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ST Solution for Precise Positioning based on TeseoV and TeseoAPP

Sept 2020

GNSS receiver serving our everyday life

Traditional applications using GNSS receivers

- **Positioning:** Smartphones offering location feature coupled with services and map
- **Mobility:** Planes, trains, boats and buses equipped with positioning box to provide location at any time
- **Driving:** Infotainment system in vehicle equipped with GNSS receiver to guide driver to reach their destination
- **Logistic:** e-commerce company such as JD developed it own logistic information system to lower cost and increase efficiency
  - ✓ > 6 million commercial vehicles
  - ✓ >80,000 buses in 36 cities
- **Farming:** Agriculture machinery based on GNSS makes agricultural operations safer and more accurate (tractors, drones, …)
- **Surveying:** purposes of mapping, establishing property boundaries, and topographic evaluation for construction, map deformation among others
- **Emergency and disaster relief**: platform deployed to dispatch 1st aid vehicle resources

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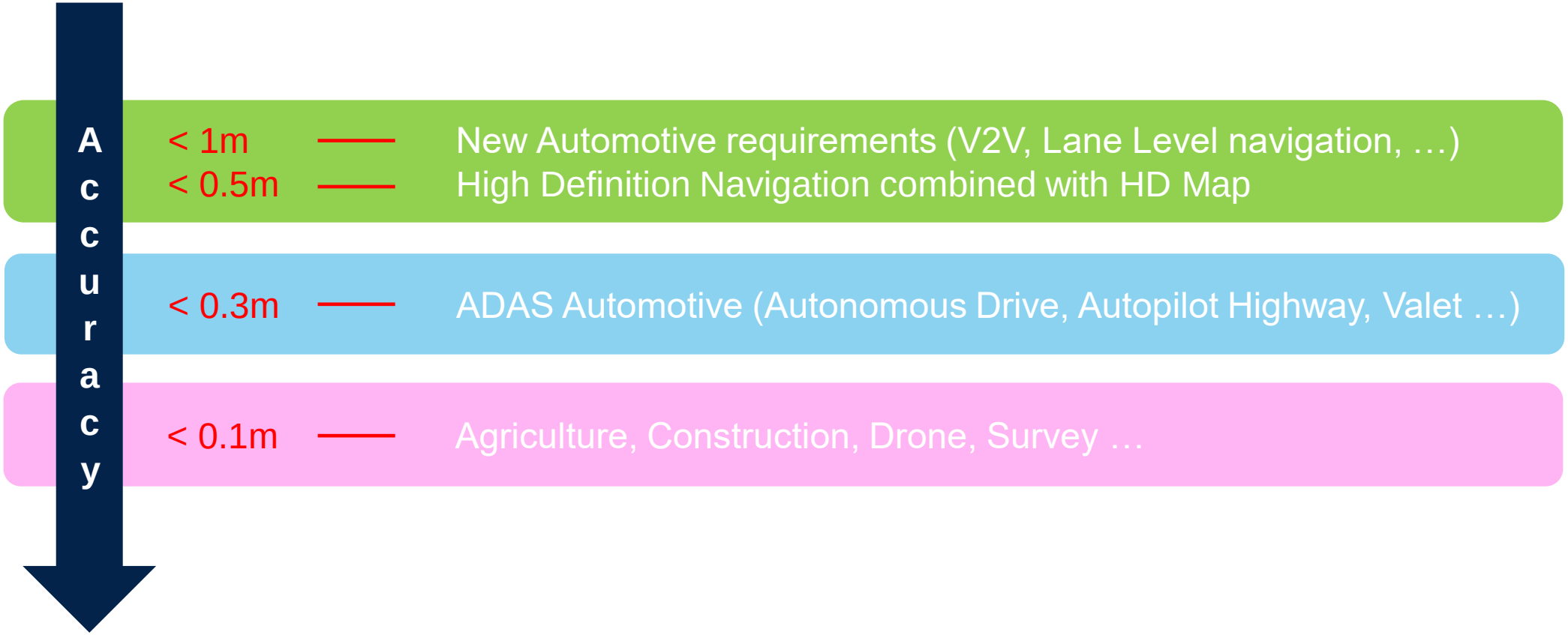
GNSS market moving to High Precision accuracy

