

Cambium Networks Ltd
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20th May 2015

Telecommunication Certification Body
UL VS Ltd
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United Kingdom

To whom it may concern,

Subject – Attestation of Antenna Performance

We, Cambium Networks Ltd, hereby attest that the key parameters for Out Of band emissions are:

- Return Loss
- VSWR
- Cross Polarization Discrimination
- Antenna gain

As can be seen from the attached antenna information below for the 4' and 6' antennas, the antenna parameters are similar and, hence, Out of Band performance between the 4' and 6' antennas will be similar.

Yours sincerely



Donald W Reid
CEng MIET, MInstLM
Principal Regulatory Engineer



PX4F-52-NXA/A

1.2 m | 4 ft Standard Parabolic Unshielded, Dual-Polarized Antenna, unpressurized, 5.250–5.850 GHz, N Female, gray antenna, molded gray radome with flash, standard pack—one-piece reflector

General Specifications

| | |
|------------------------|--|
| Antenna Type | PXF - Standard Parabolic Unshielded, Dual-Polarized Antenna, unpressurized |
| Diameter, nominal | 1.2 m 4 ft |
| Packing | Standard pack |
| Radome Color | Gray |
| Radome Material | Molded |
| Reflector Construction | One-piece reflector |
| Antenna Input | N Female |
| Antenna Color | Gray |
| Antenna Type | PXF - Standard Parabolic Unshielded, Dual-Polarized Antenna, unpressurized |
| Diameter, nominal | 1.2 m 4 ft |
| Flash Included | Yes |
| Polarization | Dual |

Electrical Specifications

| | |
|--|----------------------|
| Operating Frequency Band | 5.250 – 5.850 GHz |
| Beamwidth, Horizontal | 3.0 ° |
| Beamwidth, Vertical | 3.0 ° |
| Cross Polarization Discrimination (XPD) | 30 dB |
| Electrical Compliance | ETSI 302 217 Class 1 |
| Front-to-Back Ratio | 52 dB |
| Gain, Low Band | 34.5 dBi |
| Gain, Mid Band | 34.9 dBi |
| Gain, Top Band | 35.3 dBi |
| Operating Frequency Band | 5.250 – 5.850 GHz |
| Radiation Pattern Envelope Reference (RPE) | 4750 |
| Return Loss | 14.0 dB |
| VSWR | 1.50 |

Mechanical Specifications

| | |
|---------------------------|-----------------|
| Fine Azimuth Adjustment | ±15° |
| Fine Elevation Adjustment | ±20° |
| Mounting Pipe Diameter | 115 mm 4.5 in |
| Net Weight | 54 kg 119 lb |
| Side Struts, Included | 1 inboard |

PX4F-52-NXA/A



| | |
|-------------------------------|--------------------|
| Side Struts, Optional | 1 inboard |
| Wind Velocity Operational | 110 km/h 68 mph |
| Wind Velocity Survival Rating | 200 km/h 124 mph |

Wind Forces At Wind Velocity Survival Rating

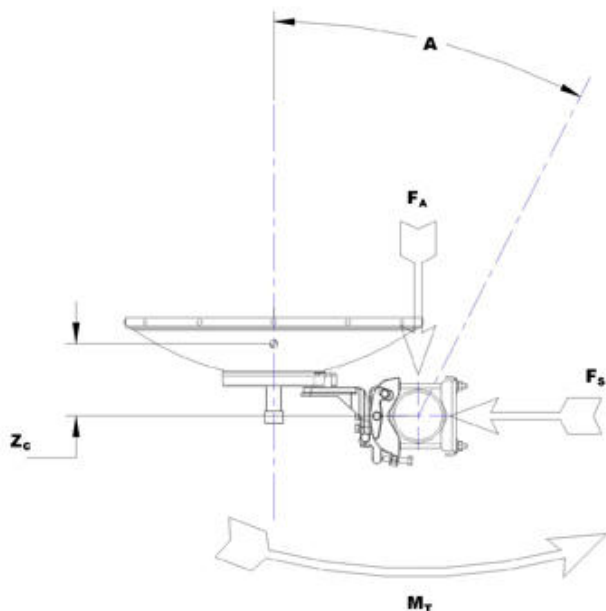
| | |
|---------------------------------------|------------------|
| Angle α for MT Max | -130 ° |
| Axial Force (FA) | 3881 N 872 lbf |
| Side Force (FS) | 552 N 124 lbf |
| Twisting Moment (MT) | 1236 N•m |
| Weight with 1/2 in (12 mm) Radial Ice | 130 kg 287 lb |
| Zcg with 1/2 in (12 mm) Radial Ice | 346 mm 14 in |
| Zcg without Ice | 203 mm 8 in |

