

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
KAZB, Coalinga, California**

November 14, 2000

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 KAZB.

The antenna is the ERI model P300-1BE-DA configuration. The vertically polarized system consists of one bay using one driven vertical dipole and three vertical parasitic elements. The antenna was tested on a 5 9/16" o.d. pole, which is the structure the station plans to use to support the array. All tests were performed on a frequency of 88.3 megahertz which is the center of the FM broadcast channel assigned to KAZB.

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.

DESCRIPTION OF THE TEST PROCEDURE

The test antenna consisted of the complete vertically polarized system with the associated 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 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.

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(Continued)

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.

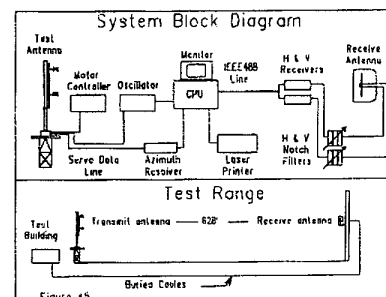
The proof-of-performance was accomplished using a 5 9/16" o.d. pole with identical dimension and configuration including all braces, ladders, conduits, coaxial lines and other appurtenances that are included in the actual aperture at which the antenna will be installed. The structure was erected vertically 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 88.3 MHz and was constantly monitored by an Anritsu Model ML521B measuring receiver.

A broad-band vertical dipole system, located approximately 628 form 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 a buried Heliax cable to an Anritsu

Model ML521B measuring receiver. 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 co-ordinated graph paper in a clockwise direction.



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(Continued)

CONCLUSIONS

The vertically polarized system consists of one bay using one driven vertical dipole and three vertical parasitic elements. 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 P300-1BE-DA array is to be mounted on the 5 9/16" o.d. pole at a bearing of North 180 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 relative field value of the vertical component relative to azimuth. A calculated vertical plane relative field pattern is shown on Figure #3 attached. The power in the maximum will reach 1.4 kilowatts (1.461 dBk).

The power at North 350-360 degrees East does not exceed 0.055 kilowatts (-12.596 dBk).

The power at North 170-180 degrees East does not exceed 0.650 kilowatts (-1.871 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.

The clear vertical length of the structure required to support the antenna is 15 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.

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(Continued)

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.

The calculated maximum power gain of the vertical pattern as shown on Figure # 1 is 2.26 (3.541dB), which would require an input power of 0.6195 kilowatts. The input flange to the antenna is 1 5/8" female.

ELECTRONICS RESEARCH, INC.

Tom Schay/jk

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**Directional Antenna System
For
KAZB, Coalinga, California**

(Continued)

ANTENNA SPECIFICATIONS

| | |
|-----------------|-------------|
| Antenna Type: | P300-1BE-DA |
| Frequency: | 88.3 MHz |
| Number of Bays: | 1 |

MECHANICAL SPECIFICATIONS

| | |
|-----------------------------|-------------------|
| Mounting: | Custom |
| System length: | 8 ft 9 in |
| Aperture length required: | 15 ft. |
| Orientation: | 180° true |
| Input flange to the antenna | 1 5/8 inch female |

ELECTRICAL SPECIFICATIONS

(For directional use)

| | |
|------------------------------|-----------------------|
| Maximum vertical ERP: | 1.4 kW (1.461 dBk) |
| Vertical maximum power gain: | 2.26 (3.541 dB) |
| Total input power: | 0.6195 kW (-2.08 dBk) |

