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 KRTM, Temecula, California

February 25, 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 KRTM.

The antenna is the ERI model LP-2E-DA configuration. The circular polarized system consists of 2 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 89 degrees East tower leg with bracketry to provide an antenna orientation of North 108 degrees East. The antenna was tested on a 24" Valmont tower, which is the structure the station plans to use to support the array. All tests were performed on a frequency of 88.9 megahertz, which is the center of the FM broadcast channel assigned to KRTM.

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
KRTM, Temecula, California

(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 24" Valmont 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.

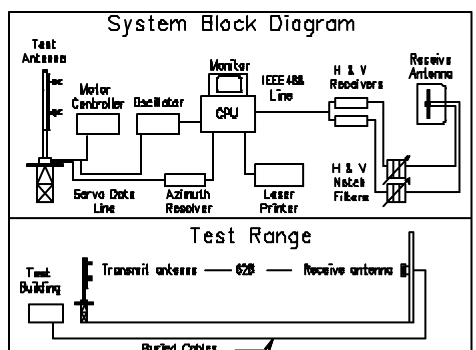

Figure #5

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 88.9 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 2 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-2E-DA array is to be mounted on the North 89 degrees East tower leg of the 24" Valmont tower at a bearing of North 108 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 .27 kilowatts (-5.686 dBk).

The power at North 280 degrees East does not exceed 0.036 kilowatts (-14.437 dBk).

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

Directional Antenna System
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(Continued)

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 26 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.

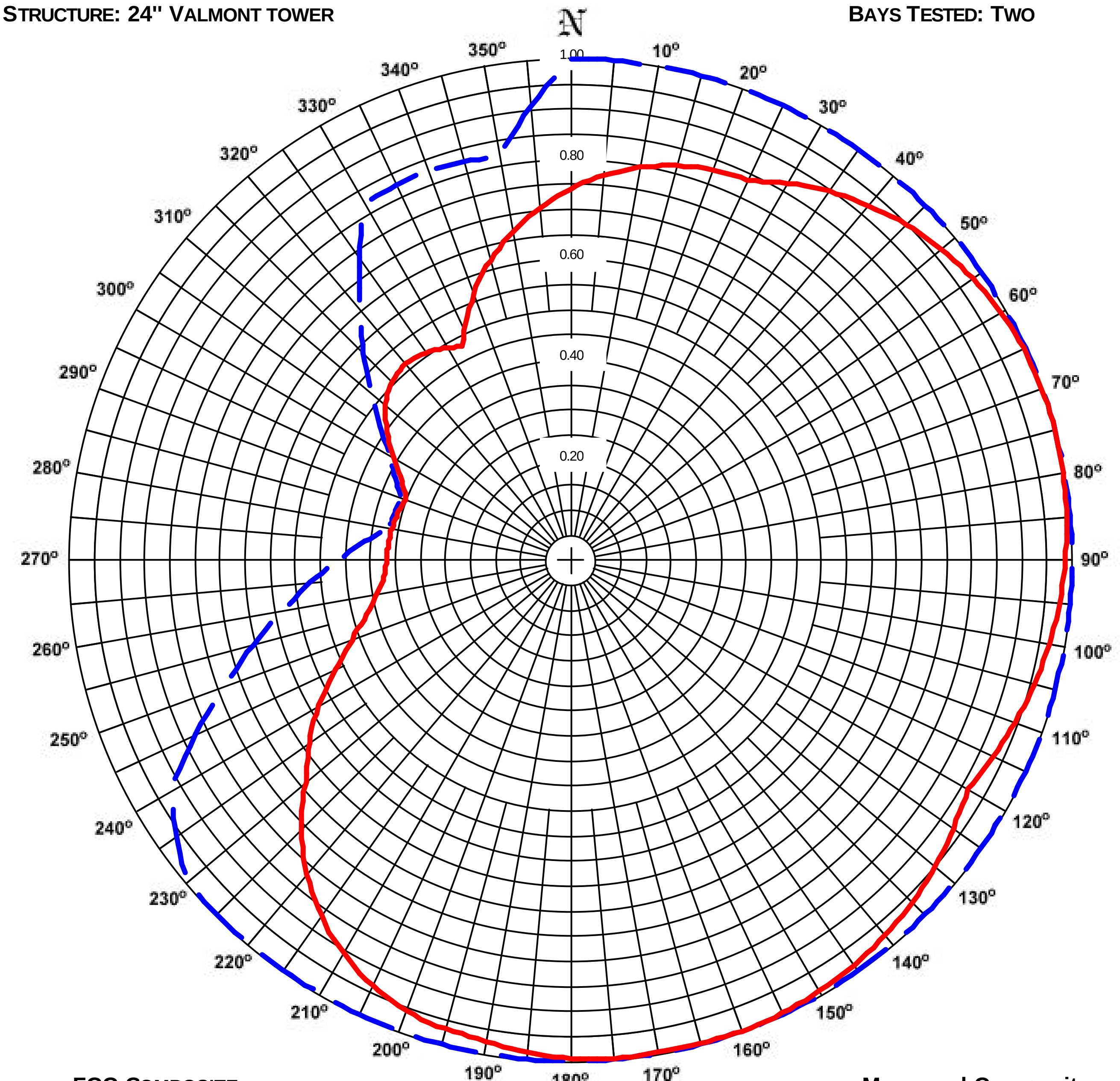
ELECTRONICS RESEARCH, INC.

