

***Directional Antenna System
for
KKLB, Elgin, Texas***

January 25, 2006

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 KKL B.

The antenna is the ERI model 1183-3CP-DA configuration. The circular polarized system consists of 3 full-wavelength spaced bays using three driven 1180 elements and one vertical parasitic element per bay. The antenna was tested on a 7' face tower, which is the structure the station plans to use to support the array, with bracketry to provide an antenna orientation of North 160 degrees East. All tests were performed on a frequency of 92.5 megahertz, which is the center of the FM broadcast channel assigned to KKL B.

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 KKLB, Elgin, Texas

(Continued)

DESCRIPTION OF THE TEST PROCEDURE

The test antenna consisted of one bay level of the circular polarized system with the associated vertical parasitic element. The elements and brackets that were used in this test are electrically equivalent to those that will be supplied with the antenna.

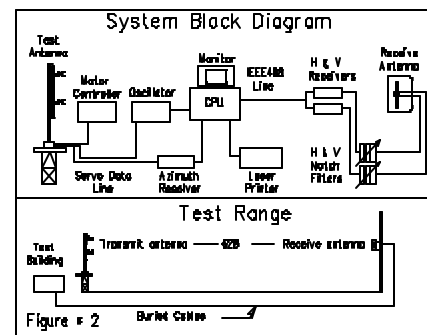
The power distribution and phase relationship to the antenna elements was adjusted in order to achieve the directional radiation patterns for both horizontal and vertical polarization components.

The proof-of-performance was accomplished using a 7' 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 North Atlantic Model 8500 angle position indicator. The resolution of this angle position indicator is one-hundredth of a degree.

The antenna under test was operated in the transmitting mode and fed from a HP8657D signal generator calibrated 1-05. The frequency of the signal source was set at 92.5 MHz and was constantly monitored by an Anritsu Model ML521B measuring receiver calibrated 6-05.

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 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.



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(Continued)

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 3 full-wavelength spaced bays using three 1180 elements and one vertical parasitic element 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 1183-3CP-DA array is to be mounted on the 7' face tower at a bearing of North 160 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 3.4 kilowatts (5.315 dBk).

The power at North 160 degrees East does not exceed 0.267 kilowatts (-5.735 dBk).

The power at North 170 degrees East does not exceed 0.267 kilowatts (-5.735 dBk).

The power at North 180 degrees East does not exceed 0.376 kilowatts (-4.248 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.

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(Continued)

The clear vertical length of the structure required to support the antenna is 51 ft 9 in if the antenna is not mounted at the top of the tower.

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.

