



Propagation Systems, Inc.

Quality Broadcast Antenna Systems

Directional FM Antenna

KRSF

Radio 74 Internationale

Ridgecrest, CA

A standard model PSIFMPH antenna was used in conjunction with the customer's triangular tower to create the necessary directional radiation pattern. The final antenna consists of one panel with two radiating elements. The panel is secured to the tower with custom-mounting brackets. The antenna dipoles are fed from a two way power divider and receive equal power and phase.

Pattern testing was performed using a 1/3 scale model element and tower. The 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 tower 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 8753A-network analyzer operating at 267.9 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 85.8% of the envelope RMS.

The antenna is to be mounted 25.6 meters (84 ft.) above ground level on the southwest tower face and positioned 265° True. At this elevation the antenna will be within the allowed +2m/-4m tolerance. No other antenna can be installed within 10 ft of any radiating element. Any guy wires that pass within 10 ft. of any radiating element must be replaced with a non-metallic substitute. It is recommended that a broadcast engineer be present to supervise the installation of the antenna and that he or she certifies that the antenna has been installed according to the enclosed instructions.

An input power level of .818 kW will be necessary at the antenna input in order to reach the required 4.0 kW ERP. The transmitter output power requirements are dependent upon the transmission line size and length used to feed the antenna.

Antenna Specifications

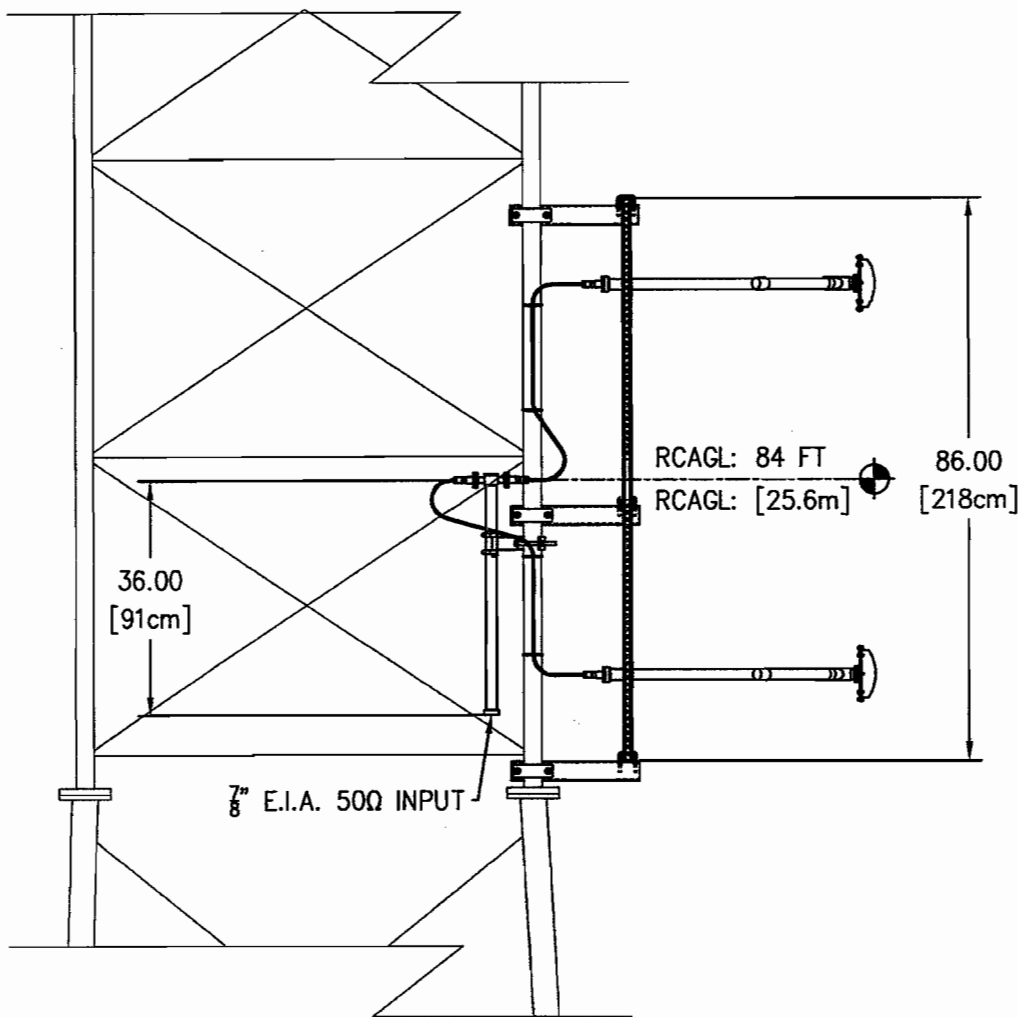
Antenna Model	PSIFMPH-1-DA
Type	1-bay directional FM panel antenna
Frequency	89.3 MHz
Polarization	Horizontal
Envelope RMS	.609
Measured RMS	.523
Gain (h-pol)	4.89 (6.89 dB)
ERP	4.0 kW
Antenna input power	.818 kW
Input	7/8" EIA input
Power rating	5 kW
Length	7.2 ft.
Weight	139 lbs.
Wind Area	13.5 sq. ft.