Educational Media Foundation

Exhibit C-1

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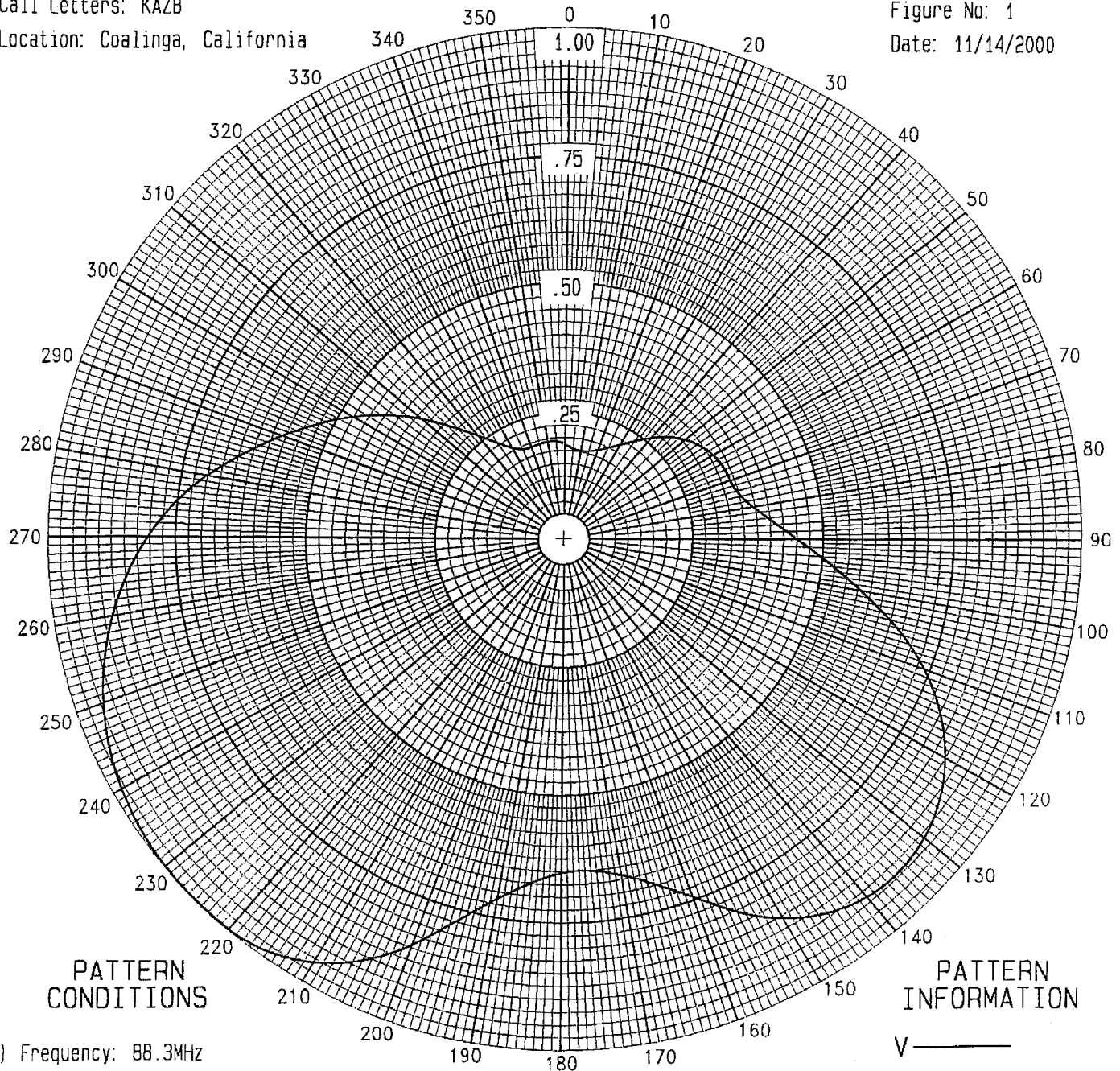
HORIZONTAL PLANE RELATIVE FIELD VERTICAL PATTERN

Call Letters: KAZB

Location: Coalinga, California

Figure No: 1

Date: 11/14/2000



- PATTERN CONDITIONS
- 1) Frequency: 88.3MHz
 - 2) Antenna Type: P300-1BE-DA
 - 3) Antenna Orientation: North 180 Deg. East
 - 4) Antenna Mounting: Custom
 - 5) Tower Type: 5 9/16" o.d. pole
 - 6) Comments: Measured pattern of the vertical component.

VERTICAL

RMS .6483

Maximum: 1 @ 220°

Minimum: .1758 @ 10°

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Exhibit C-1

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EPI Horizontal Plane Relative Field & dBk List