Cost effective solution with higher accuracy in all environments and globally available



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TeseoV & TeseoAPP GNSS Precise Positioning families

Up to Triple Band GNSS receiver ASIL B

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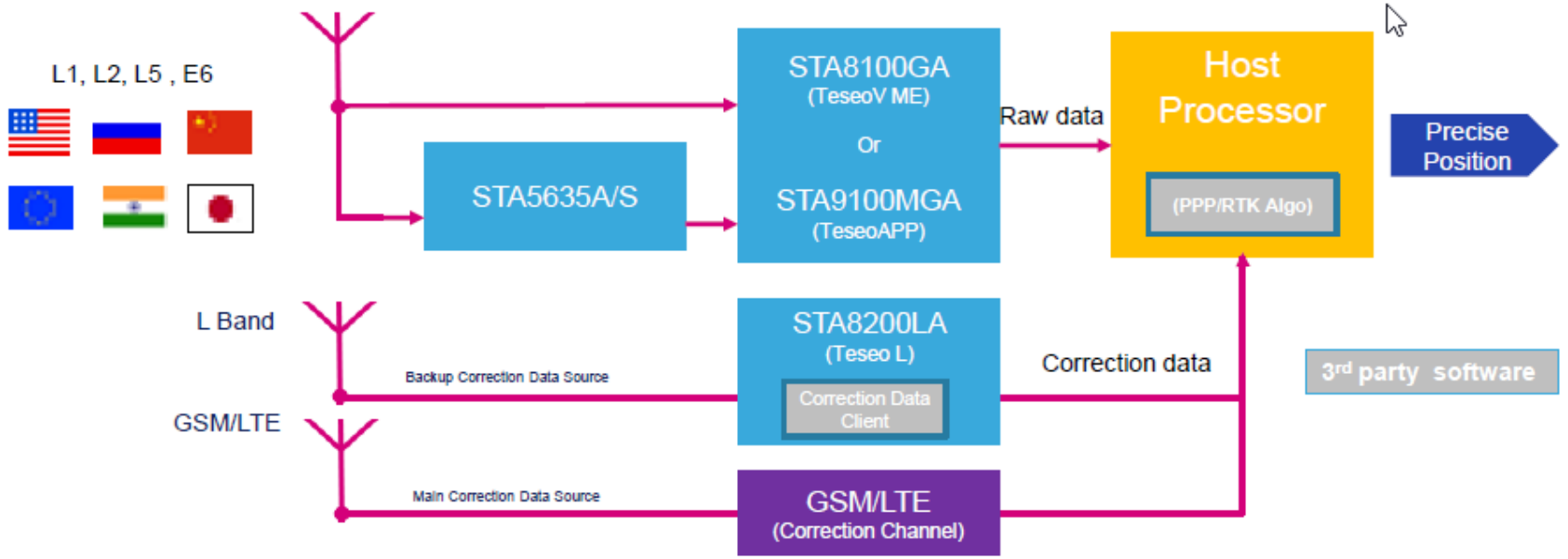
TeseoV & TeseoAPP Powerful GNSS platform

Single, Dual and Triple Frequency Architecture



		GPS / QZSS			GLONASS		BEIDOU			GALILEO				IRNSS	SBAS
		L1C/A	L2C	L5	L1OF	L2OF	B1I / B1C	B2I	B2a	E1	E5a	E5b	E6	L5	L1
case1	Dual Band L1/L5 (without STA5635A) *	I		I			I		I	I	I			I	I
case2	Dual Band L1/L5 *	I		E	I		I		E	I	E			E	I
case3	Dual Band L1/L2 *	I	E		I	E	I	E		I		E			I
case4	Triple Band L1/L5/E6*	I		I						I	I		E		I
case5	Triple Band L1/L2/L5 *	I	E	I			I	E	I	I	I	E			I

