



Certification
Directional FM Antenna
Antenna Model: PSIFML-1B-DA
Frequency: 89.3 MHz

KWCF
CSN International
Sheridan, WY
Ref. J805FM-475



Propagation Systems, Inc.

Broadcast Antennas for the Digital World

P.O. Box 113, 719 Pensacola Road, Ebensburg, PA 15931

(814)472-5540 FAX (814)472-5676

www.psibroadcast.com

Directional FM Antenna

KWCF

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A customized model PSIFML antenna with parasitic element was used in conjunction with the customer's Rohn triangular face tower to create the necessary directional radiation pattern. The final antenna consists of a single radiating element secured to the tower with a custom-mounting bracket. There is one horizontal parasitic element attached to the antenna boom.

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 measured composite pattern does not exceed the envelope pattern and is 94% of the envelope RMS.

The antenna is to be mounted 16.5 meters (54 ft) above ground level on the south tower leg. No other antenna can be installed within 10 ft of the radiating element. The antenna is to be positioned 180° 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 instructions.

An input power level of 1.27 kW will be required at the antenna input in order to reach the licensed 1.0 kW ERP. The transmitter output power requirements are dependent upon the transmission line size and length used to feed the antenna. The length of 7/8" air dielectric transmission line feeding the antenna is estimated to be 75 ft. The efficiency for this length of line is 93.5% with a resulting transmitter output power of 1.36 kW. The final length of transmission line must be determined after installation.

Antenna Specifications

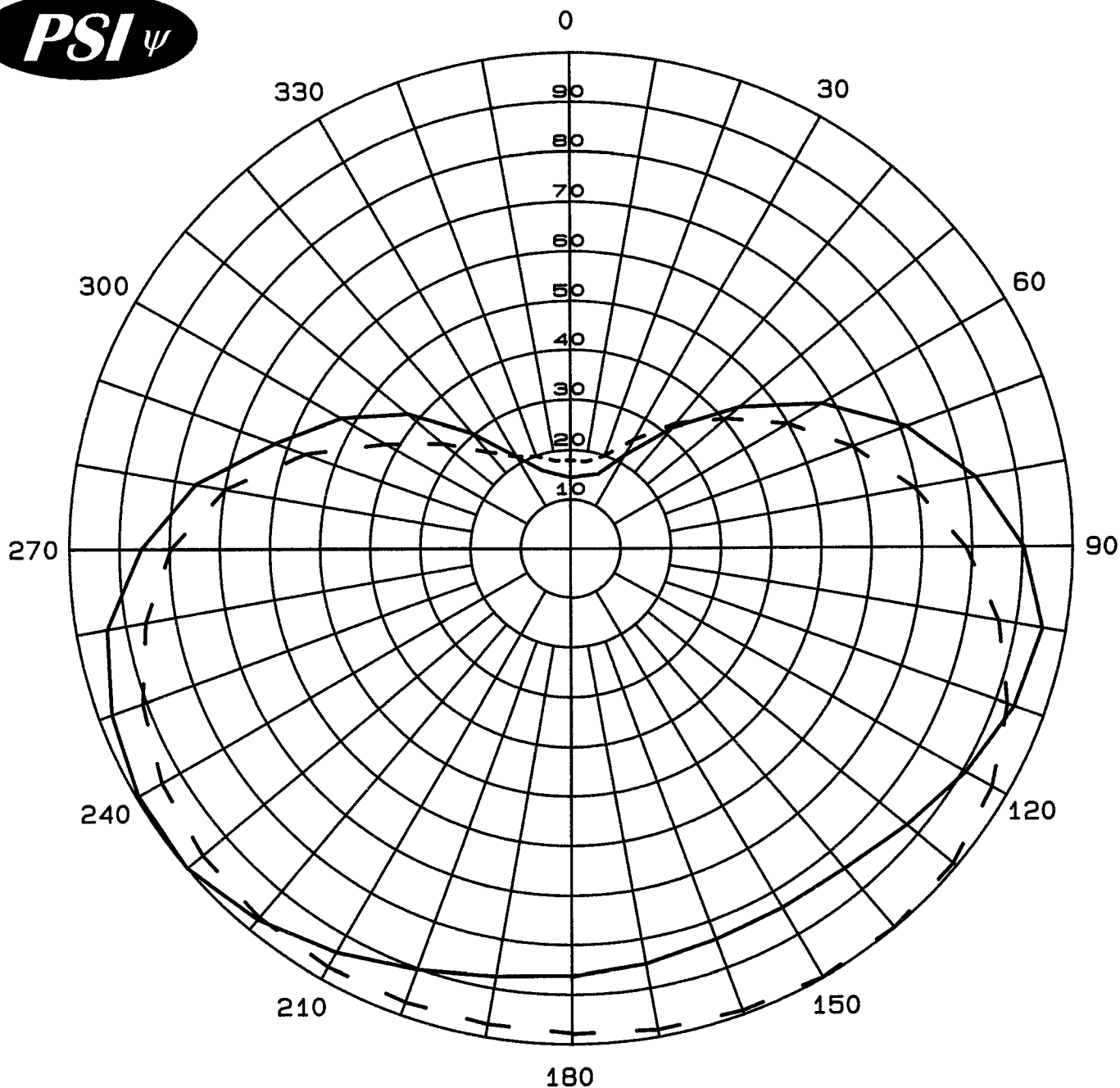
Antenna Model	PSIFML-1B-DA
Type	1-bay directional FM antenna
Bay Spacing	Single bay
Frequency	89.3 MHz
Polarization	Circular
Envelope RMS	.82
Composite RMS	.77
Gain (h-pol)	.79 (-1.02 dB)
Gain (v-pol)	.79 (-1.02 dB)
Input	7/8" EIA input
Power rating	1.5 kW
Length	3 ft.
Weight	35 lbs.
Wind Area	2.3 sq. 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
President
Propagation Systems Inc.



Measured Relative Field
Azimuth Plane Pattern
Antenna: PSIFML-1B-DA
Type: 1-Bay Directional FM
H-pol (solid): .79 (-1.02 dB)
V-pol (dash): .79 (-1.02 dB)
Frequency: 89.3 MHz
Station: KWCF Sheridan, WY

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Measured Relative Field Tabulation

Antenna: PSIFML-1B-DA

CSN International

Station: KWCF

Frequency: 89.3 MHz

Location: Sheridan, WY

Horizontal Polarization			
Angle	Relative Field	Power Gain	Gain (dB)
0	0.143	0.016	-17.92
10	0.149	0.017	-17.57
20	0.160	0.020	-16.96
30	0.217	0.037	-14.29
40	0.315	0.078	-11.05
50	0.440	0.153	-8.16
60	0.579	0.265	-5.77
70	0.712	0.401	-3.97
80	0.818	0.529	-2.76
90	0.902	0.642	-1.92
100	0.954	0.719	-1.43
110	0.939	0.696	-1.57
120	0.907	0.650	-1.87
130	0.872	0.601	-2.21
140	0.845	0.564	-2.48
150	0.838	0.554	-2.56
160	0.839	0.557	-2.54
170	0.850	0.571	-2.43
180	0.862	0.587	-2.31
190	0.876	0.606	-2.17
200	0.903	0.644	-1.91
210	0.940	0.698	-1.56
220	0.975	0.751	-1.24
230	1.000	0.790	-1.02
240	0.995	0.783	-1.06
250	0.974	0.749	-1.25
260	0.939	0.696	-1.57
270	0.856	0.579	-2.37
280	0.758	0.454	-3.43
290	0.625	0.309	-5.10
300	0.527	0.219	-6.59
310	0.423	0.141	-8.50
320	0.305	0.073	-11.34
330	0.215	0.036	-14.38
340	0.169	0.022	-16.48
350	0.152	0.018	-17.37

