



# Propagation Systems, Inc.

Quality Broadcast Antenna Systems

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**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

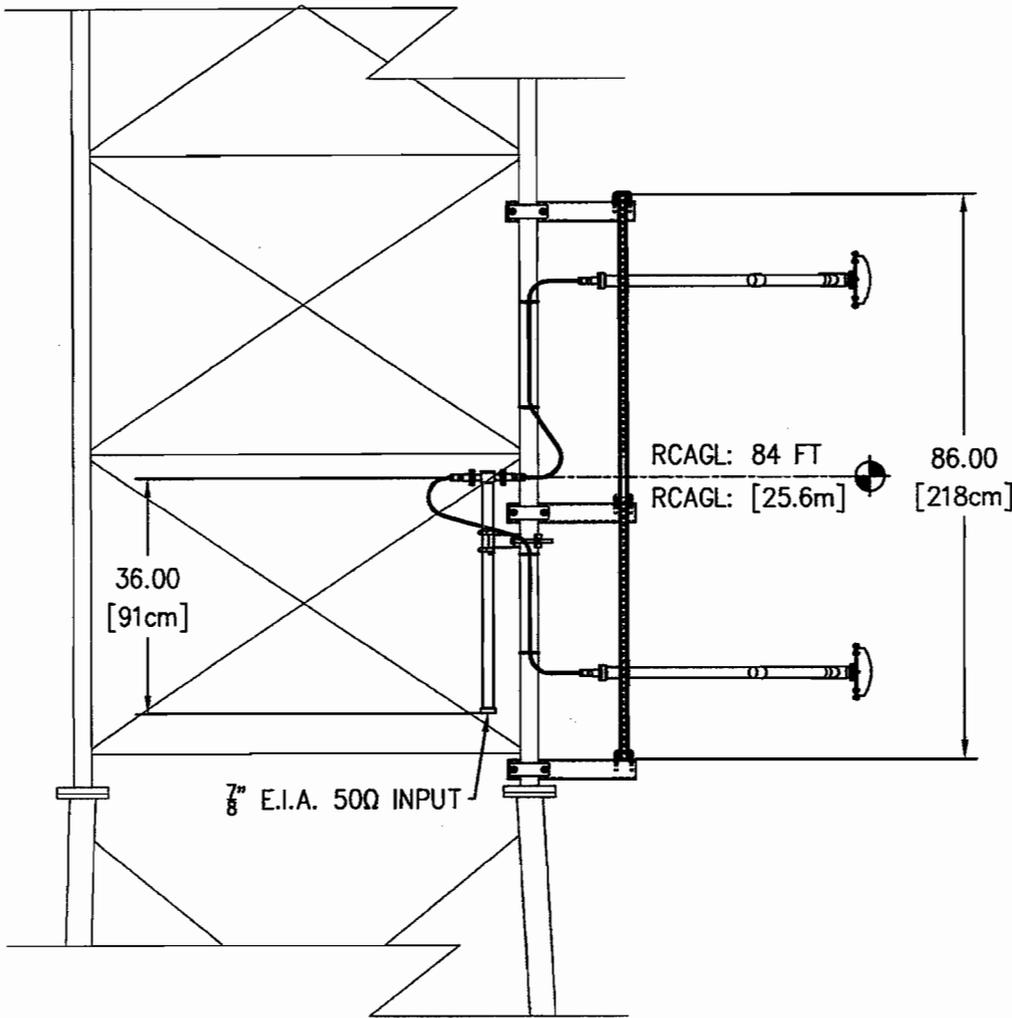
Antenna Model	PSIFMPH-1-DA
Type	1-bay directional FM panel antenna
Frequency	89.3 MHz
Polarization	Horizontal
Envelope RMS	.609
Measured RMS	.523
Gain (h-pol)	4.89 (6.89 dB)
ERP	4.0 kW
Antenna input power	.818 kW
Input	7/8" EIA input
Power rating	5 kW
Length	7.2 ft.
Weight	139 lbs.
Wind Area	13.5 sq. 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 FT <sup>2</sup>
	TIA-222-F (NO ICE)

# PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

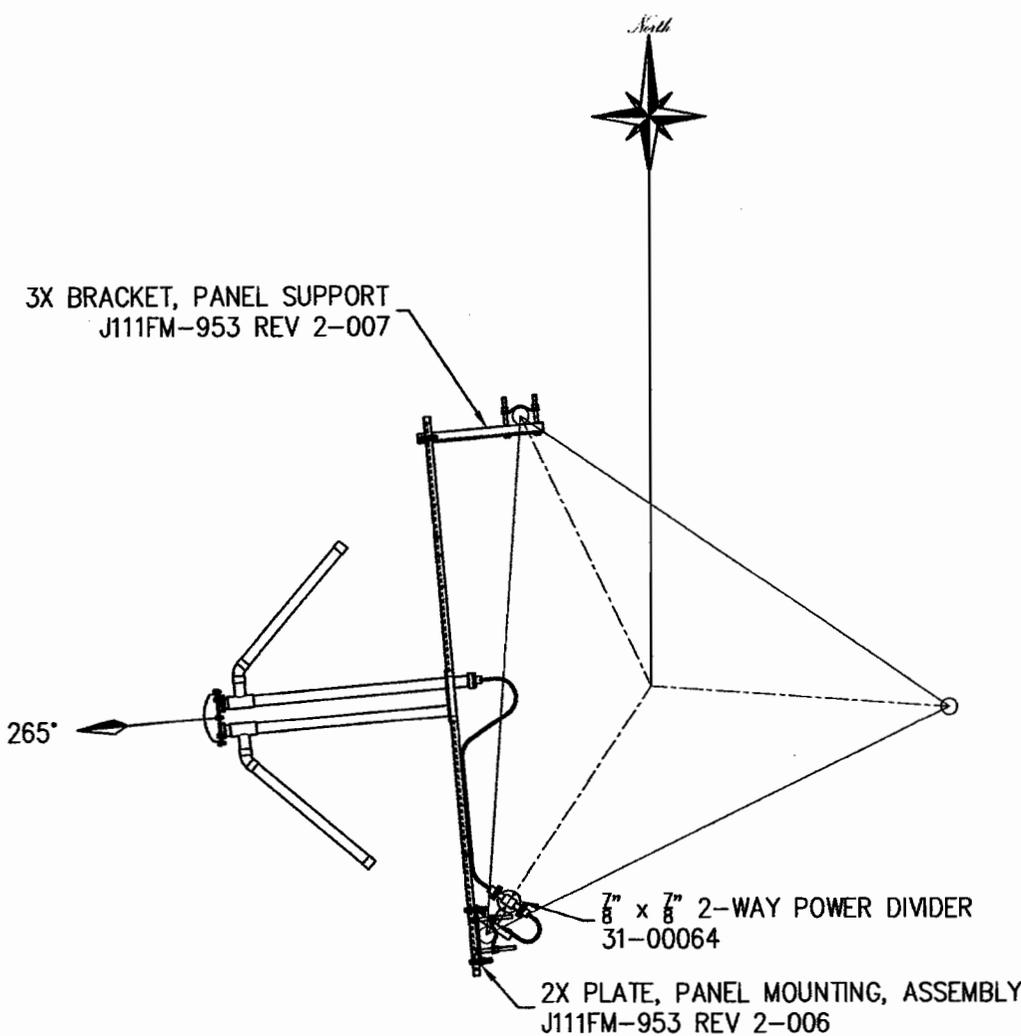
## ELEVATIONS AND SPECIFICATIONS

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

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SIZE  
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REV.	MADE BY CHECKED BY	DATE	CHANGE

