



Comprehensive Engineering Statement – September 6, 2022

On behalf of Virginia Public Media (VPM)

On September 1st, the Commission granted the Virginia Public Media (VPM) a petition to substitute channel 15 for channel 12. This statement accompanies the engineering application exhibits for a construction permit for the proposed DTS system.

WVPT-1 (reference), N. Lat. 38-09-54.4, W. Long. 79-18-50.1 (NAD 83), Structure Ht. AG 12 m
Proposed ERP: 195 kW H, 52.6 kW V, Antenna COR AMSL 1323 m, DA Dielectric TUL-BP2 6/12 M 1

WVPT-2, N. Lat. 37-59-00.0, W. Long. 78-29-01.0 (NAD 83) ASRN 1018222, Structure Ht. AG 90.5 m
Proposed ERP: 15 kW H, 6.43 kW V, Antenna COR AMSL 493.1 m, DA Dielectric TUL-BP2-1/2M-1-K

WVPT-3, N. Lat. 38-36-03.9 W. Long. 78-37-56.8 (NAD 83) ASRN 1018206, Structure Ht. AG 73.5 m
Proposed ERP: 0.25 kW, Antenna COR AMSL 962 m, DA Dielectric TUL-C2SP-15 COS 66_33

Attachment #1 is a coverage map of the proposed, noise-limited contours of all three DTS, channel 15, transmitters. This attachment also shows that the WVPT-1 city grade, noise limited, service contour completely covers Harrisonburg, the principal city.

Attachment #2 is the antenna exhibit for the three antennas of the proposed system. This exhibit includes azimuth and vertical elevation field graphs, and tables, as well as distance to contour tables that include the angles of departure calculations.

Attachment #3 is a complete environmental-RF hazard exhibit. The applicant proposes to use existing authorized towers that have not been the target of environmental objections. There will be no changes to the tower height or other changes that may call for a further environmental analysis. The applicant has an agreement with the owner of the towers on the site to reduce power or terminate transmissions, as necessary, to protect workers on the tower. This exhibit explains that the Commission's rules for protection of the public within an uncontrolled environment will be fully met.

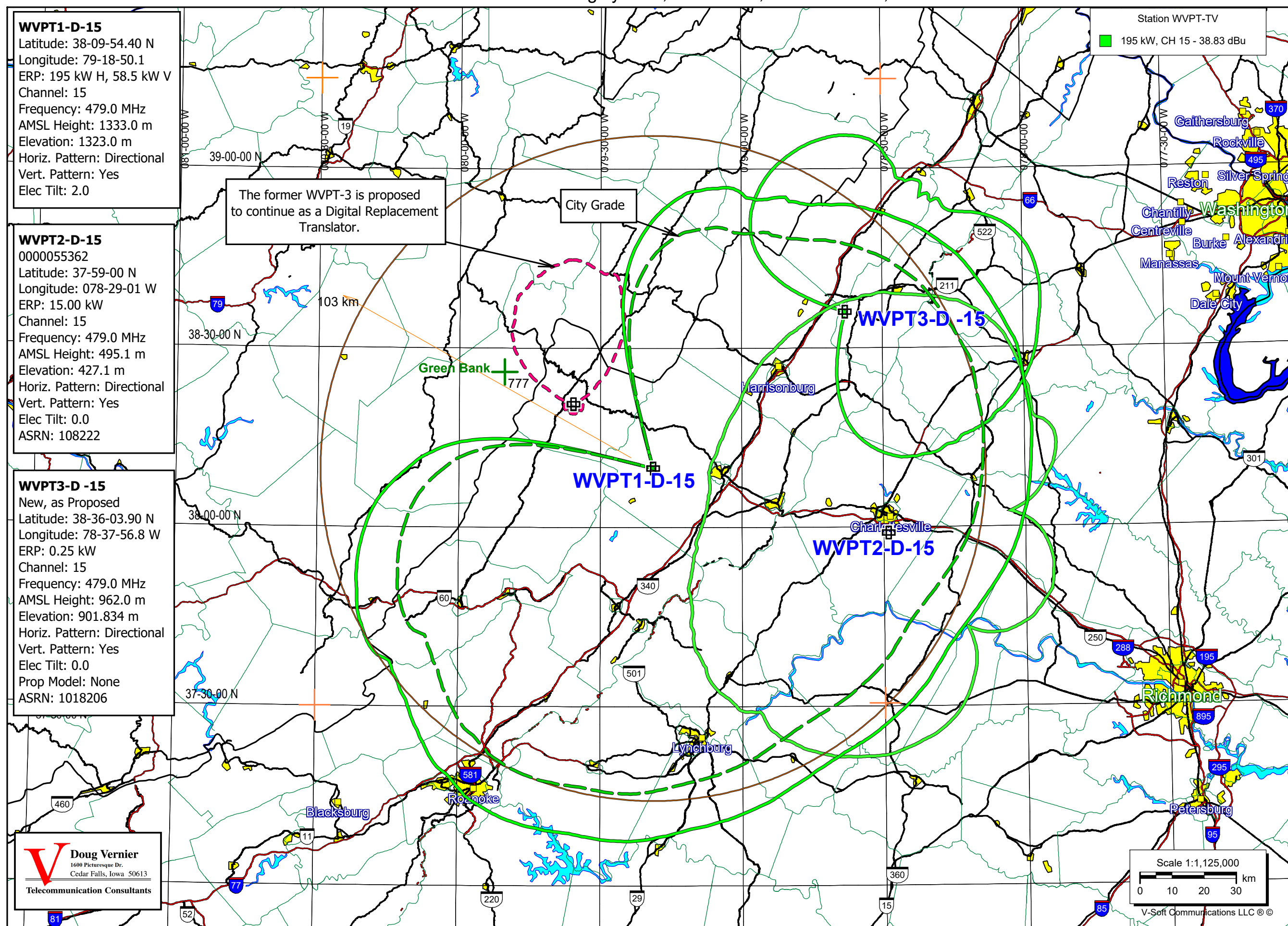
Attachment #4 is an OET 69 analysis showing that the proposed facility causes no interference to any other station above the maximum of 0.5 percent.

Attachment #5 is the conditioned approval of the National Radio Quiet Zone for the facilities requested herein.

Attachment #6 is an exhibit stating the qualifications of the preparer.

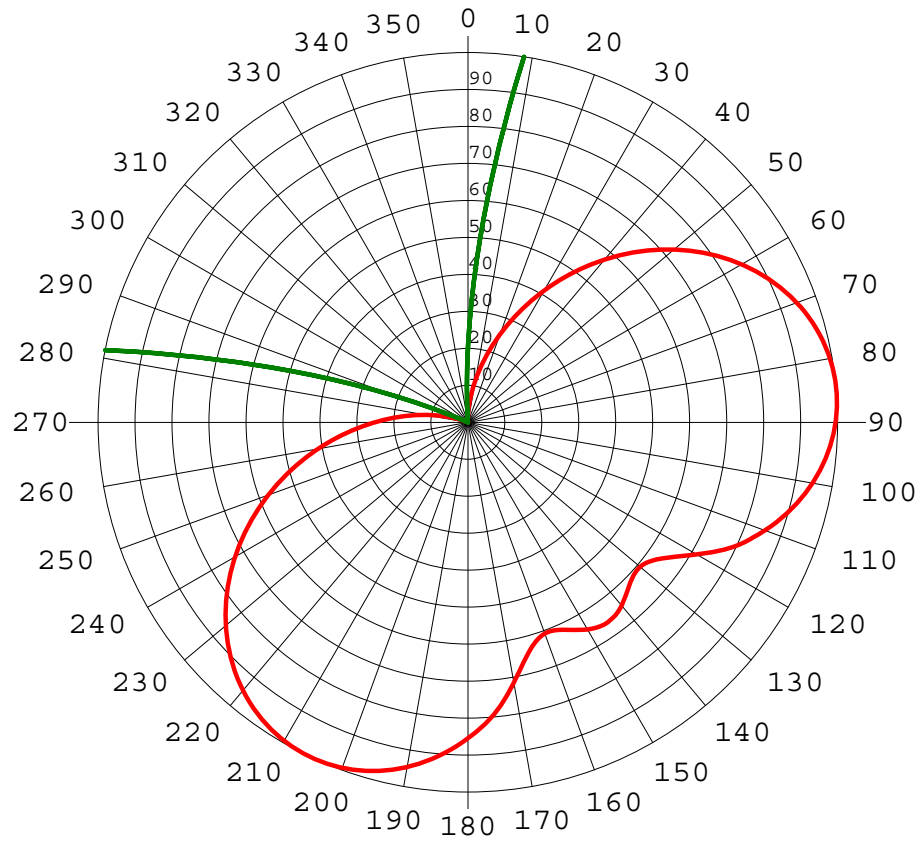
Doug Vernier

Predicted Longley-Rice, Channel 15, Noise-Limited, 38.83 dBu



Major lobes 85 and 205

Dielectric TUL-BP2 6/12 M 1



| Azi | Rel | dBk | kW | dB | Azi | Rel | dBk | kW | dB |
|-----|-------|-------|---------|--------|-----|-------|-------|---------|--------|
| 0 | 0.020 | -9.71 | 0.107 | -33.91 | 180 | 0.854 | 22.83 | 191.972 | -1.37 |
| 10 | 0.115 | 5.42 | 3.480 | -18.78 | 190 | 0.946 | 23.72 | 235.383 | -0.48 |
| 20 | 0.252 | 12.23 | 16.711 | -11.97 | 200 | 0.994 | 24.15 | 259.811 | -0.05 |
| 30 | 0.411 | 16.47 | 44.407 | -7.73 | 210 | 0.994 | 24.15 | 259.811 | -0.05 |
| 40 | 0.574 | 19.38 | 86.758 | -4.82 | 220 | 0.946 | 23.72 | 235.383 | -0.48 |
| 50 | 0.727 | 21.43 | 138.906 | -2.77 | 230 | 0.854 | 22.83 | 191.972 | -1.37 |
| 60 | 0.854 | 22.83 | 191.972 | -1.37 | 240 | 0.727 | 21.43 | 138.906 | -2.77 |
| 70 | 0.946 | 23.72 | 235.383 | -0.48 | 250 | 0.574 | 19.38 | 86.758 | -4.82 |
| 80 | 0.994 | 24.15 | 259.811 | -0.05 | 260 | 0.411 | 16.47 | 44.407 | -7.73 |
| 90 | 0.994 | 24.15 | 259.811 | -0.05 | 270 | 0.252 | 12.23 | 16.711 | -11.97 |
| 100 | 0.946 | 23.72 | 235.383 | -0.48 | 280 | 0.115 | 5.42 | 3.480 | -18.78 |
| 110 | 0.854 | 22.83 | 191.972 | -1.37 | 290 | 0.020 | -9.71 | 0.107 | -33.91 |
| 120 | 0.714 | 21.28 | 134.243 | -2.92 | 300 | 0.000 | -INF | 0.000 | -INF |
| 130 | 0.608 | 19.87 | 97.142 | -4.33 | 310 | 0.000 | -INF | 0.000 | -INF |
| 140 | 0.646 | 20.41 | 109.897 | -3.79 | 320 | 0.000 | -INF | 0.000 | -INF |
| 150 | 0.646 | 20.41 | 109.897 | -3.79 | 330 | 0.000 | -INF | 0.000 | -INF |
| 160 | 0.608 | 19.87 | 97.142 | -4.33 | 340 | 0.000 | -INF | 0.000 | -INF |
| 170 | 0.714 | 21.28 | 134.243 | -2.92 | 350 | 0.000 | -INF | 0.000 | -INF |

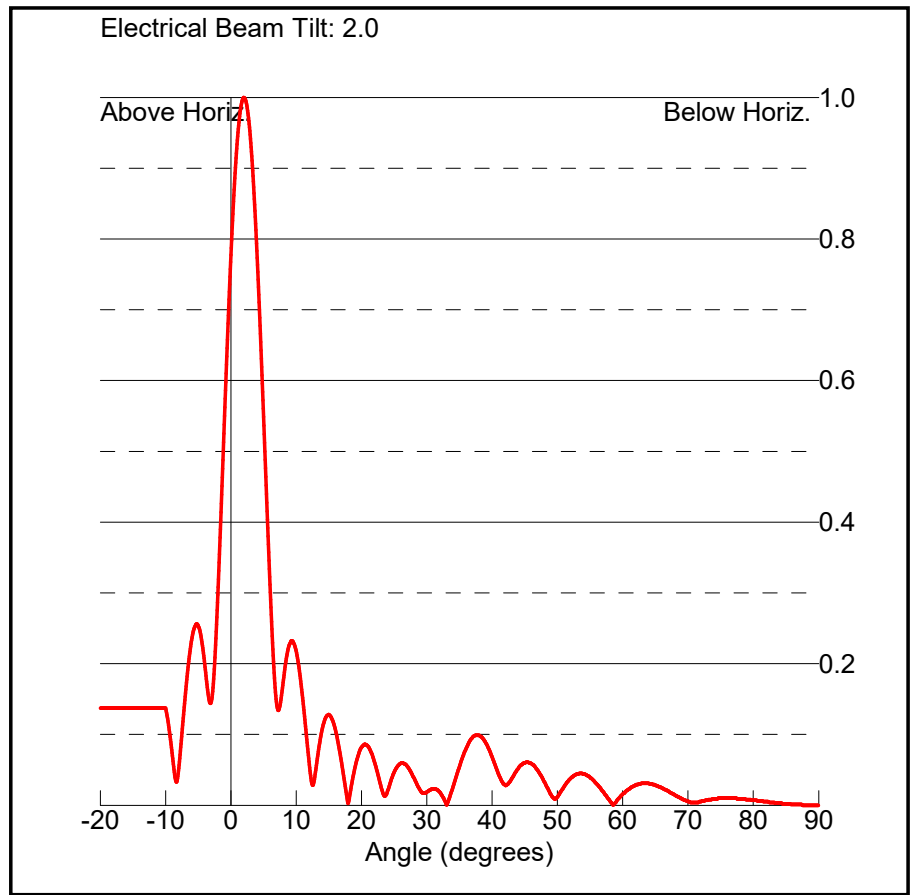
Rotation Angle = 0

Extra points:

85 1.000, 205 1.000

Vertical Elevation Pattern

| Angle (deg) | Relative Field |
|-------------|----------------|
| -10.0 | 0.137 |
| -9.9 | 0.132 |
| -9.8 | 0.127 |
| -9.7 | 0.122 |
| -9.6 | 0.116 |
| -9.5 | 0.109 |
| -9.4 | 0.102 |
| -9.3 | 0.095 |
| -9.2 | 0.088 |
| -9.1 | 0.08 |
| -9.0 | 0.072 |
| -8.9 | 0.064 |
| -8.8 | 0.056 |
| -8.7 | 0.048 |
| -8.6 | 0.041 |
| -8.5 | 0.036 |
| -8.4 | 0.033 |
| -8.3 | 0.033 |
| -8.2 | 0.037 |
| -8.1 | 0.044 |
| -8.0 | 0.052 |
| -7.9 | 0.061 |
| -7.8 | 0.071 |
| -7.7 | 0.082 |
| -7.6 | 0.092 |
| -7.5 | 0.103 |
| -7.4 | 0.114 |
| -7.3 | 0.124 |
| -7.2 | 0.135 |
| -7.1 | 0.145 |
| -7.0 | 0.155 |
| -6.9 | 0.165 |
| -6.8 | 0.175 |
| -6.7 | 0.184 |
| -6.6 | 0.193 |
| -6.5 | 0.201 |
| -6.4 | 0.209 |
| -6.3 | 0.216 |
| -6.2 | 0.223 |
| -6.1 | 0.23 |
| -6.0 | 0.235 |
| -5.9 | 0.24 |
| -5.8 | 0.245 |
| -5.7 | 0.248 |
| -5.6 | 0.251 |
| -5.5 | 0.253 |
| -5.4 | 0.255 |
| -5.3 | 0.256 |
| -5.2 | 0.256 |



| | |
|------|-------|
| -5.1 | 0.255 |
| -5.0 | 0.253 |
| -4.9 | 0.251 |
| -4.8 | 0.248 |
| -4.7 | 0.244 |
| -4.6 | 0.239 |
| -4.5 | 0.233 |
| -4.4 | 0.227 |
| -4.3 | 0.221 |
| -4.2 | 0.213 |
| -4.1 | 0.206 |
| -4.0 | 0.197 |
| -3.9 | 0.189 |
| -3.8 | 0.18 |
| -3.7 | 0.172 |
| -3.6 | 0.164 |
| -3.5 | 0.157 |
| -3.4 | 0.151 |
| -3.3 | 0.146 |
| -3.2 | 0.144 |
| -3.1 | 0.144 |
| -3.0 | 0.147 |
| -2.9 | 0.152 |

| | | | |
|------|-------|-----|-------|
| -2.8 | 0.161 | 2.5 | 0.984 |
| -2.7 | 0.172 | 2.6 | 0.977 |
| -2.6 | 0.186 | 2.7 | 0.97 |
| -2.5 | 0.201 | 2.8 | 0.961 |
| -2.4 | 0.219 | 2.9 | 0.951 |
| -2.3 | 0.238 | 3.0 | 0.939 |
| -2.2 | 0.258 | 3.1 | 0.927 |
| -2.1 | 0.279 | 3.2 | 0.914 |
| -2.0 | 0.301 | 3.3 | 0.9 |
| -1.9 | 0.324 | 3.4 | 0.885 |
| -1.8 | 0.348 | 3.5 | 0.868 |
| -1.7 | 0.372 | 3.6 | 0.851 |
| -1.6 | 0.396 | 3.7 | 0.834 |
| -1.5 | 0.421 | 3.8 | 0.815 |
| -1.4 | 0.446 | 3.9 | 0.796 |
| -1.3 | 0.471 | 4.0 | 0.775 |
| -1.2 | 0.496 | 4.1 | 0.755 |
| -1.1 | 0.522 | 4.2 | 0.733 |
| -1.0 | 0.547 | 4.3 | 0.711 |
| -0.9 | 0.572 | 4.4 | 0.689 |
| -0.8 | 0.596 | 4.5 | 0.666 |
| -0.7 | 0.621 | 4.6 | 0.642 |
| -0.6 | 0.645 | 4.7 | 0.618 |
| -0.5 | 0.669 | 4.8 | 0.594 |
| -0.4 | 0.692 | 4.9 | 0.57 |
| -0.3 | 0.715 | 5.0 | 0.546 |
| -0.2 | 0.737 | 5.1 | 0.521 |
| -0.1 | 0.759 | 5.2 | 0.496 |
| 0.0 | 0.779 | 5.3 | 0.472 |
| 0.1 | 0.8 | 5.4 | 0.447 |
| 0.2 | 0.819 | 5.5 | 0.422 |
| 0.3 | 0.838 | 5.6 | 0.398 |
| 0.4 | 0.856 | 5.7 | 0.374 |
| 0.5 | 0.873 | 5.8 | 0.351 |
| 0.6 | 0.889 | 5.9 | 0.327 |
| 0.7 | 0.904 | 6.0 | 0.305 |
| 0.8 | 0.918 | 6.1 | 0.283 |
| 0.9 | 0.931 | 6.2 | 0.262 |
| 1.0 | 0.943 | 6.3 | 0.241 |
| 1.1 | 0.954 | 6.4 | 0.222 |
| 1.2 | 0.963 | 6.5 | 0.204 |
| 1.3 | 0.972 | 6.6 | 0.188 |
| 1.4 | 0.98 | 6.7 | 0.173 |
| 1.5 | 0.986 | 6.8 | 0.16 |
| 1.6 | 0.991 | 6.9 | 0.15 |
| 1.7 | 0.995 | 7.0 | 0.142 |
| 1.8 | 0.998 | 7.1 | 0.137 |
| 1.9 | 1.0 | 7.2 | 0.134 |
| 2.0 | 1.0 | 7.3 | 0.134 |
| 2.1 | 0.999 | 7.4 | 0.137 |
| 2.2 | 0.997 | 7.5 | 0.141 |
| 2.3 | 0.994 | 7.6 | 0.146 |
| 2.4 | 0.99 | 7.7 | 0.153 |

N. Lat. = 380954.4 W. Lng. = 791850.1
 HAAT and Distance to Contour,
 FCC OET,TV 3.2 - 16.1, 130 pts - USGS 03 SEC
 Electrical Beam Tilt = 2 Degrees

WVPT1-D-15

| Azi. | AV EL | HAAT | ERP kW | dBk | Field | DAng | VFld | D-kw | %Max | D-dBk | 36-F9 |
|------|-------|-------|----------|--------|-------|-------|-------|----------|------|--------|--------|
| 000 | 648.7 | 684.3 | 2.5789 | 4.11 | 0.115 | 0.725 | 0.907 | 2.1236 | 90.7 | 4.11 | 82.05 |
| 010 | 718.5 | 614.5 | 12.3833 | 10.93 | 0.252 | 0.687 | 0.902 | 10.0751 | 90.2 | 10.93 | 92.75 |
| 020 | 822.9 | 510.1 | 32.9396 | 15.18 | 0.411 | 0.626 | 0.893 | 26.2583 | 89.3 | 14.19 | 92.53 |
| 030 | 810.7 | 522.3 | 64.2478 | 18.08 | 0.574 | 0.633 | 0.894 | 51.3441 | 89.4 | 17.10 | 99.21 |
| 040 | 717.0 | 616.0 | 103.0632 | 20.13 | 0.727 | 0.687 | 0.902 | 83.8751 | 90.2 | 20.13 | 110.89 |
| 050 | 608.5 | 724.5 | 142.2166 | 21.53 | 0.854 | 0.746 | 0.910 | 117.8683 | 91.0 | 21.53 | 118.92 |
| 060 | 561.8 | 771.2 | 174.5086 | 22.42 | 0.946 | 0.769 | 0.914 | 145.6870 | 91.4 | 22.42 | 122.82 |
| 070 | 527.7 | 805.3 | 192.6670 | 22.85 | 0.994 | 0.786 | 0.916 | 161.6761 | 91.6 | 22.85 | 125.05 |
| 080 | 547.1 | 785.9 | 192.6670 | 22.85 | 0.994 | 0.777 | 0.915 | 161.2060 | 91.5 | 22.85 | 124.36 |
| 090 | 556.1 | 776.9 | 174.5086 | 22.42 | 0.946 | 0.772 | 0.914 | 145.8135 | 91.4 | 22.42 | 123.03 |
| 100 | 549.6 | 783.4 | 142.2166 | 21.53 | 0.854 | 0.775 | 0.915 | 118.9479 | 91.5 | 21.53 | 121.26 |
| 110 | 572.3 | 760.7 | 99.4102 | 19.97 | 0.714 | 0.764 | 0.913 | 82.8571 | 91.3 | 19.97 | 116.96 |
| 120 | 589.9 | 743.1 | 72.0845 | 18.58 | 0.608 | 0.755 | 0.912 | 59.9179 | 91.2 | 18.58 | 113.19 |
| 130 | 606.7 | 726.3 | 81.3766 | 19.10 | 0.646 | 0.746 | 0.911 | 67.4634 | 91.1 | 19.11 | 113.62 |
| 140 | 623.9 | 709.1 | 81.3766 | 19.10 | 0.646 | 0.738 | 0.909 | 67.2799 | 90.9 | 19.11 | 112.88 |
| 150 | 613.3 | 719.7 | 72.0845 | 18.58 | 0.608 | 0.743 | 0.910 | 59.6978 | 91.0 | 18.58 | 112.20 |
| 160 | 617.8 | 715.2 | 99.4102 | 19.97 | 0.714 | 0.741 | 0.910 | 82.2698 | 91.0 | 19.97 | 115.05 |
| 170 | 633.4 | 699.6 | 142.2166 | 21.53 | 0.854 | 0.733 | 0.909 | 117.4005 | 90.9 | 21.53 | 117.82 |
| 180 | 608.6 | 724.4 | 174.5086 | 22.42 | 0.946 | 0.746 | 0.910 | 144.6286 | 91.0 | 22.42 | 120.94 |
| 190 | 600.0 | 733.0 | 192.6670 | 22.85 | 0.994 | 0.750 | 0.911 | 159.8965 | 91.1 | 22.85 | 122.30 |
| 200 | 555.3 | 777.7 | 192.6670 | 22.85 | 0.994 | 0.772 | 0.914 | 161.0052 | 91.4 | 22.85 | 124.06 |
| 210 | 553.6 | 779.4 | 174.5086 | 22.42 | 0.946 | 0.773 | 0.914 | 145.8680 | 91.4 | 22.42 | 123.13 |
| 220 | 646.7 | 686.3 | 142.2166 | 21.53 | 0.854 | 0.726 | 0.908 | 117.1476 | 90.8 | 21.53 | 117.22 |
| 230 | 763.6 | 569.4 | 103.0632 | 20.13 | 0.727 | 0.661 | 0.898 | 83.1383 | 89.8 | 19.20 | 106.77 |
| 240 | 670.2 | 662.8 | 64.2478 | 18.08 | 0.574 | 0.713 | 0.906 | 52.7183 | 90.6 | 18.08 | 108.70 |
| 250 | 654.2 | 678.8 | 32.9396 | 15.18 | 0.411 | 0.722 | 0.907 | 27.0999 | 90.7 | 15.18 | 103.49 |
| 260 | 647.8 | 685.2 | 12.3833 | 10.93 | 0.252 | 0.725 | 0.908 | 10.1987 | 90.8 | 10.93 | 95.32 |
| 270 | 676.8 | 656.2 | 2.5789 | 4.11 | 0.115 | 0.710 | 0.905 | 2.1137 | 90.5 | 4.11 | 81.23 |
| 280 | 661.0 | 672.0 | 0.0780 | -11.08 | 0.020 | 0.718 | 0.907 | 0.0641 | 90.7 | -11.08 | 57.17 |
| 290 | 662.4 | 670.6 | 0.0002 | -37.10 | 0.001 | 0.717 | 0.906 | 0.0002 | 90.6 | -37.10 | 21.14 |
| 300 | 664.4 | 668.6 | 0.0002 | -37.10 | 0.001 | 0.716 | 0.906 | 0.0002 | 90.6 | -37.10 | 21.12 |
| 310 | 706.6 | 626.4 | 0.0002 | -37.10 | 0.001 | 0.693 | 0.903 | 0.0002 | 90.3 | -37.10 | 20.68 |
| 320 | 736.3 | 596.7 | 0.0002 | -37.10 | 0.001 | 0.677 | 0.900 | 0.0002 | 90.0 | -37.10 | 20.44 |
| 330 | 699.3 | 633.7 | 0.0002 | -37.10 | 0.001 | 0.697 | 0.904 | 0.0002 | 90.4 | -37.10 | 20.75 |
| 340 | 697.8 | 635.2 | 0.0002 | -37.10 | 0.001 | 0.698 | 0.904 | 0.0002 | 90.4 | -37.10 | 20.76 |
| 350 | 656.8 | 676.2 | 0.0780 | -11.08 | 0.020 | 0.720 | 0.907 | 0.0641 | 90.7 | -11.08 | 57.25 |