Maximum Value

Field 1.00
Gain .79 (-1.02 dB)
Azimuth Bearing 230 degrees
Pattern RMS 0.73

Minimum Field

Field 0.143
Gain .016 (-17.92 dB)
Azimuth Bearing 0 degrees

Vertical Polarization			
Angle	Relative Field	Power Gain	Gain (dB)
0	0.178	0.025	-16.02
10	0.178	0.025	-16.02
20	0.199	0.031	-15.05
30	0.253	0.051	-12.96
40	0.328	0.085	-10.71
50	0.405	0.130	-8.87
60	0.499	0.197	-7.05
70	0.598	0.282	-5.49
80	0.695	0.382	-4.18
90	0.786	0.488	-3.11
100	0.865	0.591	-2.28
110	0.925	0.676	-1.70
120	0.967	0.739	-1.31
130	0.992	0.777	-1.09
140	1.000	0.790	-1.02
150	0.999	0.788	-1.03
160	0.992	0.777	-1.09
170	0.985	0.767	-1.15
180	0.978	0.756	-1.21
190	0.974	0.749	-1.25
200	0.973	0.748	-1.26
210	0.973	0.748	-1.26
220	0.969	0.742	-1.29
230	0.959	0.727	-1.38
240	0.942	0.701	-1.54
250	0.909	0.653	-1.85
260	0.861	0.586	-2.32
270	0.797	0.502	-2.99
280	0.698	0.385	-4.15
290	0.562	0.250	-6.03
300	0.425	0.143	-8.46
310	0.331	0.087	-10.63
320	0.255	0.051	-12.89
330	0.215	0.037	-14.37
340	0.199	0.031	-15.05
350	0.180	0.026	-15.92

Maximum Value

Field 1.00
Gain .79 (-1.02 dB)
Azimuth Bearing 140 degrees
Pattern RMS 0.74

Minimum Field

Field 0.178
Gain .025 (-16.02 dB)
Azimuth Bearing 0-10 degrees

ERP Tabulation

Antenna: PSIFML-1B-DA

CSN International

Station: KWCF

Frequency: 89.3 MHz

Location: Sheridan, WY

Horizontal Polarization

Angle	Relative Field	ERP kW	ERP (dBk)
0	0.143	0.020	-16.90
10	0.149	0.022	-16.55
20	0.160	0.025	-15.94
30	0.217	0.047	-13.27
40	0.315	0.099	-10.03
50	0.440	0.193	-7.14
60	0.579	0.335	-4.75
70	0.712	0.507	-2.95
80	0.818	0.670	-1.74
90	0.902	0.813	-0.90
100	0.954	0.910	-0.41
110	0.939	0.881	-0.55
120	0.907	0.822	-0.85
130	0.872	0.760	-1.19
140	0.845	0.714	-1.46
150	0.838	0.701	-1.54
160	0.839	0.705	-1.52
170	0.850	0.723	-1.41
180	0.862	0.743	-1.29
190	0.876	0.767	-1.15
200	0.903	0.815	-0.89
210	0.940	0.883	-0.54
220	0.975	0.951	-0.22
230	1.000	1.000	0.00
240	0.995	0.991	-0.04
250	0.974	0.948	-0.23
260	0.939	0.881	-0.55
270	0.856	0.733	-1.35
280	0.758	0.574	-2.41
290	0.625	0.391	-4.08
300	0.527	0.277	-5.57
310	0.423	0.179	-7.48
320	0.305	0.093	-10.32
330	0.215	0.046	-13.36
340	0.169	0.028	-15.46
350	0.152	0.023	-16.35

Maximum Value

Field 1.00
ERP 1.0 kW (0.0 dBk)
Azimuth Bearing 230 degrees

Minimum Field

Field 0.143
ERP .02 kW (-16.9 dBk)
Azimuth Bearing 0 degrees

Vertical Polarization

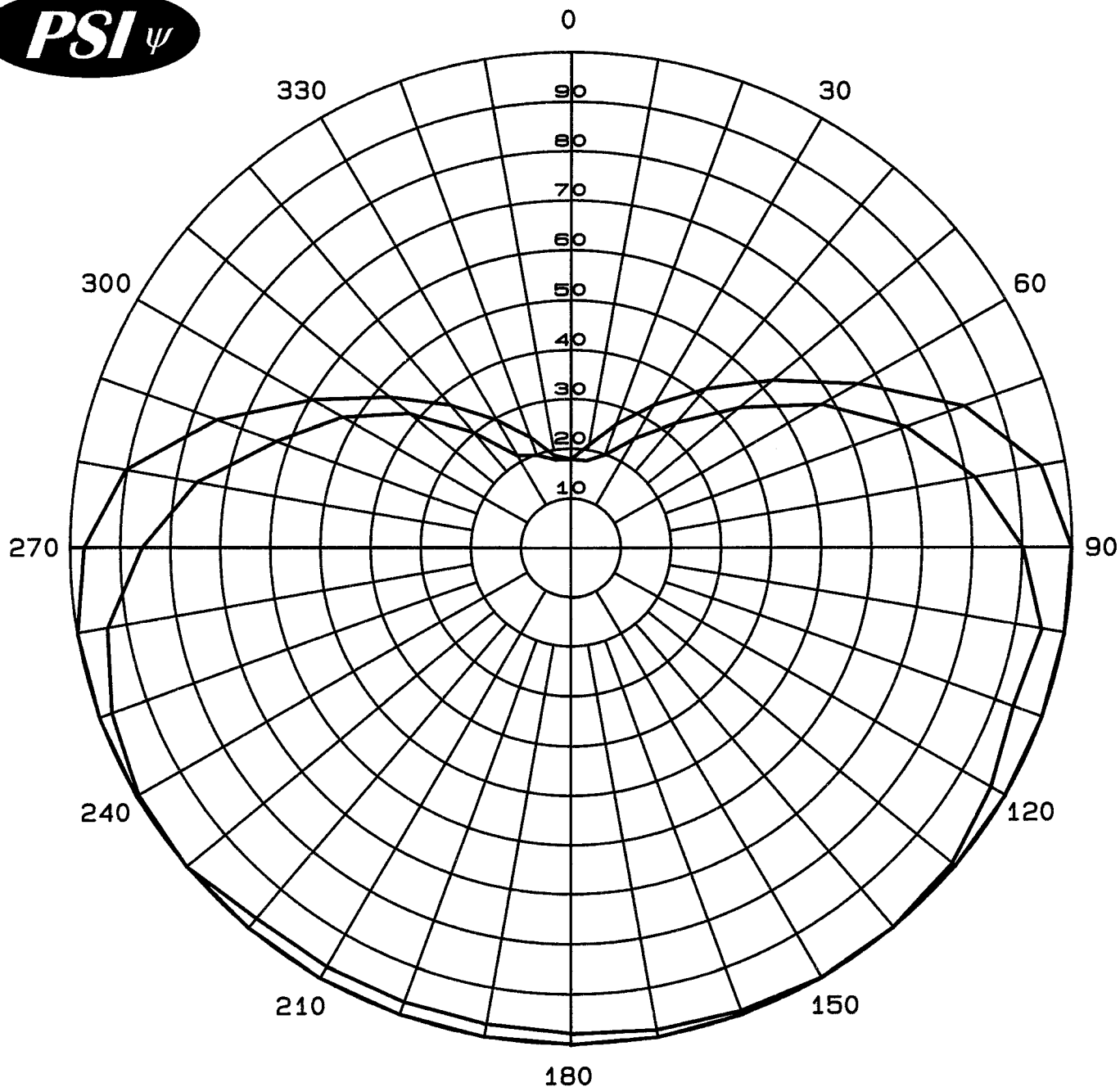
Angle	Relative Field	ERP kW	ERP (dBk)
0	0.178	0.032	-14.99
10	0.178	0.032	-14.99
20	0.199	0.040	-14.02
30	0.253	0.064	-11.94
40	0.328	0.108	-9.68
50	0.405	0.164	-7.85
60	0.499	0.249	-6.03
70	0.598	0.357	-4.47
80	0.695	0.483	-3.16
90	0.786	0.618	-2.09
100	0.865	0.748	-1.26
110	0.925	0.855	-0.68
120	0.967	0.935	-0.29
130	0.992	0.984	-0.07
140	1.000	1.000	0.00
150	0.999	0.998	-0.01
160	0.992	0.984	-0.07
170	0.985	0.971	-0.13
180	0.978	0.957	-0.19
190	0.974	0.948	-0.23
200	0.973	0.946	-0.24
210	0.973	0.946	-0.24
220	0.969	0.940	-0.27
230	0.959	0.920	-0.36
240	0.942	0.887	-0.52
250	0.909	0.826	-0.83
260	0.861	0.741	-1.30
270	0.797	0.635	-1.97
280	0.698	0.487	-3.12
290	0.562	0.316	-5.01
300	0.425	0.181	-7.43
310	0.331	0.110	-9.60
320	0.255	0.065	-11.87
330	0.215	0.046	-13.35
340	0.199	0.040	-14.02
350	0.180	0.032	-14.89