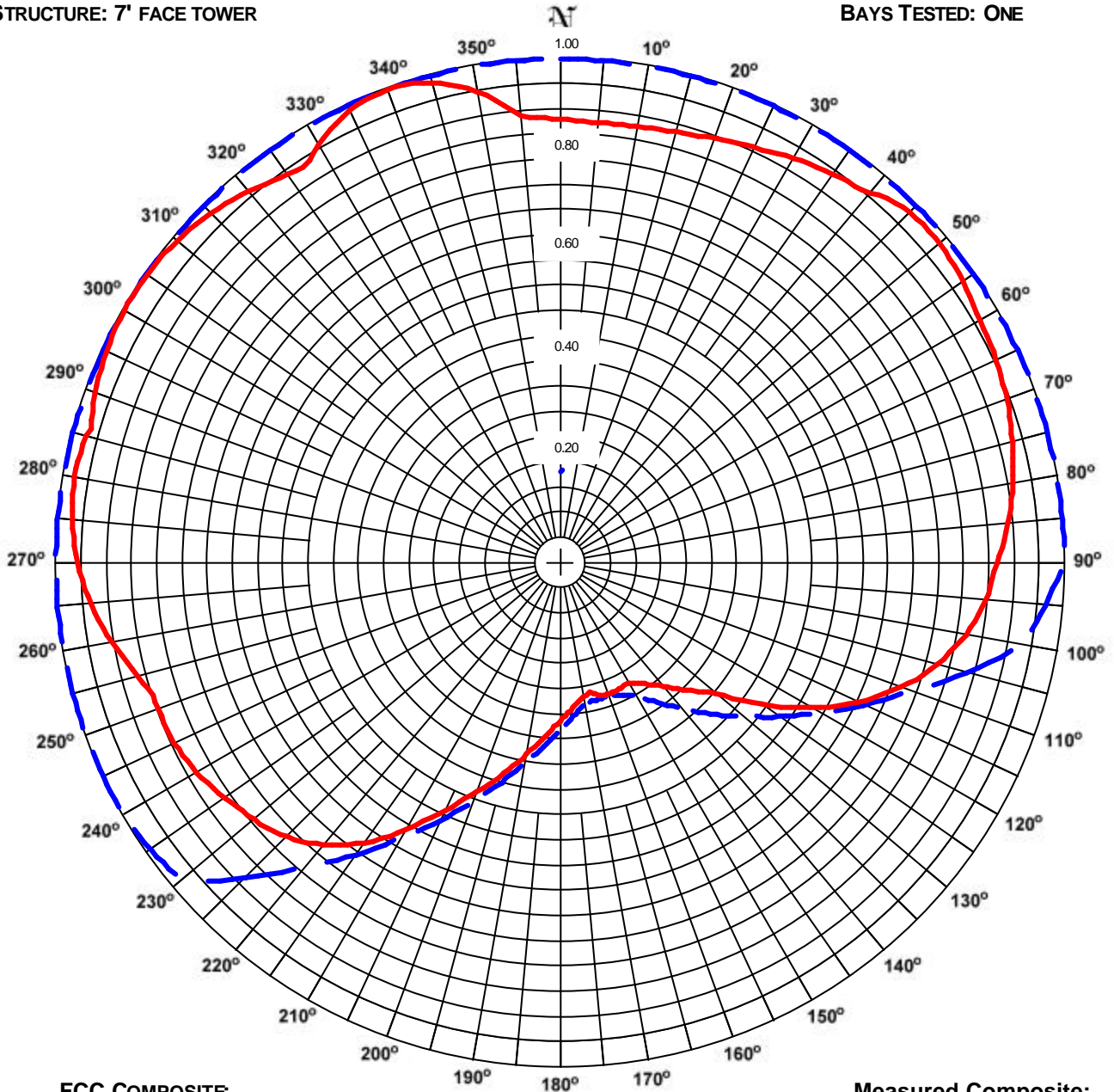
A handwritten signature in cursive script, appearing to read "Tom Shoup", with a horizontal line extending from the end of the signature.

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: KKLb
LOCATION: ELGIN, TX
ANTENNA: 1183-3CP-DA
STRUCTURE: 7' FACE TOWER

DATE: 1/23/06
FREQUENCY: 92.5 MHz
ORIENTATION: 160° TRUE
MOUNTING: CUSTOM
BAYS TESTED: ONE



FCC COMPOSITE

RMS: 0.863
MAXIMUM: 1.000 @ 0° TRUE
MINIMUM: 0.280 @ 160° TRUE

Measured Composite:

RMS: 0.804
Maximum: 1.000 @ 303° True
Minimum: 0.263 @ 167° True

COMMENTS: COMPOSITE PATTERN: THIS PATTERN SHOWS THE MAXIMUM OF EITHER THE H OR V AZIMUTH VALUES. THIS PATTERN IS GREATER THAN 85% OF THE FCC FILED COMPOSITE PATTERN BPH-200251018AAX

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: KKLb
Location: Elgin, TX
Frequency: 92.5 MHz