Statement of Certification

This is to certify the antenna has been designed, fabricated and tested under my supervision and it meets the required envelope pattern limitations set forth in the stations construction permit.

 3/16/11

Douglas A. Ross
President
Propagation Systems Inc.



SPECIFICATIONS

LENGTH: 7.2 FT [2.18m]

RATING: 5 kW

GAIN: 4.89 (6.89 dB)

WEIGHT: 139 LB [63 Kg]

WINDAREA: 13.5 FT²

TIA-222-F (NO ICE)

PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

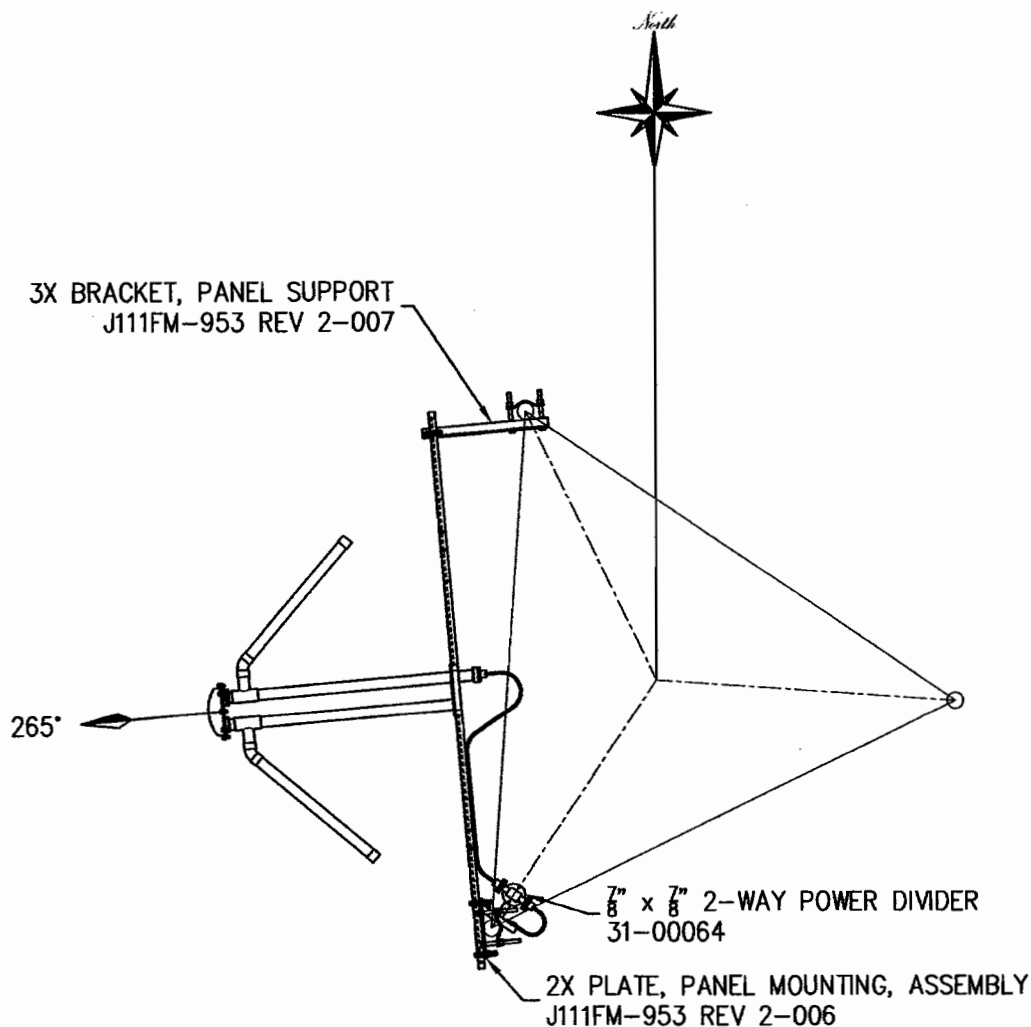
ELEVATIONS AND SPECIFICATIONS

MODEL:	PSIFMPH-1-DA	DRAWN BY:	D.G. Kellar	DATE:	3/16/11
CHANNEL/ FREQUENCY:	89.3 MHz	APPROVED BY:		DATE:	
SCALE:	1:30	DRAWING NO.:	J111FM-953 REV 2-001	REV.	

REV.	MADE BY CHECKED BY	DATE	CHANGE

This drawing is loaned subject to the express understanding and agreement that the drawing and information therein contained are, and shall remain the property of PSI, and will not be otherwise utilized or disposed of, directly or indirectly, and will not be used in whole or in part or assist in making or finish any information for the making of drawings, prints or other reproductions hereof, or for the design or making of any item, parts, object, apparatus or parts thereof, except upon the written permissions of PSI first obtained. The acceptance of this drawing will be construed as an acceptance of the forgoing agreement.