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: KRTM
LOCATION: TEMECULA, CA
ANTENNA: LP-2E-DA
STRUCTURE: 24" VALMONT TOWER

DATE: 2/3/2009
FREQUENCY: 88.9 MHZ
ORIENTATION: 108° TRUE
MOUNTING: STANDARD
BAYS TESTED: TWO



FCC COMPOSITE:
RMS: 0.898
MAXIMUM: 1.000 @ 0° TRUE
MINIMUM: 0.360 @ 290° TRUE

Measured Composite:
RMS: 0.807
Maximum: 1.000 @ 72° True
Minimum: 0.351 @ 290° 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 BMPED-20081216ANO.

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: KRTM
Location: Temecula, CA
Frequency: 88.9 MHz

Antenna: LP-2E-DA
Orientation: 108° True
Tower: 24'' Valmont tower

Figure: 1
Date: 2/3/2009
Reference: krtm1m.fig

Angle	Envelope			Polarization	Angle	Envelope			Polarization
	Field	kW	dBk			Field	kW	dBk	
0°	0.740	0.15	-8.30	Vertical	180°	0.995	0.27	-5.73	Vertical
5°	0.770	0.16	-7.95	Vertical	185°	0.987	0.26	-5.80	Vertical
10°	0.795	0.17	-7.68	Vertical	190°	0.975	0.26	-5.90	Vertical
15°	0.814	0.18	-7.47	Vertical	195°	0.968	0.25	-5.97	Horizontal
20°	0.828	0.19	-7.33	Vertical	200°	0.957	0.25	-6.07	Horizontal
25°	0.837	0.19	-7.24	Vertical	205°	0.937	0.24	-6.26	Horizontal
30°	0.867	0.20	-6.93	Horizontal	210°	0.907	0.22	-6.54	Horizontal
35°	0.897	0.22	-6.63	Horizontal	215°	0.868	0.20	-6.92	Horizontal
40°	0.923	0.23	-6.38	Horizontal	220°	0.819	0.18	-7.42	Horizontal
45°	0.946	0.24	-6.17	Horizontal	225°	0.761	0.16	-8.06	Horizontal
50°	0.964	0.25	-6.00	Horizontal	230°	0.690	0.13	-8.90	Vertical
55°	0.979	0.26	-5.87	Horizontal	235°	0.636	0.11	-9.62	Vertical
60°	0.990	0.26	-5.78	Horizontal	240°	0.581	0.09	-10.41	Vertical
65°	0.997	0.27	-5.72	Horizontal	245°	0.519	0.07	-11.38	Vertical
70°	1.000	0.27	-5.69	Horizontal	250°	0.465	0.06	-12.35	Vertical
75°	1.000	0.27	-5.69	Horizontal	255°	0.422	0.05	-13.18	Vertical
80°	0.997	0.27	-5.71	Horizontal	260°	0.392	0.04	-13.82	Vertical
85°	0.993	0.27	-5.75	Horizontal	265°	0.374	0.04	-14.22	Vertical
90°	0.987	0.26	-5.80	Horizontal	270°	0.368	0.04	-14.37	Vertical
95°	0.979	0.26	-5.87	Horizontal	275°	0.366	0.04	-14.43	Vertical
100°	0.969	0.25	-5.96	Horizontal	280°	0.362	0.04	-14.50	Vertical
105°	0.958	0.25	-6.06	Horizontal	285°	0.358	0.03	-14.62	Vertical
110°	0.944	0.24	-6.18	Horizontal	290°	0.351	0.03	-14.77	Vertical
115°	0.930	0.23	-6.32	Horizontal	295°	0.372	0.04	-14.28	Horizontal
120°	0.915	0.23	-6.45	Vertical	300°	0.407	0.04	-13.50	Horizontal
125°	0.932	0.23	-6.30	Vertical	305°	0.448	0.05	-12.66	Horizontal
130°	0.949	0.24	-6.14	Vertical	310°	0.482	0.06	-12.03	Horizontal
135°	0.964	0.25	-6.00	Vertical	315°	0.503	0.07	-11.65	Horizontal
140°	0.976	0.26	-5.89	Vertical	320°	0.511	0.07	-11.52	Horizontal
145°	0.986	0.26	-5.81	Vertical	325°	0.505	0.07	-11.62	Horizontal
150°	0.993	0.27	-5.74	Vertical	330°	0.489	0.06	-11.90	Horizontal
155°	0.998	0.27	-5.70	Vertical	335°	0.502	0.07	-11.67	Vertical
160°	1.000	0.27	-5.69	Vertical	340°	0.567	0.09	-10.61	Vertical
165°	0.999	0.27	-5.70	Vertical	345°	0.618	0.10	-9.86	Vertical
170°	0.998	0.27	-5.70	Vertical	350°	0.664	0.12	-9.24	Vertical
175°	0.998	0.27	-5.70	Vertical	355°	0.705	0.13	-8.72	Vertical

Polarization:	**Envelope**
Maximum Field:	**1.000 @ 72° True**
Minimum Field:	**0.351 @ 290° True**
RMS:	**0.807**
Maximum ERP:	**0.270 kW**
Maximum Power Gain:	**1.591 (2.016 dB)**

