



Propagation Systems, Inc.

Quality Broadcast Antenna Systems

**Directional FM Antenna
KFUT (standby)
Sunnylands Broadcasting LLC
Mecca, CA**

A standard model PSIFMV-1-DA, a vertically polarized dipole antenna, was used in conjunction with the customer's support mast to create the necessary directional radiation pattern. The final antenna consists of one radiating element with custom bracket and two parasitic elements.

Pattern testing was performed using a 1/3 scale model element and mast. The vertically polarized azimuth plane measurements were taken on a ground reflection test range. This type of test range utilizes the reflected signal and direct signal from the source antenna to form an interference pattern on the antenna under test. The antenna and mounting structure under test was mounted to a turntable that allowed the structure to be rotated 360° in the azimuth plane. The source antenna was located approximately 75 ft. from the antenna under test. The source height above ground was adjusted to peak the first lobe of the interference pattern at the antenna under test.

The test antenna was mounted in the center of rotation of the turntable. The antenna and mounting structure were rotated clockwise while data was recorded in a counter-clockwise direction. All feed cables to the antenna were secured and grounded during pattern measurements. A Hewlett Packard 8753E-network analyzer operating at 312.9 MHz was used as both the source and receiver. The level of the received signal was compared with a standard dipole to establish the directivity of the final pattern. The final pattern measured does not exceed the envelope pattern and is 92% of the envelope RMS.

The antenna is to be mounted in accordance with the supplied instructions and drawings. The antenna is to be mounted 25.9 meters (85 ft.) above ground level and positioned 220° True. At this elevation the antenna will be within the allowed +2m/-4m tolerance. It is recommended that a broadcast engineer is present to supervise the installation of the antenna and that he or she certifies the antenna has been installed according to the enclosed instructions.

An input power level of .20 kW will be necessary at the antenna input in order to reach the required .35 kW ERP. The transmitter output power requirements are dependent upon the transmission line size and length used to feed the antenna. The final length of transmission line must be determined after installation.

General Specifications

| | |
|---------------|------------------------------|
| Antenna Model | PSIFMV-1-DA |
| Type | 1-bay directional FM antenna |
| Polarization | Vertical |
| Frequency | 104.3 MHz |
| Gain (V-pol) | 1.75 (2.43 dB) |
| RMS (V-pol) | .709 |
| RMS Envelope | .771 |
| ERP (V-pol) | .35 kW (-4.56 dBk) |
| Input | 7/8" EIA |
| Power rating | 2.0 kW |
| Input power | .200 kW |
| Length | 5.0 ft. |
| Weight | 46.75 lbs. |
| Wind Area | 3.2 sq.-ft. |

Prepared By

 8/25/2014

Douglas A. Ross
Propagation Systems Inc.

VERTICAL PARASITIC
MAST MOUNTED
1301-003

BAY BRACKET
MONOPOLE MOUNTED
1301-005

SUPPORT BRACKET
MONOPOLE MOUNTED
1301-004

7/8 EIA.

RCAGL: 85 FT

RCAGL: [25.9m]

59.73
[152cm]

SPECIFICATIONS

RATING: 2 kW

GAIN: 1.75 (2.43 dB)

LENGTH: 5 FT (1.52 m)

WEIGHT: 46.75 LB [21.25 Kg]

WINDAREA: 3.2 FT²

TIA-222-F (NO ICE)

NOTE:

