# Trooper<sup>™</sup> II Slender Dual Carrier GNSS Multiband Antenna, 5G Cellular with 802.11ax

Combination Antennas - GNSS, 5G Cellular and Wi-Fi

GL9X1AX-TRB, GL9X1AX-TRW, GL9X1AX-TRB-KIT, GL9X1AX-TRW-KIT

#### **Description**

Dual carrier multiband 5G cellular and 802.11ax antennas with high rejection GPS/ GLONASS, and slender footprint for high-speed Intelligent Transportation Systems and Industrial IoT applications.

#### **Technologies**

- 5G Cellular
- Wi-Fi
- GPS L1 / GLONASS

#### **Features**

- Four 5G FR1 elements
- High rejection GNSS for asset tracking
- Slender footprint
- Easy installation and/or replacement
- Weather proof, IP67 housing
- Built-in ground plane for installation flexibility
- Meets AAR certification requirements







### Trooper<sup>™</sup> II Slender Dual Carrier GNSS Multiband Antenna, 5G Cellular with 802.11ax

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The Trooper<sup>™</sup> II dual-carrier antenna platform supports the high speed requirements of complex RF communication systems used for Intelligent Transportation Systems (ITS), and Critical Communications applications. These antennas feature four 5G elements compatible with the world's leading multi-carrier cellular routers that support 600 MHz to 6 GHz frequencies. The platform also incorporates 802.11ax Wi-Fi MIMO connectivity, with four dual band 2.4/5 GHz Wi-Fi elements supporting DSRC 5.99 GHz applications. In addition, PCTEL's proprietary high-rejection multi-GNSS technology is included for high precision tracking and asset management.

#### **Features**

- Slender 4.6-inch footprint ideal for installations with limited surface space
- Metal 1-inch stud mount with slotted jam nut provides single cable exit for easier installation and/or antenna replacement
- IP67 compliant design provides maximum protection against water or dust ingress
- Built-in ground plane for maximum placement flexibility
- Proprietary high rejection filtering allows wide-band coverage while achieving superior out-of-band rejection for all GNSS frequencies superior out-of-band rejection for all GNSS frequencies
- Meets AAR certification requirements for rail applications

#### Certifications





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#### **Standard Configurations**

| Model           | Elements   | Cable  | Connector  | Mount   | <b>Housing Color</b> |
|-----------------|--|--|--|---|----------------------|
| GL9X1AX-TRB     | LTE (All ports)<br>Wi-Fi (All Ports)<br>GNSS (1)   | Four 2-ft RG-316<br>Four 2-ft RG-316<br>One 2-ft RG-316  | SMA Plug Male (LTE)<br>SMA Plug Male (Wi-Fi)<br>SMA Plug Male (GNSS) | 1-inch (25.4 mm)<br>hole, 3/4-inch long<br>(19.05 mm) zinc stud | Black                |
| GL9X1AX-TRW     | LTE (All ports)<br>Wi-Fi (All Ports)<br>GNSS (1)   | Four 2-ft RG-316<br>Four 2-ft RG-316<br>One 2-ft RG-316  | SMA Plug Male (LTE)<br>SMA Plug Male (Wi-Fi)<br>SMA Plug Male (GNSS) | mount with jam nut  | White                |
| GL9X1AX-TRB-KIT | LTE (All ports)<br>Wi-Fi (All Ports)<br>GNSS (1)   | Four 2-ft RG-316 kitted with 15-ft PFP-240<br>jumpers (total 17-feet coax)<br>Four 2-ft RG-316 kitted with 15-ft PFP-240<br>jumpers (total 17-feet coax)<br>One 2-ft RG-316 kitted with 15-ft PFP-240<br>jumper (total 17-feet coax) | SMA Plug Male (LTE)<br>SMA Plug Male (Wi-Fi)<br>SMA Plug Male (GNSS) |   | Black                |
| GL9X1AX-TRW-KIT | KW-KITLTE (All ports)<br>Wi-Fi (All Ports)<br>GNSS (1)Four 2-ft RG-316 kitted with 15-ft PFP-240<br>jumpers (total 17-feet coax)<br>Four 2-ft RG-316 kitted with 15-ft PFP-240<br>jumpers (total 17-feet coax)<br>One 2-ft RG-316 kitted with 15-ft PFP-240<br>jumper (total 17-feet coax) |  | SMA Plug Male (LTE)<br>SMA Plug Male (Wi-Fi)<br>SMA Plug Male (GNSS) |   | White                |

