

**Larry H. Will, P.E.**

**Broadcast Engineering**

---

1055 Powderhorn Drive  
Glen Mills, PA 19342-9504

PH (610) 399-1826  
FAX (610) 399-0995  
E-Mail lwill@voicenet.com

**VIRGINIA BEACH EDUCATIONAL BROADCASTING FOUNDATION**

**LICENSEE AND PERMITTEE OF**

**W250AE, PORTSMOUTH VA**

**FACILITY ID 18865**

**FCC FILE BLFT-20011214AAC**

**EXHIBIT 13 FCC FORM 350**

**ANTENNA SYSTEM DETAILS**

W250AE operates with an ERP of 0.250 kW vertical only using a PSI Model PSIFLV-1-DA folded dipole at 12 meters AG and fed with 70 feet of Andrew Type LDF4-50A ½” nominal diameter 50 ohm coaxial cable.

The directional antenna was installed per the Construction Permit requirements and by following the manufacturer’s instructions. A copy of the manufacturer’s pattern measurements and installation instructions are included herein.



## **Propagation Systems, Inc.**

Quality Broadcast Antenna Systems

### **Directional FM Antenna WODC Virginia Beach, VI**

A modified PSIFLV antenna with was used in conjunction with the customer's triangular 36-inch face tower to create the necessary directional radiation pattern. The final antenna consists of a single radiating element secured to the tower with a fixed mounting bracket. The antenna bay is to be mounted to the northwest tower leg at 12 meters above ground. The antenna element is rated for a maximum of 500 watts of input power and has a type "N" female input.

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 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 293.7 MHz was used as both the source and receiver. The level of the received signal was compared with a standard dipole to establish the directivity of the final pattern. The final pattern measured does not exceed the envelope pattern and is 87.1% of the envelope RMS.

No other antenna can be installed within 10 ft of the radiating element. The antenna is to be positioned 270° 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 147.9 watts will be required at the antenna input in order to reach the licensed .250 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	PSIFLV-1-DA
Type	1-bay directional FM antenna
Frequency	97.9 MHz
Envelope RMS	.860
Gain (v-pol)	1.69 (2.279 dB)
RMS (v-pol)	.749
Input	Type "N" female
Power rating	500 watts
Length	4.375-ft.
Weight	20 lbs.
Windload (50/33)	32 lbs.

### Drawings

J302FM-264-002	Bay outline
J302FM-264-001	Antenna Elevation and Orientation

### 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.

## General Notes

1. Review antenna elevation and plan the installation. The antenna bracket has been designed for tower leg mount.
2. The element is aligned to 270 degrees true.
3. Use the supplied mastic and electrical tape to seal all connectors.
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. The feed points are in the up position.
6. Install one 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 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 Instructions

### Step One

Review the enclosed drawings and read all steps for a general overview of the antenna installation. Hoist the antenna bay to the proper elevation above ground and secure to the north-west tower leg with the supplied 3/8-16 x 2-15/16" ID U-bolts, nuts and locks. The element feed point must be positioned with the Teflon insulator up. Position the element to 270°.

### Step Two

Check all bolted connections for tightness. Connect the main transmission line to the antenna input located at the end of the antenna boom. Use the supplied mastic and vinyl tape to seal the type "T" connection. Secure the feed line (not supplied) to the tower leg on the inside of the tower. The antenna system should be tested before the erector leaves the premises to insure that the complete antenna 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 while the tower crew is still on site.

Prepared By



Douglas A. Ross  
Propagation Systems Inc.

