Propagation Systems, Inc.
Quality Broadcast Antenna Systems

Directional FM Antenna
KQRU-FM
Santa Clarita Organization for Planning the Environment
Acton, CA

A three element Yagi antenna was used with a 1.9" diameter round support mast to create the necessary directional radiation pattern.

Pattern testing was performed using the full-scale antenna element and mast. 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 mast 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 125 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 88.3 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 91.8% of the envelope RMS. With the antenna positioned according to the attached drawing, the maximum ERP of .10 kW will be achieved at 225° True.

The antenna is to be mounted 20 meters (65.6 ft.) above ground level per the construction permit. No other antenna can be installed within 10 ft of any radiating element. The antenna is to be mounted to the support mast and positioned 225° True and certified by a licensed surveyor. 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 drawing.

PO Box 113 • 719 Pensacola Rd • Ebensburg • PA • 15931 • Phone (814) 472-5540 • Fax (814) 472-5676
www.psibroadcast.com

An input power level of .023 kW will be required at the antenna input in order to reach the licensed .10 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.

Antenna Specifications

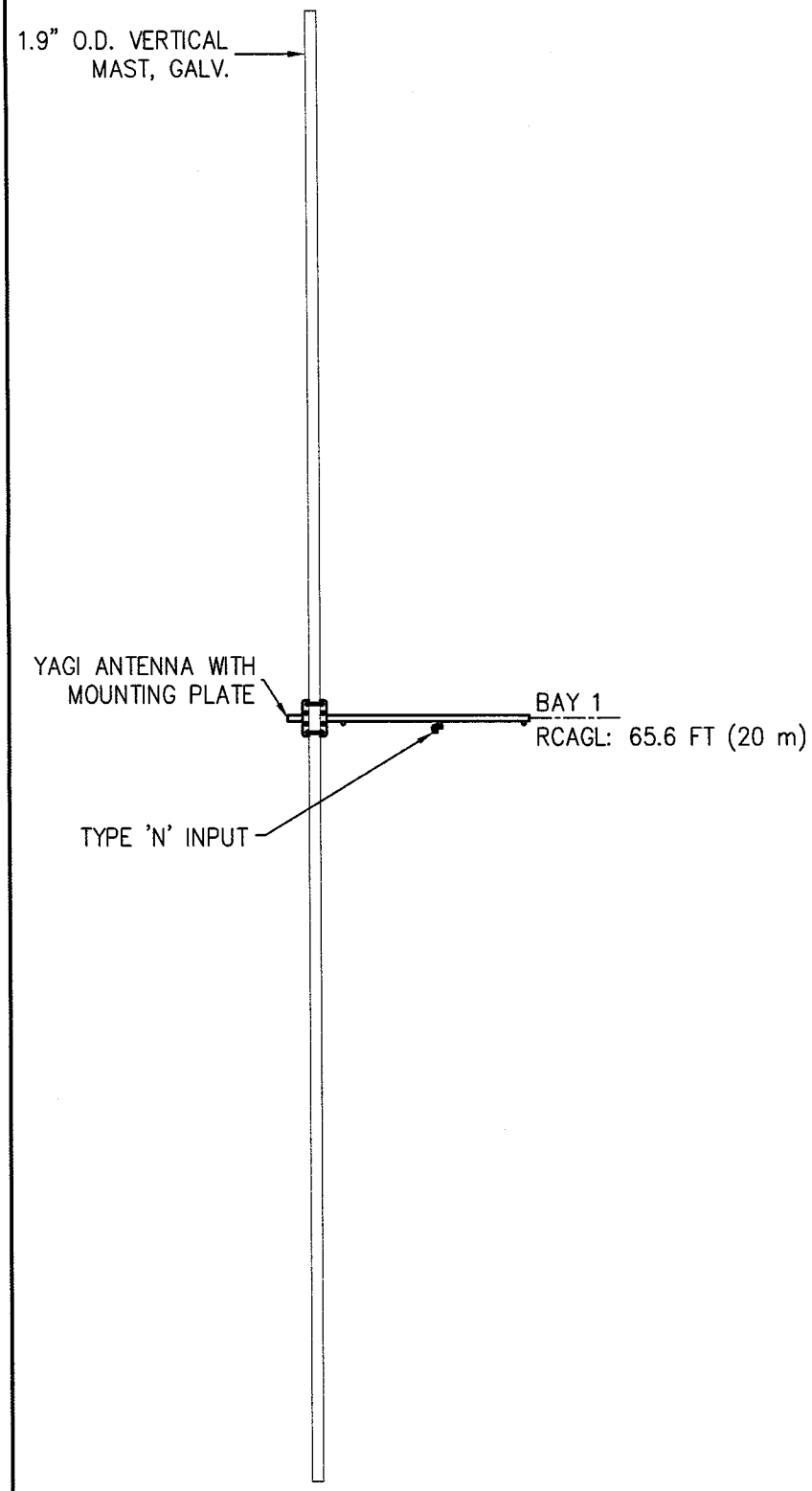
Antenna Model	PSIFMY-1-DA
Type	3-element directional FM Yagi antenna
Frequency	88.3 MHz
Polarization	Horizontal
Envelope RMS	.490
Measured RMS	.450
Gain (h-pol)	4.40 (6.43 dB)
Input	Type "N" female
Input power	.023 kW
Power rating	.300 kW
Length	42 In.
Weight	5 lbs.
Wind Area	.94 sq. ft.