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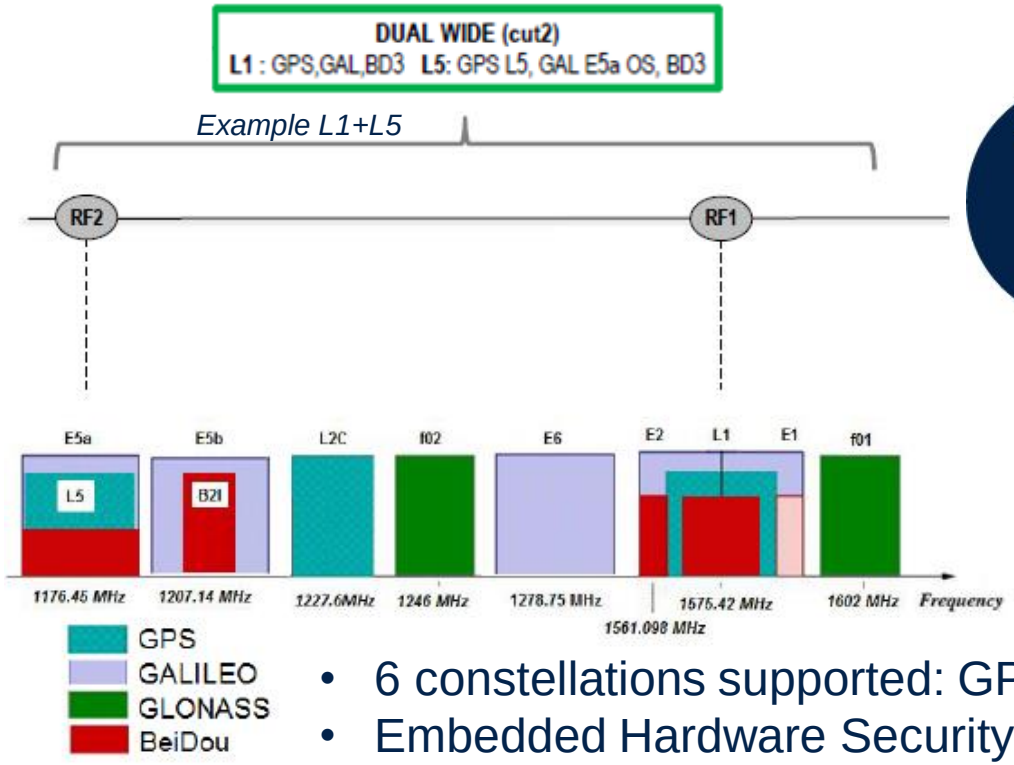
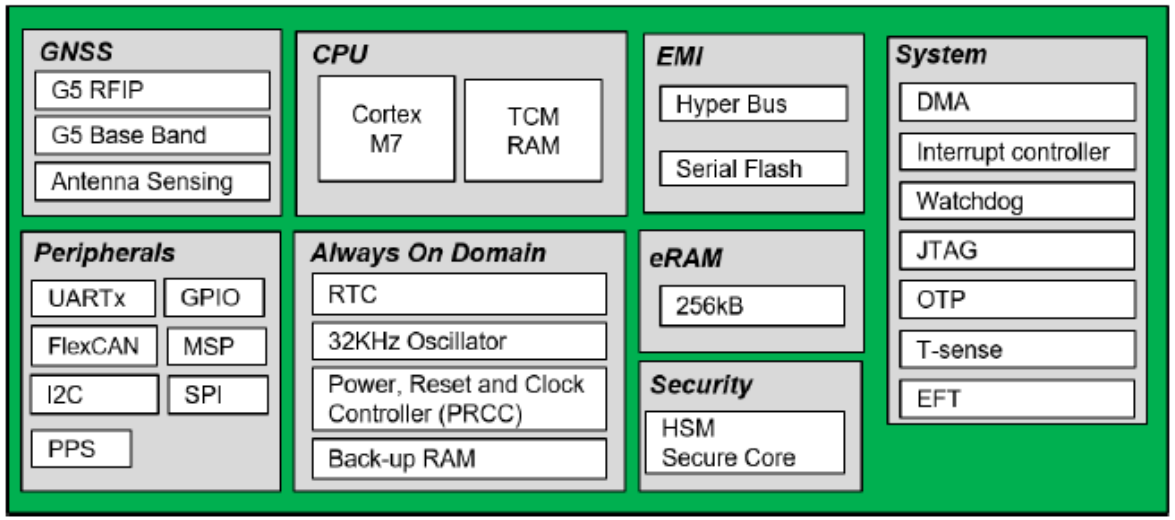
TeseoV STA8100GA