9/16/02

### ERP TABULATION

Antenna Model: PSIFLV-1-DA

Station Call: WODC

Location: Virginia Beach, VA

Frequency: 97.9 MHz

#### Measured Vertical Polarization

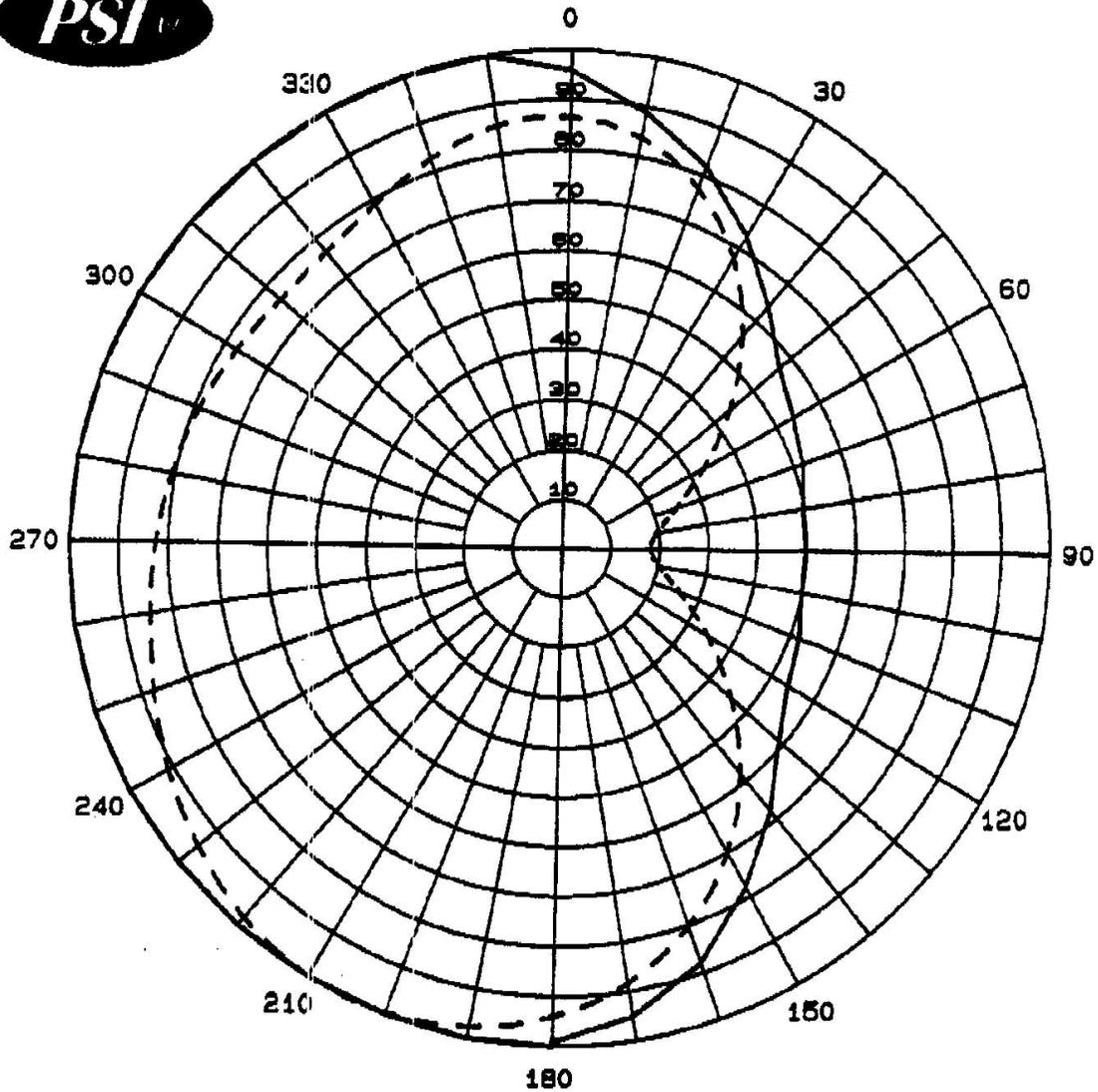
Angle	Relative Field	ERP Watts	ERP dBk
0	0.867	187.9	-7.28
10	0.839	176.0	-7.55
20	0.774	149.8	-8.25
30	0.678	114.9	-9.40
40	0.562	79.0	-11.03
50	0.442	48.8	-13.11
60	0.332	27.6	-15.60
70	0.247	15.3	-18.17
80	0.196	8.6	-20.18
90	0.182	8.3	-20.82
100	0.203	10.3	-19.87
110	0.260	16.9	-17.72
120	0.349	30.5	-15.18
130	0.462	53.4	-12.73
140	0.584	85.3	-10.69
150	0.702	123.2	-9.09
160	0.804	161.6	-7.92
170	0.883	194.9	-7.10
180	0.940	220.9	-6.56
190	0.977	238.6	-6.22
200	0.998	248.0	-6.04
210	1.000	250.0	-6.02
220	0.999	249.5	-6.03
230	0.981	240.6	-6.19
240	0.948	224.7	-6.48
250	0.911	207.5	-6.83
260	0.875	191.4	-7.18
270	0.848	178.9	-7.47
280	0.825	170.2	-7.69
290	0.807	162.8	-7.88
300	0.790	156.0	-8.07
310	0.773	149.4	-8.26
320	0.761	144.8	-8.39
330	0.766	146.7	-8.34
340	0.790	156.0	-8.07
350	0.827	171.0	-7.67

#### Maximum ERP

Field 1.00  
ERP 250 watts (-6.02 dBk)  
Azimuth 205 degrees

#### Minimum ERP

Field 0.182  
ERP 8.3 watts (-20.82 dBk)  
Azimuth 90 degrees



Measured Relative Field and  
Envelope Pattern  
Antenna: PSIFLV-1-DA  
Type: 1-Bay Directional FM  
Polarization: Vertical  
Peak Gain: 1.69 (2.279 dB)  
Station: WODC  
Virginia Beach, VA

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