



Propagation Systems, Inc.

Quality Broadcast Antenna Systems

Directional FM Antenna

WDWZ

B. Jordan Communications Corporation

Andalusia, AL

A modified PSIFML antenna model with parasitic elements was used in conjunction with the customer's Rohn 25 triangular tower to create the necessary directional radiation pattern. The final antenna consists of one radiating element secured to a PSI supplied support mast mounted to the northeast tower face and one horizontal parasitic element.

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 tower 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 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 87.2% of the envelope RMS.

The antenna and mast assembly is to be mounted 75.9 meters (249 ft) +2/-4 meters above ground level on a the northeast tower face and positioned 35° True. No other antenna can be installed on the mast or within 10 ft. of the radiating element. 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 1.24 kW will be required at the antenna input in order to reach the approved 1.4 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	PSIFML-1B-DA
Type	1-bay directional FM antenna
Frequency	89.3 MHz
Polarization	Circular
Envelope RMS	.782
Composite RMS	.682
Gain (h-pol)	1.13 (.53 dB)
Gain (v-pol)	.811 (-.91 dB)
ERP	1.4 kW
Antenna input power	1.24 kW
Antenna Input	7/8" EIA
Power rating	1500 watts
Length	7.25 ft.
Weight	60 lbs.
Wind Area	3.47 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.



11/9/12

Douglas A. Ross
President
Propagation Systems Inc.

1½" SCH. 40 x 87" VERTICAL
MAST, GALVANIZED

BRACKET, MAST MOUNTING
J912FM-1119-006

PARASITIC, HORIZONTAL, MAST MOUNTED
J912FM-1119-003, NOTE BLACK BAND

7/8" E.I.A.
50Ω INPUT

BRACKET, MAST MOUNTING
J912FM-1119-006

BAY 1
RCAGL: 249.0 FT

SPECIFICATIONS

LENGTH: 725 FT [2.2m]

RATING: 1.5 kW

GAIN: 1.13 (.53 dB)

WEIGHT: 60.0 LB [27.2 Kg]

WINDAREA: 3.47 FT²

TIA-222-F (NO ICE)

NOTE: WEIGHTS AND WINDAREA
INCLUDE ALL BRACKETS, PARASITICS
AND VERTICAL MAST

PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

ELEVATIONS AND SPECIFICATIONS

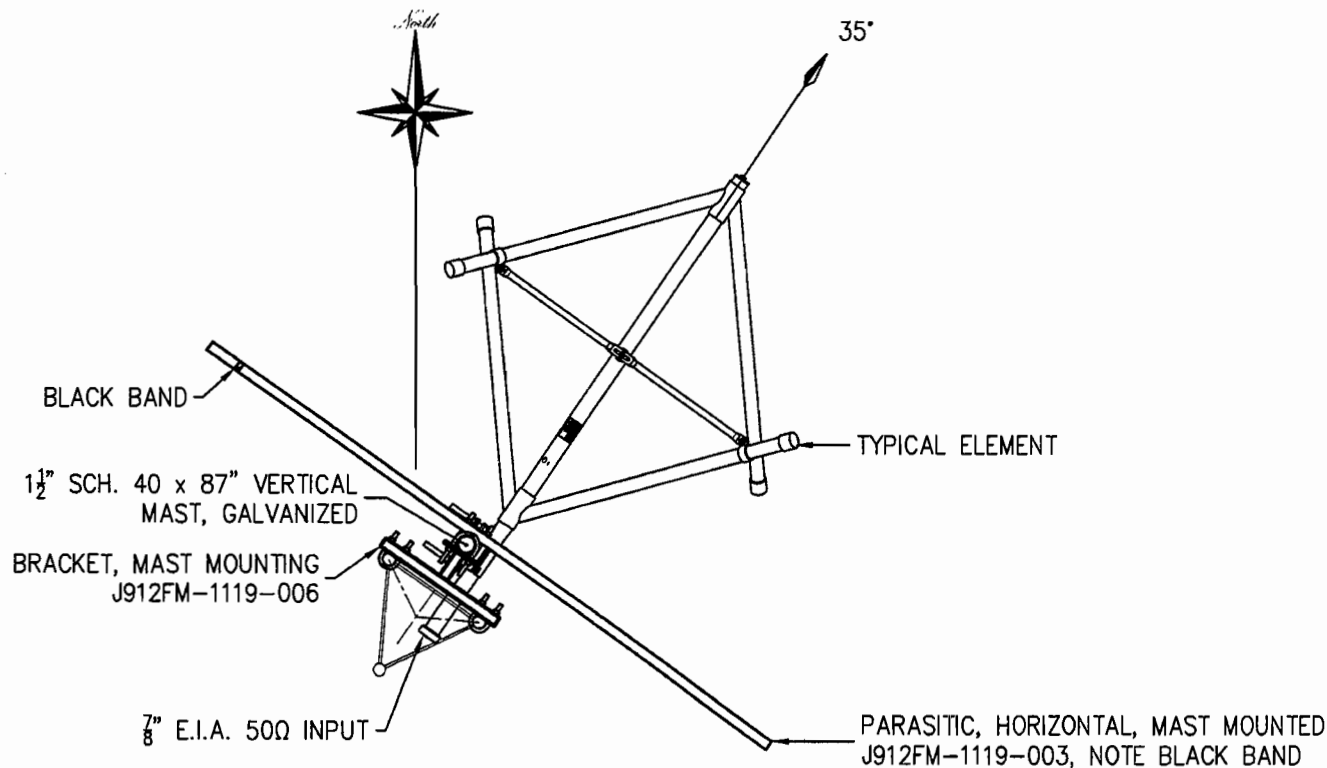
MODEL:	PSIFML-1B-DA	DRAWN BY:	D.G. Kellar	DATE:	10/18/12
CHANNEL/ FREQUENCY:	89.3 MHz	APPROVED BY:		DATE:	
SCALE:	1:30	DRAWING NO.:	J912FM-1119-001	REV.	