Multi Band, Multi constellation GNSS receiver

SAL
8x8mm BGA81
0.8mm pitch





- 6 constellations supported: GPS, GALILEO, GLONASS, BEIDOU, QZSS, IRNSS
- Embedded Hardware Security for Secure Boot
- Dedicated interface allows receiving GNSS data from the external RF front-end STA5635A
- Provide to host CPU Raw measurements of all the visible GNSS satellites, PVT and timing information

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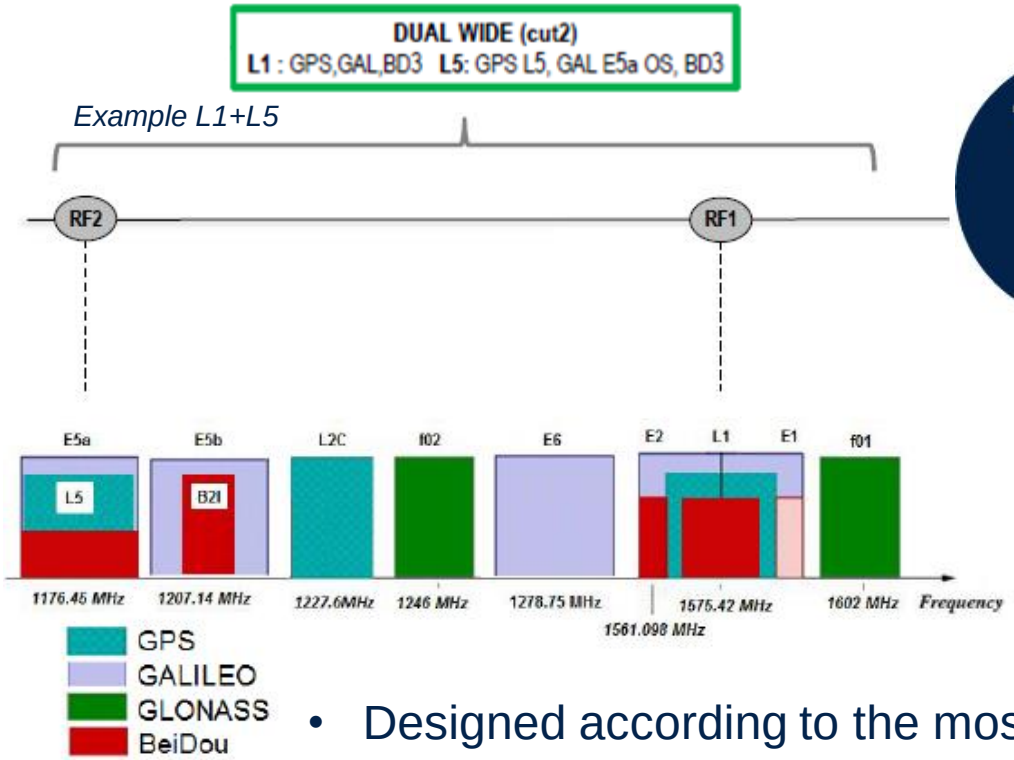
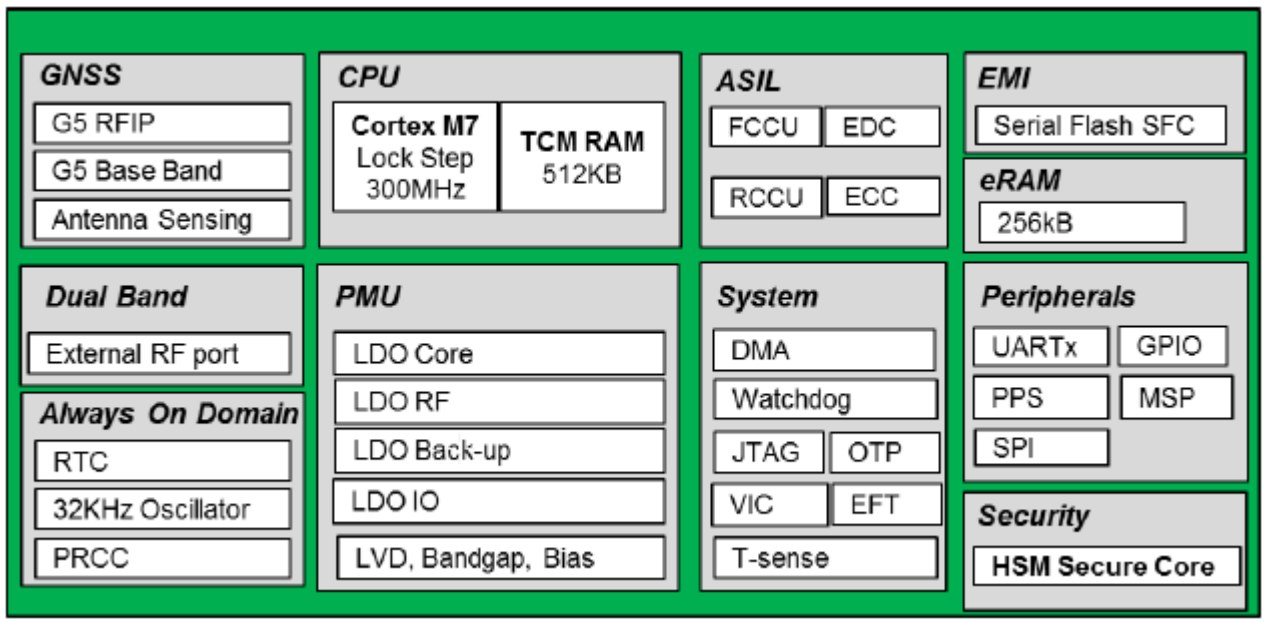
TeseoAPP STA9100MGA