#### **Electrical Specifications – RF Antennas**

| F1       | F2                      |                  |     | Gain (dB) <sup>3</sup> |           | Efficiency <sup>3</sup> |           | Efficiency <sup>3</sup> |           |           | Nominal | Maximum |  |
|----------|-------------------------|------------------|-----|------------------------|-----------|-------------------------|-----------|-------------------------|-----------|-----------|---------|---------|--|
| (MHz)    | (MHz)                   | SWR <sup>2</sup> | Max | Typical                | Range (±) | Avg                     | Range (±) | <b>Polarization</b>     | Impedance | Power     |         |         |  |
| LTE Prim | LTE Primary Ports 1 & 3 |                  |     |                        |           |                         |           |                         |           |           |         |         |  |
| 617      | 698                     | 2.9              | 1.9 | 1.5                    | 0.5       | 51%                     | 2%        |                         |           |           |         |         |  |
| 698      | 802                     | 2.0              | 3.0 | 2.0                    | 1.2       | 54%                     | 6%        |                         |           |           |         |         |  |
| 824      | 894                     | 1.7              | 3.0 | 2.6                    | 0.1       | 58%                     | 1%        |                         |           |           |         |         |  |
| 880      | 960                     | 1.8              | 3.1 | 2.6                    | 0.6       | 56%                     | 1%        | Linear                  | 50 ohms   | 25 watts  |         |         |  |
| 1710     | 2200                    | 1.9              | 4.5 | 3.9                    | 0.8       | 48%                     | 3%        |                         | 50 011115 | 25 Walls  |         |         |  |
| 2300     | 2690                    | 1.6              | 4.4 | 4.0                    | 0.4       | 47%                     | 1%        |                         |           |           |         |         |  |
| 3400     | 4200                    | 2.0              | 5.0 | 4.5                    | 0.7       | 27%                     | 2%        |                         |           |           |         |         |  |
| 5150     | 5950                    | 2.0              | 5.2 | 3.6                    | 1.6       | 35%                     | 2%        |                         |           |           |         |         |  |
| LTE Seco | ondary Por              | ts 2 & 4         |     |                        |           |                         |           |                         |           |           |         |         |  |
| 617      | 698                     | 5.1              | 0.5 | 6                      | 1.8       | 29%                     | 12%       | Linear                  |           |           |         |         |  |
| 733      | 802                     | 2.3              | 2.0 | 1.0                    | 1.4       | 46%                     | 6%        |                         |           |           |         |         |  |
| 824      | 894                     | 2.9              | 1.2 | 1.0                    | 0.8       | 48%                     | 5%        |                         |           |           |         |         |  |
| 880      | 960                     | 4.0              | 1.2 | 1.0                    | 2.2       | 37%                     | 6%        |                         | 50 ohms   | 25 watts  |         |         |  |
| 1805     | 2200                    | 2.0              | 5.2 | 4.1                    | 1.1       | 41%                     | 4%        |                         | 50 011115 | 25 Walls  |         |         |  |
| 2300     | 2690                    | 1.8              | 5.0 | 4.8                    | 0.4       | 40%                     | 4%        |                         |           |           |         |         |  |
| 3400     | 4200                    | 1.4              | 5.7 | 4.7                    | 1.4       | 29%                     | 4%        |                         |           |           |         |         |  |
| 5150     | 5950                    | 2.0              | 6.4 | 5.0                    | 1.4       | 43%                     | 4%        |                         |           |           |         |         |  |
| Wi-Fi-V  | Wi-Fi-V                 |                  |     |                        |           |                         |           |                         |           |           |         |         |  |
| 2400     | 2500                    | 1.3              | 2.9 | 2.6                    | 0.3       | 46%                     | 1%        | Lincor                  | EQ abras  | 2E uvette |         |         |  |
| 4900     | 5900                    | 1.7              | 4.4 | 3.4                    | 1.0       | 33%                     | 3%        | Linear                  | 50 ohms   | 25 watts  |         |         |  |
| Wi-Fi-U  |                         |                  |     |                        |           |                         |           |                         |           |           |         |         |  |
| 2400     | 2500                    | 1.3              | 2.8 | 2.3                    | 0.5       | 48%                     | 1%        | Linear                  | 50 ohms   | 25 watts  |         |         |  |
| 4900     | 5900                    | 1.9              | 3.2 | 1.9                    | 1.3       | 31%                     | 6%        |                         |           |           |         |         |  |

<sup>2</sup> Typical SWR measured with 2-ft RG-316 cables and no ground plane.
<sup>3</sup> Gain and efficiency measured with 2-ft RG-316 cables and no ground plane. A 2-ft ground plane

would increase average gain values by approximately 0.5 dB.



