

TW7972XF



Multi-Constellation Triple-Band Antenna

Frequency Coverage: GPS L1, L2, L5 | GALILEO E1, E5a, E5b | BEIDOU B1, B2a, B2b | GLONASS G1, G2, G3 | NavIC L5 + L-Band

The TW7972XF is a precision-tuned surface mount triple-band Accutenna® technology antenna providing coverage for triple-band GPS/QZSS-L1/L2/L5, GLONASS-G1/G2/G3, Galileo-E1/E5a/E5b, BeiDou-B1/B2b/B2a, NavIC-L5, including the satellite-based augmentation system (SBAS) available in the region of operation [WAAS (North America), EGNOS (Europe), MSAS (Japan), or GAGAN (India)], plus L-Band correction services. It is especially designed for precision triple-frequency positioning.

The radio frequency spectrum has become more congested as new LTE bands are activated and their signals or harmonic frequencies [e.g. 800MHz x 2 = 1600MHz (GLONASS-G1)] can affect GNSS antennas and receivers. In North America, planned Ligado signals at 1525 - 1536 MHz can especially impact GNSS antennas that support space-based L-band correction services (1539 - 1559 MHz). New LTE signals in Europe [Band 32 (1452 - 1496 MHz)] and Japan [Bands 11 and 21 (1476 - 1511 MHz)] have also been observed to interfere with GNSS signals. In addition, Inmarsat satellite communication (uplink: 1626.5 - 1660.5 MHz) can also affect GNSS signals. The new Tallysman XF antennas have been designed to mitigate out-of-band signals and prevent GNSS antenna saturation. Calian's custom XF filtering mitigates all existing signals and new Ligado and LTE signals, enabling the antennas and attached GNSS receivers to perform optimally.

This antenna is ideal for precision agriculture, autonomous vehicle tracking and guidance, and other applications where precision matters. The TW7972XF provides superior multipath signal rejection, a linear phase response, and tight phase centre variation (PCV).

The TW7972XF features a precision-tuned, twin circular dual-feed, stacked patch element. The signals from the two orthogonal feeds are combined in a hybrid combiner, amplified in a wideband LNA, then band-split for narrow filtering in each band and further amplified prior to recombination at the output. The TW7972XF offers excellent axial ratio and a tightly grouped phase centre variation.

This antenna provides superior multipath rejection and axial ratio, a linear phase response, and tight phase centre variation (PCV), while protecting against intermodulation and saturation caused by high-level LTE 700 MHz signals. The TW7972XF is housed in a magnetic mounted, IP67 weatherproof enclosure. A 100 mm diameter ground plane is recommended for optimal antenna performance.



Applications

- Autonomous vehicle tracking and guidance
- Positive Train Control (PTC)
- Positive Train Location (PTL)
- Precision GNSS positioning
- Precision agriculture
- Triple-frequency RTK and PPP receivers
- Law enforcement and public safety

Features

- Very low noise preamp (< 2.5 dB typ.)
- Low axial ratio (< 2 dB at zenith)
- Tight phase centre variation
- High-gain LNA (32 dB typ.)
- Low current (32 mA typ.)
- ESD circuit protection (15 kV)
- Invariant performance from 2.5 to 16 VDC
- IP67, REACH, and RoHS compliant

Benefits

- Excellent interference mitigation
- Excellent multipath rejection
- Increased system accuracy
- Excellent signal-to-noise ratio

About Calian: With global headquarters and manufacturing in Ottawa, Canada, Calian is a leading manufacturer of high-precision antennas and components for Global Navigation Satellite System (GNSS) applications. Calian's mission is to support the needs of a new generation of positioning systems by delivering unprecedented antenna precision at competitive prices. Learn more at www.calian.com/gnss

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Antenna - Measured with a 100 mm ground plane

