

Consolidated Engineering Statement

WWFP, FacId 122933 – License application

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7/27/2023

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Abstract

This application confirms the antenna is built according to the Construction Permit, and the radiation hazard is well within the limits of OET 65. Some material here is extracted from the original construction permit application, from the Antenna Pattern Proof and from the Radiation Hazard Measurement.

Current authorization

CP WWFP.C 213A Brigantine , NJ
Hope Christian Church 0000154146 122933
0.730D kW 114.0m HAAT 115.0m COR AMSL
N Lat 392127.00 W Lon 742536.00

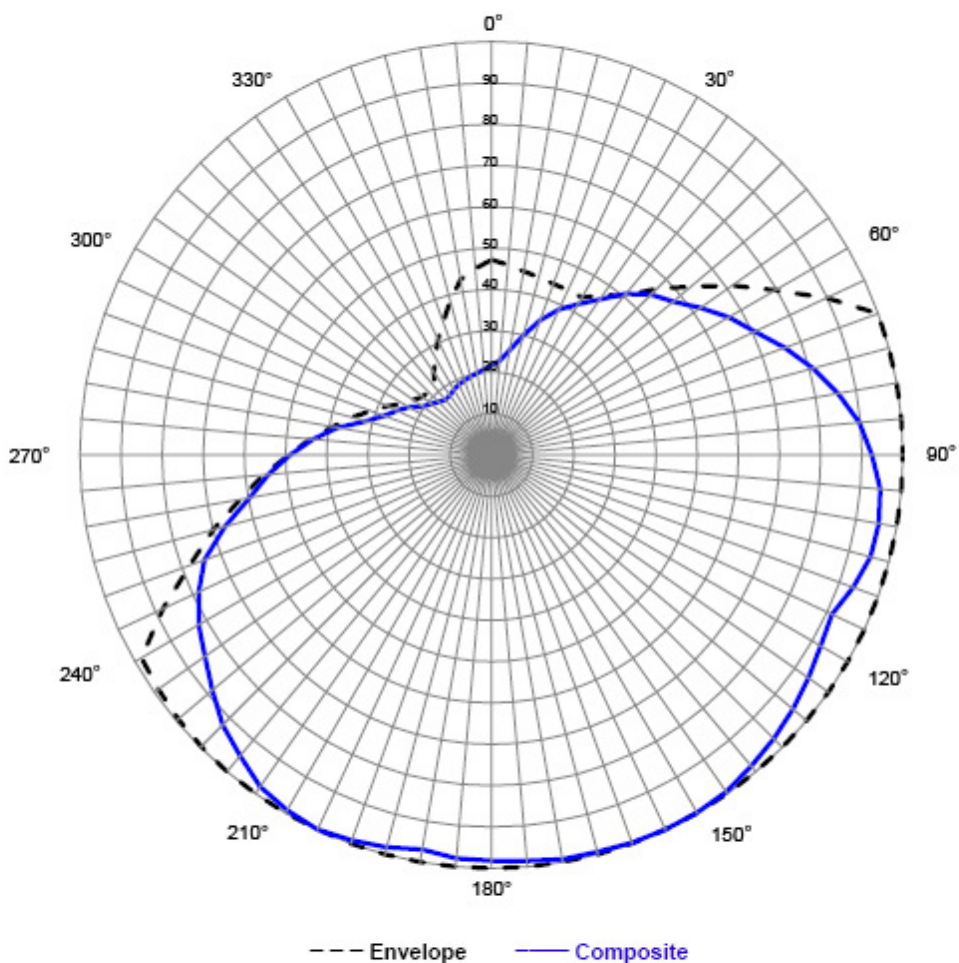
Antenna

This section supplements the Antenna Pattern Proof from the antenna manufacturer, attached separately, and shows the antenna is compliant. Pages 5 and 7 are given here for convenience of staff. Note the required 1.0 is at 155 degrees.



Propagation Systems, Inc.

**Relative Field
Azimuth Plane Pattern**



Pattern Type:	Measured Composite	Tower:	4" Diameter mast
Antenna Model:	PSIFMR-1-DA	Orientation:	150°
Polarization:	Circular	Frequency:	90.5 MHz
RMS (envelope)	0.783	Station:	WWFP
RMS (composite)	0.726	Date:	6/5/2023

Composite Pattern Tabulation

Antenna Model: PSIFMR-1-DA

Hope Christian Church of Marlton, Inc.