REV.	MADE BY	CHECKED BY	DATE	CHANGE
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SIZE

A



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PLANVIEW AND ORIENTATION

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SIZE

A

MODEL: PSIFML-1B-DA

CHANNEL/FREQUENCY: 89.3 MHz

SCALE: 1:20

DRAWN BY: D.G. Kellar

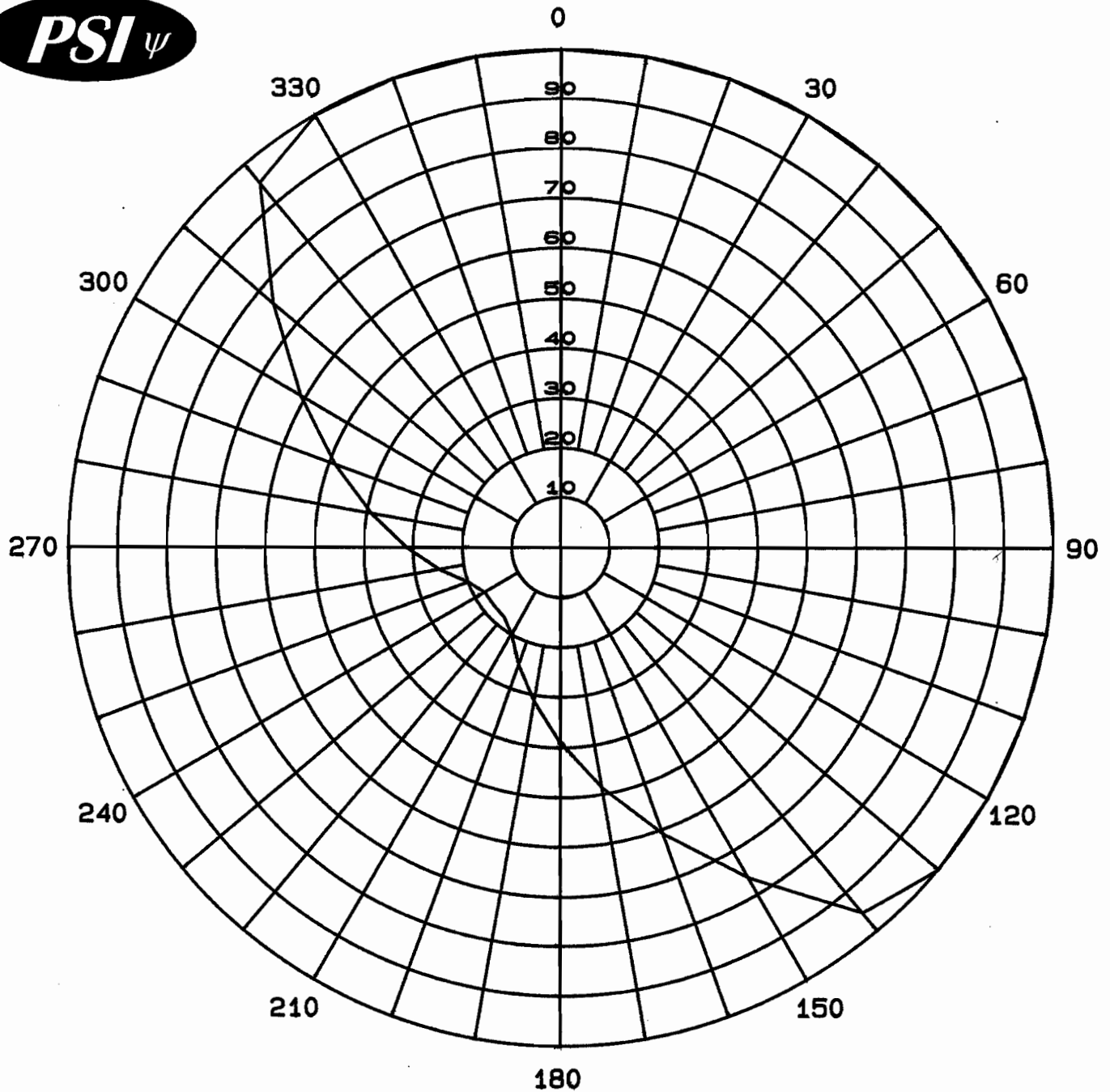
APPROVED BY:

DRAWING NO.: J912FM-1119-002

DATE: 10/18/12

DATE:

REV.



Maximum Envelope
Azimuth Plane Pattern
Antenna: PSIFML-1B-DA
Type: 1-Bay Directional FM Antenna
ERP: 1.4 kW (1.46 dBk)
RMS Envelope: .782
Frequency: 89.3 MHz
WDWZ Andalusia, AL

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Maximum Envelope Tabulation

Antenna: PSIFML-1B-DA

B. Jordan Communications Corporation

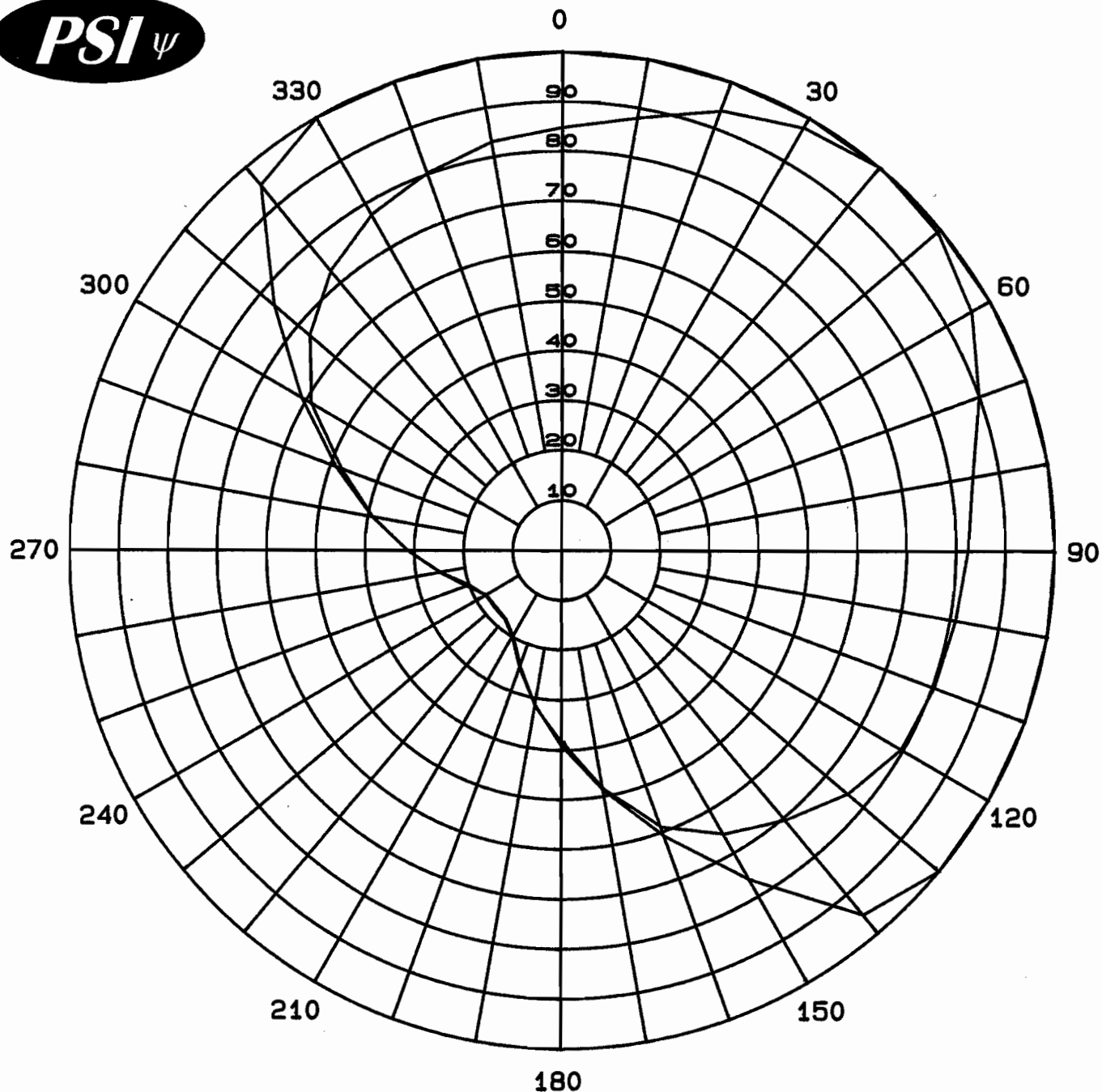
Station: WDWZ

Frequency: 89.3 MHz

Location: Andalusia, AL

Maximum ERP: 1.4 kW (1.46 dBk)