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#### **Electrical Specifications – RF Antennas (continued)**

#### **Minimum Isolation (dB)**<sup>4</sup>

|                     | LTE Prim      | ary (1&3) | LTE Secon     | dary (2&4) | Wi-Fi        |      |
|---------------------|---------------|-----------|---------------|------------|--------------|------|
| LTE Primary (1&3)   | 600-960 MHz   | 15.0      | 600-960 MHz   | 13.0       | 617-960 MHz  | 25.0 |
|                     | 1.71-2.7 GHz  | 20.0      | 1.71-2.7 GHz  | 18.0       | 1.71-2.7 GHz | 20.0 |
|                     | 3.4-4.2 GHz   | 40.0      | 3.4-4.2 GHz   | 25.0       | 3.3-5.9 GHz  | 25.0 |
|                     | 5.15-5.95 GHz | 45.0      | 5.15-5.95 GHz | 35.0       |              |      |
| LTE Secondary (2&4) |               |           | 600-960 MHz   | 15.0       | 617-960 MHz  | 25.0 |
|                     |               |           | 1.71-2.7 GHz  | 20.0       | 1.71-2.7 GHz | 17.0 |
|                     |               |           | 3.4-4.2 GHz   | 20.0       | 3.3-5.9 GHz  | 25.0 |
|                     |               |           | 5.15-5.95 GHz | 35.0       |              |      |
| Wi-Fi               |               |           |               |            | 2.4-2.5 GHz  | 15.0 |
|                     |               |           |               |            | 4.9-5.9 GHz  | 30.0 |

#### **Electrical Specifications – GNSS Antenna**

| Frequency Range       | 1565 - 1608 MHz   |  |  |  |
|-----------------------|---|--|--|--|
| Amplifier Gain        | @ 3.0 VDC: 26 dB (typical)                                      |  |  |  |
| Output VSWR           | 2.0:1 (maximum)   |  |  |  |
| DC Current            | 25 mA (typical)   |  |  |  |
| DC Voltage            | 2.8 - 6.0 V (operating)<br>≤ 12.0 V (survivability)             |  |  |  |
| Noise Figure          | < 2.0 dB (typical)  |  |  |  |
| Out-of-Band Rejection | f0 = 1586 MHz<br>f0 ± 50 MHz: ≥ 60 dBc<br>f0 ± 60 MHz: ≥ 70 dBc |  |  |  |
| Nominal Gain          | 3 dBic @ 90°<br>-2 dBic @ 20°                                   |  |  |  |
| Polarization          | Right hand circular   |  |  |  |
| Nominal Impedance     | 50 ohms   |  |  |  |

#### **Mechanical Specifications**

#### **Physical**

| Dimensions (L x W x H)          | 10.5 L x 4.6 W x 3.5 H in (267 x 117 x 90 mm)  |  |  |  |
|---------------------------------|--|--|--|--|
| Weight                          | 2 lbs (.91 kg)   |  |  |  |
| Radome Construction             | UV-Stable Rugged Thermoplastics  |  |  |  |
| Operating / Storage Temperature | -40°C to +85°C   |  |  |  |
| Gasket Design & Construction    | Contour matching, conformable, thermoplastic-elastomer gasket designed to seal between radome and baseplate. Gasket flexes and conforms to contoured surfaces. Baseplate has a 3M* VHB mounting pad for anti-rotation. |  |  |  |

## For more information about this product contact your sales representative or visit > pctel.com/antenna-products

#### **Solving Complex Wireless Challenges**

PCTEL is a leading global provider of wireless technology, including purpose-built Industrial IoT devices, antenna systems, and test and measurement solutions. Trusted by our customers for over 25 years, we solve complex wireless challenges to help organizations stay connected, transform, and grow.



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