Maximum Value

Field 1.00
ERP 1.0 kW (0.0 dBk)
Azimuth Bearing 140 degrees

Minimum Field

Field 0.178
ERP .032 (-14.99 dB)
Azimuth Bearing 0-10 degrees



Measured Composite Field
Maximum Envelope Pattern
Antenna: PSIFML-1B-DA
Type: 1-Bay Directional FM
Composite RMS: .77
Envelope RMS: .82
Frequency: 89.3 MHz
Station: KWCF Sheridan, WY

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Composite Pattern
Maximum of H-pol or V-pol

Antenna: PSIFML-1B-DA

CSN International

Station: KWCF

Frequency: 89.3 MHz

Location: Sheridan, WY

Maximum ERP: 1.0 kW (0.0 dBk)

Angle	Relative Field	ERP kW	ERP dBK
0	0.178	0.032	-14.99
10	0.178	0.032	-14.99
20	0.199	0.040	-14.02
30	0.253	0.064	-11.94
40	0.328	0.108	-9.68
50	0.440	0.193	-7.14
60	0.579	0.335	-4.75
70	0.712	0.507	-2.95
80	0.818	0.670	-1.74
90	0.902	0.813	-0.90
100	0.954	0.910	-0.41
110	0.939	0.881	-0.55
120	0.967	0.935	-0.29
130	0.992	0.984	-0.07
140	1.000	1.000	0.00
150	0.999	0.998	-0.01
160	0.992	0.984	-0.07
170	0.985	0.971	-0.13
180	0.978	0.957	-0.19
190	0.974	0.948	-0.23
200	0.973	0.946	-0.24
210	0.973	0.946	-0.24
220	0.975	0.951	-0.22
230	1.000	1.000	0.00
240	0.995	0.991	-0.04
250	0.974	0.948	-0.23
260	0.939	0.881	-0.55
270	0.856	0.733	-1.35
280	0.758	0.574	-2.41
290	0.625	0.391	-4.08
300	0.527	0.277	-5.57
310	0.423	0.179	-7.48
320	0.305	0.093	-10.32
330	0.215	0.046	-13.35
340	0.199	0.040	-14.02
350	0.180	0.032	-14.89

Envelope Pattern

Antenna: PSIFML-1B-DA

CSN

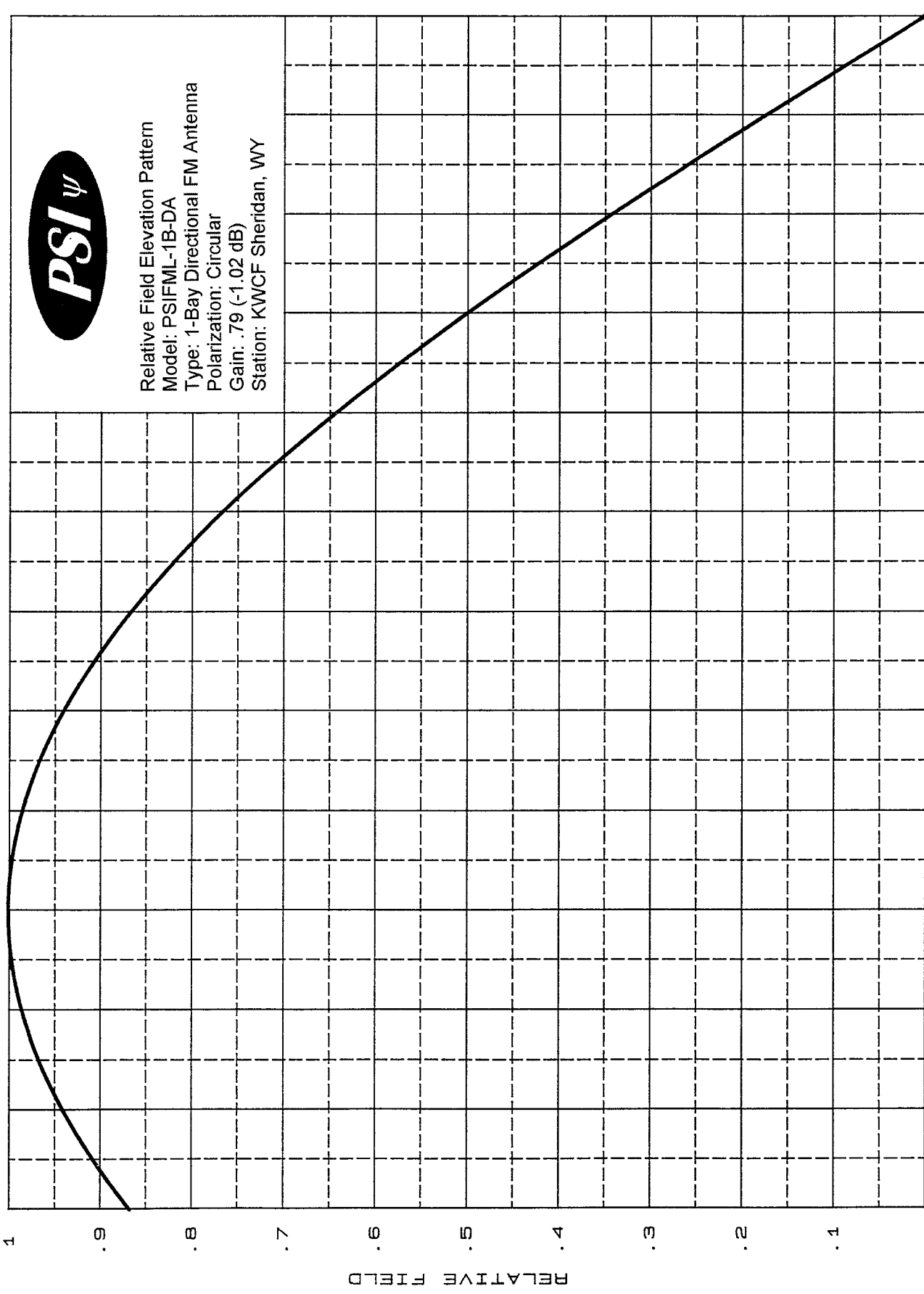
Station: KWCF

Frequency: 89.3 MHz

Location: Sheridan, WY

Maximum ERP: 1.0 kW (0.0 dBk)

Angle	Relative Field	ERP kW	ERP dBK
0	0.178	0.032	-14.99
10	0.210	0.044	-13.56
20	0.264	0.070	-11.57
30	0.332	0.110	-9.58
40	0.419	0.176	-7.56
50	0.527	0.278	-5.56
60	0.663	0.440	-3.57
70	0.835	0.697	-1.57
80	0.952	0.906	-0.43
90	1.000	1.000	0.00
100	1.000	1.000	0.00
110	1.000	1.000	0.00
120	1.000	1.000	0.00
130	1.000	1.000	0.00
140	1.000	1.000	0.00
150	1.000	1.000	0.00
160	1.000	1.000	0.00
170	1.000	1.000	0.00
180	1.000	1.000	0.00
190	1.000	1.000	0.00
200	1.000	1.000	0.00
210	1.000	1.000	0.00
220	1.000	1.000	0.00
230	1.000	1.000	0.00
240	1.000	1.000	0.00
250	1.000	1.000	0.00
260	1.000	1.000	0.00
270	0.972	0.945	-0.25
280	0.902	0.814	-0.90
290	0.752	0.566	-2.48
300	0.597	0.356	-4.48
310	0.474	0.225	-6.48
320	0.377	0.142	-8.47
330	0.299	0.089	-10.49
340	0.238	0.057	-12.47
350	0.189	0.036	-14.47



DEGREES BELOW HORIZONTAL

INSTALLATION INSTRUCTIONS

KWCF

89.3 MHz

Sheridan, WY

Antenna Model: PSIFML-1B-DA

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 and PSI.