| REV. | MADE BY | CHECKED BY | DATE | CHANGE |
|------|---------|------------|------|--------|
| | | | | |

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SIZE

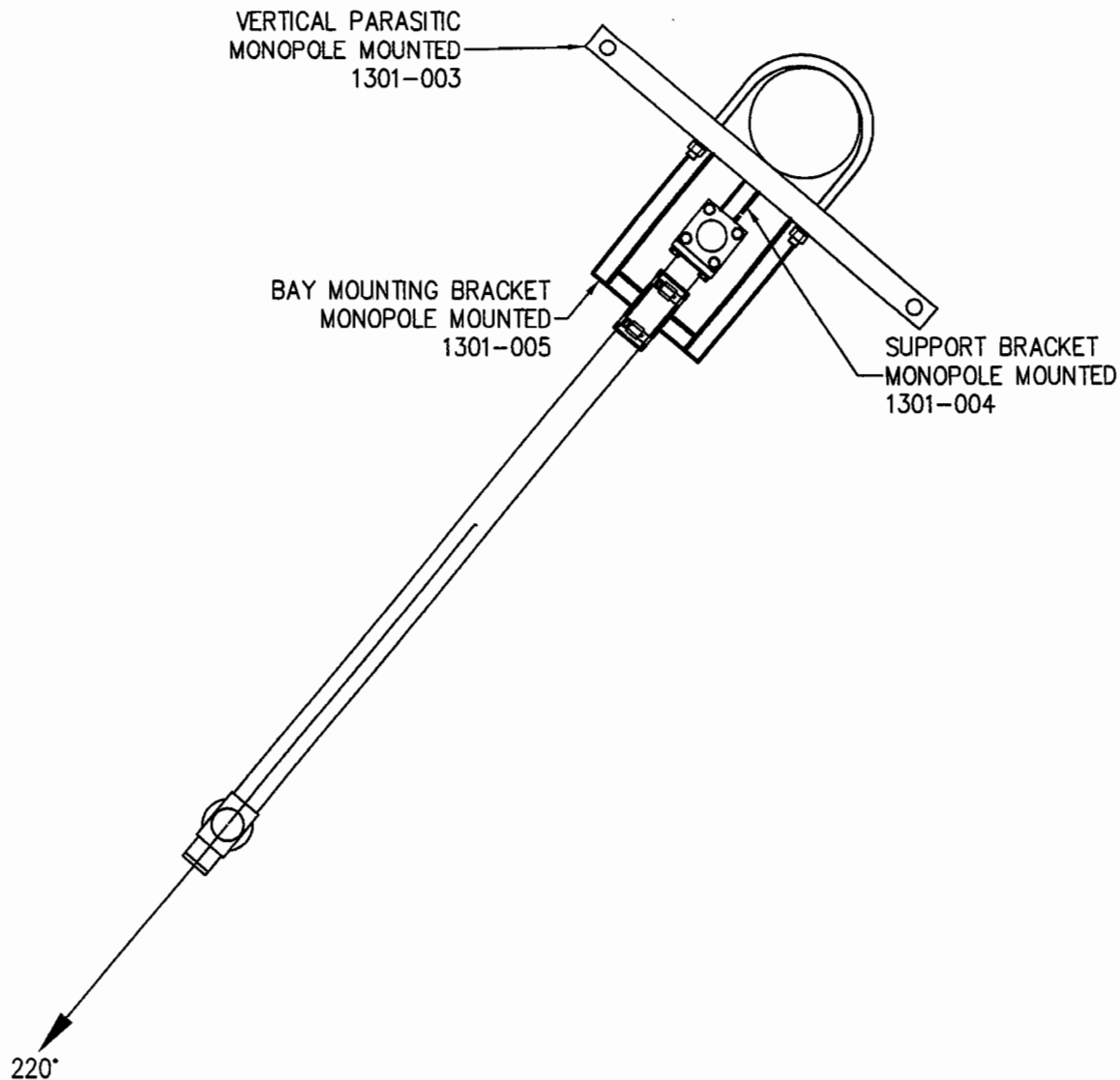
A

PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

ANTENNA ELEVATIONS AND SPECIFICATIONS

| | | |
|-------------------------------------|----------------------------|------------------|
| MODEL: PSIFMV-1-DA | DRAWN BY: B.K.SCHILLING | DATE: 8/20/14 |
| CHANNEL/ FREQUENCY: 104.3 MHz | APPROVED BY: | DATE: |
| SCALE: 1:10 | DRAWING NO.: 1301-001 | REV. |