Multi Band, Multi constellation GNSS receiver for ASIL B Precise Positioning

8x8mm BGA81
0.8mm pitch
ASIL





- Designed according to the most stringent automotive safety standards ISO 26262 to guarantee full autonomous driving type of applications requiring the automotive safety integrity levels ASIL-B
- Pin to pin compatible w/ TESEOV

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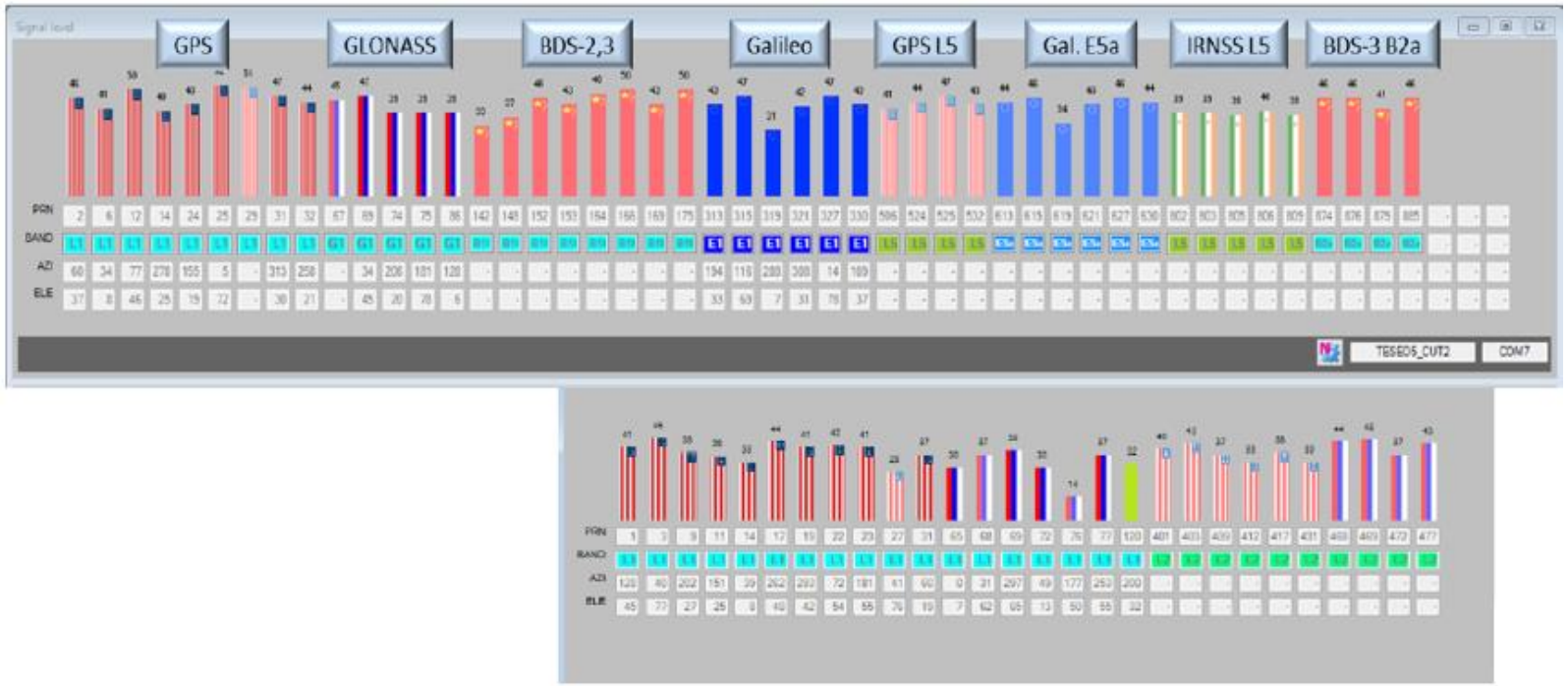
TeseoV Evaluation Kit