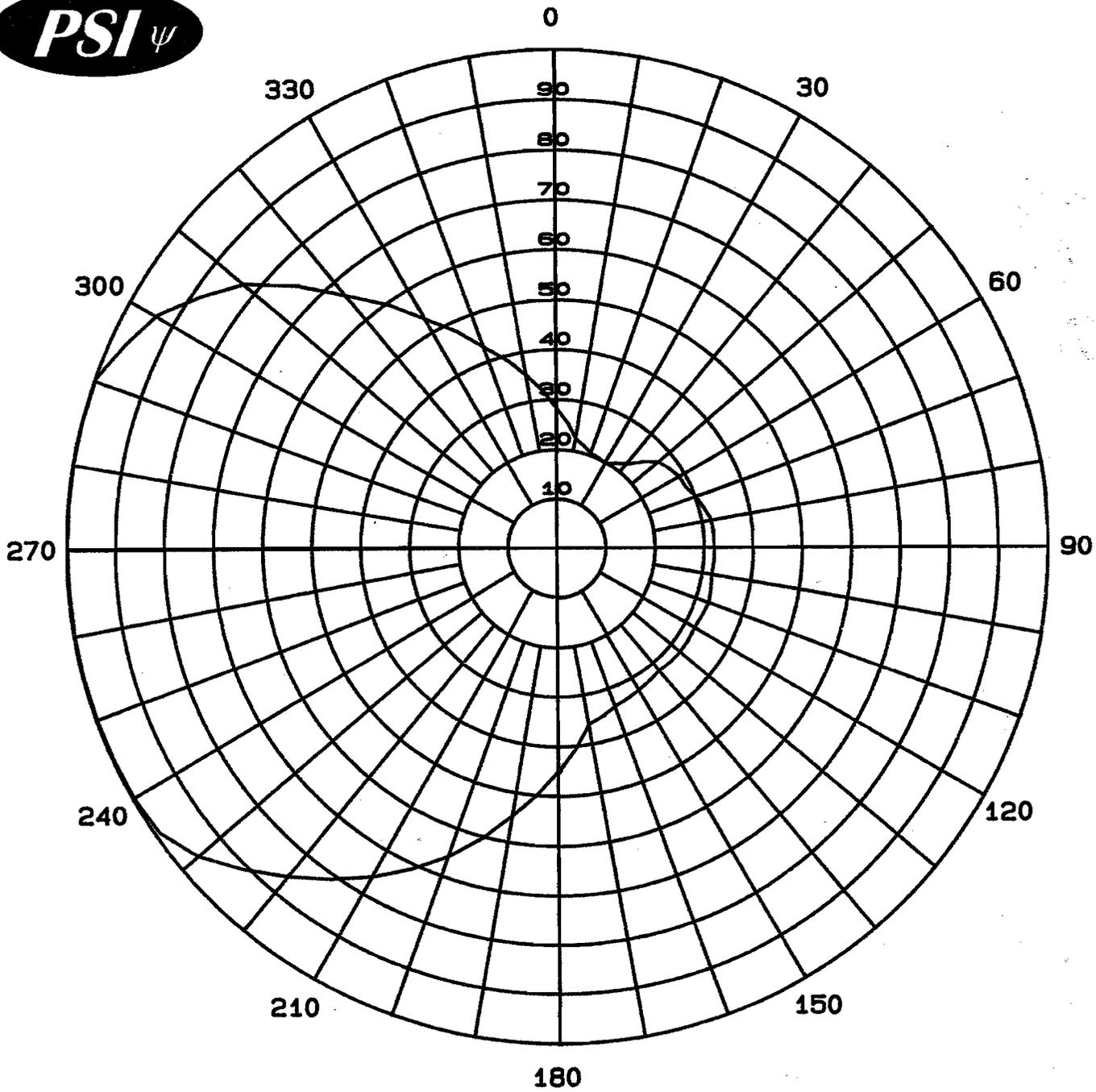
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Ebensburg, Pennsylvania USA 814-472-5540