Radio Station KAZB
List For Figure# 1

Frequency: 88.3MHz
Date 11/14/2000

| AZIMUTH | RELATIVE FIELD | dBk | POWER kW | POLARIZATION | AZIMUTH | RELATIVE FIELD | dBk | POWER kW | POLARIZATION |
|---------|-------------------|---------|-------------|--------------|---------|-------------------|---------|-------------|--------------|
| 0° | 0.186 | -13.135 | 0.049 | VERTICAL | 180° | 0.655 | -2.210 | 0.601 | VERTICAL |
| 5° | 0.179 | -13.496 | 0.045 | VERTICAL | 185° | 0.677 | -1.927 | 0.642 | VERTICAL |
| 10° | 0.176 | -13.639 | 0.043 | VERTICAL | 190° | 0.717 | -1.433 | 0.719 | VERTICAL |
| 15° | 0.178 | -13.508 | 0.045 | VERTICAL | 195° | 0.774 | -0.760 | 0.840 | VERTICAL |
| 20° | 0.186 | -13.168 | 0.048 | VERTICAL | 200° | 0.848 | 0.034 | 1.008 | VERTICAL |
| 25° | 0.197 | -12.642 | 0.054 | VERTICAL | 205° | 0.913 | 0.675 | 1.168 | VERTICAL |
| 30° | 0.213 | -11.963 | 0.064 | VERTICAL | 210° | 0.960 | 1.110 | 1.291 | VERTICAL |
| 35° | 0.234 | -11.166 | 0.076 | VERTICAL | 215° | 0.989 | 1.367 | 1.370 | VERTICAL |
| 40° | 0.259 | -10.285 | 0.094 | VERTICAL | 220° | 1.000 | 1.461 | 1.400 | VERTICAL |
| 45° | 0.284 | -9.485 | 0.113 | VERTICAL | 225° | 1.000 | 1.461 | 1.400 | VERTICAL |
| 50° | 0.304 | -8.879 | 0.129 | VERTICAL | 230° | 0.999 | 1.456 | 1.398 | VERTICAL |
| 55° | 0.320 | -8.433 | 0.143 | VERTICAL | 235° | 0.994 | 1.408 | 1.383 | VERTICAL |
| 60° | 0.332 | -8.124 | 0.154 | VERTICAL | 240° | 0.983 | 1.313 | 1.353 | VERTICAL |
| 65° | 0.339 | -7.939 | 0.161 | VERTICAL | 245° | 0.967 | 1.168 | 1.309 | VERTICAL |
| 70° | 0.342 | -7.871 | 0.163 | VERTICAL | 250° | 0.945 | 0.971 | 1.251 | VERTICAL |
| 75° | 0.349 | -7.676 | 0.171 | VERTICAL | 255° | 0.918 | 0.718 | 1.180 | VERTICAL |
| 80° | 0.370 | -7.176 | 0.192 | VERTICAL | 260° | 0.885 | 0.404 | 1.098 | VERTICAL |
| 85° | 0.404 | -6.420 | 0.228 | VERTICAL | 265° | 0.847 | 0.024 | 1.005 | VERTICAL |
| 90° | 0.450 | -5.472 | 0.284 | VERTICAL | 270° | 0.804 | -0.433 | 0.905 | VERTICAL |
| 95° | 0.510 | -4.393 | 0.364 | VERTICAL | 275° | 0.755 | -0.977 | 0.799 | VERTICAL |
| 100° | 0.582 | -3.239 | 0.474 | VERTICAL | 280° | 0.700 | -1.636 | 0.686 | VERTICAL |
| 105° | 0.665 | -2.077 | 0.620 | VERTICAL | 285° | 0.639 | -2.432 | 0.571 | VERTICAL |
| 110° | 0.740 | -1.149 | 0.767 | VERTICAL | 290° | 0.582 | -3.240 | 0.474 | VERTICAL |
| 115° | 0.802 | -0.450 | 0.902 | VERTICAL | 295° | 0.527 | -4.104 | 0.389 | VERTICAL |
| 120° | 0.852 | 0.066 | 1.015 | VERTICAL | 300° | 0.474 | -5.019 | 0.315 | VERTICAL |
| 125° | 0.888 | 0.428 | 1.104 | VERTICAL | 305° | 0.419 | -6.095 | 0.246 | VERTICAL |
| 130° | 0.911 | 0.653 | 1.162 | VERTICAL | 310° | 0.364 | -7.317 | 0.185 | VERTICAL |
| 135° | 0.921 | 0.751 | 1.189 | VERTICAL | 315° | 0.308 | -8.754 | 0.133 | VERTICAL |
| 140° | 0.916 | 0.698 | 1.174 | VERTICAL | 320° | 0.264 | -10.119 | 0.097 | VERTICAL |
| 145° | 0.894 | 0.491 | 1.120 | VERTICAL | 325° | 0.229 | -11.324 | 0.074 | VERTICAL |
| 150° | 0.857 | 0.125 | 1.029 | VERTICAL | 330° | 0.206 | -12.262 | 0.059 | VERTICAL |
| 155° | 0.805 | -0.421 | 0.908 | VERTICAL | 335° | 0.193 | -12.820 | 0.052 | VERTICAL |
| 160° | 0.745 | -1.095 | 0.777 | VERTICAL | 340° | 0.191 | -12.930 | 0.051 | VERTICAL |
| 165° | 0.699 | -1.650 | 0.684 | VERTICAL | 345° | 0.192 | -12.875 | 0.052 | VERTICAL |
| 170° | 0.668 | -2.040 | 0.625 | VERTICAL | 350° | 0.193 | -12.821 | 0.052 | VERTICAL |
| 175° | 0.653 | -2.243 | 0.597 | VERTICAL | 355° | 0.192 | -12.867 | 0.052 | VERTICAL |

CITY OF LICENSE: Coalinga, California

MOUNTING STRUTURE: 5 9/16" o.d. pole

ANTENNA TYPE: P300-1BE-DA NUMBER OF BAYS:1

ENVELOPE MAXIMUM RELATIVE FIELD=1.0000 AZIMUTH=220°

ENVELOPE MINIMUM RELATIVE FIELD=0.1758 AZIMUTH= 10°

ENVELOPE RMS= .6483

MAXIMUM VERTICAL E.R.P.= 1.400kW

ENVELOPE POWER INPUT= 0.6195kW

ENVELOPE VERTICAL POWER GAIN OF THE COMPLETE ARRAY= 2.260(3.541dB)

ANTENNA ORIENTATION: North 180 degrees East

REFERENCE: KAZB2V.PAT

THEORETICAL VERTICAL PLANE RELATIVE FIELD PATTERN

FIGURE # 3

Coalinga, California

KAZB

88.3MHz

1 BAY P300-1BE-DA ANTENNA

November 14, 2000

0 DEGREE BEAM TILT

0 PERCENT FIRST NULL FILL

0 PERCENT SECOND NULL FILL

