

INSTRUCTION MANUAL
W234AX
94.7 MHz
Allentown, PA
Antenna Model: PSIFML-2A-WS-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 brackets have been designed for tower leg mount only. Be aware of possible mounting conflicts such as other antennas, guy wires, tower leg flanges, conduits etc. and plan accordingly.
2. All bays are to be aligned to the same azimuth angle.
3. Use only the supplied hardware.
4. Exercise care when connecting the Type "N" connectors.
5. Check a bracket on the tower leg for proper fit.
6. Install one bay at a time.
7. Keep all transmission lines free from dirt and moisture. All Teflon insulators must be clean and dry.
8. The antenna does not require pressurization.
9. The antenna has been tuned at the factory and should not require field adjustment.
10. 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

Attach mounting bracket J809FM0787-008 and -011 to the supplied support mast. Use the supplied 3/8-16 x 2" ID U-bolts as shown in drawing J809FM-787-001. Hoist the mast to correct elevation and secure to the north tower leg. Adjust the brackets as necessary to keep the pipe vertical and plumb.

Step Two

The antenna must be installed one bay at a time. Starting with bay one carefully hoist the element and secure the bracket to the support mast 32.9" down from the top using the supplied 1/2-13 x 6" bolts and back plates. Position the antenna 300° as shown in drawing J809FM-787-002. Next attach the horizontal parasitic element directly above the bay using the supplied 3/8-16 x 2" ID U-bolts. Position the parasitic with black band as shown in drawing J809FM-787-002.

Step Three

Follow the same procedure with bay 2. The elements are to be spaced 112.2" according to the attached drawing J809FM-787-001.

Step Four

Next attach the power divider to the support mast using the supplied bracket. Position the power divider near the center of radiation. Connect the 1/2" coaxial cables to each bay and power divider. Use caution when attaching the cable to the antenna elements not to split the connector finger stock. Secure the cable to the support mast with the supplied tie wraps. Do not crush the cable when tightening the tie wraps. Seal the Type "N" connections with the supplied mastic and electrical tape.

Step Five

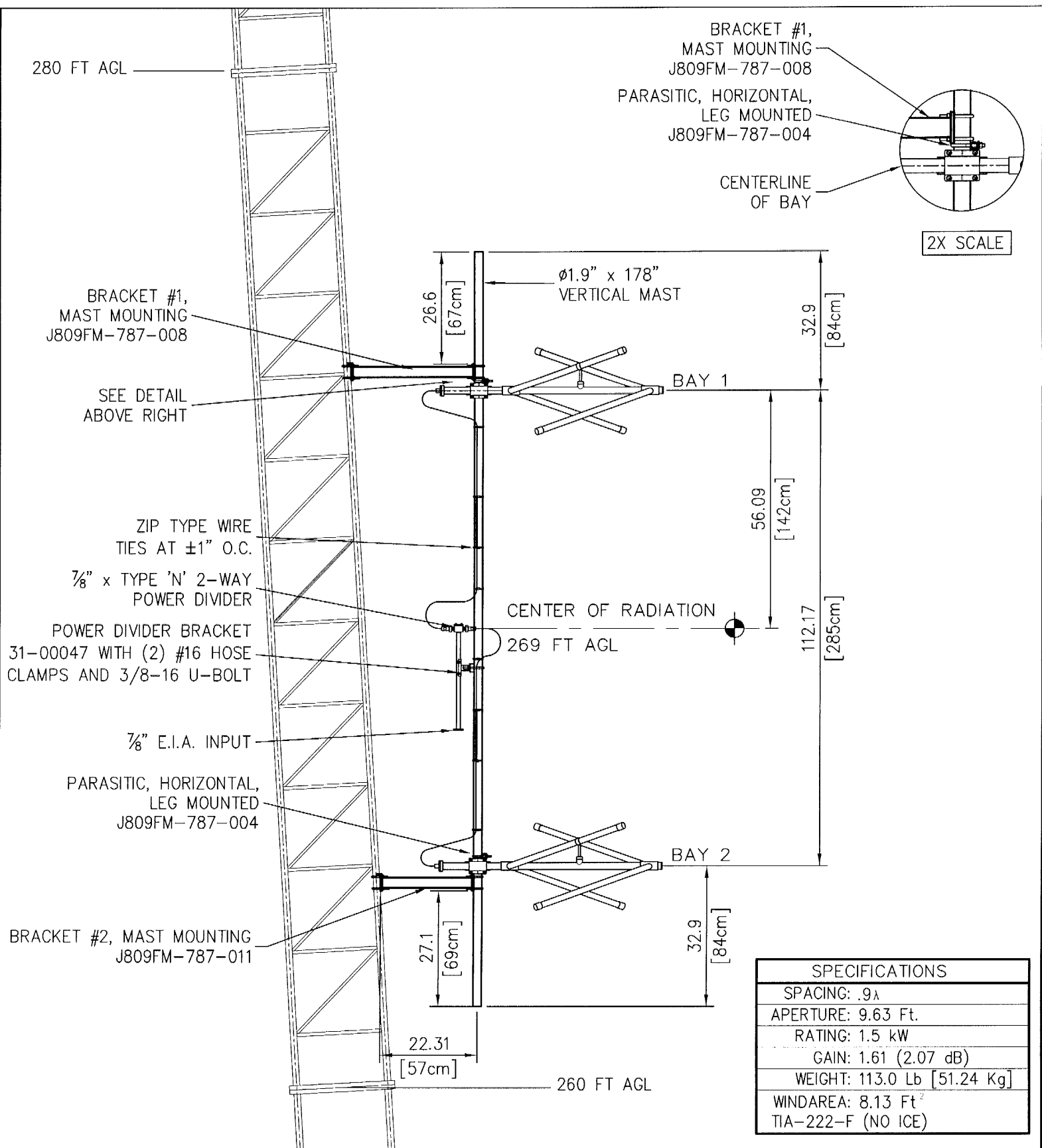
Check all bolted connections for tightness. Connect the main transmission line (not supplied) to the antenna input located at the base of the power divider. The antenna has a 7/8" EIA type input flange.

