



Certification
Directional FM Antenna
Antenna Model: PSIFML-1-DA
Frequency: 90.3 MHz

KBXO
Creative Educational Media Corp.
Coachella, CA
Ref. J803FM-367



Propagation Systems, Inc.

Quality Broadcast Antenna Systems

**Directional FM Antenna
KBXO
Creative Educational Media Corp.
Coachella, CA**

A standard model PSIFML antenna with parasitic element was used in conjunction with the customers' 4" diameter support mast to create the necessary directional radiation pattern. The final antenna consists of a single radiating element secured to the support mast with an integral-mounting bracket. A single horizontal parasitic is mounted to the support mast behind the radiating element. The antenna bay is mounted 10 feet above the tower top. The antenna element is fed from the end of the boom and 1/2" coaxial transmission line is recommended.

Pattern testing was performed using a 1/3 scale model 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 pole 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 8753A-network analyzer operating at 270.9 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.

General Notes

1. Review antenna elevation and plan the installation. The antenna bracket has been designed for a 4" diameter mast.
2. The bay is to be positioned 35 degrees true.
3. Exercise care when assembling the inner conductors of the coaxial line. The bullet should fit firmly in the inner conductor in order to assure a proper connection.
4. The feed point is in the up position.
5. Keep all transmission lines free from dirt and moisture. All Teflon insulators must be clean and dry.
6. The antenna does not require pressurization.
7. The antenna has been tuned at the factory and should not require field adjustment.
8. The antenna system should be tested before the erector leaves the premises to insure that the complete antenna system is functioning properly.

Installation Instructions

Step One

Review the enclosed drawings and read all steps for a general overview of the antenna installation. A 4.0" diameter support mast is required. A 20 ft. section of galvanized steel pipe (3-1/2" schedule 40) is recommended. This length of pipe will allow 5 ft. below the tower top for mounting. No bracketing has been supplied for the attachment of the support mast to the tower.

Step Two

Starting with the bay, attach the supplied 7/8" elbow to the antenna input. Use the supplied 1/4-20 x 3/4" bolts, locks and O-ring. Next mount the antenna to the support mast 65" from the top end. The feed point insulator must be in the up position. Use the supplied 4-1/16" ID U-bolts, nuts and locks. The mounting bracket has been pre-attached to the antenna and should not be moved. Attach the horizontal parasitic to the support mast behind the bay as shown in drawing J803FM-367-001 and J803FM-367-002.

Step Three

Connect the feed line (not supplied) to the 7/8" elbow. Secure the feed line to the backside of the support mast. Hoist the assembly and secure the mast to the tower leg. Rotate the mast to position the antenna 35 degrees true.

Step Four

The antenna system should be tested before the erector leaves the premises to insure that the complete antenna system is functioning properly. The antenna has been tested and tuned at the factory. It should not require tuning; however if the antenna has a high VSWR, consult the factory immediately (814-472-5540) while the tower crew is still on site.

The antenna is to be mounted on a 4" diameter support mast that extends 185" above the tower. The antenna center of radiation approved in the construction permit is 23 meters above ground. No other antenna can be installed within 10 ft of the radiating element. The antenna is to be positioned 35° True. 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 307.7 watts will be required at the antenna input in order to reach the licensed .32 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-1-DA
Type	1-bay low power directional FM antenna
Frequency	90.3 MHz
Gain (H-pol)	1.04 (.17 dB)
RMS (H-pol)	.66
Gain (V-pol)	1.01 (.04 dB)
RMS (V-pol)	.65
Envelope RMS	.71
Input	7/8" EIA input
Power rating	1 kW
Length	15.4 ft. (with support mast)
Weight	35 lbs.

Uncrating

When uncrating the antenna system, open each crate carefully so that the crates may be used to return any merchandise that may have been damaged in shipping. Separate all parts and confirm that all items on the packing list have been received. If any parts are missing, notify PSI or it's agent prior to assembling the antenna. If any parts are damaged through shipment or are missing, **promptly** notify the shipping carrier.