PX4F-52-NXA/A

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Wind Forces At Wind Velocity Survival Rating Image



Packed Dimensions

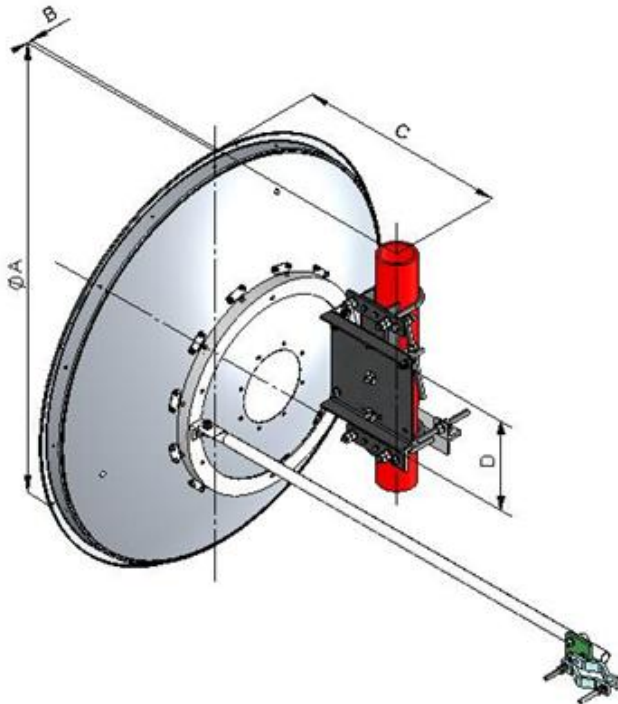
| | | | |
|------------------------------|----------|--|----------|
| Gross Weight, Packed Antenna | 152.0 kg | | 335.1 lb |
| Height | 143.0 cm | | 56.3 in |
| Length | 143.0 cm | | 56.3 in |
| Width | 84.0 cm | | 33.1 in |

PX4F-52-NXA/A

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Antenna Dimensions And Mounting Information



| Dimensions in Inches (mm) | | | | |
|---------------------------|-------------|------------|------------|------------|
| Antenna Size, ft (m) | A | B | C | D |
| 4 (1.2) | 50.8 (1291) | 12.5 (318) | 16.2 (411) | 11.8 (299) |

Regulatory Compliance/Certifications

Agency

ISO 9001:2008

Classification

Designed, manufactured and/or distributed under this quality management system

Included Products

PX4F-52/A (Product Component—not orderable) — 1.2 m | 4 ft Standard Parabolic Unshielded, Dual-Polarized Antenna, unpressurized, 5.250–5.850 GHz

* Footnotes

Axial Force (FA)

Maximum forces exerted on a supporting structure as a result of wind from the most critical direction for this parameter. The individual maximums specified may not occur simultaneously. All forces are referenced to the mounting pipe.

Cross Polarization Discrimination (XPD)

The difference between the peak of the co-polarized main beam and the maximum cross-polarized signal over an angle twice the 3 dB beamwidth of the co-polarized main beam.

