



# Propagation Systems, Inc.

Quality Broadcast Antenna Systems

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**Directional FM Antenna  
KJFT  
CSN International  
Arlee, MT**

A standard model PSIFMR antenna was used in conjunction with the customer's Microflex 700 series triangular face tower to create the necessary directional radiation pattern. The final antenna consists of two radiating elements each secured to the tower with a custom-mounting bracket and support mast. The antenna bays are full wave spaced. The antenna array is end fed and has a 1-5/8" EIA input. Each radiating element receives equal power and phase.

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 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 90% of the envelope RMS.

The antenna is to be mounted 13 meters (42.5 ft) above ground level on the northeast tower face. This elevation is 5 meters below the approved 18-meter center of radiation. The 13-meter elevation is necessary for the required 10 ft. minimum separation between the KJFT antenna and existing antennas located on the tower. The antenna is to be positioned 20° 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 50 watts will be required at the antenna input in order to reach the licensed .11 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 50 ft. The efficiency for this length of line is 95.5% with a resulting transmitter output power of 52.54 watts. The final length of transmission line must be determined after installation.

### **Antenna Specifications**

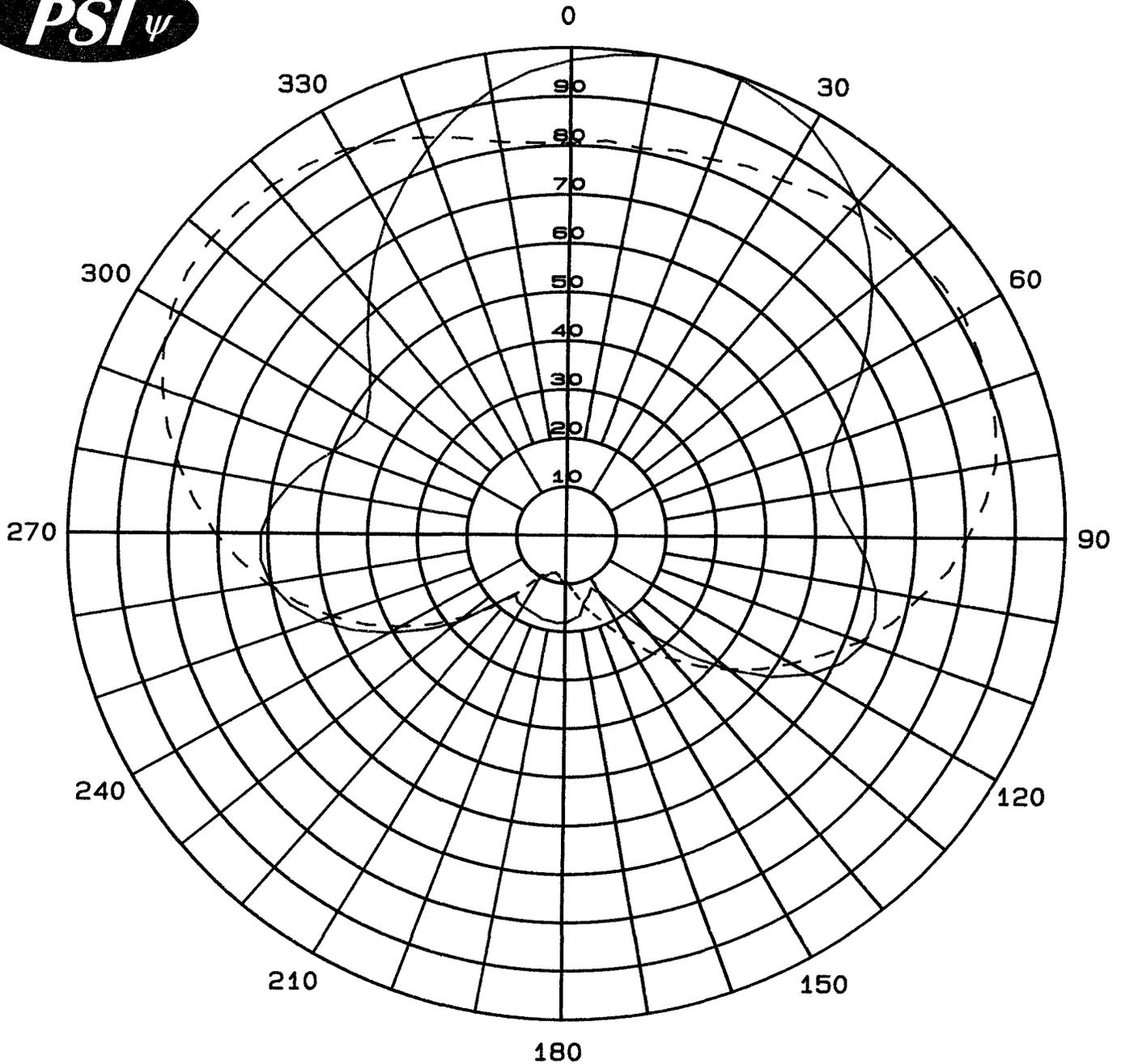
Antenna Model	PSIFMR-2-DA
Type	2-bay directional FM antenna
Bay Spacing	full wave spaced elements
Frequency	90.3 MHz
Polarization	Circular
Envelope RMS	.788
Composite RMS	.710
Gain (h-pol)	2.20 (3.42 dB)
RMS (h-pol)	.603
Gain (v-pol)	1.94 (2.89 dB)
RMS (v-pol)	.721
Input	1-5/8" EIA end fed input
Power rating	9 kW
Length	22 ft.- 9-3/8 in.
Weight	264 lbs.
Wind Area	26.6 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.

 3/13/07

Douglas A. Ross  
President  
Propagation Systems Inc.



Measured Relative Field  
Azimuth Plane Pattern  
Antenna: PSIFMR-2-DA  
Type: 2-Bay Directional FM  
H-pol Gain (solid): 2.20 (3.42 dB)  
V-pol Gain (dash): 1.94 (2.89 dB)  
Frequency: 90.3 MHz  
KJFT Arlee, MT

**Propagation Systems Inc.**  
**PO Box 113**  
**Ebensburg, PA 15931**

## Measured Relative Field Tabulation

Antenna: PSIFMR-2-DA  
 CSN International  
 Station: KJFT  
 Frequency: 90.3 MHz  
 Location: Arlee, MT

### Horizontal Polarization

Angle	Relative Field	Power Gain	Gain (dB)
0	0.974	2.09	3.20
10	1.000	2.20	3.42
20	0.995	2.18	3.38
30	0.965	2.05	3.11
40	0.895	1.76	2.46
50	0.794	1.39	1.42
60	0.679	1.01	0.06
70	0.567	0.71	-1.50
80	0.535	0.63	-2.01
90	0.576	0.73	-1.37
100	0.632	0.88	-0.56
110	0.638	0.90	-0.48
120	0.568	0.71	-1.49
130	0.431	0.41	-3.89
140	0.268	0.16	-8.01
150	0.135	0.04	-13.97
160	0.133	0.04	-14.10
170	0.167	0.06	-12.12
180	0.180	0.07	-11.47
190	0.180	0.07	-11.47
200	0.175	0.07	-11.72
210	0.170	0.06	-11.97
220	0.157	0.05	-12.66
230	0.281	0.17	-7.60
240	0.408	0.37	-4.36
250	0.527	0.61	-2.14
260	0.602	0.80	-0.98
270	0.615	0.83	-0.80
280	0.568	0.71	-1.49
290	0.499	0.55	-2.61
300	0.469	0.48	-3.15
310	0.519	0.59	-2.27
320	0.627	0.86	-0.63
330	0.744	1.22	0.86
340	0.843	1.56	1.94
350	0.923	1.87	2.73

Maximum Value

Field 1.00  
 Gain 2.20 (3.42 dB)  
 Azimuth Bearing 10 degrees

Minimum Field

Field 0.120  
 Gain .032 (-14.99 dB)  
 Azimuth Bearing 155 degrees

### Vertical Polarization

Angle	Relative Field	Power Gain	Gain (dB)
0	0.805	1.43	1.54
10	0.807	1.43	1.56
20	0.823	1.49	1.73
30	0.845	1.57	1.96
40	0.877	1.69	2.28
50	0.900	1.78	2.51
60	0.912	1.83	2.62
70	0.899	1.78	2.50
80	0.872	1.67	2.23
90	0.804	1.42	1.53
100	0.718	1.13	0.55
110	0.629	0.87	-0.60
120	0.525	0.61	-2.17
130	0.429	0.40	-3.93
140	0.333	0.24	-6.13
150	0.250	0.14	-8.62
160	0.178	0.07	-11.57
170	0.126	0.03	-14.57
180	0.097	0.02	-16.84
190	0.083	0.02	-18.19
200	0.082	0.01	-18.30
210	0.095	0.02	-17.02
220	0.163	0.06	-12.33
230	0.266	0.16	-8.08
240	0.382	0.32	-4.93
250	0.499	0.55	-2.61
260	0.607	0.81	-0.91
270	0.707	1.10	0.41
280	0.792	1.38	1.40
290	0.867	1.65	2.18
300	0.920	1.86	2.70
310	0.940	1.94	2.89
320	0.932	1.91	2.81
330	0.909	1.82	2.60
340	0.868	1.66	2.19
350	0.818	1.47	1.68

Maximum Value

Field 0.940  
 Gain 1.94 (2.89 dB)  
 Azimuth Bearing 310 degrees

Minimum Field

Field 0.079  
 Gain .014 (-18.62 dB)  
 Azimuth Bearing 195 degrees

## ERP Tabulation

Antenna: PSIFMR-2-DA

CSN International

Station: KJFT

Frequency: 90.3 MHz

Location: Arlee, MT

Maximum ERP: .11 kW (-9.59 dBk)