Drawing Index

Drawing Number

J803FM-367-001

J803FM-367-002

J803FM-367-004

Description

Antenna Top View/Orientation

Antenna Elevation

Antenna Element Parasitic

Statement of Certification

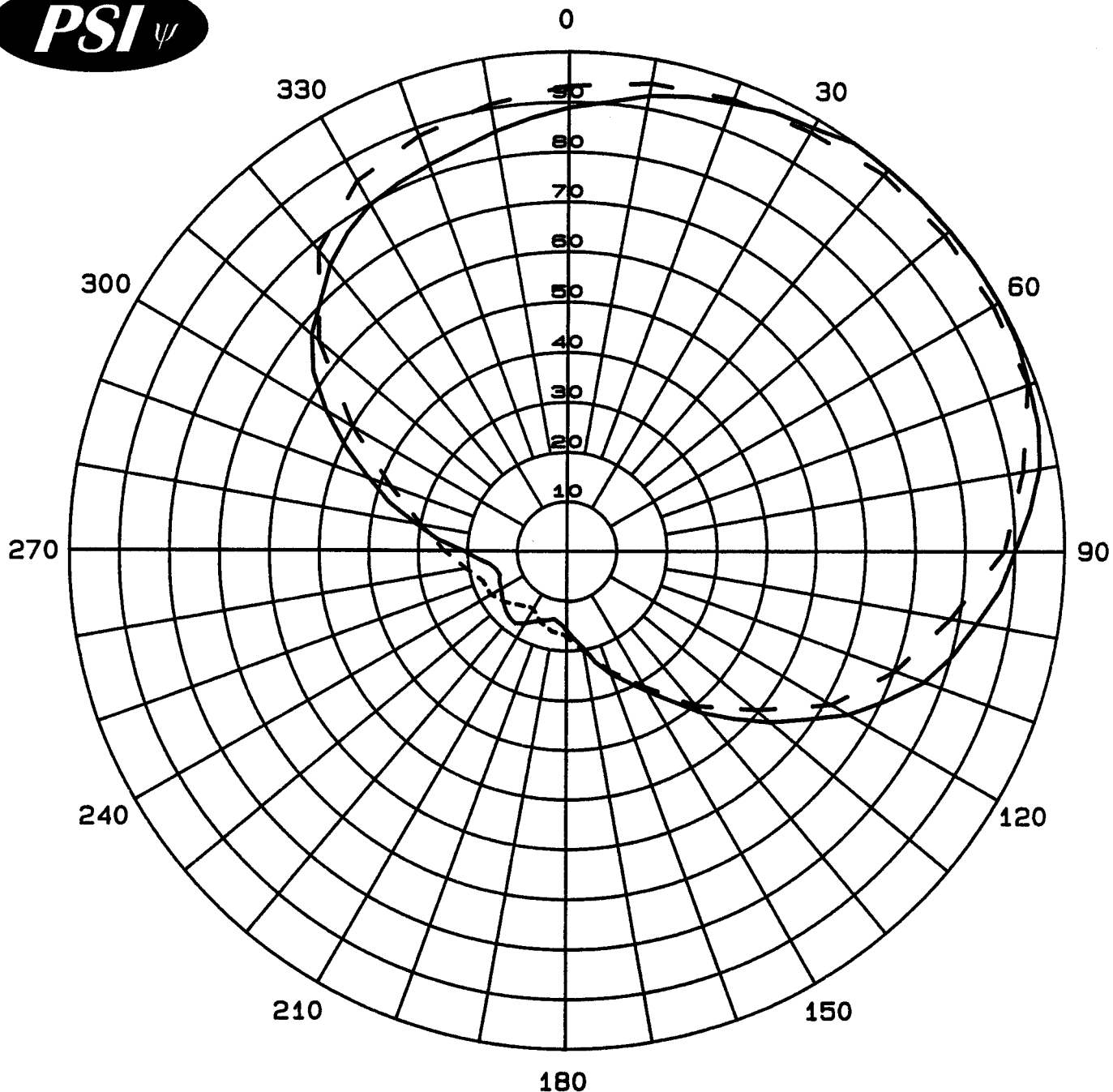
This is to certify the antenna has been designed, fabricated and tested under my supervision and it meets the required envelope pattern limitations set forth in the stations construction permit.



Douglas A. Ross

President

Propagation Systems Inc.



Measured Relative Field
Azimuth Plane Pattern
Antenna: PSIFML-1-DA
Type: 1-Bay FM Directional
Gain (H-pol): 1.04 (.17 dB)
Gain (V-pol): 1.01 (.04 dB)
Frequency: 90.3 MHz
Station: KBXO Coachella, CA

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Measured Relative Field Tabulation

Antenna: PSIFML-1-DA
Creative Educational Media Corp.
Station: KBXO
Frequency: 90.3 MHz
Location: Coachella, CA

Horizontal Polarization

Vertical Polarization

Angle	Relative Field	Power Gain	Gain (dB)
0	0.888	0.82	-0.86
10	0.927	0.89	-0.49
20	0.955	0.95	-0.23
30	0.981	1.00	0.00
40	1.000	1.04	0.17
50	1.000	1.04	0.17
60	1.000	1.04	0.17
70	0.987	1.01	0.06
80	0.965	0.97	-0.14
90	0.902	0.85	-0.73
100	0.837	0.73	-1.38
110	0.765	0.61	-2.16
120	0.654	0.44	-3.52
130	0.533	0.30	-5.30
140	0.422	0.19	-7.32
150	0.323	0.11	-9.65
160	0.261	0.07	-11.50
170	0.195	0.04	-14.03
180	0.156	0.03	-15.97
190	0.138	0.02	-17.03
200	0.148	0.02	-16.42
210	0.168	0.03	-15.32
220	0.175	0.03	-14.97
230	0.163	0.03	-15.59
240	0.150	0.02	-16.31
250	0.141	0.02	-16.85
260	0.155	0.02	-16.02
270	0.208	0.04	-13.47
280	0.307	0.10	-10.09
290	0.423	0.19	-7.30
300	0.560	0.33	-4.87
310	0.673	0.47	-3.27
320	0.745	0.58	-2.39
330	0.798	0.66	-1.79
340	0.821	0.70	-1.54
350	0.852	0.75	-1.22