PX4F-52-NXA/A

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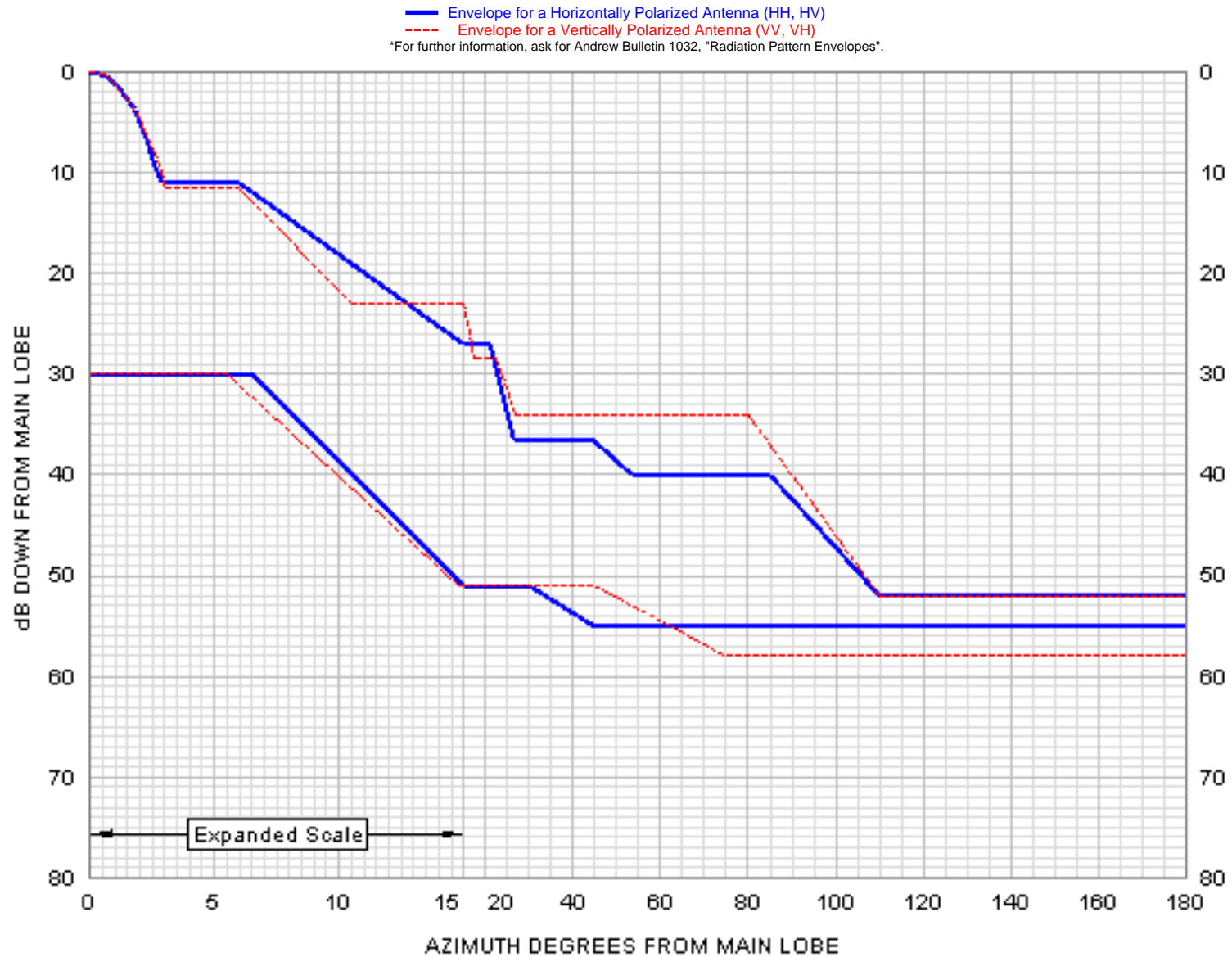
| | |
|--|--|
| Front-to-Back Ratio | Denotes highest radiation relative to the main beam, at $180^\circ \pm 40^\circ$, across the band. Production antennas do not exceed rated values by more than 2 dB unless stated otherwise. |
| Gain, Mid Band | For a given frequency band, gain is primarily a function of antenna size. The gain of Andrew antennas is determined by either gain by comparison or by computer integration of the measured antenna patterns. |
| Operating Frequency Band | Bands correspond with CCIR recommendations or common allocations used throughout the world. Other ranges can be accommodated on special order. |
| Packing | Andrew standard packing is suitable for export. Antennas are shipped as standard in totally recyclable cardboard or wire-bound crates (dependent on product). For your convenience, Andrew offers heavy duty export packing options. |
| Radiation Pattern Envelope Reference (RPE) | Radiation patterns determine an antenna's ability to discriminate against unwanted signals under conditions of radio congestion. Radiation patterns are dependent on antenna series, size, and frequency. |
| Return Loss | The figure that indicates the proportion of radio waves incident upon the antenna that are rejected as a ratio of those that are accepted. |
| Side Force (FS) | Maximum side force exerted on the mounting pipe as a result of wind from the most critical direction for this parameter. The individual maximums specified may not occur simultaneously. All forces are referenced to the mounting pipe. |
| Twisting Moment (MT) | Maximum forces exerted on a supporting structure as a result of wind from the most critical direction for this parameter. The individual maximums specified may not occur simultaneously. All forces are referenced to the mounting pipe. |
| VSWR | Maximum; is the guaranteed Peak Voltage-Standing-Wave-Ratio within the operating band. |
| Wind Velocity Operational | The wind speed where the antenna deflection is equal to or less than 0.1 degrees. In the case of ValuLine antennas, it is defined as a maximum deflection of $0.3 \times$ the 3 dB beam width of the antenna. |
| Wind Velocity Survival Rating | The maximum wind speed the antenna, including mounts and radomes, where applicable, will withstand without permanent deformation. Realignment may be required. This wind speed is applicable to antenna with the specified amount of radial ice. |