### Horizontal Polarization

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.974	0.104	-9.81
10	1.000	0.110	-9.59
20	0.995	0.109	-9.63
30	0.965	0.102	-9.90
40	0.895	0.088	-10.55
50	0.794	0.069	-11.59
60	0.679	0.051	-12.95
70	0.567	0.035	-14.51
80	0.535	0.031	-15.02
90	0.576	0.036	-14.38
100	0.632	0.044	-13.57
110	0.638	0.045	-13.49
120	0.568	0.035	-14.50
130	0.431	0.020	-16.90
140	0.268	0.008	-21.02
150	0.135	0.002	-26.98
160	0.133	0.002	-27.11
170	0.167	0.003	-25.13
180	0.180	0.004	-24.48
190	0.180	0.004	-24.48
200	0.175	0.003	-24.73
210	0.170	0.003	-24.98
220	0.157	0.003	-25.67
230	0.281	0.009	-20.61
240	0.408	0.018	-17.37
250	0.527	0.031	-15.15
260	0.602	0.040	-13.99
270	0.615	0.042	-13.81
280	0.568	0.035	-14.50
290	0.499	0.027	-15.62
300	0.469	0.024	-16.16
310	0.519	0.030	-15.28
320	0.627	0.043	-13.64
330	0.744	0.061	-12.15
340	0.843	0.078	-11.07
350	0.923	0.094	-10.28

Maximum Value (H-pol)

Field 1.00  
ERP .11 kW (-9.59 dBk)

Azimuth Bearing 10 degrees

Minimum Field (H-pol)

Field 0.120  
ERP .002 kW (-28.0 dBk)

Azimuth Bearing 155 degrees

### Vertical Polarization

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.805	0.071	-11.47
10	0.807	0.072	-11.45
20	0.823	0.075	-11.28
30	0.845	0.079	-11.05
40	0.877	0.085	-10.73
50	0.900	0.089	-10.50
60	0.912	0.091	-10.39
70	0.899	0.089	-10.51
80	0.872	0.084	-10.78
90	0.804	0.071	-11.48
100	0.718	0.057	-12.46
110	0.629	0.044	-13.61
120	0.525	0.030	-15.18
130	0.429	0.020	-16.94
140	0.333	0.012	-19.14
150	0.250	0.007	-21.63
160	0.178	0.003	-24.58
170	0.126	0.002	-27.58
180	0.097	0.001	-29.85
190	0.083	0.001	-31.20
200	0.082	0.001	-31.31
210	0.095	0.001	-30.03
220	0.163	0.003	-25.34
230	0.266	0.008	-21.09
240	0.382	0.016	-17.94
250	0.499	0.027	-15.62
260	0.607	0.041	-13.92
270	0.707	0.055	-12.60
280	0.792	0.069	-11.61
290	0.867	0.083	-10.83
300	0.920	0.093	-10.31
310	0.940	0.097	-10.12
320	0.932	0.096	-10.20
330	0.909	0.091	-10.41
340	0.868	0.083	-10.82
350	0.818	0.074	-11.33

Maximum Value (V-pol)

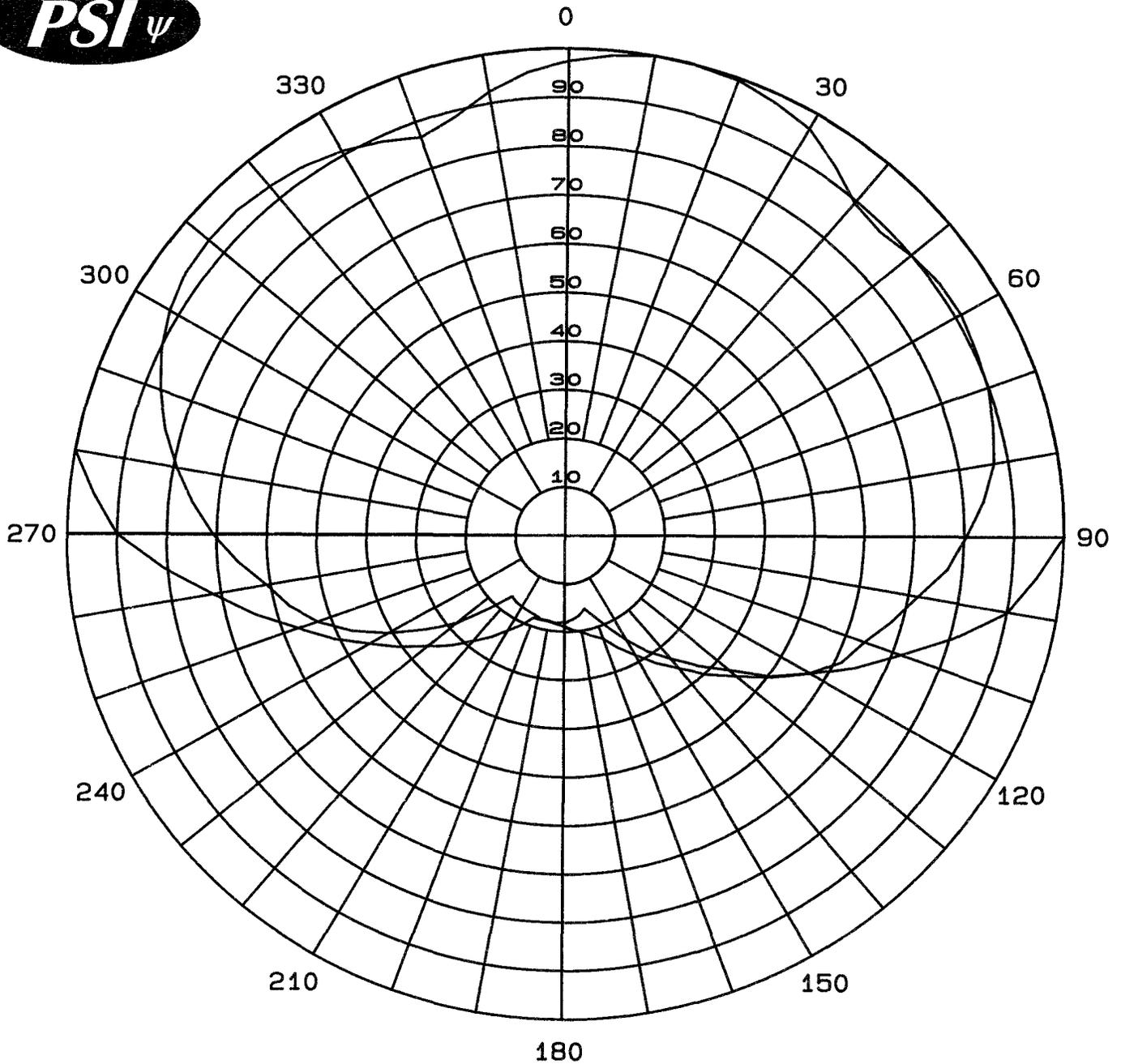
Field 0.940  
ERP .097 kW (-10.12 dBk)

Azimuth Bearing 310 degrees

Minimum Field (V-pol)

Field 0.079  
ERP .0007 kW (-31.6 dBk)

Azimuth Bearing 195 degrees



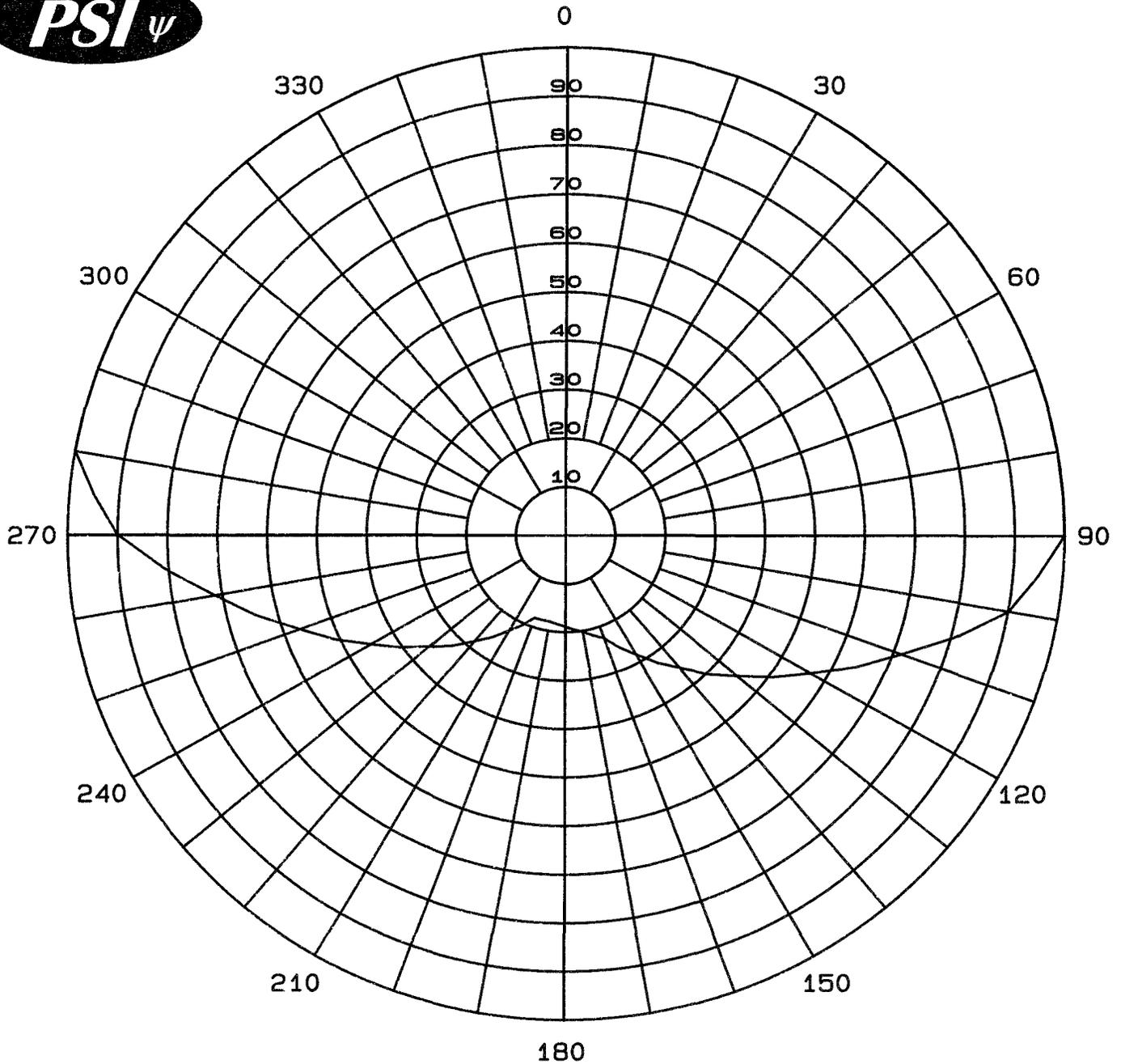
Measured Composite and  
Maximum Envelope Pattern  
Antenna: PSIFMR-2-DA  
Type: 2-Bay Directional FM  
Composite RMS: .710  
Envelope RMS: .788  
Frequency: 90.3 MHz  
KJFT Arlee, MT