SIZE
A



PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

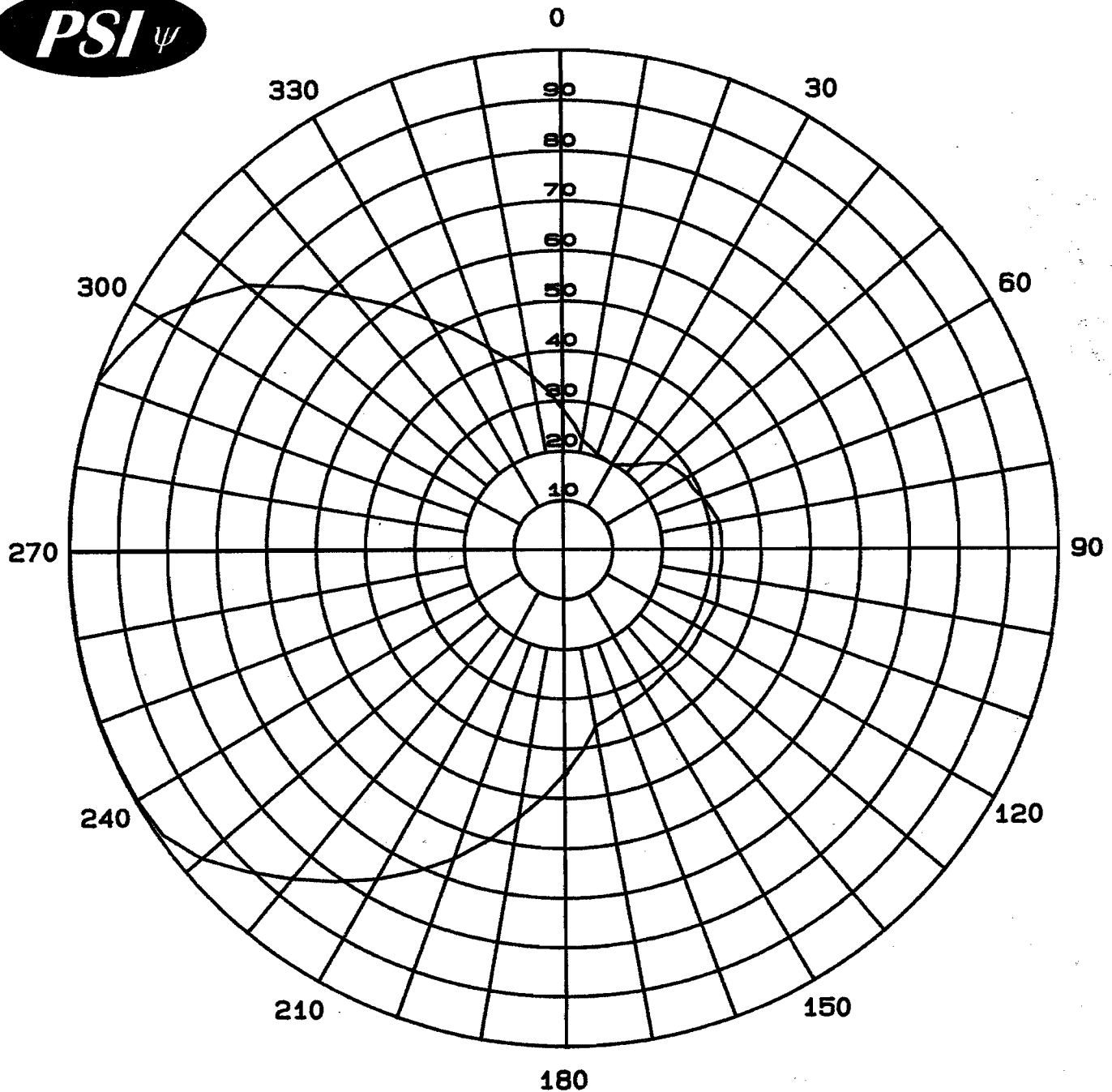
ANTENNA PLAN VIEW AND ORIENTATION

REV.	MADE BY CHECKED BY	DATE	CHANGE

This drawing is loaned subject to the express understanding and agreement that the drawing and information therein contained are, and shall remain the property of PSI, and will not be otherwise utilized or disposed of, directly or indirectly, and will not be used in whole or in part or assist in making or finish any information for the making of drawings, prints or other reproductions hereof, or for the design or making of any item, parts, object, apparatus or parts thereof, except upon the written permissions of PSI first obtained. The acceptance of this drawing will be construed as an acceptance of the forgoing agreement.

SIZE
A

MODEL: PSIFMPH-1-DA	DRAWN BY: D.G. Kellar	DATE: 3/01/11
CHANNEL/FREQUENCY: 89.3 MHz	APPROVED BY:	DATE:
SCALE: 1:30	DRAWING NO.: J111FM-953 REV 2-002	REV.



Maximum Envelope
Azimuth Plane Pattern
Antenna: PSIFMPH-1-DA
Type: 1-Bay Directional FM Antenna
ERP: 4.0 kW (6.02 dBk)
RMS Envelope: .609
Frequency: 89.3 MHz
KRSF Ridgecrest, CA