Ave El= 644.09 M HAAT= 688.91 M AMSL= 1333 M



Antenna Model: **TUM-LP-BP2-7/14M-1**

Proposal Number: **C-71676-1**
Date: **7-July-21**
Customer: **WVPT**
Location: **Elliott Knob, VA**

Electrical Specifications

Polarization: **Elliptical**
Azimuth Pattern: **Directional**
Antenna Input: **3-1/8"** **50 Ohm** **EIA/DCA**
VSWR: **Channel** **1.15 : 1**
Bandwidth: **MHz**
Rated Input Power: **14 kW** **(11.46 dBk)** **Maximum Average Power**

Mechanical Specifications

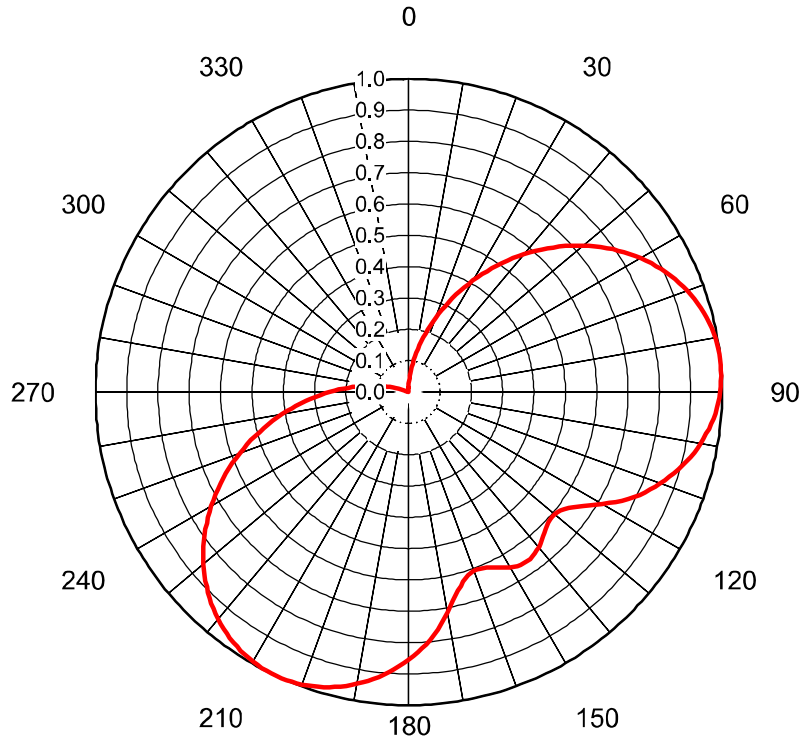
Mounting: **Side Mounted**
Environmental Protection: **Panel Cover**
Height: **21.1 ft (6.4m)**
Weight: **850 lb (0.4t)**
Effective Projected Area: **84.8 ft² (7.9m²)** **TIA-222-G** Basic Wind Speed: **90 m/h (144.8 km/h)**

Channel Specifications

| Call | CH | Freq | Hpol ERP | Vpol ERP | TPO | Peak Main Lobe Hpol Gain | Peak Main Lobe Vpol Gain | Peak at Horizontal Hpol Gain | Peak at Horizontal Vpol Gain |
|--------|----|---------|----------------------|------------------------|------------------------|--------------------------------|--------------------------------|------------------------------------|------------------------------------|
| WVPT-1 | 15 | 479 MHz | 195 kW (22.0 dBk) | 39.0 kW (15.91 dBk) | 7.41 kW (16.31 dBk) | 27.63 (14.41dB) | 5.53 (7.42dB) | 13.93 (11.44dB) | 2.79 (4.45dB) |

ERP of 263 kW was changed to 195 kW on this sheet to accommodate NRZQ request.

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AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-71676-2**
 Date **7-Jun-21**
 Call Letters **WVPT-1**
 Channel **15**
 Frequency **479 MHz**
 Antenna Type **TUM-LP-BP2-7/14M-1**
 Gain **2.36 (3.73dB)**
 Calculated

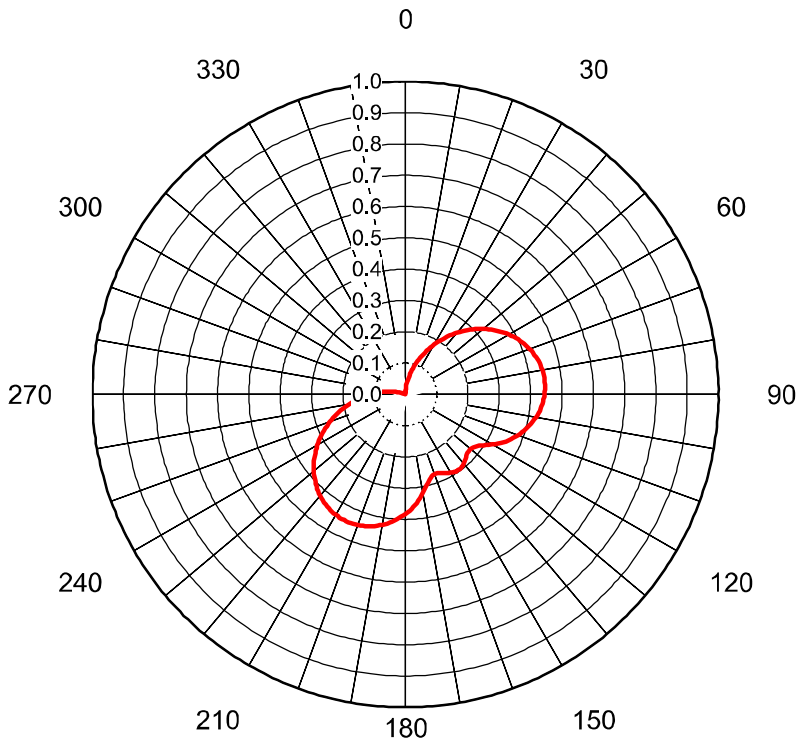
| Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 0.020 | 36 | 0.509 | 72 | 0.959 | 108 | 0.876 | 144 | 0.659 | 180 | 0.854 | 216 | 0.971 | 252 | 0.542 | 288 | 0.034 | 324 | 0.000 |
| 1 | 0.027 | 37 | 0.526 | 73 | 0.965 | 109 | 0.865 | 145 | 0.660 | 181 | 0.865 | 217 | 0.965 | 253 | 0.526 | 289 | 0.027 | 325 | 0.000 |
| 2 | 0.034 | 38 | 0.542 | 74 | 0.971 | 110 | 0.854 | 146 | 0.659 | 182 | 0.876 | 218 | 0.959 | 254 | 0.509 | 290 | 0.020 | 326 | 0.000 |
| 3 | 0.043 | 39 | 0.558 | 75 | 0.976 | 111 | 0.843 | 147 | 0.657 | 183 | 0.886 | 219 | 0.953 | 255 | 0.493 | 291 | 0.014 | 327 | 0.000 |
| 4 | 0.051 | 40 | 0.574 | 76 | 0.980 | 112 | 0.831 | 148 | 0.655 | 184 | 0.896 | 220 | 0.946 | 256 | 0.477 | 292 | 0.009 | 328 | 0.000 |
| 5 | 0.061 | 41 | 0.590 | 77 | 0.984 | 113 | 0.819 | 149 | 0.651 | 185 | 0.905 | 221 | 0.939 | 257 | 0.460 | 293 | 0.005 | 329 | 0.000 |
| 6 | 0.071 | 42 | 0.606 | 78 | 0.988 | 114 | 0.807 | 150 | 0.646 | 186 | 0.914 | 222 | 0.931 | 258 | 0.444 | 294 | 0.002 | 330 | 0.000 |
| 7 | 0.081 | 43 | 0.622 | 79 | 0.991 | 115 | 0.794 | 151 | 0.641 | 187 | 0.923 | 223 | 0.923 | 259 | 0.427 | 295 | 0.000 | 331 | 0.000 |
| 8 | 0.092 | 44 | 0.637 | 80 | 0.994 | 116 | 0.780 | 152 | 0.636 | 188 | 0.931 | 224 | 0.914 | 260 | 0.411 | 296 | 0.000 | 332 | 0.000 |
| 9 | 0.103 | 45 | 0.653 | 81 | 0.996 | 117 | 0.765 | 153 | 0.630 | 189 | 0.939 | 225 | 0.905 | 261 | 0.395 | 297 | 0.000 | 333 | 0.000 |
| 10 | 0.115 | 46 | 0.668 | 82 | 0.998 | 118 | 0.748 | 154 | 0.624 | 190 | 0.946 | 226 | 0.896 | 262 | 0.378 | 298 | 0.000 | 334 | 0.000 |
| 11 | 0.127 | 47 | 0.683 | 83 | 0.999 | 119 | 0.731 | 155 | 0.619 | 191 | 0.953 | 227 | 0.886 | 263 | 0.362 | 299 | 0.000 | 335 | 0.000 |
| 12 | 0.140 | 48 | 0.698 | 84 | 1.000 | 120 | 0.714 | 156 | 0.614 | 192 | 0.959 | 228 | 0.876 | 264 | 0.346 | 300 | 0.000 | 336 | 0.000 |
| 13 | 0.153 | 49 | 0.712 | 85 | 1.000 | 121 | 0.698 | 157 | 0.610 | 193 | 0.965 | 229 | 0.865 | 265 | 0.330 | 301 | 0.000 | 337 | 0.000 |
| 14 | 0.166 | 50 | 0.727 | 86 | 1.000 | 122 | 0.682 | 158 | 0.608 | 194 | 0.971 | 230 | 0.854 | 266 | 0.314 | 302 | 0.000 | 338 | 0.000 |
| 15 | 0.180 | 51 | 0.741 | 87 | 0.999 | 123 | 0.667 | 159 | 0.607 | 195 | 0.976 | 231 | 0.843 | 267 | 0.298 | 303 | 0.000 | 339 | 0.000 |
| 16 | 0.194 | 52 | 0.755 | 88 | 0.998 | 124 | 0.653 | 160 | 0.608 | 196 | 0.980 | 232 | 0.831 | 268 | 0.283 | 304 | 0.000 | 340 | 0.000 |
| 17 | 0.208 | 53 | 0.768 | 89 | 0.996 | 125 | 0.641 | 161 | 0.610 | 197 | 0.984 | 233 | 0.819 | 269 | 0.267 | 305 | 0.000 | 341 | 0.000 |
| 18 | 0.222 | 54 | 0.781 | 90 | 0.994 | 126 | 0.631 | 162 | 0.615 | 198 | 0.988 | 234 | 0.807 | 270 | 0.252 | 306 | 0.000 | 342 | 0.000 |
| 19 | 0.237 | 55 | 0.794 | 91 | 0.991 | 127 | 0.622 | 163 | 0.622 | 199 | 0.991 | 235 | 0.794 | 271 | 0.237 | 307 | 0.000 | 343 | 0.000 |
| 20 | 0.252 | 56 | 0.807 | 92 | 0.988 | 128 | 0.615 | 164 | 0.631 | 200 | 0.994 | 236 | 0.781 | 272 | 0.222 | 308 | 0.000 | 344 | 0.000 |
| 21 | 0.267 | 57 | 0.819 | 93 | 0.984 | 129 | 0.610 | 165 | 0.641 | 201 | 0.996 | 237 | 0.768 | 273 | 0.208 | 309 | 0.000 | 345 | 0.000 |
| 22 | 0.283 | 58 | 0.831 | 94 | 0.980 | 130 | 0.608 | 166 | 0.653 | 202 | 0.998 | 238 | 0.755 | 274 | 0.194 | 310 | 0.000 | 346 | 0.000 |
| 23 | 0.298 | 59 | 0.843 | 95 | 0.976 | 131 | 0.607 | 167 | 0.667 | 203 | 0.999 | 239 | 0.741 | 275 | 0.180 | 311 | 0.000 | 347 | 0.000 |
| 24 | 0.314 | 60 | 0.854 | 96 | 0.971 | 132 | 0.608 | 168 | 0.682 | 204 | 1.000 | 240 | 0.727 | 276 | 0.166 | 312 | 0.000 | 348 | 0.000 |
| 25 | 0.330 | 61 | 0.865 | 97 | 0.965 | 133 | 0.610 | 169 | 0.698 | 205 | 1.000 | 241 | 0.712 | 277 | 0.153 | 313 | 0.000 | 349 | 0.000 |
| 26 | 0.346 | 62 | 0.876 | 98 | 0.959 | 134 | 0.614 | 170 | 0.714 | 206 | 1.000 | 242 | 0.698 | 278 | 0.140 | 314 | 0.000 | 350 | 0.000 |
| 27 | 0.362 | 63 | 0.886 | 99 | 0.953 | 135 | 0.619 | 171 | 0.731 | 207 | 0.999 | 243 | 0.683 | 279 | 0.127 | 315 | 0.000 | 351 | 0.000 |
| 28 | 0.378 | 64 | 0.896 | 100 | 0.946 | 136 | 0.624 | 172 | 0.748 | 208 | 0.998 | 244 | 0.668 | 280 | 0.115 | 316 | 0.000 | 352 | 0.000 |
| 29 | 0.395 | 65 | 0.905 | 101 | 0.939 | 137 | 0.630 | 173 | 0.765 | 209 | 0.996 | 245 | 0.653 | 281 | 0.103 | 317 | 0.000 | 353 | 0.000 |
| 30 | 0.411 | 66 | 0.914 | 102 | 0.931 | 138 | 0.636 | 174 | 0.780 | 210 | 0.994 | 246 | 0.637 | 282 | 0.092 | 318 | 0.000 | 354 | 0.000 |
| 31 | 0.427 | 67 | 0.923 | 103 | 0.923 | 139 | 0.641 | 175 | 0.794 | 211 | 0.991 | 247 | 0.622 | 283 | 0.081 | 319 | 0.000 | 355 | 0.000 |
| 32 | 0.444 | 68 | 0.931 | 104 | 0.914 | 140 | 0.646 | 176 | 0.807 | 212 | 0.988 | 248 | 0.606 | 284 | 0.071 | 320 | 0.000 | 356 | 0.002 |
| 33 | 0.460 | 69 | 0.939 | 105 | 0.905 | 141 | 0.651 | 177 | 0.819 | 213 | 0.984 | 249 | 0.590 | 285 | 0.061 | 321 | 0.000 | 357 | 0.005 |
| 34 | 0.477 | 70 | 0.946 | 106 | 0.896 | 142 | 0.655 | 178 | 0.831 | 214 | 0.980 | 250 | 0.574 | 286 | 0.051 | 322 | 0.000 | 358 | 0.009 |
| 35 | 0.493 | 71 | 0.953 | 107 | 0.886 | 143 | 0.657 | 179 | 0.843 | 215 | 0.976 | 251 | 0.558 | 287 | 0.043 | 323 | 0.000 | 359 | 0.014 |

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AZIMUTH PATTERN Vertical Polarization

In Free Space

Proposal No. **C-71676-2**
Date **7-Jun-21**
Call Letters **WVPT-1**
Channel **15**
Frequency **479 MHz**
Antenna Type **TUM-LP-BP2-7/14M-1**
Gain **2.36 (3.73dB)**
Calculated



| Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 0.009 | 36 | 0.228 | 72 | 0.429 | 108 | 0.392 | 144 | 0.295 | 180 | 0.382 | 216 | 0.434 | 252 | 0.242 | 288 | 0.015 |
| 1 | 0.012 | 37 | 0.235 | 73 | 0.432 | 109 | 0.387 | 145 | 0.295 | 181 | 0.387 | 217 | 0.432 | 253 | 0.235 | 289 | 0.012 |
| 2 | 0.015 | 38 | 0.242 | 74 | 0.434 | 110 | 0.382 | 146 | 0.295 | 182 | 0.392 | 218 | 0.429 | 254 | 0.228 | 290 | 0.009 |
| 3 | 0.019 | 39 | 0.250 | 75 | 0.436 | 111 | 0.377 | 147 | 0.294 | 183 | 0.396 | 219 | 0.426 | 255 | 0.221 | 291 | 0.006 |
| 4 | 0.023 | 40 | 0.257 | 76 | 0.438 | 112 | 0.372 | 148 | 0.293 | 184 | 0.401 | 220 | 0.423 | 256 | 0.213 | 292 | 0.004 |
| 5 | 0.027 | 41 | 0.264 | 77 | 0.440 | 113 | 0.366 | 149 | 0.291 | 185 | 0.405 | 221 | 0.420 | 257 | 0.206 | 293 | 0.002 |
| 6 | 0.032 | 42 | 0.271 | 78 | 0.442 | 114 | 0.361 | 150 | 0.289 | 186 | 0.409 | 222 | 0.416 | 258 | 0.198 | 294 | 0.001 |
| 7 | 0.036 | 43 | 0.278 | 79 | 0.443 | 115 | 0.355 | 151 | 0.287 | 187 | 0.413 | 223 | 0.413 | 259 | 0.191 | 295 | 0.000 |
| 8 | 0.041 | 44 | 0.285 | 80 | 0.444 | 116 | 0.349 | 152 | 0.284 | 188 | 0.416 | 224 | 0.409 | 260 | 0.184 | 296 | 0.000 |
| 9 | 0.046 | 45 | 0.292 | 81 | 0.445 | 117 | 0.342 | 153 | 0.282 | 189 | 0.420 | 225 | 0.405 | 261 | 0.176 | 297 | 0.000 |
| 10 | 0.051 | 46 | 0.299 | 82 | 0.446 | 118 | 0.335 | 154 | 0.279 | 190 | 0.423 | 226 | 0.401 | 262 | 0.169 | 298 | 0.000 |
| 11 | 0.057 | 47 | 0.305 | 83 | 0.447 | 119 | 0.327 | 155 | 0.277 | 191 | 0.426 | 227 | 0.396 | 263 | 0.162 | 299 | 0.000 |
| 12 | 0.063 | 48 | 0.312 | 84 | 0.447 | 120 | 0.320 | 156 | 0.275 | 192 | 0.429 | 228 | 0.392 | 264 | 0.155 | 300 | 0.000 |
| 13 | 0.068 | 49 | 0.319 | 85 | 0.447 | 121 | 0.312 | 157 | 0.273 | 193 | 0.432 | 229 | 0.387 | 265 | 0.148 | 301 | 0.000 |
| 14 | 0.074 | 50 | 0.325 | 86 | 0.447 | 122 | 0.305 | 158 | 0.272 | 194 | 0.434 | 230 | 0.382 | 266 | 0.140 | 302 | 0.000 |
| 15 | 0.080 | 51 | 0.331 | 87 | 0.447 | 123 | 0.298 | 159 | 0.271 | 195 | 0.436 | 231 | 0.377 | 267 | 0.133 | 303 | 0.000 |
| 16 | 0.087 | 52 | 0.337 | 88 | 0.446 | 124 | 0.292 | 160 | 0.272 | 196 | 0.438 | 232 | 0.372 | 268 | 0.126 | 304 | 0.000 |
| 17 | 0.093 | 53 | 0.344 | 89 | 0.445 | 125 | 0.287 | 161 | 0.273 | 197 | 0.440 | 233 | 0.366 | 269 | 0.120 | 305 | 0.000 |
| 18 | 0.099 | 54 | 0.349 | 90 | 0.444 | 126 | 0.282 | 162 | 0.275 | 198 | 0.442 | 234 | 0.361 | 270 | 0.113 | 306 | 0.000 |
| 19 | 0.106 | 55 | 0.355 | 91 | 0.443 | 127 | 0.278 | 163 | 0.278 | 199 | 0.443 | 235 | 0.355 | 271 | 0.106 | 307 | 0.000 |
| 20 | 0.113 | 56 | 0.361 | 92 | 0.442 | 128 | 0.275 | 164 | 0.282 | 200 | 0.444 | 236 | 0.349 | 272 | 0.099 | 308 | 0.000 |
| 21 | 0.120 | 57 | 0.366 | 93 | 0.440 | 129 | 0.273 | 165 | 0.287 | 201 | 0.445 | 237 | 0.344 | 273 | 0.093 | 309 | 0.000 |
| 22 | 0.126 | 58 | 0.372 | 94 | 0.438 | 130 | 0.272 | 166 | 0.292 | 202 | 0.446 | 238 | 0.337 | 274 | 0.087 | 310 | 0.000 |
| 23 | 0.133 | 59 | 0.377 | 95 | 0.436 | 131 | 0.271 | 167 | 0.298 | 203 | 0.447 | 239 | 0.331 | 275 | 0.080 | 311 | 0.000 |
| 24 | 0.140 | 60 | 0.382 | 96 | 0.434 | 132 | 0.272 | 168 | 0.305 | 204 | 0.447 | 240 | 0.325 | 276 | 0.074 | 312 | 0.000 |
| 25 | 0.148 | 61 | 0.387 | 97 | 0.432 | 133 | 0.273 | 169 | 0.312 | 205 | 0.447 | 241 | 0.319 | 277 | 0.068 | 313 | 0.000 |
| 26 | 0.155 | 62 | 0.392 | 98 | 0.429 | 134 | 0.275 | 170 | 0.320 | 206 | 0.447 | 242 | 0.312 | 278 | 0.063 | 314 | 0.000 |
| 27 | 0.162 | 63 | 0.396 | 99 | 0.426 | 135 | 0.277 | 171 | 0.327 | 207 | 0.447 | 243 | 0.305 | 279 | 0.057 | 315 | 0.000 |
| 28 | 0.169 | 64 | 0.401 | 100 | 0.423 | 136 | 0.279 | 172 | 0.335 | 208 | 0.446 | 244 | 0.299 | 280 | 0.051 | 316 | 0.000 |
| 29 | 0.176 | 65 | 0.405 | 101 | 0.420 | 137 | 0.282 | 173 | 0.342 | 209 | 0.445 | 245 | 0.292 | 281 | 0.046 | 317 | 0.000 |
| 30 | 0.184 | 66 | 0.409 | 102 | 0.416 | 138 | 0.284 | 174 | 0.349 | 210 | 0.444 | 246 | 0.285 | 282 | 0.041 | 318 | 0.000 |
| 31 | 0.191 | 67 | 0.413 | 103 | 0.413 | 139 | 0.287 | 175 | 0.355 | 211 | 0.443 | 247 | 0.278 | 283 | 0.036 | 319 | 0.000 |
| 32 | 0.198 | 68 | 0.416 | 104 | 0.409 | 140 | 0.289 | 176 | 0.361 | 212 | 0.442 | 248 | 0.271 | 284 | 0.032 | 320 | 0.000 |
| 33 | 0.206 | 69 | 0.420 | 105 | 0.405 | 141 | 0.291 | 177 | 0.366 | 213 | 0.440 | 249 | 0.264 | 285 | 0.027 | 321 | 0.000 |
| 34 | 0.213 | 70 | 0.423 | 106 | 0.401 | 142 | 0.293 | 178 | 0.372 | 214 | 0.438 | 250 | 0.257 | 286 | 0.023 | 322 | 0.000 |
| 35 | 0.221 | 71 | 0.426 | 107 | 0.396 | 143 | 0.294 | 179 | 0.377 | 215 | 0.436 | 251 | 0.250 | 287 | 0.019 | 323 | 0.000 |