Station: WWFP

Frequency: 90.5 MHz

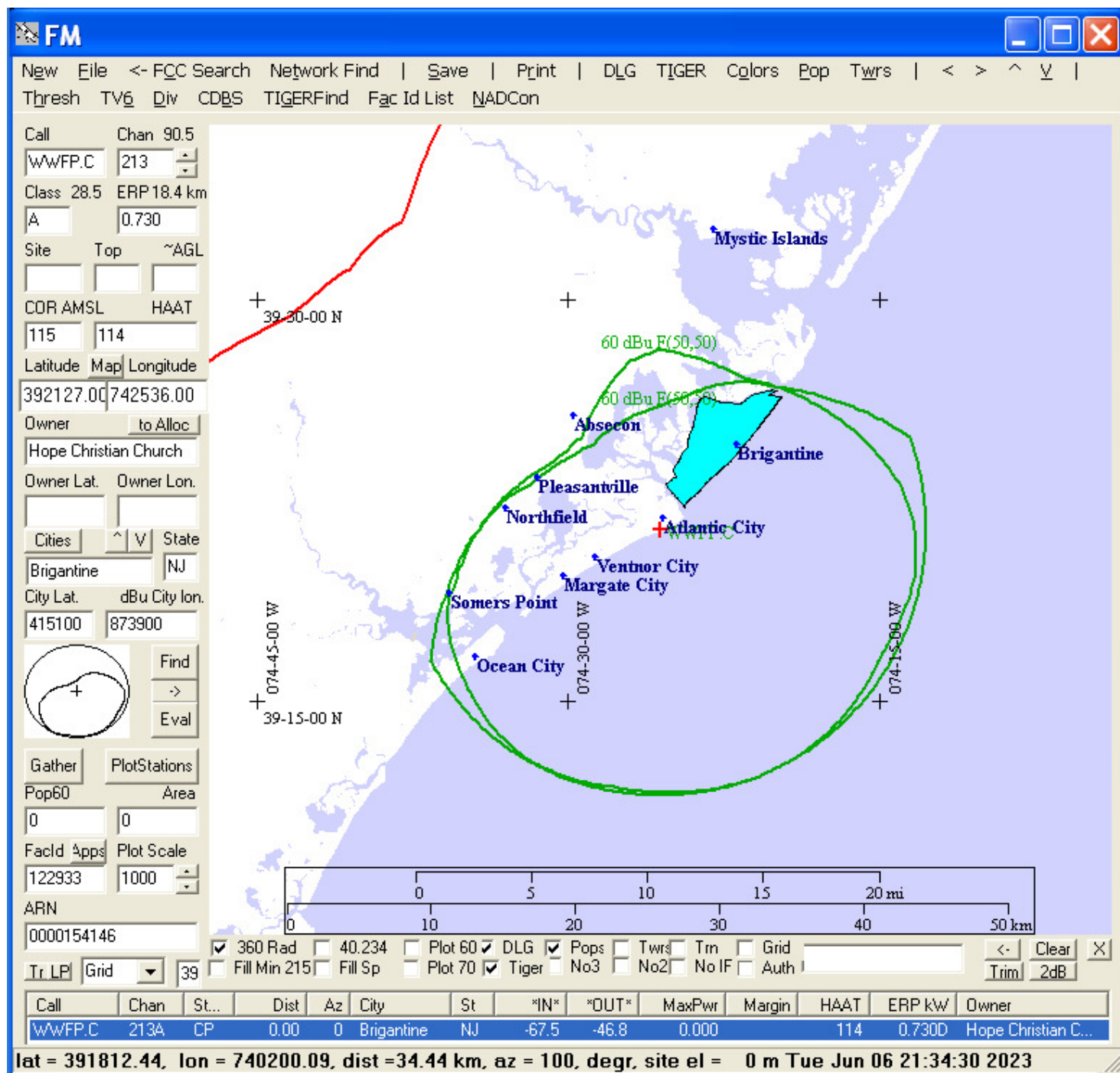
Location: Brigantine, NJ

Maximum ERP: .73 kW

Angle	Relative Field	ERP (kW)	ERP (dBk)
0	0.217	0.034	-14.64
10	0.257	0.048	-13.16
20	0.347	0.088	-10.56
30	0.421	0.130	-8.88
40	0.503	0.185	-7.34
50	0.577	0.243	-6.14
60	0.666	0.324	-4.90
70	0.759	0.420	-3.76
80	0.855	0.534	-2.72
90	0.924	0.624	-2.05
100	0.956	0.667	-1.76
110	0.936	0.639	-1.94
120	0.924	0.623	-2.05
130	0.956	0.668	-1.75
140	0.982	0.705	-1.52
150	0.999	0.729	-1.37
160	0.999	0.728	-1.38
170	0.993	0.720	-1.43
180	0.982	0.703	-1.53
190	0.969	0.686	-1.64
200	0.992	0.718	-1.44
210	0.993	0.719	-1.43
220	0.950	0.659	-1.81
230	0.885	0.572	-2.42
240	0.821	0.492	-3.08
250	0.742	0.402	-3.96
260	0.596	0.260	-5.86
270	0.489	0.175	-7.58
280	0.380	0.105	-9.77
290	0.277	0.056	-12.52
300	0.232	0.039	-14.06
310	0.192	0.027	-15.70
320	0.174	0.022	-16.56
330	0.182	0.024	-16.17
340	0.191	0.027	-15.75
350	0.201	0.029	-15.30

City coverage

The city of Brigantine is entirely surrounded by the 60 dBu F(50,50) contour of the achieved pattern. The encircling CP pattern is also shown here.



TPO Calculation

This page from the antenna proof gives the antenna input power (0.845 kW) and gain in each polarization (0.864) needed to achieve the desired ERP. It also shows the fill of the achieved pattern over the CP pattern is 92.7%, well above the required 85%.



Propagation Systems, Inc.

Quality Broadcast Antenna Systems

An input power level of .845 kW will be required at the antenna input in order to reach the licensed .73 kW ERP. The transmitter output power requirements are dependent upon the transmission line size and length used to feed the antenna. The final length of transmission line must be determined after installation.

Antenna Specifications

Antenna Model	PSIFMR-1-DA
Type	1-bay directional FM antenna
Frequency	90.5 MHz