| REV. | MADE BY | CHECKED BY | DATE | CHANGE |
|------|---------|------------|------|--------|
| | | | | |

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SIZE

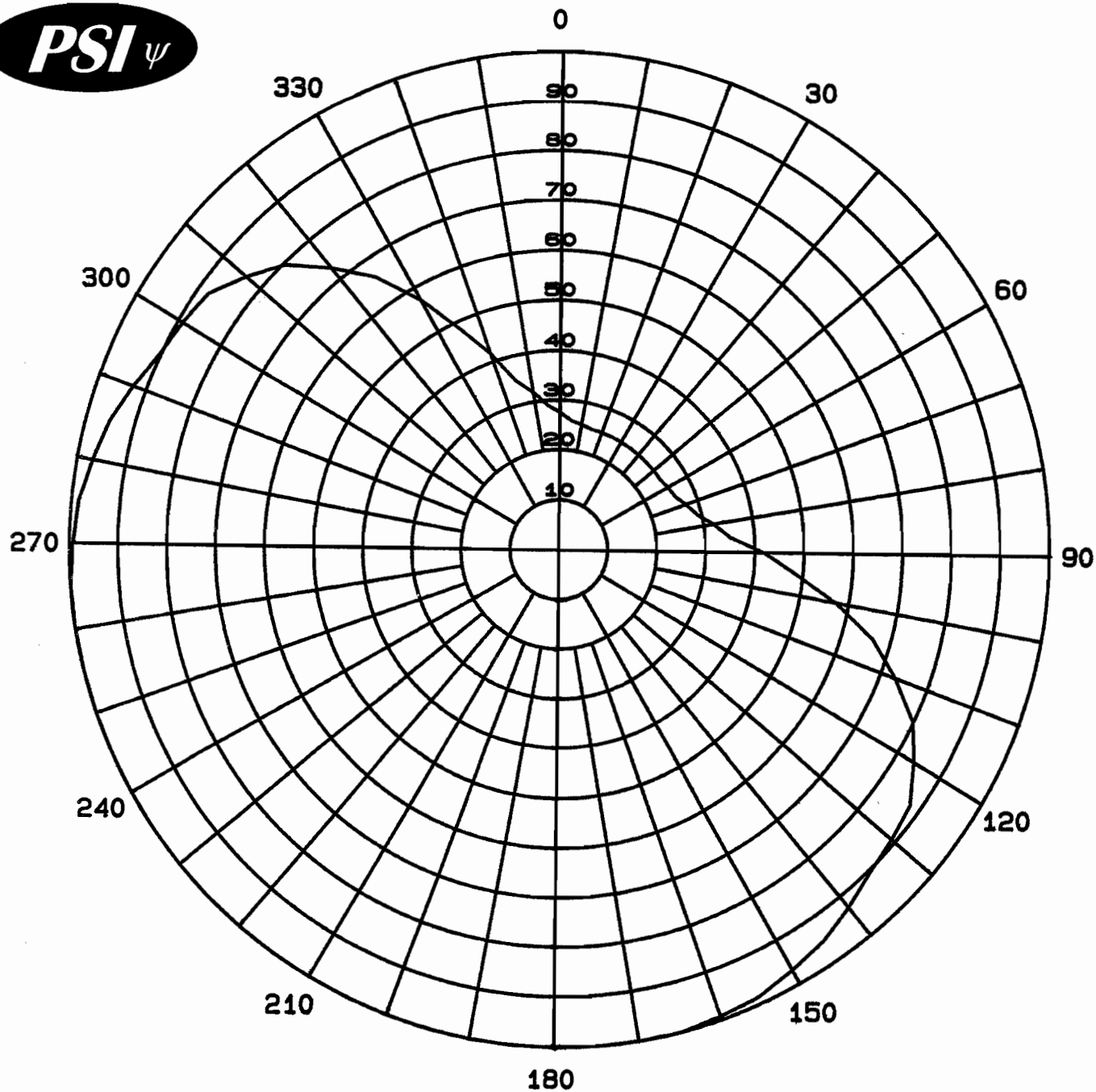
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PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

ANTENNA ORIENTATION

| | | |
|-------------------------------------|----------------------------|------------------|
| MODEL: PSIFMV-1-DA | DRAWN BY: B.K.SCHILLING | DATE: 8/20/14 |
| CHANNEL/ FREQUENCY: 104.3 MHz | APPROVED BY: | DATE: |
| SCALE: | DRAWING NO.: 1301-002 | REV. |



Maximum Envelope
Azimuth Plane Pattern
Antenna: PSIFMV-1-DA
Type: 1-Bay Directional FM Antenna
ERP: .35 kW (-4.56 dBk)
RMS Envelope: .771
Frequency: 104.3 MHz
KFUT (standby) Mecca, CA