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.

Douglas A Ross 3/10/14

Douglas A. Ross
President
Propagation Systems Inc.



SPECIFICATIONS
SPACING: 1.0λ
RATING: 300 W
GAIN: 4.4 (6.43 dB)
WEIGHT: 5 LB [2.27 Kg]
WINDAREA: .94 FT^2 TIA-222-F (NO ICE)

REV.	MADE BY / CHECKED BY	DATE	CHANGE

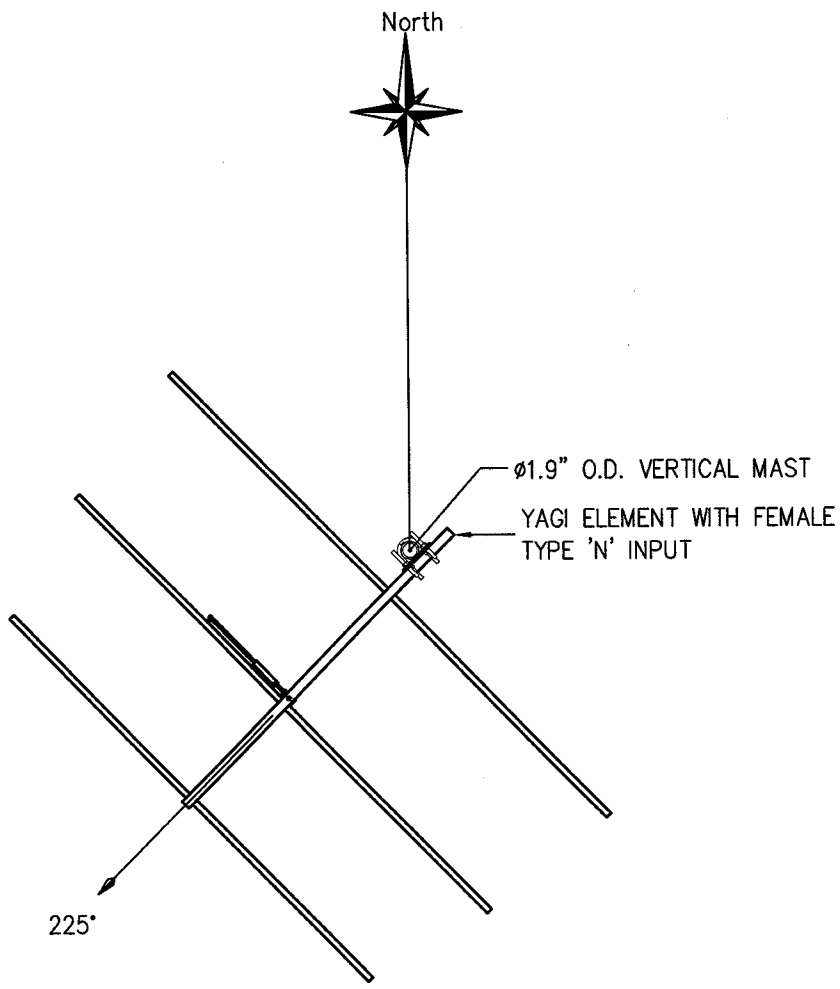
SIZE: A

PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

ELEVATIONS AND SPECIFICATIONS

MODEL:	DRAWN BY:	DATE:
PSIFMY-1-DA	D.G. Kellar	3/10/14
CHANNEL/ FREQUENCY: 88.3 MHz	APPROVED BY:	DATE:
SCALE: 1:30	DRAWING NO.: 1262-001	REV.