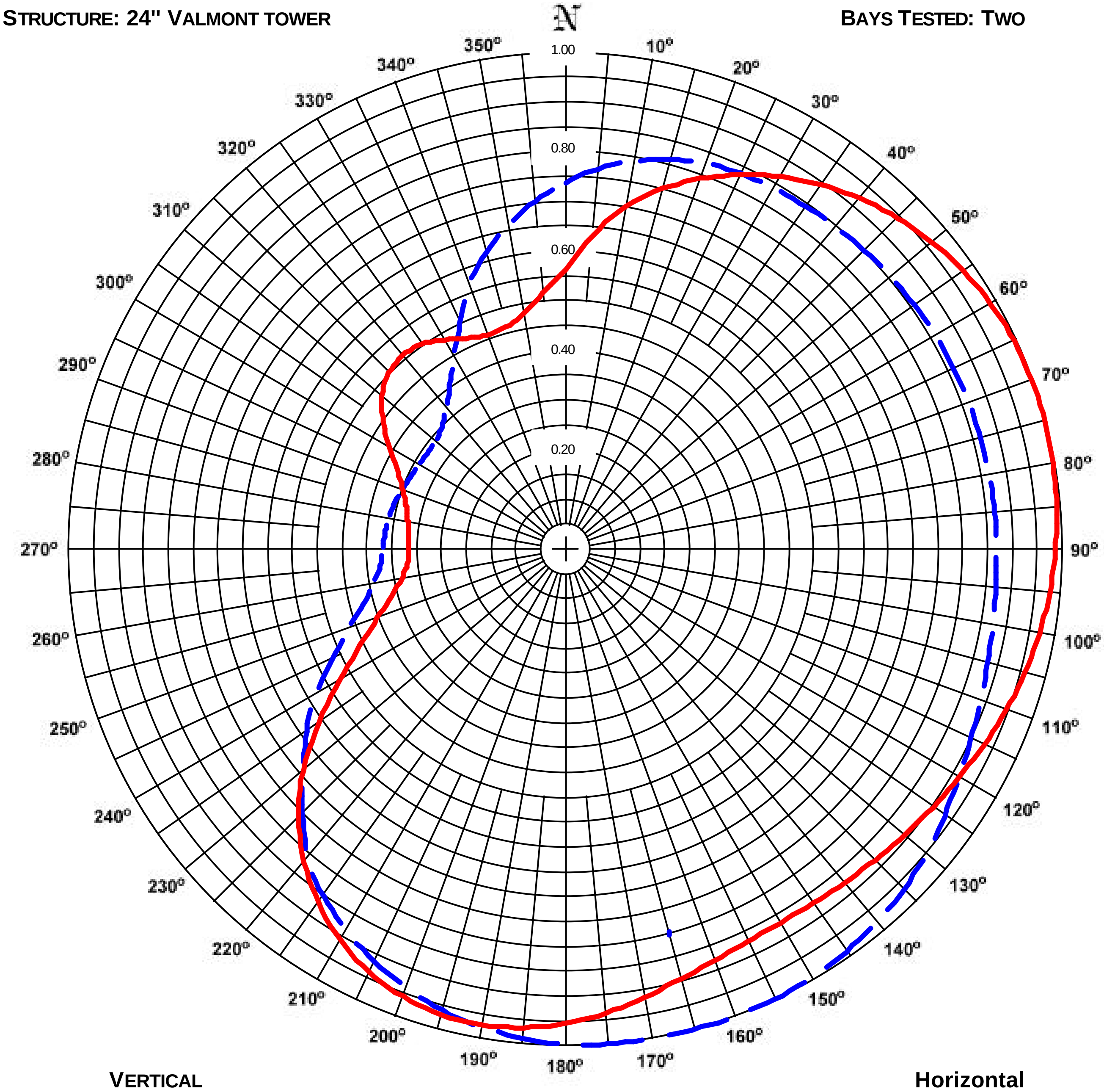
Total Input Power: 0.170 kW

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: KRTM
LOCATION: TEMECULA, CA
ANTENNA: LP-2E-DA
STRUCTURE: 24" VALMONT TOWER

DATE: 2/3/2009
FREQUENCY: 88.9 MHZ
ORIENTATION: 108° TRUE
MOUNTING: STANDARD
BAYS TESTED: TWO



VERTICAL

RMS: 0.771
MAXIMUM: 1.000 @ 161° TRUE
MINIMUM: 0.339 @ 307° TRUE

Horizontal

RMS: 0.772
Maximum: 1.000 @ 72° True
Minimum: 0.314 @ 271° True

COMMENTS: MEASURED PATTERNS OF THE HORIZONTAL AND VERTICAL COMPONTENTS.