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Maximum Envelope Tabulation

Antenna: PSIFMPH-1-DA

Radio 74 Internationale

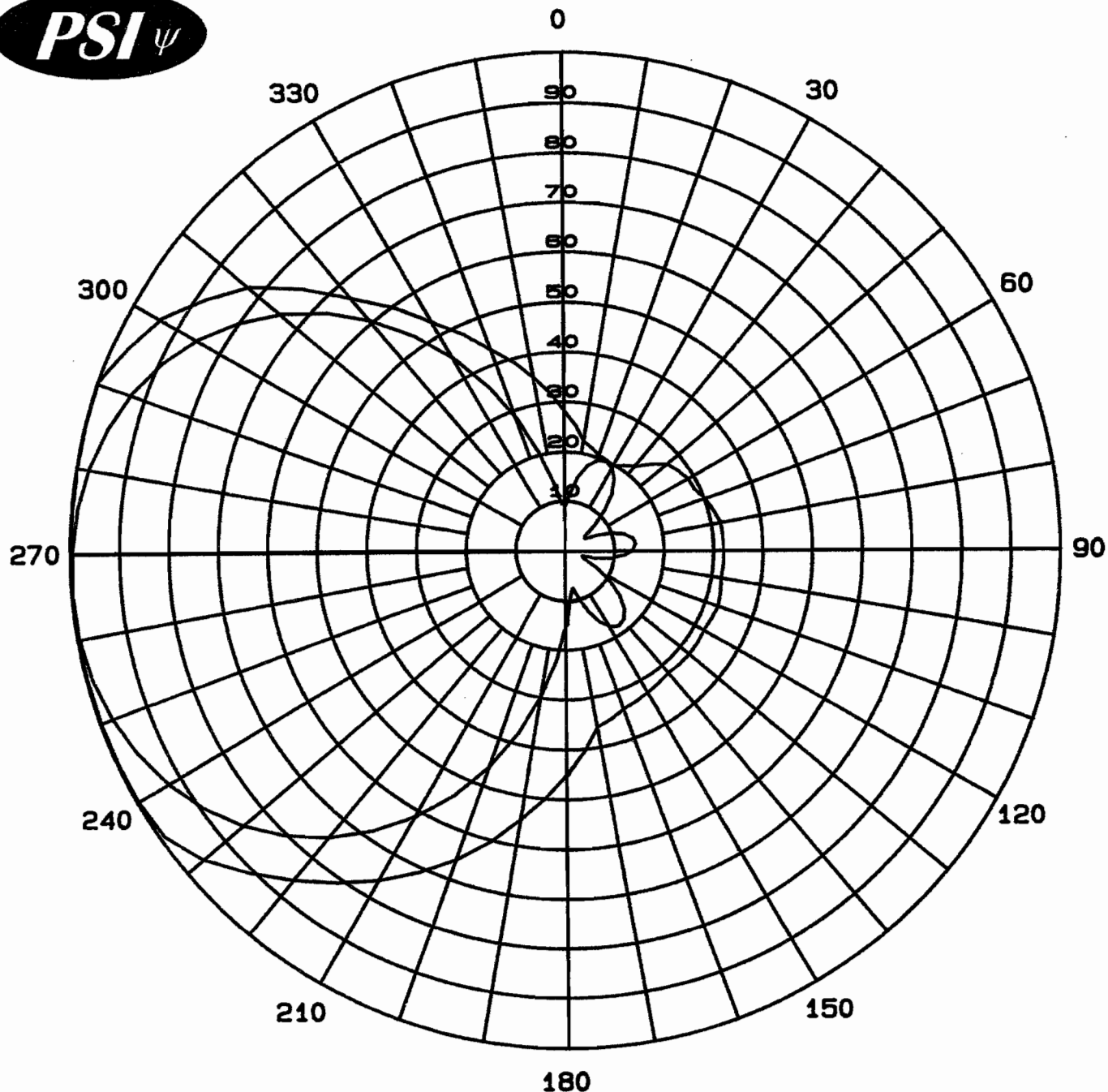
Station: KRSF

Frequency: 89.3 MHz

Location: Ridgecrest, CA

Maximum ERP: 4.0 kW (6.02 dBk)

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.279	0.311	-5.07
10	0.222	0.197	-7.05
20	0.202	0.163	-7.87
30	0.195	0.152	-8.18
40	0.219	0.192	-7.17
50	0.268	0.287	-5.42
60	0.285	0.325	-4.88
70	0.299	0.358	-4.47
80	0.317	0.402	-3.96
90	0.320	0.410	-3.88
100	0.319	0.407	-3.90
110	0.327	0.428	-3.69
120	0.321	0.412	-3.85
130	0.324	0.420	-3.77
140	0.321	0.412	-3.85
150	0.329	0.433	-3.64
160	0.339	0.460	-3.38
170	0.360	0.518	-2.85
180	0.449	0.806	-0.93
190	0.547	1.197	0.78
200	0.659	1.737	2.40
210	0.764	2.335	3.68
220	0.862	2.972	4.73
230	0.961	3.694	5.68
240	1.000	4.000	6.02
250	1.000	4.000	6.02
260	1.000	4.000	6.02
270	1.000	4.000	6.02
280	1.000	4.000	6.02
290	1.000	4.000	6.02
300	0.938	3.519	5.46
310	0.828	2.742	4.38
320	0.663	1.758	2.45
330	0.530	1.124	0.51
340	0.428	0.733	-1.35
350	0.351	0.493	-3.07



