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 KKLA, Los Angeles, California

August 18, 2014

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 KKLA.

The antenna is the ERI model 1182-1CP-DA configuration. The circular polarized system consists of one bay using one driven circular polarized radiating element. The antenna was mounted on the North 234 degrees East tower face with bracketry to provide an antenna orientation of North 234 degrees East. The antenna was tested on a self-support, which is the structure the station plans to use to support the array. All tests were performed on a frequency of 99.5 megahertz, which is the center of the FM broadcast channel assigned to KKLA.

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
KKLA, Los Angeles, California

(Continued)

DESCRIPTION OF THE TEST PROCEDURE

The test antenna consisted of a full-scale model of the complete circular polarized system. The elements and brackets that were used in this test are electrically equivalent to those that will be supplied with the antenna. All devices included in the test model 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 self support 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.

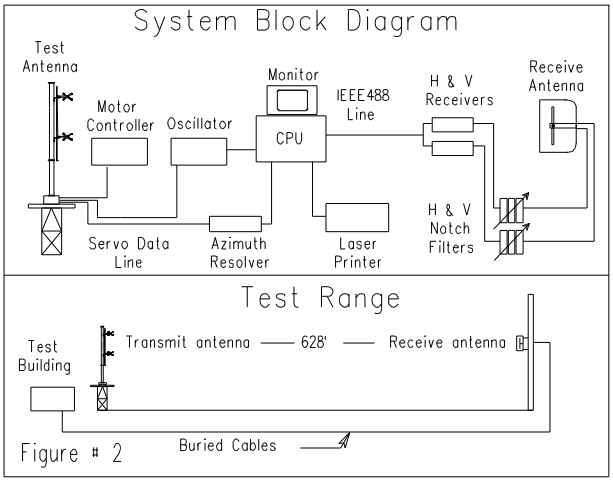

Figure # 2

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 99.5 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.

(Continued)

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. The power distribution and phase relationship will be fixed when the antenna is manufactured. Proper maintenance of the elements should be all that is required to maintain the pattern in adjustment.

The 1182-1CP-DA array is to be mounted on the North 234 degrees East tower face of the self-support at a bearing of North 234 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 10.000 kilowatts (10.000 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 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.

ERI® Horizontal Plane Relative Field Pattern

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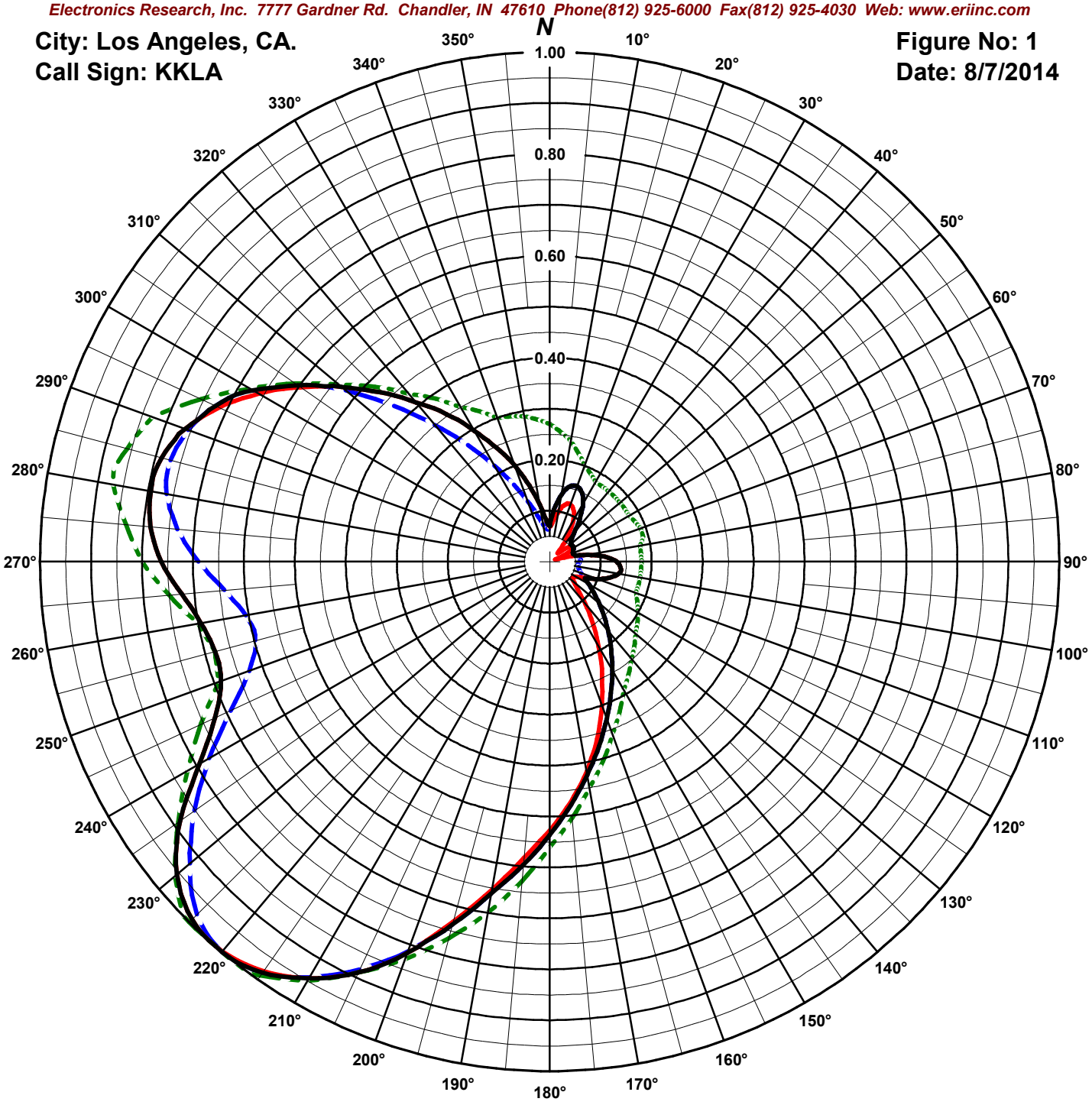
City: Los Angeles, CA.
Call Sign: KKLA