Maximum Value

Field 1.00
Gain 1.04 (.17 dB)
Azimuth Bearing 36-60 degrees

Minimum Field

Field 0.138
Gain .02 (-17.03 dB)
Azimuth Bearing 190 degrees

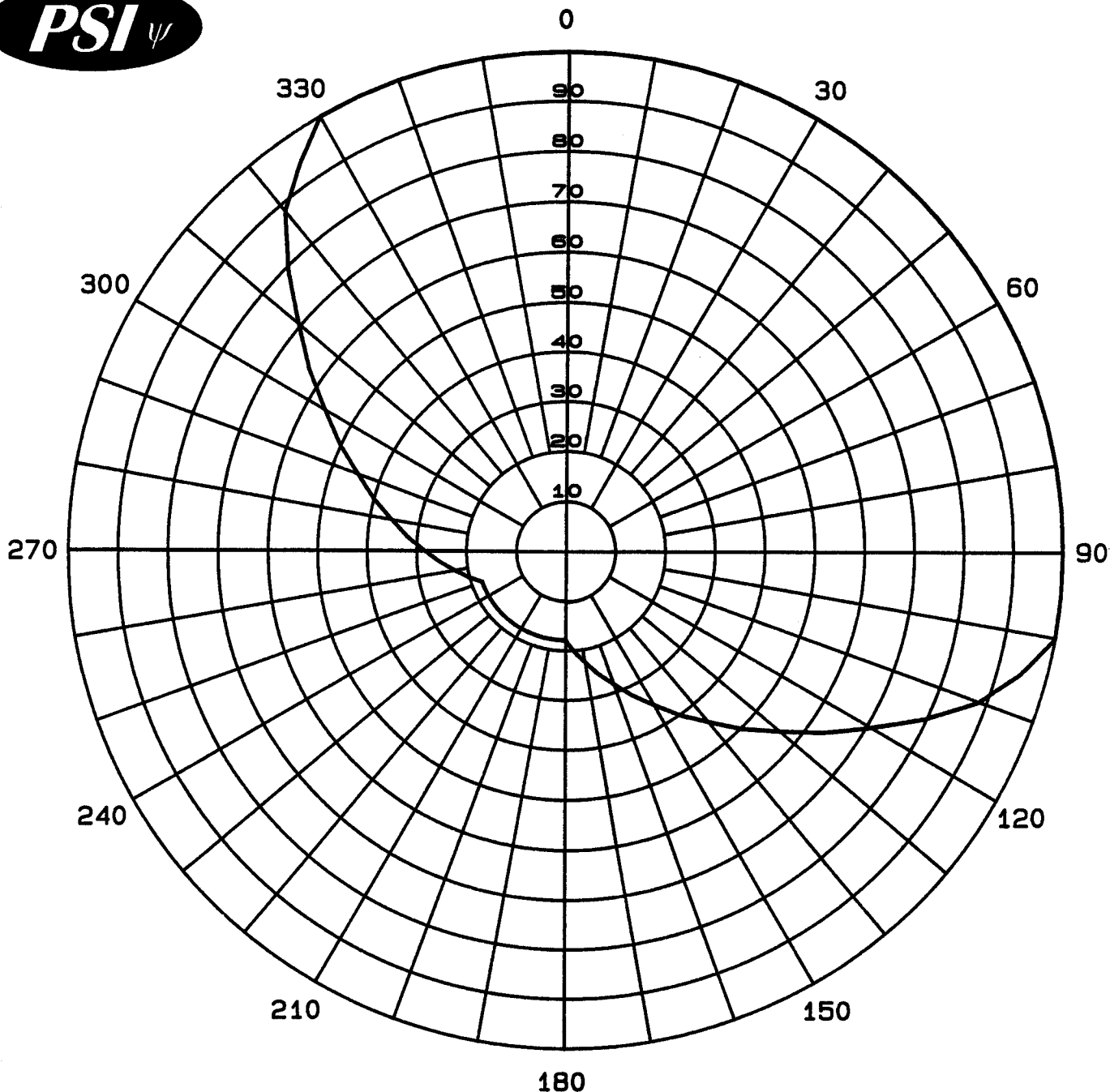
Angle	Relative Field	Power Gain	Gain (dB)
0	0.932	0.90	-0.44
10	0.951	0.94	-0.27
20	0.963	0.96	-0.16
30	0.970	0.98	-0.09
40	0.986	1.01	0.04
50	0.986	1.01	0.04
60	0.986	1.01	0.04
70	0.986	1.01	0.04
80	0.931	0.90	-0.45
90	0.880	0.81	-0.94
100	0.783	0.64	-1.95
110	0.703	0.51	-2.89
120	0.615	0.39	-4.05
130	0.496	0.26	-5.92
140	0.405	0.17	-7.68
150	0.314	0.10	-9.89
160	0.256	0.07	-11.66
170	0.203	0.04	-13.68
180	0.170	0.03	-15.22
190	0.164	0.03	-15.53
200	0.152	0.02	-16.19
210	0.133	0.02	-17.35
220	0.143	0.02	-16.72
230	0.160	0.03	-15.75
240	0.175	0.03	-14.97
250	0.178	0.03	-14.82
260	0.205	0.04	-13.59
270	0.247	0.06	-11.98
280	0.298	0.09	-10.35
290	0.378	0.15	-8.28
300	0.499	0.26	-5.87
310	0.654	0.44	-3.52
320	0.782	0.64	-1.97
330	0.852	0.75	-1.22
340	0.882	0.81	-0.92
350	0.907	0.86	-0.68

Maximum Value

Field 0.986
Gain 1.01 (.04 dB)
Azimuth Bearing 40-70 degrees

Minimum Field

Field 0.133
Gain .02 (-17.35 dB)
Azimuth Bearing 210 degrees



Maximum Envelope
Azimuth Plane Pattern
Antenna: PSIFML-1-DA
Type: 1-Bay FM Directional
Peak ERP: .320 kW (-4.95 dBk)
Configuration: Pole Mount
Frequency: 90.3 MHz
Station: KBXO Coachella, CA

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Maximum Envelope Tabulation

Antenna: PSIFML-1-DA

Creative Educational Media Corp.