Drawing Index

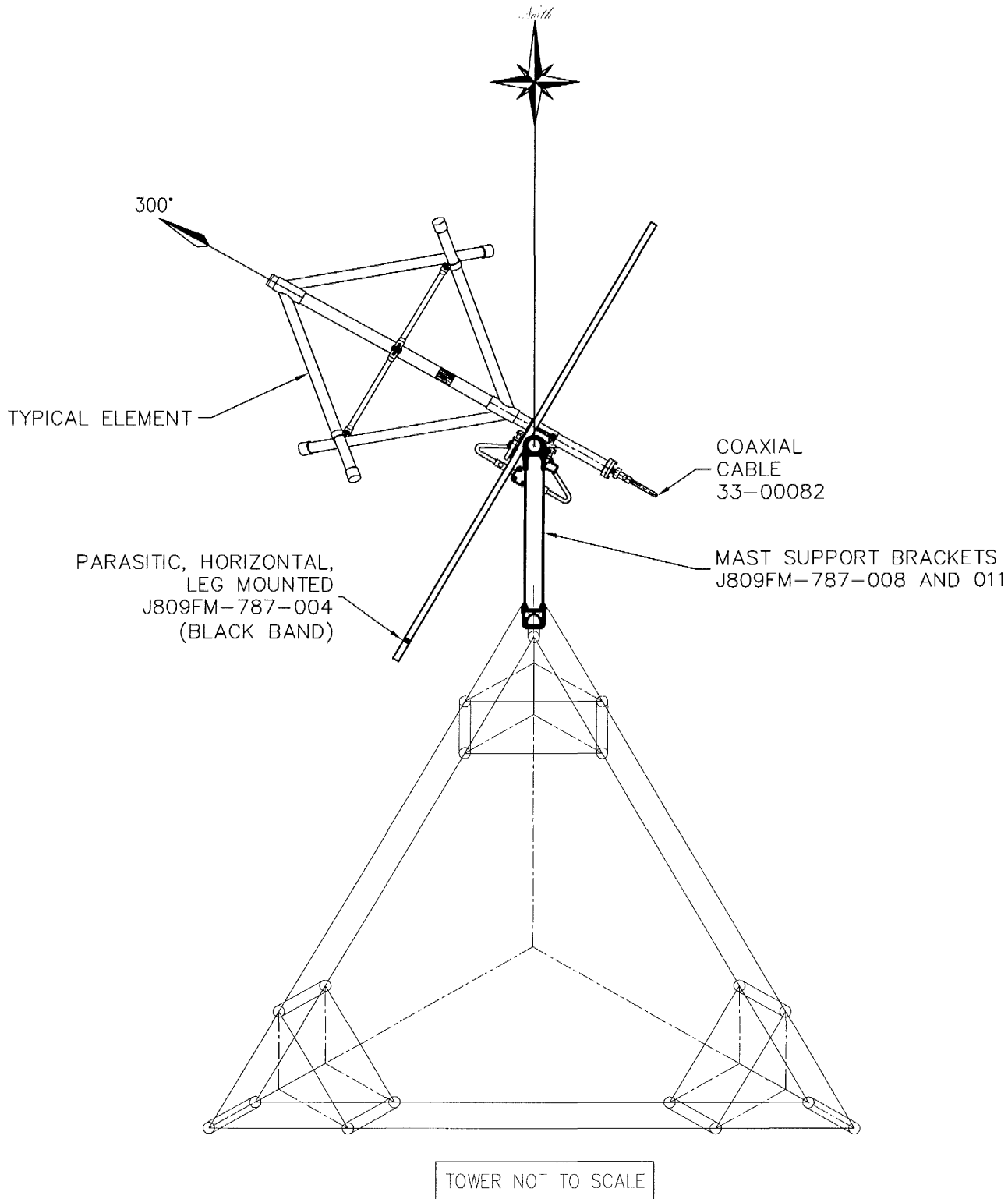
<u>Drawing</u>	<u>Title</u>
J809FM-787-001	Antenna Elevation and Specifications
J809FM-787-002	Antenna Plan View and Orientation
J809FM-787-004	Parasitic, Horizontal, Mast Mounted
J809FM-787-008	Bracket #1, Mast Mounted
J809FM-787-011	Bracket #2, Mast Mounted
33-00082	1/2" Feed Cable Outline
33-00064	Power Divider Outline
31-00047	Power Divider Bracket
33-00155	Antenna Saddle Bracket
31-00046	Connector Sealing Detail

Antenna Specifications

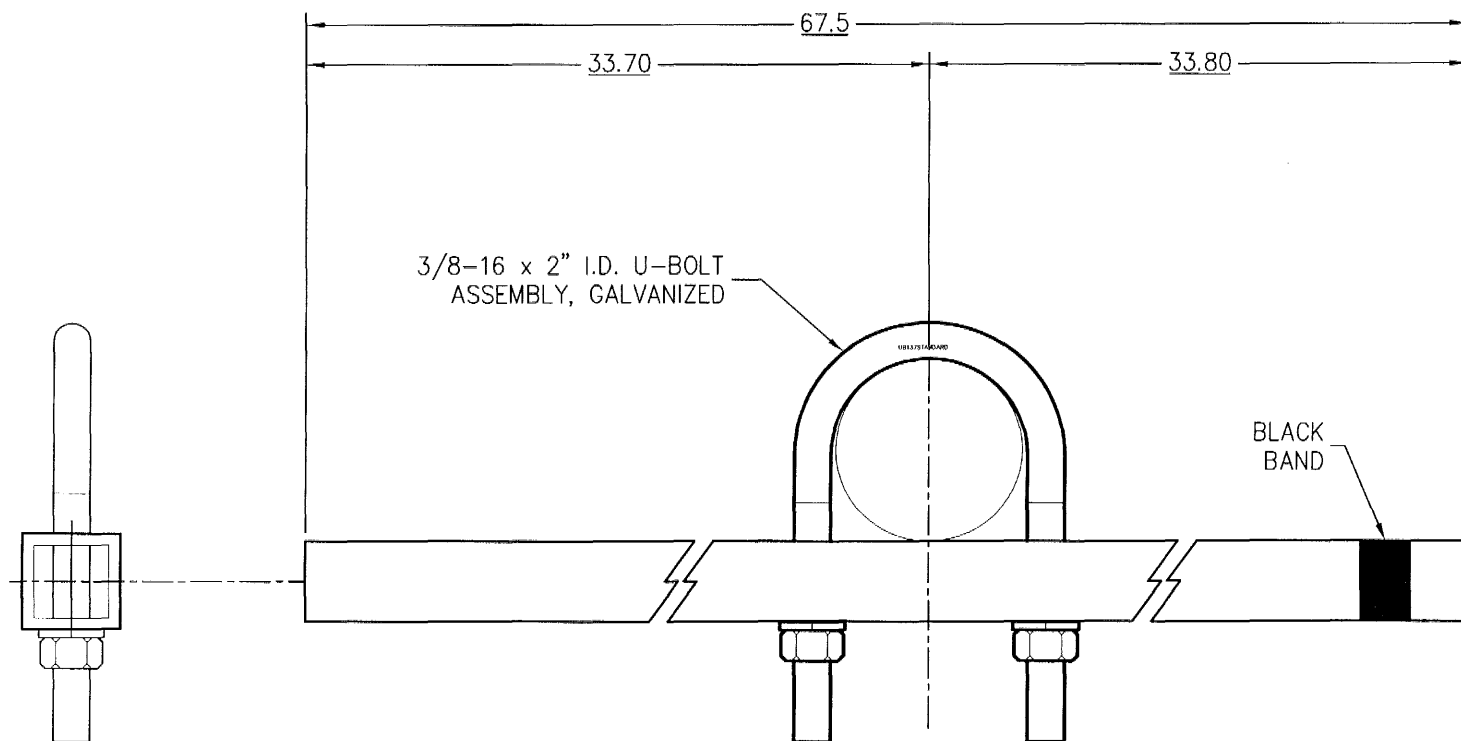
Model	PSIFML-2A-WS-DA
Description	2-bay low power directional FM broadcast antenna
Configuration	Center fed
Frequency	94.7 MHz
Polarization	Circular
Bay Spacing	.9λ
Gain	1.61 (2.07 dB)
Input	7/8" EIA center fed
Rating	1500 W
Length	14.8 ft.
Aperture	9.3 ft.
Weight	113 lbs.
Wind Area	8.13 Sq. Ft.