Antenna: 1183-3CP-DA
Orientation: 160° True
Tower: 7' face tower

Figure: 1
Date: 1/23/06
Reference: kklb1m.fig

| Angle | Envelope | | | Polarization | Angle | Envelope | | | Polarization |
|-------|----------|------|-------|--------------|-------|----------|------|-------|--------------|
| | Field | kW | dBk | | | Field | kW | dBk | |
| 0° | 0.880 | 2.63 | 4.21 | Horizontal | 180° | 0.312 | 0.33 | -4.79 | Horizontal |
| 5° | 0.877 | 2.62 | 4.17 | Horizontal | 185° | 0.345 | 0.40 | -3.93 | Horizontal |
| 10° | 0.879 | 2.63 | 4.20 | Horizontal | 190° | 0.385 | 0.50 | -2.97 | Horizontal |
| 15° | 0.885 | 2.67 | 4.26 | Horizontal | 195° | 0.431 | 0.63 | -1.99 | Horizontal |
| 20° | 0.895 | 2.73 | 4.36 | Horizontal | 200° | 0.482 | 0.79 | -1.02 | Horizontal |
| 25° | 0.909 | 2.81 | 4.49 | Horizontal | 205° | 0.539 | 0.99 | -0.05 | Horizontal |
| 30° | 0.927 | 2.92 | 4.65 | Horizontal | 210° | 0.610 | 1.26 | 1.02 | Vertical |
| 35° | 0.942 | 3.02 | 4.80 | Horizontal | 215° | 0.676 | 1.55 | 1.91 | Vertical |
| 40° | 0.959 | 3.13 | 4.95 | Vertical | 220° | 0.728 | 1.80 | 2.56 | Vertical |
| 45° | 0.983 | 3.28 | 5.16 | Vertical | 225° | 0.767 | 2.00 | 3.01 | Vertical |
| 50° | 0.984 | 3.29 | 5.17 | Vertical | 230° | 0.791 | 2.13 | 3.28 | Vertical |
| 55° | 0.975 | 3.23 | 5.09 | Vertical | 235° | 0.812 | 2.24 | 3.51 | Horizontal |
| 60° | 0.961 | 3.14 | 4.97 | Horizontal | 240° | 0.832 | 2.35 | 3.71 | Horizontal |
| 65° | 0.954 | 3.09 | 4.90 | Horizontal | 245° | 0.843 | 2.42 | 3.84 | Horizontal |
| 70° | 0.943 | 3.02 | 4.80 | Horizontal | 250° | 0.848 | 2.44 | 3.88 | Horizontal |
| 75° | 0.929 | 2.93 | 4.68 | Horizontal | 255° | 0.866 | 2.55 | 4.06 | Vertical |
| 80° | 0.912 | 2.83 | 4.51 | Horizontal | 260° | 0.902 | 2.76 | 4.41 | Vertical |
| 85° | 0.891 | 2.70 | 4.31 | Horizontal | 265° | 0.933 | 2.96 | 4.71 | Vertical |
| 90° | 0.867 | 2.56 | 4.08 | Horizontal | 270° | 0.956 | 3.11 | 4.93 | Vertical |
| 95° | 0.847 | 2.44 | 3.87 | Vertical | 275° | 0.971 | 3.21 | 5.06 | Vertical |
| 100° | 0.817 | 2.27 | 3.55 | Vertical | 280° | 0.978 | 3.25 | 5.12 | Vertical |
| 105° | 0.774 | 2.04 | 3.09 | Vertical | 285° | 0.972 | 3.21 | 5.07 | Vertical |
| 110° | 0.719 | 1.76 | 2.45 | Vertical | 290° | 0.981 | 3.27 | 5.15 | Horizontal |
| 115° | 0.652 | 1.44 | 1.59 | Vertical | 295° | 0.992 | 3.35 | 5.25 | Horizontal |
| 120° | 0.572 | 1.11 | 0.46 | Vertical | 300° | 0.999 | 3.39 | 5.30 | Horizontal |
| 125° | 0.488 | 0.81 | -0.92 | Vertical | 305° | 0.999 | 3.39 | 5.31 | Horizontal |
| 130° | 0.400 | 0.54 | -2.64 | Vertical | 310° | 0.993 | 3.35 | 5.25 | Horizontal |
| 135° | 0.356 | 0.43 | -3.66 | Horizontal | 315° | 0.980 | 3.27 | 5.14 | Horizontal |
| 140° | 0.318 | 0.34 | -4.64 | Horizontal | 320° | 0.961 | 3.14 | 4.97 | Horizontal |
| 145° | 0.292 | 0.29 | -5.36 | Horizontal | 325° | 0.942 | 3.02 | 4.80 | Horizontal |
| 150° | 0.274 | 0.25 | -5.94 | Horizontal | 330° | 0.957 | 3.12 | 4.94 | Vertical |
| 155° | 0.275 | 0.26 | -5.89 | Vertical | 335° | 0.988 | 3.32 | 5.21 | Vertical |
| 160° | 0.276 | 0.26 | -5.87 | Vertical | 340° | 1.000 | 3.40 | 5.31 | Vertical |
| 165° | 0.269 | 0.25 | -6.09 | Vertical | 345° | 0.986 | 3.30 | 5.19 | Vertical |
| 170° | 0.269 | 0.25 | -6.08 | Horizontal | 350° | 0.948 | 3.06 | 4.85 | Vertical |
| 175° | 0.287 | 0.28 | -5.52 | Horizontal | 355° | 0.889 | 2.69 | 4.29 | Horizontal |