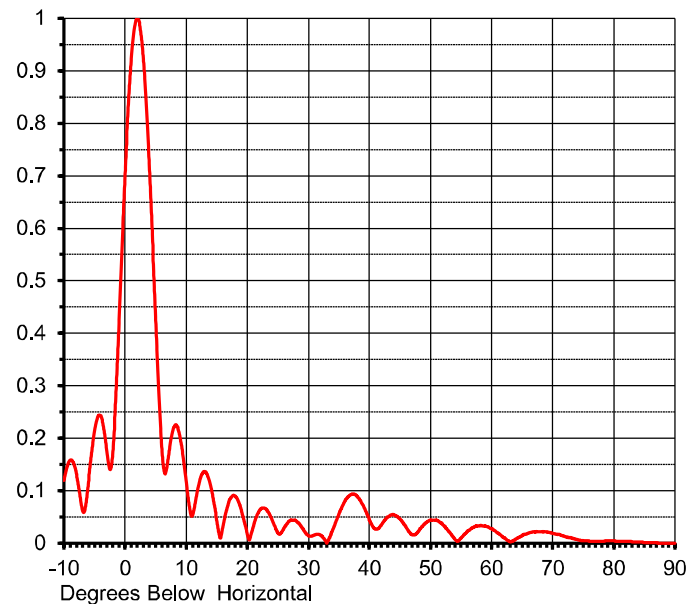
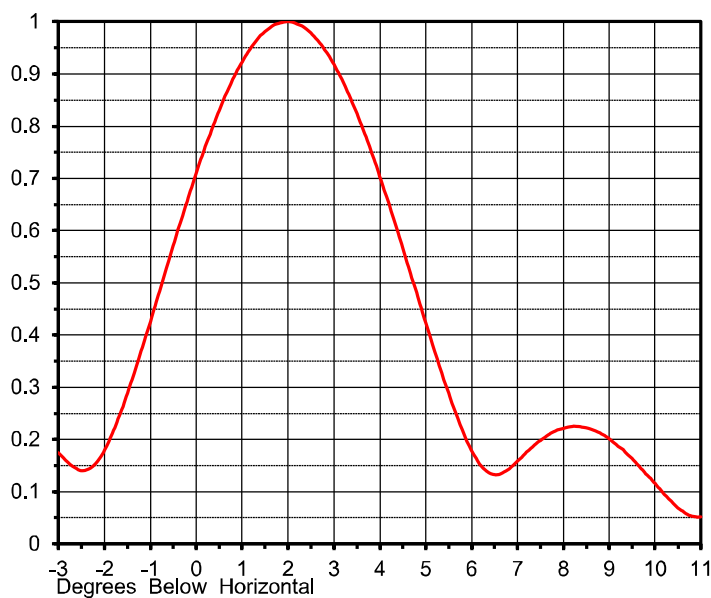
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ELEVATION PATTERN

Proposal No. **C-71676-2**
 Date **7-Jun-21**
 Call Letters **WVPT-1**
 Channel **15**
 Frequency **479 MHz**
 Antenna Type **TUM-LP-BP2-7/14M-1**

RMS Directivity at Main Lobe **14.1 (11.48 dB)**
 RMS Directivity at Horizontal **7.1 (8.51 dB)**
Calculated

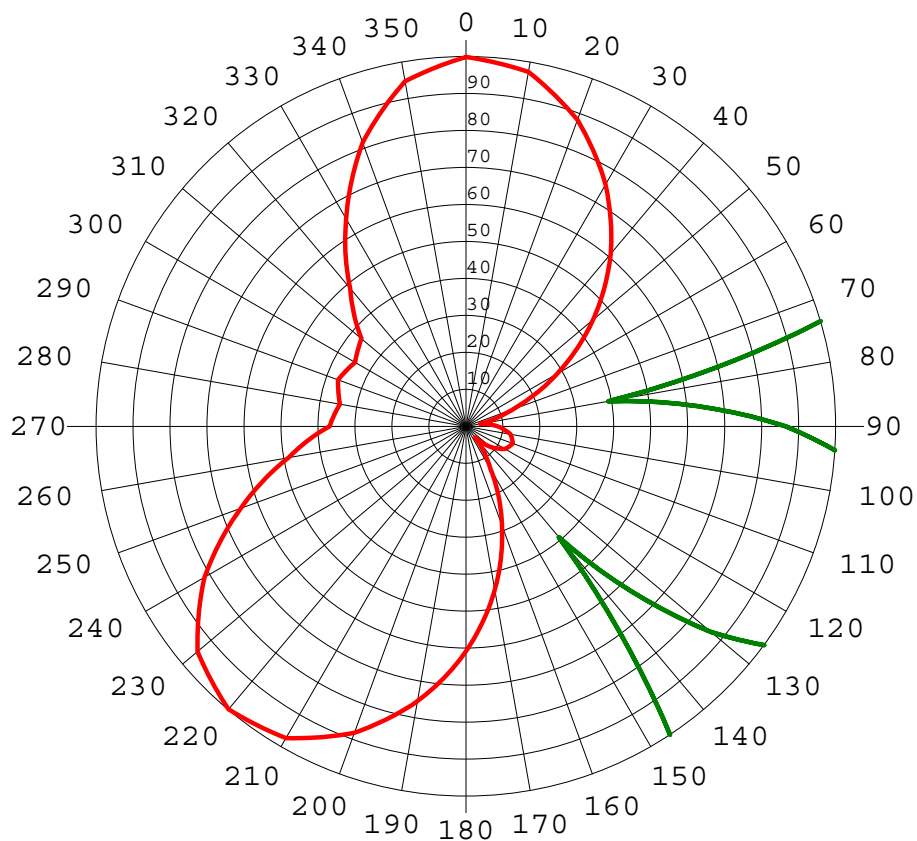
Beam Tilt **2.00 deg**
 Pattern Number **07U141200**



| Angle | Field | Angle | Field | Angle | Field | Angle | Field | Angle | Field |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| -10.0 | 0.119 | 10.0 | 0.115 | 30.0 | 0.014 | 50.0 | 0.043 | 70.0 | 0.019 |
| -9.0 | 0.158 | 11.0 | 0.052 | 31.0 | 0.015 | 51.0 | 0.043 | 71.0 | 0.016 |
| -8.0 | 0.131 | 12.0 | 0.109 | 32.0 | 0.015 | 52.0 | 0.035 | 72.0 | 0.013 |
| -7.0 | 0.062 | 13.0 | 0.136 | 33.0 | 0.000 | 53.0 | 0.022 | 73.0 | 0.010 |
| -6.0 | 0.119 | 14.0 | 0.108 | 34.0 | 0.025 | 54.0 | 0.007 | 74.0 | 0.007 |
| -5.0 | 0.216 | 15.0 | 0.043 | 35.0 | 0.055 | 55.0 | 0.009 | 75.0 | 0.005 |
| -4.0 | 0.242 | 16.0 | 0.031 | 36.0 | 0.080 | 56.0 | 0.022 | 76.0 | 0.003 |
| -3.0 | 0.174 | 17.0 | 0.079 | 37.0 | 0.092 | 57.0 | 0.030 | 77.0 | 0.003 |
| -2.0 | 0.179 | 18.0 | 0.090 | 38.0 | 0.089 | 58.0 | 0.033 | 78.0 | 0.003 |
| -1.0 | 0.426 | 19.0 | 0.063 | 39.0 | 0.071 | 59.0 | 0.032 | 79.0 | 0.004 |
| 0.0 | 0.710 | 20.0 | 0.017 | 40.0 | 0.044 | 60.0 | 0.027 | 80.0 | 0.004 |
| 1.0 | 0.923 | 21.0 | 0.033 | 41.0 | 0.026 | 61.0 | 0.019 | 81.0 | 0.003 |
| 2.0 | 1.000 | 22.0 | 0.062 | 42.0 | 0.036 | 62.0 | 0.010 | 82.0 | 0.003 |
| 3.0 | 0.918 | 23.0 | 0.065 | 43.0 | 0.050 | 63.0 | 0.003 | 83.0 | 0.002 |
| 4.0 | 0.704 | 24.0 | 0.046 | 44.0 | 0.053 | 64.0 | 0.008 | 84.0 | 0.002 |
| 5.0 | 0.424 | 25.0 | 0.019 | 45.0 | 0.046 | 65.0 | 0.014 | 85.0 | 0.001 |
| 6.0 | 0.179 | 26.0 | 0.028 | 46.0 | 0.030 | 66.0 | 0.019 | 86.0 | 0.001 |
| 7.0 | 0.158 | 27.0 | 0.043 | 47.0 | 0.016 | 67.0 | 0.021 | 87.0 | 0.001 |
| 8.0 | 0.221 | 28.0 | 0.042 | 48.0 | 0.022 | 68.0 | 0.022 | 88.0 | 0.000 |
| 9.0 | 0.201 | 29.0 | 0.029 | 49.0 | 0.036 | 69.0 | 0.021 | 89.0 | 0.000 |
| | | | | | | | | 90.0 | 0.000 |

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WVPT-2, Dielectric TUL-BP2-1/2M-1-K

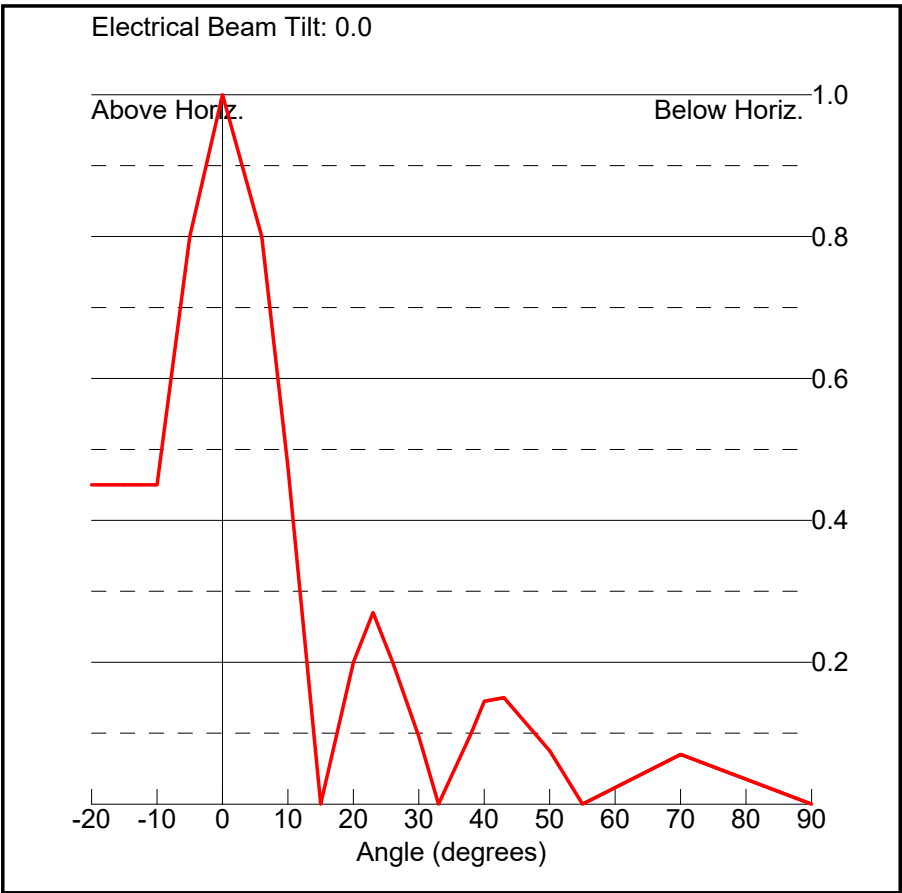


| Azi | Rel | dBk | kW | dB | Azi | Rel | dBk | kW | dB |
|-----|-------|--------|--------|--------|-----|-------|-------|--------|-------|
| 0 | 0.999 | 11.75 | 14.956 | -0.01 | 180 | 0.609 | 7.46 | 5.569 | -4.30 |
| 10 | 0.973 | 11.53 | 14.207 | -0.24 | 190 | 0.755 | 9.32 | 8.557 | -2.44 |
| 20 | 0.882 | 10.67 | 11.659 | -1.09 | 200 | 0.882 | 10.67 | 11.659 | -1.09 |
| 30 | 0.755 | 9.32 | 8.557 | -2.44 | 210 | 0.973 | 11.53 | 14.207 | -0.24 |
| 40 | 0.609 | 7.46 | 5.569 | -4.30 | 220 | 0.999 | 11.75 | 14.956 | -0.01 |
| 50 | 0.449 | 4.81 | 3.026 | -6.95 | 230 | 0.947 | 11.29 | 13.456 | -0.47 |
| 60 | 0.285 | 0.85 | 1.215 | -10.92 | 240 | 0.816 | 10.00 | 9.991 | -1.76 |
| 70 | 0.133 | -5.76 | 0.266 | -17.52 | 250 | 0.648 | 7.99 | 6.290 | -3.77 |
| 80 | 0.039 | -16.40 | 0.023 | -28.16 | 260 | 0.487 | 5.51 | 3.556 | -6.25 |
| 90 | 0.087 | -9.49 | 0.112 | -21.26 | 270 | 0.369 | 3.09 | 2.038 | -8.67 |
| 100 | 0.123 | -6.46 | 0.226 | -18.22 | 280 | 0.346 | 2.54 | 1.796 | -9.22 |
| 110 | 0.135 | -5.62 | 0.274 | -17.38 | 290 | 0.368 | 3.07 | 2.030 | -8.69 |
| 120 | 0.123 | -6.46 | 0.226 | -18.22 | 300 | 0.346 | 2.54 | 1.796 | -9.22 |
| 130 | 0.087 | -9.49 | 0.112 | -21.26 | 310 | 0.369 | 3.09 | 2.038 | -8.67 |
| 140 | 0.039 | -16.40 | 0.023 | -28.16 | 320 | 0.487 | 5.51 | 3.556 | -6.25 |
| 150 | 0.133 | -5.76 | 0.266 | -17.52 | 330 | 0.648 | 7.99 | 6.290 | -3.77 |
| 160 | 0.285 | 0.85 | 1.215 | -10.92 | 340 | 0.816 | 10.00 | 9.991 | -1.76 |
| 170 | 0.449 | 4.81 | 3.026 | -6.95 | 350 | 0.947 | 11.29 | 13.456 | -0.47 |

Rotation Angle = 0

Vertical Elevation Pattern

| Angle (deg) | Relative Field |
|-------------|----------------|
| -10.0 | 0.45 |
| -5.0 | 0.8 |
| 0.0 | 1.0 |
| 6.0 | 0.8 |
| 10.0 | 0.475 |
| 15.0 | 0.0 |
| 20.0 | 0.2 |
| 23.0 | 0.27 |
| 26.0 | 0.2 |
| 30.0 | 0.095 |
| 33.0 | 0.0 |
| 38.0 | 0.1 |
| 40.0 | 0.145 |
| 43.0 | 0.15 |
| 50.0 | 0.075 |
| 55.0 | 0.0 |
| 70.0 | 0.07 |
| 90.0 | 0.0 |



N. Lat. = 375900.0 W. Lng. = 782901.0
 HAAT and Distance to Contour,
 FCC OET,TV 3.2 - 16.1, 130 pts - USGS 03 SEC

WVPT-2 Vertical Elevation and Angle of Depression

| Azi. | AV EL | HAAT | ERP kW | dBk | Field | DAng | VFld | D-kw | %Max | D-dBk | 38.83-F9 |
|------|-------|-------|---------|--------|-------|-------|-------|---------|------|--------|----------|
| 000 | 138.0 | 357.1 | 14.9700 | 11.75 | 0.999 | 0.523 | 0.983 | 14.4522 | 98.3 | 11.75 | 74.69 |
| 010 | 130.4 | 364.7 | 14.2009 | 11.52 | 0.973 | 0.529 | 0.982 | 13.7045 | 98.2 | 11.52 | 74.99 |
| 020 | 128.9 | 366.2 | 11.6689 | 10.67 | 0.882 | 0.530 | 0.982 | 11.2602 | 98.2 | 10.67 | 73.79 |
| 030 | 136.1 | 359.0 | 8.5504 | 9.32 | 0.755 | 0.525 | 0.983 | 8.2538 | 98.3 | 9.32 | 71.21 |
| 040 | 203.4 | 291.7 | 5.5632 | 7.45 | 0.609 | 0.473 | 0.984 | 5.3891 | 98.4 | 7.45 | 64.57 |
| 050 | 262.7 | 232.4 | 3.0240 | 4.81 | 0.449 | 0.422 | 0.986 | 2.9395 | 98.6 | 4.81 | 57.98 |
| 060 | 147.2 | 347.9 | 1.2184 | 0.86 | 0.285 | 0.517 | 0.983 | 1.1768 | 98.3 | 0.86 | 59.68 |
| 070 | 124.0 | 371.1 | 0.2653 | -5.76 | 0.133 | 0.534 | 0.982 | 0.2560 | 98.2 | -5.76 | 52.45 |
| 080 | 121.0 | 374.1 | 0.0228 | -16.42 | 0.039 | 0.536 | 0.982 | 0.0220 | 98.2 | -16.42 | 38.37 |
| 090 | 116.6 | 378.5 | 0.1135 | -9.45 | 0.087 | 0.539 | 0.982 | 0.1095 | 98.2 | -9.45 | 47.96 |
| 100 | 114.7 | 380.4 | 0.2269 | -6.44 | 0.123 | 0.540 | 0.982 | 0.2188 | 98.2 | -6.44 | 51.96 |
| 110 | 105.6 | 389.5 | 0.2734 | -5.63 | 0.135 | 0.547 | 0.982 | 0.2635 | 98.2 | -5.63 | 53.35 |
| 120 | 127.6 | 367.5 | 0.2269 | -6.44 | 0.123 | 0.531 | 0.982 | 0.2190 | 98.2 | -6.44 | 51.43 |
| 130 | 139.9 | 355.2 | 0.1135 | -9.45 | 0.087 | 0.522 | 0.983 | 0.1096 | 98.3 | -9.45 | 46.97 |
| 140 | 147.9 | 347.2 | 0.0228 | -16.42 | 0.039 | 0.516 | 0.983 | 0.0220 | 98.3 | -16.42 | 37.35 |
| 150 | 149.3 | 345.8 | 0.2653 | -5.76 | 0.133 | 0.515 | 0.983 | 0.2563 | 98.3 | -5.76 | 51.27 |
| 160 | 153.2 | 341.9 | 1.2184 | 0.86 | 0.285 | 0.512 | 0.983 | 1.1771 | 98.3 | 0.86 | 59.38 |
| 170 | 150.2 | 344.9 | 3.0240 | 4.81 | 0.449 | 0.514 | 0.983 | 2.9212 | 98.3 | 4.81 | 64.35 |
| 180 | 144.5 | 350.6 | 5.5632 | 7.45 | 0.609 | 0.519 | 0.983 | 5.3725 | 98.3 | 7.45 | 68.03 |
| 190 | 149.3 | 345.8 | 8.5504 | 9.32 | 0.755 | 0.515 | 0.983 | 8.2593 | 98.3 | 9.32 | 70.26 |
| 200 | 157.1 | 338.0 | 11.6689 | 10.67 | 0.882 | 0.509 | 0.983 | 11.2760 | 98.3 | 10.67 | 71.56 |
| 210 | 173.3 | 321.8 | 14.2009 | 11.52 | 0.973 | 0.497 | 0.983 | 13.7344 | 98.3 | 11.52 | 71.48 |
| 220 | 175.9 | 319.2 | 14.9700 | 11.75 | 0.999 | 0.495 | 0.984 | 14.4802 | 98.4 | 11.75 | 71.59 |
| 230 | 164.8 | 330.3 | 13.4521 | 11.29 | 0.947 | 0.503 | 0.983 | 13.0044 | 98.3 | 11.29 | 71.82 |
| 240 | 168.0 | 327.1 | 9.9878 | 9.99 | 0.816 | 0.501 | 0.983 | 9.6570 | 98.3 | 9.99 | 69.85 |
| 250 | 202.1 | 293.0 | 6.2986 | 7.99 | 0.648 | 0.474 | 0.984 | 6.1010 | 98.4 | 7.99 | 65.26 |
| 260 | 212.7 | 282.4 | 3.5575 | 5.51 | 0.487 | 0.465 | 0.984 | 3.4480 | 98.4 | 5.51 | 61.79 |
| 270 | 220.8 | 274.3 | 2.0424 | 3.10 | 0.369 | 0.459 | 0.985 | 1.9804 | 98.5 | 3.10 | 58.44 |
| 280 | 238.1 | 257.0 | 1.7957 | 2.54 | 0.346 | 0.444 | 0.985 | 1.7430 | 98.5 | 2.54 | 56.75 |
| 290 | 218.9 | 276.2 | 2.0314 | 3.08 | 0.368 | 0.460 | 0.985 | 1.9695 | 98.5 | 3.08 | 58.52 |
| 300 | 199.3 | 295.8 | 1.7957 | 2.54 | 0.346 | 0.476 | 0.984 | 1.7392 | 98.4 | 2.54 | 58.99 |
| 310 | 178.6 | 316.5 | 2.0424 | 3.10 | 0.369 | 0.493 | 0.984 | 1.9759 | 98.4 | 3.10 | 60.82 |
| 320 | 166.5 | 328.6 | 3.5575 | 5.51 | 0.487 | 0.502 | 0.983 | 3.4394 | 98.3 | 5.51 | 64.36 |
| 330 | 165.6 | 329.5 | 6.2986 | 7.99 | 0.648 | 0.503 | 0.983 | 6.0892 | 98.3 | 7.99 | 67.43 |
| 340 | 159.7 | 335.4 | 9.9878 | 9.99 | 0.816 | 0.507 | 0.983 | 9.6529 | 98.3 | 9.99 | 70.44 |
| 350 | 144.5 | 350.6 | 13.4521 | 11.29 | 0.947 | 0.519 | 0.983 | 12.9910 | 98.3 | 11.29 | 73.45 |

