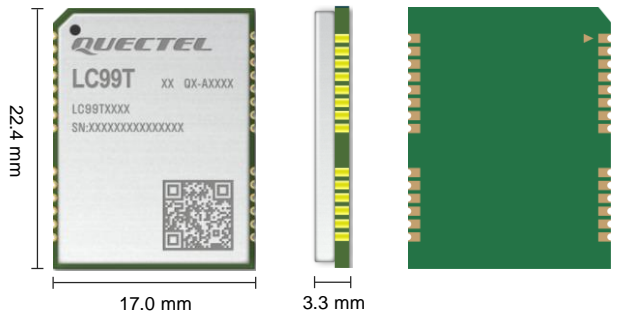


# Quectel LC99T (IA)

## High-Precision Timing GNSS Module



Quectel LC99T (IA) is a dual-band high-precision timing GNSS module, which can concurrently track GPS, GLONASS, Galileo, BDS, QZSS and NavIC satellite signals. It also supports SBAS (including WAAS, EGNOS, MSAS and GAGAN) and the AGNSS functionality. In contrast to single-band GNSS modules, it tracks a substantially greater number of visible satellites, enhancing overall signal reception. With nanosecond timing accuracy, the module is particularly well suited for infrastructure applications with precise timing requirements.

LC99T (IA) is designed to meet the most stringent timing synchronization requirements within global 4G/5G mobile networks. In addition, the module can generate a 10 MHz square wave for various applications. By effectively minimizing timing errors of the primary source of cellular network synchronization, it empowers operators to maximize their network performance. Simultaneously, LC99T (IA) meets the strict synchronization demands of the next-generation networks across various vertical industries such as 5G X-Haul, smart grid, data centers, satellite communications, calibration services, and industrial automation applications.

The module's multi-band capability reduces timing errors to less than 13.6 ns under open-sky conditions. Additionally, it is designed and manufactured in accordance with the stringent Quality Management System, aligning with the IATF 16949:2016 Standard.



## Key Features

- ✓ Multi-GNSS engine for GPS, GLONASS, Galileo, BDS, QZSS and NavIC
- ✓ Ideal for dense urban canyons and multi-path environments
- ✓ AGNSS
- ✓ Optimized accuracy and availability with survey-in (Auto Position Hold) and single-satellite timing
- ✓ L1 + L5 bands
- ✓ PPS, synchronized to GNSS/UTC within 13.6 ns (1 sigma)
- ✓ 10 MHz frequency output



AGNSS  
Technology



Multi-Constellation  
System



RoHS Compliant



Tracking Sensitivity:  
-160 dBm



Operating Temperature  
Range: -40 °C to +85 °C



Anti-jamming

# Quectel LC99T (IA)

| GNSS Module  | LC99T (IA)   |
|--|--|
| Dimensions   | 22.4 mm × 17.0 mm × 3.3 mm   |
| Weight   | Approx. 2.0 g  |
| Temperature Range  |  |
| Operating Temperature  | -40 °C to +85 °C   |
| Storage Temperature  | -40 °C to +90 °C   |
| GNSS Features  |  |
| Supported Bands  | GPS: L1 C/A; L5<br>GLONASS: L1<br>Galileo: E1; E5a<br>BDS: B1I; B1C; B2a<br>QZSS: L1 C/A; L5<br>NavIC: L5  |
| Default Constellations   | GPS + GLONASS + Galileo + BDS + QZSS + NavIC   |
| Number of Channels   | 80 Tracking Channels<br>4 Fast Acquisition Channels  |
| Number of Concurrent GNSS constellations                           | 5 + QZSS   |
| SBAS   | WAAS, EGNOS, MSAS and GAGAN  |
| Horizontal Position Accuracy <sup>①</sup>                          | Autonomous: 1.0 m  |
| Velocity Accuracy <sup>②</sup>                                     | Without Aid: 0.1 m/s   |
| Acceleration Accuracy <sup>②</sup>                                 | Without Aid: 0.1 m/s <sup>2</sup>  |
| 1PPS Timing Accuracy <sup>②</sup>                                  | < 13.6 ns @ 1σ   |
| 1PPS Jitter <sup>②</sup>   | ±6.5 ns  |
| Frequency Reference <sup>②</sup>                                   | 10 MHz ±0.05 ppm   |
| TTF (with AGNSS) <sup>③</sup>                                      | Warm Start: 5 s  |
| TTF (without AGNSS) <sup>②</sup>                                   | Cold Start: 35 s<br>Warm Start: 28 s<br>Hot Start: 2 s   |
| Sensitivity (@ Default Constellations) <sup>④</sup>                | Acquisition: -145 dBm<br>Tracking: -160 dBm<br>Reacquisition: -153 dBm   |
| Dynamic Performance <sup>②</sup>                                   | Maximum Altitude: 18000 m<br>Maximum Velocity: 515 m/s<br>Maximum Acceleration: 4g   |
| Certifications   |  |
| Regulatory   | Europe: CE   |
| Others   | RoHS   |
| Interface  |  |
| UART   | Adjustable: 115200–921600 bps<br>Default: 460800 bps<br>Update Rate: 1 Hz (default), up to 10 Hz   |
| Protocol   |  |
| Protocol   | NMEA 0183  |
| External Antenna Interface   |  |
| Antenna Type   | Active <sup>⑤</sup>  |
| Antenna Power Supply   | External or through VDD_RF pin   |
| Electrical Characteristics   |  |
| Supply Voltage Range   | 3.0–3.6 V, Typ. 3.3 V  |
| I/O Voltage  | Following VCC  |
| Current Consumption (@ Default Constellations, 3.3 V) <sup>②</sup> | <b>Normal Operation:</b><br>290 mA (957 mW) @ Acquisition<br>285 mA (940.5 mW) @ Tracking<br><b>Power Saving Mode:</b><br>55 μA (181.5 μW) @ Backup mode |

## NOTE:

- ①: CEP, 50 %, 24 hours static, -130 dBm, more than 6 SVs.
- ②: Default constellations, room temperature, all satellites at -130 dBm.
- ③: Open-sky, active high-precision GNSS antenna.
- ④: Tested with an external LNA with 16.5 dB gain and 0.85 dB noise figure.
- ⑤: To further mitigate the impact of out-of-band signals on GNSS module performance, you must choose the active antenna whose SAW filter is placed in front of the LNA in the internal framework. DO NOT place the LNA in the front.