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.					
SIZE A					PROPAGATION SYSTEMS, INC. Ebensburg, Pennsylvania USA 814-472-5540 ANTENNA ELEVATIONS AND SPECIFICATIONS
MODEL:		PSIFML-2A-WS-DA		DRAWN BY:	D.G. Kellar
CHANNEL/FREQUENCY:		94.7 MHz		APPROVED BY:	
SCALE:		1:20		DRAWING NO.:	J809FM-787-001
				DATE:	8/10/09
				DATE:	
				REV.	



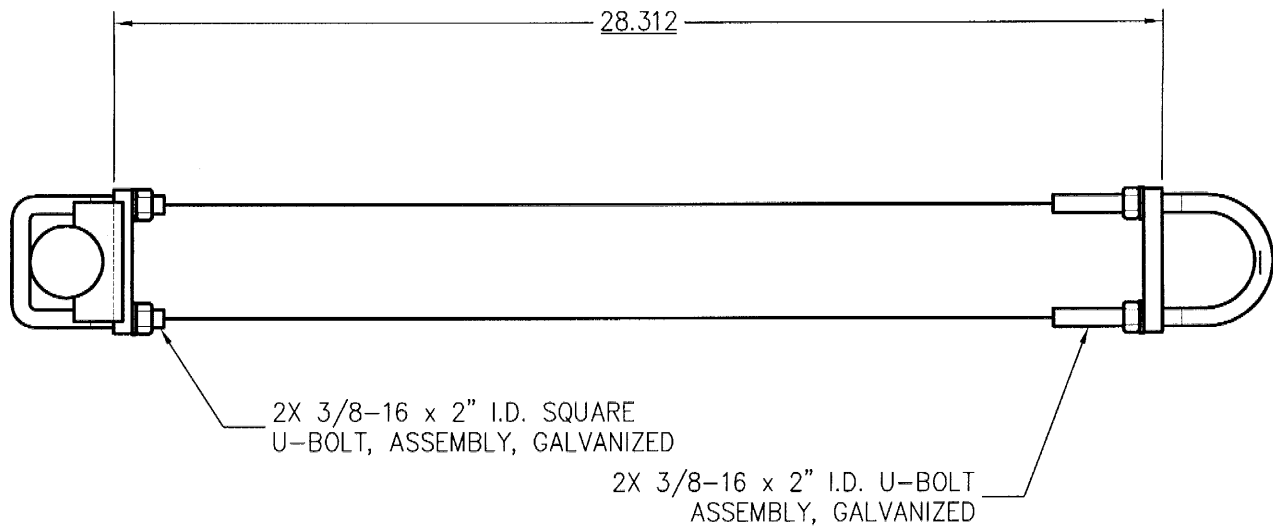
				PROPAGATION SYSTEMS, INC.			
				Ebensburg, Pennsylvania USA 814-472-5540			
				ANTENNA PLAN VIEW AND ORIENTATION			
REV.		MADE BY		DATE		CHANGE	
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				DRAWN BY: D.G. Kellar APPROVED BY:		DATE: 8/10/09	
				DRAWING NO.: J809FM-787-002		REV.	



NOTES:

1. (2) ASSEMBLIES REQUIRED
2. WEIGHT: 5.4 Lb/EACH
3. WINDAREA: .47 Ft²

				PROPAGATION SYSTEMS, INC.	
				Ebensburg, Pennsylvania USA 814-472-5540	
REV.	MADE BY CHECKED BY	DATE	CHANGE	PARASITIC, HORIZONTAL, MAST MOUNTED	
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				CHANNEL/FREQUENCY: 94.7 MHz	
				SCALE: 1:2	
				DRAWING NO.: J809FM-787-004	
SIZE A				DRAWN BY: D.G. Kellar	DATE: 8/28/09
				APPROVED BY:	DATE:
				REV.	



NOTES:

1. (1) REQUIRED
2. HOT DIP GALVANIZE
3. WEIGHT: 9.2 LB/EACH
4. WINDAREA: .46 Ft²

REV.	MADE BY CHECKED BY	DATE	CHANGE

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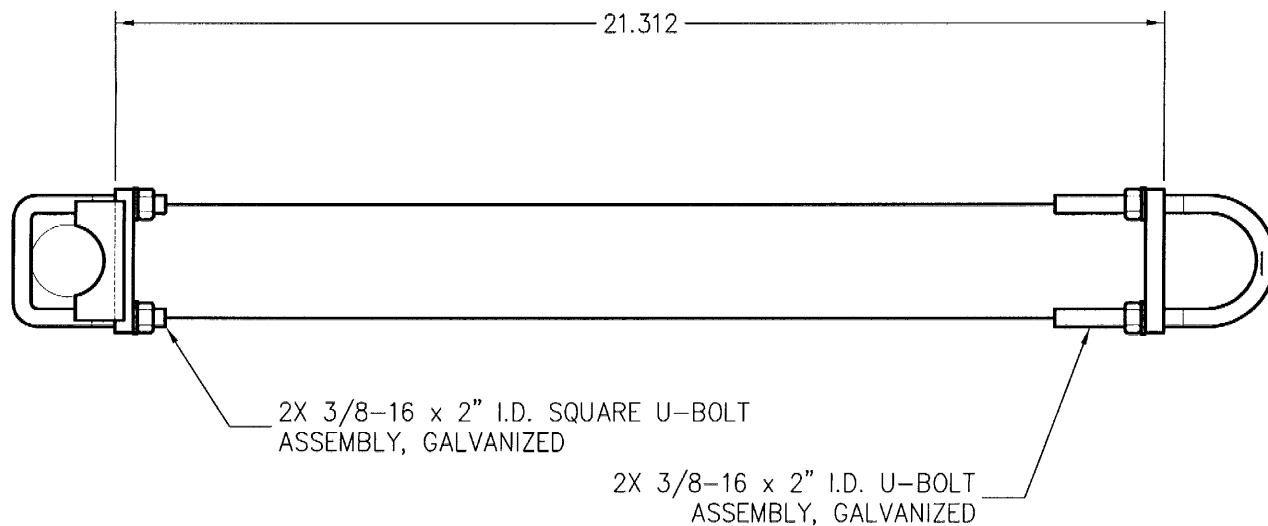
SIZE
A

PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

BRACKET #1, MAST MOUNTING

MODEL: PSIFML-2A-WS-DA	DRAWN BY: D.G. Kellar	DATE: 9/01/09
CHANNEL/ FREQUENCY: 94.7 MHz	APPROVED BY:	DATE:
SCALE: 1:4	DRAWING NO.: J809FM-787-008	REV.