Ave El= 162.12 M HAAT= 332.98 M AMSL= 495.1 M



Antenna Model: **TUL-BP2-2/4M-1-K**

Proposal Number: **C-71706-1**
Date: **21-Jun-21**
Customer: **WVPT**
Location: **Charlottesville, VA**

Electrical Specifications

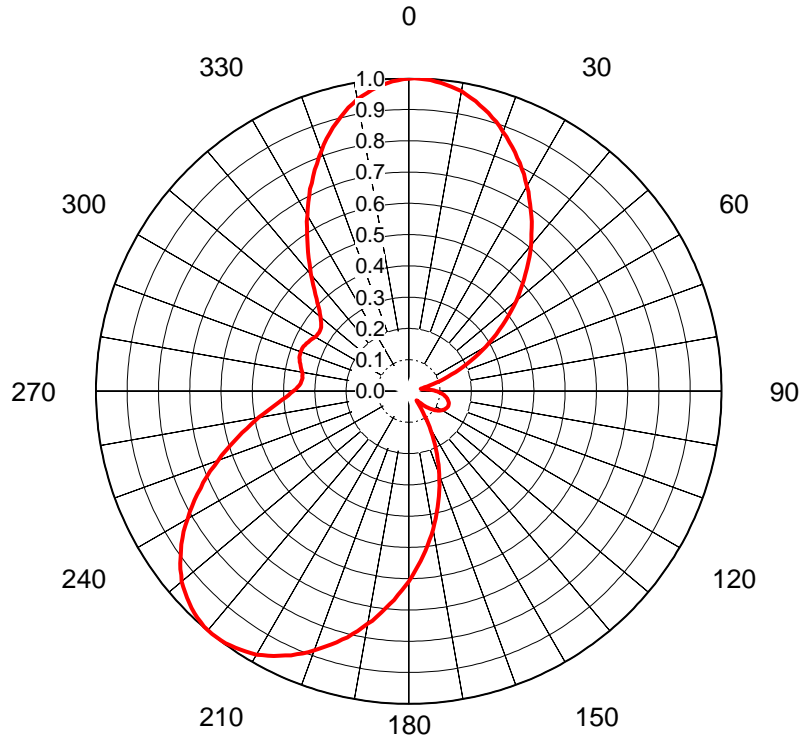
Polarization: **Elliptical**
Azimuth Pattern: **Directional**
Antenna Input: **1-5/8"** **50 Ohm** **EIA/DCA**
VSWR: **Channel** **1.15 : 1**
Bandwidth: **MHz**
Rated Input Power: **2 kW** **(3.01 dBk)** **Maximum Average Power**

Mechanical Specifications

Mounting: **Side Mounted**
Environmental Protection: **Panel Cover**
Height: **6.8 ft (2.1m)**
Weight: **80 lb (0t)**
Effective Projected Area: **15.8 ft² (1.5m²)** **TIA-222-G** Basic Wind Speed: **90 m/h (144.8 km/h)**

Channel Specifications

| Call | CH | Freq | Hpol ERP | Vpol ERP | TPO | Peak Main Lobe Hpol Gain | Peak Main Lobe Vpol Gain | Peak at Horizontal Hpol Gain | Peak at Horizontal Vpol Gain |
|--------|----|---------|------------------------|-----------------------|-----------------------|--------------------------------|--------------------------------|------------------------------------|------------------------------------|
| WVPT-2 | 15 | 479 MHz | 15.0 kW (11.76 dBk) | 6.43 kW (8.08 dBk) | 2.53 kW (4.03 dBk) | 8.21 (9.15dB) | 3.52 (5.47dB) | 8.21 (9.15dB) | 3.52 (5.47dB) |



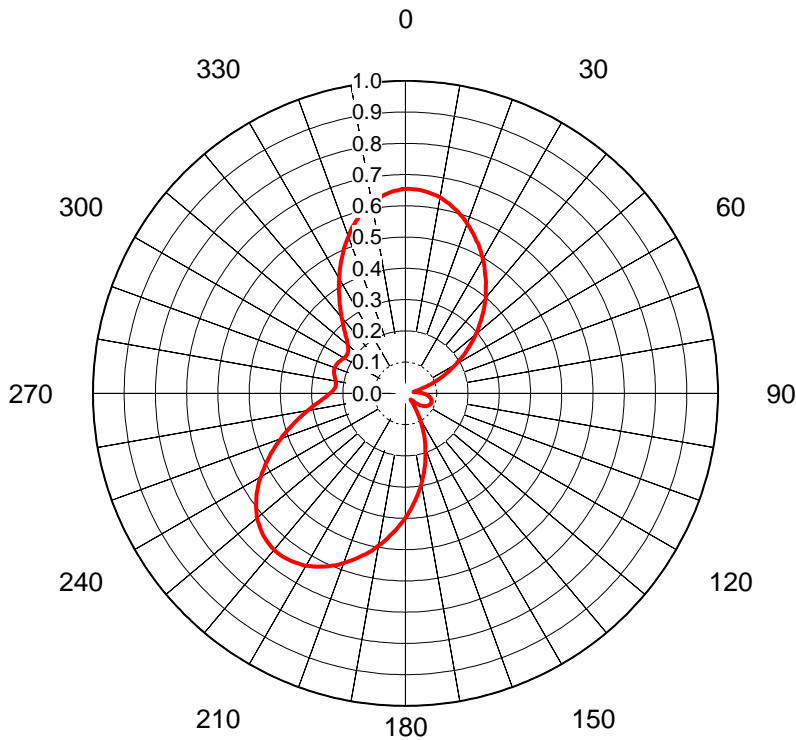
AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-71706-1**
Date **21-Jun-21**
Call Letters **WVPT-2**
Channel **15**
Frequency **479 MHz**
Antenna Type **TUL-BP2-2/4M-1-K**
Gain **2.75 (4.4dB)**
Calculated

| Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 0.998 | 36 | 0.670 | 72 | 0.106 | 108 | 0.134 | 144 | 0.060 | 180 | 0.609 | 216 | 0.996 | 252 | 0.614 | 288 | 0.367 |
| 1 | 1.000 | 37 | 0.653 | 73 | 0.094 | 109 | 0.135 | 145 | 0.070 | 181 | 0.624 | 217 | 0.998 | 253 | 0.596 | 289 | 0.367 |
| 2 | 0.999 | 38 | 0.638 | 74 | 0.082 | 110 | 0.135 | 146 | 0.082 | 182 | 0.638 | 218 | 0.999 | 254 | 0.579 | 290 | 0.368 |
| 3 | 0.998 | 39 | 0.624 | 75 | 0.070 | 111 | 0.135 | 147 | 0.094 | 183 | 0.653 | 219 | 1.000 | 255 | 0.563 | 291 | 0.367 |
| 4 | 0.996 | 40 | 0.609 | 76 | 0.060 | 112 | 0.134 | 148 | 0.106 | 184 | 0.670 | 220 | 0.998 | 256 | 0.549 | 292 | 0.367 |
| 5 | 0.993 | 41 | 0.592 | 77 | 0.052 | 113 | 0.134 | 149 | 0.119 | 185 | 0.683 | 221 | 0.998 | 257 | 0.531 | 293 | 0.365 |
| 6 | 0.990 | 42 | 0.576 | 78 | 0.045 | 114 | 0.133 | 150 | 0.133 | 186 | 0.697 | 222 | 0.994 | 258 | 0.515 | 294 | 0.363 |
| 7 | 0.987 | 43 | 0.561 | 79 | 0.041 | 115 | 0.132 | 151 | 0.147 | 187 | 0.712 | 223 | 0.991 | 259 | 0.501 | 295 | 0.361 |
| 8 | 0.982 | 44 | 0.545 | 80 | 0.039 | 116 | 0.130 | 152 | 0.162 | 188 | 0.728 | 224 | 0.987 | 260 | 0.487 | 296 | 0.357 |
| 9 | 0.978 | 45 | 0.528 | 81 | 0.040 | 117 | 0.128 | 153 | 0.177 | 189 | 0.744 | 225 | 0.981 | 261 | 0.471 | 297 | 0.355 |
| 10 | 0.973 | 46 | 0.513 | 82 | 0.044 | 118 | 0.127 | 154 | 0.191 | 190 | 0.755 | 226 | 0.976 | 262 | 0.456 | 298 | 0.352 |
| 11 | 0.965 | 47 | 0.496 | 83 | 0.048 | 119 | 0.125 | 155 | 0.207 | 191 | 0.770 | 227 | 0.969 | 263 | 0.443 | 299 | 0.349 |
| 12 | 0.958 | 48 | 0.480 | 84 | 0.053 | 120 | 0.123 | 156 | 0.221 | 192 | 0.785 | 228 | 0.962 | 264 | 0.429 | 300 | 0.346 |
| 13 | 0.951 | 49 | 0.465 | 85 | 0.059 | 121 | 0.120 | 157 | 0.238 | 193 | 0.797 | 229 | 0.955 | 265 | 0.416 | 301 | 0.343 |
| 14 | 0.942 | 50 | 0.449 | 86 | 0.064 | 122 | 0.118 | 158 | 0.254 | 194 | 0.812 | 230 | 0.947 | 266 | 0.406 | 302 | 0.344 |
| 15 | 0.933 | 51 | 0.432 | 87 | 0.070 | 123 | 0.115 | 159 | 0.269 | 195 | 0.822 | 231 | 0.936 | 267 | 0.394 | 303 | 0.342 |
| 16 | 0.925 | 52 | 0.416 | 88 | 0.076 | 124 | 0.111 | 160 | 0.285 | 196 | 0.835 | 232 | 0.926 | 268 | 0.384 | 304 | 0.343 |
| 17 | 0.914 | 53 | 0.399 | 89 | 0.081 | 125 | 0.108 | 161 | 0.300 | 197 | 0.848 | 233 | 0.915 | 269 | 0.377 | 305 | 0.345 |
| 18 | 0.905 | 54 | 0.382 | 90 | 0.086 | 126 | 0.104 | 162 | 0.318 | 198 | 0.858 | 234 | 0.902 | 270 | 0.369 | 306 | 0.346 |
| 19 | 0.894 | 55 | 0.367 | 91 | 0.091 | 127 | 0.100 | 163 | 0.333 | 199 | 0.871 | 235 | 0.889 | 271 | 0.361 | 307 | 0.350 |
| 20 | 0.882 | 56 | 0.350 | 92 | 0.096 | 128 | 0.096 | 164 | 0.350 | 200 | 0.882 | 236 | 0.877 | 272 | 0.356 | 308 | 0.356 |
| 21 | 0.871 | 57 | 0.333 | 93 | 0.100 | 129 | 0.091 | 165 | 0.367 | 201 | 0.894 | 237 | 0.862 | 273 | 0.350 | 309 | 0.361 |
| 22 | 0.858 | 58 | 0.318 | 94 | 0.104 | 130 | 0.086 | 166 | 0.382 | 202 | 0.905 | 238 | 0.849 | 274 | 0.346 | 310 | 0.369 |
| 23 | 0.848 | 59 | 0.300 | 95 | 0.108 | 131 | 0.081 | 167 | 0.399 | 203 | 0.914 | 239 | 0.833 | 275 | 0.345 | 311 | 0.377 |
| 24 | 0.835 | 60 | 0.285 | 96 | 0.111 | 132 | 0.076 | 168 | 0.416 | 204 | 0.925 | 240 | 0.816 | 276 | 0.343 | 312 | 0.384 |
| 25 | 0.822 | 61 | 0.269 | 97 | 0.115 | 133 | 0.070 | 169 | 0.432 | 205 | 0.933 | 241 | 0.801 | 277 | 0.342 | 313 | 0.394 |
| 26 | 0.812 | 62 | 0.254 | 98 | 0.118 | 134 | 0.064 | 170 | 0.449 | 206 | 0.942 | 242 | 0.784 | 278 | 0.344 | 314 | 0.406 |
| 27 | 0.797 | 63 | 0.238 | 99 | 0.120 | 135 | 0.059 | 171 | 0.465 | 207 | 0.951 | 243 | 0.769 | 279 | 0.343 | 315 | 0.416 |
| 28 | 0.785 | 64 | 0.221 | 100 | 0.123 | 136 | 0.053 | 172 | 0.480 | 208 | 0.958 | 244 | 0.752 | 280 | 0.346 | 316 | 0.429 |
| 29 | 0.770 | 65 | 0.207 | 101 | 0.125 | 137 | 0.048 | 173 | 0.496 | 209 | 0.965 | 245 | 0.734 | 281 | 0.349 | 317 | 0.443 |
| 30 | 0.755 | 66 | 0.191 | 102 | 0.127 | 138 | 0.044 | 174 | 0.513 | 210 | 0.973 | 246 | 0.719 | 282 | 0.352 | 318 | 0.456 |
| 31 | 0.744 | 67 | 0.177 | 103 | 0.128 | 139 | 0.040 | 175 | 0.528 | 211 | 0.978 | 247 | 0.701 | 283 | 0.355 | 319 | 0.471 |
| 32 | 0.728 | 68 | 0.162 | 104 | 0.130 | 140 | 0.039 | 176 | 0.545 | 212 | 0.982 | 248 | 0.684 | 284 | 0.357 | 320 | 0.487 |
| 33 | 0.712 | 69 | 0.147 | 105 | 0.132 | 141 | 0.041 | 177 | 0.561 | 213 | 0.987 | 249 | 0.665 | 285 | 0.361 | 321 | 0.501 |
| 34 | 0.697 | 70 | 0.133 | 106 | 0.133 | 142 | 0.045 | 178 | 0.576 | 214 | 0.990 | 250 | 0.648 | 286 | 0.363 | 322 | 0.515 |
| 35 | 0.683 | 71 | 0.119 | 107 | 0.134 | 143 | 0.052 | 179 | 0.592 | 215 | 0.993 | 251 | 0.633 | 287 | 0.365 | 323 | 0.531 |

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AZIMUTH PATTERN Vertical Polarization

In Free Space

Proposal No. **C-71706-1**
Date **21-Jun-21**
Call Letters **WVPT-2**
Channel **15**
Frequency **479 MHz**
Antenna Type **TUL-BP2-2/4M-1-K**
Gain **2.75 (4.4dB)**
Calculated

| Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 0.654 | 36 | 0.438 | 72 | 0.070 | 108 | 0.088 | 144 | 0.039 | 180 | 0.399 | 216 | 0.652 | 252 | 0.402 | 288 | 0.240 | 324 | 0.359 |
| 1 | 0.655 | 37 | 0.427 | 73 | 0.061 | 109 | 0.088 | 145 | 0.046 | 181 | 0.408 | 217 | 0.653 | 253 | 0.391 | 289 | 0.240 | 325 | 0.369 |
| 2 | 0.654 | 38 | 0.417 | 74 | 0.053 | 110 | 0.089 | 146 | 0.053 | 182 | 0.417 | 218 | 0.654 | 254 | 0.379 | 290 | 0.241 | 326 | 0.379 |
| 3 | 0.653 | 39 | 0.408 | 75 | 0.046 | 111 | 0.088 | 147 | 0.061 | 183 | 0.427 | 219 | 0.655 | 255 | 0.369 | 291 | 0.240 | 327 | 0.391 |
| 4 | 0.652 | 40 | 0.399 | 76 | 0.039 | 112 | 0.088 | 148 | 0.070 | 184 | 0.438 | 220 | 0.654 | 256 | 0.359 | 292 | 0.240 | 328 | 0.402 |
| 5 | 0.650 | 41 | 0.388 | 77 | 0.034 | 113 | 0.088 | 149 | 0.078 | 185 | 0.447 | 221 | 0.653 | 257 | 0.348 | 293 | 0.239 | 329 | 0.414 |
| 6 | 0.648 | 42 | 0.377 | 78 | 0.030 | 114 | 0.087 | 150 | 0.087 | 186 | 0.456 | 222 | 0.651 | 258 | 0.337 | 294 | 0.238 | 330 | 0.424 |
| 7 | 0.646 | 43 | 0.367 | 79 | 0.027 | 115 | 0.086 | 151 | 0.096 | 187 | 0.466 | 223 | 0.649 | 259 | 0.328 | 295 | 0.236 | 331 | 0.436 |
| 8 | 0.643 | 44 | 0.357 | 80 | 0.026 | 116 | 0.085 | 152 | 0.106 | 188 | 0.476 | 224 | 0.646 | 260 | 0.319 | 296 | 0.234 | 332 | 0.448 |
| 9 | 0.640 | 45 | 0.346 | 81 | 0.026 | 117 | 0.084 | 153 | 0.116 | 189 | 0.487 | 225 | 0.642 | 261 | 0.308 | 297 | 0.232 | 333 | 0.459 |
| 10 | 0.637 | 46 | 0.336 | 82 | 0.029 | 118 | 0.083 | 154 | 0.125 | 190 | 0.494 | 226 | 0.639 | 262 | 0.299 | 298 | 0.231 | 334 | 0.471 |
| 11 | 0.632 | 47 | 0.325 | 83 | 0.031 | 119 | 0.082 | 155 | 0.136 | 191 | 0.504 | 227 | 0.635 | 263 | 0.290 | 299 | 0.228 | 335 | 0.480 |
| 12 | 0.627 | 48 | 0.314 | 84 | 0.035 | 120 | 0.080 | 156 | 0.145 | 192 | 0.514 | 228 | 0.630 | 264 | 0.281 | 300 | 0.227 | 336 | 0.492 |
| 13 | 0.623 | 49 | 0.305 | 85 | 0.038 | 121 | 0.079 | 157 | 0.156 | 193 | 0.522 | 229 | 0.625 | 265 | 0.273 | 301 | 0.225 | 337 | 0.503 |
| 14 | 0.617 | 50 | 0.294 | 86 | 0.042 | 122 | 0.077 | 158 | 0.166 | 194 | 0.531 | 230 | 0.620 | 266 | 0.266 | 302 | 0.225 | 338 | 0.513 |
| 15 | 0.611 | 51 | 0.283 | 87 | 0.046 | 123 | 0.075 | 159 | 0.176 | 195 | 0.538 | 231 | 0.612 | 267 | 0.258 | 303 | 0.224 | 339 | 0.524 |
| 16 | 0.605 | 52 | 0.272 | 88 | 0.050 | 124 | 0.073 | 160 | 0.186 | 196 | 0.547 | 232 | 0.606 | 268 | 0.252 | 304 | 0.224 | 340 | 0.534 |
| 17 | 0.598 | 53 | 0.261 | 89 | 0.053 | 125 | 0.071 | 161 | 0.196 | 197 | 0.555 | 233 | 0.599 | 269 | 0.247 | 305 | 0.226 | 341 | 0.545 |
| 18 | 0.593 | 54 | 0.250 | 90 | 0.057 | 126 | 0.068 | 162 | 0.208 | 198 | 0.562 | 234 | 0.590 | 270 | 0.241 | 306 | 0.227 | 342 | 0.556 |
| 19 | 0.585 | 55 | 0.240 | 91 | 0.060 | 127 | 0.065 | 163 | 0.218 | 199 | 0.570 | 235 | 0.582 | 271 | 0.236 | 307 | 0.229 | 343 | 0.564 |
| 20 | 0.577 | 56 | 0.229 | 92 | 0.063 | 128 | 0.063 | 164 | 0.229 | 200 | 0.577 | 236 | 0.574 | 272 | 0.233 | 308 | 0.233 | 344 | 0.574 |
| 21 | 0.570 | 57 | 0.218 | 93 | 0.065 | 129 | 0.060 | 165 | 0.240 | 201 | 0.585 | 237 | 0.564 | 273 | 0.229 | 309 | 0.236 | 345 | 0.582 |
| 22 | 0.562 | 58 | 0.208 | 94 | 0.068 | 130 | 0.057 | 166 | 0.250 | 202 | 0.593 | 238 | 0.556 | 274 | 0.227 | 310 | 0.241 | 346 | 0.590 |
| 23 | 0.555 | 59 | 0.196 | 95 | 0.071 | 131 | 0.053 | 167 | 0.261 | 203 | 0.598 | 239 | 0.545 | 275 | 0.226 | 311 | 0.247 | 347 | 0.599 |
| 24 | 0.547 | 60 | 0.186 | 96 | 0.073 | 132 | 0.050 | 168 | 0.272 | 204 | 0.605 | 240 | 0.534 | 276 | 0.224 | 312 | 0.252 | 348 | 0.606 |
| 25 | 0.538 | 61 | 0.176 | 97 | 0.075 | 133 | 0.046 | 169 | 0.283 | 205 | 0.611 | 241 | 0.524 | 277 | 0.224 | 313 | 0.258 | 349 | 0.612 |
| 26 | 0.531 | 62 | 0.166 | 98 | 0.077 | 134 | 0.042 | 170 | 0.294 | 206 | 0.617 | 242 | 0.513 | 278 | 0.225 | 314 | 0.266 | 350 | 0.620 |
| 27 | 0.522 | 63 | 0.156 | 99 | 0.079 | 135 | 0.038 | 171 | 0.305 | 207 | 0.623 | 243 | 0.503 | 279 | 0.225 | 315 | 0.273 | 351 | 0.625 |
| 28 | 0.514 | 64 | 0.145 | 100 | 0.080 | 136 | 0.035 | 172 | 0.314 | 208 | 0.627 | 244 | 0.492 | 280 | 0.227 | 316 | 0.281 | 352 | 0.630 |
| 29 | 0.504 | 65 | 0.136 | 101 | 0.082 | 137 | 0.031 | 173 | 0.325 | 209 | 0.632 | 245 | 0.480 | 281 | 0.228 | 317 | 0.290 | 353 | 0.635 |
| 30 | 0.494 | 66 | 0.125 | 102 | 0.083 | 138 | 0.029 | 174 | 0.336 | 210 | 0.637 | 246 | 0.471 | 282 | 0.231 | 318 | 0.299 | 354 | 0.639 |
| 31 | 0.487 | 67 | 0.116 | 103 | 0.084 | 139 | 0.026 | 175 | 0.346 | 211 | 0.640 | 247 | 0.459 | 283 | 0.232 | 319 | 0.308 | 355 | 0.642 |
| 32 | 0.476 | 68 | 0.106 | 104 | 0.085 | 140 | 0.026 | 176 | 0.357 | 212 | 0.643 | 248 | 0.448 | 284 | 0.234 | 320 | 0.319 | 356 | 0.646 |
| 33 | 0.466 | 69 | 0.096 | 105 | 0.086 | 141 | 0.027 | 177 | 0.367 | 213 | 0.646 | 249 | 0.436 | 285 | 0.236 | 321 | 0.328 | 357 | 0.649 |
| 34 | 0.456 | 70 | 0.087 | 106 | 0.087 | 142 | 0.030 | 178 | 0.377 | 214 | 0.648 | 250 | 0.424 | 286 | 0.238 | 322 | 0.337 | 358 | 0.651 |
| 35 | 0.447 | 71 | 0.078 | 107 | 0.088 | 143 | 0.034 | 179 | 0.388 | 215 | 0.650 | 251 | 0.414 | 287 | 0.239 | 323 | 0.348 | 359 | 0.653 |