Technology

Dual-feed Stacked RHCP ceramic patch

| | | Gain | Axial Ratio |
|---------------------------------------|---------|---------------------|--------------|
| | | dBic typ. at Zenith | dB at Zenith |
| GNSS | | | |
| GPS / QZSS | L1 | 4.0 | < 1.0 |
| | L2 | 4.0 | < 1.5 |
| | L5 | -1.5 | < 2.0 |
| GLONASS | G1 | 2.5 | < 1.5 |
| | G2 | 2.5 | < 2.0 |
| | G3 | 2.5 | < 2.0 |
| Galileo | E1 | 4.0 | < 1.0 |
| | E5A | -1.5 | < 2.0 |
| | E5B | 2.5 | < 2.0 |
| | E6 | - | - |
| BeiDou | B1 | 4.0 | < 1.0 |
| | B2b | 2.5 | < 1.5 |
| | B2a | -1.5 | < 2.0 |
| | B3 | - | - |
| IRNSS / NavIC | L5 | -1.5 | < 2.0 |
| QZSS | L6 | - | - |
| L-Band Services (1525 MHz - 1559 MHz) | | 3.5 | < 1.0 |
| Satellite Communications | | | |
| Iridium | | - | - |
| Globalstar | | - | - |
| Other | | | |
| Axial Ratio at 10° | - | Efficiency | - |
| PC Variation | ± 10 mm | - | - |

Mechanicals

| | |
|----------------------|-----------------------------------|
| Size | 69 mm (dia.) x 22 mm (h.) |
| Weight | 180 g |
| Radome | LEXAN™ EXL9330, Base: Zamac Metal |
| Mount | Magnetic |
| Available Connectors | See Ordering Guide |

Environmental

| | |
|-----------------------|--|
| Operating Temperature | -40 °C to +85 °C |
| Storage Temperature | -50 °C to 105 °C |
| Vibration | MIL-STD-810-E - Test Method 514.5 |
| Shock | MIL-STD-810G Method 516.6 |
| Salt Fog | MIL-STD-810-F - Test Method 509.5 |
| IP Rating | IP67 |
| Compliance | IPC-A-610, FCC, RED / CE Mark, RoHS, REACH |

Warranty

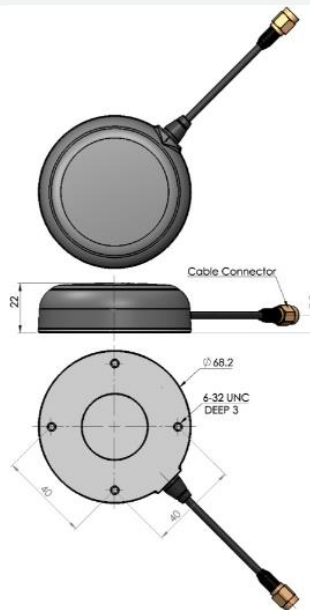
| | |
|------------------|--------------------------|
| Parts and Labour | 3-year standard warranty |
|------------------|--------------------------|

Low Noise Amplifier (LNA) - Measured at 3V and 25°C

| Frequency Bandwidth | | Out of Band Rejection |
|---------------------|-----------------|--|
| Lower Band | 1164 - 1254 MHz | ≥ 70 dB @ ≤ 1050 MHz ≥ 65 dB @ ≤ 1125 MHz ≥ 70 dB @ ≥ 1350 MHz |
| L-Band Corr. | 1539 - 1559 MHz | ≥ 65 dB @ ≤ 1500 MHz ≥ 45 dB @ ≤ 1525 MHz ≥ 05 dB @ ≤ 1536 MHz ≥ 30 dB @ ≥ 1626 MHz ≥ 65 dB @ ≥ 1650 MHz |
| Upper Band | 1559 - 1606 MHz | |

| | |
|------------------------|--|
| Architecture | eXtended Filtering |
| Gain | 32 dB typ., 30 dB min. |
| Noise Figure | 2.5 dB typ. |
| VSWR | < 1.5:1 typ., 1.8:1 max |
| Supply Voltage Range | 2.5 to 16 VDC nominal, up to 50mV p-p ripple |
| Supply Current | 32 mA typ. |
| ESD Circuit Protection | 15 kV air discharge |
| P 1dB Output | 11 dBm typ. |
| Group Delay | 12 (L1), 7 (L2, L5) [ns] |
| PCO | - |

Mechanical Diagram



Ordering Information

Part Number **33-7972XF-xx-yyyy**

Where xx = connector type; yyyy = cable length in mm

Please refer to our **Ordering Guide** to review available radomes and connectors at:
<https://at.calian.com/gnss/information-support/part-number-ordering-guide/>