PX4F-52 - Radiation Pattern Envelope



RPE: 4750

Engineering Approved:
28 March 2003



PX4F-52 - Radiation Pattern Envelope



RPE: 4750

Engineering Approved:
28 March 2003

| H/H | | H/V | | V/V | | V/H | |
|--------|--------|--------|--------|--------|--------|--------|--------|
| Angle | dB | Angle | dB | Angle | dB | Angle | dB |
| 0.00 | 0.00 | 0.00 | -30.00 | 0.00 | 0.00 | 0.00 | -30.00 |
| 0.60 | -0.30 | 6.50 | -30.00 | 0.60 | -0.30 | 5.50 | -30.00 |
| 1.10 | -1.30 | 15.00 | -51.00 | 0.90 | -0.95 | 14.80 | -51.00 |
| 1.80 | -3.70 | 30.00 | -51.00 | 1.50 | -2.60 | 45.00 | -51.00 |
| 2.30 | -6.80 | 44.72 | -55.00 | 1.90 | -4.10 | 75.00 | -58.00 |
| 2.60 | -9.30 | 180.00 | -55.00 | 2.20 | -5.75 | 180.00 | -58.00 |
| 2.90 | -11.00 | | | 2.60 | -8.00 | | |
| 6.00 | -11.00 | | | 2.90 | -9.90 | | |
| 15.00 | -27.00 | | | 3.00 | -11.50 | | |
| 21.00 | -27.00 | | | 6.00 | -11.50 | | |
| 26.50 | -36.50 | | | 10.50 | -23.00 | | |
| 44.50 | -36.50 | | | 15.00 | -23.00 | | |
| 53.50 | -40.00 | | | 17.50 | -28.50 | | |
| 85.00 | -40.00 | | | 22.50 | -28.50 | | |
| 110.00 | -52.00 | | | 26.90 | -34.00 | | |
| 180.00 | -52.00 | | | 80.00 | -34.00 | | |
| | | | | 110.00 | -52.00 | | |
| | | | | 180.00 | -52.00 | | |

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PX6F-52/A

1.8 m | 6 ft Standard Parabolic Unshielded, Dual-Polarized Antenna, unpressurized, 5.250–5.850 GHz

General Specifications

| | |
|-------------------|--|
| Antenna Type | PXF - Standard Parabolic Unshielded, Dual-Polarized Antenna, unpressurized |
| Diameter, nominal | 1.8 m 6 ft |
| Polarization | Dual |

Electrical Specifications

| | |
|--|----------------------|
| Beamwidth, Horizontal | 1.8 ° |
| Beamwidth, Vertical | 1.8 ° |
| Cross Polarization Discrimination (XPD) | 30 dB |
| Electrical Compliance | ETSI 302 217 Class 1 |
| Front-to-Back Ratio | 49 dB |
| Gain, Low Band | 37.0 dBi |
| Gain, Mid Band | 37.6 dBi |
| Gain, Top Band | 38.1 dBi |
| Operating Frequency Band | 5.250 – 5.850 GHz |
| Radiation Pattern Envelope Reference (RPE) | 4752 |
| Return Loss | 14.0 dB |
| VSWR | 1.50 |