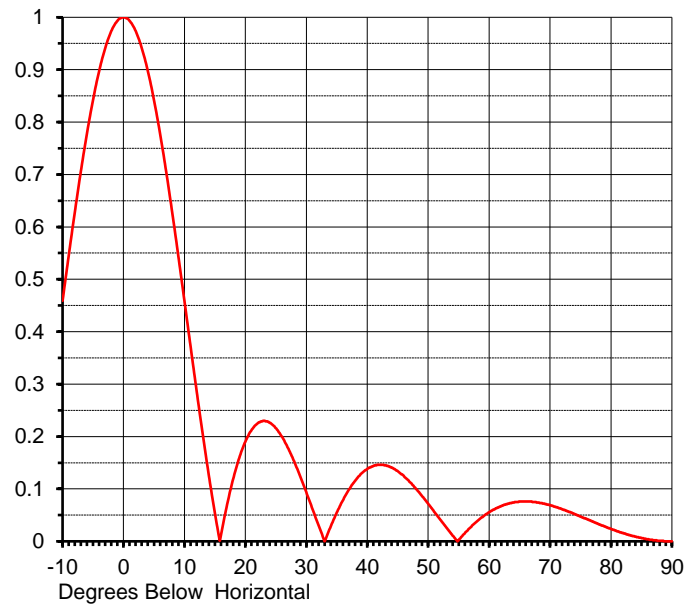
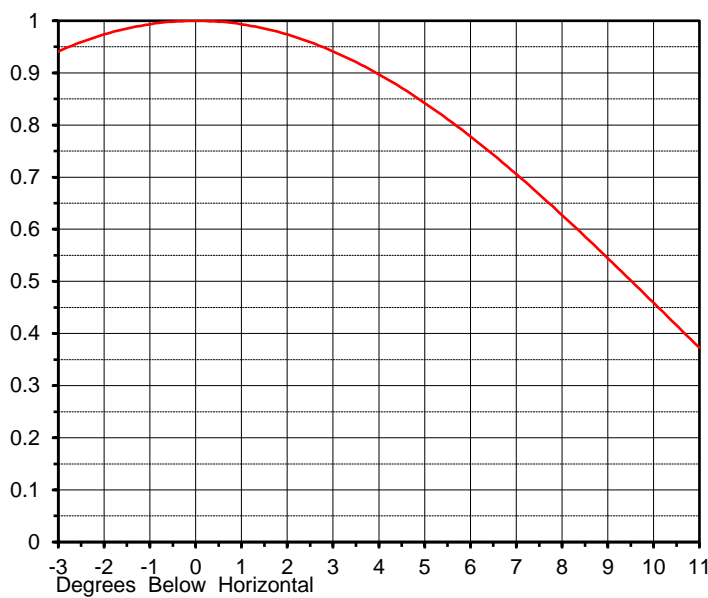
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ELEVATION PATTERN

Proposal No. **C-71706-1**
 Date **21-Jun-21**
 Call Letters **WVPT-2**
 Channel **15**
 Frequency **479 MHz**
 Antenna Type **TUL-BP2-2/4M-1-K**

RMS Directivity at Main Lobe **4.3 (6.29 dB)**
 RMS Directivity at Horizontal **4.3 (6.33 dB)**
Calculated

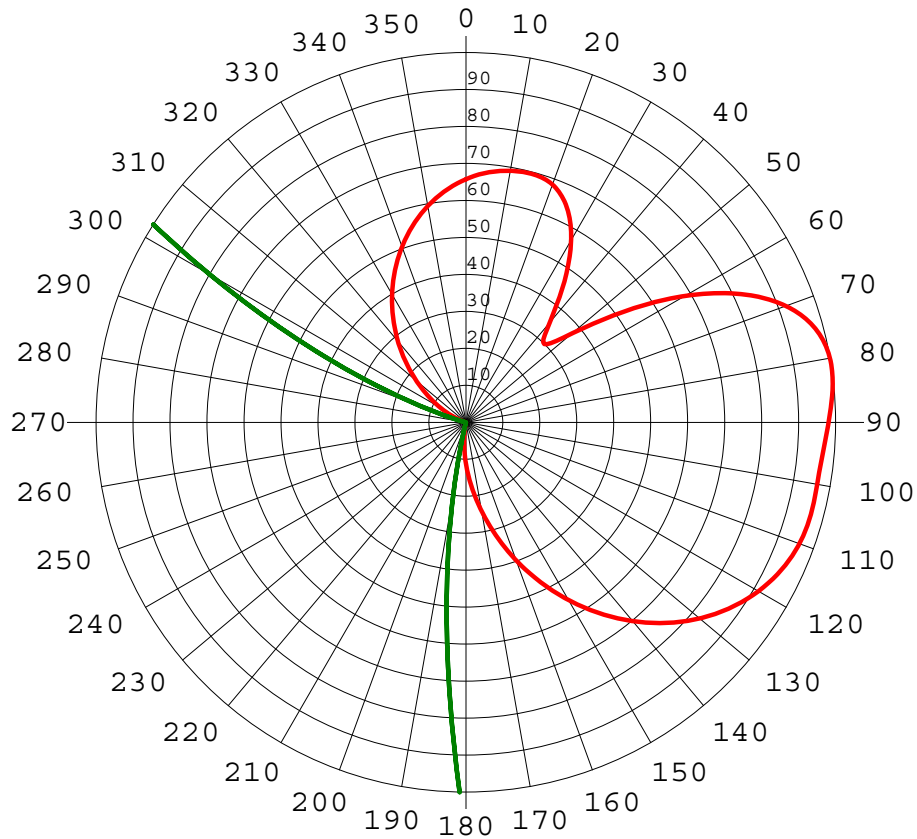
Beam Tilt **0.00 deg**
 Pattern Number **02U043000**



| Angle | Field | Angle | Field | Angle | Field | Angle | Field | Angle | Field |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| -10.0 | 0.459 | 10.0 | 0.459 | 30.0 | 0.094 | 50.0 | 0.072 | 70.0 | 0.069 |
| -9.0 | 0.544 | 11.0 | 0.373 | 31.0 | 0.062 | 51.0 | 0.056 | 71.0 | 0.065 |
| -8.0 | 0.627 | 12.0 | 0.287 | 32.0 | 0.031 | 52.0 | 0.041 | 72.0 | 0.061 |
| -7.0 | 0.706 | 13.0 | 0.205 | 33.0 | 0.000 | 53.0 | 0.026 | 73.0 | 0.057 |
| -6.0 | 0.778 | 14.0 | 0.126 | 34.0 | 0.028 | 54.0 | 0.011 | 74.0 | 0.052 |
| -5.0 | 0.842 | 15.0 | 0.054 | 35.0 | 0.055 | 55.0 | 0.002 | 75.0 | 0.047 |
| -4.0 | 0.897 | 16.0 | 0.012 | 36.0 | 0.078 | 56.0 | 0.015 | 76.0 | 0.043 |
| -3.0 | 0.941 | 17.0 | 0.070 | 37.0 | 0.099 | 57.0 | 0.027 | 77.0 | 0.038 |
| -2.0 | 0.974 | 18.0 | 0.119 | 38.0 | 0.115 | 58.0 | 0.038 | 78.0 | 0.033 |
| -1.0 | 0.993 | 19.0 | 0.159 | 39.0 | 0.129 | 59.0 | 0.047 | 79.0 | 0.028 |
| 0.0 | 1.000 | 20.0 | 0.190 | 40.0 | 0.138 | 60.0 | 0.055 | 80.0 | 0.024 |
| 1.0 | 0.993 | 21.0 | 0.212 | 41.0 | 0.144 | 61.0 | 0.062 | 81.0 | 0.019 |
| 2.0 | 0.974 | 22.0 | 0.225 | 42.0 | 0.146 | 62.0 | 0.067 | 82.0 | 0.016 |
| 3.0 | 0.941 | 23.0 | 0.230 | 43.0 | 0.145 | 63.0 | 0.071 | 83.0 | 0.012 |
| 4.0 | 0.897 | 24.0 | 0.226 | 44.0 | 0.141 | 64.0 | 0.074 | 84.0 | 0.009 |
| 5.0 | 0.842 | 25.0 | 0.216 | 45.0 | 0.134 | 65.0 | 0.076 | 85.0 | 0.006 |
| 6.0 | 0.778 | 26.0 | 0.200 | 46.0 | 0.125 | 66.0 | 0.076 | 86.0 | 0.004 |
| 7.0 | 0.706 | 27.0 | 0.178 | 47.0 | 0.113 | 67.0 | 0.076 | 87.0 | 0.002 |
| 8.0 | 0.627 | 28.0 | 0.153 | 48.0 | 0.100 | 68.0 | 0.074 | 88.0 | 0.001 |
| 9.0 | 0.544 | 29.0 | 0.124 | 49.0 | 0.086 | 69.0 | 0.072 | 89.0 | 0.000 |
| | | | | | | | | 90.0 | 0.000 |

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WVPT-3 Dielectric TUL-C2SP-15 COS 66_33

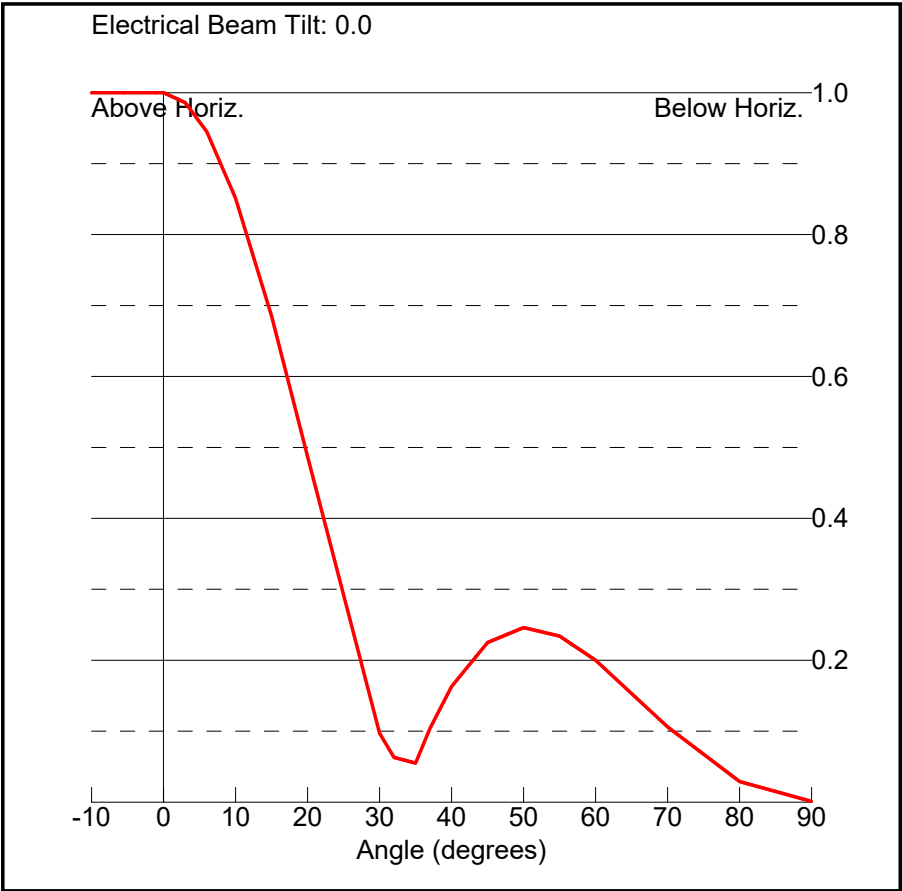


| Azi | Rel | dBk | kW | dB | Azi | Rel | dBk | kW | dB |
|-----|-------|--------|-------|--------|-----|-------|--------|-------|--------|
| 0 | 0.657 | -9.66 | 0.108 | -3.64 | 180 | 0.111 | -25.11 | 0.003 | -19.09 |
| 10 | 0.691 | -9.23 | 0.119 | -3.21 | 190 | 0.019 | -40.24 | 0.000 | -34.22 |
| 20 | 0.684 | -9.32 | 0.117 | -3.30 | 200 | 0.000 | -INF | 0.000 | -INF |
| 30 | 0.569 | -10.92 | 0.081 | -4.90 | 210 | 0.000 | -INF | 0.000 | -INF |
| 40 | 0.352 | -15.08 | 0.031 | -9.06 | 220 | 0.000 | -INF | 0.000 | -INF |
| 50 | 0.373 | -14.59 | 0.035 | -8.57 | 230 | 0.000 | -INF | 0.000 | -INF |
| 60 | 0.683 | -9.33 | 0.117 | -3.31 | 240 | 0.000 | -INF | 0.000 | -INF |
| 70 | 0.920 | -6.74 | 0.212 | -0.72 | 250 | 0.000 | -INF | 0.000 | -INF |
| 80 | 0.999 | -6.03 | 0.250 | -0.01 | 260 | 0.000 | -INF | 0.000 | -INF |
| 90 | 0.981 | -6.19 | 0.240 | -0.17 | 270 | 0.000 | -INF | 0.000 | -INF |
| 100 | 0.964 | -6.33 | 0.233 | -0.31 | 280 | 0.000 | -INF | 0.000 | -INF |
| 110 | 0.959 | -6.38 | 0.230 | -0.36 | 290 | 0.014 | -43.09 | 0.000 | -37.07 |
| 120 | 0.913 | -6.81 | 0.208 | -0.79 | 300 | 0.080 | -27.96 | 0.002 | -21.94 |
| 130 | 0.825 | -7.69 | 0.170 | -1.67 | 310 | 0.175 | -21.15 | 0.008 | -15.13 |
| 140 | 0.702 | -9.10 | 0.123 | -3.08 | 320 | 0.286 | -16.91 | 0.020 | -10.89 |
| 150 | 0.554 | -11.14 | 0.077 | -5.12 | 330 | 0.399 | -14.00 | 0.040 | -7.98 |
| 160 | 0.397 | -14.05 | 0.039 | -8.03 | 340 | 0.505 | -11.95 | 0.064 | -5.93 |
| 170 | 0.243 | -18.30 | 0.015 | -12.28 | 350 | 0.594 | -10.55 | 0.088 | -4.53 |

Rotation Angle = 0

WVPT-3 Vertical Elevation Pattern - TUL-C2SP-15 COS 66_33.AZ

| Angle (deg) | Relative Field |
|-------------|----------------|
| 0.0 | 1.0 |
| 3.0 | 0.986 |
| 6.0 | 0.945 |
| 10.0 | 0.851 |
| 15.0 | 0.685 |
| 20.0 | 0.487 |
| 30.0 | 0.097 |
| 32.0 | 0.063 |
| 35.0 | 0.055 |
| 37.0 | 0.104 |
| 40.0 | 0.163 |
| 45.0 | 0.225 |
| 50.0 | 0.246 |
| 55.0 | 0.234 |
| 60.0 | 0.2 |
| 70.0 | 0.106 |
| 80.0 | 0.029 |
| 90.0 | 0.001 |



N. Lat. = 383603.9 W. Lng. = 783756.8
 HAAT and Distance to Contour,
 FCC OET,TV 3.2 - 16.1, 130 pts - USGS 03 SEC

WVPT-3 Ch 15, Azimuth and Vertical Elevation and Depression Angle

| Azi. | AV EL | HAAT | ERP kW | dBk | Field | DAng | VFld | D-kW | %Max | D-dBk | 38.83-F9 |
|------|-------|-------|--------|--------|-------|-------|-------|--------|------|--------|----------|
| 000 | 312.3 | 649.7 | 0.1079 | -9.67 | 0.657 | 0.706 | 0.976 | 0.1029 | 97.6 | -9.67 | 54.61 |
| 010 | 422.1 | 539.9 | 0.1194 | -9.23 | 0.691 | 0.644 | 0.979 | 0.1143 | 97.9 | -9.23 | 53.23 |
| 020 | 618.3 | 343.7 | 0.1170 | -9.32 | 0.684 | 0.514 | 0.983 | 0.1130 | 98.3 | -9.32 | 46.59 |
| 030 | 577.6 | 384.4 | 0.0809 | -10.92 | 0.569 | 0.543 | 0.982 | 0.0780 | 98.2 | -10.92 | 46.21 |
| 040 | 419.2 | 542.8 | 0.0310 | -15.09 | 0.352 | 0.645 | 0.978 | 0.0297 | 97.8 | -15.09 | 45.11 |
| 050 | 282.6 | 679.4 | 0.0348 | -14.59 | 0.373 | 0.722 | 0.976 | 0.0331 | 97.6 | -14.59 | 47.84 |
| 060 | 278.2 | 683.8 | 0.1166 | -9.33 | 0.683 | 0.724 | 0.976 | 0.1111 | 97.6 | -9.33 | 55.75 |
| 070 | 275.3 | 686.7 | 0.2116 | -6.74 | 0.920 | 0.726 | 0.976 | 0.2015 | 97.6 | -6.74 | 59.77 |
| 080 | 277.0 | 685.0 | 0.2495 | -6.03 | 0.999 | 0.725 | 0.976 | 0.2376 | 97.6 | -6.03 | 60.84 |
| 090 | 295.9 | 666.1 | 0.2406 | -6.19 | 0.981 | 0.715 | 0.976 | 0.2293 | 97.6 | -6.19 | 60.20 |
| 100 | 298.4 | 663.6 | 0.2323 | -6.34 | 0.964 | 0.714 | 0.976 | 0.2214 | 97.6 | -6.34 | 59.92 |
| 110 | 332.2 | 629.8 | 0.2299 | -6.38 | 0.959 | 0.695 | 0.977 | 0.2194 | 97.7 | -6.38 | 59.14 |
| 120 | 385.3 | 576.7 | 0.2084 | -6.81 | 0.913 | 0.665 | 0.978 | 0.1993 | 97.8 | -6.81 | 57.41 |
| 130 | 437.1 | 524.9 | 0.1702 | -7.69 | 0.825 | 0.635 | 0.979 | 0.1630 | 97.9 | -7.69 | 54.97 |
| 140 | 436.0 | 526.0 | 0.1232 | -9.09 | 0.702 | 0.635 | 0.979 | 0.1180 | 97.9 | -9.09 | 53.06 |
| 150 | 410.1 | 551.9 | 0.0767 | -11.15 | 0.554 | 0.651 | 0.978 | 0.0734 | 97.8 | -11.15 | 50.83 |
| 160 | 334.1 | 627.9 | 0.0394 | -14.04 | 0.397 | 0.694 | 0.977 | 0.0376 | 97.7 | -14.04 | 47.84 |
| 170 | 322.0 | 640.0 | 0.0148 | -18.31 | 0.243 | 0.701 | 0.977 | 0.0141 | 97.7 | -18.31 | 42.01 |
| 180 | 308.0 | 654.0 | 0.0031 | -25.11 | 0.111 | 0.708 | 0.976 | 0.0029 | 97.6 | -25.11 | 32.73 |
| 190 | 414.6 | 547.4 | 0.0001 | -40.45 | 0.019 | 0.648 | 0.978 | 0.0001 | 97.8 | -40.45 | 13.31 |
| 200 | 665.0 | 297.0 | 0.0000 | -86.02 | 0.000 | 0.477 | 0.984 | 0.0000 | 98.4 | -86.02 | 0.00 |
| 210 | 627.7 | 334.3 | 0.0000 | -86.02 | 0.000 | 0.506 | 0.983 | 0.0000 | 98.3 | -86.02 | 0.00 |
| 220 | 460.5 | 501.5 | 0.0000 | -86.02 | 0.000 | 0.620 | 0.979 | 0.0000 | 97.9 | -86.02 | 0.00 |
| 230 | 399.0 | 563.0 | 0.0000 | -86.02 | 0.000 | 0.657 | 0.978 | 0.0000 | 97.8 | -86.02 | 0.00 |
| 240 | 359.6 | 602.4 | 0.0000 | -86.02 | 0.000 | 0.680 | 0.977 | 0.0000 | 97.7 | -86.02 | 0.00 |
| 250 | 358.8 | 603.2 | 0.0000 | -86.02 | 0.000 | 0.680 | 0.977 | 0.0000 | 97.7 | -86.02 | 0.00 |
| 260 | 358.3 | 603.7 | 0.0000 | -86.02 | 0.000 | 0.681 | 0.977 | 0.0000 | 97.7 | -86.02 | 0.00 |
| 270 | 346.3 | 615.7 | 0.0000 | -86.02 | 0.000 | 0.687 | 0.977 | 0.0000 | 97.7 | -86.02 | 0.00 |
| 280 | 337.5 | 624.5 | 0.0000 | -86.02 | 0.000 | 0.692 | 0.977 | 0.0000 | 97.7 | -86.02 | 0.00 |
| 290 | 324.4 | 637.6 | 0.0000 | -43.10 | 0.014 | 0.699 | 0.977 | 0.0000 | 97.7 | -43.10 | 11.48 |
| 300 | 332.6 | 629.4 | 0.0016 | -27.96 | 0.080 | 0.695 | 0.977 | 0.0015 | 97.7 | -27.96 | 28.42 |
| 310 | 342.2 | 619.8 | 0.0077 | -21.16 | 0.175 | 0.690 | 0.977 | 0.0073 | 97.7 | -21.16 | 37.75 |
| 320 | 335.2 | 626.8 | 0.0204 | -16.89 | 0.286 | 0.694 | 0.977 | 0.0195 | 97.7 | -16.89 | 43.79 |
| 330 | 317.8 | 644.2 | 0.0398 | -14.00 | 0.399 | 0.703 | 0.977 | 0.0380 | 97.7 | -14.00 | 48.14 |
| 340 | 309.8 | 652.2 | 0.0638 | -11.95 | 0.505 | 0.707 | 0.976 | 0.0608 | 97.6 | -11.95 | 51.25 |
| 350 | 302.5 | 659.5 | 0.0882 | -10.54 | 0.594 | 0.711 | 0.976 | 0.0841 | 97.6 | -10.54 | 53.47 |

Ave El= 378.16 M HAAT= 583.84 M AMSL= 962 M



Antenna Model: **TUA-C2SP-1/2M-1-K**

Proposal Number: **C-71708-1**
Date: **21-Jun-21**
Customer: **WVPT**
Location: **Big Mountain, VA**

Electrical Specifications

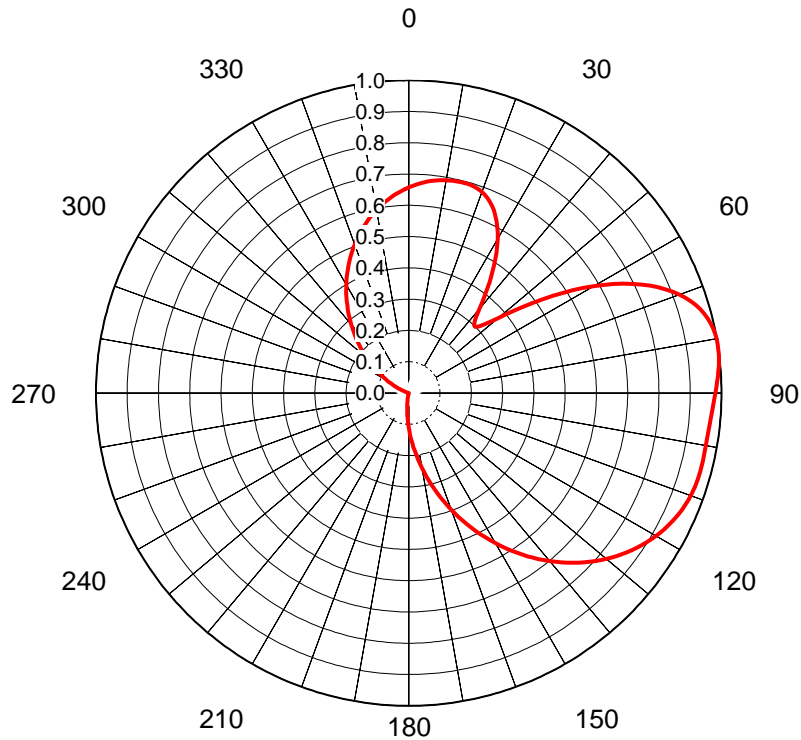
Polarization: **Horizontal**
Azimuth Pattern: **Directional**
Antenna Input: **1-5/8"** **50 Ohm** **EIA/DCA**
VSWR: **Channel** **1.15 : 1**
Bandwidth: **MHz**
Rated Input Power: **2 kW** **(3.01 dBk)** **Maximum Average Power**

Mechanical Specifications

Mounting: **Side Mounted**
Environmental Protection: **Panel Cover**
Height: **3.2 ft (1m)**
Weight: **75 lb (0t)**
Effective Projected Area: **5.2 ft² (0.5m²)** **TIA-222-G** Basic Wind Speed: **90 m/h (144.8 km/h)**