TeseoV EVB to multi-frequency, multi-constellation performances assessment



Provides an easy to use evaluation board to test GNSS multifrequency performances of TeseoV

- One single GNSS inputs for both L1 and L1/L5 Bands
- Board host TeseoV dual band module (26pins, 23 x 18mm)

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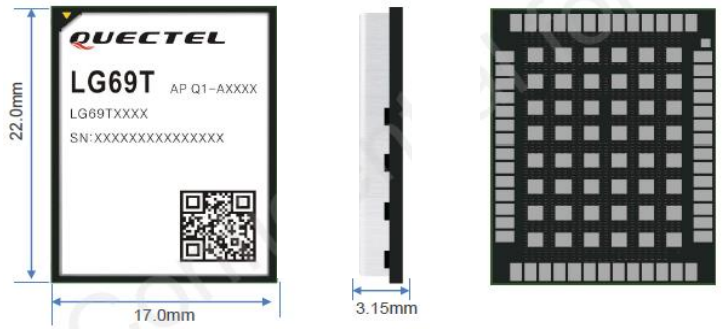
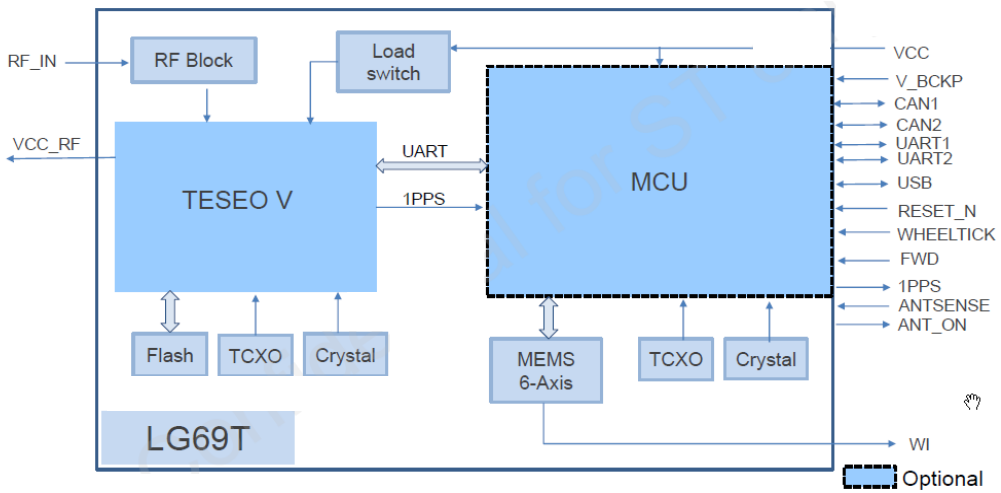
LG69T-AP Module: QUECTEL