NOTES:

1. (1) REQUIRED
2. HOT DIP GALVANIZE
3. WEIGHT: 7.6 LB/EACH
4. WINDAREA: .26 Ft²

REV.	MADE BY CHECKED BY	DATE	CHANGE

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SIZE
A

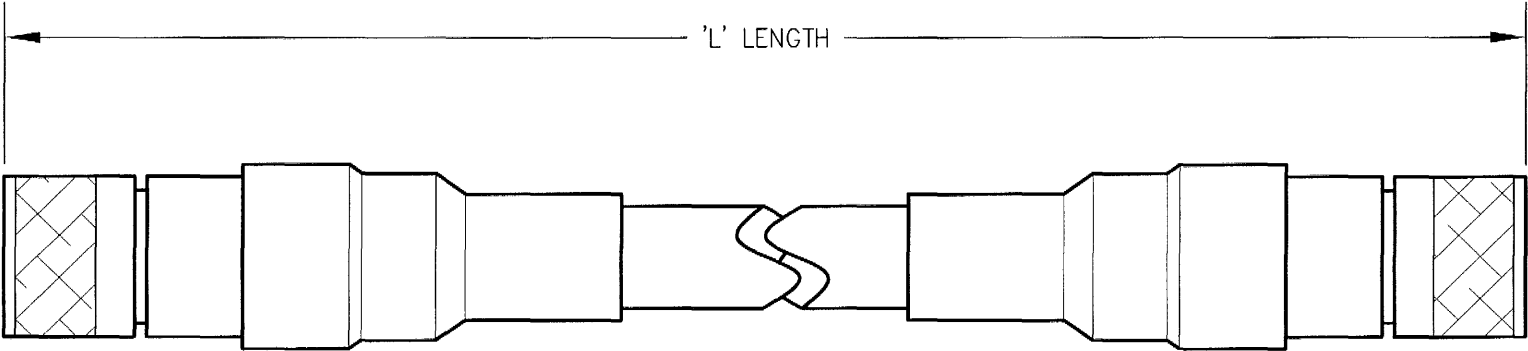
PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

BRACKET #2, MAST MOUNTING

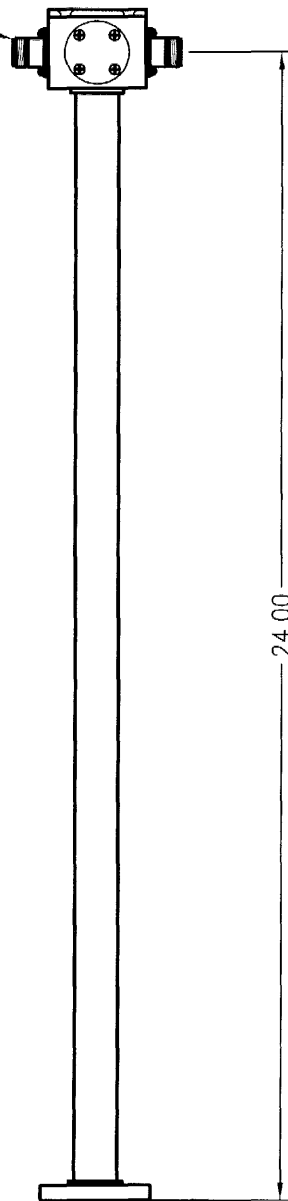
MODEL: PSIFML-2A-WS-DA	DRAWN BY: D.G. Kellar	DATE: 9/01/09
CHANNEL/FREQUENCY: 94.7 MHz	APPROVED BY:	DATE:
SCALE: 1:4	DRAWING NO.: J809FM-787-011	REV.

CABLE LENGTHS		
FREQUENCY RANGE	FINISHED LENGTH	QTY
88.1 – 89.9	96.0	2
90.1 – 95.9	96.0	2
96.1 – 101.9	91.0	2
102.1 – 107.9	86.0	2
NOTES:		



			PROPAGATION SYSTEMS, INC.		
			Ebensburg, Pennsylvania USA 814-472-5540		
REV.	MADE BY CHECKED BY	DATE	CHANGE		
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			MODEL: PSIFML-2	DRAWN BY: P. MCINTOSH	DATE: 9-6-00
			CHANNEL / FREQUENCY:	APPROVED BY:	DATE:
			SCALE: 1:1	DRAWING NO.: 33-00082	REV.