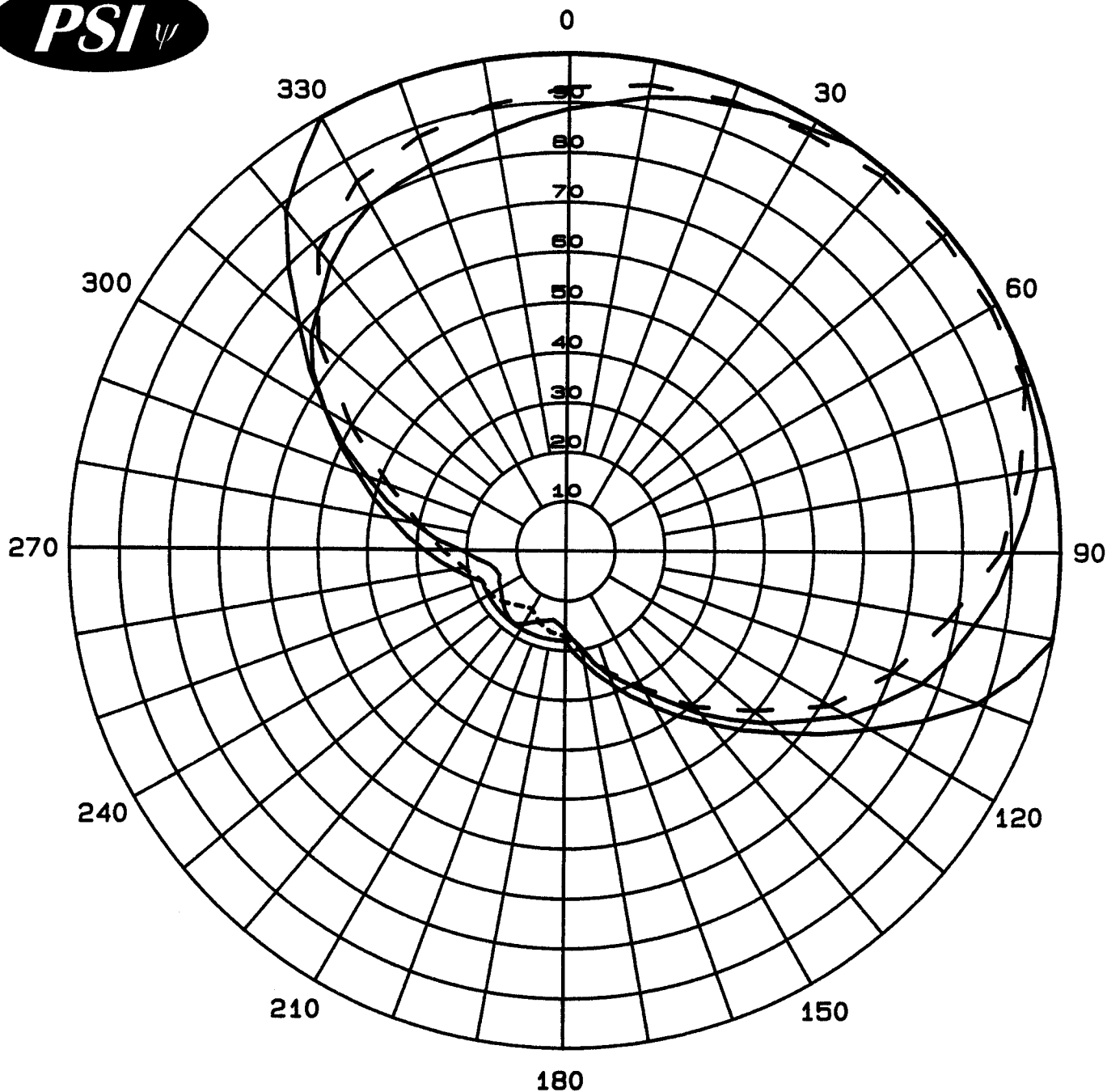
Station: KBXO

Frequency: 90.3 MHz

Location: Coachella, CA

Maximum ERP: .320 kW (-4.95 dBk)

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	1.000	0.320	-4.95
10	1.000	0.320	-4.95
20	1.000	0.320	-4.95
30	1.000	0.320	-4.95
40	1.000	0.320	-4.95
50	1.000	0.320	-4.95
60	1.000	0.320	-4.95
70	1.000	0.320	-4.95
80	1.000	0.320	-4.95
90	1.000	0.320	-4.95
100	1.000	0.320	-4.95
110	0.883	0.250	-6.03
120	0.707	0.160	-7.96
130	0.562	0.101	-9.95
140	0.447	0.064	-11.94
150	0.356	0.041	-13.92
160	0.283	0.026	-15.91
170	0.225	0.016	-17.90
180	0.179	0.010	-19.89
190	0.178	0.010	-19.94
200	0.178	0.010	-19.94
210	0.178	0.010	-19.94
220	0.178	0.010	-19.94
230	0.178	0.010	-19.94
240	0.178	0.010	-19.94
250	0.178	0.010	-19.94
260	0.224	0.016	-17.94
270	0.282	0.025	-15.94
280	0.354	0.040	-13.97
290	0.445	0.063	-11.98
300	0.560	0.100	-9.98
310	0.704	0.159	-8.00
320	0.885	0.251	-6.01
330	1.000	0.320	-4.95
340	1.000	0.320	-4.95
350	1.000	0.320	-4.95