**Propagation Systems Inc.**  
**PO Box 113**  
**Ebensburg, PA 15931**

## Composite Pattern Tabulation

Antenna: PSIFMR-2-DA  
CSN International  
Station: KJFT  
Frequency: 90.3 MHz  
Location: Arlee, MT  
Maximum ERP: .11 kW (-9.59 dBk)

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.974	5.69	7.55
10	1.000	6.00	7.78
20	0.995	5.94	7.74
30	0.965	5.59	7.47
40	0.895	4.81	6.82
50	0.900	4.86	6.87
60	0.912	4.99	6.98
70	0.899	4.85	6.86
80	0.872	4.56	6.59
90	0.804	3.88	5.89
100	0.718	3.09	4.90
110	0.638	2.44	3.88
120	0.568	1.94	2.87
130	0.431	1.11	0.47
140	0.333	0.67	-1.77
150	0.250	0.38	-4.26
160	0.178	0.19	-7.21
170	0.167	0.17	-7.76
180	0.180	0.19	-7.11
190	0.180	0.19	-7.11
200	0.175	0.18	-7.36
210	0.170	0.17	-7.61
220	0.163	0.16	-7.97
230	0.281	0.47	-3.24
240	0.408	1.00	-0.01
250	0.527	1.67	2.22
260	0.607	2.21	3.45
270	0.707	3.00	4.77
280	0.792	3.76	5.76
290	0.867	4.51	6.54
300	0.920	5.08	7.06
310	0.940	5.30	7.24
320	0.932	5.21	7.17
330	0.909	4.96	6.95
340	0.868	4.52	6.55
350	0.923	5.11	7.09



Maximum Envelope  
Relative Field Pattern  
Antenna: PSIFMR-2-DA  
Type: 2-Bay Directional FM  
Peak ERP: .11 kW (-9.59 dBk)  
Envelope RMS: .788  
Frequency: 90.3 MHz  
KJFT Arlee, MT

**Propagation Systems Inc.**  
**PO Box 113**  
**Ebensburg, PA 15931**

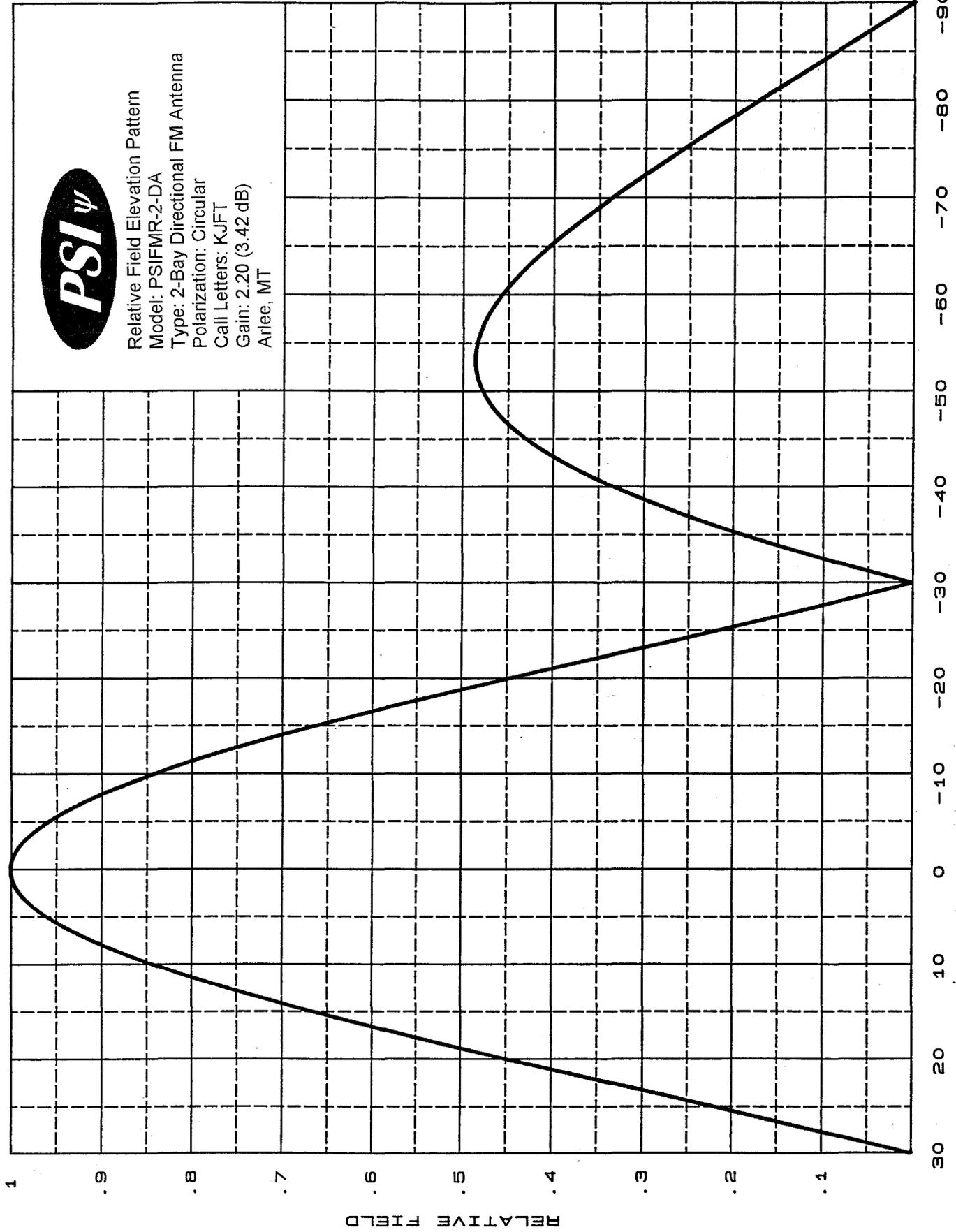
### Maximum Envelope Tabulation

Antenna: PSIFMR-2-DA  
CSN International  
Station: KJFT  
Frequency: 90.3 MHz  
Location: Arlee, MT  
Maximum ERP: .11 kW (-9.59 dBk)

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	1.000	0.11	-9.59
10	1.000	0.11	-9.59
20	1.000	0.11	-9.59
30	1.000	0.11	-9.59
40	1.000	0.11	-9.59
50	1.000	0.11	-9.59
60	1.000	0.11	-9.59
70	1.000	0.11	-9.59
80	1.000	0.11	-9.59
90	1.000	0.11	-9.59
100	0.900	0.09	-10.50
110	0.715	0.06	-12.50
120	0.568	0.04	-14.50
130	0.451	0.02	-16.50
140	0.358	0.01	-18.51
150	0.285	0.01	-20.49
160	0.226	0.01	-22.50
165	0.202	0.00	-23.48
170	0.188	0.00	-24.10
180	0.180	0.00	-24.48
190	0.180	0.00	-24.48
200	0.226	0.01	-22.50
210	0.285	0.01	-20.49
220	0.358	0.01	-18.51
230	0.451	0.02	-16.50
240	0.568	0.04	-14.50
250	0.715	0.06	-12.50
260	0.900	0.09	-10.50
270	1.000	0.11	-9.59
280	1.000	0.11	-9.59
290	1.000	0.11	-9.59
300	1.000	0.11	-9.59
310	1.000	0.11	-9.59
320	1.000	0.11	-9.59
330	1.000	0.11	-9.59
340	1.000	0.11	-9.59
350	1.000	0.11	-9.59



Relative Field Elevation Pattern  
Model: PSIFMR-2-DA  
Type: 2-Bay Directional FM Antenna  
Polarization: Circular  
Call Letters: KJFT  
Gain: 2.20 (3.42 dB)  
Arlee, MT