ANTENNA PLAN VIEW AND ORIENTATION

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

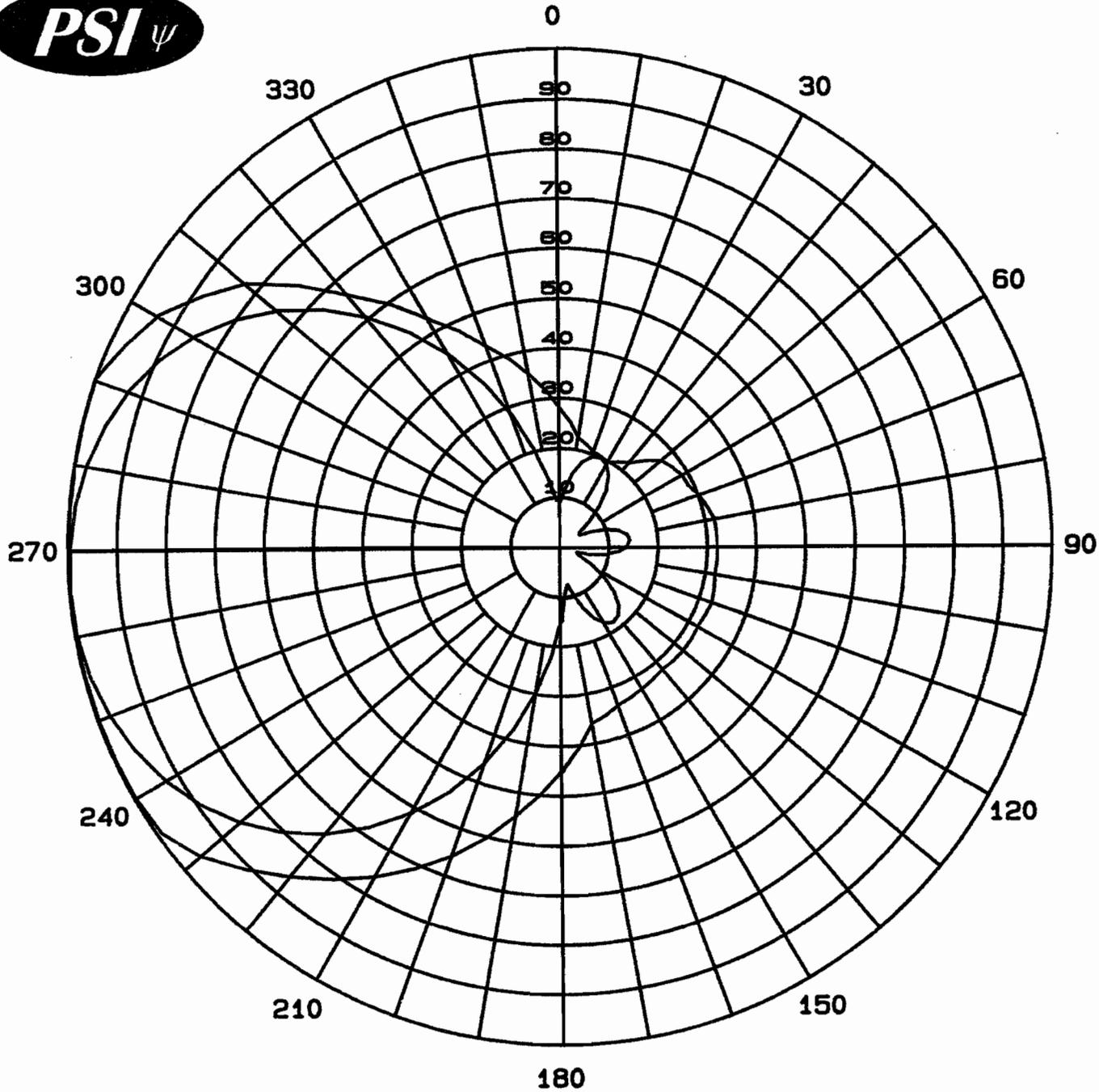
Station: KRSF

Frequency: 89.3 MHz

Location: Ridgecrest, CA

Maximum ERP: 4.0 kW (6.02 dBk)