General Notes:

1. Review antenna elevation and plan the installation. The antenna bolts directly to the tower leg. Be aware of possible mounting conflicts such as other antennas, guy wires, tower leg flanges, conduits etc. and plan accordingly.
2. The bay is to be aligned 180° true.
3. Use only the supplied hardware.
4. 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.
5. Check a bracket on the tower leg for proper fit.
6. Keep all transmission lines free from dirt and moisture. All Teflon insulators must be clean and dry.
7. The antenna can be pressurized.
8. The antenna has been tuned at the factory.
9. The antenna system should be tested before the erector leaves the premises to insure that the complete antenna system is functioning properly.

Installation Procedure

Step One

The antenna is to be installed on the southwest leg of the customer's Rohn 3WN tower leg using the supplied 1-3/8" ID U-bolts. Position the antenna 180 degrees relative to true north.

Step Two

Attach the horizontal parasitic to the antenna boom with the supplied #28 hose clamps. Reference drawing J805FM-475-009, colored band must be positioned east. The antenna-mounting bracket has been pre attached to the antenna boom and should not be moved. Attach the element to the tower leg. Use the supplied 3/8-16 x 1-3/8" ID U-bolts. The feed point must be up. Refer to drawing J805FM-475-002. Connect the feed line (not supplied) to the 7/8" EIA input at the end of the antenna boom. Secure the feed line to the tower leg and seal the connector with rubber mastic and electrical tape.

Step Three

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.

Drawing Index

<u>Drawing</u>	<u>Title</u>
J805FM-475-002	Antenna Elevation
J805FM-475-010	Antenna Orientation
J805FM-475-009	Parasitic Attachment
J805FM-475-008	Horizontal Parasitic Element
J805FM-475-011	Tower Leg Mount
J805FM-475-006	Bracket Spacer
33-00062	Mounting Bracket Detail

Specifications

Model	PSIFML-1B-DA
Description	1-bay low power FM directional broadcast antenna
Frequency	89.3 MHz
Polarization	Circular
Gain	.79 (-1.02 dB)
Input	7/8" EIA
Rating	1.5 kW
Length	3 Ft.
Weight	35 lbs.
Wind Area	2.3 Sq. Ft.


SPECIFICATIONS	
MODEL:	PSIFML-1B-DA
FREQUENCY:	89.3 MHz
APPROX. GAIN:	0.79 (-1.02 dB)
POWER RATING:	1.5 kW
WEIGHT:	35 Lb (15.88 Kg)
WIND AREA:	2.3 Sq. Ft.
(NO ICE)	