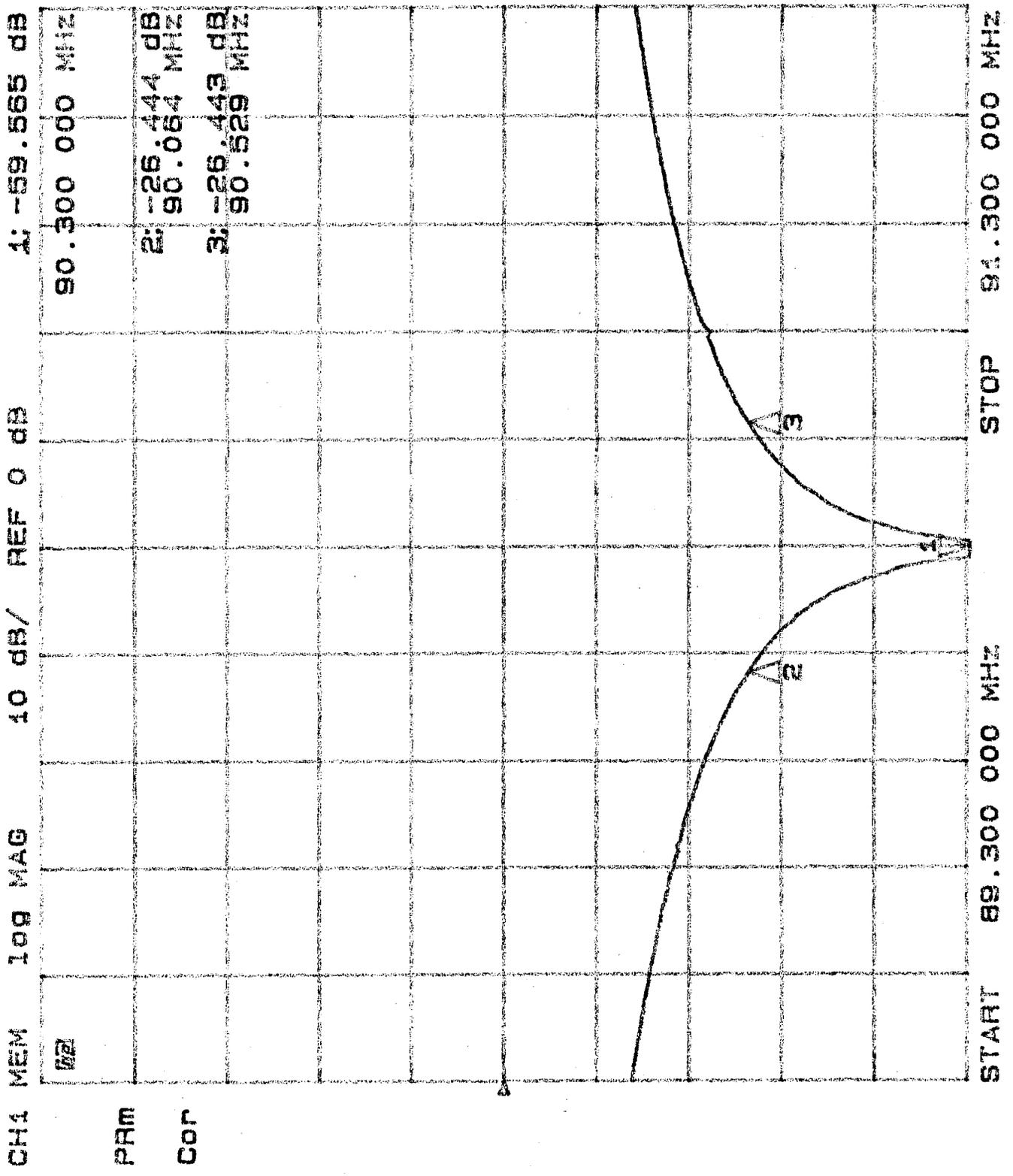
DEGREES BELOW HORIZONTAL

11-01

J107FM-57Z

FMR-Z-DA

FINAL



# INSTRUCTION MANUAL

KJFT

CSN International

Arlee, MT

90.3 MHz

Antenna Model: PSIFMR-2-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 its 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 face mount and must be installed on the northeast tower face. 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 and O-ring at all 1-5/8" flange connections.
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 for proper fit.
6. Install one bay/inter-bay assembly at a time.
7. Keep all transmission lines free from dirt and moisture. All Teflon insulators must be clean and dry.
8. The antenna must be pressurized with dry air or nitrogen.
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

The antenna is to mount to the northeast tower face with the antenna boom positioned perpendicular to the face, 20° true. Begin by installing the support mast to the tower face with the supplied brackets as shown in drawing J107FM-572-011. Use the supplied 3/8-16 x 3-9/16" ID U-bolts. The brackets are designed so that the antenna center of radiation will be 42.5 ft. above ground level.

### Step Two

Assemble the shorting stub with bay block to inter-bay one using the supplied 5/16-18 x 7/8" bolts, locks and O-ring. Next attach bay one to the inter-bay one block with the 5/16-18 x 7/8" bolts, locks and O-ring. The radomes must be positioned with the red band down. Refer the drawing J107FM-572-012 for an over view. Next attach the bay bracket to the antenna boom using the supplied #28 hose clamps. Attach an inter-bay bracket approx. 12" below the bay using the supplied #28 hose clamps. Bay one/inter-bay one is now ready to be installed on the support mast.

### Step Three

Hoist the antenna bay to the proper elevation and secure to the support mast with the supplied 3/8-16 x 2-15/16" ID U-bolts, nuts and locks. **Use caution when erecting the assembly. The inter-bay inner conductor is not captivated. Secure the inter-bay inner conductor before erecting.**

### Step Four

Next attach bay two to the inter-bay two block with the 5/16-18 x 7/8" bolts, locks and O-ring. The radomes must be positioned with the red band down, refer to drawing J107FM-572-013. Inter-bay one has been preassembled to the fine matcher. Secure the bay bracket to the boom of bay two using the supplied #28 hose clamps. Attach the inter-bay bracket to the fine matcher between probe one and two using the #28 hose clamps. Bay two/inter-bay two is now ready to be installed on the tower.

### Step Five

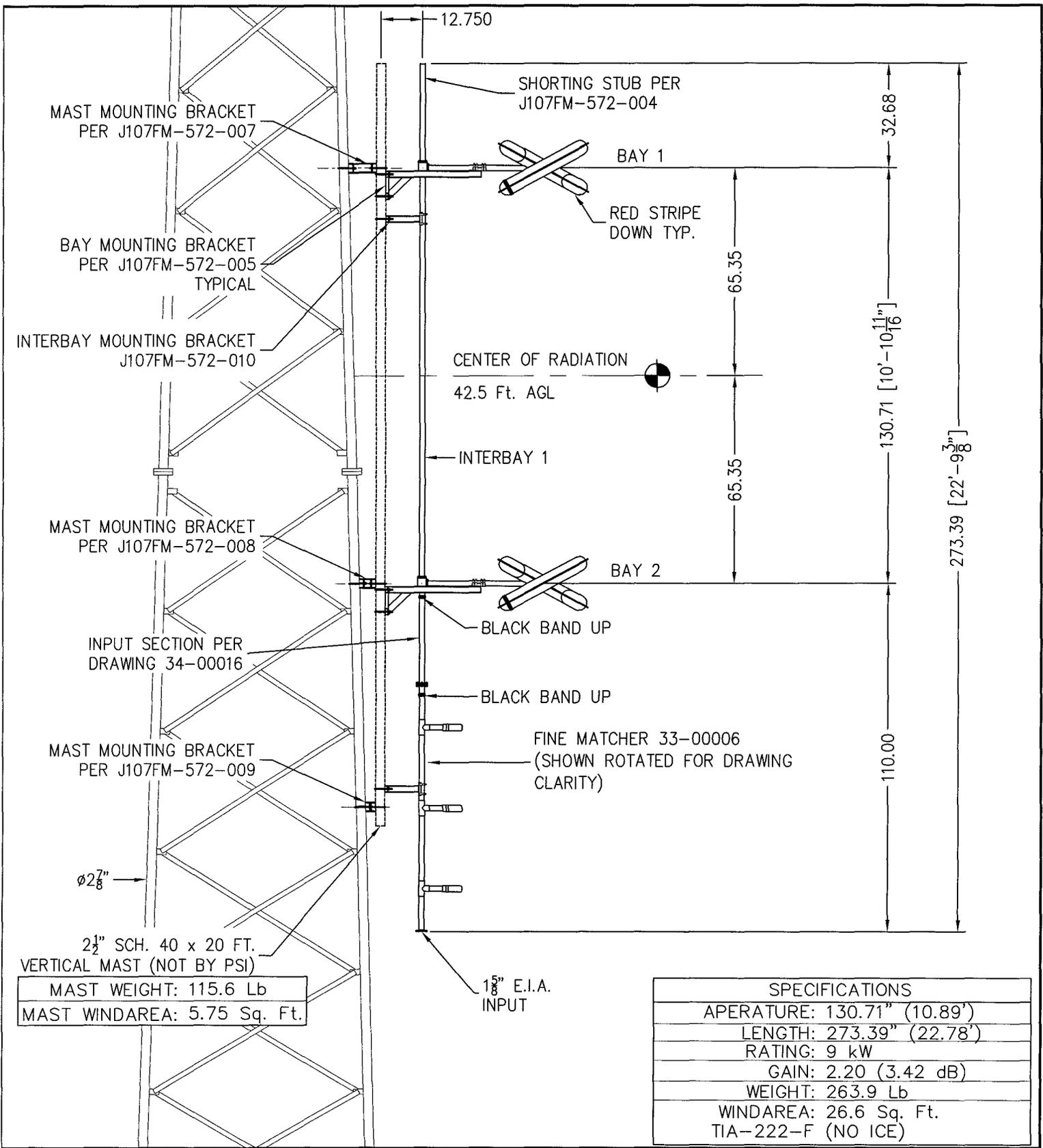
Hoist the antenna bay/inter-bay assembly to the proper elevation and connect to inter-bay one that was previously installed on the tower. Secure the bay and inter-bay/tuner to the support mast with the supplied 3/8-16 x 2-15/16" ID U-bolts, nuts and locks.

### Step Six

**Check all bolted connections for tightness.** Connect the main transmission line to the antenna input located at the base of the input section. Do not allow the weight of the feed line to be supported by the antenna. It is recommended the antenna system be pressurized to a maximum of 5 lbs. with dry air or nitrogen. If the VSWR is greater than 1.15:1 contact the factory, phone number 814-472-5540, for instructions before applying power to the antenna.