REV.	MADE BY / CHECKED BY	DATE	CHANGE

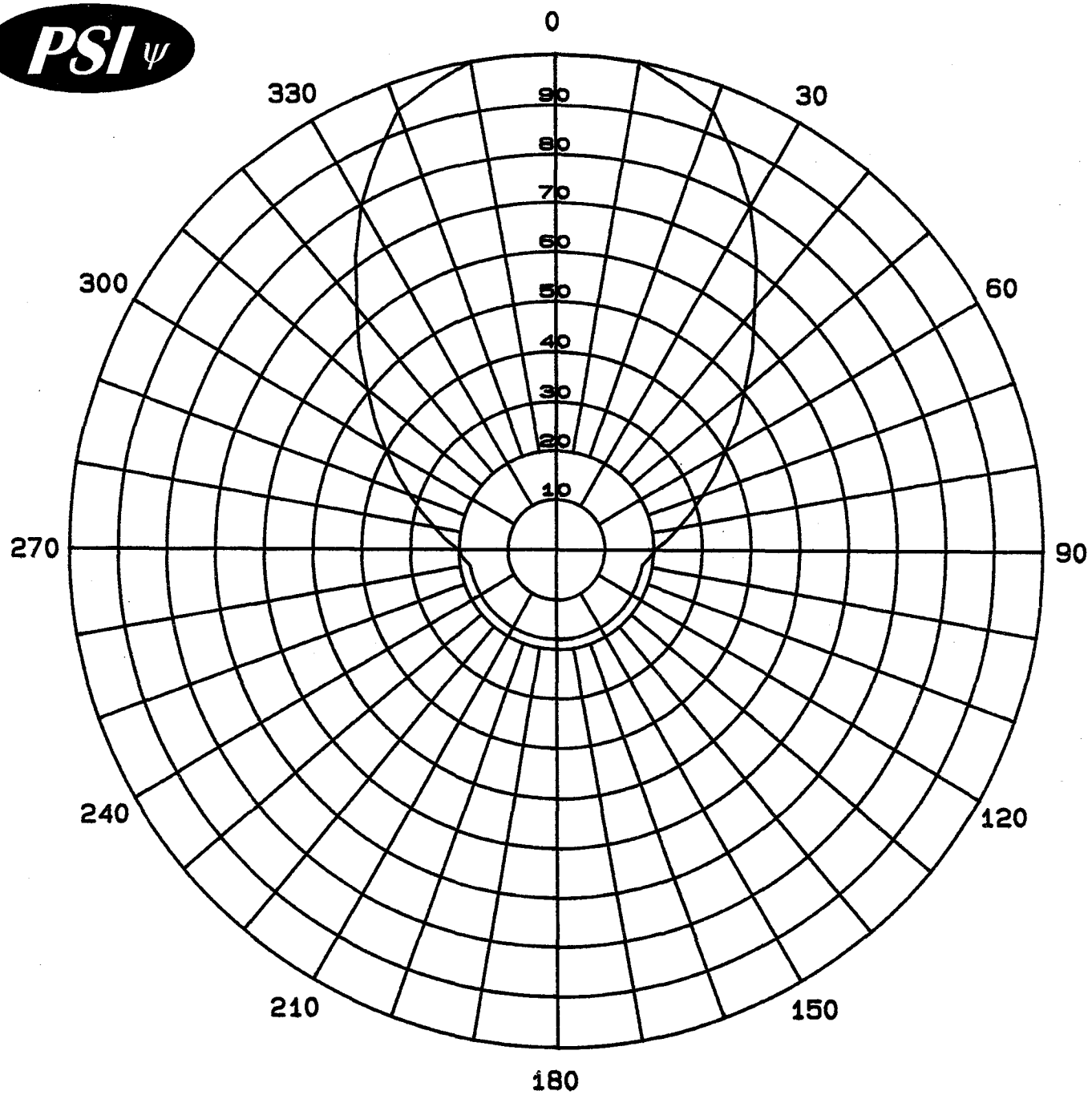
SIZE: A

PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

PLAN VIEW AND ORIENTATION

MODEL: PSIFMY-1-DA	DRAWN BY: D.A. Kellar	DATE: 3/10/14	
CHANNEL/FREQUENCY: 88.3 MHz	APPROVED BY:	DATE:	
SCALE: 1:20	DRAWING NO.: 1262-002	REV.	