ROHN TOWER
SECTION 3WN, $\phi 15\frac{1}{8}$ " LEG

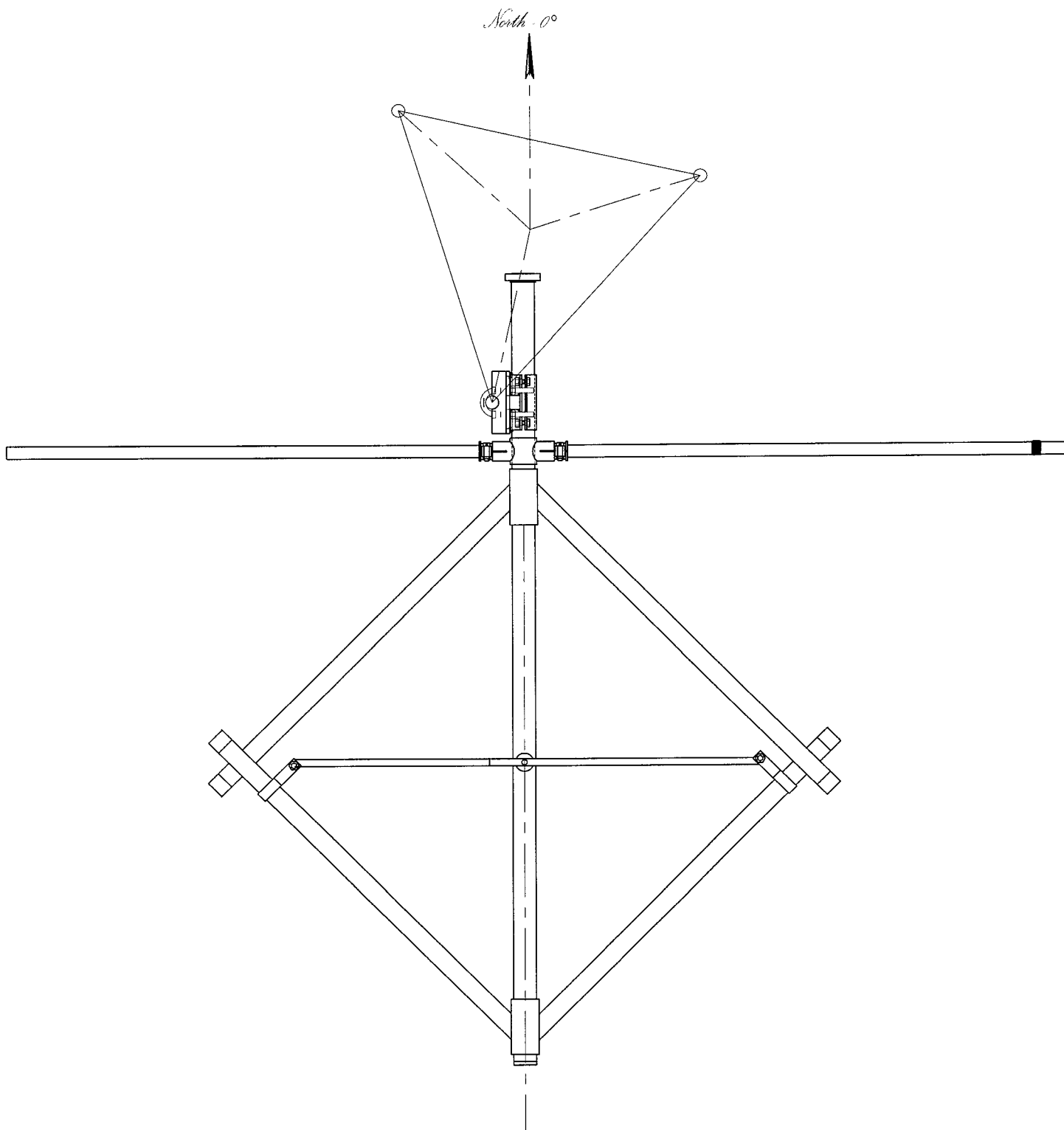
$\pm 6'-3"$
CLEAR

$\frac{7}{8}$ " E.I.A.
CONNECTION

$10'-0"$
CLEAR

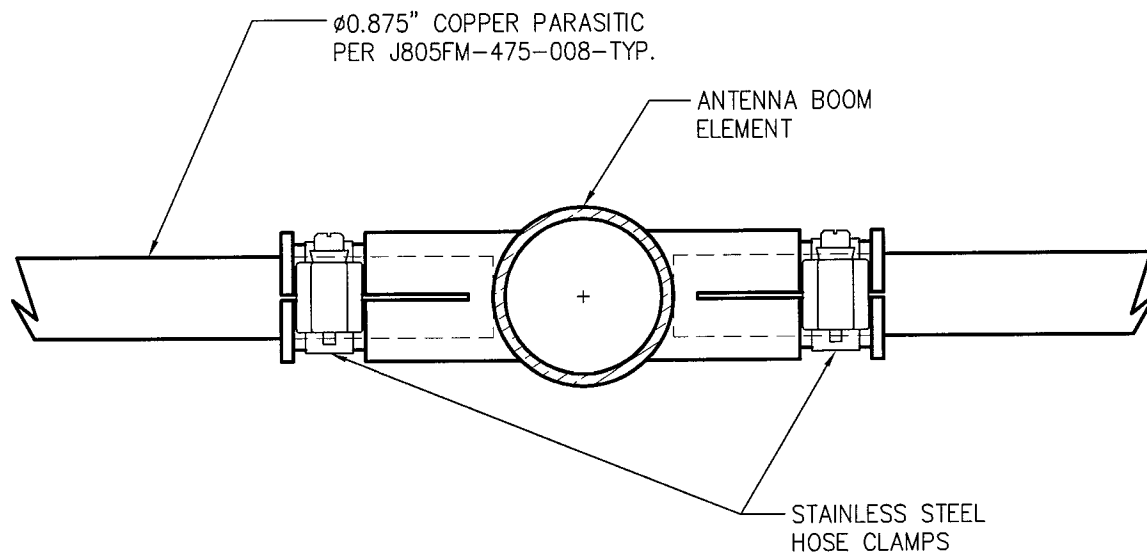
44 Ft. A.G.L. 

<table border="1"> <tr> <th>REV.</th> <th>MADE BY</th> <th>CHECKED BY</th> <th>DATE</th> <th>CHANGE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>				REV.	MADE BY	CHECKED BY	DATE	CHANGE						MATERIAL:		PROPAGATION SYSTEMS, INC. Ebensburg, Pennsylvania USA			
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 foregoing agreement.						TOLERANCES UNLESS OTHERWISE NOTED FRACTIONS X/X $\pm 1/16"$ DECIMALS .XX $\pm .01"$ DECIMALS .XXX $\pm .005"$ ANGLES $\pm 3'$		SIZE <div style="font-size: 2em; font-weight: bold; text-align: center;">A</div>		FML SINGLE BAY ANTENNA ELEVATIONS									
						MODEL: PSIFML-1B-DA		DRAWN BY: D.G. Kellar		DATE: 8/15/05									
						CHANNEL/FREQUENCY: 89.3 MHz		APPROVED BY:		DATE:									
						SCALE: 1:16		PART NO.:		DRAWING NO.: J805FM-475-002		REV. 0							



180° TRUE

				MATERIAL:		PROPAGATION SYSTEMS, INC.													
						Ebensburg, Pennsylvania USA													
						ANTENNA ORIENTATION IN PLAN VIEW													
REV.		MADE BY CHECKED BY		DATE		CHANGE		MODEL: PSIFML-1B-DA		DRAWN BY: D.G. Kellar		DATE: 9/14/05							
<p>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.</p>								TOLERANCES UNLESS OTHERWISE NOTED		SIZE A		CHANNEL/ FREQUENCY: 89.3 MHz		APPROVED BY:		DATE:			
								FRACTIONS X/X ± 1/16"				SCALE: 1:12		PART NO.: 33-00111		DRAWING NO.: J805FM-475-010		REV. 0	
								DECIMALS XX ± .01"											
								DECIMALS XXX ± .005"											
						ANGLES ± 3°													