## **Drawing Index**

<u>Drawing</u>	<u>Title</u>
J107FM-572-001	Antenna Elevation
J107FM-572-002	Antenna Orientation
J107FM-572-011	Support Mast Mounting
J107FM-572-012	Bay 1 Elevation
J107FM-572-013	Bay 2 Elevation with Fine Matcher
J107FM-572-007	Mast Mounting Bracket #1
J107FM-572-008	Mast Mounting Bracket #2
J107FM-572-009	Mast Mounting Bracket #3
J107FM-572-005	Antenna Bay Bracket
J107FM-572-010	Inter-Bay Bracket
J107FM-572-004	Shorting Stub
33-00006	Tuner



SPECIFICATIONS	
APERATURE:	130.71" (10.89')
LENGTH:	273.39" (22.78')
RATING:	9 kW
GAIN:	2.20 (3.42 dB)
WEIGHT:	263.9 Lb
WINDAREA:	26.6 Sq. Ft.
TIA-	222-F (NO ICE)

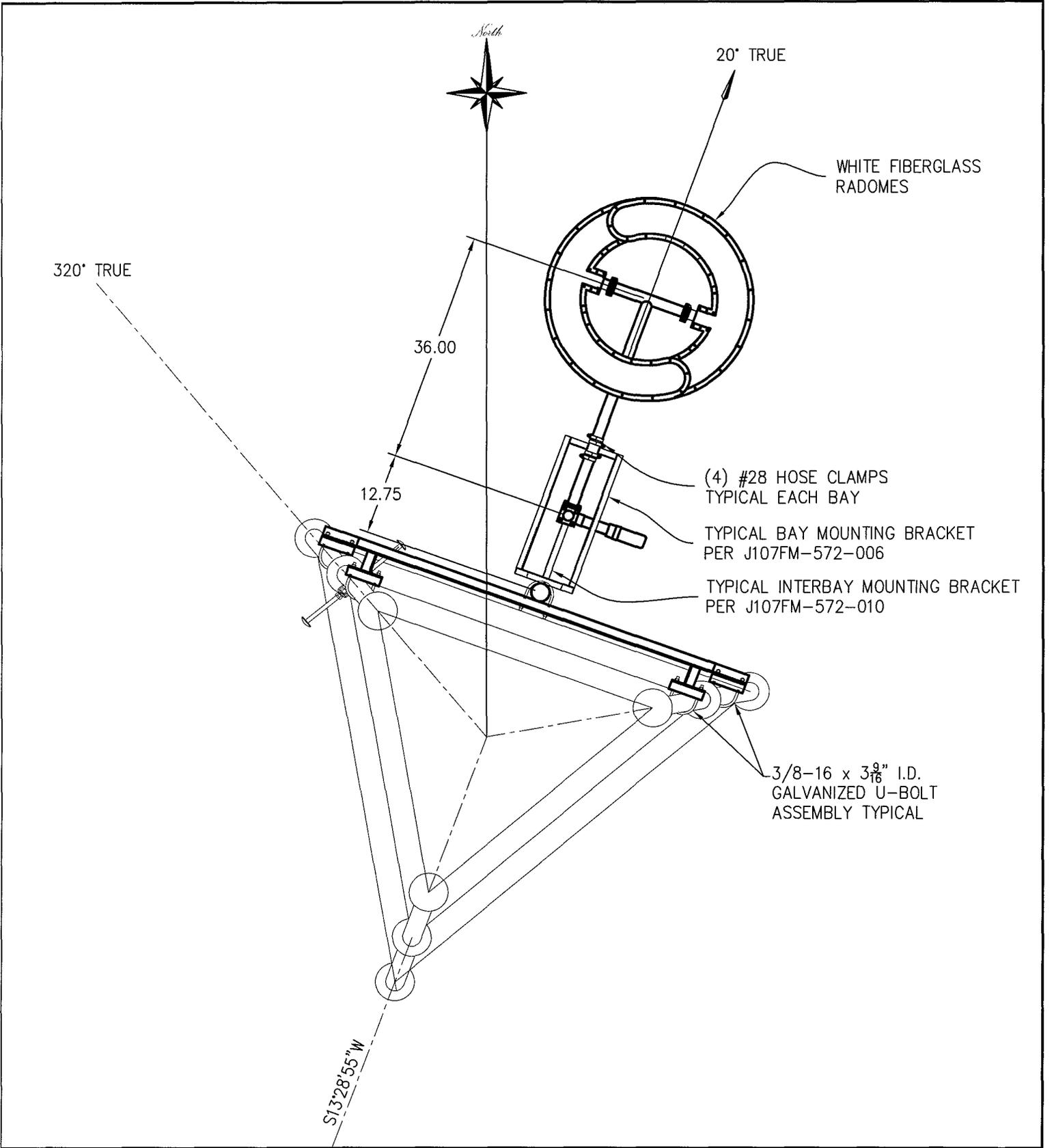
REV.	MADE BY	CHECKED BY	DATE	CHANGE	SIZE
					A

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 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.

**PROPAGATION SYSTEMS, INC.**  
 Ebensburg, Pennsylvania USA 814-472-5540

2-BAY END FED POWER-TILLER™ ARRAY

MODEL: PSIFMR-2-DA	DRAWN BY: D.G. Kellar	DATE: 1/29/07
CHANNEL/FREQUENCY: 90.3 MHz	APPROVED BY:	DATE:
SCALE: 1:40	DRAWING NO.: J107FM-572-001	REV. 0



REV.	MADE BY CHECKED BY	DATE	CHANGE

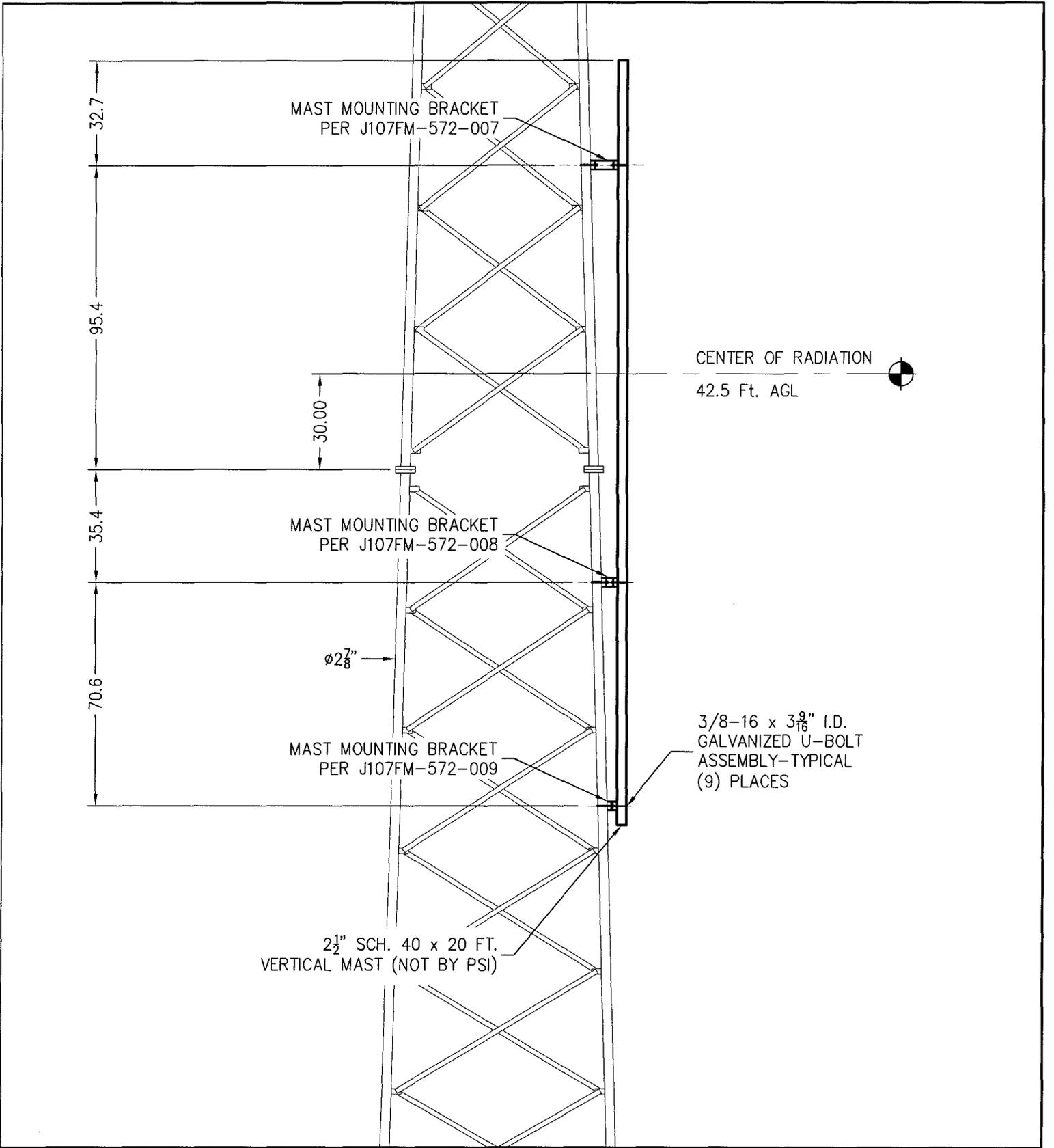
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SIZE: **A**

**PROPAGATION SYSTEMS, INC.**  
Ebensburg, Pennsylvania USA 814-472-5540

**ANTENNA PLAN VIEW AND ORIENTATION**

MODEL: PSIFMR-2-DA	DRAWN BY: D.G. Kellar	DATE: 1/26/07
CHANNEL/FREQUENCY: 90.3 MHz	APPROVED BY:	DATE:
SCALE: 1:20	DRAWING NO.: J107FM-572-002	REV. 0