Polarization:
Maximum Field:
Minimum Field:
RMS:
Maximum ERP:
Maximum Power Gain:

Envelope
1.000 @ 303° True
0.263 @ 167° True
0.804
3.400 kW
2.431 (3.858 dB)

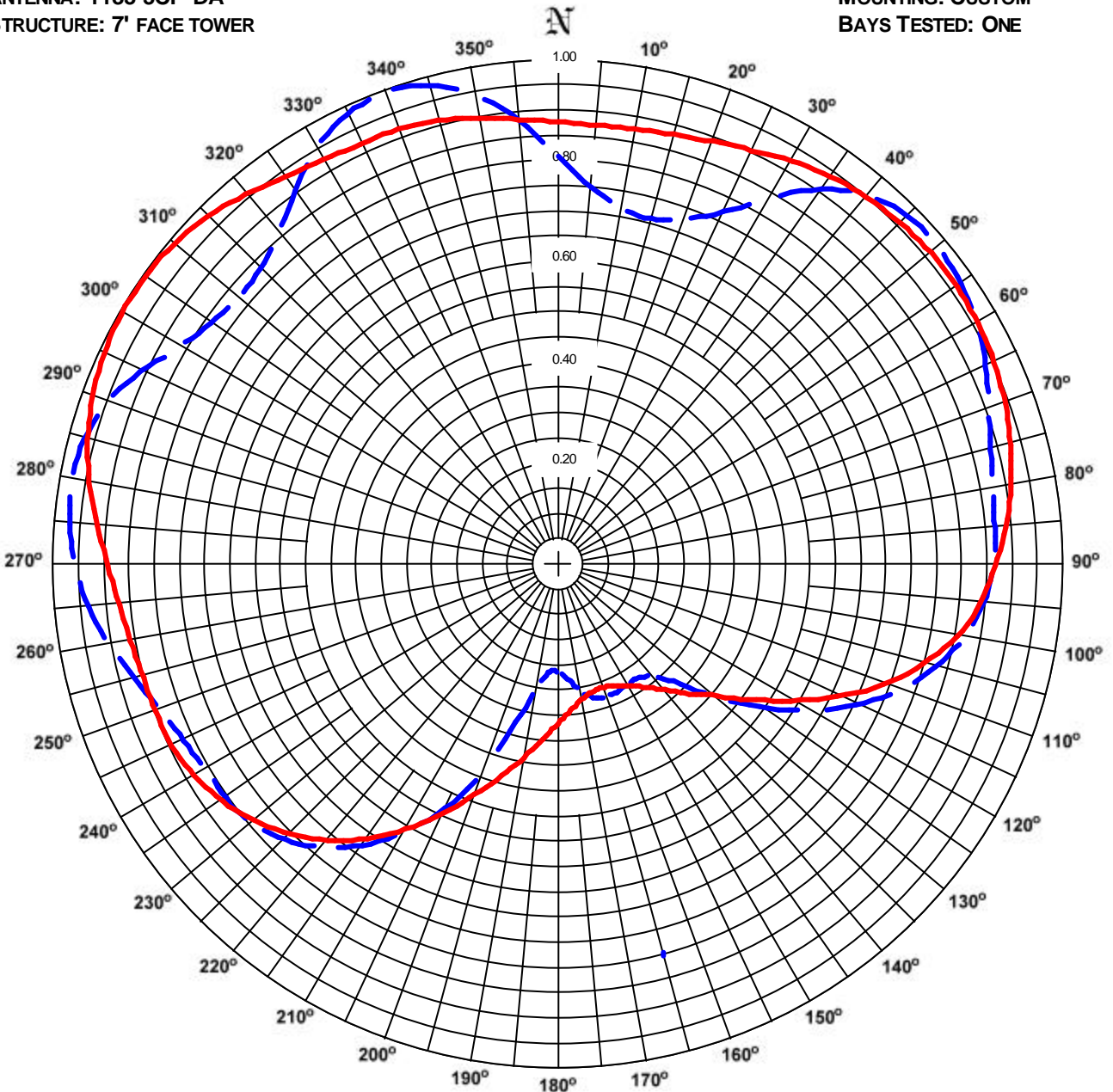
Total Input Power: 1.398 kW

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: KKL B
LOCATION: ELGIN, TX
ANTENNA: 1183-3CP-DA
STRUCTURE: 7' FACE TOWER

DATE: 1/23/06
FREQUENCY: 92.5 MHz
ORIENTATION: 160° TRUE
MOUNTING: CUSTOM
BAYS TESTED: ONE



VERTICAL

RMS: 0.769
MAXIMUM: 1.000 @ 340° TRUE
MINIMUM: 0.208 @ 183° TRUE

Horizontal

RMS: 0.791
Maximum: 1.000 @ 303° True
Minimum: 0.256 @ 161° 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: KKLb
Location: Elgin, TX
Frequency: 92.5 MHz