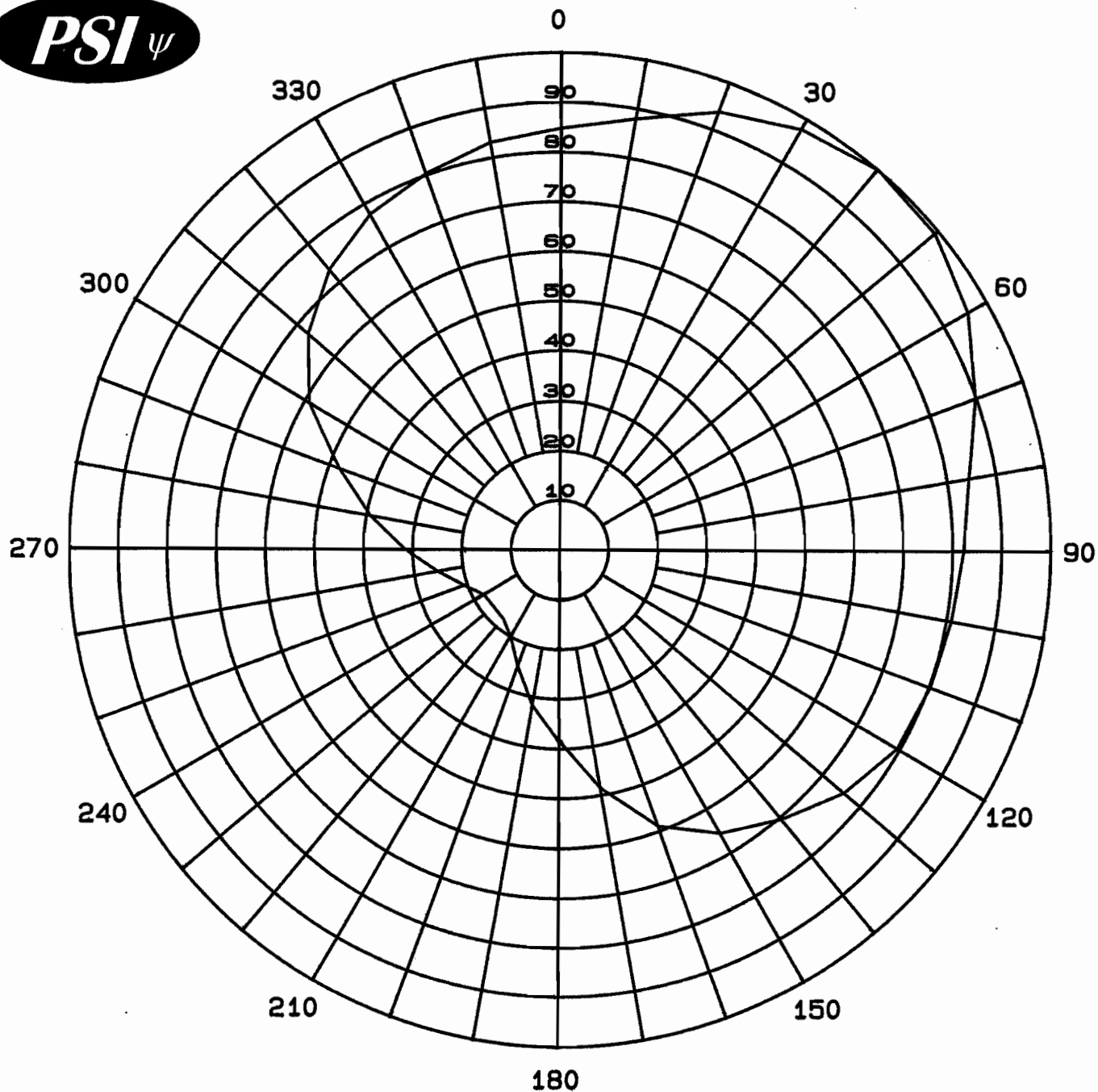
Angle	Relative Field	ERP (kW)	ERP (dBk)
0	1.000	1.400	1.46
10	1.000	1.400	1.46
20	1.000	1.400	1.46
30	1.000	1.400	1.46
40	1.000	1.400	1.46
50	1.000	1.400	1.46
60	1.000	1.400	1.46
70	1.000	1.400	1.46
80	1.000	1.400	1.46
90	1.000	1.400	1.46
100	1.000	1.400	1.46
110	1.000	1.400	1.46
120	1.000	1.400	1.46
130	1.000	1.400	1.46
140	0.953	1.271	1.04
150	0.763	0.815	-0.89
160	0.610	0.521	-2.83
170	0.488	0.333	-4.77
180	0.391	0.214	-6.70
190	0.313	0.137	-8.63
200	0.250	0.088	-10.58
210	0.200	0.056	-12.52
220	0.180	0.045	-13.43
230	0.178	0.044	-13.53
240	0.178	0.044	-13.53
250	0.200	0.056	-12.52
260	0.250	0.088	-10.58
270	0.313	0.137	-8.63
280	0.391	0.214	-6.70
290	0.488	0.333	-4.77
300	0.610	0.521	-2.83
310	0.763	0.815	-0.89
320	0.953	1.271	1.04
330	1.000	1.400	1.46
340	1.000	1.400	1.46
350	1.000	1.400	1.46



Maximum Envelope and
Composite Pattern
Antenna: PSIFML-1B-DA
Type: 1-Bay Directional FM Antenna
ERP: 1.4 kW (1.46 dBk)
RMS Envelope: .782
RMS Composite: .682
Frequency: 89.3 MHz

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

WDWZ Andalusia, AL



Measured Composite
Azimuth Plane Pattern
Antenna: PSIFML-1B-DA
Type: 1-Bay Directional FM Antenna
ERP: 1.4 kW (1.46 dBk)
RMS Composite: .682
Frequency: 89.3 MHz
WDWZ Andalusia, AL

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Composite Pattern Tabulation