Maximum Envelope
Azimuth Plane Pattern
Antenna: PSIFMY-1-DA
Type: 3-Element Yagi Antenna
ERP: .10 kW (-10.0 dBk)
RMS Envelope: .490
Pattern Rotation: 221°
Frequency: 88.3 MHz

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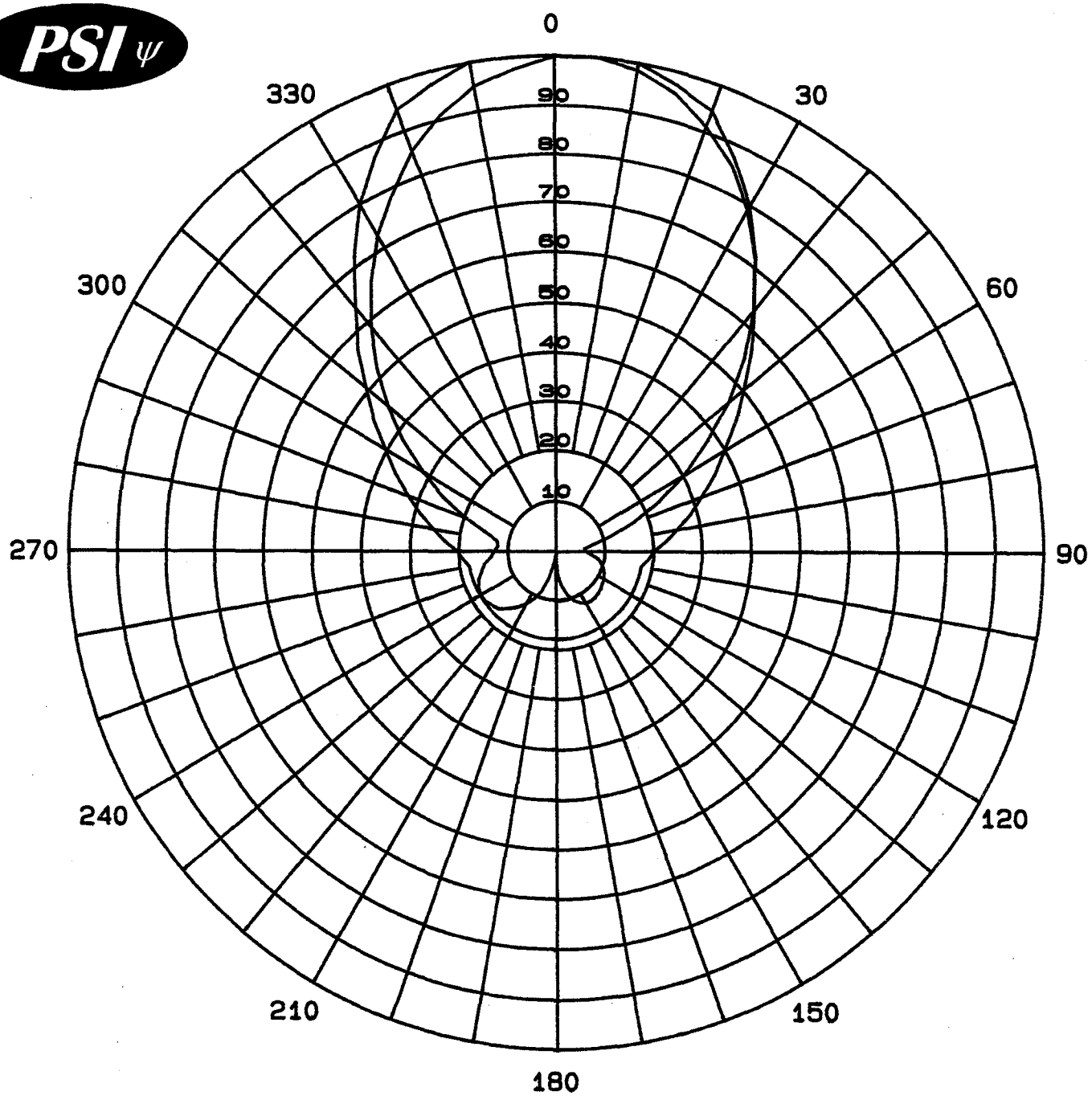
Ebensburg, PA 15931