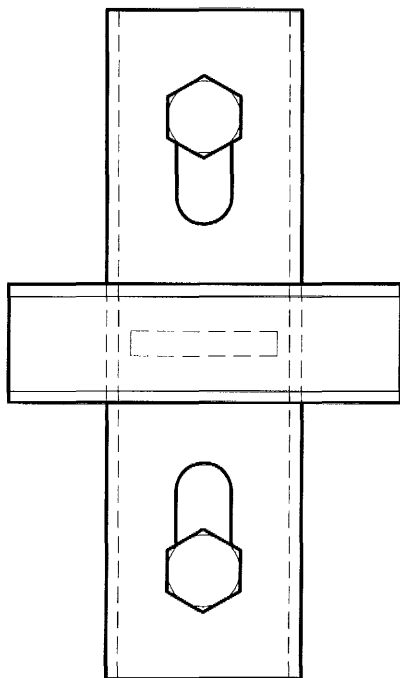
2X TYPE 'N'
OUTPUT



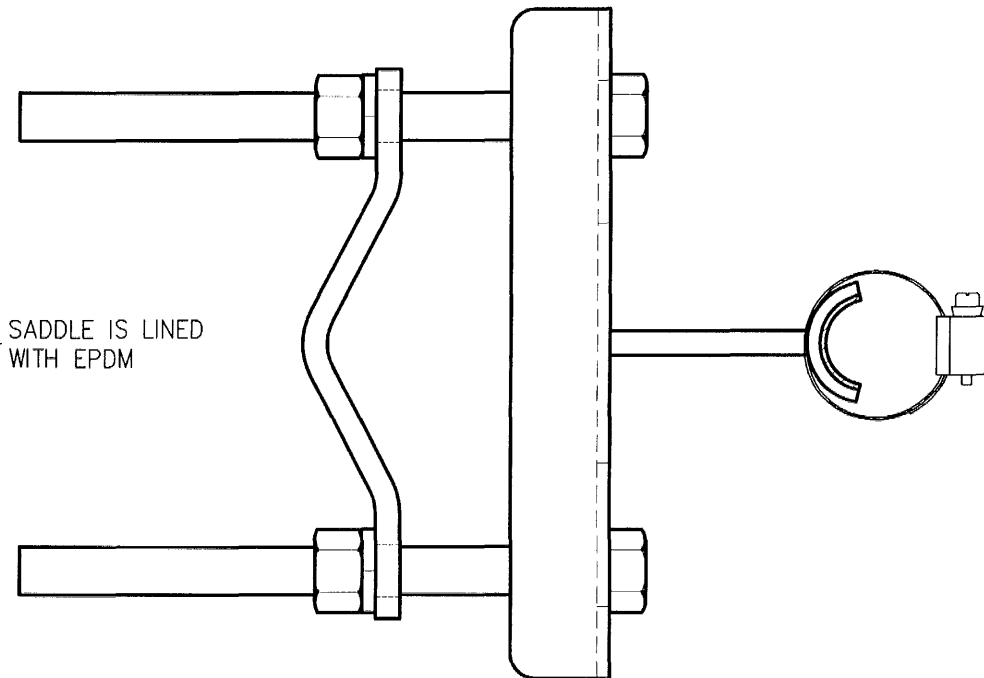
24.00

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

REV.		MADE BY	CHECKED BY	DATE	CHANGE	PROPAGATION SYSTEMS, INC. Ebensburg, Pennsylvania USA 814-472-5540 POWER DIVIDER, $\frac{7}{8}$ " x TYPE 'N', 2-WAY				
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.						SIZE				
						A				
								MODEL:	DRAWN BY: D.G. Kellar	DATE: 2/18/08
								CHANNEL/FREQUENCY:	APPROVED BY:	DATE:
SCALE: 1:4						DRAWING NO.: 33-00064				
						REV.				

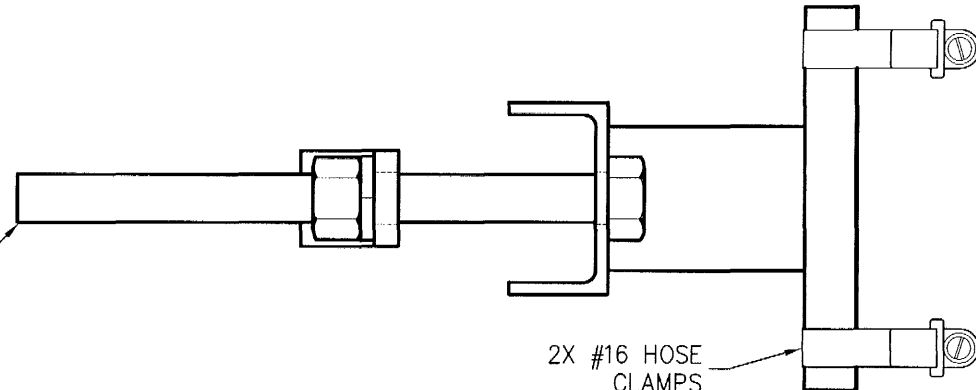


FRONT VIEW



PLAN VIEW

2X 1/2-13 x 6" GALVANIZED, BOLT
HEXNUT AND LOCKWASHER



2X #16 HOSE
CLAMPS

SIDE VIEW

SPECIFICATIONS

WEIGHT: 3.0 Lb [1.36 Kg]

WINDAREA: .4 Ft²

TIA-222-F (NO ICE)

PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

POWER DIVIDER MOUNTING BRACKET

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SIZE

A

MODEL:

CHANNEL/
FREQUENCY:

SCALE:

1:2

DRAWN BY:

D.G. Kellar

APPROVED BY:

DRAWING NO.:

31-00047

DATE:

5/25/07

DATE:

REV.

STEP 1: WRAP JOINT WITH (2) 2 1/4" WIDE MASTIC PROVIDED WITH ANTENNA. ASSURE MASTIC OVERLAPS AS SHOWN

STEP 2: WRAP BLACK ELECTRICAL TAPE (PROVIDED) OVER MASTIC. COVER ENTIRE MASTIC AREA

SEAL ALL JOINTS AS OUTLINED IN STEPS 1 AND 2 ABOVE

TYPE 'N' OUTPUT POWER DIVIDER

PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

TYPE N JOINT SEALING INSTRUCTIONS

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.

SIZE

A

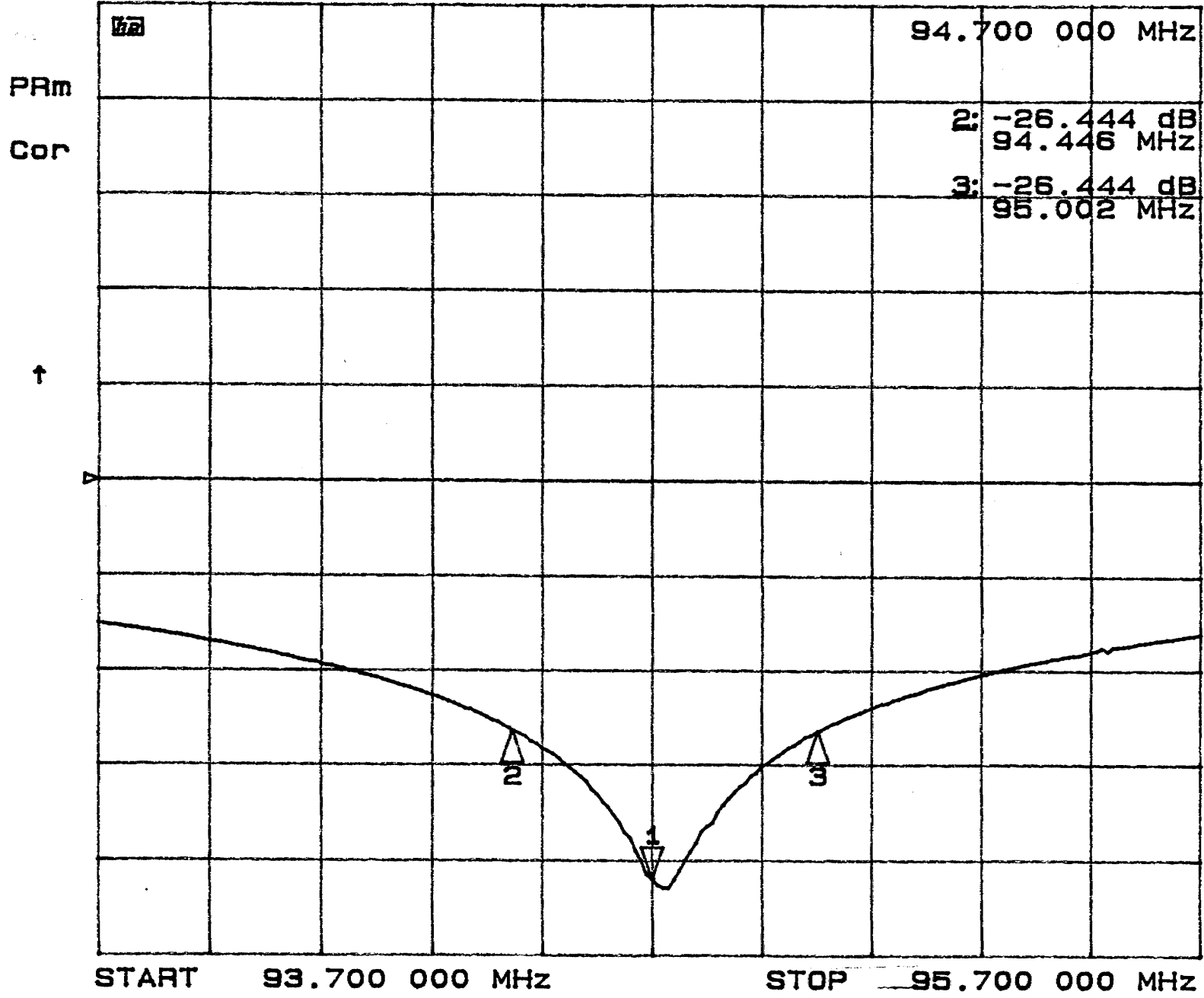
MODEL: PSIFML	DRAWN BY: D.G. Kellar	DATE: 2/6/07
CHANNEL/FREQUENCY:	APPROVED BY:	DATE:
SCALE: 1:2	DRAWING NO.: 31-00046	REV.