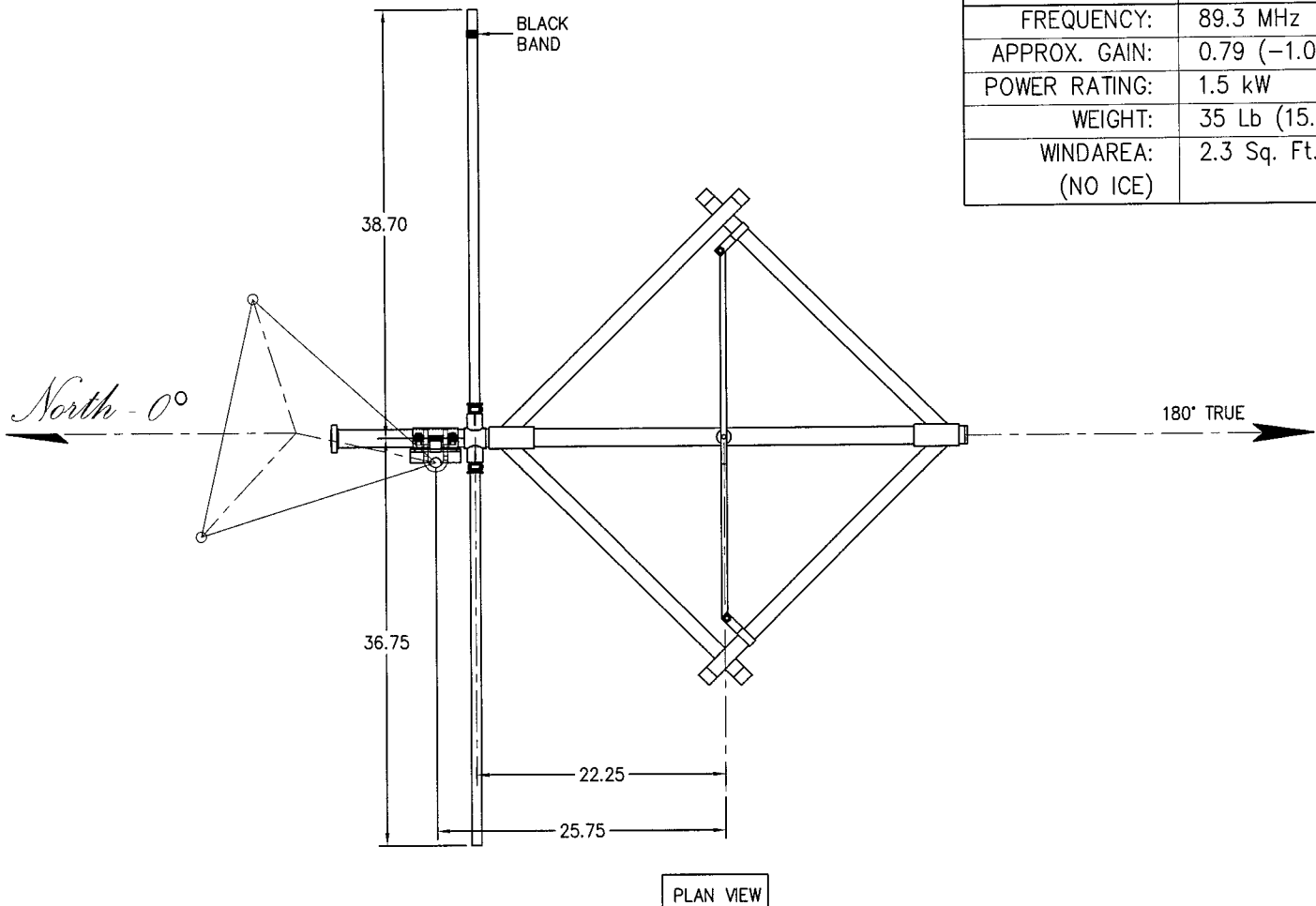


NOTE:
REF. DRAWING J805FM-475-001 FOR PLANVIEW OF
ANTENNA AND DETAILS OF PARASITICS

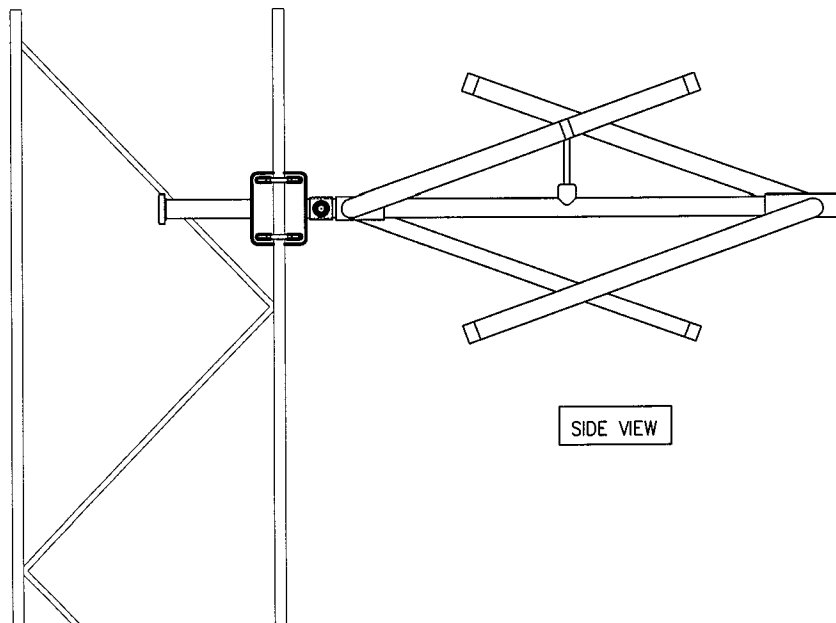
				MATERIAL:		PROPAGATION SYSTEMS, INC.			
						Ebensburg, Pennsylvania USA			
						PARASITIC MOUNTING ASSEMBLY DETAILS			
REV.	MADE BY CHECKED BY	DATE	CHANGE			MODEL: PSIFML-1B-DA	DRAWN BY: D.G. Kellar	DATE: 9/20/05	
This drawing is loaned subject to the express understanding and agreement that the drawing 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.				TOLERANCES FRACTIONS X/X ±1/16" DECIMALS XX ±.01" DECIMALS XXX ±.005" ANGLES ± 3°		SIZE A		CHANNEL/ FREQUENCY: 89.3 MHz	
						APPROVED BY:		DATE:	
						SCALE: 1:2		PART NO.:	
						DRAWING NO.: J805FM-475-009		REV. 0	

SPECIFICATIONS

MODEL:	PSIFML-1B-DA
FREQUENCY:	89.3 MHz
APPROX. GAIN:	0.79 (-1.02 dB)
POWER RATING:	1.5 kW
WEIGHT:	35 Lb (15.88 Kg)
WINDAREA: (NO ICE)	2.3 Sq. Ft.