Antenna: 1183-3CP-DA
Orientation: 160° True
Tower: 7' face tower

Figure: 2
Date: 1/23/06
Reference: kklb1m.fig

| Angle | Horizontal | | | Vertical | | | Angle | Horizontal | | | Vertical | | |
|-------|------------|------|-------|----------|------|-------|-------|------------|------|-------|----------|------|-------|
| | Field | kW | dBk | Field | kW | dBk | | Field | kW | dBk | Field | kW | dBk |
| 0° | 0.880 | 2.63 | 4.21 | 0.811 | 2.24 | 3.49 | 180° | 0.312 | 0.33 | -4.79 | 0.211 | 0.15 | -8.21 |
| 5° | 0.877 | 2.62 | 4.17 | 0.754 | 1.93 | 2.87 | 185° | 0.345 | 0.40 | -3.93 | 0.212 | 0.15 | -8.14 |
| 10° | 0.879 | 2.63 | 4.20 | 0.721 | 1.77 | 2.48 | 190° | 0.385 | 0.50 | -2.97 | 0.249 | 0.21 | -6.77 |
| 15° | 0.885 | 2.67 | 4.26 | 0.713 | 1.73 | 2.38 | 195° | 0.431 | 0.63 | -1.99 | 0.321 | 0.35 | -4.55 |
| 20° | 0.895 | 2.73 | 4.36 | 0.732 | 1.82 | 2.60 | 200° | 0.482 | 0.79 | -1.02 | 0.430 | 0.63 | -2.02 |
| 25° | 0.909 | 2.81 | 4.49 | 0.774 | 2.04 | 3.10 | 205° | 0.539 | 0.99 | -0.05 | 0.530 | 0.95 | -0.20 |
| 30° | 0.927 | 2.92 | 4.65 | 0.841 | 2.40 | 3.81 | 210° | 0.603 | 1.24 | 0.92 | 0.610 | 1.26 | 1.02 |
| 35° | 0.942 | 3.02 | 4.80 | 0.912 | 2.83 | 4.51 | 215° | 0.660 | 1.48 | 1.70 | 0.676 | 1.55 | 1.91 |
| 40° | 0.954 | 3.09 | 4.90 | 0.959 | 3.13 | 4.95 | 220° | 0.709 | 1.71 | 2.33 | 0.728 | 1.80 | 2.56 |
| 45° | 0.961 | 3.14 | 4.97 | 0.983 | 3.28 | 5.16 | 225° | 0.751 | 1.92 | 2.83 | 0.767 | 2.00 | 3.01 |
| 50° | 0.965 | 3.17 | 5.01 | 0.984 | 3.29 | 5.17 | 230° | 0.785 | 2.10 | 3.21 | 0.791 | 2.13 | 3.28 |
| 55° | 0.965 | 3.17 | 5.00 | 0.975 | 3.23 | 5.09 | 235° | 0.812 | 2.24 | 3.51 | 0.802 | 2.19 | 3.40 |
| 60° | 0.961 | 3.14 | 4.97 | 0.959 | 3.13 | 4.95 | 240° | 0.832 | 2.35 | 3.71 | 0.806 | 2.21 | 3.44 |
| 65° | 0.954 | 3.09 | 4.90 | 0.936 | 2.98 | 4.74 | 245° | 0.843 | 2.42 | 3.84 | 0.818 | 2.27 | 3.57 |
| 70° | 0.943 | 3.02 | 4.80 | 0.909 | 2.81 | 4.48 | 250° | 0.848 | 2.44 | 3.88 | 0.838 | 2.39 | 3.78 |
| 75° | 0.929 | 2.93 | 4.68 | 0.888 | 2.68 | 4.29 | 255° | 0.851 | 2.46 | 3.91 | 0.866 | 2.55 | 4.06 |