Channel Specifications

| Call | CH | Freq | Hpol ERP | TPO | Peak Main Lobe Hpol Gain | Peak at Horizontal Hpol Gain |
|--------|----|---------|-------------------------|--------------------------|--------------------------------|------------------------------------|
| WVPT-4 | 15 | 479 MHz | 0.250 kW -(6.02 dBk) | 0.052 kW -(12.82 dBk) | 7.33 (8.65dB) | 7.33 (8.65dB) |



AZIMUTH PATTERN Horizontal Polarization

In Free Space

Proposal No. **C-71708-1**
Date **21-Jun-21**
Call Letters **WVPT-4 - WVPT-3**
Channel **15**
Frequency **479 MHz**
Antenna Type **TUA-C2SP-1/2M-1-K**
Gain **3.42 (5.34dB)**
Calculated

Unequal power and phasing

| Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value | Deg | Value |
|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 0 | 0.657 | 36 | 0.440 | 72 | 0.948 | 108 | 0.963 | 144 | 0.645 | 180 | 0.111 | 216 | 0.000 | 252 | 0.000 | 288 | 0.006 |
| 1 | 0.662 | 37 | 0.417 | 73 | 0.960 | 109 | 0.962 | 145 | 0.630 | 181 | 0.100 | 217 | 0.000 | 253 | 0.000 | 289 | 0.010 |
| 2 | 0.667 | 38 | 0.395 | 74 | 0.970 | 110 | 0.959 | 146 | 0.615 | 182 | 0.089 | 218 | 0.000 | 254 | 0.000 | 290 | 0.014 |
| 3 | 0.671 | 39 | 0.373 | 75 | 0.978 | 111 | 0.957 | 147 | 0.600 | 183 | 0.078 | 219 | 0.000 | 255 | 0.000 | 291 | 0.019 |
| 4 | 0.675 | 40 | 0.352 | 76 | 0.985 | 112 | 0.954 | 148 | 0.585 | 184 | 0.068 | 220 | 0.000 | 256 | 0.000 | 292 | 0.024 |
| 5 | 0.678 | 41 | 0.334 | 77 | 0.991 | 113 | 0.950 | 149 | 0.570 | 185 | 0.059 | 221 | 0.000 | 257 | 0.000 | 293 | 0.030 |
| 6 | 0.681 | 42 | 0.319 | 78 | 0.995 | 114 | 0.946 | 150 | 0.554 | 186 | 0.050 | 222 | 0.000 | 258 | 0.000 | 294 | 0.036 |
| 7 | 0.684 | 43 | 0.308 | 79 | 0.998 | 115 | 0.942 | 151 | 0.539 | 187 | 0.041 | 223 | 0.000 | 259 | 0.000 | 295 | 0.042 |
| 8 | 0.687 | 44 | 0.301 | 80 | 0.999 | 116 | 0.937 | 152 | 0.523 | 188 | 0.033 | 224 | 0.000 | 260 | 0.000 | 296 | 0.049 |
| 9 | 0.689 | 45 | 0.300 | 81 | 1.000 | 117 | 0.932 | 153 | 0.508 | 189 | 0.026 | 225 | 0.000 | 261 | 0.000 | 297 | 0.056 |
| 10 | 0.691 | 46 | 0.304 | 82 | 1.000 | 118 | 0.926 | 154 | 0.492 | 190 | 0.019 | 226 | 0.000 | 262 | 0.000 | 298 | 0.064 |
| 11 | 0.692 | 47 | 0.314 | 83 | 0.999 | 119 | 0.920 | 155 | 0.476 | 191 | 0.014 | 227 | 0.000 | 263 | 0.000 | 299 | 0.072 |
| 12 | 0.693 | 48 | 0.330 | 84 | 0.997 | 120 | 0.913 | 156 | 0.460 | 192 | 0.009 | 228 | 0.000 | 264 | 0.000 | 300 | 0.080 |
| 13 | 0.694 | 49 | 0.349 | 85 | 0.995 | 121 | 0.906 | 157 | 0.444 | 193 | 0.004 | 229 | 0.000 | 265 | 0.000 | 301 | 0.088 |
| 14 | 0.695 | 50 | 0.373 | 86 | 0.993 | 122 | 0.899 | 158 | 0.428 | 194 | 0.001 | 230 | 0.000 | 266 | 0.000 | 302 | 0.097 |
| 15 | 0.695 | 51 | 0.399 | 87 | 0.990 | 123 | 0.891 | 159 | 0.412 | 195 | 0.000 | 231 | 0.000 | 267 | 0.000 | 303 | 0.106 |
| 16 | 0.695 | 52 | 0.428 | 88 | 0.987 | 124 | 0.883 | 160 | 0.397 | 196 | 0.000 | 232 | 0.000 | 268 | 0.000 | 304 | 0.115 |
| 17 | 0.693 | 53 | 0.459 | 89 | 0.984 | 125 | 0.874 | 161 | 0.381 | 197 | 0.000 | 233 | 0.000 | 269 | 0.000 | 305 | 0.125 |
| 18 | 0.691 | 54 | 0.491 | 90 | 0.981 | 126 | 0.865 | 162 | 0.365 | 198 | 0.000 | 234 | 0.000 | 270 | 0.000 | 306 | 0.135 |
| 19 | 0.688 | 55 | 0.523 | 91 | 0.978 | 127 | 0.855 | 163 | 0.349 | 199 | 0.000 | 235 | 0.000 | 271 | 0.000 | 307 | 0.144 |
| 20 | 0.684 | 56 | 0.556 | 92 | 0.975 | 128 | 0.845 | 164 | 0.334 | 200 | 0.000 | 236 | 0.000 | 272 | 0.000 | 308 | 0.155 |
| 21 | 0.679 | 57 | 0.588 | 93 | 0.972 | 129 | 0.835 | 165 | 0.318 | 201 | 0.000 | 237 | 0.000 | 273 | 0.000 | 309 | 0.165 |
| 22 | 0.672 | 58 | 0.620 | 94 | 0.970 | 130 | 0.825 | 166 | 0.303 | 202 | 0.000 | 238 | 0.000 | 274 | 0.000 | 310 | 0.175 |
| 23 | 0.664 | 59 | 0.652 | 95 | 0.968 | 131 | 0.814 | 167 | 0.288 | 203 | 0.000 | 239 | 0.000 | 275 | 0.000 | 311 | 0.186 |
| 24 | 0.655 | 60 | 0.683 | 96 | 0.967 | 132 | 0.803 | 168 | 0.273 | 204 | 0.000 | 240 | 0.000 | 276 | 0.000 | 312 | 0.196 |
| 25 | 0.644 | 61 | 0.713 | 97 | 0.966 | 133 | 0.791 | 169 | 0.258 | 205 | 0.000 | 241 | 0.000 | 277 | 0.000 | 313 | 0.207 |
| 26 | 0.632 | 62 | 0.742 | 98 | 0.965 | 134 | 0.779 | 170 | 0.243 | 206 | 0.000 | 242 | 0.000 | 278 | 0.000 | 314 | 0.218 |
| 27 | 0.618 | 63 | 0.770 | 99 | 0.965 | 135 | 0.767 | 171 | 0.229 | 207 | 0.000 | 243 | 0.000 | 279 | 0.000 | 315 | 0.229 |
| 28 | 0.603 | 64 | 0.796 | 100 | 0.964 | 136 | 0.754 | 172 | 0.215 | 208 | 0.000 | 244 | 0.000 | 280 | 0.000 | 316 | 0.240 |
| 29 | 0.586 | 65 | 0.821 | 101 | 0.965 | 137 | 0.742 | 173 | 0.201 | 209 | 0.000 | 245 | 0.000 | 281 | 0.000 | 317 | 0.252 |
| 30 | 0.569 | 66 | 0.844 | 102 | 0.965 | 138 | 0.728 | 174 | 0.187 | 210 | 0.000 | 246 | 0.000 | 282 | 0.000 | 318 | 0.263 |
| 31 | 0.550 | 67 | 0.866 | 103 | 0.965 | 139 | 0.715 | 175 | 0.173 | 211 | 0.000 | 247 | 0.000 | 283 | 0.000 | 319 | 0.274 |
| 32 | 0.529 | 68 | 0.885 | 104 | 0.965 | 140 | 0.702 | 176 | 0.160 | 212 | 0.000 | 248 | 0.000 | 284 | 0.000 | 320 | 0.286 |
| 33 | 0.508 | 69 | 0.904 | 105 | 0.965 | 141 | 0.688 | 177 | 0.147 | 213 | 0.000 | 249 | 0.000 | 285 | 0.000 | 321 | 0.297 |
| 34 | 0.486 | 70 | 0.920 | 106 | 0.965 | 142 | 0.674 | 178 | 0.135 | 214 | 0.000 | 250 | 0.000 | 286 | 0.001 | 322 | 0.308 |
| 35 | 0.464 | 71 | 0.935 | 107 | 0.964 | 143 | 0.659 | 179 | 0.123 | 215 | 0.000 | 251 | 0.000 | 287 | 0.003 | 323 | 0.320 |

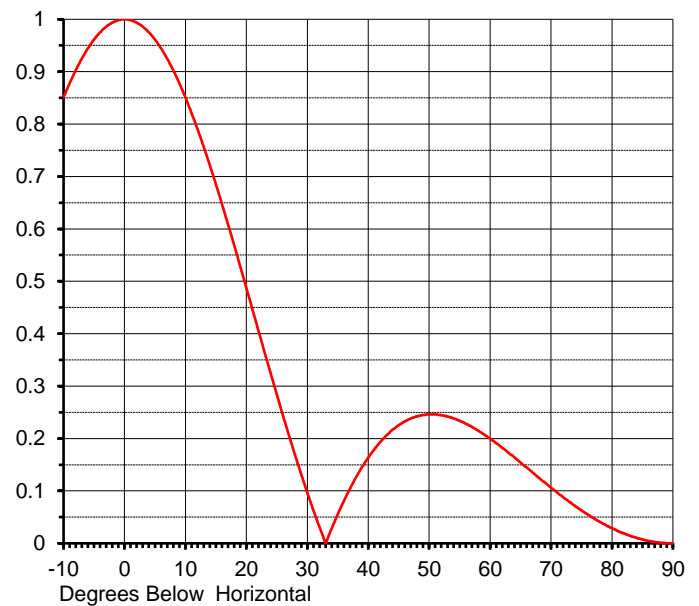
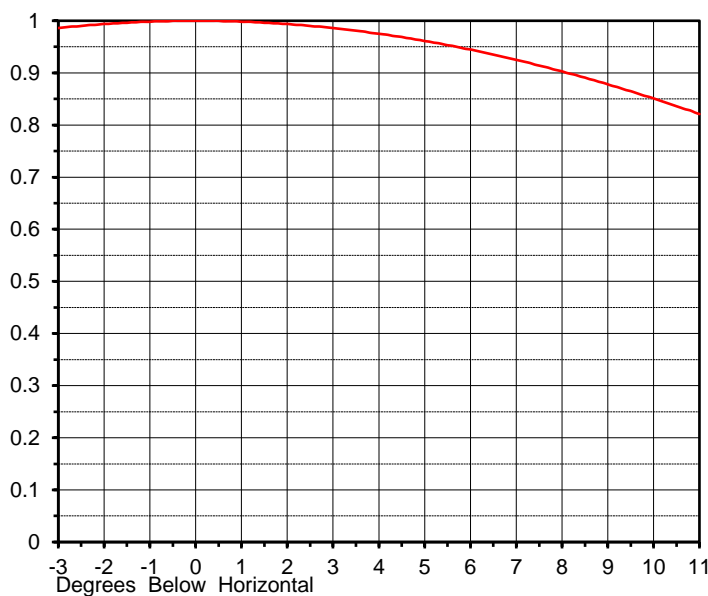
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ELEVATION PATTERN

Proposal No. **C-71708-1**
 Date **21-Jun-21**
 Call Letters **WVPT-4- WVPT-3**
 Channel **15**
 Frequency **479 MHz**
 Antenna Type **TUA-C2SP-1/2M-1-K**

RMS Directivity at Main Lobe **2.1 (3.30 dB)**
 RMS Directivity at Horizontal **2.1 (3.22 dB)**
Calculated

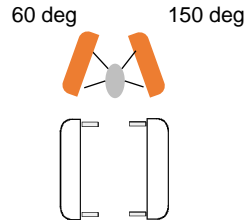
Beam Tilt **0.00 deg**
 Pattern Number **01U022000**



| Angle | Field | Angle | Field | Angle | Field | Angle | Field | Angle | Field |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| -10.0 | 0.851 | 10.0 | 0.851 | 30.0 | 0.097 | 50.0 | 0.246 | 70.0 | 0.106 |
| -9.0 | 0.878 | 11.0 | 0.821 | 31.0 | 0.063 | 51.0 | 0.246 | 71.0 | 0.097 |
| -8.0 | 0.903 | 12.0 | 0.790 | 32.0 | 0.031 | 52.0 | 0.244 | 72.0 | 0.088 |
| -7.0 | 0.925 | 13.0 | 0.757 | 33.0 | 0.000 | 53.0 | 0.242 | 73.0 | 0.079 |
| -6.0 | 0.945 | 14.0 | 0.722 | 34.0 | 0.028 | 54.0 | 0.238 | 74.0 | 0.071 |
| -5.0 | 0.961 | 15.0 | 0.685 | 35.0 | 0.055 | 55.0 | 0.234 | 75.0 | 0.063 |
| -4.0 | 0.975 | 16.0 | 0.647 | 36.0 | 0.081 | 56.0 | 0.228 | 76.0 | 0.055 |
| -3.0 | 0.986 | 17.0 | 0.608 | 37.0 | 0.104 | 57.0 | 0.222 | 77.0 | 0.048 |
| -2.0 | 0.994 | 18.0 | 0.569 | 38.0 | 0.126 | 58.0 | 0.215 | 78.0 | 0.041 |
| -1.0 | 0.998 | 19.0 | 0.528 | 39.0 | 0.146 | 59.0 | 0.208 | 79.0 | 0.035 |
| 0.0 | 1.000 | 20.0 | 0.487 | 40.0 | 0.163 | 60.0 | 0.200 | 80.0 | 0.029 |
| 1.0 | 0.998 | 21.0 | 0.446 | 41.0 | 0.179 | 61.0 | 0.191 | 81.0 | 0.023 |
| 2.0 | 0.994 | 22.0 | 0.405 | 42.0 | 0.194 | 62.0 | 0.182 | 82.0 | 0.019 |
| 3.0 | 0.986 | 23.0 | 0.364 | 43.0 | 0.206 | 63.0 | 0.173 | 83.0 | 0.014 |
| 4.0 | 0.975 | 24.0 | 0.324 | 44.0 | 0.217 | 64.0 | 0.164 | 84.0 | 0.011 |
| 5.0 | 0.961 | 25.0 | 0.284 | 45.0 | 0.225 | 65.0 | 0.154 | 85.0 | 0.007 |
| 6.0 | 0.945 | 26.0 | 0.244 | 46.0 | 0.233 | 66.0 | 0.145 | 86.0 | 0.005 |
| 7.0 | 0.925 | 27.0 | 0.206 | 47.0 | 0.238 | 67.0 | 0.135 | 87.0 | 0.003 |
| 8.0 | 0.903 | 28.0 | 0.168 | 48.0 | 0.242 | 68.0 | 0.125 | 88.0 | 0.001 |
| 9.0 | 0.878 | 29.0 | 0.132 | 49.0 | 0.245 | 69.0 | 0.116 | 89.0 | 0.000 |
| | | | | | | | | 90.0 | 0.000 |

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MECHANICAL SPECIFICATIONS



Proposal No. **C-71708-1**
 Date **21-Jun-21**
 Call Letters **~~WVPT-4~~ WVPT-3**
 Channel **15**
 Frequency **479 MHz**
 Antenna Type **TUA-C2SP-1/2M-1-K**

Preliminary Specifications

Side Mounted

With ice TIA-222-G

Basic Wind Speed 90 m/h (144.8 km/h)

Structure Class II

Exposure Category C

Topography Category 1

Design Ice 0.75 in $t_{iz} = 1.98$ in

Wind Speed w/Ice 40 m/h (64.4 km/h)

Mechanical Specifications

| | | without ice | with ice |
|-------------------------------|--------------------|--|---|
| Height | H2 | 3.2 ft (1m) | |
| Height of Center of Radiation | H3 | 1.6 ft (0.5m) | |
| Effective Projected Area | (EPA) _A | 5.2 ft ² (0.5m ²) | 10.8 ft ² (1m ²) |
| Weight | W | 75 lb (0t) | 175 lb (0.1t) |

Antenna designed in accordance with AISC specifications for design of structural steel as prescribed by TIA-222-G

Prepared by: CAB

Date: 15-Apr-21

ME:

EE:

Rev. No.1 by: CAB

Date: 21-Jun-21

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Summary

| | |
|--------------|--------------------------|
| Proposal No. | C-71708-1 |
| Date | 21-Jun-21 |
| Call Letters | WVPT-4 –WVPT–3 |
| Channel | 15 |
| Frequency | 479 MHz |
| Antenna Type | TUA-C2SP-1/2M-1-K |

Antenna

| | | Hpol |
|------------|-----------------|----------------------|
| ERP: | 0.250 kW | -(6.02 dBk) |
| Peak Gain* | 7.33 | (8.65 dB) |

| | | |
|----------------------------|-----------------|-----------------------|
| Antenna Input Power | 0.034 kW | -(14.67 dBk) |
|----------------------------|-----------------|-----------------------|

Transmission Line

| | | | |
|------------|----------------------|---------------|--------------------|
| Type: | Flexline Foam | Attenuation: | (1.85 dB) |
| Size: | 7/8" | Efficiency: | 65.3% |
| Impedance: | 50 Ohm | | |
| Length: | 220 ft | 67.1 m | |

Transmitter Output

| | |
|-----------------|-----------------------|
| 0.052 kW | -(12.82 dBk) |
|-----------------|-----------------------|

Transmitter filter losses not included

* Directivity and Gain are with respect to half wave dipole. The gain includes feed system losses

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Environmental Exhibit – Existing towers to be used.

System Shenandoah Valley Educational TV Corporation

WVPT-TV DTS, Channel 15, 195 kW H, 58.5 kW V DA

Elliott Knob Site (WVPT-1):

This is an isolated, Forestry controlled, antenna site located on a high elevation hilltop, overlooking a wide expanse of terrain with a rapid fall-off of elevation in the direction of the proposed major lobe. The site is at the top of a long winding 4-5-mile steep road up the mountain. There's gate with a lock at the start of this road with warning signs posted. Consequently, the site is off limits to vehicles, however, hikers are allowed past the gate and can be seen walking along the road. The area cannot be fenced off under instructions from the Forest Service which prohibit fencing at the site. Therefore, the majority of this site can be considered uncontrolled; however, the tower itself is fenced as is the portions of the compound next to it, on either side, and it is well posted with RF warning signs.

Based on the manufacturer's provided vertical elevation field tables and the formulas expressed in the OET Bulletin, No. 65, August 1997 as amended, "Evaluating Compliance with FCC guidelines for Human Exposure to Radio Frequency Electronic Magnetic Fields", published by the Federal Communications Commission's Office of Science and Engineering, the proposed 195 kW facility, operating on 479 MHz, with its antenna radiation center 10 meters above ground level, is predicted to produce a maximum power density at 11 meters from the tower base of 446.22 uW/cm^2 . As is shown in the graph in attachment A, this point calculates to be 138.9 percent of the maximum, and it is therefore above the uncontrolled maximum.¹ The area within this point is not on the road and is over a strip of tall vegetation along the steep hillside, so this effectively isolates area from the public. The applicant will clearly post this area to warn workers.

¹ The manufacturer's vertical elevation field was used for this calculation using the total horizontal and vertical ERP without regard to the antenna pattern. This calculation also does not consider any fall off of the terrain to the south of the transmitter that would make the effective antenna height taller.

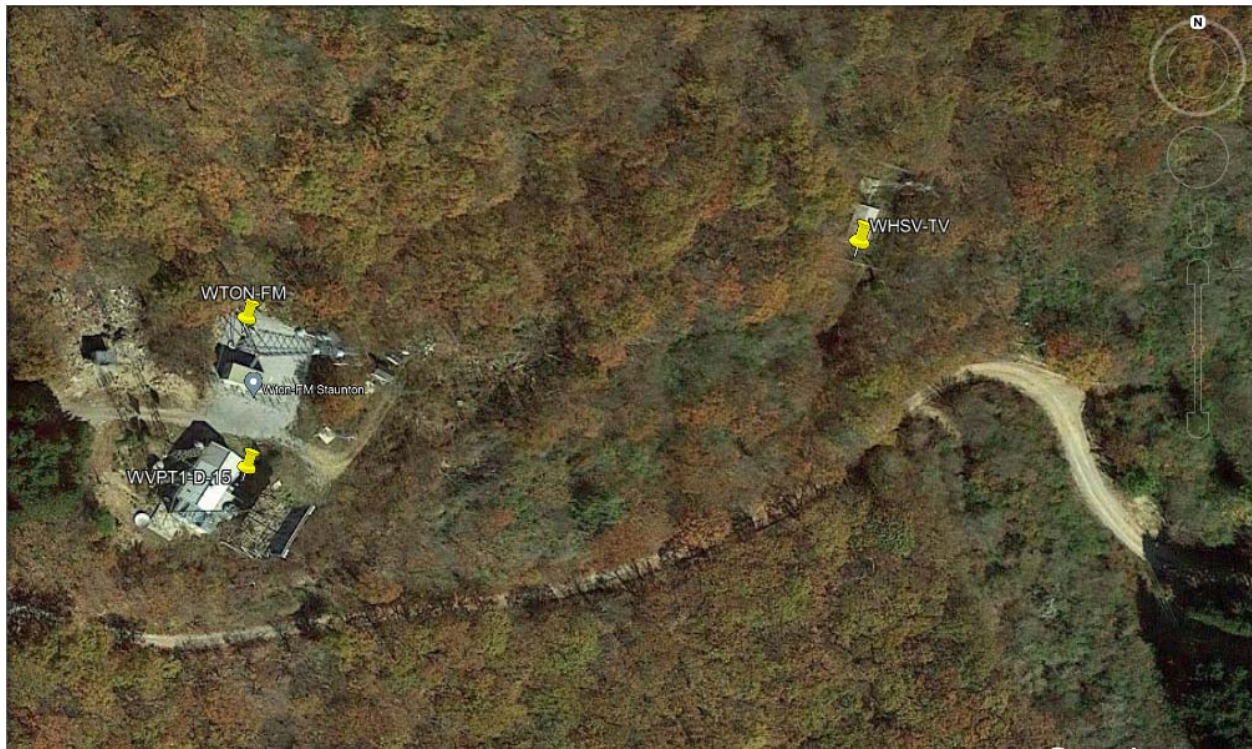
There may be hikers on the public road to the south, below the antenna (see below). The elevation at road level, and around this point #1, is nine meters lower than the elevation at the tower base. The effective antenna height on the road is 17 meters. An OET 65 calculation was made at this point, located 30 meters from the tower, showing the power density to be 3.45 uW/cm^2 which is 1.1 percent of the maximum. Another set of calculations was made for a point on the road, located 36 meters from the WVPT antenna at 150 degrees true north (See pt. #2). The depression angle to this point is 31.4 degrees. The difference in elevation is 14 meters and the effective antenna height becomes 22 meters. This amounts to a power density of 57.01 uW/cm^2 , which is 17.7 percent of the maximum. The applicant will post appropriate warning signs along the pertinent road segments.



WHSV-TV operates a DTS transmitter generating 271 kW ERP, on channel 20, from a location 140 m to the east. The calculations show the power density of WHSV-TV at point #1 and #2 to be nearly zero².

² See the map on the next page. The vertical elevation field, as listed in the FCC database, was used for these calculations.