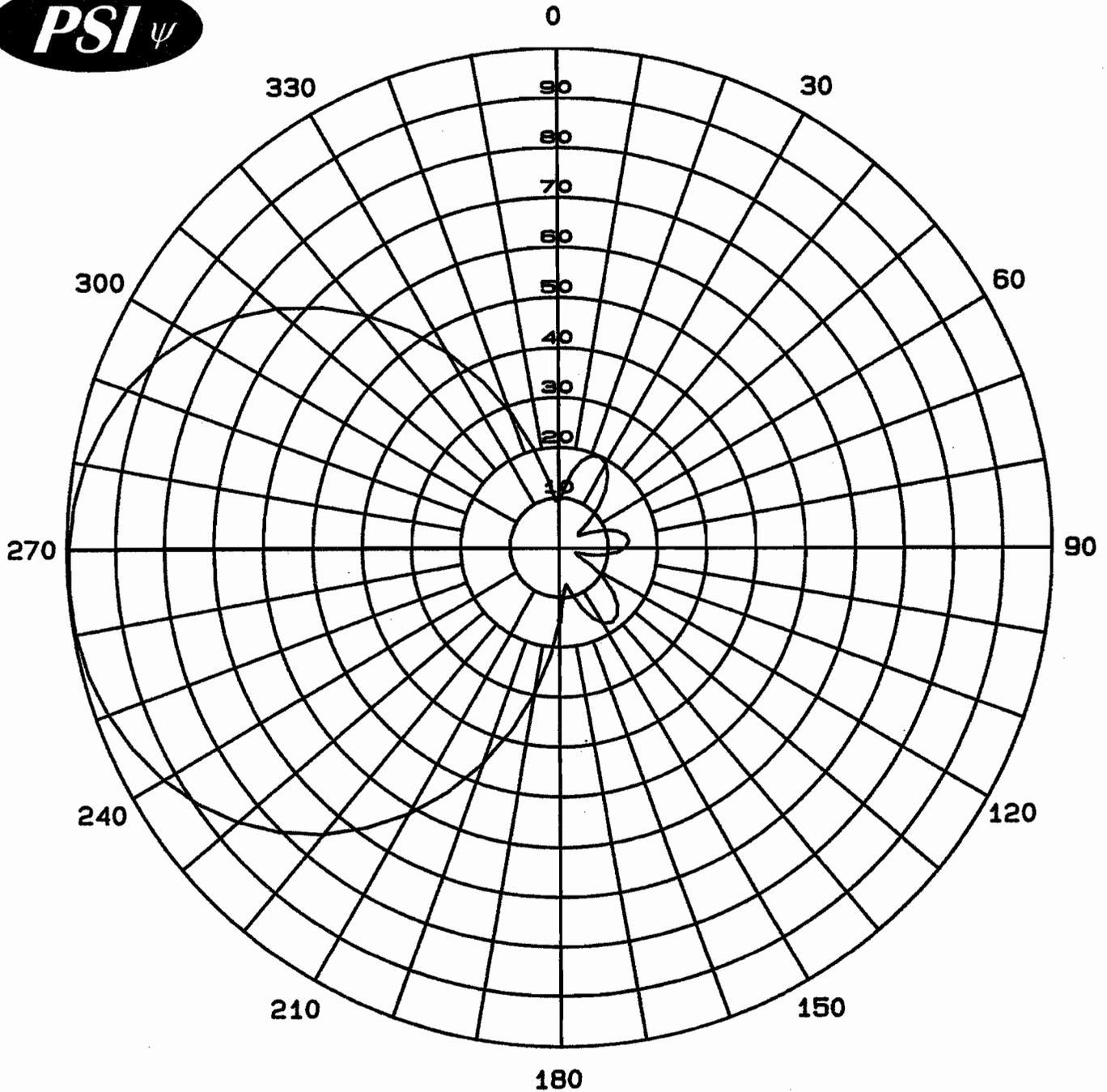
Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.279	0.311	-5.07
10	0.222	0.197	-7.05
20	0.202	0.163	-7.87
30	0.195	0.152	-8.18
40	0.219	0.192	-7.17
50	0.268	0.287	-5.42
60	0.285	0.325	-4.88
70	0.299	0.358	-4.47
80	0.317	0.402	-3.96
90	0.320	0.410	-3.88
100	0.319	0.407	-3.90
110	0.327	0.428	-3.69
120	0.321	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.**  
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**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: KRSE