LG69T-AP for high precision Positioning application with TeseoV





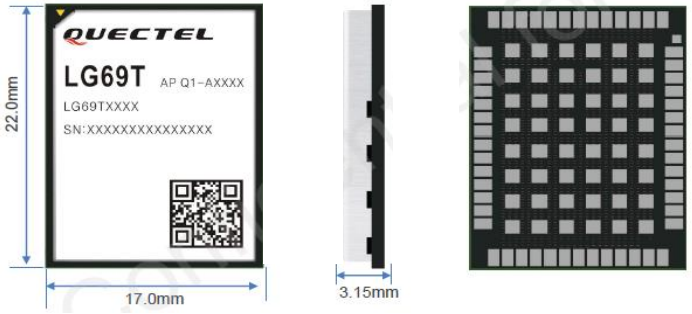
Automotive Grade

LG69T (AP): RTK + DR Integrated

- TeseoV
- L1+L5 Dual Band GNSS
- High Performance MCU Embedded
- 6-axis sensor integrated
- RTK integrated for High precision positioning (cm level)
- DR integrated for High precision positioning coupled with Sensors
- GNSS Raw Data Output
- Sensor Raw Data Output
- Automotive Grade

LG69T Module: QUECTEL

LG69T AP High Level specifications



Dimensions (mm)	22.0 × 17.0 × 3.15
Weight (g)	1.9
GNSS Features	
Supported Bands	GPS L1 C/A Galileo E1 B/C QZSS L1 C/A GPS L5 Galileo E5a QZSS L5 NAVIC (IRNSS) L5 BeiDou B1I/C/ B2a
Channels	80 Tracking Channels 4 Fast Acquisition Channels
SBAS	WAAS, EGNOS, MSAS, GAGAN
Horizontal Position Accuracy①	Autonomous: <1.2m CEP **RTK: <0.15m CEP**
Velocity Accuracy①	Without Aid: <0.1m/s **RTK: <0.05 m/s**
Convergence Time ①	With RTK: <10s
Timing Accuracy①	<20ns
TTFF② (Without A-GNSS)	Cold Start: <33s Warm Start: <25s Hot Start: <1.5s
Sensitivity②	Acquisition: -147dBm Tracking: -163dBm Reacquisition: -156dBm
Dynamic Performance③	Maximum Altitude: 18000m Maximum Velocity: 515m/s Maximum Acceleration: 4.0g
Dynamic Heading Accuracy①	<0.15° CEP @80Km/h
Navigation Update Rate	RAW: 10Hz PVT: 10Hz RTK: 50Hz **IMU: 100Hz**

Interfaces	
UART	× 2 Adjustable: 115200bps~921600bps Default: 460800bps
I2C	× 1 Master, Slave Up to 1Mbps
SPI	× 1 Master, Slave Up to 150Mbps
CAN	× 2 Up to 1Mbps
Protocols	
Protocols	NMEA 0183 / RTCM 3.x
External Antenna Interface	
Antenna Type	Active
Antenna Power Supply	External
Electrical Features	
Supply Voltage Range	3.0V~3.6V, Typical 3.3V
I/O Voltage	Typical 3.3V

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Thank you

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