Measured Relative Field and
Maximum Envelope Comparison
Antenna: PSIFML-1-DA
Type: 1-Bay FM Directional
Gain (H-pol): 1.04 (.17 dB)
Gain (V-pol): 1.01 (.04 dB)
Frequency: 90.3 MHz
Station: KBXO Coachella, CA

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

ERP Tabulation

Antenna: PSIFML-1-DA
Creative Educational Media Corp.
Station: KBXO
Frequency: 90.3 MHz
Location: Coachella, CA
Maximum ERP: .32 kW (-4.95 dBk)

Horizontal Polarization

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.888	0.252	-5.98
10	0.927	0.275	-5.61
20	0.955	0.292	-5.35
30	0.981	0.308	-5.12
40	1.000	0.320	-4.95
50	1.000	0.320	-4.95
60	1.000	0.320	-4.95
70	0.987	0.312	-5.06
80	0.965	0.298	-5.26
90	0.902	0.260	-5.84
100	0.837	0.224	-6.49
110	0.765	0.187	-7.28
120	0.654	0.137	-8.64
130	0.533	0.091	-10.41
140	0.422	0.057	-12.44
150	0.323	0.033	-14.76
160	0.261	0.022	-16.62
170	0.195	0.012	-19.15
180	0.156	0.008	-21.09
190	0.138	0.006	-22.15
200	0.148	0.007	-21.54
210	0.168	0.009	-20.44
220	0.175	0.010	-20.09
230	0.163	0.009	-20.70
240	0.150	0.007	-21.43
250	0.141	0.006	-21.96
260	0.155	0.008	-21.14
270	0.208	0.014	-18.59
280	0.307	0.030	-15.21
290	0.423	0.057	-12.42
300	0.560	0.100	-9.98
310	0.673	0.145	-8.39
320	0.745	0.178	-7.51
330	0.798	0.204	-6.91
340	0.821	0.216	-6.66
350	0.852	0.232	-6.34

Maximum Value (H-pol)

Field 1.00
ERP .320 kW (-4.95 dBk)

Azimuth Bearing 36-60 degrees

Minimum Field (H-pol)

Field 0.138
ERP .006 kW (-22.15 dBk)

Azimuth Bearing 190 degrees

Vertical Polarization

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.932	0.278	-5.56
10	0.951	0.289	-5.38
20	0.963	0.297	-5.28
30	0.970	0.301	-5.21
40	0.986	0.311	-5.08
50	0.986	0.311	-5.08
60	0.986	0.311	-5.08
70	0.986	0.311	-5.08
80	0.931	0.277	-5.57
90	0.880	0.248	-6.06
100	0.783	0.196	-7.07
110	0.703	0.158	-8.01
120	0.615	0.121	-9.17
130	0.496	0.079	-11.04
140	0.405	0.052	-12.80
150	0.314	0.032	-15.01
160	0.256	0.021	-16.78
170	0.203	0.013	-18.80
180	0.170	0.009	-20.34
190	0.164	0.009	-20.65
200	0.152	0.007	-21.31
210	0.133	0.006	-22.47
220	0.143	0.007	-21.84
230	0.160	0.008	-20.87
240	0.175	0.010	-20.09
250	0.178	0.010	-19.94
260	0.205	0.013	-18.71
270	0.247	0.020	-17.09
280	0.298	0.028	-15.46
290	0.378	0.046	-13.40
300	0.499	0.080	-10.99
310	0.654	0.137	-8.64
320	0.782	0.196	-7.08
330	0.852	0.232	-6.34
340	0.882	0.249	-6.04
350	0.907	0.263	-5.80

Maximum Value (V-pol)

Field 0.99
ERP .311 kW (-5.08 dBk)