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Maximum Envelope Tabulation

Antenna: PSIFMV-1-DA

Sunnylands Broadcasting LLC

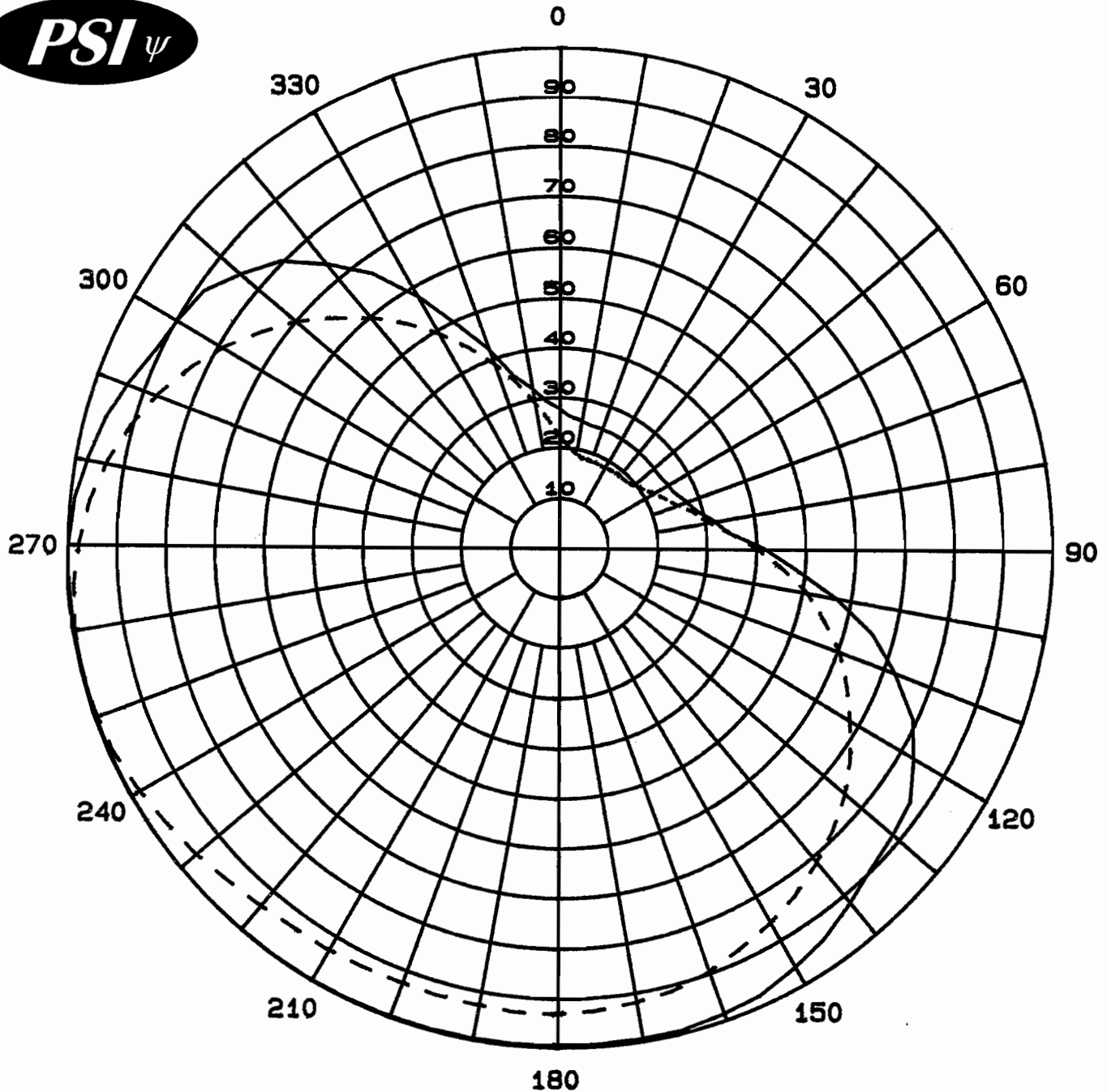
Station: KFUT (Standby)