Mechanical Specifications

| | |
|-------------------------------|--------------------|
| Fine Azimuth Adjustment | ±15° |
| Fine Elevation Adjustment | ±20° |
| Mounting Pipe Diameter | 115 mm 4.5 in |
| Net Weight | 70 kg 154 lb |
| Side Struts, Included | 1 inboard |
| Side Struts, Optional | 1 inboard |
| Wind Velocity Operational | 110 km/h 68 mph |
| Wind Velocity Survival Rating | 200 km/h 124 mph |

Wind Forces At Wind Velocity Survival Rating

| | |
|---------------------------|-------------------|
| Angle α for MT Max | -130 ° |
| Axial Force (FA) | 8779 N 1974 lbf |
| Side Force (FS) | 1946 N 437 lbf |
| Twisting Moment (MT) | 3826 N•m |

Product Specifications

COMMSCOPE®

PX6F-52/A



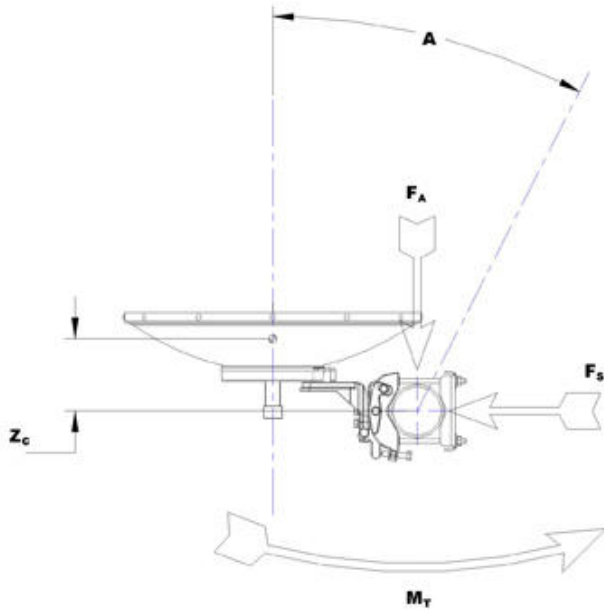
| | |
|---------------------------------------|-----------------|
| Weight with 1/2 in (12 mm) Radial Ice | 122 kg 269 lb |
| Zcg with 1/2 in (12 mm) Radial Ice | 347 mm 14 in |
| Zcg without Ice | 278 mm 11 in |

PX6F-52/A

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Wind Forces At Wind Velocity Survival Rating Image

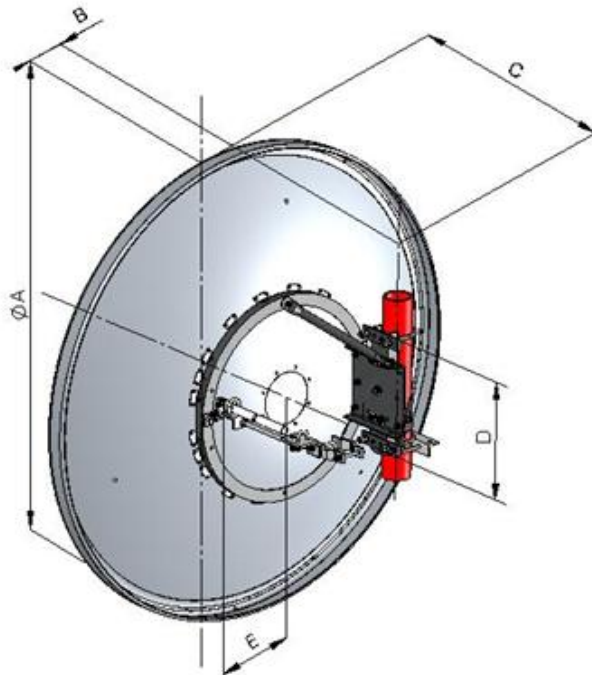


PX6F-52/A

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Antenna Dimensions And Mounting Information



| Dimensions in Inches (mm) | | | | | |
|---------------------------|-------------|------------|------------|------------|------------|
| Antenna Size, ft (m) | A | B | C | D | E |
| 6 (1.8) | 76.3 (1939) | 17.1 (435) | 17.9 (455) | 19.3 (490) | 14.3 (362) |