| 80° | 0.912 | 2.83 | 4.51 | 0.875 | 2.60 | 4.16 | 260° | 0.859 | 2.51 | 4.00 | 0.902 | 2.76 | 4.41 |
| 85° | 0.891 | 2.70 | 4.31 | 0.869 | 2.57 | 4.10 | 265° | 0.873 | 2.59 | 4.13 | 0.933 | 2.96 | 4.71 |
| 90° | 0.867 | 2.56 | 4.08 | 0.864 | 2.54 | 4.05 | 270° | 0.892 | 2.70 | 4.32 | 0.956 | 3.11 | 4.93 |
| 95° | 0.840 | 2.40 | 3.80 | 0.847 | 2.44 | 3.87 | 275° | 0.916 | 2.85 | 4.55 | 0.971 | 3.21 | 5.06 |
| 100° | 0.803 | 2.19 | 3.41 | 0.817 | 2.27 | 3.55 | 280° | 0.942 | 3.02 | 4.80 | 0.978 | 3.25 | 5.12 |
| 105° | 0.749 | 1.91 | 2.81 | 0.774 | 2.04 | 3.09 | 285° | 0.964 | 3.16 | 5.00 | 0.972 | 3.21 | 5.07 |
| 110° | 0.687 | 1.60 | 2.05 | 0.719 | 1.76 | 2.45 | 290° | 0.981 | 3.27 | 5.15 | 0.950 | 3.07 | 4.86 |
| 115° | 0.610 | 1.27 | 1.02 | 0.652 | 1.44 | 1.59 | 295° | 0.992 | 3.35 | 5.25 | 0.912 | 2.82 | 4.51 |
| 120° | 0.533 | 0.97 | -0.14 | 0.572 | 1.11 | 0.46 | 300° | 0.999 | 3.39 | 5.30 | 0.868 | 2.56 | 4.08 |
| 125° | 0.461 | 0.72 | -1.41 | 0.488 | 0.81 | -0.92 | 305° | 0.999 | 3.39 | 5.31 | 0.839 | 2.40 | 3.79 |
| 130° | 0.398 | 0.54 | -2.68 | 0.400 | 0.54 | -2.64 | 310° | 0.993 | 3.35 | 5.25 | 0.827 | 2.32 | 3.66 |
| 135° | 0.356 | 0.43 | -3.66 | 0.323 | 0.36 | -4.49 | 315° | 0.980 | 3.27 | 5.14 | 0.834 | 2.36 | 3.74 |
| 140° | 0.318 | 0.34 | -4.64 | 0.286 | 0.28 | -5.56 | 320° | 0.961 | 3.14 | 4.97 | 0.861 | 2.52 | 4.01 |
| 145° | 0.292 | 0.29 | -5.36 | 0.272 | 0.25 | -5.99 | 325° | 0.942 | 3.02 | 4.80 | 0.907 | 2.80 | 4.47 |
| 150° | 0.274 | 0.25 | -5.94 | 0.273 | 0.25 | -5.96 | 330° | 0.930 | 2.94 | 4.68 | 0.957 | 3.12 | 4.94 |
| 155° | 0.262 | 0.23 | -6.33 | 0.275 | 0.26 | -5.89 | 335° | 0.923 | 2.90 | 4.62 | 0.988 | 3.32 | 5.21 |
| 160° | 0.256 | 0.22 | -6.51 | 0.276 | 0.26 | -5.87 | 340° | 0.921 | 2.89 | 4.60 | 1.000 | 3.40 | 5.31 |
| 165° | 0.259 | 0.23 | -6.42 | 0.269 | 0.25 | -6.09 | 345° | 0.915 | 2.85 | 4.54 | 0.986 | 3.30 | 5.19 |
| 170° | 0.269 | 0.25 | -6.08 | 0.250 | 0.21 | -6.73 | 350° | 0.903 | 2.77 | 4.43 | 0.948 | 3.06 | 4.85 |
| 175° | 0.287 | 0.28 | -5.52 | 0.225 | 0.17 | -7.64 | 355° | 0.889 | 2.69 | 4.29 | 0.887 | 2.68 | 4.27 |