REV.	MADE BY CHECKED BY	DATE	CHANGE

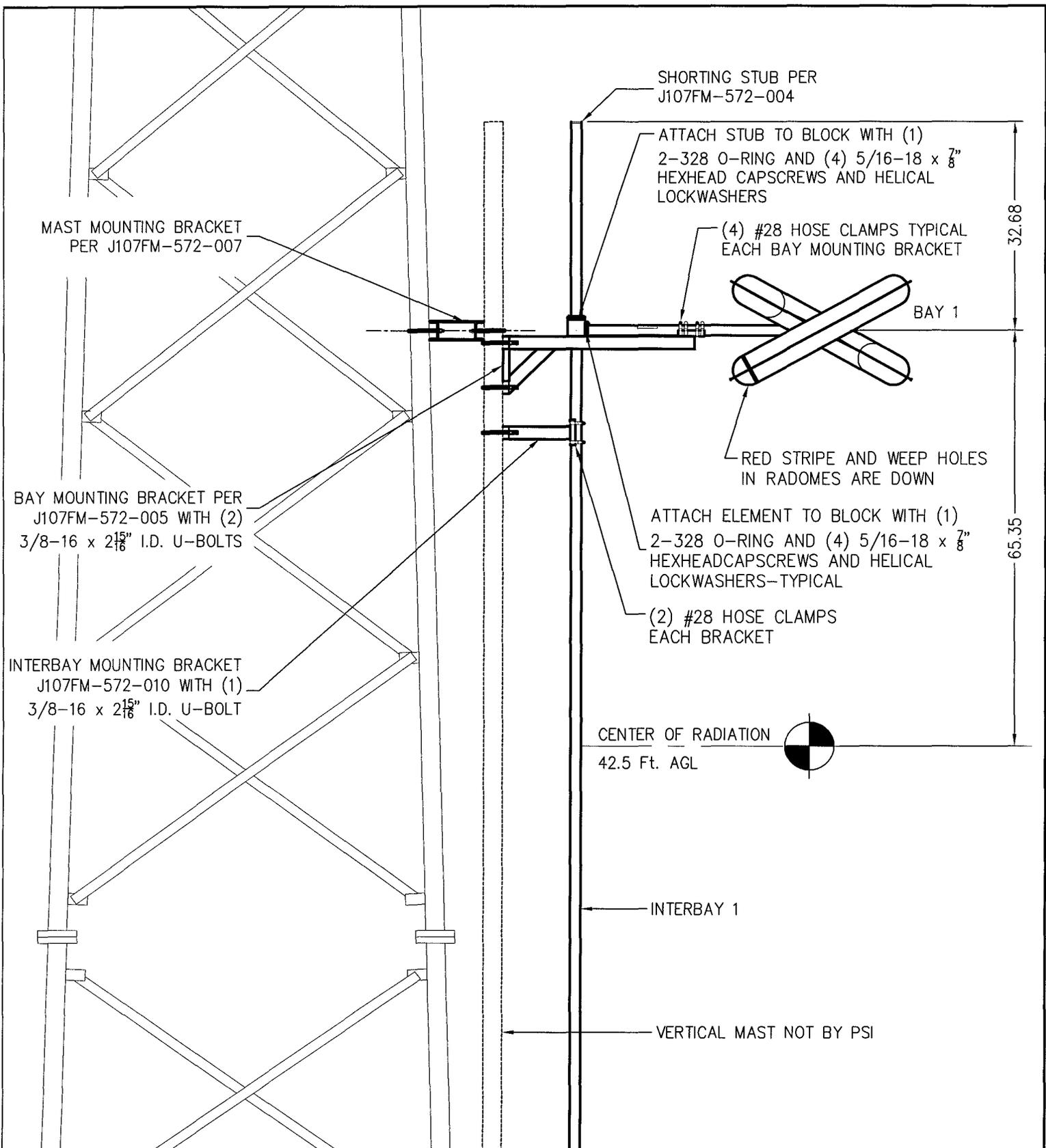
This drawing is loaned subject to the express understanding and agreement that the drawing and information therein contained are, and shall remain the property of PSI, and will not be otherwise utilized or disposed of, directly or indirectly, and will not be used in whole or in part or assist in making 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

**VERTICAL MAST MOUNTING ELEVATIONS**

MODEL: PSIFMR-2-DA	DRAWN BY: D.G. Kellar	DATE: 3/15/07
CHANNEL/ FREQUENCY: 90.3 MHz	APPROVED BY:	DATE:
SCALE: 1:40	DRAWING NO.: J107FM-572-011	REV. 0



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.

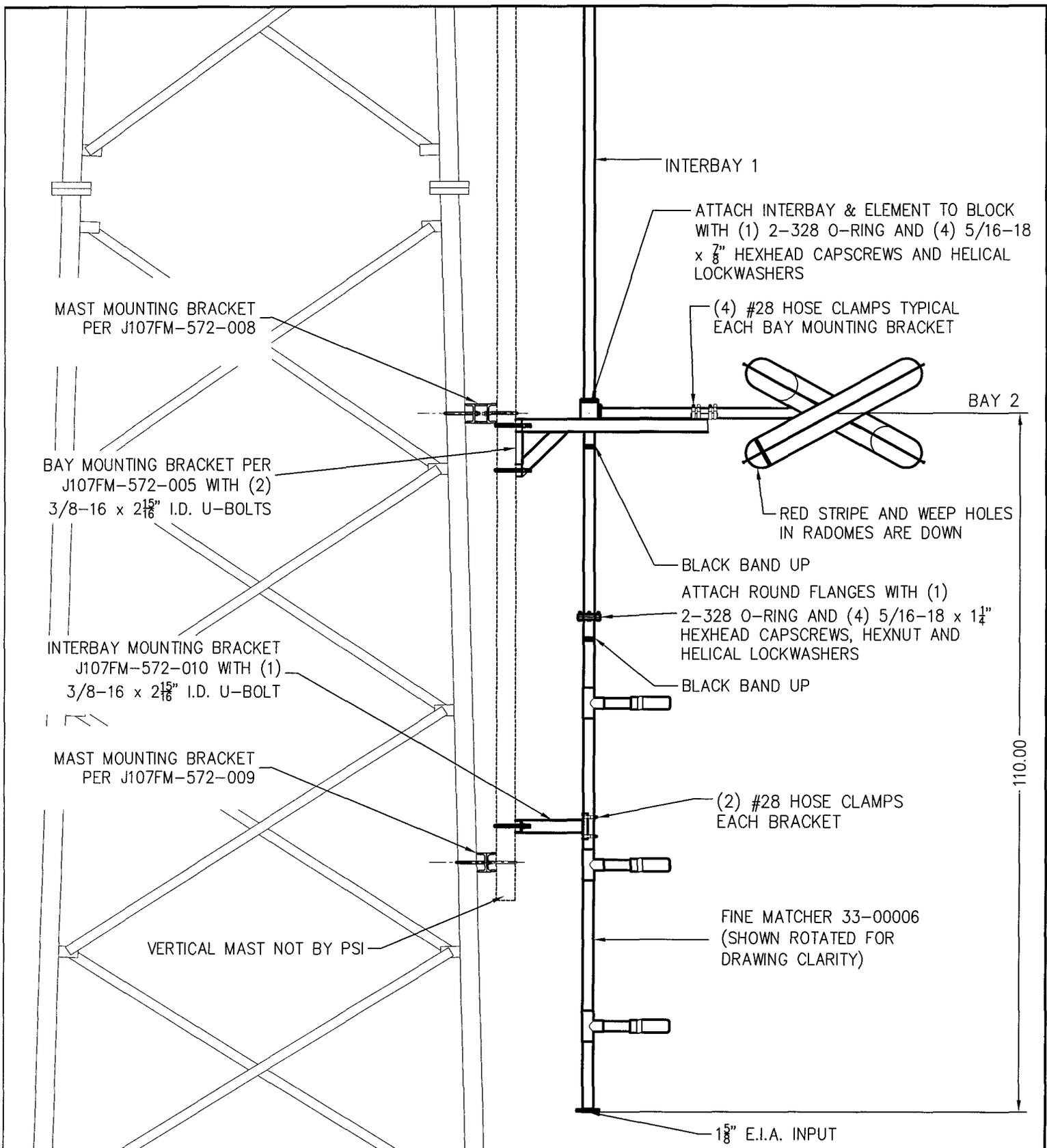
A

## PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

### BAY 1 ELEVATIONS AND INSTALLATION

MODEL: PSIFMR-2-DA	DRAWN BY: D.G. Kellar	DATE: 3/15/07
CHANNEL/FREQUENCY: 90.3 MHz	APPROVED BY:	DATE:
SCALE: 1:20	DRAWING NO.: J107FM-572-012	REV. 0



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.

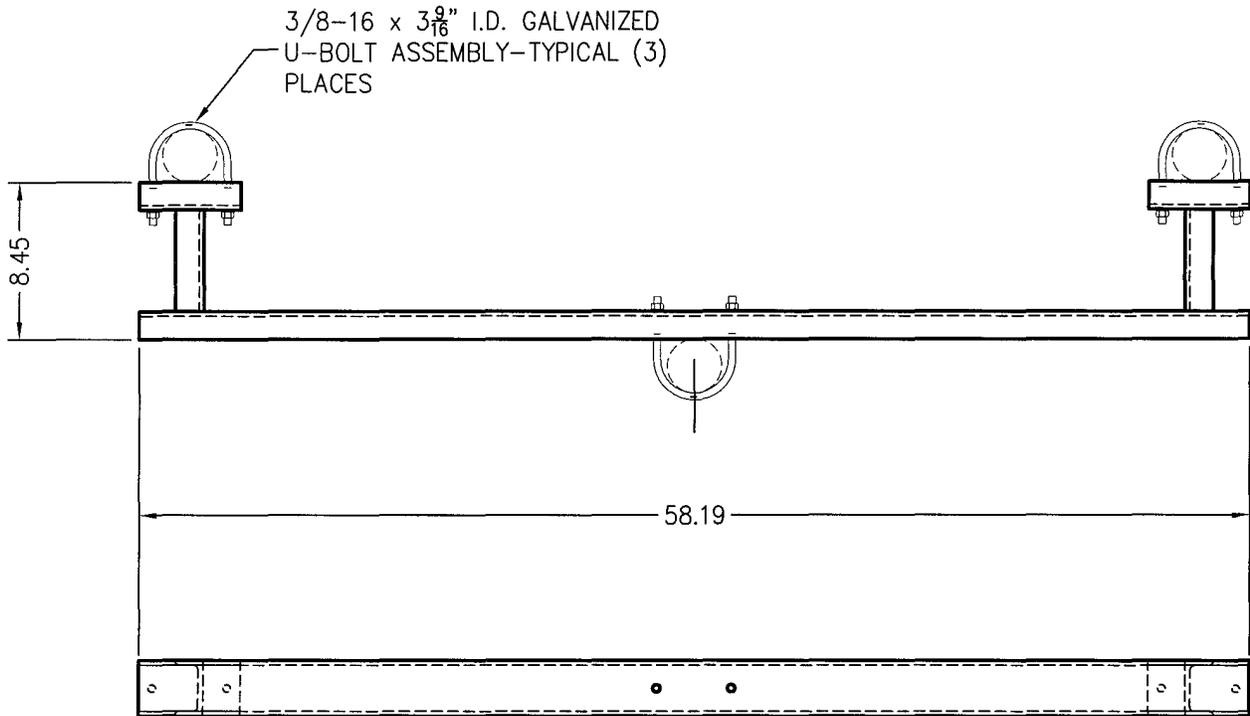
A

## PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

### BAY 2 ELEVATIONS AND INSTALLATION

MODEL: PSIFMR-2-DA	DRAWN BY: D.G. Kellar	DATE: 3/15/07
CHANNEL/FREQUENCY: 90.3 MHz	APPROVED BY:	DATE:
SCALE: 1:20	DRAWING NO.: J107FM-572-013	REV. 0