Frequency: 104.3 MHz

Location: Mecca, CA

Maximum ERP: .35 kW (-4.56 dBk)

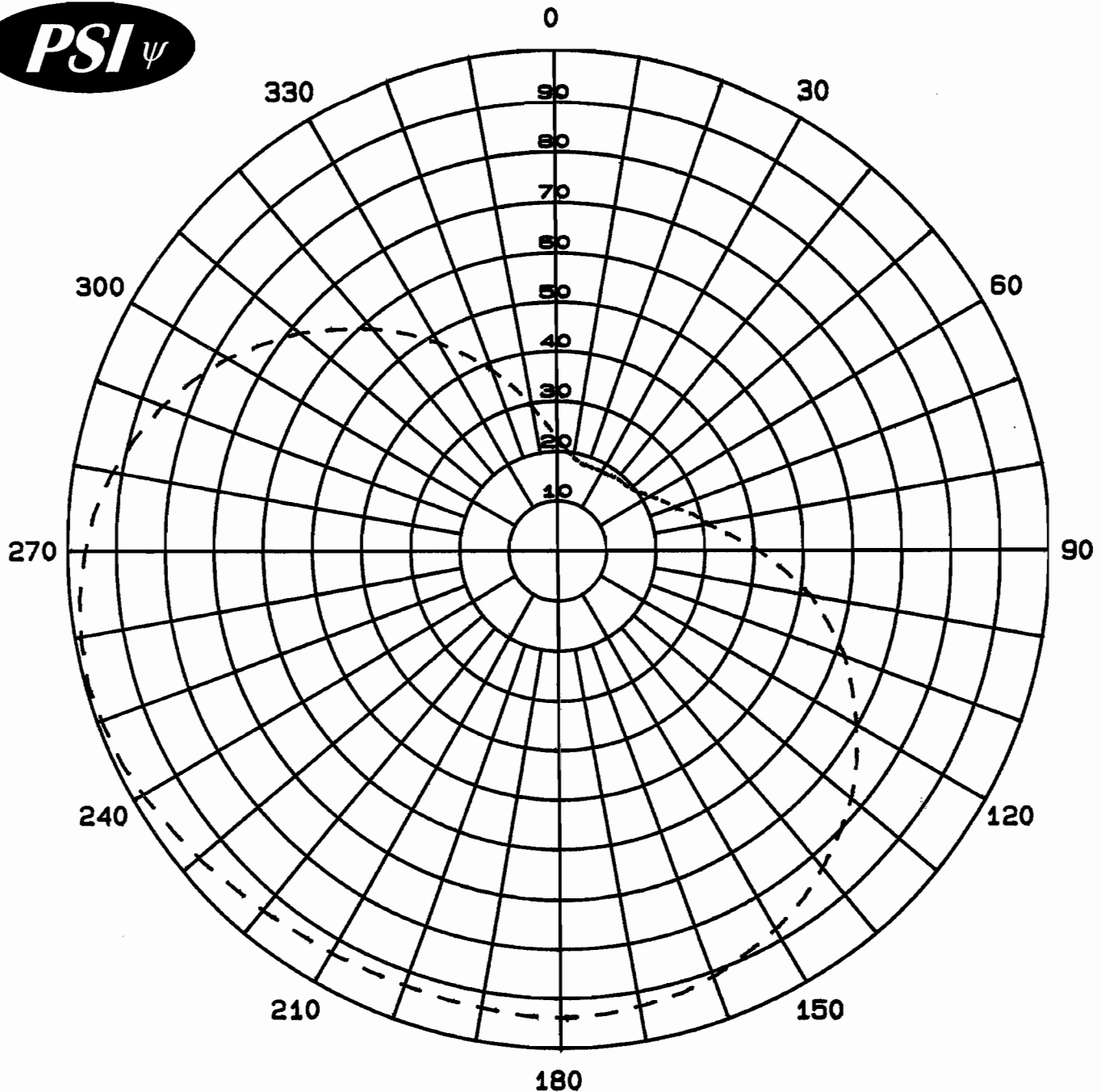
| Angle | Relative Field | ERP (kW) | ERP (dBk) |
|-------|----------------|----------|-----------|
| 0 | 0.275 | 0.026 | -15.77 |
| 10 | 0.255 | 0.023 | -16.43 |
| 20 | 0.250 | 0.022 | -16.60 |
| 30 | 0.250 | 0.022 | -16.60 |
| 40 | 0.250 | 0.022 | -16.60 |
| 50 | 0.250 | 0.022 | -16.60 |
| 60 | 0.255 | 0.023 | -16.43 |
| 70 | 0.275 | 0.026 | -15.77 |
| 80 | 0.320 | 0.036 | -14.46 |
| 90 | 0.418 | 0.061 | -12.14 |
| 100 | 0.574 | 0.115 | -9.38 |
| 110 | 0.730 | 0.187 | -7.29 |
| 120 | 0.383 | 0.051 | -12.90 |
| 130 | 0.891 | 0.278 | -5.56 |
| 140 | 0.928 | 0.301 | -5.21 |
| 150 | 0.969 | 0.329 | -4.83 |
| 160 | 0.993 | 0.345 | -4.62 |
| 170 | 1.000 | 0.350 | -4.56 |
| 180 | 1.000 | 0.350 | -4.56 |
| 190 | 1.000 | 0.350 | -4.56 |
| 200 | 1.000 | 0.350 | -4.56 |
| 210 | 1.000 | 0.350 | -4.56 |
| 220 | 1.000 | 0.350 | -4.56 |
| 230 | 1.000 | 0.350 | -4.56 |
| 240 | 1.000 | 0.350 | -4.56 |
| 250 | 1.000 | 0.350 | -4.56 |
| 260 | 1.000 | 0.350 | -4.56 |
| 270 | 0.993 | 0.345 | -4.62 |
| 280 | 0.969 | 0.329 | -4.83 |
| 290 | 0.928 | 0.301 | -5.21 |
| 300 | 0.891 | 0.278 | -5.56 |
| 310 | 0.838 | 0.246 | -6.09 |
| 320 | 0.730 | 0.187 | -7.29 |
| 330 | 0.574 | 0.115 | -9.38 |
| 340 | 0.418 | 0.061 | -12.14 |
| 350 | 0.320 | 0.036 | -14.46 |