KQRU Acton, CA

Maximum Envelope Pattern

Antenna: PSIFMY-1-DA
Santa Clarita Organization for Planning the Environment
Station: KQRU
Acton, CA
Frequency: 88.3 MHz
Maximum ERP: .10 kW (-10.0 dBk)
Pattern Rotation: 221 Degrees
Horizontal Polarization

Angle	Relative Field	ERP kW	ERP dBK
0	1.000	0.100	-10.00
10	1.000	0.100	-10.00
20	0.945	0.089	-10.49
30	0.799	0.064	-11.95
40	0.636	0.040	-13.93
50	0.506	0.026	-15.92
60	0.402	0.016	-17.92
70	0.320	0.010	-19.90
80	0.254	0.006	-21.90
90	0.202	0.004	-23.89
100	0.179	0.003	-24.94
110	0.179	0.003	-24.94
120	0.179	0.003	-24.94
130	0.179	0.003	-24.94
140	0.179	0.003	-24.94
150	0.179	0.003	-24.94
160	0.179	0.003	-24.94
170	0.179	0.003	-24.94
180	0.179	0.003	-24.94
190	0.179	0.003	-24.94
200	0.179	0.003	-24.94
210	0.179	0.003	-24.94
220	0.179	0.003	-24.94
230	0.179	0.003	-24.94
240	0.179	0.003	-24.94
250	0.179	0.003	-24.94
260	0.179	0.003	-24.94
270	0.202	0.004	-23.89
280	0.254	0.006	-21.90
290	0.320	0.010	-19.90
300	0.402	0.016	-17.92
310	0.506	0.026	-15.92
320	0.636	0.040	-13.93
330	0.799	0.064	-11.95
340	0.945	0.089	-10.49
350	1.000	0.100	-10.00



Maximum Envelope and
Measured Pattern
Antenna: PSIFMY-1-DA
Type: 3-Element Yagi Antenna
ERP: .10 kW (-10.0 dBk)
RMS Envelope: .490
RMS Measured: .450
Frequency: 88.3 MHz