Figure No: 1
Date: 8/7/2014



Antenna Orientation: 234° True

Frequency: 99.5 MHz
Antenna Type: 1182-1CP-DA

Antenna Mounting: Custom
Tower Type: S.S. Tower

HORIZONTAL	VERTICAL	COMPOSITE	FCC ENVELOPE
RMS: .5	RMS: .486	RMS: .504	RMS: .535
Maximum: 1 @ 222°	Maximum: 1 @ 220°	Maximum: 1 @ 220°	Maximum: 1 @ 216°
Minimum: .011 @ 70°	Minimum: .049 @ 69°	Minimum: .049 @ 69°	Minimum: .18 @ 30°

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 BLH-20060829BEO.

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 **Date: 8/7/2014**
Station: KKLA **Antenna: 1182-1CP-DA**
Location: Los Angeles, CA. **Antenna Orientation: 234° True**
Frequency: 99.5 MHz **Number of Bays: 1**

Azimuth	Envelope			Polarization	Azimuth	Envelope			Polarization
	Field	kW	dBk	Maximum		Field	kW	dBk	Maximum
0°	0.070	0.049	-13.069	Vertical	180°	0.536	2.875	4.587	Vertical
5°	0.103	0.106	-9.749	Vertical	185°	0.598	3.571	5.527	Vertical
10°	0.133	0.177	-7.530	Vertical	190°	0.662	4.381	6.416	Vertical
15°	0.152	0.232	-6.345	Vertical	195°	0.738	5.441	7.357	Vertical
20°	0.157	0.248	-6.063	Vertical	200°	0.817	6.679	8.247	Horizontal
25°	0.150	0.224	-6.492	Vertical	205°	0.890	7.919	8.987	Horizontal
30°	0.131	0.172	-7.651	Vertical	210°	0.944	8.915	9.501	Horizontal
35°	0.103	0.107	-9.702	Vertical	215°	0.984	9.690	9.863	Vertical
40°	0.076	0.058	-12.343	Vertical	220°	1.000	10.000	10.000	Vertical
45°	0.060	0.036	-14.457	Vertical	225°	0.992	9.850	9.934	Horizontal
50°	0.054	0.029	-15.392	Vertical	230°	0.954	9.110	9.595	Horizontal
55°	0.054	0.030	-15.295	Vertical	235°	0.885	7.829	8.937	Horizontal
60°	0.054	0.029	-15.397	Vertical	240°	0.794	6.297	7.991	Horizontal
65°	0.051	0.026	-15.891	Vertical	245°	0.724	5.244	7.197	Horizontal
70°	0.049	0.024	-16.230	Vertical	250°	0.686	4.709	6.729	Horizontal
75°	0.051	0.026	-15.822	Vertical	255°	0.680	4.624	6.650	Horizontal
80°	0.076	0.057	-12.408	Horizontal	260°	0.695	4.828	6.838	Horizontal
85°	0.109	0.119	-9.232	Horizontal	265°	0.725	5.257	7.207	Horizontal
90°	0.132	0.174	-7.600	Horizontal	270°	0.762	5.804	7.637	Horizontal
95°	0.140	0.195	-7.106	Horizontal	275°	0.786	6.177	7.907	Horizontal
100°	0.137	0.188	-7.247	Horizontal	280°	0.795	6.320	8.007	Horizontal
105°	0.122	0.148	-8.308	Horizontal	285°	0.788	6.208	7.930	Horizontal
110°	0.101	0.101	-9.947	Horizontal	290°	0.761	5.792	7.628	Horizontal
115°	0.076	0.058	-12.360	Horizontal	295°	0.724	5.236	7.190	Vertical
120°	0.089	0.078	-11.054	Vertical	300°	0.672	4.516	6.547	Vertical
125°	0.106	0.111	-9.530	Vertical	305°	0.603	3.638	5.608	Vertical
130°	0.126	0.159	-7.975	Vertical	310°	0.534	2.850	4.548	Horizontal
135°	0.151	0.227	-6.442	Vertical	315°	0.470	2.209	3.442	Horizontal
140°	0.179	0.319	-4.958	Vertical	320°	0.408	1.663	2.208	Horizontal
145°	0.210	0.443	-3.537	Vertical	325°	0.354	1.250	0.970	Horizontal
150°	0.246	0.605	-2.184	Vertical	330°	0.297	0.879	-0.558	Horizontal
155°	0.285	0.813	-0.901	Vertical	335°	0.246	0.607	-2.167	Horizontal
160°	0.328	1.075	0.315	Vertical	340°	0.202	0.407	-3.909	Horizontal
165°	0.374	1.402	1.468	Vertical	345°	0.154	0.236	-6.262	Horizontal
170°	0.425	1.804	2.561	Vertical	350°	0.113	0.129	-8.911	Horizontal
175°	0.479	2.291	3.600	Vertical	355°	0.083	0.069	-11.625	Horizontal

Horizontal Polarization:
Maximum: 1.801 (2.554 dB)
Horizontal Plane: 1.801 (2.554 dB)
Maximum ERP: 10.000 kW

Vertical Polarization:
Maximum: 1.801 (2.554 dB)
Horizontal Plane: 1.801 (2.554 dB)
Maximum ERP: 10.000 kW

Total Input Power: 5.554 kW
Reference: KKLA1M.FIG

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

ERI® Horizontal Plane Relative Field Pattern

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Figure# 1A **Date: 8/7/2014**
Station: KKLA **Antenna: 1182-1CP-DA**
Location: Los Angeles, CA. **Antenna Orientation: 234° True**
Frequency: 99.5 MHz **Number of Bays: 1**