Maximum Envelope and
Measured Pattern
Antenna: PSIFMV-1-DA
Type: 1-Bay Directional FM Antenna
ERP: .35 kW (-4.56 dBk)
RMS Envelope: .771
RMS Measured: .709
Frequency: 104.3 MHz

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

KFUT (standby) Mecca, CA



Measured Relative Field
Azimuth Plane Pattern
Antenna: PSIFMV-1-DA
Type: 1-Bay Directional FM Antenna
Gain V-pol (dash): 1.75 (2.43 dB)
RMS: .709
Frequency: 104.3 MHz
KFUT (standby) Mecca, CA

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Measured Relative Field Tabulation

Antenna: PSIFMV-1-DA

Sunnylands Broadcasting LLC

Station: KFUT (Standby)

Frequency: 104.3 MHz

Location: Mecca, CA

Vertical Polarization

| Angle | Relative Field | Power Gain | Gain (dB) |
|-------|----------------|------------|-----------|
| 0 | 0.223 | 0.087 | -10.60 |
| 10 | 0.190 | 0.063 | -11.99 |
| 20 | 0.182 | 0.058 | -12.37 |
| 30 | 0.183 | 0.059 | -12.32 |
| 40 | 0.189 | 0.063 | -12.04 |
| 50 | 0.194 | 0.066 | -11.81 |
| 60 | 0.218 | 0.083 | -10.80 |
| 70 | 0.253 | 0.112 | -9.51 |
| 80 | 0.307 | 0.165 | -7.83 |
| 90 | 0.403 | 0.284 | -5.46 |
| 100 | 0.514 | 0.462 | -3.35 |
| 110 | 0.610 | 0.651 | -1.86 |
| 120 | 0.688 | 0.828 | -0.82 |
| 130 | 0.765 | 1.024 | 0.10 |
| 140 | 0.822 | 1.182 | 0.73 |
| 150 | 0.868 | 1.318 | 1.20 |
| 160 | 0.904 | 1.430 | 1.55 |
| 170 | 0.925 | 1.497 | 1.75 |
| 180 | 0.936 | 1.533 | 1.86 |
| 190 | 0.931 | 1.517 | 1.81 |
| 200 | 0.928 | 1.507 | 1.78 |
| 210 | 0.932 | 1.520 | 1.82 |
| 220 | 0.940 | 1.546 | 1.89 |
| 230 | 0.960 | 1.613 | 2.08 |
| 240 | 0.981 | 1.684 | 2.26 |
| 250 | 0.995 | 1.733 | 2.39 |
| 260 | 0.995 | 1.733 | 2.39 |
| 270 | 0.972 | 1.653 | 2.18 |
| 280 | 0.929 | 1.510 | 1.79 |
| 290 | 0.864 | 1.306 | 1.16 |
| 300 | 0.782 | 1.070 | 0.29 |
| 310 | 0.690 | 0.833 | -0.79 |
| 320 | 0.590 | 0.609 | -2.15 |
| 330 | 0.487 | 0.415 | -3.82 |
| 340 | 0.386 | 0.261 | -5.84 |
| 350 | 0.292 | 0.149 | -8.26 |