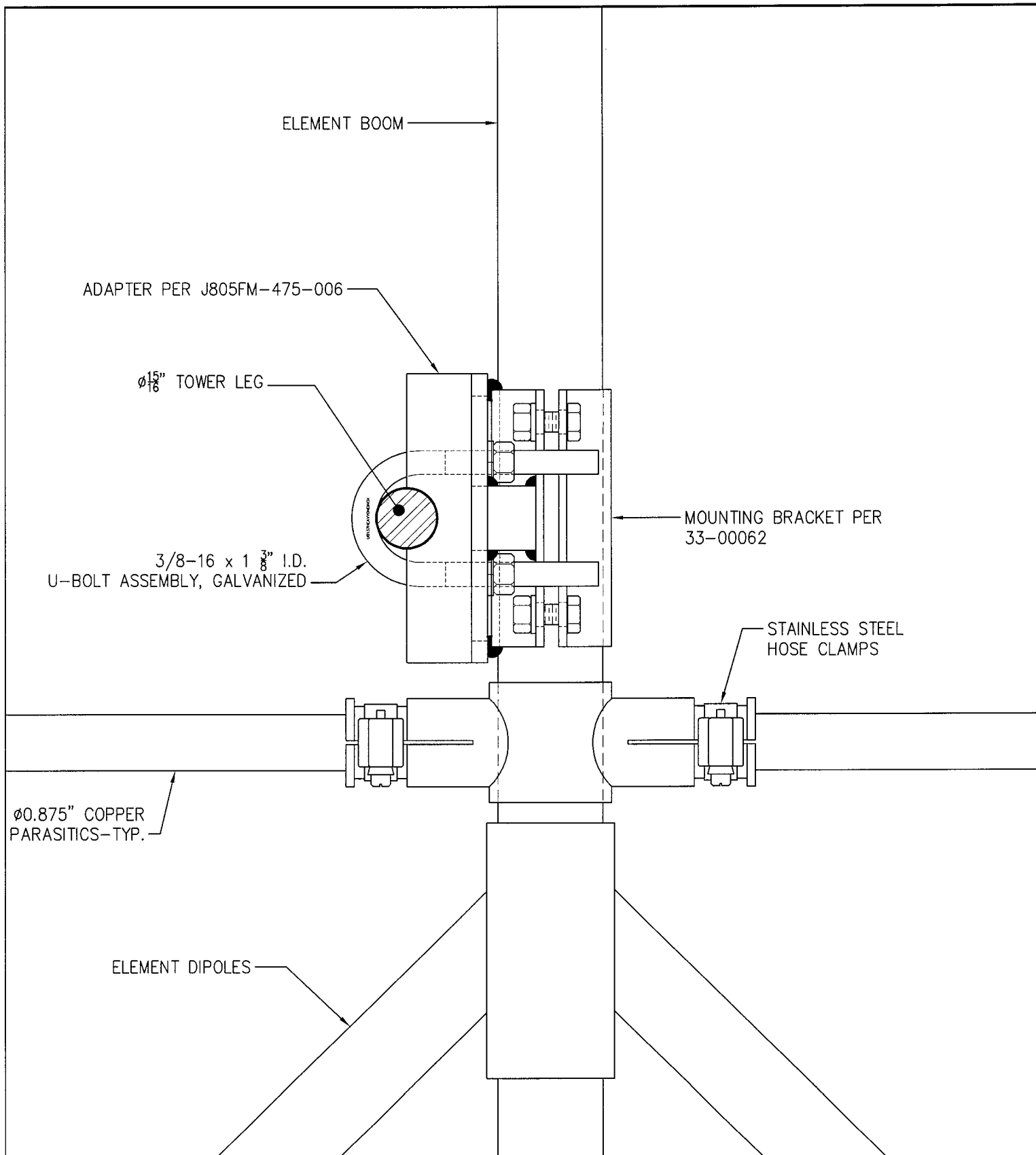


PLAN VIEW

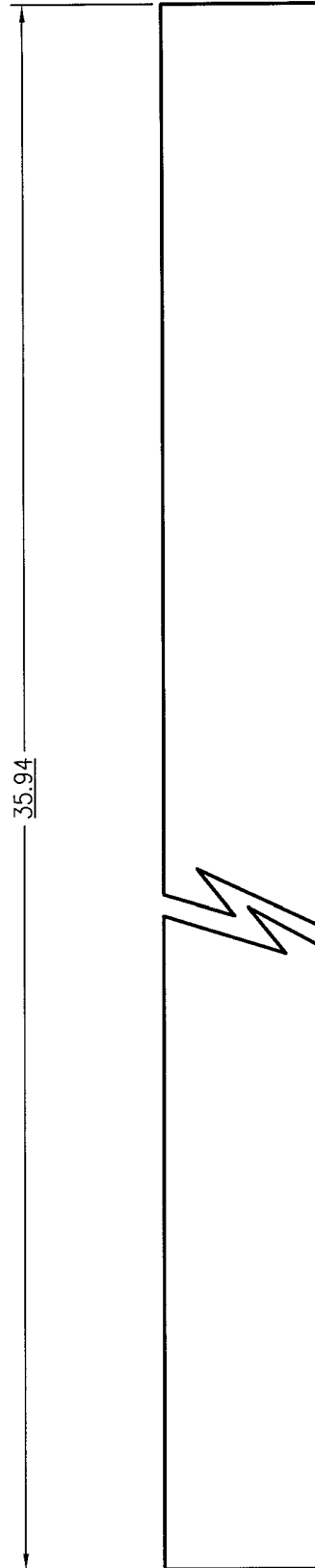
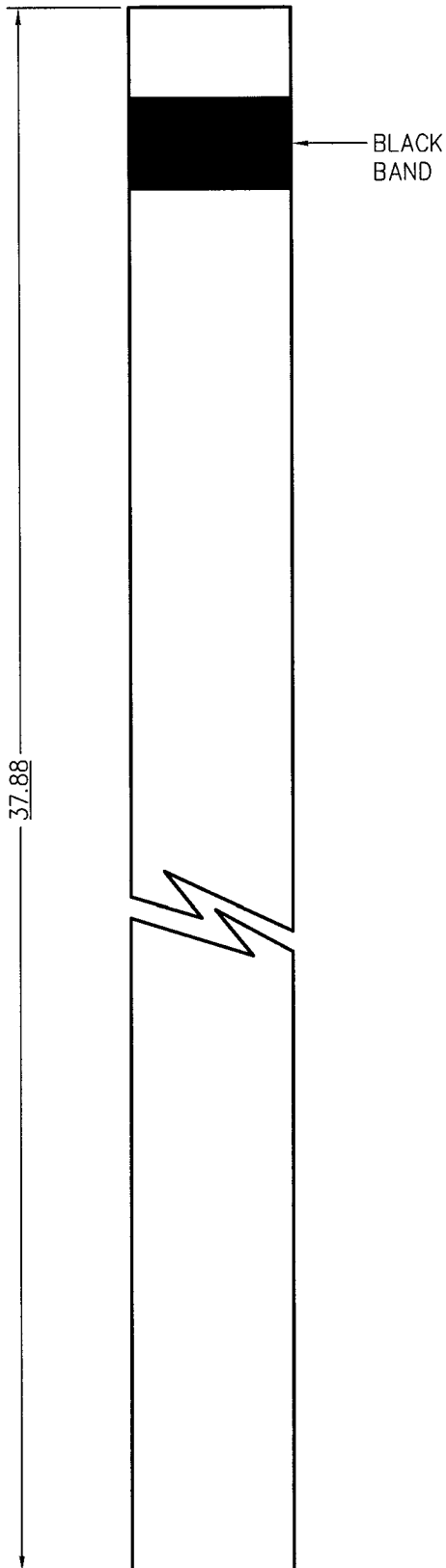


SIDE VIEW

PROPAGATION SYSTEMS, INC. Ebensburg, Pennsylvania USA			
TYPICAL BREAKDOWN BAY TOP & SIDE VIEW			
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 foregoing agreement.			
MATERIAL:		MODEL: PSIFML-1B-DA	
TOLERANCES UNLESS OTHERWISE NOTED FRACTIONS X/X ± 1/16" DECIMALS XX ± .01" DECIMALS XXX ± .005" ANGLES ± 3°		DRAWN BY: D.G. Kellar	
SIZE A		DATE: 9/14/05	
CHANNEL/FREQUENCY: 89.3 MHz		APPROVED BY:	
SCALE: 1:12		DATE:	
PART NO.: 33-00111		DRAWING NO.: J805FM-475-001	
REV. 0		REV. 0	

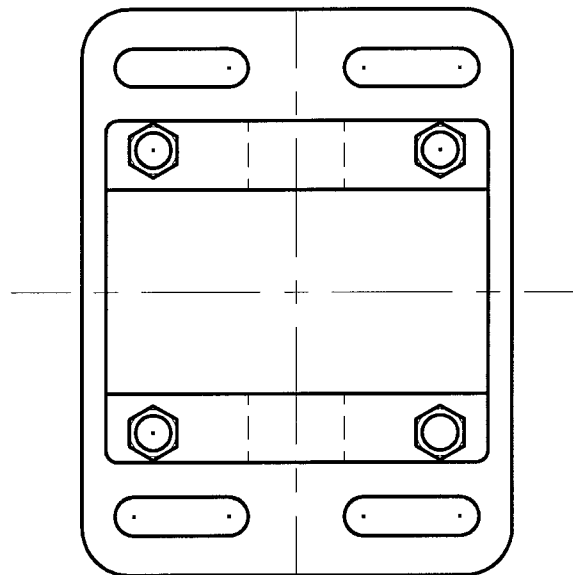
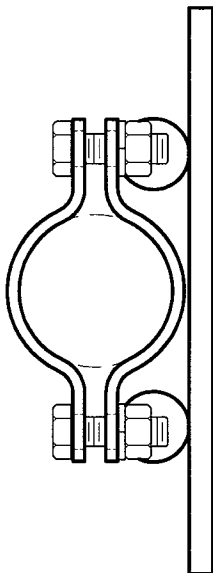
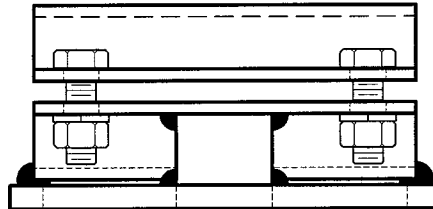


<table border="1"> <tr> <td>REV.</td> <td>MADE BY</td> <td>DATE</td> <td>CHANGE</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>				REV.	MADE BY	DATE	CHANGE					MATERIAL:		PROPAGATION SYSTEMS, INC. Ebensburg, Pennsylvania USA			
REV.	MADE BY	DATE	CHANGE														
This drawing 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 foregoing agreement.						ELEMENT MOUNTING DETAILS IN PLAN VIEW		MODEL: PSIFML-1B-DA		DRAWN BY: D.G. Kellar		DATE: 9/22/05					
TOLERANCES FRACTIONS X/X ± 1/16" DECIMALS .XX ± .01" DECIMALS .XXX ± .005" ANGLES ± 3°						SIZE A		CHANNEL/FREQUENCY: 89.3 MHz		APPROVED BY:		DATE:					
SCALE: 1:2						PART NO.:		DRAWING NO.: J805FM-475-011		REV. 0							

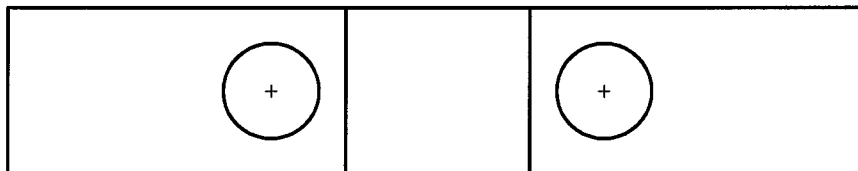
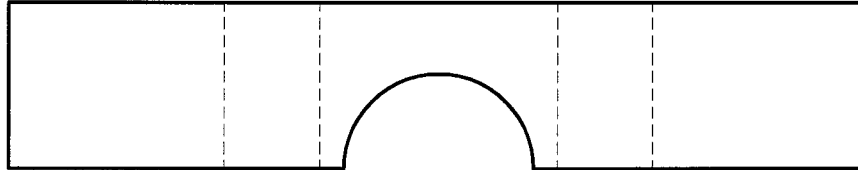