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: KRTM
Location: Temecula, CA
Frequency: 88.9 MHz

Antenna: LP-2E-DA
Orientation: 108° True
Tower: 24'' Valmont tower

Figure: 2
Date: 2/3/2009
Reference: krm1m.fig

Angle	Horizontal			Vertical			Angle	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.566	0.09	-10.62	0.740	0.15	-8.30	180°	0.953	0.25	-6.10	0.995	0.27	-5.73
5°	0.637	0.11	-9.61	0.770	0.16	-7.95	185°	0.965	0.25	-6.00	0.987	0.26	-5.80
10°	0.702	0.13	-8.75	0.795	0.17	-7.68	190°	0.970	0.25	-5.95	0.975	0.26	-5.90
15°	0.753	0.15	-8.15	0.814	0.18	-7.47	195°	0.968	0.25	-5.97	0.959	0.25	-6.05
20°	0.795	0.17	-7.68	0.828	0.19	-7.33	200°	0.957	0.25	-6.07	0.938	0.24	-6.24
25°	0.833	0.19	-7.27	0.837	0.19	-7.24	205°	0.937	0.24	-6.26	0.913	0.23	-6.48
30°	0.867	0.20	-6.93	0.840	0.19	-7.20	210°	0.907	0.22	-6.54	0.884	0.21	-6.76
35°	0.897	0.22	-6.63	0.844	0.19	-7.16	215°	0.868	0.20	-6.92	0.850	0.20	-7.10
40°	0.923	0.23	-6.38	0.848	0.19	-7.11	220°	0.819	0.18	-7.42	0.807	0.18	-7.55
45°	0.946	0.24	-6.17	0.852	0.20	-7.08	225°	0.761	0.16	-8.06	0.749	0.15	-8.20
50°	0.964	0.25	-6.00	0.855	0.20	-7.04	230°	0.690	0.13	-8.90	0.690	0.13	-8.90
55°	0.979	0.26	-5.87	0.858	0.20	-7.01	235°	0.606	0.10	-10.03	0.636	0.11	-9.62
60°	0.990	0.26	-5.78	0.861	0.20	-6.99	240°	0.525	0.07	-11.28	0.581	0.09	-10.41
65°	0.997	0.27	-5.72	0.863	0.20	-6.97	245°	0.457	0.06	-12.50	0.519	0.07	-11.38
70°	1.000	0.27	-5.69	0.865	0.20	-6.95	250°	0.404	0.04	-13.57	0.465	0.06	-12.35
75°	1.000	0.27	-5.69	0.866	0.20	-6.93	255°	0.364	0.04	-14.47	0.422	0.05	-13.18