Maximum Envelope and
Measured Pattern

Antenna: PSIFMPH-1-DA

Type: 1-Bay Directional FM Antenna

ERP: 4.0 kW (6.02 dBk)

RMS Envelope: .609

RMS Measured: .523

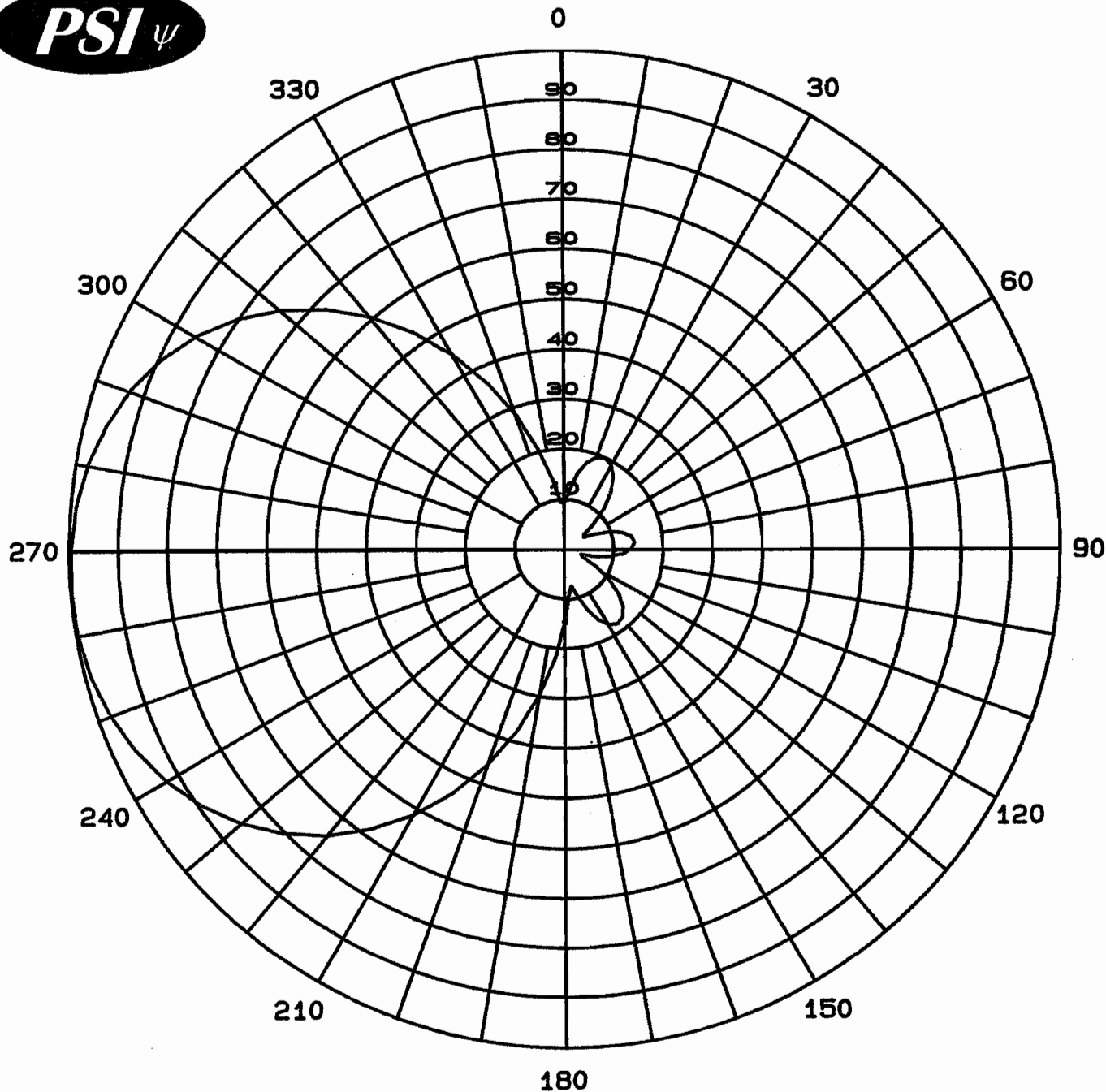
Frequency: 89.3 MHz

Propagation Systems Inc.