Antenna: PSIFML-1B-DA

B. Jordan Communications Corporation

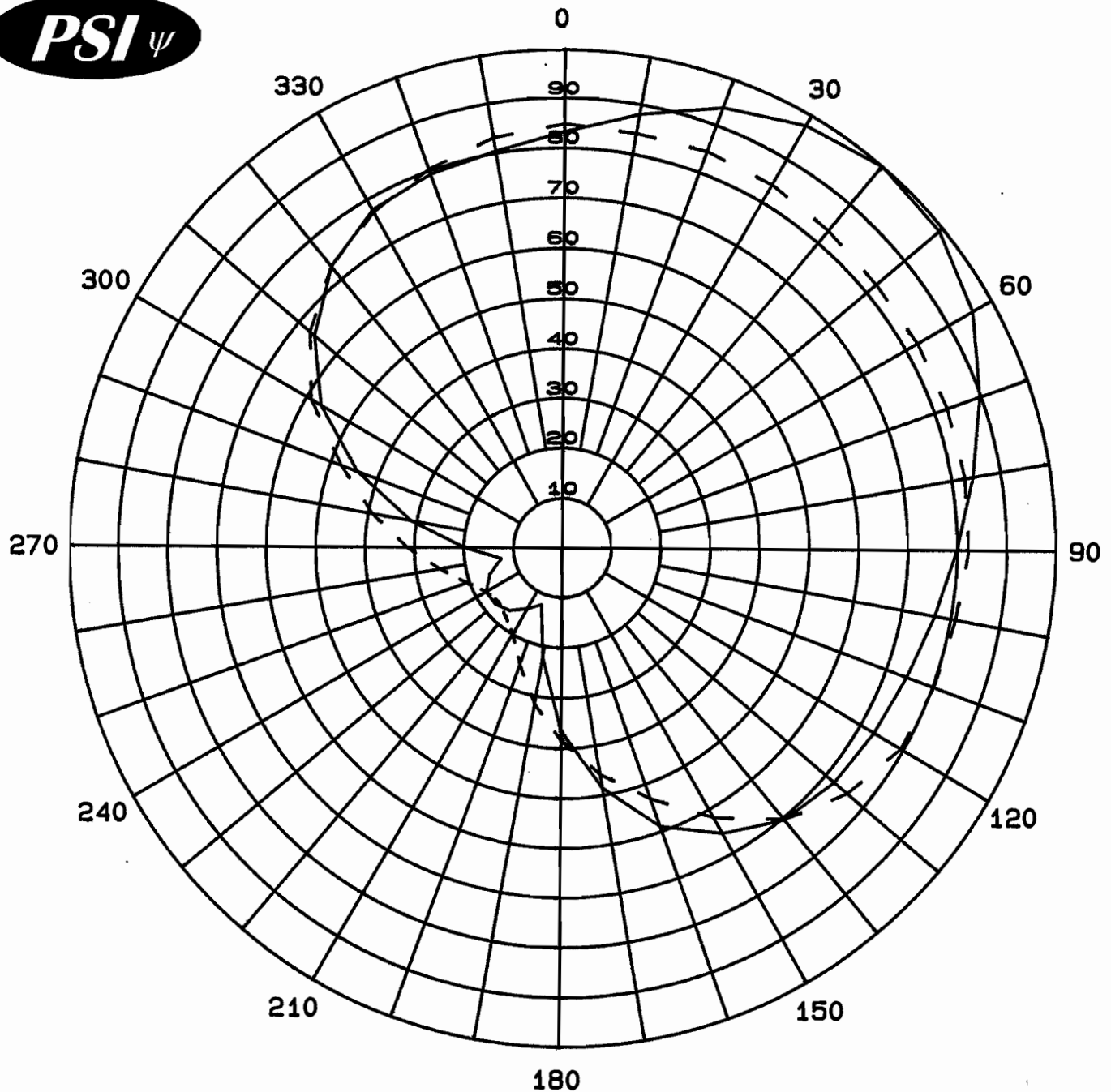
Station: WDWZ

Frequency: 89.3 MHz

Location: Andalusia, AL

Maximum ERP: 1.4 kW (1.46 dBk)