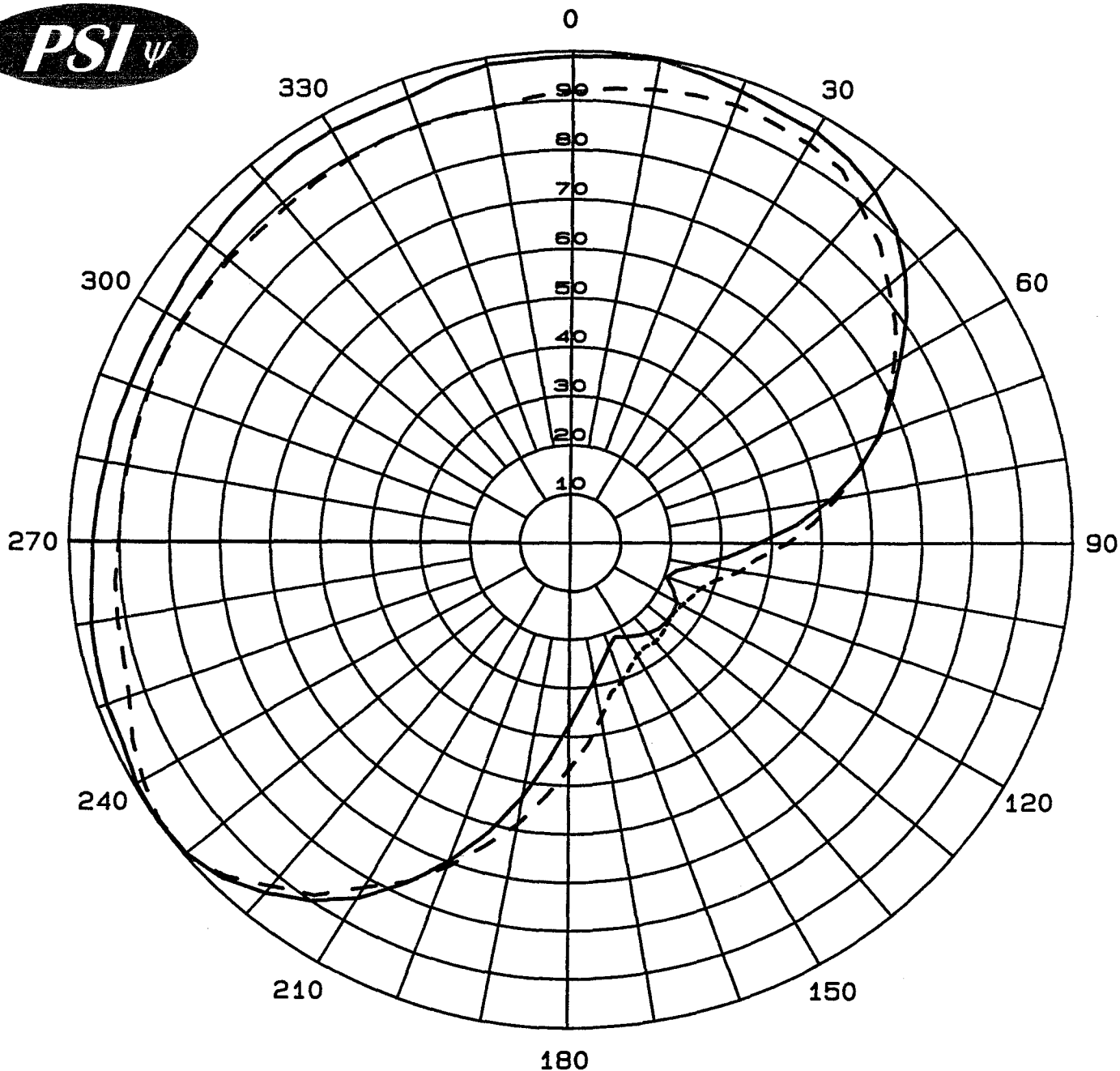
1809PM-787

FUAC

ML-2A-WS-DA

CH1 MEM log MAG 10 dB/ REF 0 dB 1: -42.054 dB





Relative Field Pattern
Antenna: PSIFML-2A-WS-DA
Type: 2-Bay Directional FM Antenna
Gain (h-pol): 1.61 (2.07 dB)
Gain (v-pol): 1.61 (2.07 dB)
Frequency: 94.7 MHz
Station: W234AX
Location: Allentown, PA