Satellite map showing the relationship between the proposed facility and WHSV-TV and WTON-FM.



WTON-FM operates with an ERP of 0.34 kW. Based on its coordinates, the transmitter is 25 meters to the north of the WVPT-TV antenna. Its EPA type #1 antenna center is 12 meters above ground level. The difference in elevation makes the effective antenna height at Point #1 and #2 to be 28 meters, thus producing 4.48 uW/cm^2 at head height, which is 2.2% of the maximum. Since this is an existing facility, at an antenna farm, that produces no more than 5% of the maximum, no further analysis was deemed necessary.

The licensed facility of W22EX-D is located some 159 meters to the east of the points on the road that we have been observing. This station uses an ERP of 15 kW, as observed at a head height of 13 meters above ground. Using a vertical elevation field of 0.2 for the high gain antenna, this produces a virtually zero power density at the points along the road. Since this is an existing facility that produces less than 5% of the maximum, no further action was deemed necessary. (Sec. 1.1307 (b) (3) ii.)

It should be noted that, due to use of the highly directional antenna that protects the Green Bank Observatory and Sugar Grove, much of the transmitter power for the WVPT-1 goes to the south and south southeast with little or no power going directly north, consequently, we have focused the calculations along and around the main lobes of the antenna. (Please see the antenna azimuth graph and vertical elevation field table attached to this application under the “antenna exhibit”.)

Charlottesville Site (WVPT-2):

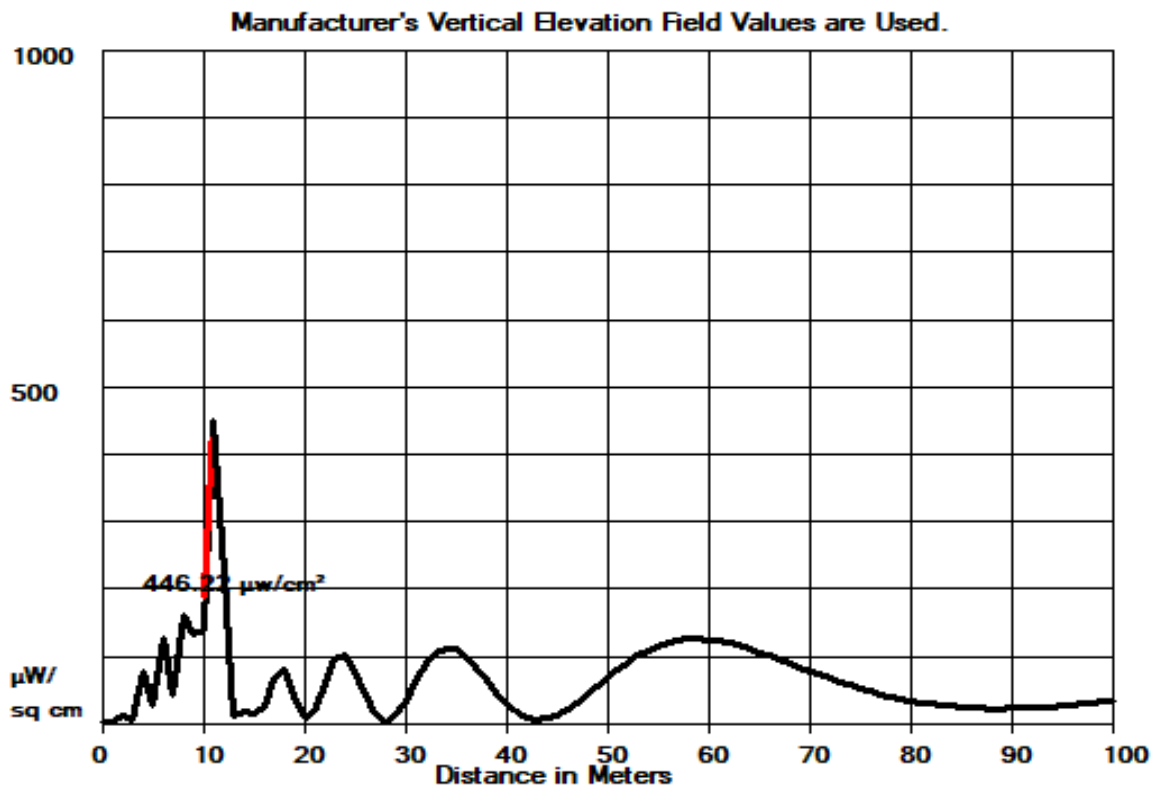
This site will use a Dielectric TUL-BP2-1/2M-1-K antenna that transmits with 15 kW of horizontally polarized radiated power from an antenna height of 66 meters above the ground. The highest power density of 1.20 uW/cm^2 , 0.4 percent, is calculated at 71 m from the tower base. Since this value is well below 5%, further analysis of this site was deemed unnecessary.

Luray Site (WVPT-3)

This site will use a Dielectric TUL-C2SP-15 COS 66_33.AZ antenna that transmits with .25 kW of horizontally polarized radiated power from a head height antenna of 59.1 meters above the ground. The highest power density of 0.09 uW/cm^2 , (effectively 0%) is calculated at 40 m from the tower base. Since this value is well below 5%, further analysis of this site was deemed unnecessary.

The applicant will protect workers by either reducing R.F. emissions or terminating operations when workers are on the site or on towers where exposure to electromagnetic radiation may be received. The applicant will cooperate with all other stations at the site to assure that there will be no exposures to workers or the public beyond the Commission’s maximum. As a total system, considering all its DTS transmitters, the applicant will be in full compliance with the Commission’s human exposure to radiofrequency electromagnetic fields rules.

WVPT-1



HORZ. DISTANCE FROM Digital TV RADIATOR vs POWER DENSITY (Microwatt/Square cm)

Pwr H kW= 195, Pwr V kW= 58.5, COR = 8M, Chan= 15

Dist(Meters) Total (uW/cm2) Percent of Max

| | | |
|----|--------|-------|
| 0 | 0.00 | 0.0 |
| 1 | 0.52 | 0.2 |
| 2 | 10.09 | 3.1 |
| 3 | 1.86 | 0.6 |
| 4 | 75.19 | 23.4 |
| 5 | 24.20 | 7.5 |
| 6 | 122.30 | 38.1 |
| 7 | 40.63 | 12.6 |
| 8 | 158.87 | 49.4 |
| 9 | 130.88 | 40.7 |
| 10 | 135.41 | 42.1 |
| 11 | 446.22 | 138.9 |
| 12 | 221.18 | 68.8 |
| 13 | 8.43 | 2.6 |
| 14 | 13.76 | 4.3 |
| 15 | 10.58 | 3.3 |
| 16 | 20.31 | 6.3 |
| 17 | 64.85 | 20.2 |
| 18 | 75.98 | 23.6 |
| 19 | 38.01 | 11.8 |
| 20 | 4.13 | 1.3 |
| 21 | 15.46 | 4.8 |
| 22 | 56.58 | 17.6 |
| 23 | 92.37 | 28.7 |
| 24 | 97.87 | 30.5 |
| 25 | 74.58 | 23.2 |
| 26 | 38.65 | 12.0 |

| Dist (M) | Total (uW/cm2) | Percent of Max |
|----------|----------------|----------------|
| 27 | 10.41 | 3.2 |
| 28 | 0.08 | 0.0 |
| 29 | 8.80 | 2.7 |
| 30 | 31.75 | 9.9 |
| 31 | 58.98 | 18.4 |
| 32 | 85.09 | 26.5 |
| 33 | 102.61 | 31.9 |
| 34 | 109.51 | 34.1 |
| 35 | 107.23 | 33.4 |
| 36 | 96.20 | 29.9 |
| 37 | 79.55 | 24.8 |
| 38 | 61.25 | 19.1 |
| 39 | 41.95 | 13.1 |
| 40 | 26.16 | 8.1 |
| 41 | 14.08 | 4.4 |
| 42 | 6.42 | 2.0 |
| 43 | 3.57 | 1.1 |
| 44 | 4.84 | 1.5 |
| 45 | 10.03 | 3.1 |
| 46 | 18.54 | 5.8 |
| 47 | 28.60 | 8.9 |
| 48 | 40.48 | 12.6 |
| 49 | 53.23 | 16.6 |
| 50 | 65.55 | 20.4 |
| 51 | 77.15 | 24.0 |
| 52 | 87.71 | 27.3 |
| 53 | 97.80 | 30.4 |
| 54 | 105.99 | 33.0 |
| 55 | 112.37 | 35.0 |
| 56 | 117.27 | 36.5 |
| 57 | 120.85 | 37.6 |
| 58 | 122.20 | 38.0 |
| 59 | 122.40 | 38.1 |
| 60 | 121.33 | 37.8 |
| 61 | 119.70 | 37.3 |
| 62 | 116.65 | 36.3 |
| 63 | 113.03 | 35.2 |
| 64 | 108.17 | 33.7 |
| 65 | 102.95 | 32.0 |
| 66 | 98.06 | 30.5 |
| 67 | 92.73 | 28.9 |
| 68 | 86.96 | 27.1 |
| 69 | 80.89 | 25.2 |
| 70 | 75.23 | 23.4 |
| 71 | 69.53 | 21.6 |
| 72 | 64.17 | 20.0 |
| 73 | 58.97 | 18.4 |
| 74 | 53.81 | 16.7 |
| 75 | 48.88 | 15.2 |

| Dist (M) | Total (uW/cm2) | Percent of Max |
|----------|----------------|----------------|
| 76 | 44.73 | 13.9 |
| 77 | 40.61 | 12.6 |
| 78 | 37.02 | 11.5 |
| 79 | 33.86 | 10.5 |
| 80 | 30.97 | 9.6 |
| 81 | 28.32 | 8.8 |
| 82 | 26.09 | 8.1 |
| 83 | 24.31 | 7.6 |
| 84 | 22.86 | 7.1 |
| 85 | 21.59 | 6.7 |
| 86 | 20.52 | 6.4 |
| 87 | 19.92 | 6.2 |
| 88 | 19.53 | 6.1 |
| 89 | 19.59 | 6.1 |
| 90 | 19.76 | 6.2 |
| 91 | 20.12 | 6.3 |
| 92 | 20.71 | 6.4 |
| 93 | 21.49 | 6.7 |
| 94 | 22.44 | 7.0 |
| 95 | 23.45 | 7.3 |
| 96 | 24.76 | 7.7 |
| 97 | 26.17 | 8.1 |
| 98 | 27.75 | 8.6 |
| 99 | 29.39 | 9.1 |
| 100 | 31.08 | 9.7 |

tvstudy v2.2.5 (4uoc83)

Database: 127.0.0.1, Study: BLANK0000055362 #216, Model: Longley-Rice

Start: 2022.08.26 11:33:00

Study created: 2022.08.26 11:33:00

Study build station data: LMS TV 2022-08-12 #20

Proposal: WVPT D15 DD LIC STAUNTON, VA

File number: BLANK0000055362

Facility ID: 60111

Station data: User record

Record ID: 218

Country: U.S.

Zone: I

Ref. lat.: 38 09 54.40 N

Ref. long.: 79 18 50.10 W

DTS sites: 3

Search options:

Baseline record excluded if station has CP

Stations potentially affected by proposal:

| IX | Call | Chan | Svc | Status | City, State | File Number | Distance |
|-----|---------|------|-----|--------|-------------------|------------------|----------|
| No | WXIX-TV | D15 | DT | LIC | NEWPORT, KY | BLANK0000157812 | 466.6 km |
| No | W15EB-D | D15 | DC | LIC | CHARLOTTE, NC | BLANK0000188950 | 357.9 |
| Yes | WRAZ | D15 | DT | LIC | RALEIGH, NC | BLANK0000143683 | 285.5 |
| No | WEWS-TV | D15 | DT | LIC | CLEVELAND, OH | BLCDT20091211ACS | 411.5 |
| Yes | WQCW | D15 | DT | LIC | PORTSMOUTH, OH | BLANK0000168240 | 256.2 |
| Yes | WPSU-TV | D15 | DD | LIC | CLEARFIELD, PA | BLEDT20130614ACC | 337.1 |
| No | WLTX | D15 | DT | LIC | COLUMBIA, SC | BLANK0000082085 | 470.5 |
| No | WTNZ | D15 | DT | LIC | KNOXVILLE, TN | BLANK0000081278 | 477.0 |
| Yes | WFDC-DT | D15 | DT | LIC | ARLINGTON, VA | BLANK0000041206 | 212.3 |
| No | WXII-TV | D16 | DT | LIC | WINSTON-SALEM, NC | BLANK0000157823 | 219.9 |
| No | WINP-TV | D16 | DT | LIC | PITTSBURGH, PA | BLANK0000098050 | 259.6 |

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied, DTS site # 1:

Channel: D15
Latitude: 38 9 54.40 N (NAD83)
Longitude: 79 18 50.10 W
Height AMSL: 1333.0 m
HAAT: 689.0 m
Peak ERP: 195 kW
Antenna: DIE TUL-BP2 6/12 M I 0.0 deg
Elev Pattn: DIE
Elec Tilt: 2.00

38.8 dBu contour:

| Azimuth | ERP | HAAT | Distance |
|---------|---------|---------|----------|
| 0.0 deg | 2.58 kW | 680.7 m | 76.8 km |
| 45.0 | 123 | 664.5 | 108.9 |
| 90.0 | 175 | 779.1 | 116.8 |
| 135.0 | 84.9 | 711.3 | 107.5 |
| 180.0 | 175 | 726.4 | 114.7 |
| 225.0 | 123 | 615.3 | 106.8 |
| 270.0 | 2.58 | 655.4 | 76.1 |
| 315.0 | 0.000 | 604.2 | 24.3 |

Database HAAT does not agree with computed HAAT
Database HAAT: 689 m Computed HAAT: 680 m

Record parameters as studied, DTS site # 2:

Channel: D15
Latitude: 37 59 0.00 N (NAD83)
Longitude: 78 29 1.00 W
Height AMSL: 495.1 m
HAAT: 333.0 m
Peak ERP: 15.0 kW
Antenna: DIE TUL-BP2 - 1/2M-1-K 0.0 deg
Elev Pattn: DIE

38.8 dBu contour:

| Azimuth | ERP | HAAT | Distance |
|---------|---------|---------|----------|
| 0.0 deg | 15.0 kW | 354.2 m | 74.6 km |
| 45.0 | 4.20 | 266.9 | 61.6 |
| 90.0 | 0.114 | 379.1 | 48.0 |
| 135.0 | 0.060 | 366.8 | 43.7 |
| 180.0 | 5.56 | 359.0 | 68.8 |
| 225.0 | 14.2 | 323.8 | 71.9 |
| 270.0 | 2.04 | 278.0 | 58.4 |
| 315.0 | 2.75 | 320.1 | 62.5 |

Database HAAT does not agree with computed HAAT

Database HAAT: 333 m Computed HAAT: 331 m

Record parameters as studied, DTS site # 3:

Channel: D15
Latitude: 38 36 3.90 N (NAD83)
Longitude: 78 37 56.80 W
Height AMSL: 962.0 m
HAAT: 611.0 m
Peak ERP: 0.250 kW
Antenna: DIE TUL-C2SP-COS66 0.0 deg
Elev Pattn: DIE

38.8 dBu contour:

| Azimuth | ERP | HAAT | Distance |
|---------|----------|---------|----------|
| 0.0 deg | 0.108 kW | 652.6 m | 54.5 km |
| 45.0 | 0.022 | 641.1 | 44.2 |
| 90.0 | 0.241 | 667.1 | 60.1 |
| 135.0 | 0.147 | 500.3 | 53.4 |
| 180.0 | 0.003 | 655.1 | 31.7 |
| 225.0 | 0.000 | 540.3 | 0.2 |
| 270.0 | 0.000 | 619.0 | 0.2 |
| 315.0 | 0.013 | 621.3 | 40.5 |

Database HAAT does not agree with computed HAAT

Database HAAT: 611 m Computed HAAT: 612 m

**DTS proposal has coverage outside reference facility and distance limit

Distance to Canadian border: 438.9 km

Distance to Mexican border: 2135.0 km

Conditions at FCC monitoring station: Laurel MD

DTS site # 1 Bearing: 62.0 degrees Distance: 243.2 km

DTS site # 2 Bearing: 47.2 degrees Distance: 195.3 km

DTS site # 3 Bearing: 67.6 degrees Distance: 168.8 km

**Proposal is within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:

DTS site # 1 Bearing: 283.8 degrees Distance: 2236.1 km

DTS site # 2 Bearing: 284.4 degrees Distance: 2311.5 km

DTS site # 3 Bearing: 282.8 degrees Distance: 2282.8 km

No land mobile station failures found

Study cell size: 2.00 km

Profile point spacing: 1.00 km

Maximum new IX to full-service and Class A: 0.50%

Maximum new IX to LPTV: 2.00%

Interference to BLANK0000143683 LIC scenario 1

| | Call | Chan | Svc | Status | City, State | File Number | Distance |
|-------------|---------|------|-----|--------|---------------|-----------------|----------|
| Desired: | WRAZ | D15 | DT | LIC | RALEIGH, NC | BLANK0000143683 | |
| Undesireds: | WVPT | D15 | DD | LIC | STAUNTON, VA | BLANK0000055362 | 285.5 km |
| | WRDC | D14 | DT | LIC | DURHAM, NC | BLANK0000125503 | 0.0 |
| | W15EB-D | D15 | DC | LIC | CHARLOTTE, NC | BLANK0000188950 | 219.2 |
| | WLTX | D15 | DT | LIC | COLUMBIA, SC | BLANK0000082085 | 268.9 |
| | WFDC-DT | D15 | DT | LIC | ARLINGTON, VA | BLANK0000041206 | 384.8 |

| | | | | | | |
|---------|-----|----|-----|-------------------|-----------------|-------|
| WPXU-TV | D16 | DT | LIC | JACKSONVILLE, NC | BLANK0000129487 | 161.6 |
| WXII-TV | D16 | DT | LIC | WINSTON-SALEM, NC | BLANK0000157823 | 183.3 |

| Service area | Terrain-limited | IX-free, before | IX-free, after | Percent New IX |
|-------------------|-------------------|-------------------|-------------------|----------------|
| 48202.4 3,800,594 | 48030.7 3,797,515 | 47482.9 3,734,433 | 47140.6 3,728,684 | 0.72 0.15 |

| Undesired | Total IX | Unique IX, before | Unique IX, after |
|--------------------|--------------|-------------------|------------------|
| WVPT D15 DD LIC | 398.2 8,652 | 342.3 5,749 | |
| WRDC D14 DT LIC | 4.0 208 | 4.0 208 | |
| W15EB-D D15 DC LIC | 40.2 2,498 | 4.0 25 | |
| WLTX D15 DT LIC | 60.2 1,385 | 44.1 738 | 40.1 526 |
| WFDC-DT D15 DT LIC | 31.8 718 | 31.8 718 | 19.9 112 |
| WPXU-TV D16 DT LIC | 107.2 1,304 | 107.2 1,304 | 107.2 1,304 |
| WXII-TV D16 DT LIC | 340.5 59,632 | 320.4 57,616 | 292.5 55,941 |

Interference to BLANK0000168240 LIC scenario 1

| Call | Chan | Svc | Status | City, State | File Number | Distance |
|------------------|------|-----|--------|----------------|------------------|----------|
| Desired: WQCW | D15 | DT | LIC | PORTSMOUTH, OH | BLANK0000168240 | |
| Undesireds: WVPT | D15 | DD | LIC | STAUNTON, VA | BLANK0000055362 | 256.2 km |
| WLFG | D14 | DD | LIC | GRUNDY, VA | BLANK0000071597 | 187.2 |
| WTTK | D15 | DT | LIC | KOKOMO, IN | BLANK0000153399 | 375.7 |
| WXIX-TV | D15 | DT | LIC | NEWPORT, KY | BLANK0000157812 | 212.8 |
| WEWS-TV | D15 | DT | LIC | CLEVELAND, OH | BLCDT20091211ACS | 321.2 |
| WOHL-CD | D15 | DC | LIC | LIMA, OH | BLANK0000140190 | 299.8 |
| WTNZ | D15 | DT | LIC | KNOXVILLE, TN | BLANK0000081278 | 318.9 |

| Service area | Terrain-limited | IX-free, before | IX-free, after | Percent New IX |
|-------------------|-------------------|-------------------|-------------------|----------------|
| 37994.3 1,307,345 | 35904.9 1,236,020 | 35435.2 1,214,030 | 35431.2 1,213,911 | 0.01 0.01 |

| Undesired | Total IX | Unique IX, before | Unique IX, after |
|--------------------|--------------|-------------------|------------------|
| WVPT D15 DD LIC | 4.0 119 | 4.0 119 | |
| WLFG D14 DD LIC | 15.9 639 | 11.9 639 | |
| WTTK D15 DT LIC | 12.0 76 | 8.0 71 | |
| WXIX-TV D15 DT LIC | 242.9 3,797 | 191.2 3,123 | 191.2 3,123 |
| WEWS-TV D15 DT LIC | 199.1 17,019 | 167.2 16,436 | 167.2 16,436 |
| WOHL-CD D15 DC LIC | 4.0 19 | 0.0 0 | 0.0 0 |

| | | | | | | |
|-----------------|------|-------|------|-------|------|-------|
| WTNZ D15 DT LIC | 55.5 | 1,133 | 35.7 | 1,047 | 35.7 | 1,047 |
|-----------------|------|-------|------|-------|------|-------|

Interference to BLEDT20130614ACC LIC scenario 1

| | Call | Chan | Svc | Status | City, State | File Number | Distance |
|-------------|---------|------|-----|--------|----------------|------------------|----------|
| Desired: | WPSU-TV | D15 | DD | LIC | CLEARFIELD, PA | BLEDT20130614ACC | |
| Undesireds: | WVPT | D15 | DD | LIC | STAUNTON, VA | BLANK0000055362 | 337.1 km |
| | WBNF-CD | D15 | DC | LIC | BUFFALO, NY | BLDTA20111130LWW | 215.3 |
| | NEW | D15 | DT | APP | SYRACUSE, NY | BLANK0000195668 | 269.2 |
| | WEWS-TV | D15 | DT | LIC | CLEVELAND, OH | BLCDT20091211ACS | 275.2 |
| | WFDC-DT | D15 | DT | LIC | ARLINGTON, VA | BLANK0000041206 | 268.8 |
| | WINP-TV | D16 | DT | LIC | PITTSBURGH, PA | BLANK0000098050 | 148.5 |

| Service area | Terrain-limited | IX-free, before | IX-free, after | Percent New IX |
|-------------------|-----------------|-----------------|-----------------|----------------|
| 36299.1 1,055,133 | 32592.1 868,013 | 31575.4 840,238 | 31563.4 840,169 | 0.04 0.01 |

| Undesired | Total IX | Unique IX, before | Unique IX, after |
|--------------------|--------------|-------------------|------------------|
| WVPT D15 DD LIC | 12.1 69 | 12.1 69 | |
| WBNF-CD D15 DC LIC | 12.0 105 | 0.0 0 | |
| NEW D15 DT APP | 108.5 318 | 80.3 182 | |
| WEWS-TV D15 DT LIC | 522.3 11,079 | 450.3 9,729 | |
| WFDC-DT D15 DT LIC | 410.1 16,438 | 369.9 15,828 | |
| WINP-TV D16 DT LIC | 59.9 1,290 | 24.0 680 | |

Interference to BLANK0000041206 LIC scenario 1

| | Call | Chan | Svc | Status | City, State | File Number | Distance |
|-------------|---------|------|-----|--------|----------------|------------------|----------|
| Desired: | WFDC-DT | D15 | DT | LIC | ARLINGTON, VA | BLANK0000041206 | |
| Undesireds: | WVPT | D15 | DD | LIC | STAUNTON, VA | BLANK0000055362 | 212.3 km |
| | WPSU-TV | D15 | DD | LIC | CLEARFIELD, PA | BLEDT20130614ACC | 268.8 |

| Service area | Terrain-limited | IX-free, before | IX-free, after | Percent New IX |
|-------------------|-------------------|-------------------|-------------------|----------------|
| 24894.9 8,155,998 | 24166.4 8,114,847 | 23748.8 8,078,686 | 23157.0 8,039,127 | 2.49 0.49 |

| Undesired | Total IX | Unique IX, before | Unique IX, after |
|-----------|----------|-------------------|------------------|
|-----------|----------|-------------------|------------------|

| | | | | | | |
|--------------------|-------|--------|-------|--------|-------|--------|
| WVPT D15 DD LIC | 898.3 | 66,834 | | | 591.8 | 39,559 |
| WPSU-TV D15 DD LIC | 417.6 | 36,161 | 417.6 | 36,161 | 111.1 | 8,886 |

Interference to proposal scenario 1
12.88% interference received

| | Call | Chan | Svc | Status | City, State | File Number | Distance |
|-------------|---------|------|-----|--------|----------------|------------------|----------|
| Desired: | WVPT | D15 | DD | LIC | STAUNTON, VA | BLANK0000055362 | |
| Undesireds: | WRAZ | D15 | DT | LIC | RALEIGH, NC | BLANK0000143683 | 285.5 km |
| | WQCW | D15 | DT | LIC | PORTSMOUTH, OH | BLANK0000168240 | 256.2 |
| | WPSU-TV | D15 | DD | LIC | CLEARFIELD, PA | BLEDT20130614ACC | 337.1 |
| | WFDC-DT | D15 | DT | LIC | ARLINGTON, VA | BLANK0000041206 | 212.3 |

| Service area | Terrain-limited | IX-free | Percent IX |
|--------------------|--------------------|--------------------|----------------|
| 28200.0 965,699 | 24456.1 861,474 | 21423.0 750,557 | 12.40 12.88 |

| Undesired | Total IX | Unique IX | Prcnt Unique IX |
|------------------------------|------------------|----------------|-----------------|
| WRAZ D15 DT LIC 1315.0 | 62,373 649.7 | 26,537 2.66 | 3.08 |
| WQCW D15 DT LIC 87.6 | 546 63.6 | 403 0.26 | 0.05 |
| WPSU-TV D15 DD LIC 112.3 | 200 44.1 | 83 0.18 | 0.01 |
| WFDC-DT D15 DT LIC 2267.7 | 83,864 1534.2 | 47,907 6.27 | 5.56 |



NATIONAL RADIO ASTRONOMY OBSERVATORY

POST OFFICE BOX 2
GREEN BANK, WV 24944-0002
NRQZ OFFICE TELEPHONE (304) 456-2107
HTTP://WWW.GB.NRAO.EDU/

FAX (304) 456-2276
NRQZ@NRAO.EDU

August 11, 2022
Page 1 of 2
NRQZ ID: 13157

WVPT
298 PORT REPUBLIC ROAD
HARRISONBURG, VA 22801

| | |
|--------------------------------|---------------------------------|
| Application Reason/Purpose | Prior coordination notification |
| File Number | 13157 |
| Applicant Name | WVPT |
| Call Sign | |
| Site Name or Loc | ['WVPT1', 'WVPT4'] |
| Previous NRAO Coordination No. | |
| Current NRAO Coordination No. | 13157-01, 13157-04 |

Dear Applicant:

The National Radio Quiet Zone (NRQZ) has evaluated these facilities to determine the interference impact on our highly sensitive radio astronomy operations.