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.847	1.004	0.02
10	0.880	1.083	0.35
20	0.938	1.232	0.91
30	0.977	1.337	1.26
40	1.000	1.400	1.46
50	0.991	1.374	1.38
60	0.956	1.280	1.07
70	0.898	1.128	0.52
80	0.844	0.997	-0.01
90	0.822	0.947	-0.24
100	0.809	0.917	-0.38
110	0.802	0.902	-0.45
120	0.794	0.882	-0.54
130	0.757	0.802	-0.96
140	0.705	0.697	-1.57
150	0.657	0.604	-2.19
160	0.591	0.489	-3.11
170	0.487	0.332	-4.79
180	0.386	0.209	-6.81
190	0.313	0.137	-8.63
200	0.249	0.087	-10.61
210	0.200	0.056	-12.52
220	0.179	0.045	-13.48
230	0.176	0.043	-13.63
240	0.178	0.044	-13.53
250	0.200	0.056	-12.52
260	0.249	0.087	-10.61
270	0.311	0.135	-8.68
280	0.390	0.213	-6.72
290	0.478	0.320	-4.95
300	0.591	0.488	-3.11
310	0.672	0.632	-1.99
320	0.734	0.754	-1.23
330	0.777	0.845	-0.73
340	0.804	0.905	-0.44
350	0.831	0.966	-0.15



Measured Relative Field
Azimuth Plane Pattern
Antenna: PSIFML-1B-DA
Type: 1-Bay Directional FM Antenna
Gain H-pol (solid): 1.13 (.53 dB)
Gain V-pol (dash): .811 (-.91 dB)
Frequency: 89.3 MHz
WDWZ Andalusia, CO

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Measured Relative Field Tabulation

Antenna: PSIFML-1B-DA

B. Jordan Communications Corporation

Station: WDWZ

Frequency: 89.3 MHz

Location: Andalusia, AL

Horizontal Polarization

Angle	Relative Field	Power Gain	Gain (dB)
0	0.831	0.780	-1.08
10	0.880	0.875	-0.58
20	0.938	0.995	-0.02
30	0.977	1.079	0.33
40	1.000	1.130	0.53
50	0.991	1.109	0.45
60	0.956	1.033	0.14
70	0.898	0.910	-0.41
80	0.844	0.805	-0.94
90	0.799	0.722	-1.41
100	0.767	0.664	-1.78
110	0.744	0.626	-2.03
120	0.732	0.605	-2.18
130	0.723	0.590	-2.29
140	0.705	0.562	-2.50
150	0.657	0.488	-3.12
160	0.591	0.394	-4.04
170	0.487	0.268	-5.72
180	0.367	0.152	-8.18
190	0.221	0.055	-12.58
200	0.121	0.017	-17.81
210	0.141	0.022	-16.48
220	0.165	0.031	-15.12
230	0.176	0.035	-14.56
240	0.178	0.036	-14.46
250	0.156	0.027	-15.62
260	0.125	0.018	-17.53
270	0.198	0.044	-13.54
280	0.311	0.109	-9.61
290	0.442	0.221	-6.56
300	0.566	0.362	-4.41
310	0.659	0.491	-3.09
320	0.733	0.607	-2.17
330	0.777	0.682	-1.66
340	0.793	0.711	-1.48
350	0.804	0.730	-1.37

Maximum Value

Field 1.00
Gain 1.13 (.53 dB)

Azimuth Bearing 40 degrees

Minimum Field

Field 0.121
Gain .017 (-17.81 dB)

Azimuth Bearing 200 degrees

Vertical Polarization

Angle	Relative Field	Power Gain	Gain (dB)
0	0.847	0.811	-0.91
10	0.841	0.799	-0.97
20	0.844	0.805	-0.94
30	0.840	0.797	-0.99
40	0.831	0.781	-1.07
50	0.824	0.767	-1.15
60	0.826	0.770	-1.13
70	0.826	0.770	-1.13
80	0.826	0.771	-1.13
90	0.822	0.764	-1.17
100	0.809	0.740	-1.31
110	0.802	0.728	-1.38
120	0.794	0.712	-1.47
130	0.757	0.648	-1.89
140	0.705	0.561	-2.51
150	0.621	0.436	-3.61
160	0.533	0.321	-4.93
170	0.461	0.240	-6.20
180	0.386	0.168	-7.74
190	0.313	0.111	-9.56
200	0.249	0.070	-11.55
210	0.200	0.045	-13.45
220	0.179	0.036	-14.41
230	0.169	0.032	-14.91
240	0.178	0.036	-14.46
250	0.200	0.045	-13.45
260	0.249	0.070	-11.55
270	0.311	0.109	-9.61
280	0.390	0.172	-7.65
290	0.478	0.258	-5.88
300	0.591	0.394	-4.04
310	0.672	0.510	-2.92
320	0.734	0.608	-2.16
330	0.773	0.675	-1.71
340	0.804	0.730	-1.37
350	0.831	0.780	-1.08

