

## Embedded Multi-Constellation Full-Band Antenna

Frequency Coverage: GPS L1, L2, L5 | QZSS L6 | GALILEO E1, E5a, E5b, E6 | BEIDOU B1, B2a, B2b, B3 | GLONASS G1, G2, G3 | NavIC L5 + L-Band

The TW3997EXF is an embedded precision-tuned full-band Accutenna® technology antenna providing coverage for GPS/QZSS-L1/L2/L5/L6, GLONASS-G1/G2/G3, Galileo-E1/E5a/E5b/E6, BeiDou-B1/B2/B2a/B3, 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 Corrections. 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 Corrections (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.

Ideal for autonomous vehicle tracking and guidance, precision agriculture, and other applications where precision matters, the TW3997EXF provides superior multipath signal rejection, a linear phase response, and tight phase centre variation (PCV).

The TW3997EXF 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 antenna also has a strong pre-filter to mitigate inter-modulated signal interference from Ligado, LTE and other cellular bands. The TW3997EXF offers excellent axial ratio and a tightly grouped phase centre variation.

The standard housed TW3990XF antenna (37 dB gain) and the higher gain embedded TW3990EXF (37 dB gain) are also available.



### Applications

- Autonomous vehicle tracking and guidance
- Full-band RTK and PPP receivers
- Precision GNSS position
- Precision agriculture
- Network timing & synchronization
- Law enforcement and public safety

### Features

- Very low noise preamp (2.5 dB typ.)
- Low axial ratio (< 2.0 dB typ.)
- Tight phase centre variation
- High-gain LNA (28 dB typ.)
- Low current (26 mA typ.)
- ESD circuit protection (15 kV)
- Invariant performance from 2.5 to 16 VDC

### Benefits

- Ideal for full-band RTK surveying systems
- Great multipath rejection
- Increased system accuracy
- Great signal-to-noise ratio
- CE RED, RoHS, and REACH compliant

**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](http://www.calian.com)

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Antenna - Measured with a 100 mm ground plane

Technology Dual-feed Stacked RHCP ceramic patch

| GNSS                                  |         |                    |              |
|---------------------------------------|---------|--------------------|--------------|
|                                       |         | Gain               | Axial Ratio  |
|                                       |         | dBi typ. at Zenith | dB at Zenith |
| GPS / QZSS                            | L1      | 4.0                | < 1          |
|                                       | L2      | 4.0                | < 1          |
|                                       | L5      | -1.5               | < 1.5        |
| GLONASS                               | G1      | 2.5                | < 1.5        |
|                                       | G2      | 2.5                | < 1.5        |
|                                       | G3      | 2.5                | < 1.5        |
| Galileo                               | E1      | 4.0                | < 1          |
|                                       | E5A     | -1.5               | < 1.5        |
|                                       | E5B     | 2.5                | < 1.5        |
|                                       | E6      | -3.0               | < 1.5        |
| BeiDou                                | B1      | 4.0                | < 1          |
|                                       | B2b     | 2.5                | < 1.5        |
|                                       | B2a     | -1.5               | < 1.5        |
|                                       | B3      | -2.0               | < 1.5        |
| IRNSS / NavIC                         | L5      | -1.5               | < 1.5        |
| QZSS                                  | L6      | -3.0               | < 1.5        |
| L-Band Services (1539 MHz - 1559 MHz) |         | 3.5                | < 1          |
| Satellite Communications              |         |                    |              |
| Iridium                               | -       | -                  | -            |
|                                       | -       | -                  | -            |
| Other                                 |         |                    |              |
| Axial Ratio at 10°                    | -       | Efficiency         | -            |
| PCV Φ > 15°                           | ± 10 mm | PCO                | -            |

## Mechanicals

|                      |   |
|----------------------|---|
| Size                 | 62 mm (dia.) x 17 mm (h.) (see diagram) |
| Weight               | 70 g                                    |
| Radome               | -                                       |
| Mount                | 5 x M2 screws                           |
| Available Connectors | Please refer to ordering guide          |

## Environmental

|                       |                                       |
|-----------------------|---------------------------------------|
| Operating Temperature | -40 °C to +85 °C                      |
| Storage Temperature   | -55 °C to +95 °C                      |
| Vibration             | MIL-STD-810D Method 514.3-1           |
| Shock                 | Vertical axis: 50 G, other axes: 30 G |
| Salt Fog              | MIL-STD-810F Section 509.4            |
| Other Tests           | -                                     |
| IP Rating             | -                                     |
| Compliance            | IPC-A-610, FCC, CE RED, RoHS, REACH   |

## Warranty

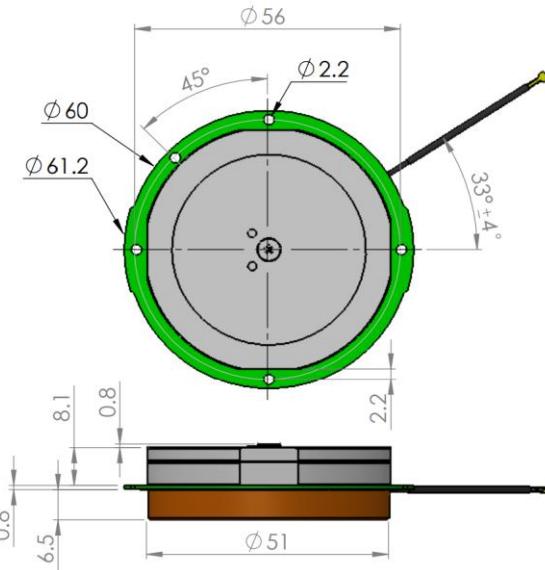
|                  |                          |
|------------------|--------------------------|
| Parts and Labour | 1-year standard warranty |
|------------------|--------------------------|

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

| Frequency Bandwith |                 | Out of Band Rejection  |
|--------------------|-----------------|--|
| Lower Band         | 1164 - 1300 MHz | ≥ 85 dB @ ≤ 0950 MHz<br>≥ 70 dB @ ≤ 1125 MHz<br>≥ 75 dB @ ≥ 1350 MHz |
| L-Band Corr.       | 1539 - 1559 MHz | ≥ 65 dB @ ≤ 1500 MHz<br>≥ 45 dB @ ≤ 1525 MHz                         |
| Upper Band         | 1559 - 1606 MHz | ≥ 05 dB @ ≤ 1536 MHz<br>≥ 30 dB @ ≥ 1626 MHz<br>≥ 65 dB @ ≥ 1650 MHz |

|                        |  |
|------------------------|--|
| Architecture           | eXtended Filtering                           |
| Gain                   | 28 dB typ., 26 dB min.                       |
| Noise Figure           | 2.5 dB typ.                                  |
| VSWR                   | < 1.5:1 typ., 2:1 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           | -  |
| Group Delay            | -  |

Mechanical Diagram - Units in 'mm' or 'inches' where specified



## Ordering Information

Part Number **33-3997EXF-xx-zzzz**  
Where xx = connector type and zzzz = cable length in mm (where applicable)

Please refer to our **Ordering Guide** to review available radomes and connectors at:  
<https://www.tallysman.com/resource/tallysman-ordering-guide/>

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