Azimuth	Horizontal			Vertical			Azimuth	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.069	0.048	-13.196	0.070	0.049	-13.069	180°	0.528	2.784	4.447	0.536	2.875	4.587
5°	0.080	0.065	-11.901	0.103	0.106	-9.749	185°	0.584	3.414	5.332	0.598	3.571	5.527
10°	0.099	0.097	-10.116	0.133	0.177	-7.530	190°	0.654	4.272	6.306	0.662	4.381	6.416
15°	0.116	0.134	-8.724	0.152	0.232	-6.345	195°	0.731	5.350	7.284	0.738	5.441	7.357
20°	0.118	0.140	-8.528	0.157	0.248	-6.063	200°	0.817	6.679	8.247	0.814	6.624	8.211
25°	0.111	0.122	-9.123	0.150	0.224	-6.492	205°	0.890	7.919	8.987	0.883	7.790	8.915
30°	0.091	0.084	-10.782	0.131	0.172	-7.651	210°	0.944	8.915	9.501	0.942	8.868	9.478
35°	0.064	0.041	-13.847	0.103	0.107	-9.702	215°	0.980	9.611	9.828	0.984	9.690	9.863
40°	0.035	0.013	-19.011	0.076	0.058	-12.343	220°	0.998	9.969	9.987	1.000	10.000	10.000
45°	0.024	0.006	-22.428	0.060	0.036	-14.457	225°	0.992	9.850	9.934	0.978	9.573	9.810
50°	0.039	0.016	-18.092	0.054	0.029	-15.392	230°	0.954	9.110	9.595	0.922	8.494	9.291
55°	0.054	0.029	-15.406	0.054	0.030	-15.295	235°	0.885	7.829	8.937	0.851	7.244	8.600
60°	0.053	0.028	-15.557	0.054	0.029	-15.397	240°	0.794	6.297	7.991	0.772	5.957	7.750
65°	0.035	0.013	-19.026	0.051	0.026	-15.891	245°	0.724	5.244	7.197	0.691	4.777	6.792
70°	0.011	0.001	-28.982	0.049	0.024	-16.230	250°	0.686	4.709	6.729	0.627	3.934	5.948
75°	0.037	0.014	-18.563	0.051	0.026	-15.822	255°	0.680	4.624	6.650	0.598	3.579	5.537
80°	0.076	0.057	-12.408	0.057	0.032	-14.882	260°	0.695	4.828	6.838	0.606	3.668	5.645
85°	0.109	0.119	-9.232	0.061	0.037	-14.327	265°	0.725	5.257	7.207	0.641	4.110	6.139
90°	0.132	0.174	-7.600	0.059	0.035	-14.609	270°	0.762	5.804	7.637	0.689	4.754	6.770
95°	0.140	0.195	-7.106	0.056	0.031	-15.046	275°	0.786	6.177	7.907	0.733	5.373	7.303
100°	0.137	0.188	-7.247	0.057	0.033	-14.865	280°	0.795	6.320	8.007	0.763	5.825	7.653
105°	0.122	0.148	-8.308	0.060	0.036	-14.473	285°	0.788	6.208	7.930	0.770	5.926	7.728
110°	0.101	0.101	-9.947	0.066	0.043	-13.652	290°	0.761	5.792	7.628	0.755	5.694	7.554
115°	0.076	0.058	-12.360	0.075	0.057	-12.467	295°	0.715	5.117	7.090	0.724	5.236	7.190
120°	0.059	0.035	-14.604	0.089	0.078	-11.054	300°	0.659	4.347	6.382	0.672	4.516	6.547
125°	0.054	0.030	-15.276	0.106	0.111	-9.530	305°	0.597	3.562	5.517	0.603	3.638	5.608
130°	0.062	0.039	-14.124	0.126	0.159	-7.975	310°	0.534	2.850	4.548	0.523	2.731	4.364
135°	0.079	0.062	-12.050	0.151	0.227	-6.442	315°	0.470	2.209	3.442	0.432	1.866	2.709
140°	0.108	0.118	-9.297	0.179	0.319	-4.958	320°	0.408	1.663	2.208	0.350	1.227	0.890
145°	0.147	0.217	-6.628	0.210	0.443	-3.537	325°	0.354	1.250	0.970	0.279	0.778	-1.092
150°	0.192	0.370	-4.314	0.246	0.605	-2.184	330°	0.297	0.879	-0.558	0.218	0.474	-3.246
155°	0.243	0.592	-2.279	0.285	0.813	-0.901	335°	0.246	0.607	-2.167	0.167	0.278	-5.567
160°	0.299	0.895	-0.480	0.328	1.075	0.315	340°	0.202	0.407	-3.909	0.126	0.158	-8.010
165°	0.360	1.295	1.121	0.374	1.402	1.468	345°	0.154	0.236	-6.262	0.095	0.090	-10.434
170°	0.417	1.743	2.413	0.425	1.804	2.561	350°	0.113	0.129	-8.911	0.075	0.056	-12.532
175°	0.474	2.243	3.509	0.479	2.291	3.600	355°	0.083	0.069	-11.625	0.065	0.042	-13.809

Horizontal Polarization:
Maximum: 1.801 (2.554 dB)
Horizontal Plane: 1.801 (2.554 dB)
Maximum ERP: 10.000 kW

Vertical Polarization:
Maximum: 1.801 (2.554 dB)
Horizontal Plane: 1.801 (2.554 dB)
Maximum ERP: 10.000 kW