Azimuth Bearing 40-70 degrees

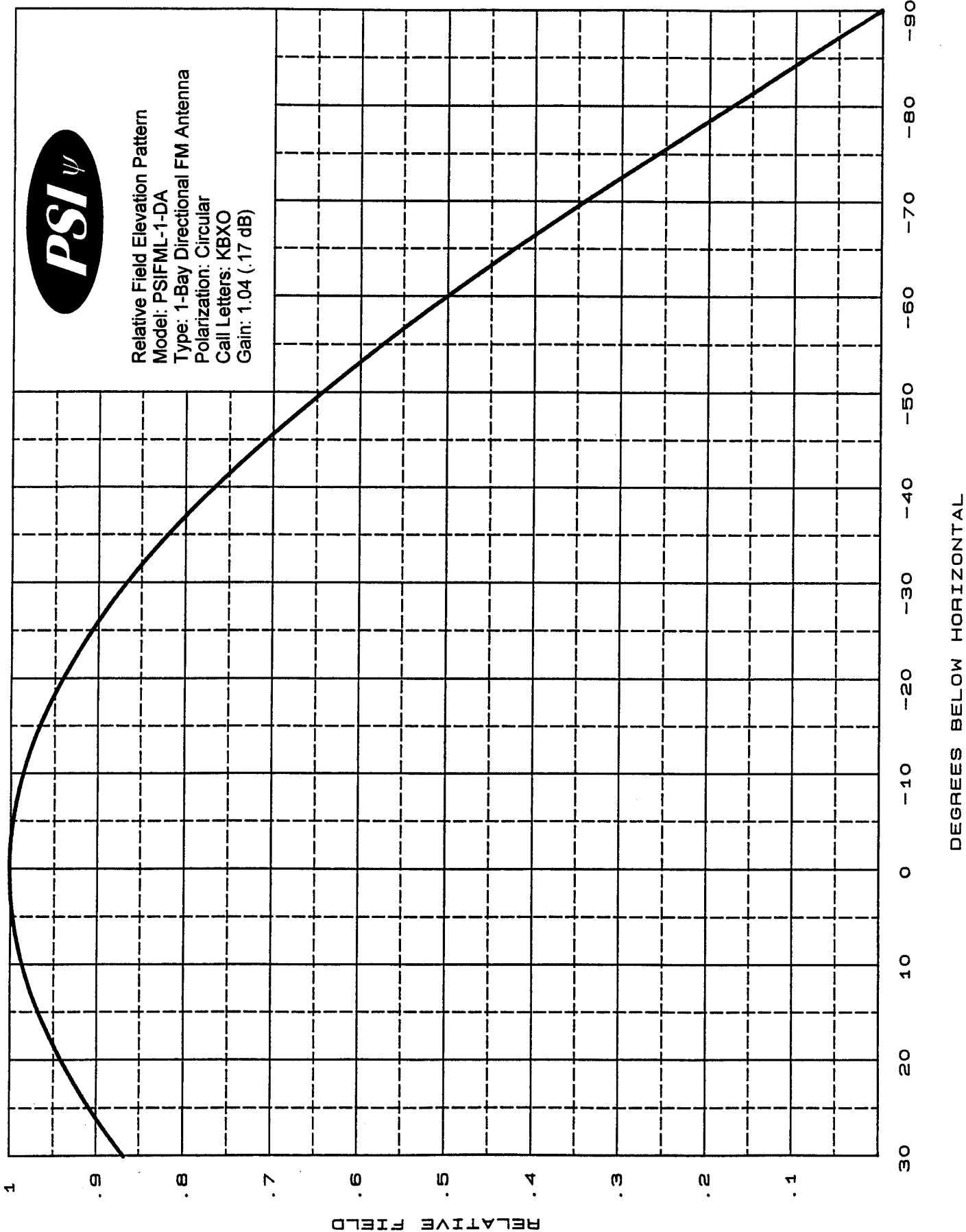
Minimum Field (V-pol)

Field 0.133
ERP .006 kW (-22.47 dBk)

Azimuth Bearing 210 degrees



Relative Field Elevation Pattern
Model: PSIFML-1-DA
Type: 1-Bay Directional FM Antenna
Polarization: Circular
Call Letters: KBXO
Gain: 1.04 (.17 dB)



PARASITICS ANTENNA PER
J903FM-367-004 & 1/2-13 x 4 1/16"
I.D. U-BOLT, HEXNUT AND
LOCKWASHER TYP. (1) PLACE

7/8" E.I.A. 90° ELBOW

3.6"

65"

BAY 1

120"

WIRE TIES AT
±12" O.C.