| | | |
|----------------------------|--------------------------|--------------------------|
| Polarization: | Horizontal | Vertical |
| Maximum Field: | 1.000 @ 303° True | 1.000 @ 340° True |
| Minimum Field: | 0.256 @ 161° True | 0.208 @ 183° True |
| RMS: | 0.791 | 0.769 |
| Maximum ERP: | 3.400 kW | 3.400 kW |
| Maximum Power Gain: | 2.431 (3.858 dB) | 2.431 (3.858 dB) |

Total Input Power: 1.398 kW

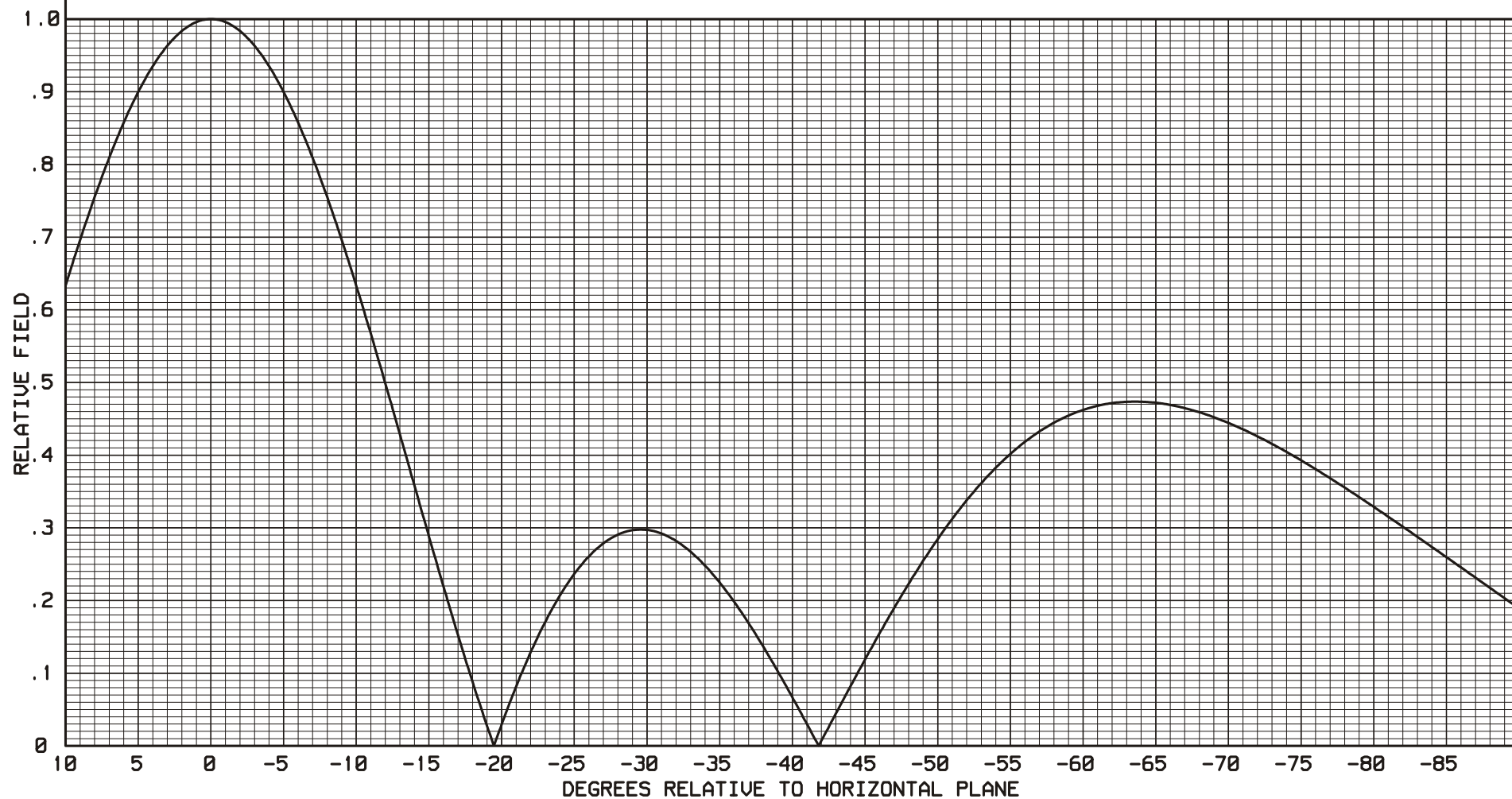
ELECTRONICS RESEARCH, INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610

FIGURE 3

----THEORETICAL----
VERTICAL PLANE RELATIVE FIELD

ERI TYPE 1083-3CP-DA ANTENNA
+0.00 DEGREE(S) BEAM TILT
0 PERCENT FIRST NULL FILL
0 PERCENT SECOND NULL FILL

BAY SPACING:
FULL WAVE



Directional Antenna System for KKLB, Elgin, Texas

(Continued)

ANTENNA SPECIFICATIONS

| | |
|-----------------|-------------|
| Antenna Type: | 1183-3CP-DA |
| Frequency: | 92.5 MHz |
| Number of Bays: | three |

MECHANICAL SPECIFICATIONS

| | |
|---|-------------|
| Mounting: | Custom |
| System length: | 31 ft 9 in |
| Aperture length required: | 51 ft 9 in. |
| Orientation: | 160° true |
| Input flange to the antenna 3 1/8 inch female | |

ELECTRICAL SPECIFICATIONS (For directional use)

| | |
|--------------------------------|----------------------|
| Maximum horizontal ERP: | 3.4 kW (5.315 dBk) |
| Horizontal maximum power gain: | 2.431 (3.858 dB) |
| Maximum vertical ERP: | 3.4 kW (5.315 dBk) |
| Vertical maximum power gain: | 2.431 (3.858 dB) |
| Total input power: | 1.398 kW (1.457 dBk) |