Maximum Value

Field 1.00

Gain 1.75 (2.43 dB)

Azimuth Bearing 255 degrees

Minimum Field

Field 0.182

Gain .058 (-12.37 dB)

Azimuth Bearing 15-20 degrees

ERP Tabulation

Antenna: PSIFMV-1-DA

Sunnylands Broadcasting LLC

Station: KFUT (Standby)

Frequency: 104.3 MHz

Location: Mecca, CA

Maximum ERP: .35 kW (-4.56 dBk)

Vertical Polarization

| Angle | Relative Field | ERP (kW) | ERP (dBk) |
|-------|----------------|----------|-----------|
| 0 | 0.223 | 0.017 | -17.59 |
| 10 | 0.190 | 0.013 | -18.98 |
| 20 | 0.182 | 0.012 | -19.36 |
| 30 | 0.183 | 0.012 | -19.31 |
| 40 | 0.189 | 0.013 | -19.03 |
| 50 | 0.194 | 0.013 | -18.80 |
| 60 | 0.218 | 0.017 | -17.79 |
| 70 | 0.253 | 0.022 | -16.50 |
| 80 | 0.307 | 0.033 | -14.82 |
| 90 | 0.403 | 0.057 | -12.45 |
| 100 | 0.514 | 0.092 | -10.34 |
| 110 | 0.610 | 0.130 | -8.85 |
| 120 | 0.688 | 0.166 | -7.81 |
| 130 | 0.765 | 0.205 | -6.89 |
| 140 | 0.822 | 0.236 | -6.26 |
| 150 | 0.868 | 0.264 | -5.79 |
| 160 | 0.904 | 0.286 | -5.44 |
| 170 | 0.925 | 0.299 | -5.24 |
| 180 | 0.936 | 0.307 | -5.13 |
| 190 | 0.931 | 0.303 | -5.18 |
| 200 | 0.928 | 0.301 | -5.21 |
| 210 | 0.932 | 0.304 | -5.17 |
| 220 | 0.940 | 0.309 | -5.10 |
| 230 | 0.960 | 0.323 | -4.91 |
| 240 | 0.981 | 0.337 | -4.73 |
| 250 | 0.995 | 0.347 | -4.60 |
| 260 | 0.995 | 0.347 | -4.60 |
| 270 | 0.972 | 0.331 | -4.81 |
| 280 | 0.929 | 0.302 | -5.20 |
| 290 | 0.864 | 0.261 | -5.83 |
| 300 | 0.782 | 0.214 | -6.70 |
| 310 | 0.690 | 0.167 | -7.78 |
| 320 | 0.590 | 0.122 | -9.14 |
| 330 | 0.487 | 0.083 | -10.81 |
| 340 | 0.386 | 0.052 | -12.83 |
| 350 | 0.292 | 0.030 | -15.25 |

Maximum Value (H-pol)

Field 1.00

ERP .350 kW (-4.56 dBk)

Azimuth Bearing 255 degrees

Minimum Field (H-pol)