PO Box 113

Ebensburg, PA 15931

KRSF Ridgecrest, CA



Measured Relative Field
Azimuth Plane Pattern
Antenna: PSIFMPH-1-DA
Polarization: Horizontal
Type: 1-Bay Directional FM Antenna
Gain H-pol (solid): 4.89 (6.89 dB)
Frequency: 89.3 MHz
KRSF Ridgecrest, CA

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

ERP Tabulation

Antenna: PSIFMPH-1-DA

Radio 74 Internationale

Station: KRSF

Frequency: 89.3 MHz

Location: Ridgecrest, CA

Maximum ERP: 4.0 kW (6.02 dBk)

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.087	0.030	-15.19
10	0.149	0.089	-10.52
20	0.192	0.147	-8.31
30	0.190	0.144	-8.40
40	0.147	0.086	-10.63
50	0.078	0.024	-16.14
60	0.044	0.008	-21.11
70	0.099	0.039	-14.07
80	0.137	0.075	-11.24
90	0.136	0.074	-11.31
100	0.095	0.036	-14.42
110	0.035	0.005	-23.10
120	0.073	0.021	-16.71
130	0.142	0.081	-10.93
140	0.182	0.132	-8.78
150	0.180	0.130	-8.87
160	0.133	0.071	-11.50
170	0.077	0.024	-16.25
180	0.149	0.089	-10.52
190	0.298	0.355	-4.50
200	0.460	0.846	-0.72
210	0.616	1.518	1.81
220	0.751	2.256	3.53
230	0.856	2.931	4.67
240	0.930	3.460	5.39
250	0.976	3.810	5.81
260	0.998	3.984	6.00
270	0.997	3.976	5.99
280	0.975	3.803	5.80
290	0.928	3.445	5.37
300	0.851	2.897	4.62
310	0.742	2.202	3.43
320	0.604	1.459	1.64
330	0.446	0.796	-0.99
340	0.282	0.318	-4.97
350	0.137	0.075	-11.24

Maximum Value

Field 1.00

ERP 4.0 kW (6.02 dBk)

Azimuth Bearing 265 degrees

Minimum Field

Field 0.035

Gain .005 kW (-23.1 dBk)

Azimuth Bearing 110 degrees

Measured Relative Field Tabulation

Antenna: PSIFMPH-1-DA

Radio 74 Internationale

Station: KRSF

Frequency: 89.3 MHz

Location: Ridgecrest, CA

Horizontal Polarization

Angle	Relative Field	Power Gain	Gain (dB)
0	0.087	0.037	-14.32
10	0.149	0.109	-9.64
20	0.192	0.180	-7.44
30	0.190	0.177	-7.53
40	0.147	0.106	-9.76
50	0.078	0.030	-15.27
60	0.044	0.009	-20.24
70	0.099	0.048	-13.19
80	0.137	0.092	-10.37
90	0.136	0.090	-10.44
100	0.095	0.044	-13.55
110	0.035	0.006	-22.23
120	0.073	0.026	-15.84
130	0.142	0.099	-10.06
140	0.182	0.162	-7.91
150	0.180	0.158	-8.00
160	0.133	0.086	-10.63
170	0.077	0.029	-15.38
180	0.149	0.109	-9.64
190	0.298	0.434	-3.62
200	0.460	1.035	0.15
210	0.616	1.856	2.68
220	0.751	2.758	4.41
230	0.856	3.583	5.54
240	0.930	4.229	6.26
250	0.976	4.658	6.68
260	0.998	4.870	6.88
270	0.997	4.861	6.87
280	0.975	4.649	6.67
290	0.928	4.211	6.24
300	0.851	3.541	5.49
310	0.742	2.692	4.30
320	0.604	1.784	2.51
330	0.446	0.973	-0.12
340	0.282	0.389	-4.10
350	0.137	0.092	-10.37

Maximum Value

Field 1.00

Gain 4.89 (6.89 dB)