* Footnotes

| | |
|--|---|
| Axial Force (FA) | Maximum forces exerted on a supporting structure as a result of wind from the most critical direction for this parameter. The individual maximums specified may not occur simultaneously. All forces are referenced to the mounting pipe. |
| Cross Polarization Discrimination (XPD) | The difference between the peak of the co-polarized main beam and the maximum cross-polarized signal over an angle twice the 3 dB beamwidth of the co-polarized main beam. |
| Front-to-Back Ratio | Denotes highest radiation relative to the main beam, at $180^\circ \pm 40^\circ$, across the band. Production antennas do not exceed rated values by more than 2 dB unless stated otherwise. |
| Gain, Mid Band | For a given frequency band, gain is primarily a function of antenna size. The gain of Andrew antennas is determined by either gain by comparison or by computer integration of the measured antenna patterns. |
| Operating Frequency Band | Bands correspond with CCIR recommendations or common allocations used throughout the world. Other ranges can be accommodated on special order. |
| Radiation Pattern Envelope Reference (RPE) | Radiation patterns determine an antenna's ability to discriminate against unwanted signals under conditions of radio congestion. Radiation patterns |

PX6F-52/A

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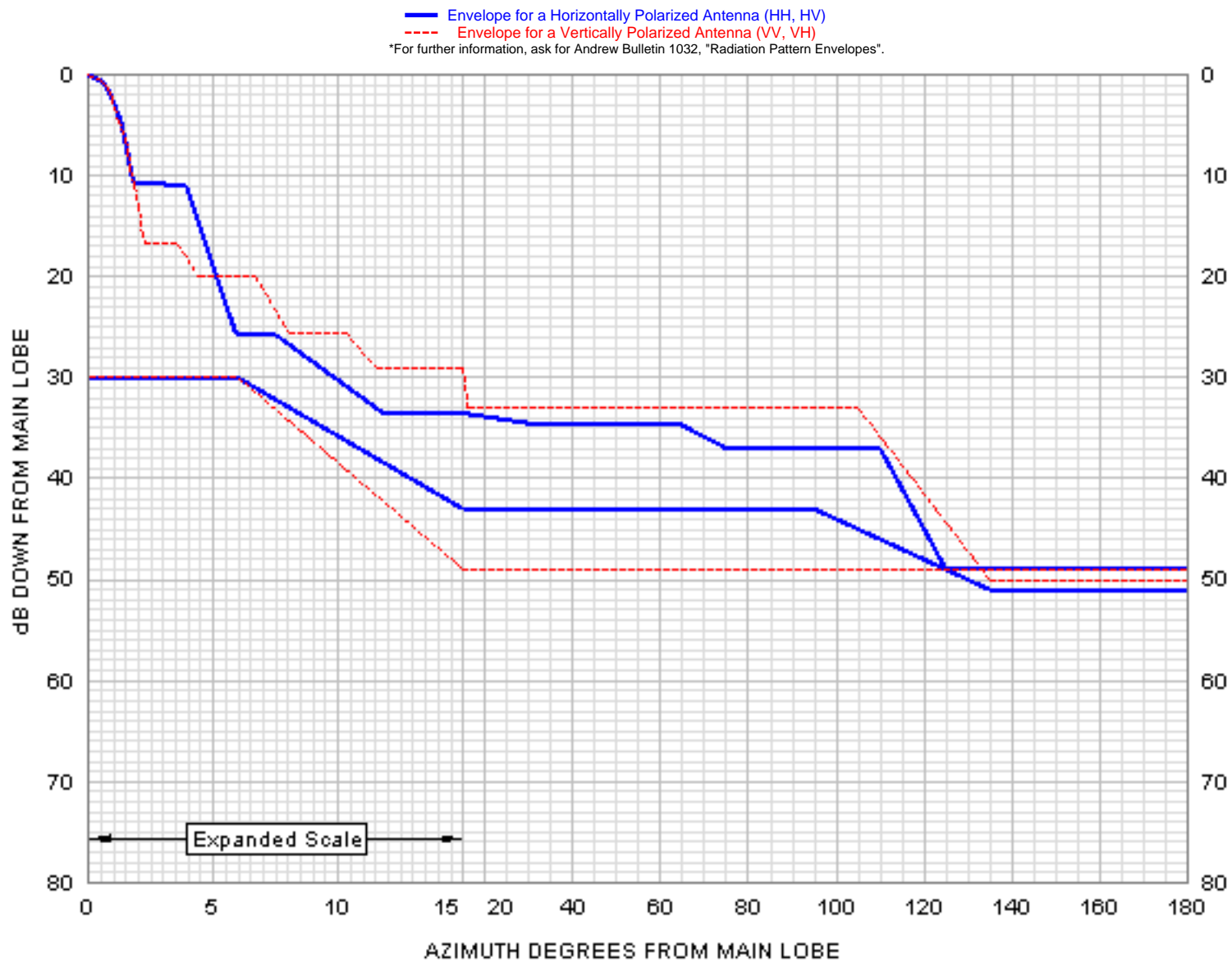
| | |
|-------------------------------|--|
| | are dependent on antenna series, size, and frequency. |
| Return Loss | The figure that indicates the proportion of radio waves incident upon the antenna that are rejected as a ratio of those that are accepted. |
| Side Force (FS) | Maximum side force exerted on the mounting pipe as a result of wind from the most critical direction for this parameter. The individual maximums specified may not occur simultaneously. All forces are referenced to the mounting pipe. |
| Twisting Moment (MT) | Maximum forces exerted on a supporting structure as a result of wind from the most critical direction for this parameter. The individual maximums specified may not occur simultaneously. All forces are referenced to the mounting pipe. |
| VSWR | Maximum; is the guaranteed Peak Voltage-Standing-Wave-Ratio within the operating band. |
| Wind Velocity Operational | The wind speed where the antenna deflection is equal to or less than 0.1 degrees. In the case of ValuLine antennas, it is defined as a maximum deflection of 0.3 x the 3 dB beam width of the antenna. |
| Wind Velocity Survival Rating | The maximum wind speed the antenna, including mounts and radomes, where applicable, will withstand without permanent deformation. Realignment may be required. This wind speed is applicable to antenna with the specified amount of radial ice. |