80°	0.997	0.27	-5.71	0.867	0.20	-6.92	260°	0.336	0.03	-15.16	0.392	0.04	-13.82
85°	0.993	0.27	-5.75	0.868	0.20	-6.92	265°	0.320	0.03	-15.59	0.374	0.04	-14.22
90°	0.987	0.26	-5.80	0.868	0.20	-6.92	270°	0.314	0.03	-15.74	0.368	0.04	-14.37
95°	0.979	0.26	-5.87	0.870	0.20	-6.90	275°	0.316	0.03	-15.69	0.366	0.04	-14.43
100°	0.969	0.25	-5.96	0.874	0.21	-6.86	280°	0.322	0.03	-15.52	0.362	0.04	-14.50
105°	0.958	0.25	-6.06	0.880	0.21	-6.79	285°	0.332	0.03	-15.26	0.358	0.03	-14.62
110°	0.944	0.24	-6.18	0.889	0.21	-6.70	290°	0.348	0.03	-14.86	0.351	0.03	-14.77
115°	0.930	0.23	-6.32	0.901	0.22	-6.59	295°	0.372	0.04	-14.28	0.346	0.03	-14.91
120°	0.915	0.23	-6.45	0.915	0.23	-6.45	300°	0.407	0.04	-13.50	0.342	0.03	-15.01
125°	0.902	0.22	-6.58	0.932	0.23	-6.30	305°	0.448	0.05	-12.66	0.340	0.03	-15.07
130°	0.891	0.21	-6.69	0.949	0.24	-6.14	310°	0.482	0.06	-12.03	0.341	0.03	-15.04
135°	0.882	0.21	-6.78	0.964	0.25	-6.00	315°	0.503	0.07	-11.65	0.352	0.03	-14.77
140°	0.874	0.21	-6.85	0.976	0.26	-5.89	320°	0.511	0.07	-11.52	0.373	0.04	-14.25
145°	0.869	0.20	-6.91	0.986	0.26	-5.81	325°	0.505	0.07	-11.62	0.405	0.04	-13.53
150°	0.866	0.20	-6.94	0.993	0.27	-5.74	330°	0.489	0.06	-11.90	0.449	0.05	-12.65
155°	0.869	0.20	-6.90	0.998	0.27	-5.70	335°	0.471	0.06	-12.23	0.502	0.07	-11.67
160°	0.879	0.21	-6.81	1.000	0.27	-5.69	340°	0.461	0.06	-12.42	0.567	0.09	-10.61
165°	0.894	0.22	-6.66	0.999	0.27	-5.70	345°	0.464	0.06	-12.35	0.618	0.10	-9.86
170°	0.914	0.23	-6.46	0.998	0.27	-5.70	350°	0.483	0.06	-12.00	0.664	0.12	-9.24
175°	0.936	0.24	-6.26	0.998	0.27	-5.70	355°	0.519	0.07	-11.39	0.705	0.13	-8.72