**NOTES:**

1. (1) REQUIRED
2. WEIGHT: 28.75 Lb

REV.	MADE BY CHECKED BY	DATE	CHANGE

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SIZE  
**A**

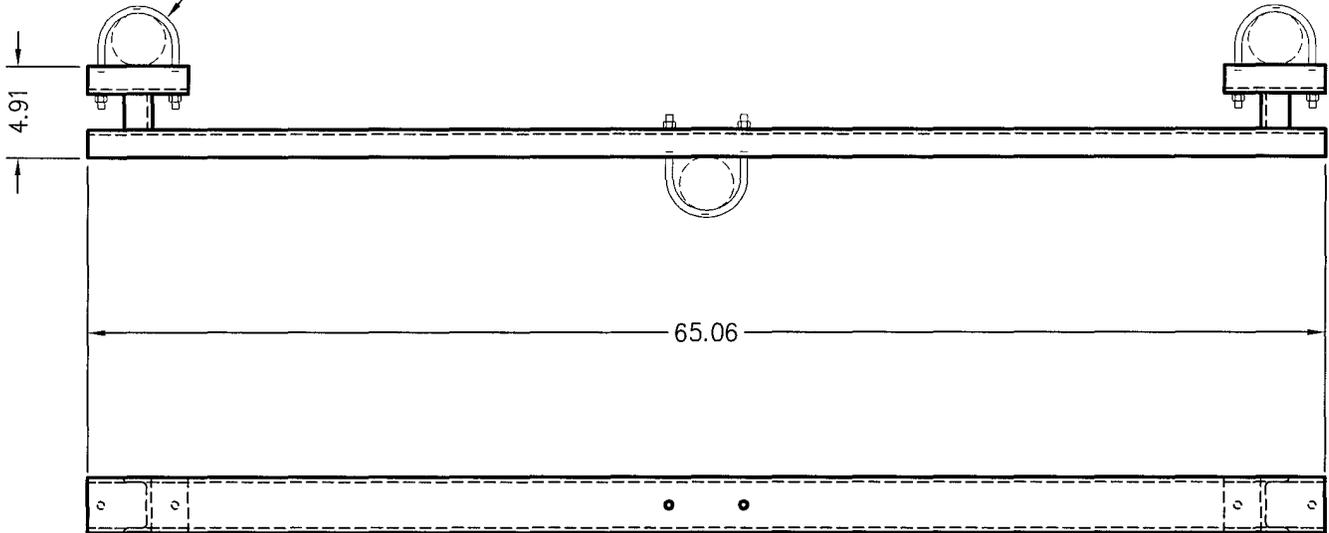
# PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

## MAST MOUNTING BRACKET #1

MODEL: PSIFMR-2-DA	DRAWN BY: D.G. Kellar	DATE: 3/14/07
CHANNEL/ FREQUENCY: 90.3 MHz	APPROVED BY:	DATE:
SCALE: 1:10	DRAWING NO.: J107FM-572-007	REV. 0

3/8-16 x 3<sup>9</sup>/<sub>16</sub>" I.D. GALVANIZED  
U-BOLT ASSEMBLY-TYPICAL (3)  
PLACES

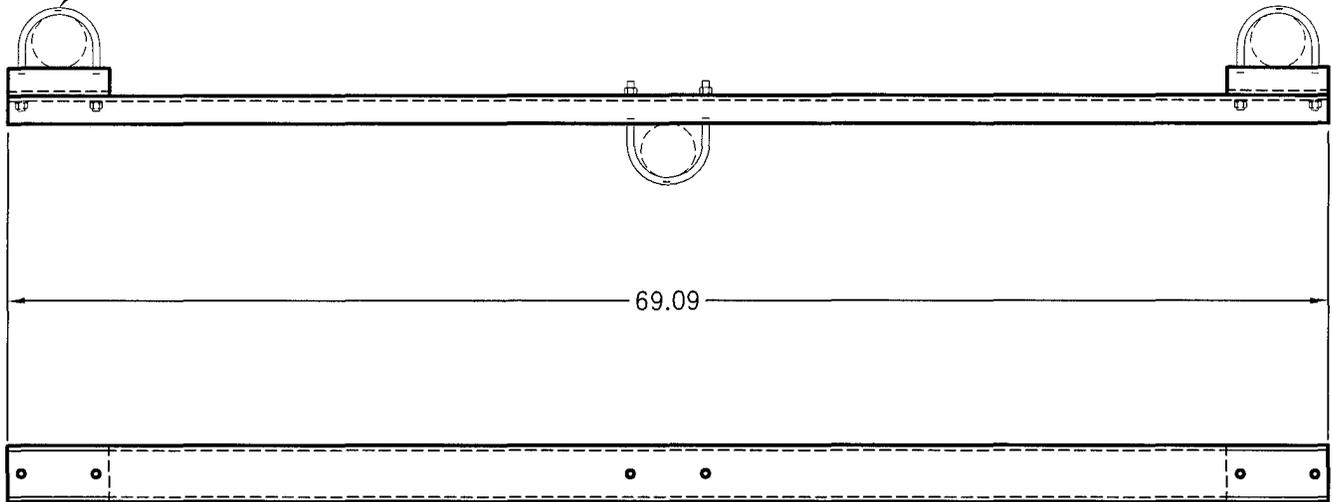


NOTES:

1. (1) REQUIRED
2. WEIGHT: 30.47 Lb

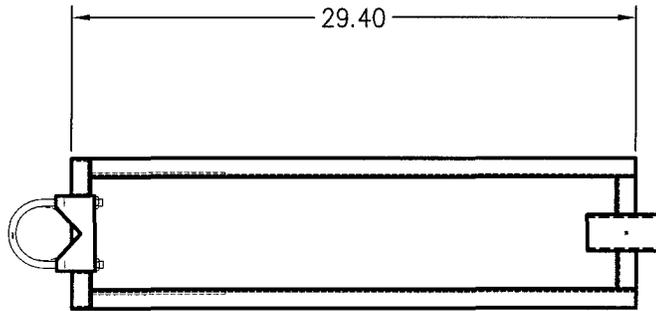
<b>PROPAGATION SYSTEMS, INC.</b>			
Ebensburg, Pennsylvania USA 814-472-5540			
<b>MAST MOUNTING BRACKET #2</b>			
REV.	MADE BY CHECKED BY	DATE	CHANGE
This drawing is loaned subject to the express understanding and agreement that the drawing and information therein contained are, and shall remain the 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.			A
MODEL: PSIFMR-2-DA		DRAWN BY: D.G. Kellar	DATE: 3/14/07
CHANNEL/ FREQUENCY: 90.3 MHz		APPROVED BY:	DATE:
SCALE: 1:10		DRAWING NO.: J107FM-572-008	REV. 0

3/8-16 x 3<sup>9</sup>/<sub>16</sub>" I.D. GALVANIZED  
U-BOLT ASSEMBLY-TYPICAL (3)  
PLACES



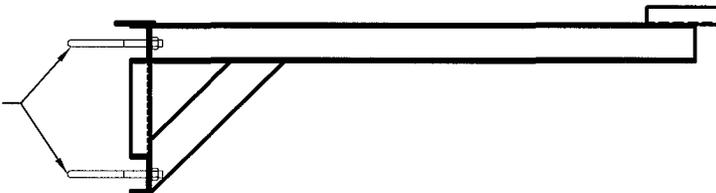
- NOTES:  
1. (1) REQUIRED  
2. WEIGHT: 30.47 Lb

REV.		MADE BY	DATE	CHANGE	<b>PROPAGATION SYSTEMS, INC.</b> Ebensburg, Pennsylvania USA 814-472-5540 MAST MOUNTING BRACKET #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 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					
					CHANNEL/ FREQUENCY:	APPROVED BY:	DATE:	
					SCALE:	DRAWING NO.:	REV.	
					1:10	J107FM-572-009	0	



TOP VIEW

3/8-16 x 2<sup>15</sup>/<sub>16</sub>" I.D.  
GALVANIZED U-BOLT  
ASSEMBLY TYPICAL  
(2) PLACES

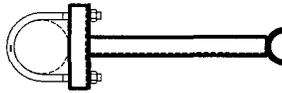


SIDE VIEW

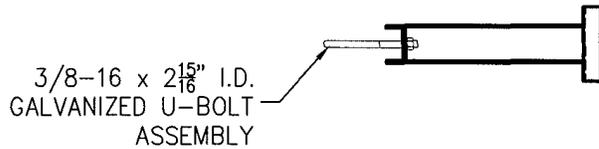
NOTES:

1. APPROXIMATE WIEGHT: 11.6 Lb/EACH
2. (2) ASSEMBLIES REQUIRED
3. HOT DIP GALVANIZED

				<b>PROPAGATION SYSTEMS, INC.</b>						
				Ebensburg, Pennsylvania USA 814-472-5540						
				CUSTOM BAY MOUNTING BRACKET						
REV.	MADE BY	CHECKED BY	DATE	CHANGE	MODEL:	DRAWN BY:	DATE:			
					PSIFMR-2-DA	D.G. Kellar	2/19/07			
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.					CHANNEL/ FREQUENCY:	APPROVED BY:	DATE:			
								90.3 MHz		
					SCALE:	1:10	DRAWING NO.:	J107FM-572-005	REV.	0