Propagation Systems Inc.
PO Box 113
Ebensburg, PA 15931

Family Life Network

Relative Field Tabulation

Antenna: PSIFML-2A-WS-DA

Family Life Network

Station: W234AX

Frequency: 94.7 MHz

Location: Allentown, PA

Horizontal Polarization

Angle	Relative Field	Power Gain	Gain (dB)
0	0.991	1.581	1.99
10	0.999	1.606	2.06
20	0.977	1.537	1.87
30	0.966	1.503	1.77
40	0.934	1.405	1.48
50	0.862	1.196	0.78
60	0.754	0.915	-0.38
70	0.650	0.680	-1.67
80	0.524	0.441	-3.55
90	0.371	0.222	-6.54
100	0.255	0.105	-9.80
110	0.203	0.066	-11.78
120	0.244	0.096	-10.18
130	0.250	0.101	-9.97
140	0.241	0.094	-10.29
150	0.221	0.079	-11.04
160	0.227	0.083	-10.81
170	0.283	0.129	-8.90
180	0.372	0.223	-6.51
190	0.527	0.447	-3.49
200	0.694	0.776	-1.10
210	0.844	1.148	0.60
220	0.942	1.428	1.55
230	0.995	1.595	2.03
240	0.995	1.595	2.03
250	0.982	1.552	1.91
260	0.971	1.516	1.81
270	0.954	1.465	1.66
280	0.943	1.432	1.56
290	0.938	1.415	1.51
300	0.938	1.415	1.51
310	0.948	1.448	1.61
320	0.959	1.482	1.71
330	0.965	1.499	1.76
340	0.963	1.492	1.74
350	0.987	1.570	1.96

Vertical Polarization

Angle	Relative Field	Power Gain	Gain (dB)
0	0.917	1.353	1.31
10	0.935	1.407	1.48
20	0.947	1.443	1.59
30	0.937	1.414	1.50
40	0.891	1.278	1.07
50	0.819	1.080	0.33
60	0.741	0.884	-0.54
70	0.653	0.687	-1.63
80	0.536	0.462	-3.36
90	0.430	0.298	-5.26
100	0.339	0.185	-7.33
110	0.275	0.121	-9.16
120	0.255	0.105	-9.80
130	0.254	0.104	-9.85
140	0.265	0.113	-9.47
150	0.265	0.113	-9.47
160	0.302	0.147	-8.33
170	0.362	0.211	-6.76
180	0.463	0.345	-4.62
190	0.585	0.550	-2.60
200	0.708	0.808	-0.93
210	0.819	1.080	0.33
220	0.925	1.378	1.39
230	1.000	1.610	2.07
240	0.981	1.549	1.90
250	0.935	1.408	1.48
260	0.918	1.356	1.32
270	0.902	1.310	1.17
280	0.900	1.304	1.15
290	0.899	1.301	1.14
300	0.897	1.295	1.12
310	0.895	1.290	1.10
320	0.890	1.275	1.06
330	0.898	1.298	1.13
340	0.900	1.304	1.15
350	0.898	1.298	1.13

ERP Tabulation

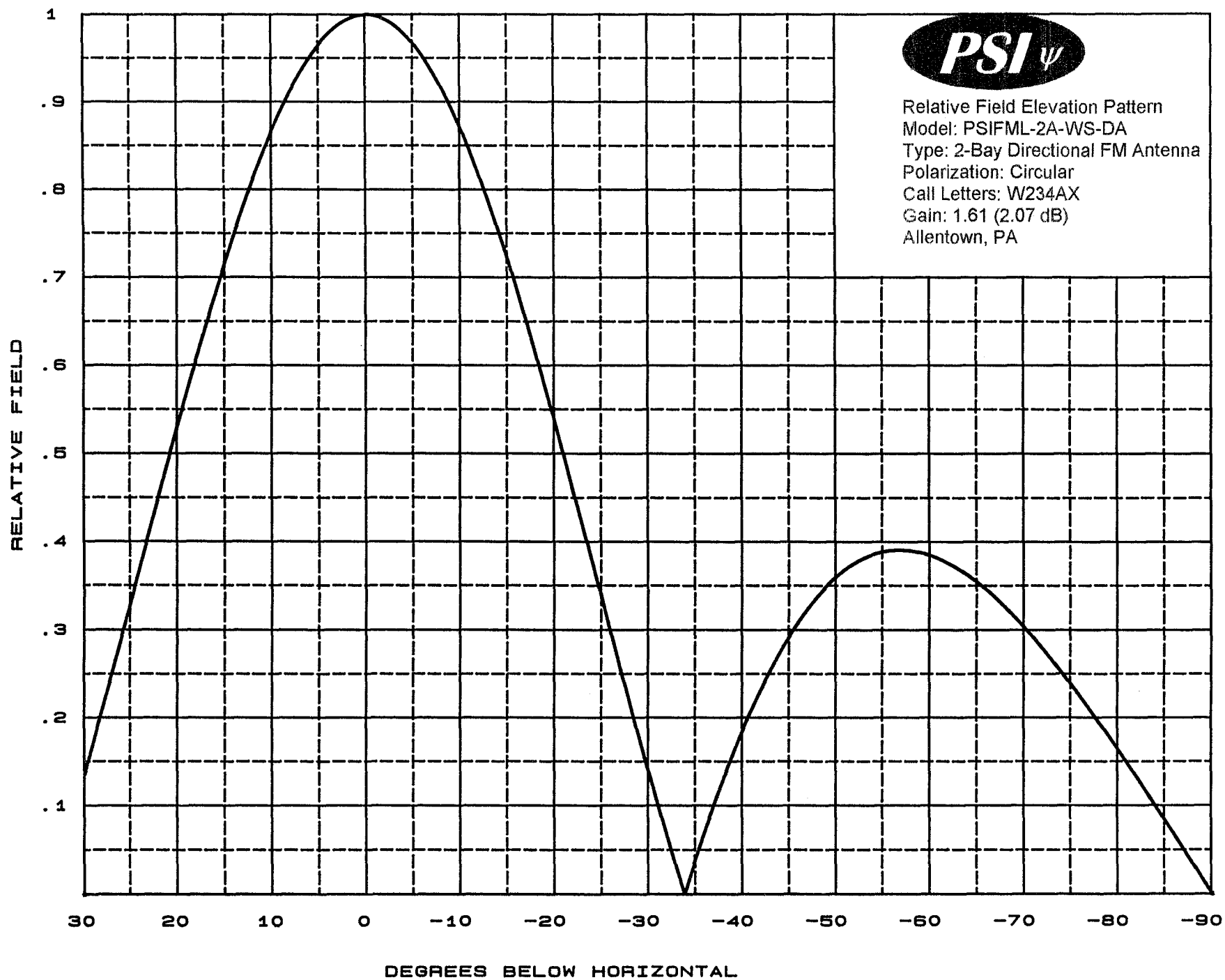
Antenna: PSIFML-2A-WS-DA
Family Life Network
Station: W234AX
Frequency: 94.7 MHz
Location: Allentown, PA
Maximum ERP: .010 kW (-20.0 dBk)