Total Input Power: 5.554 kW
Reference: KKLA1M.FIG

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

ERI® Vertical Plane Relative Field Pattern

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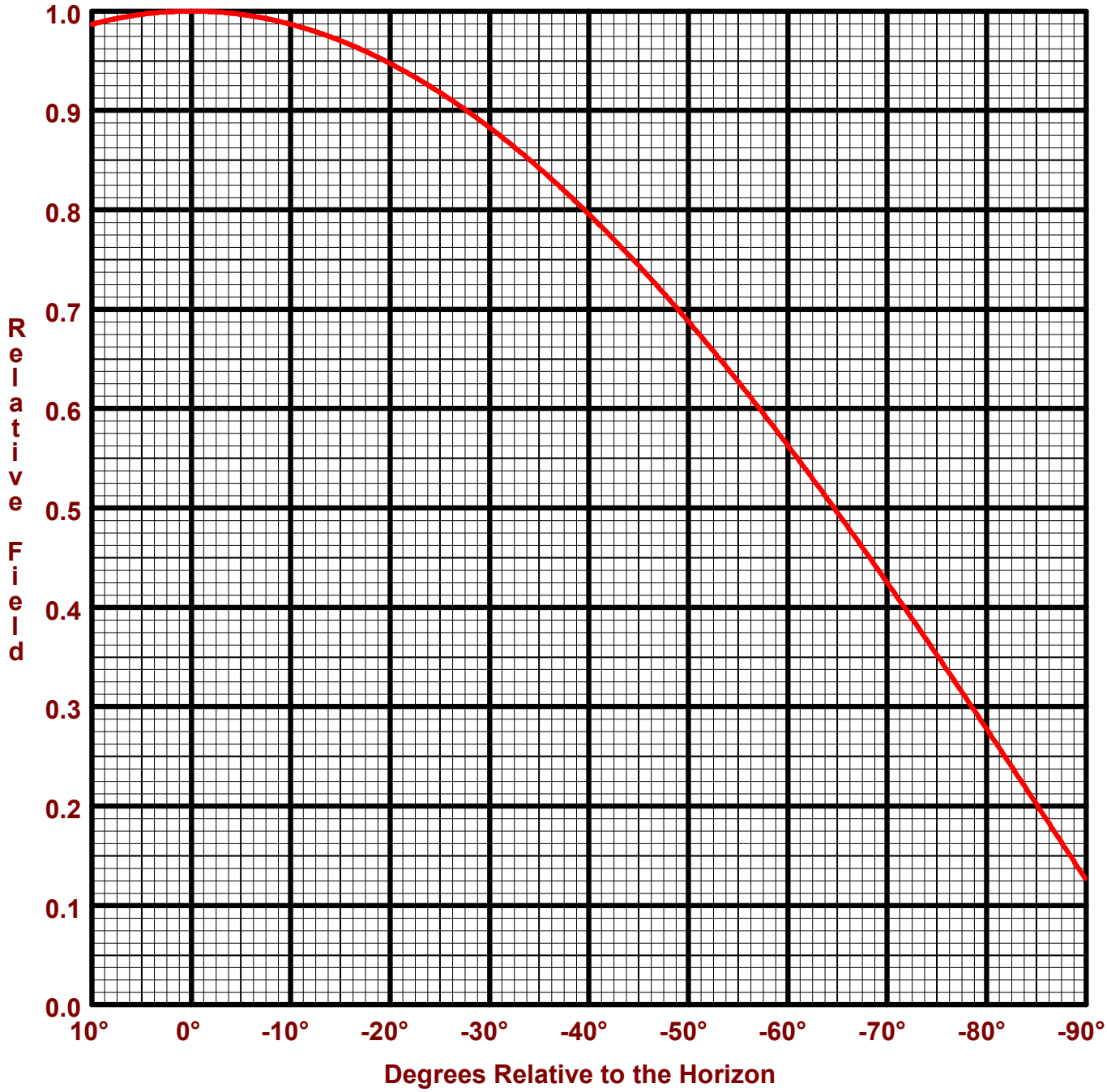
Figure No: 3
Call Sign: KKLA
Location: Los Angeles, CA.
Frequency: 99.5 MHz
1 bay 1182-1CP-DA antenna

Date: 8/7/2014
H/V Power Ratio: 1
1 Wave-length Spacing
0° Beam Tilt
0% First Null Fill



Horizontal Polarization:
Maximum: 1.801 (2.554 dB)
Horizontal Plane: 1.801 (2.554 dB)
Maximum ERP: 10.000 kW

Vertical Polarization:
Maximum: 1.801 (2.554 dB)
Horizontal Plane: 1.801 (2.554 dB)
Maximum ERP: 10.000 kW

Directional Antenna System
for
KKLA, Los Angeles, California

(Continued)

ANTENNA SPECIFICATIONS

Antenna Type:	1182-1CP-DA
Frequency:	99.5 MHz
Number of Bays:	One

MECHANICAL SPECIFICATIONS

Mounting:	Custom
System length:	8 ft
Aperture length required:	20 ft
Orientation:	234° true

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

ELECTRICAL SPECIFICATIONS
(For directional use)

Maximum horizontal ERP:	10.000 kW (10 dBk)
Horizontal maximum power gain:	1.801 (2.554 dB)
Maximum vertical ERP:	10.000 kW (10 dBk)
Vertical maximum power gain:	1.801 (2.554 dB)
Total input power:	5.554 kW (7.446 dBk)