Polarization:	**Horizontal**	**Vertical**
Maximum Field:	**1.000 @ 72° True**	**1.000 @ 161° True**
Minimum Field:	**0.314 @ 271° True**	**0.339 @ 307° True**
RMS:	**0.772**	**0.771**
Maximum ERP:	**0.270 kW**	**0.270 kW**
Maximum Power Gain:	**1.591 (2.016 dB)**	**1.591 (2.016 dB)**

Total Input Power: 0.170 kW

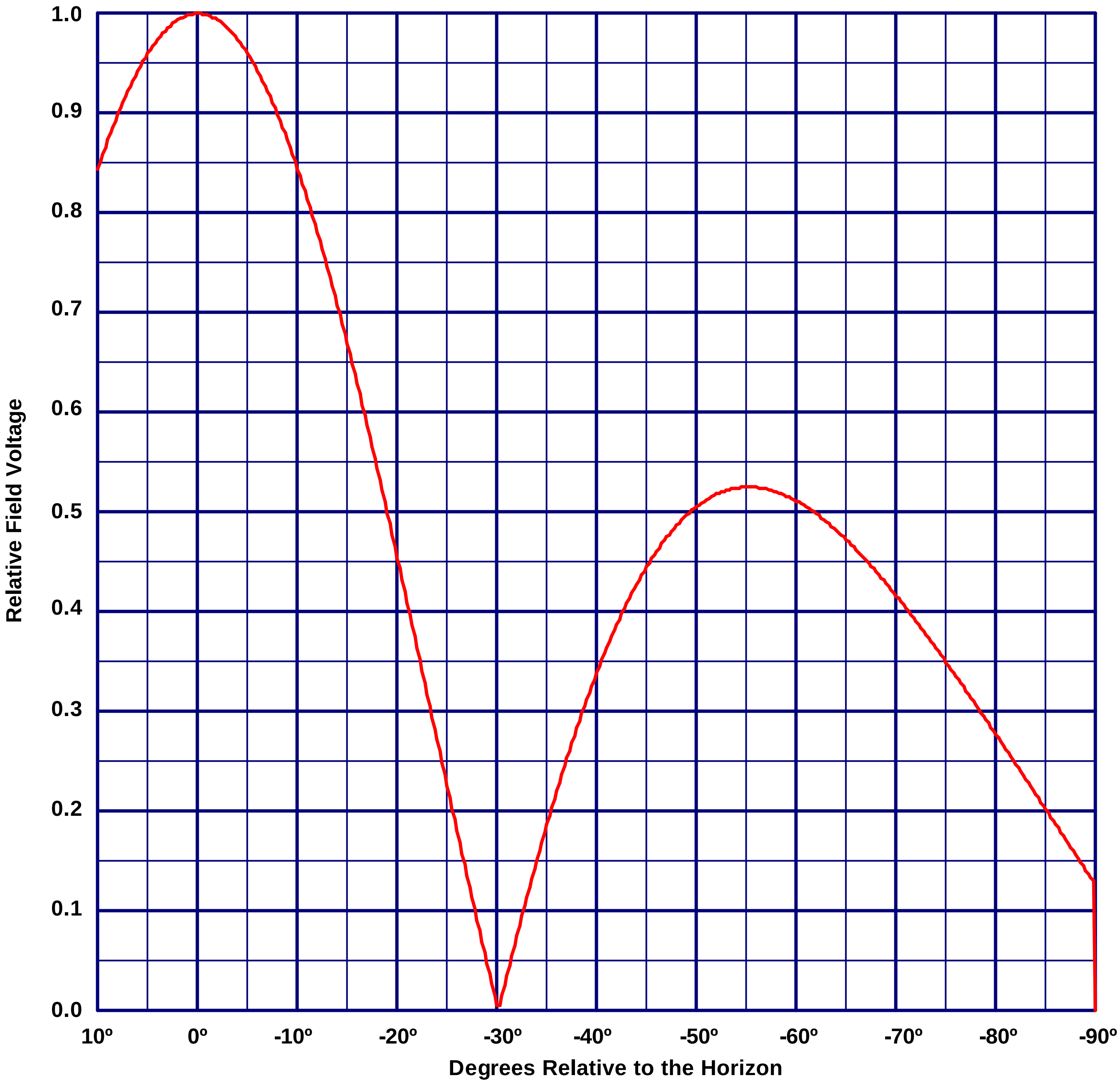
ERI®

Vertical Plane Relative Field Pattern

KRTM, Temecula, CA, 88.9 MHz

Figure#: 3 Date: 2/3/2009

A 2 level, 1 wave-length spaced LP-2E-DA directional antenna with 0° beam tilt, 0% null fill and a H/V maximum power ratio of 1.000



Vertical Polarization Gain:	Horizontal Polarization Gain:
Maximum: 1.591 (2.016 dB) Horizontal Plane: 1.591 (2.016 dB)	Maximum: 1.591 (2.016 dB) Horizontal Plane: 1.591 (2.016 dB)