Ø4" MAST NOT
SUPPLIED BY PSI

TOP OF TOWER

COAXIAL LINE NOT
SUPPLIED BY PSI

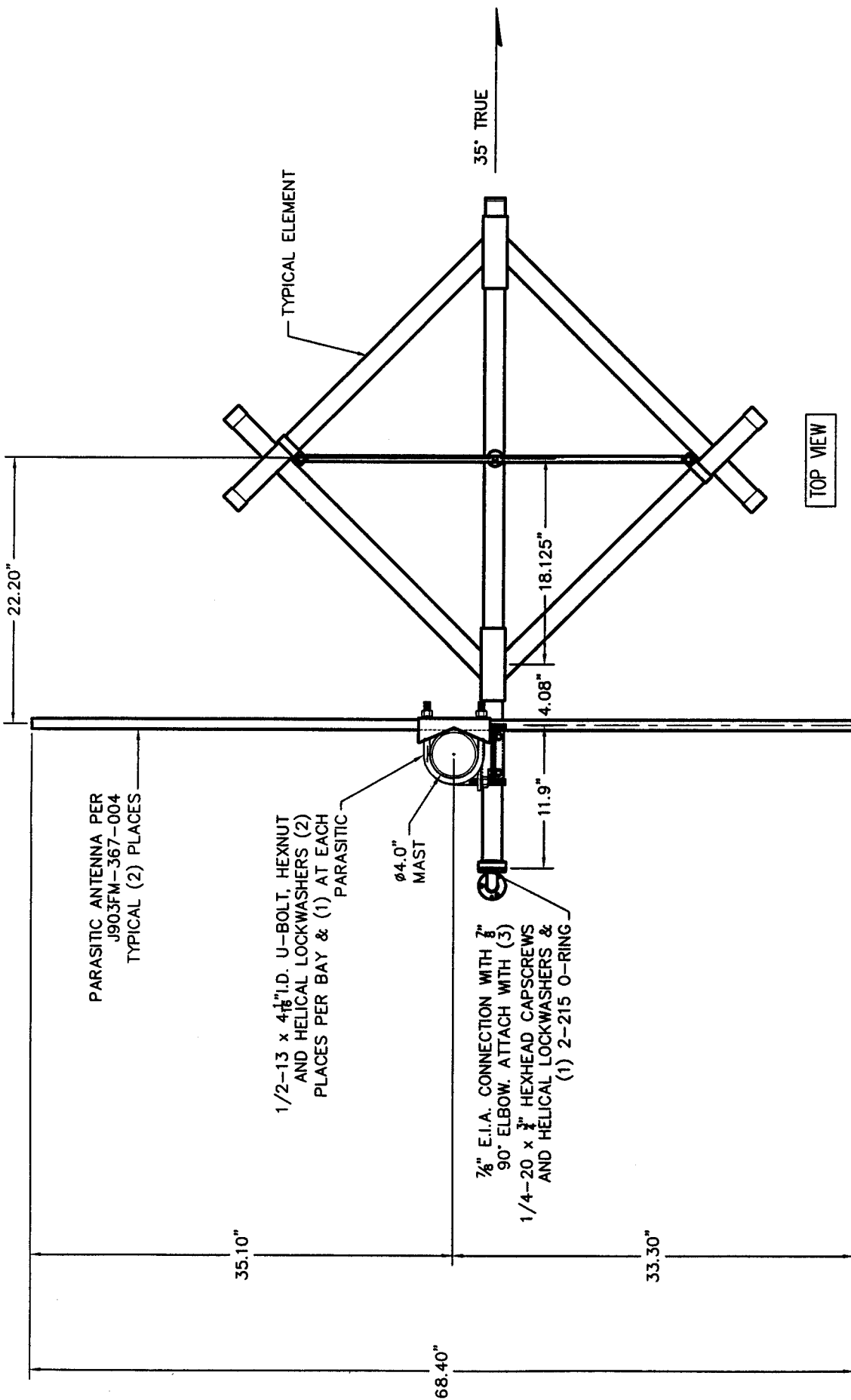
SPECIFICATIONS	
FREQUENCY:	90.3 MHz
INPUT:	7/8" E.I.A.
RATING:	1 kW
GAIN:	1.01 (0.04 dB)
WEIGHT:	35 Lbs
APPROX. WINDLOAD (50/33 PSF)	130 Lbs

MADE BY
CHECKED BY
DATE
CHANGE

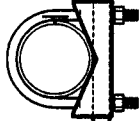
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MATERIAL:	
NOT APPLICABLE	
TOLERANCES UNLESS OTHERWISE NOTED FRACTIONS X/X ±1/16" DECIMALS XX ±.01" DECIMALS XXX ±.005" ANGLES ± 3°	SIZE A

PROPAGATION SYSTEMS, INC.			
Ebensburg, Pennsylvania USA			
ANTENNA ELEVATIONS			
MODEL:	PSIFML-1-DA	DRAWN BY:	D.G. Kellar
CHANNEL/ FREQUENCY:	90.3 MHz	APPROVED BY:	
SCALE:	1:20	DRAWING NO.:	J803FM-367-002
PART NO.:		REV.	0
DATE:	9/30/03		



PROPAGATION SYSTEMS, INC.		Ebensburg, Pennsylvania USA	
TYPICAL ANTENNA PLANVIEW		DATE: 9/30/03	
MODEL: PSIFML-1-DA		DRAWN BY: D.G. Kellar	
CHANNEL/FREQUENCY: 90.3 MHz		APPROVED BY:	
SCALE: 1:10		PART NO.: J803FM-367-001	
REV. 0		REV. 0	
MATERIAL: NOT APPLICABLE		SIZE: A	
TOLERANCES UNLESS OTHERWISE NOTED		FRACTIONS X/XX ± 1/16"	
DECIMALS XXX ± .01"		ANGLES ± 3°	
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 making any information for the making of drawings, prints or other reproductions hereof, or for the design or making of any item, parts, objects, apparatus or parts thereof, except upon the written permission of PSI first obtained. The acceptance of this drawing will be construed as an acceptance of the foregoing agreement.		CHANGE	
REV.	MADE BY	CHECKED BY	DATE