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

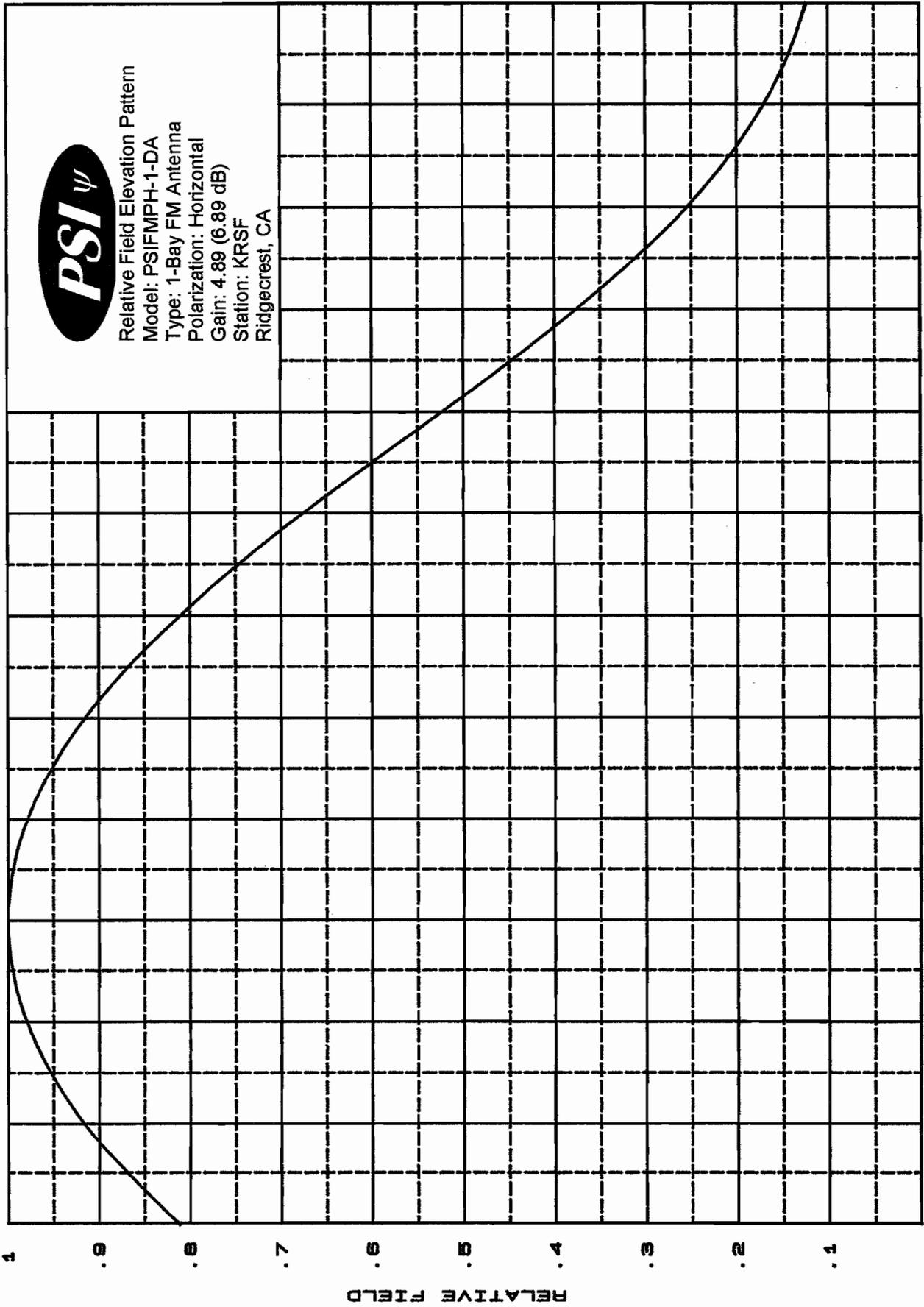
Field 0.035

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: KRFSF  
Ridgecrest, CA



DEGREES BELOW HORIZONTAL