Directional Antenna System
for
KRTM, Temecula, California

(Continued)

ANTENNA SPECIFICATIONS

Antenna Type:	LP-2E-DA
Frequency:	88.9 MHz
Number of Bays:	Two

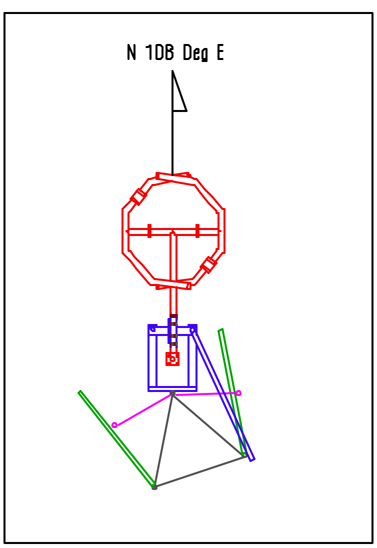
MECHANICAL SPECIFICATIONS

Mounting:	Standard
System length:	19 ft 9 in
Aperture length required:	26 ft
Orientation:	108° true

Input flange to the antenna 1 5/8” female.

ELECTRICAL SPECIFICATIONS
(For directional use)

Maximum horizontal ERP:	0.270 kW (-5.686 dBk)
Horizontal maximum power gain:	1.591 (2.016 dB)
Maximum vertical ERP:	0.270 kW (-5.686 dBk)
Vertical maximum power gain:	1.591 (2.016 dB)
Total input power:	0.170 kW (-7.702 dBk)



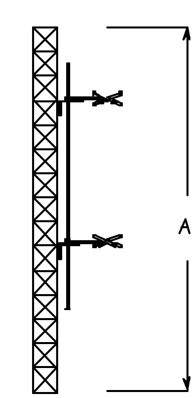


Figure #4