TOP VIEW

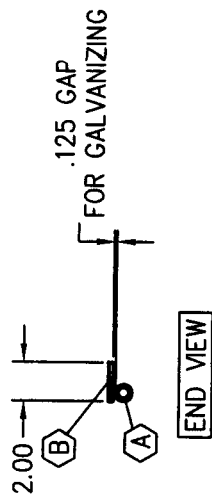
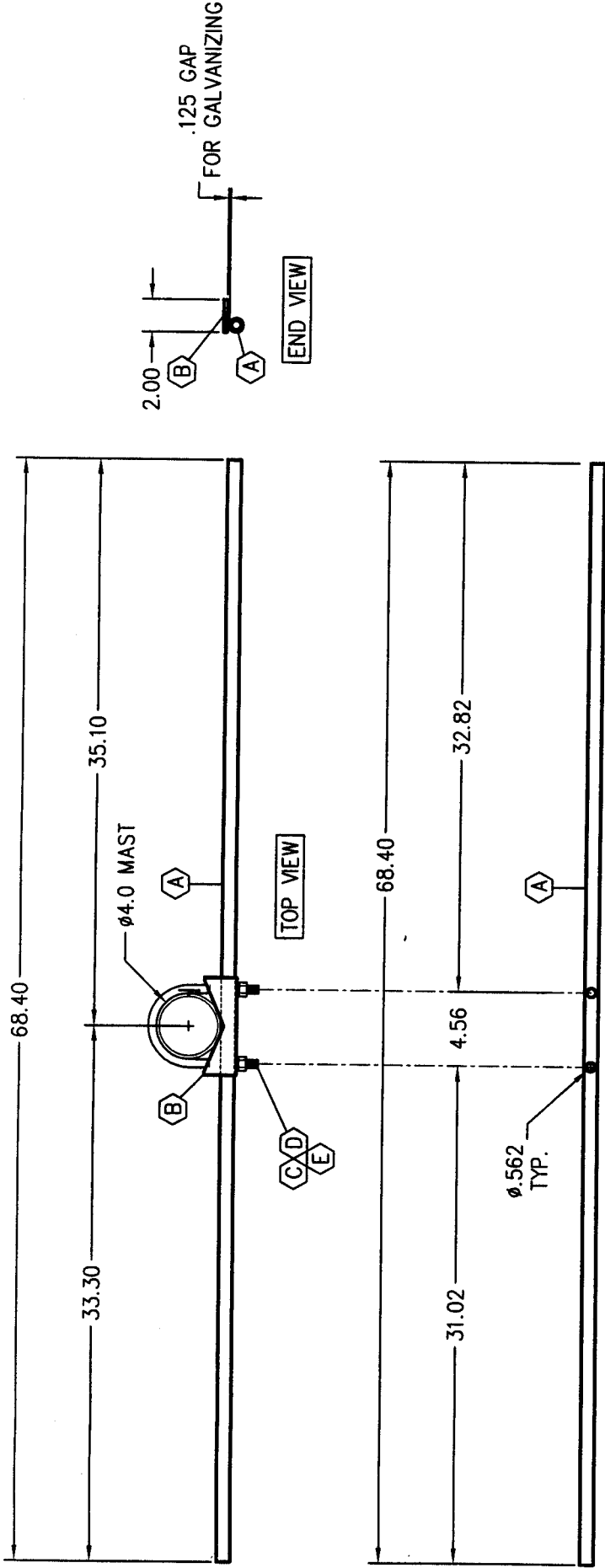


END VIEW



FRONT VIEW

REV.		MADE BY	CHECKED BY	DATE	CHANGE	MATERIAL: AS SHOWN ABOVE		SIZE A		TOLERANCES UNLESS OTHERWISE NOTED FRACTIONS X/4 ± 1/16" DECIMALS .XX ± .01" ANGLES XXX ± .005"	
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 permission of PSI first obtained. The acceptance of this drawing will be construed as an acceptance of the foregoing agreement.											
PROPAGATION SYSTEMS, INC. Ebensburg, Pennsylvania USA						PARASITIC ANTENNA FABRICATION DETAILS					
MODEL: PSIFML-1-DA						DRAWN BY: D.G. Keller					
CHANNEL / FREQUENCY: 90.3 MHz						DATE: 10/06/03					
SCALE: 1:10						PART NO.: J903FM-367-004					
						APPROVED BY: _____					
						DATE: _____					
						DRAWING NO.: J903FM-367-004					
						REV. 0					



ITEM 'A' DETAIL

MATERIALS LIST		
ITEM	QTY	SIZE AND DESCRIPTION
A	1	3/4" SCH. 40 x 68.40" STEEL PIPE
B	1	1/4" x 2" x 6" TOP PLATE
C	1	1/2-13 x 4-1/16" I.D. U-BOLT, GALVANIZED
D	2	1/2-13 HEXNUT, GALVANIZED
E	2	1/2" HELICAL LOCKWASHER, GALVANIZED

NOTES:

- CAREFULLY CLEAN AND DEBURR ENTIRE ASSEMBLY.
- ASSEMBLY TO BE HOT DIP GALVANIZED
- (1) ASSEMBLY REQUIRED
- APPROXIMATE WEIGHT EACH: 8.14 Lbs

PROPAGATION SYSTEMS, INC. Ebensburg, Pennsylvania USA		MODEL: PSIFML-1-DA		DRAWN BY: D.A. Keller	DATE: 10/06/03
		CHANNEL/FREQUENCY: 90.3 MHz		APPROVED BY:	
MATERIAL: AS SHOWN ABOVE		TOLERANCES UNLESS OTHERWISE NOTED FRACTIONS X/X ± 1/16" DECIMALS XX ± .01" ANGLES XXX ± .005°		SCALE: 1:10	
REV. _____ MADE BY _____ CHECKED BY _____ DATE _____		CHANGE _____		DRAWING NO.: J903FM-367-004	
This drawing is loaned subject to the express understanding and agreement that the drawing and information contained herein are, and shall remain the property of PSI, and will not be otherwise utilized or disposed of, directly or indirectly, in whole or in part or assist in making or finish any information for the making of drawings, prints, models, or for the design or making of any item, parts, object, apparatus or parts thereof, except upon the written permission of PSI first obtained. The acceptance of this drawing will be construed as an acceptance of the foregoing agreement.					

REG 305-09

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