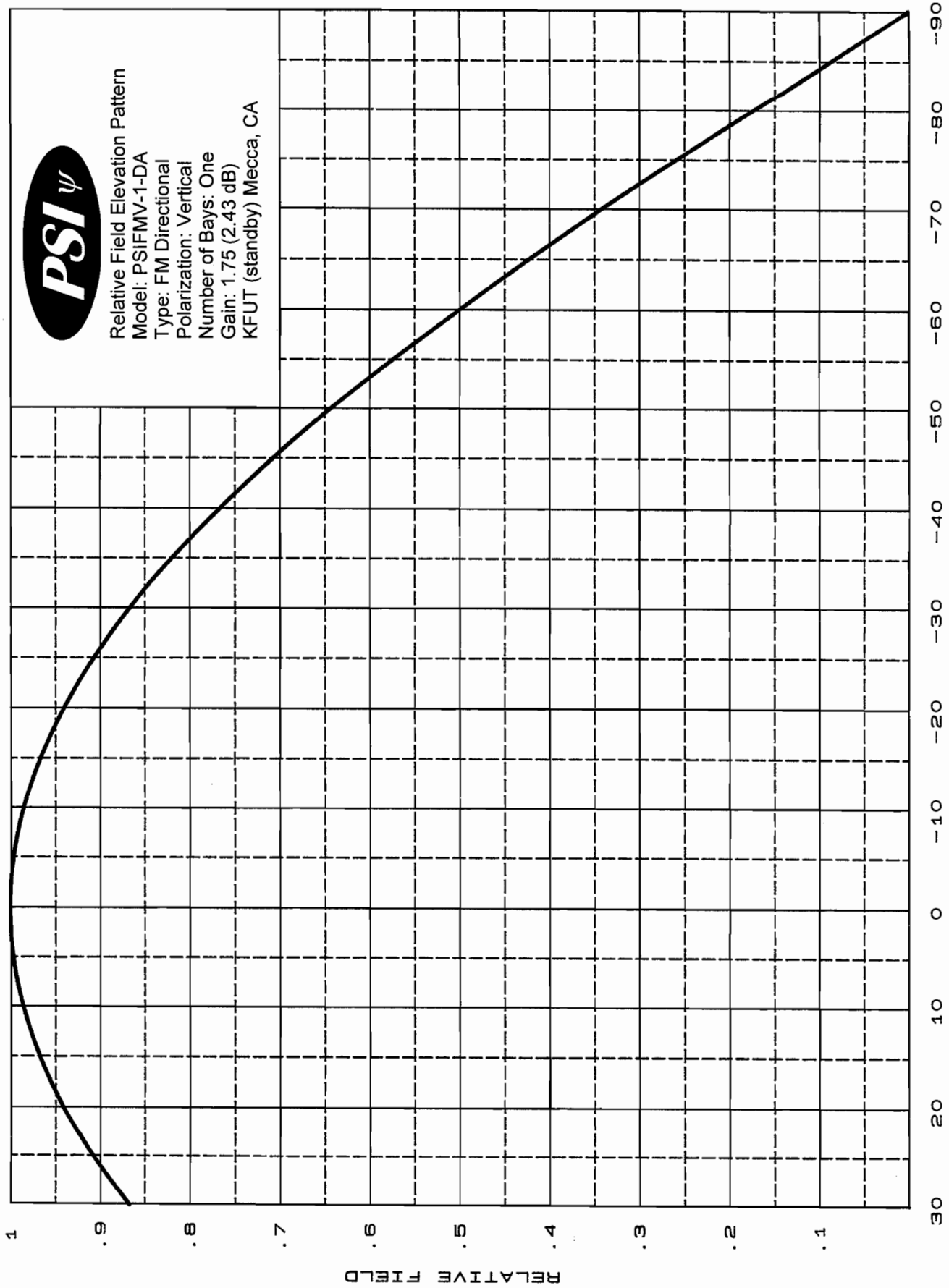
Field 0.182

ERP .012 kW (-19.36 dBk)

Azimuth Bearing 15-20 degrees



Relative Field Elevation Pattern
Model: PSIFMV-1-DA
Type: FM Directional
Polarization: Vertical
Number of Bays: One
Gain: 1.75 (2.43 dB)
KFUT (standby) Mecca, CA



DEGREES BELOW HORIZONTAL