(1) EACH REQUIRED

				MATERIAL:		PROPAGATION SYSTEMS, INC.					
						Ebensburg, Pennsylvania USA					
						PARASITIC FABRICATION DETAILS					
REV.	MADE BY	CHECKED BY	DATE	CHANGE		MODEL:	PSIFML-1B-DA	DRAWN BY:	D.G. Kellar	DATE:	9/20/05
<p>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 foregoing agreement.</p>						CHANNEL/FREQUENCY:	89.3 MHz	APPROVED BY:		DATE:	
						SCALE:	PART NO.:	DRAWING NO.:	J805FM-475-008	REV.	0
					<p>TOLERANCES UNLESS OTHERWISE NOTED</p> <p>FRACTIONS $\frac{X}{Y}$ $\pm 1/16"$</p> <p>DECIMALS XX $\pm .01"$</p> <p>DECIMALS XXX $\pm .005"$</p> <p>ANGLES $\pm 3^\circ$</p>		SIZE	A			

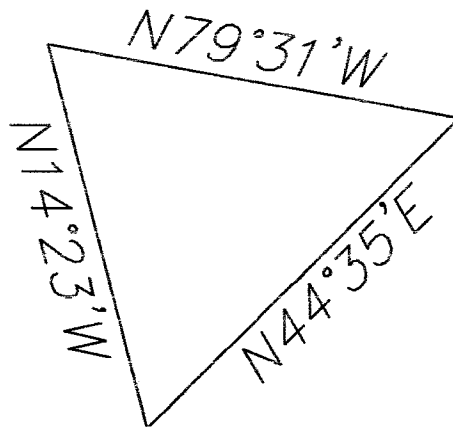


<table border="1"> <tr> <td>REV.</td> <td>MADE BY CHECKED BY</td> <td>DATE</td> <td>CHANGE</td> </tr> </table>				REV.	MADE BY CHECKED BY	DATE	CHANGE	MATERIAL:		PROPAGATION SYSTEMS, INC. Ebensburg, Pennsylvania USA			
REV.	MADE BY CHECKED BY	DATE	CHANGE										
This drawing is loaned subject to the 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.				TOLERANCES UNLESS OTHERWISE NOTED FRACTIONS X/X ±1/16" DECIMALS XX ±.01" DECIMALS XXX ±.005" ANGLES ± 3°		SIZE A		MODEL: PSIFM		DRAWN BY: P. MCNEISH		DATE: 10-1-99	
				CHANNEL/FREQUENCY:		APPROVED BY:		DATE:					
				SCALE: 1:2		PART NO.: 33-00062		DRAWING NO.: 33-00062		REV. 0			



				MATERIAL:		PROPAGATION SYSTEMS, INC.								
						Ebensburg, Pennsylvania USA								
						MOUNTING BRACKET SPACER DETAIL								
REV.	MADE BY	CHECKED BY	DATE	CHANGE	MODEL: PSIFML-1B-DA		DRAWN BY: D.G. Kellar		DATE: 9/19/05					
<p>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.</p>					TOLERANCES UNLESS OTHERWISE NOTED FRACTIONS X/X ±1/16" DECIMALS .XX ±.01" DECIMALS .XXX ±.005" ANGLES ± 3°		SIZE A		CHANNEL/ FREQUENCY: 89.3 MHz		APPROVED BY:		DATE:	
							SCALE:		PART NO.:		DRAWING NO.: J805FM-475-006		REV. 0	

SHIP MID SEPT



TOWER LAYOUT

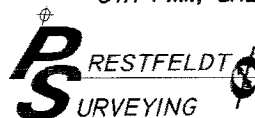
NOTE: DUE TO THE SMALL
SIZE OF THE TOWER
FOOTPRINT BEARINGS ALONG
THE BASE AS SHOWN ON THE
ABOVE DRAWING ARE $\pm 1^\circ$.

BEARINGS ARE TRUE NORTH

EXHIBIT FOR TOWER

CLIENT: CSN INTERNATIONAL

LOCATION: SW1/4SW1/4, SECTION 36, T54N, R84W,
6TH P.M., SHERIDAN COUNTY, WYOMING.

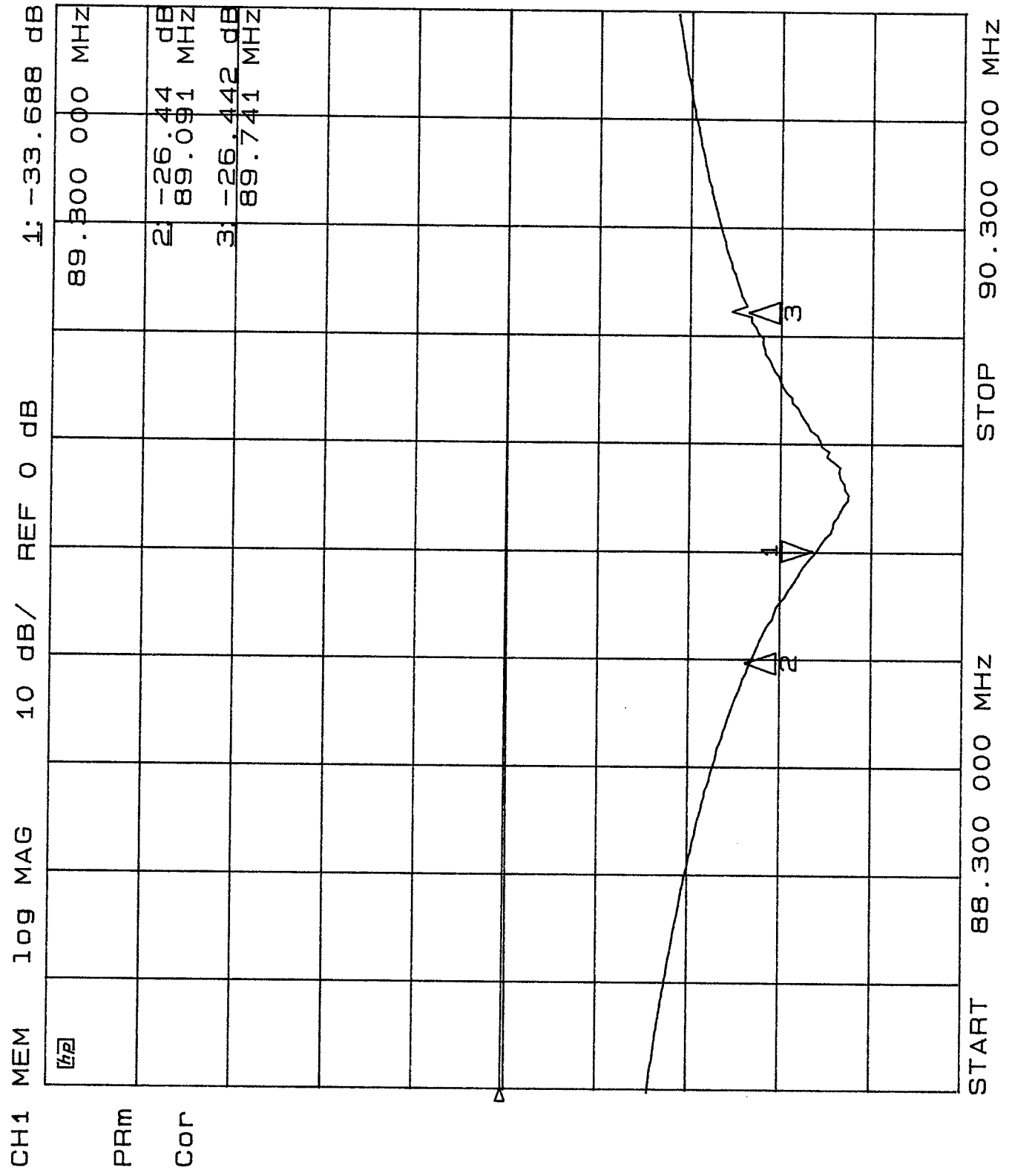


PO BOX 3082
SHERIDAN, WY 82801
307-672-7415
FAX 674-5000

JN: 2005078
DF: 2005/2005078D
AUGUST, 2005

230000
33000000
4.00E+10

Final





Propagation Systems, Inc.

P.O. Box 113, 719 Pensacola Road, Ebensburg, PA 15931 (814)472-5540 FAX (814)472-5676