Maximum Value

Field 0.85
Gain .811 (-.91 dB)

Azimuth Bearing 0 degrees

Minimum Field

Field 0.169
Gain .032 (-14.91 dB)

Azimuth Bearing 230 degrees

ERP Tabulation

Antenna: PSIFML-1B-DA

B. Jordan Communications Corporation

Station: WDWZ

Frequency: 89.3 MHz

Location: Andalusia, AL

Maximum ERP: 1.4 kW (1.46 dBk)

Horizontal Polarization

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.831	0.780	-1.08
10	0.880	1.083	0.35
20	0.938	1.232	0.91
30	0.977	1.337	1.26
40	1.000	1.400	1.46
50	0.991	1.374	1.38
60	0.956	1.280	1.07
70	0.898	1.128	0.52
80	0.844	0.997	-0.01
90	0.799	0.895	-0.48
100	0.767	0.823	-0.85
110	0.744	0.776	-1.10
120	0.732	0.749	-1.25
130	0.723	0.731	-1.36
140	0.705	0.697	-1.57
150	0.657	0.604	-2.19
160	0.591	0.489	-3.11
170	0.487	0.332	-4.79
180	0.367	0.188	-7.25
190	0.221	0.068	-11.65
200	0.121	0.020	-16.88
210	0.141	0.028	-15.55
220	0.165	0.038	-14.19
230	0.176	0.043	-13.63
240	0.178	0.044	-13.53
250	0.156	0.034	-14.69
260	0.125	0.022	-16.60
270	0.198	0.055	-12.61
280	0.311	0.135	-8.68
290	0.442	0.274	-5.63
300	0.566	0.448	-3.48
310	0.659	0.608	-2.16
320	0.733	0.752	-1.24
330	0.777	0.845	-0.73
340	0.793	0.880	-0.55
350	0.804	0.905	-0.44

Maximum Value (H-pol)

Field 1.00
ERP 1.4 kW (1.46 dBk)

Azimuth Bearing 40 degrees

Minimum Field (H-pol)

Field 0.121
ERP .02 kW (-16.88 dBk)

Azimuth Bearing 200 degrees

Vertical Polarization

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.847	1.004	0.02
10	0.841	0.990	-0.04
20	0.844	0.997	-0.01
30	0.840	0.987	-0.06
40	0.831	0.968	-0.14
50	0.824	0.950	-0.22
60	0.826	0.954	-0.20
70	0.826	0.954	-0.20
80	0.826	0.956	-0.20
90	0.822	0.947	-0.24
100	0.809	0.917	-0.38
110	0.802	0.902	-0.45
120	0.794	0.882	-0.54
130	0.757	0.802	-0.96
140	0.705	0.695	-1.58
150	0.621	0.540	-2.68
160	0.533	0.398	-4.00
170	0.461	0.298	-5.26
180	0.386	0.209	-6.81
190	0.313	0.137	-8.63
200	0.249	0.087	-10.61
210	0.200	0.056	-12.52
220	0.179	0.045	-13.48
230	0.169	0.040	-13.98
240	0.178	0.044	-13.53
250	0.200	0.056	-12.52
260	0.249	0.087	-10.61
270	0.311	0.135	-8.68
280	0.390	0.213	-6.72
290	0.478	0.320	-4.95
300	0.591	0.488	-3.11
310	0.672	0.632	-1.99
320	0.734	0.754	-1.23
330	0.773	0.837	-0.78
340	0.804	0.905	-0.44
350	0.831	0.966	-0.15

Maximum Value (V-pol)

Field 0.85
ERP 1.004 kW (.02 dBk)

Azimuth Bearing 0 degrees

Minimum Field (V-pol)

Field 0.169
ERP .040 kW (-13.98 dBk)

Azimuth Bearing 230 degrees



Relative Field Elevation Pattern
Model: PSIFML-1B-DA
Type: Directional FM
Polarization: Circular
Number of Bays: One
Gain: 1.13 (53 dB)
WDWZ Andalusia, AL