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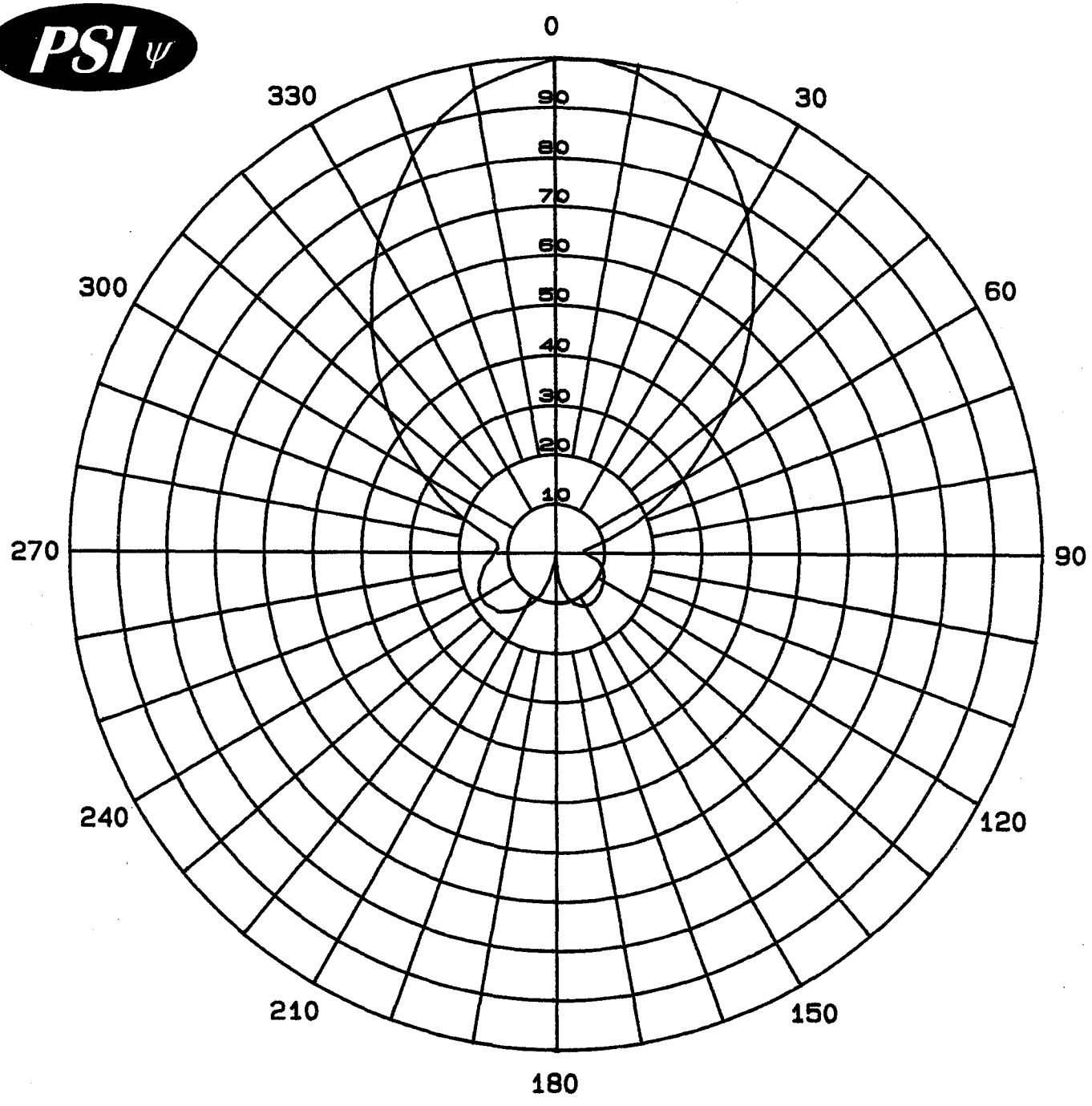
Pattern Rotation: 221°
KQRU Acton, CA



Measured Relative Field
Azimuth Plane Pattern
Antenna: PSIFMY-1-DA
Type: 3-Element Yagi Antenna
Gain H-pol (solid): 4.4 (6.43 dB)
RMS Measured: .450
Frequency: 88.3 MHz
Pattern Rotation: 221°