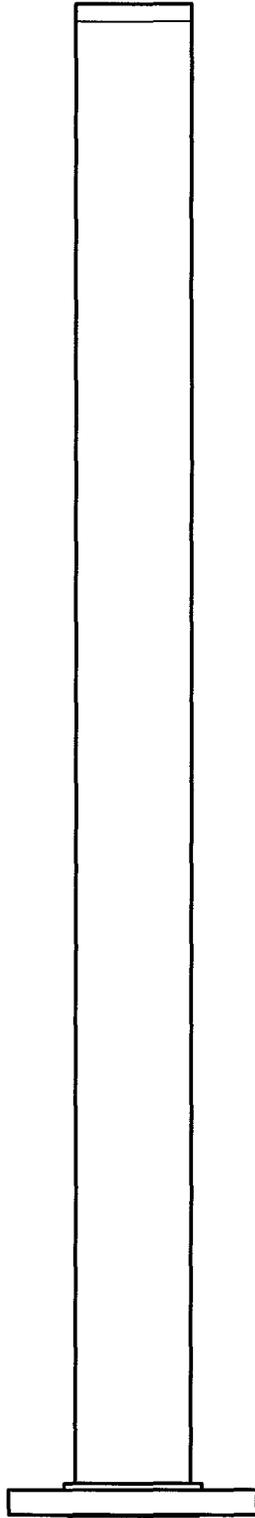
TOP VIEW



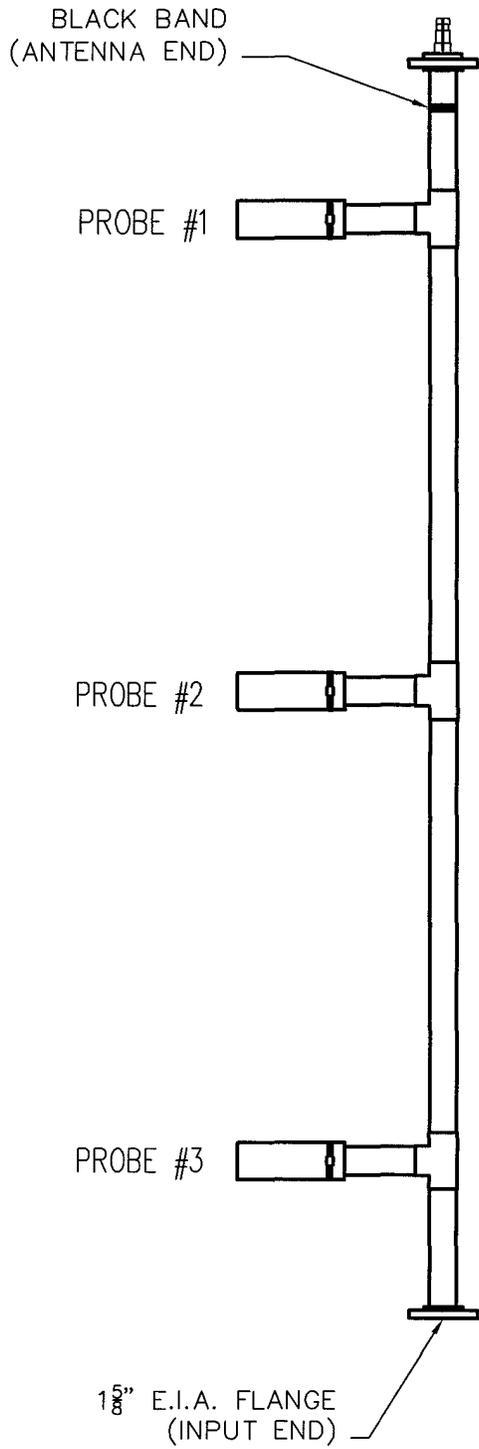
SIDE VIEW

NOTES:  
 1. APPROXIMATE WIEGHT: 2.9 Lb/EACH  
 2. (2) ASSEMBLIES REQUIRED

REV.		MADE BY	CHECKED BY	DATE	CHANGE
<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>					
					SIZE
					A
<h1>PROPAGATION SYSTEMS, INC.</h1> <p>Ebensburg, Pennsylvania USA 814-472-5540</p> <h2>CUSTOM INTERBAY SUPPORT BRACKET</h2>					
MODEL:		PSIFMR-2-DA		DRAWN BY: D.G. Kellar	
CHANNEL/FREQUENCY:		90.3 MHz		DATE: 3/15/07	
SCALE:		1:10		DRAWING NO.: J107FM-572-010	
					REV. 0



				<b>PROPAGATION SYSTEMS, INC.</b>	
				Ebensburg, Pennsylvania USA 814-472-5540	
REV.	MADE BY CHECKED BY	DATE	CHANGE	SHORTING STUB OUTLINE	
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	MODEL:	DRAWN BY: <i>D.G. Kellar</i> DATE: 1/26/07
			A	CHANNEL/ FREQUENCY:	APPROVED BY: DATE:
				SCALE:	DRAWING NO.: J107FM-572-004 REV. 0
				NONE	



REV.	MADE BY	CHECKED BY	DATE	CHANGE

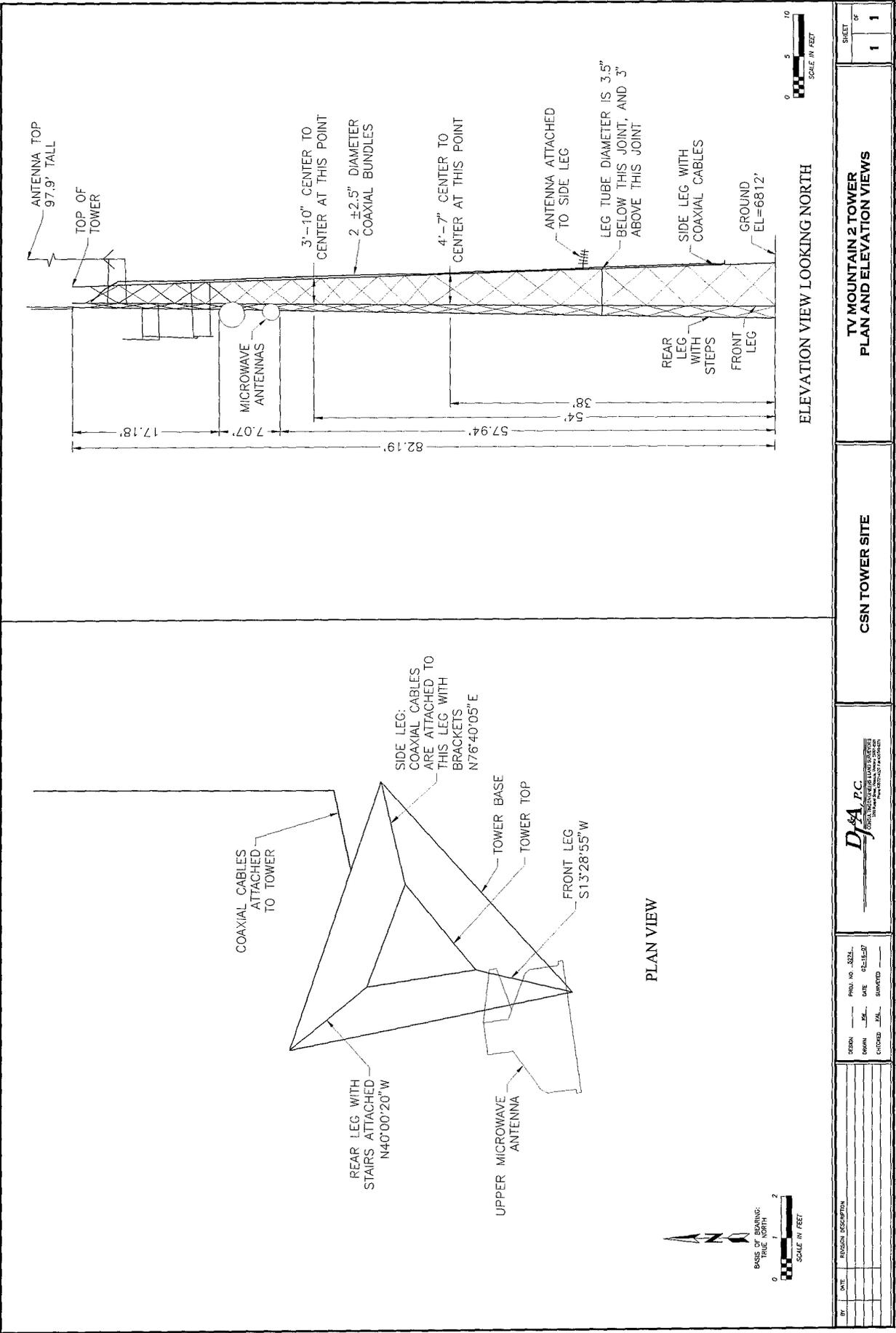
# PROPAGATION SYSTEMS, INC.

Ebensburg, Pennsylvania USA 814-472-5540

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SIZE  
**A**

<b>3 PROBE TUNER ASSEMBLY</b>		
MODEL:	DRAWN BY: <b>D. RICHEY</b>	DATE: <b>1-28-98</b>
CHANNEL/ FREQUENCY:	APPROVED BY:	DATE:
SCALE: <b>1:16</b>	DRAWING NO.: <b>33-00006</b>	REV. <b>0</b>



SHEET	1	OF	1
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**TV MOUNTAIN 2 TOWER  
PLAN AND ELEVATION VIEWS**

**CSN TOWER SITE**

**D&A PC**  
DESIGN ARCHITECTURE LAND SURVEYING  
10000 W. 100th St., Suite 100  
Overland Park, MO 66213-3400  
TEL: 913.666.1100 FAX: 913.666.1101

DESIGN	PROJ. NO.	3822
DRAWN	DATE	02-15-07
CHECKED	SCALE	AS SHOWN

BY	DATE	REVISION DESCRIPTION