Azimuth Bearing 265 degrees

Minimum Field

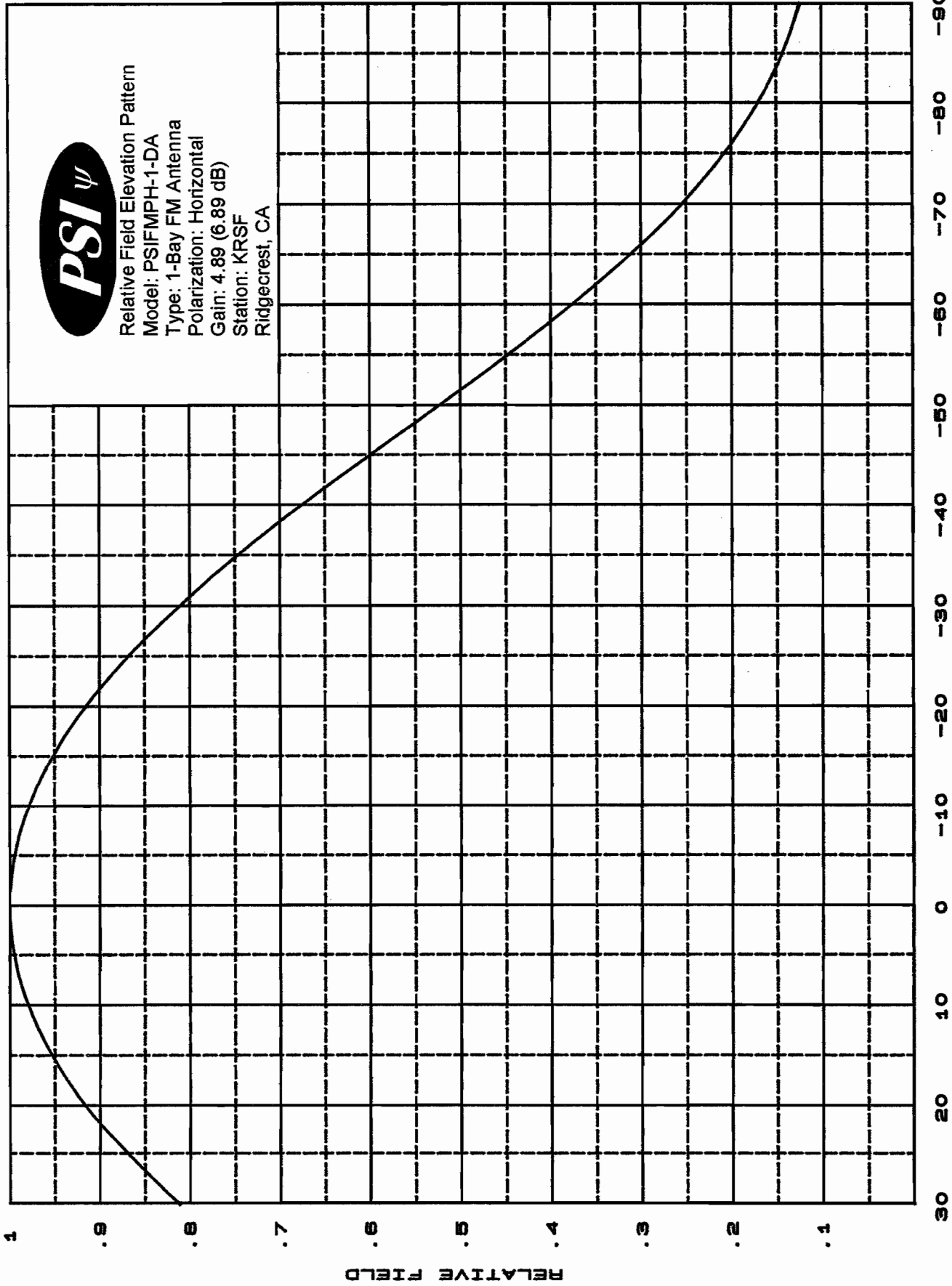
Field 0.035

Gain .006 (-22.23 dB)

Azimuth Bearing 110 degrees



Relative Field Elevation Pattern
Model: PSIFMPH-1-DA
Type: 1-Bay FM Antenna
Polarization: Horizontal
Gain: 4.89 (6.89 dB)
Station: KRSF
Ridgecrest, CA



DEGREES BELOW HORIZONTAL