Horizontal Polarization

Angle	Relative Field	ERP Watts	ERP (dBw)
0	0.991	9.82	9.92
10	0.999	9.98	9.99
20	0.977	9.55	9.80
30	0.966	9.33	9.70
40	0.934	8.73	9.41
50	0.862	7.43	8.71
60	0.754	5.69	7.55
70	0.650	4.23	6.26
80	0.524	2.74	4.38
90	0.371	1.38	1.39
100	0.255	0.65	-1.87
110	0.203	0.41	-3.85
120	0.244	0.60	-2.25
130	0.250	0.63	-2.04
140	0.241	0.58	-2.36
150	0.221	0.49	-3.11
160	0.227	0.52	-2.88
170	0.283	0.80	-0.96
180	0.372	1.39	1.42
190	0.527	2.78	4.44
200	0.694	4.82	6.83
210	0.844	7.13	8.53
220	0.942	8.87	9.48
230	0.995	9.91	9.96
240	0.995	9.91	9.96
250	0.982	9.64	9.84
260	0.971	9.42	9.74
270	0.954	9.10	9.59
280	0.943	8.89	9.49
290	0.938	8.79	9.44
300	0.938	8.79	9.44
310	0.948	8.99	9.54
320	0.959	9.20	9.64
330	0.965	9.31	9.69
340	0.963	9.27	9.67
350	0.987	9.75	9.89

Vertical Polarization

Angle	Relative Field	ERP Watts	ERP (dBw)
0	0.917	8.40	9.24
10	0.935	8.74	9.42
20	0.947	8.96	9.53
30	0.937	8.78	9.43
40	0.891	7.94	9.00
50	0.819	6.71	8.26
60	0.741	5.49	7.40
70	0.653	4.26	6.30
80	0.536	2.87	4.58
90	0.430	1.85	2.68
100	0.339	1.15	0.60
110	0.275	0.75	-1.23
120	0.255	0.65	-1.87
130	0.254	0.64	-1.91
140	0.265	0.70	-1.54
150	0.265	0.70	-1.54
160	0.302	0.91	-0.40
170	0.362	1.31	1.17
180	0.463	2.15	3.32
190	0.585	3.42	5.34
200	0.708	5.02	7.01
210	0.819	6.71	8.26
220	0.925	8.56	9.32
230	1.000	10.00	10.00
240	0.981	9.62	9.83
250	0.935	8.74	9.42
260	0.918	8.42	9.25
270	0.902	8.14	9.11
280	0.900	8.10	9.08
290	0.899	8.08	9.08
300	0.897	8.05	9.06
310	0.895	8.01	9.04
320	0.890	7.92	8.99
330	0.898	8.06	9.07
340	0.900	8.10	9.08
350	0.898	8.06	9.06





Propagation Systems Inc.
 Elevation Pattern Tabulation
 Antenna: PSIFML-2A-WS-DA
 Bay spacing: .90 wave

Angle	Field	dB	Angle	Field	dB	Angle	Field	dB
-90.0	0.001	-60.000	-50.0	0.361	-8.856	-10.0	0.868	-1.226
-89.0	0.017	-35.642	-49.0	0.351	-9.104	-9.0	0.892	-0.989
-88.0	0.033	-29.582	-48.0	0.339	-9.398	-8.0	0.914	-0.777
-87.0	0.050	-26.073	-47.0	0.326	-9.746	-7.0	0.934	-0.592
-86.0	0.066	-23.581	-46.0	0.311	-10.152	-6.0	0.951	-0.434
-85.0	0.083	-21.663	-45.0	0.294	-10.626	-5.0	0.966	-0.300
-84.0	0.099	-20.106	-44.0	0.276	-11.180	-4.0	0.978	-0.192
-83.0	0.115	-18.786	-43.0	0.256	-11.823	-3.0	0.988	-0.109
-82.0	0.131	-17.651	-42.0	0.235	-12.579	-2.0	0.994	-0.049
-81.0	0.147	-16.655	-41.0	0.212	-13.475	-1.0	0.998	-0.013
-80.0	0.163	-15.771	-40.0	0.187	-14.543	0.0	1.000	0.000
-79.0	0.178	-14.983	-39.0	0.161	-15.844	1.0	0.998	-0.013
-78.0	0.193	-14.274	-38.0	0.134	-17.472	2.0	0.994	-0.049
-77.0	0.208	-13.625	-37.0	0.105	-19.614	3.0	0.988	-0.109
-76.0	0.223	-13.033	-36.0	0.074	-22.605	4.0	0.978	-0.192
-75.0	0.237	-12.495	-35.0	0.042	-27.510	5.0	0.966	-0.300
-74.0	0.251	-11.994	-34.0	0.009	-40.974	6.0	0.951	-0.433
-73.0	0.265	-11.540	-33.0	0.025	-31.937	7.0	0.934	-0.592
-72.0	0.278	-11.118	-32.0	0.061	-24.306	8.0	0.914	-0.777
-71.0	0.291	-10.734	-31.0	0.097	-20.227	9.0	0.893	-0.987
-70.0	0.303	-10.379	-30.0	0.135	-17.403	10.0	0.868	-1.226
-69.0	0.314	-10.055	-29.0	0.173	-15.230	11.0	0.842	-1.493
-68.0	0.325	-9.758	-28.0	0.212	-13.462	12.0	0.814	-1.790
-67.0	0.335	-9.487	-27.0	0.252	-11.978	13.0	0.784	-2.118
-66.0	0.345	-9.244	-26.0	0.292	-10.698	14.0	0.752	-2.478
-65.0	0.354	-9.025	-25.0	0.332	-9.570	15.0	0.718	-2.873
-64.0	0.362	-8.830	-24.0	0.373	-8.572	16.0	0.684	-3.303
-63.0	0.369	-8.657	-23.0	0.413	-7.677	17.0	0.647	-3.776
-62.0	0.375	-8.512	-22.0	0.453	-6.869	18.0	0.610	-4.289
-61.0	0.381	-8.390	-21.0	0.493	-6.135	19.0	0.572	-4.850
-60.0	0.385	-8.294	-20.0	0.533	-5.462	20.0	0.533	-5.462
-59.0	0.388	-8.219	-19.0	0.572	-4.850	21.0	0.494	-6.132
-58.0	0.390	-8.175	-18.0	0.610	-4.291	22.0	0.454	-6.866
-57.0	0.391	-8.152	-17.0	0.647	-3.776	23.0	0.413	-7.677
-56.0	0.391	-8.158	-16.0	0.683	-3.305	24.0	0.373	-8.572
-55.0	0.389	-8.196	-15.0	0.718	-2.873	25.0	0.332	-9.570
-54.0	0.386	-8.260	-14.0	0.752	-2.478	26.0	0.292	-10.693
-53.0	0.382	-8.356	-13.0	0.784	-2.118	27.0	0.252	-11.973
-52.0	0.377	-8.484	-12.0	0.814	-1.790	28.0	0.212	-13.462
-51.0	0.369	-8.650	-11.0	0.842	-1.494	29.0	0.173	-15.222