Polarization	Circular
Envelope RMS	.783
Composite RMS	.726
Gain (h-pol)	.864 (-.635 dB)
Gain (v-pol)	.864 (-.635 dB)
Input	1-5/8" EIA end fed input
Input power	.845 kW
Power rating	9 kW
Length	5.1 ft.
Weight	74.3 lbs.
Wind Area	8.7 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.

A handwritten signature in black ink, appearing to read "Douglas A. Ross".

Douglas A. Ross
President
Propagation Systems Inc.

System schematic:

Ant (EIA)

- 0.1 Adapter EIA->NF
Tower cable 80 ft NM-NM
- 0.1 Arrester NF-NM (at grounded entrance panel to bldg)
- 0.1 3 ft Jumper NF-NM
- 0.1 Elbow NF-NM
- 0.1 Adapter NF->EIA

Transmitter (EIA)

Total -0.5

NM is N Male

NF is N Female

The long run includes the length of the 3 foot jumper length

The connectors on the antenna and transmitter don't count.

CALCULATION NUMBER 1

Transmitter Output:	1.0724 KW
2 EIA->N adapter -.2 dB	-48.266 Watts
Arrester, jumpr, elbow -.3 dB	-68.357 Watts
Transmission Line:	Andrew LDF4-50A, 1/2 Inch
Length Of Line:	83 Feet
Loss in dB/100 Ft. At 90.5 mHz:	.645 dB
Line Efficiency At 90.5 mHz:	88.4 %
Max. Average Power Rating of Line:	1.99 KW
Power Dissipated In Line:	110.87 Watts
Power At Input To Antenna:	844.91 Watts
Antenna Make/Model:	PSI FMR-1-DA
Number of Bays:	One
Max. Antenna Input Power Rating:	9 KW
Antenna Power Gain:	.864
System E. R. P.:	730 Watts

Radiation Hazard

Some of the initial material here is extracted from the CP application to provide clarity in following the measurement of radiation given in a separate attached document.

The new site is atop the existing Atlantic Place hotel, which already has ASR 1038528. Hence no FAA or ASR processing is required. Since the antenna is not located at the exact same location on the roof as the ASR, the coordinates are slightly different (~0.1 km). The 20 foot pole supporting the antenna rises above the flat roof.