NRAO Special Condition Statement:

The National Radio Astronomy Observatory (NRAO), Green Bank, Pocahontas County, WV, objects unless the Applicant's license is restricted to an Effective Radiated Power (ERP) of Watts per MHz unit bandwidth at Azimuth degrees True North in the Site-Specific Data Below.

Sugar Grove Research Station Special Condition Statement:

The Sugar Grove Research Station, formerly Naval Radio Research Observatory (NRRO) located at Sugar Grove Pendleton County, WV, objects unless the Applicant's license is restricted to an Effective Radiated Power (ERP) of Watts per MHz unit bandwidth at Azimuth degrees True North in the Site-Specific Data Below.

NRQZ Office Special Condition Statement

The NRQZ Office objects unless the activation of WVPT 1, 2, and 4 is coordinated with NRAO and SGRS to ensure proper installation and antenna manufacturer specifications meet the proposed thresholds under active transmission. Order of activation, under coordination, to be WVPT 1, 4, and lastly, 2.

To meet this Special Condition, the Applicant shall:

1. Use the final engineering submitted by the applicant or their designated technical representative indicating that all facilities meet the ERP restriction.
2. Arrange for the requested site inspection to verify the implementation of this Special Condition.
3. Coordinate activation of WVPT 1, 2, and 4 as addressed in the NRQZ Office Special Condition.
4. Post a copy of this document and associated attachments at the Transmit facility.
5. Provide a Construction Notification as defined by the FCC for your specific radio service.



NATIONAL RADIO ASTRONOMY OBSERVATORY

POST OFFICE BOX 2
GREEN BANK, WV 24944-0002
NRQZ OFFICE TELEPHONE (304) 456-2107
HTTP://WWW.GB.NRAO.EDU/

FAX (304) 456-2276
NRQZ@NRAO.EDU

The NRQZ Office requests that:

1. This Letter of Concurrence be attached to the FCC application.
2. The FCC application should indicate to the FCC that the assignment should be modified to include the current NRQZ ID in the supplementary details line (e.g. "SUP: NRQZ COORD COMPLETE 2022 AUG 11/NRQZ ID 13157").
3. The applicant provides the NRQZ Office (nrqz@nrao.edu) with notice of its official filing with the FCC per section 47CFR1.924 (a) (2).
4. The FCC should email the NSF Electromagnetic Spectrum Management Unit (esm@nsf.gov) when the supplemental details have been modified to include the NRQZ ID as this will facilitate faster approval of the application.

The National Radio Astronomy Observatory (NRAO) site located at Green Bank, Pocahontas County, WV, has no objection to this frequency assignment provided the special conditions are met.

The Sugar Grove Research Station, the former Naval Radio Research Observatory (NRRO), located at Sugar Grove, Pendleton County, WV has no objections to this frequency assignment provided the special conditions are met.

This letter constitutes coordination of assignment in the National Radio Quiet Zone as required by the FCC Rules and Regulations 47CFR1.924.

If I may be of assistance, please feel free to contact me.

Sincerest regards,

Sheldon Wasik
NRQZ Program Administrator

cc: nrqz@nrao.edu, esm@nsf.gov, Sugar Grove Research Station Spectrum Management Group

Attachments:

Site-Specific Data

SGRS ERP Limits

Recognition of WVPT2 and WVPT3

Site Inspection Worksheet(s)

This concurrence remains valid provided the data contained within is consistent with the applicant's filing at the Commission. Any discrepancy in system parameters, such as geographical coordinates (Latitude, Longitude, AMSL), antenna height above ground level (AGL), antenna gains or directivity (orientation), channel (operating frequency or frequency bands), emission type, and power requires re-coordination. If the Commission has questions regarding the validity of this or any concurrence, please direct inquiries to nrqz@nrao.edu or 304-456-2107.

| NRQZ ID | Site Name | Lat N NAD83 | Lon W NAD83 | MSL (m) | Max TX Pwr (W) | # TX per Sector | # TX per Facility | Freq Low (MHz) | Freq High (MHz) | Bandwidth (MHz) | Max Gain (dBi) | Antenna Model | AGL (m) | Az ° True | Mechanical-DT | Electrical-DT | Max eRPd of facility (W) | NRAO ERPd Limit (W) |
|----------|-----------|--------------|---------------|---------|----------------|-----------------|-------------------|----------------|-----------------|-----------------|----------------|----------------------------|---------|-----------|---------------|---------------|--------------------------|---------------------|
| 13157-04 | WVPT 4 | 38 36 3.900 | -78 37 56.800 | 901.834 | 250.0 | 1 | 1 | 476.0 | 482.0 | 5.38 | 2.15 | Die-TUL-C2SP-15 COS 66_33 | 60.2 | 260.335 | 0 | 0 | 250.0 | 4.4e-01 |
| 13157-01 | WVPT 1 | 38 09 54.400 | -79 18 50.100 | 1323.0 | 263000.0 | 1 | 1 | 476.0 | 482.0 | 5.38 | 2.15 | Dielectric TUL-BP2 6/12M 1 | 10.0 | 303.05 | 0 | 2 | 263000.0 | 3.8e+00 |

| Site ID | Bearing of Antenna (DEG) | Mechanical + Electrical Down Tilt (DEG) | Bearing to SG (DEG) | Elevation to 1st Obstacle (DEG) | Off-axis Angle Azimuth (DEG) | Off-Axis Angles Elevation (DEG) | Main Beam Gain (dBi) | Antenna Gain towards Sugar Grove (dBm) | Maximum Allowed ERP(dBd) towards Sugar Grove (WATTS) | Distance to 1 st Obstacle (km) | Height of 1 st obstacle (m) |
|----------|--------------------------|---|---------------------|---------------------------------|------------------------------|---------------------------------|----------------------|--|--|---|--|
| 13157-01 | 152 | 2 | 4 | 12 | -148 | 12 | 2.1 | -42.4 | 7.4 | .1 | 1355 |



NATIONAL RADIO ASTRONOMY OBSERVATORY

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GREEN BANK, WV 24944-0002
NRQZ OFFICE TELEPHONE (304) 456-2107
HTTP://WWW.GB.NRAO.EDU/

FAX (304) 456-2276
NRQZ@NRAO.EDU

- The NRQZ Office recognizes that:
- NRQZ ID 13157-02 (Site WVPT2) is located outside of the NRQZ. The Site-Specific data below is a representation of the conditions that could be set if the site were to be located in the NRQZ. The NRAO and SGRS would appreciate any voluntary coordination for NRQZ ID 13157-02.

| NRQZ ID | Site Name | Lat N NAD83 | Lon W NAD83 | MSL (m) | Max TX Pwr (W) | # TX per Sector | # TX per Facility | Freq Low (MHz) | Freq High (MHz) | Bandwidth (MHz) | Max Gain (dBi) | Antenna Model | AGL (m) | Az ° True | Mechanical-DT | Electrical-DT | Max eRPd of facility (W) | NRAO ERPd Limit (W) |
|----------|-----------|-------------|-------------|---------|----------------|-----------------|-------------------|----------------|-----------------|-----------------|----------------|-----------------------------|---------|-----------|---------------|---------------|--------------------------|---------------------|
| 13157-02 | WVPT2 | 37 59 00.00 | -78 29 1.00 | 42 7.1 | 1000.0 | 1 | 1 | 476.0 | 482.0 | 5.38 | 2.15 | Dielectric TUL-BP2-1/2M-1-K | 68.0 | 293.215 | 0 | 0 | 1000.0 | 9.6e-01 |

| Site ID | Bearing of Antenna (DEG) | Mechanical + Electrical Down Tilt (DEG) | Bearing to SG (DEG) | Elevation to 1st Obstacle (DEG) | Off-axis Angle Azimuth (DEG) | Off-Axis Angles Elevation (DEG) | Main Beam Gain (dBi) | Antenna Gain towards Sugar Grove (dBm) | Maximum Allowed ERP(dBd) towards Sugar Grove (WATTS) | Distance to 1st Obstacle (km) | Height of 1st obstacle (m) |
|----------|--------------------------|---|---------------------|---------------------------------|------------------------------|---------------------------------|----------------------|--|--|-------------------------------|----------------------------|
| 13157-02 | 289 | 0 | 310 | 1 | 22 | 1 | 2.1 | -4.1 | 1.6 | 34 | 884 |

- NRQZ ID 13157-03 (Site WVPT3) will remain on the previously coordinated channel 12, thus is being dropped from this application in a change to channel 15. The NRQZ office requests any status updates in the FCC filing process of these conditions, and requires coordination for any future alterations.

REV

2/11/2021

3/25/2022 DATE of submission

NRQZ# 13157-01

Magnetic Declination Correction 9.88333333 ° West

(Value only)

Go to this URL and calculate declination

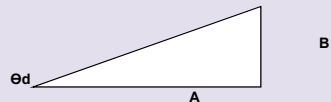
<https://www.ngdc.noaa.gov/geomag/calculators/magcalc.shtml#declination>

Site Name WVPT1 Latitude (N): 38 09 54.4 (dd mm ss.s)
 Location Elliott Knob Longitude (W): 79 18 50.1 (dd mm ss.s)
 City/State AMSL: 1323 Meters 4340.50 Ft
 HAGL (centerline) 10 Meters 32.81 Ft
 Frequency: 476 MHz 4373.31 Ft

NRAO AERP (watts) 3.8 watts at 303.1 ° True (Φd)
 Bandwidth in MHz 5.38 watts at 303.1 ° True
 Dominant Path Defraction watts at 303.1 ° True

| Sector Name or Indicator | 1 | 2 | 3 |
|---|----------------------------|------------|------------|
| a. Antenna Type (Model/Tilt) | Dielectric TUL-BP2 6/12M 1 | | |
| Electrical Tilt or Tilt Range | 2 | | |
| b. Maximum Antenna Gain | 2.2 dBd | dBd | dBd |
| c. Antenna Azimuth (° True or "omni") | 152 °T | °T | °T |
| Antenna Azimuth (° Mag) | 161.9 °Mag | 9.9 °Mag | 9.9 °Mag |
| d. Az to GBT on Antenna Pattern | 151.1 ° | 303.1 ° | 303.1 ° |
| e. Antenna Gain to GBT (b - f) | -53.80 dB | 0.00 dB | 0.00 dB |
| f. Antenna Gain to GBT Below Maximum | -56.00 dB | dB | dB |
| g. Mechanical Downtilt (Φbt) | 0 ° | ° | 0 ° |
| h. Loss to GBT Due to Mechanical Downtilt | 0 dB | dB | dB |
| i. Transmitter Output Power | 263000 watts | watts | watts |
| j. System Losses: Combiner/Duplexer | 0 dB | dB | dB |
| Lightning Arrestor | 0 dB | dB | dB |
| Main Line | 0 dB | dB | dB |
| RF Filter | 0 dB | dB | dB |
| Misc. connectors, etc. | 0 dB | dB | dB |
| j. System Loss | 0.00 dB | 0.00 dB | 0.00 dB |
| k. Power to Antenna (ix j) | 263000.00 watts | 0.00 watts | 0.00 watts |
| l. Main Beam Power (k x b) | 436471.36 watts | 0.00 watts | 0.00 watts |
| m. ERPd to GBT (l x (f + h)) or (l x (e - (h + j))) | 1.10 watts | 0.00 watts | 0.00 watts |

Power at output of duplexer 263000.00 #NUM! #NUM!
 263000.00 #NUM! #NUM!



Enter 1st Obstacle Information provided by NRQZ office

0.1 Distance to 1st Obstacle (km) 328
 4373.36 TX AMSL (ft) B = Ant Ht AMSL minus Ht of 1st Obs -35.51041996
 4408.87 AMSL of 1st Obstacle (Ft) Φd = arctan(B/A) = -6.18 °

A -Φd value indicates that the first obstacle is above the horizon
 A +Φd value indicates that the first obstacle is below the horizon

Effective mechanical downtilt adjustment:

Effective Elevation = Φd - Φbt cos(Φd - Φbt) = 0.0 0.0 0.0
 Effective Elevation Adjustment = 0.0 ° 0.0 ° 0.0 °

Definitions:

Φd = Azimuth to GBT
 Φbt = Azimuth of mechanical beam tilt (verticle)
 Φd = Elevation to 1st obstacle (negative above horizon)
 Φbt = Elevation of antenna mechanical beam tilt (neg. above horizon)

Note: No adjustments for electrical beam tilt are required because
 the pattern data already accounts for this

Effective azimuth on horizontal pattern = Φd - Antenna Azimuth (True) {If AZ<0, then add 360}
 Effective elevation on vertical pattern = Φd - Φbt cos(Φd - Φbt) {If ELEV<0, then add 360}

Antenna Gain = HPAT(Eff AZ) + VPAT(Eff ELEV) + Max Gain

(03) Go to the URL indicated here to have NGDC calculate the the magnetic declination associated with these coordiantes.

(04) Value only of the magnetic declination as provided by going the URL provided in (3)

(06 and (07) Please provide either a 1A/2C survey or Google Earth KML file to verify the site location.

Note format for LAT/LONG - No special characters, numerals only

(08) AMSL or height above mean sea level

(09) HAGL or antenna height above ground level (Not sea level) to centerline

(12) AZ bearing toward the GBT from your fixed facility

(13) Specify the bandwidth allowance associated with this submission

(14) If dominant path is Diffraction limited, then you can use additional attenuation due to Mechanical Down Tilt

(17) This is the model number of your antenna and its associated ET. Please attach antenna datum (H/V) to verify your values.

(18) Maximum antenna gain associated with specified antenna model number

(19) Indicate the AZ bearing of each sector in degrees True North

(20) Equals your AZ + ~ 8° or 9° degrees more due to magnetic declination

(21) A calculated value of the Horizontal offset AZ bearing from your facility to GBT

(23) Antenna gain at offset Horizontal AZ bearing. If value in Row (19) indicates an AZ bearing between two values, provide the lesser attenuation.

(24) Provide values only if using Mechanical Tilt AND site is not SCATTER diffraction limited!

(25) Antenna gain at offset Vertical AZ bearing (within +/- Row 24 values)

(26) Watts per transmitter. If you are utilizing multiple transmitters (RRH's) per sector, you need to download Site Inspection Worksheet #2 or #3.

(27) Values for system losses are to be indicated as a negative value

Note: If site is troposcatter, use only the Vertical ET antenna attenuation value at 0 degrees

1.10 Congratulations. Meets NRAO Power Density Limits!

(51) Distance to first obstacle as provided by the NRQZ office.

(53) Height of first obstacle as provided by the NRQZ office.

(57) Calculated AZ bearing on the vertical pattern based upon offset AZ bearing to GBT

(58) Check the antenna pattern at this offset AZ bearing. If AZ bearing is between two values, provide the lesser attenuation.

REV

2/11/2021

3/25/2022 DATE of submission

NRQZ# 13157-04

Magnetic Declination Correction 9.13333333 ° West

(Value only)

Go to this URL and calculate declination

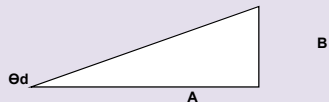
<https://www.ngdc.noaa.gov/geomag/calculators/magcalc.shtml#declination>

Site Name WVPT4 Latitude (N): 38 36 03.9 (dd mm ss.s)
 Location Big Mountain Longitude (W): 78 37 56.8 (dd mm ss.s)
 City/State AMSL: 901.834 Meters 2958.74 Ft
 HAGL (centerline) 60.2 Meters 197.50 Ft
 Frequency: 476 MHz 3156.24 Ft

NRAO AERP (watts) 0.4 watts at 0.4 ° True (Φd)
 Bandwidth in MHz 5.38 watts at 0.4 ° True
 Dominant Path Diffraction watts at 0.4 ° True

| Sector Name or Indicator | 1 | 2 | 3 |
|---|---------------------------|------------|------------|
| a. Antenna Type (Model/Tilt) | Die-TUL-C2SP-15 COS 66 33 | | |
| Electrical Tilt or Tilt Range | 0 | | |
| b. Maximum Antenna Gain | 2.2 dBd | dBd | dBd |
| c. Antenna Azimuth (° True or "omni") | 80 °T | °T | °T |
| Antenna Azimuth (° Mag) | 89.1 °Mag | 9.1 °Mag | 9.1 °Mag |
| d. Az to GBT on Antenna Pattern | 280.4 ° | 0.4 ° | 0.4 ° |
| e. Antenna Gain to GBT (b - f) | -32.02 dB | 0.00 dB | 0.00 dB |
| f. Antenna Gain to GBT Below Maximum | -34.22 dB | dB | dB |
| g. Mechanical Downtilt (Φbt) | 0 ° | ° | 0 ° |
| h. Loss to GBT Due to Mechanical Downtilt | 0 dB | dB | dB |
| i. Transmitter Output Power | 250.00 watts | watts | watts |
| j. System Losses: Combiner/Duplexer | 0 dB | dB | dB |
| Lightning Arrestor | 0 dB | dB | dB |
| Main Line | 0 dB | dB | dB |
| RF Filter | 0 dB | dB | dB |
| Misc. connectors, etc. | 0 dB | dB | dB |
| j. System Loss | 0.00 dB | 0.00 dB | 0.00 dB |
| k. Power to Antenna (ix j) | 250.00 watts | 0.00 watts | 0.00 watts |
| l. Main Beam Power (k x b) | 414.90 watts | 0.00 watts | 0.00 watts |
| m. ERPd to GBT (l x (f + h)) or (l x (e - (h + j))) | 0.16 watts | 0.00 watts | 0.00 watts |

Power at output of duplexer 250.00 #NUM! #NUM!
 250.00 #NUM! #NUM!



Enter 1st Obstacle Information provided by NRQZ office

Ed = Angle to 1st Obstacle
 A = Distance to 1st Obstacle in Feet 145997
 B = Ant Ht AMSL minus Ht of 1st Obs -833.6304725
 Ed = arctan(B/A) = -0.33 °
 A -Ed value indicates that the first obstacle is above the horizon
 A +Ed value indicates that the first obstacle is below the horizon

Effective mechanical downtilt adjustment:

Effective Elevation = Ed - Φbt cos(Φd - Φbt) = 0.0 0.0 0.0
 Effective Elevation Adjustment = 0.0 ° 0.0 ° 0.0 °

Definitions:

Φd = Azimuth to GBT
 Φbt = Azimuth of mechanical beam tilt (verticle)
 Ed = Elevation to 1st obstacle (negative above horizon)
 Φbt = Elevation of antenna mechanical beam tilt (neg. above horizon)

Note: No adjustments for electrical beam tilt are required because the pattern data already accounts for this

Effective azimuth on horizontal pattern = Φd - Antenna Azimuth (True) {If AZ<0, then add 360}
 Effective elevation on vertical pattern = Ed - Φbt cos(Φd - Φbt) {If ELEV<0, then add 360}

Antenna Gain = HPAT(Eff AZ) + VPAT(Eff ELEV) + Max Gain

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(25) Antenna gain at offset Vertical AZ bearing (within +/- Row 24 values)

(26) Watts per transmitter. If you are utilizing multiple transmitters (RRH's) per sector, you need to download Site Inspection Worksheet #2 or #3.

(27) Values for system losses are to be indicated as a negative value

Note: If site is troposcatter, use only the Vertical ET antenna attenuation value at 0 degrees

0.16 Congratulations. Meets NRAO Power Density Limits!

(51) Distance to first obstacle as provided by the NRQZ office.

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(57) Calculated AZ bearing on the vertical pattern based upon offset AZ bearing to GBT

(58) Check the antenna pattern at this offset AZ bearing. If AZ bearing is between two values, provide the lesser attenuation.

**Declaration and
Statement of Qualifications**

I, Douglas L. Vernier, declare that I have received training as an engineer from the University of Michigan, School of Engineering. That, I have received degrees from the University in the field of Broadcast Telecommunications. That, I have been active in broadcast consulting for over 40 years;

That, I have held a Federal Communications Commission First Class Radiotelephone License continually since 1964. In 1985, this license was reissued by the Commission as a lifetime General Radiotelephone license no. PG-16-16464;

That, I am certified as a Professional Broadcast Engineer (#50258) by the Society of Broadcast Engineers, Indianapolis, Indiana. (Life-time Certification received in 2010);

That, my qualifications are a matter of record with the Federal Communications Commission;

That, I have been retained by Virginia Public Media to prepare the engineering showing appended hereto;

That, I have prepared this broadcast engineering showing, the technical information contained in same and the facts stated within are true of my knowledge;

That, under penalty of perjury, I declare that the foregoing is correct.

Douglas L. Vernier

A handwritten signature in blue ink, appearing to read "Doug Vernier", with a large, stylized initial "D" and a horizontal line extending to the right.

Executed on September 9, 2022