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Measured Relative Field

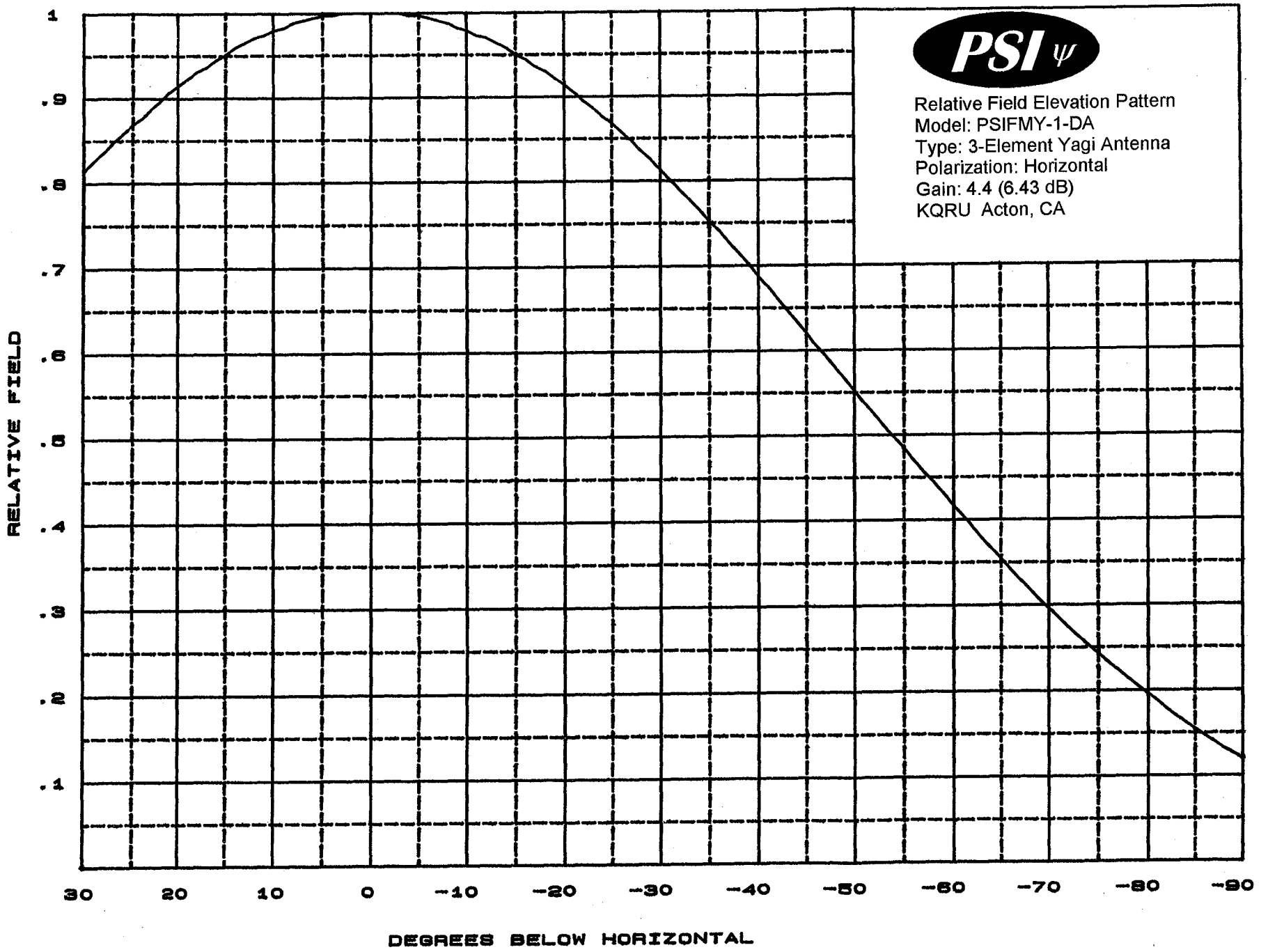
Antenna: PSIFMY-1-DA
Santa Clarita Organization for Planning the Environment
Station: KQRU
Acton, CA
Frequency: 88.3 MHz
Gain: 4.40 (6.43 dB)
Pattern Rotation: 221 Degrees
Horizontal Polarization