ASR 1038528

NAD27: 392124.58 742532.46

NAD83: 392125.00 742531.00

Site El: 2.1m Height 108.2m Top AMSL 110.3m

Structure Type: B

Location: 1507 BOARDWALK & NEW UYORK AVE, ATLANTIC CITY, NJ

Dates Construction: 01/01/1991 Action: 02/26/1998

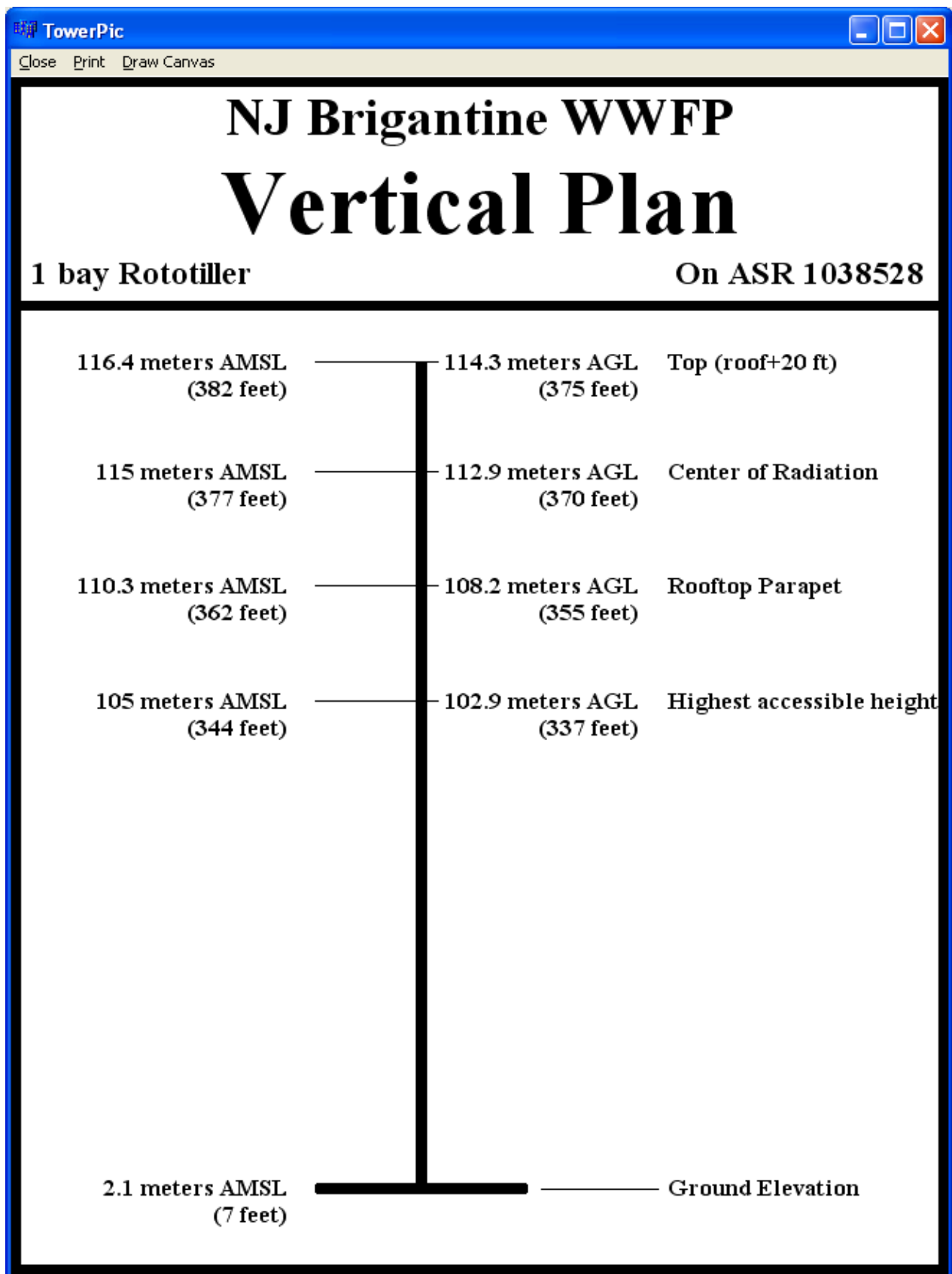
FAA Circular Number: Chapter: None

Owner: ATLANTIC PALACE

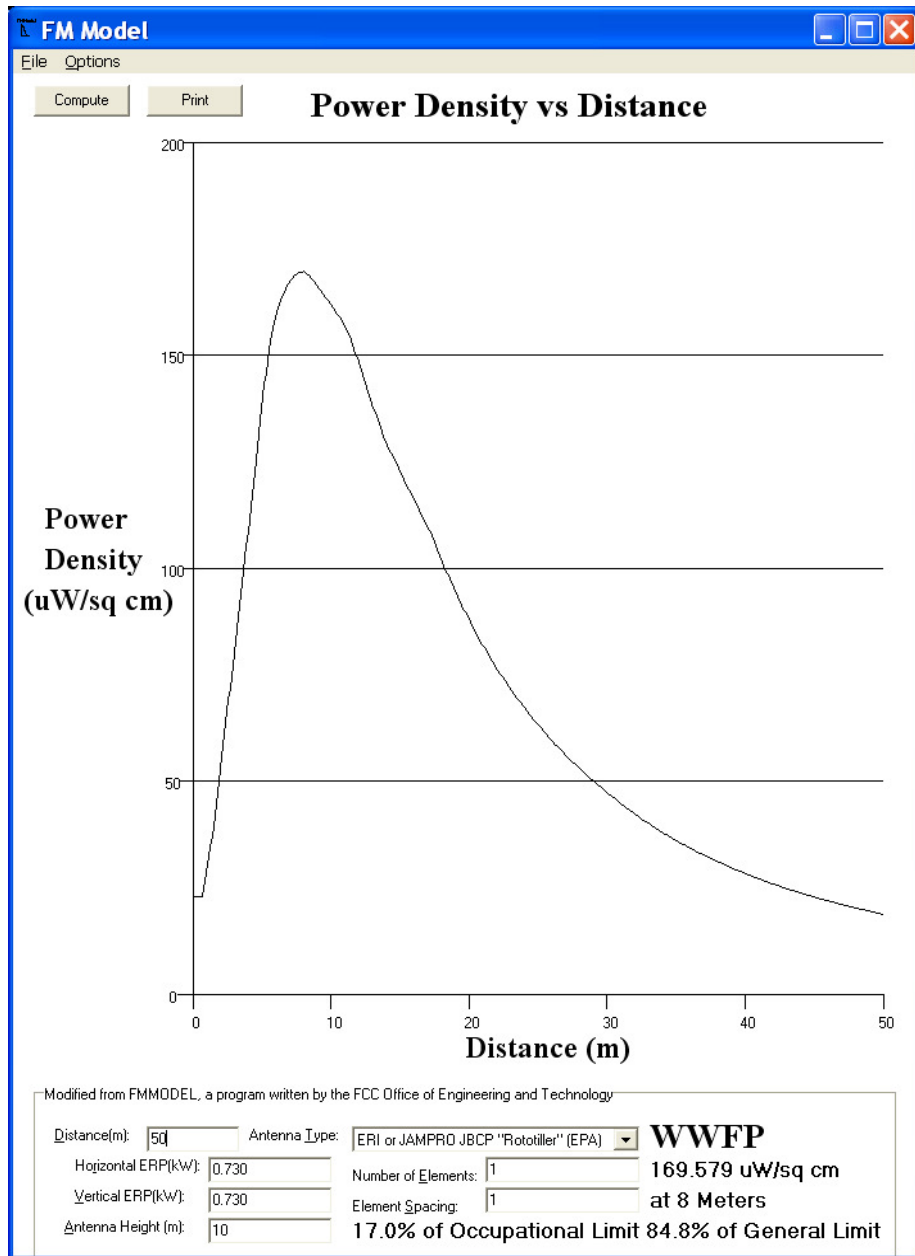
SMR LEASING MARVIN WAXMAN

6845 WESTFIELD AVE

PENNSAUKEN, NJ, 08110



The highest location accessible to personnel is 10 meters below the center of radiation of the proposed facility (see earlier diagram). **Note that the “Highest accessible height” is accessible only by climbing a ladder and unlocking a trap door. There is no rooftop public access.** The antenna is a circularly polarized EPA rototiller/double vee style antenna with a single bay. Hence no hazard is predicted.



The actual measurement quoted here, 39.5 uW/sq cm, is from the attached Radiation Hazard Measurement document. Note that the limitations of the size of the building and the offset location on the measurement area prevent measurement to any great distance from the center of the support mast.

Radiation Hazard Study of WWFP Antenna									
Radials Centered on Antenna Azimuth of 150 degrees from True North									
All readings in uW/cm sq									
Performed 7/24/2023									
	Azimuth (Degrees from True North)								
Distance	15	60	105	150	195	240	285	330	
(Meters)									
2	6.5	5.4	5.7	5.4	9.4	39.8	13.8	5.3	
4	5.9	5.5	2.6	5.7	8.9	11.0			
6		0.3	11.6			2.5			
8		0.9							
10		1.0							
12		2.1							
14		2.8							
16		2.4							
Note: The top floor of this building is small, the readings were performed in 8 radials until we hit the outside wall.									
Note: The maximum reading of 39.8 uW/cm sq was at 2 meters on the 240 degree radial and is in bold type above.									

The maximum allowed value for radiation in the FM band for an unfenced (general population) area is 200 uW/cm sq (OET 65, pg 67, Table 1 (B)). The maximum value reported was 39.8 uW/cm sq, which is only 19.9% of the maximum of 200 uW/cm sq.