PX6F-52 - Radiation Pattern Envelope



RPE: 4752

Engineering Approved:
28 March 2003



PX6F-52 - Radiation Pattern Envelope



RPE: 4752

Engineering Approved:
28 March 2003

| H/H | | H/V | | V/V | | V/H | |
|--------|--------|--------|--------|--------|--------|--------|--------|
| Angle | dB | Angle | dB | Angle | dB | Angle | dB |
| 0.00 | 0.00 | 0.00 | -30.00 | 0.00 | 0.00 | 0.00 | -30.00 |
| 0.50 | -0.60 | 6.00 | -30.00 | 0.50 | -0.60 | 6.00 | -30.00 |
| 0.80 | -1.50 | 15.00 | -43.00 | 0.70 | -1.10 | 15.00 | -49.00 |
| 1.10 | -3.30 | 95.00 | -43.00 | 0.85 | -1.60 | 180.00 | -49.00 |
| 1.30 | -4.70 | 135.00 | -51.00 | 1.05 | -3.30 | | |
| 1.40 | -5.80 | 180.00 | -51.00 | 1.20 | -4.50 | | |
| 1.50 | -6.90 | | | 1.50 | -6.50 | | |
| 1.60 | -8.20 | | | 1.60 | -8.00 | | |
| 1.70 | -9.50 | | | 1.70 | -9.50 | | |
| 1.80 | -10.70 | | | 1.85 | -11.00 | | |
| 3.90 | -10.90 | | | 2.00 | -12.80 | | |
| 5.90 | -25.65 | | | 2.10 | -14.40 | | |
| 7.50 | -25.75 | | | 2.15 | -15.60 | | |
| 11.80 | -33.50 | | | 2.25 | -16.60 | | |
| 15.00 | -33.50 | | | 3.60 | -16.80 | | |
| 30.00 | -34.50 | | | 4.40 | -20.00 | | |
| 64.00 | -34.50 | | | 6.70 | -20.00 | | |
| 75.00 | -37.00 | | | 8.00 | -25.50 | | |
| 110.00 | -37.00 | | | 10.30 | -25.50 | | |
| 125.00 | -49.00 | | | 11.50 | -29.00 | | |
| 180.00 | -49.00 | | | 15.00 | -29.00 | | |
| | | | | 16.00 | -33.00 | | |
| | | | | 105.00 | -33.00 | | |
| | | | | 135.00 | -50.00 | | |
| | | | | 180.00 | -50.00 | | |

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