Angle	Relative Field	Power Gain	Gain dB
0	0.998	4.382	6.42
10	0.985	4.269	6.30
20	0.910	3.644	5.62
30	0.788	2.732	4.37
40	0.632	1.757	2.45
50	0.464	0.947	-0.24
60	0.304	0.407	-3.91
70	0.169	0.126	-9.01
80	0.076	0.025	-15.95
90	0.059	0.015	-18.15
100	0.086	0.033	-14.88
110	0.104	0.048	-13.22
120	0.114	0.057	-12.43
130	0.120	0.063	-11.98
140	0.124	0.068	-11.70
150	0.122	0.065	-11.84
160	0.107	0.050	-12.98
170	0.075	0.025	-16.06
180	0.029	0.004	-24.32
190	0.027	0.003	-24.94
200	0.086	0.033	-14.88
210	0.122	0.065	-11.84
220	0.151	0.100	-9.99
230	0.171	0.129	-8.91
240	0.179	0.141	-8.51
250	0.169	0.126	-9.01
260	0.149	0.098	-10.10
270	0.128	0.072	-11.42
280	0.123	0.067	-11.77
290	0.199	0.174	-7.59
300	0.315	0.437	-3.60
310	0.449	0.887	-0.52
320	0.589	1.526	1.84
330	0.729	2.338	3.69
340	0.856	3.224	5.08
350	0.951	3.979	6.00

Measured Relative Field
ERP Tabulation

Antenna: PSIFMY-1-DA
Santa Clarita Organization for Planning the Environment
Station: KQRU
Acton, CA
Frequency: 88.3 MHz
Maximum ERP: .10 kW (-10.0 dBk)
Pattern Rotation: 221 Degrees
Horizontal Polarization

Angle	Relative Field	ERP kW	ERP dBk
0	0.998	0.0996	-10.02
10	0.985	0.0970	-10.13
20	0.910	0.0828	-10.82
30	0.788	0.0621	-12.07
40	0.632	0.0399	-13.99
50	0.464	0.0215	-16.67
60	0.304	0.0092	-20.34
70	0.169	0.0029	-25.44
80	0.076	0.0006	-32.38
90	0.059	0.0003	-34.58
100	0.086	0.0007	-31.31
110	0.104	0.0011	-29.66
120	0.114	0.0013	-28.86
130	0.120	0.0014	-28.42
140	0.124	0.0015	-28.13
150	0.122	0.0015	-28.27
160	0.107	0.0011	-29.41
170	0.075	0.0006	-32.50
180	0.029	0.0001	-40.75
190	0.027	0.0001	-41.37
200	0.086	0.0007	-31.31
210	0.122	0.0015	-28.27
220	0.151	0.0023	-26.42
230	0.171	0.0029	-25.34
240	0.179	0.0032	-24.94
250	0.169	0.0029	-25.44
260	0.149	0.0022	-26.54
270	0.128	0.0016	-27.86
280	0.123	0.0015	-28.20
290	0.199	0.0040	-24.02
300	0.315	0.0099	-20.03
310	0.449	0.0202	-16.96
320	0.589	0.0347	-14.60
330	0.729	0.0531	-12.75
340	0.856	0.0733	-11.35
350	0.951	0.0904	-10.44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Relative Field Elevation Pattern
Model: PSIFMY-1-DA
Type: 3-Element Yagi Antenna
Polarization: Horizontal
Gain: 4.4 (6.43 dB)
KQRU Acton, CA
RELATIVE FIELD
1
.9
.8
.7
.6
.5
.4
.3
.2
.1
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
DEGREES BELOW HORIZONTAL