GM-903, Cm-level RTK, L1/L2 Dual-band, Bluetooth/ USB GNSS Smart Antenna Module

RoHS Compliant





Overview

GM-903 is equipped with high-sensitivity, high precision **u-blox ZED-F9P** GNSS engine, GNSS multi-band antenna, backup battery, SPP/BLE in a compact module.

Mounted with wide-band antenna, this module supports dual band L1/L2 and multi-satellite systems GPS/GLONASS/BEIDOU/Galileo/QZSS simultaneously in one design.

This receiver exhibits fast RTK fix, reliable performance, high update rate for highly dynamic applications and centimeter accuracy in a small and energy-efficient way. **It could be served as either a RTK rover or RTK base**.

Bluetooth SPP profile is supported for the popular legacy applications. The BT device name is unique for clearly identification. The BT baud rate could be updated via air by user.

NMEA/RTCM messages could be exchanged via BT or USB interfaces.

This all-in-one smart antenna module allows just plug and play, fast time to market with outstanding performance.

Applications

- UAV
- Automatic farming
- Machine control
- Robotic guidance
- Photogrammetry
- Surveying

Features

- *Based on ZED-F9P high precision engine.*
- ***Plug and play cm-level smart antenna module***
- *Dual-Mode Bluetooth Support*
  - *Only SPP enabled by default*
- Built-in L1/L2 band antenna and circuits supporting multiple constellations simultaneously
  - GPS+Galileo+GLONASS+BeiDou
  - SBAS, QZSS
- DGNSS RTCM 10403.3 version 3 messages support for RTK fix.
- High sensitivity+:-167dBm tracking/-148dBm acquisition
- Up to 8Hz update rate for quad-GNSS constellation or 15Hz for dual-GNSS constellations.
- **Spoofing detection / monitoring**
  - Multiple constellatins should be enabled.
- **Jamming / interference indicator**
  - For continuous wave (narrow-band) jammers/interference only
- Windows location sensor support
- OMA SUPL compliant A-GPS support
- SBAS (WAAS, EGNOS, MSAS, GAGAN) support
- Excellent EMI protection

Technical Specifications

Receiver Performance Data+

Supported	u-blox ZED-F9P GPS/SBAS/QZSS: (MHz)

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GNSS Constellations	L1 C/A (1575.42), L2C (1227.60) GLONASS: (MHz) L1OF (1602+k*0.5625, k= -7,…,5,6), L2OF (1246+k*0.4375, k= -7,…,5,6), Galileo: (MHz) E1-B/C (1575.42), E5b (1207.140) BeiDou: (MHz) B1I (1561.098) B2I (1207.140)
Position Accuracy (RTK baseline up to 20km; 24 hours static)	Horizontal: RTK: 1 cm+1ppm CEP SBAS: 1 m CEP PVT: 1.5 m CEP Vertical: (result with 1km baseline) RTK: 1 cm+1ppm R50
Velocity Accuracy	<0.05 m/s (speed) <0.3° (heading) (50% @ 30 m/s for dynamic operation)
Time Pulse Signal	0.25Hz...10MHz3 RMS: 30ns, 99%: 60ns
Time To First Fix (TTFF) Hot start Aided start Cold start	Autonomous (All at -130dBm) 2sec (GPS+Glonass+Galileo+BeiDou) 2sec (GPS+Glonass+Galileo+BeiDou) 25sec (GPS+Glonass+Galileo+BeiDou)
Sensitivity	GPS+Glonass+Galileo+BeiDou Acquisition: -148 dBm Reacquisition: -160 dBm Tracking & navigation: -167 dBm
Max. Update Rate	a. GPS+Glonass+Galileo+BeiDou b. GPS+BeiDoui c. GPS RTK: 8Hz@a, 15Hz@b, 20Hz@c PVT: 10Hz@a, 25Hz@b, 25Hz@c
RTK Convergence Time	RAW: 20Hz@a, 25Hz@b, 25Hz@c <10s@a&b, <30s@c Depends on atmospheric conditions, baseline length, multipath conditions, satellite visibility and geometry
Moving Base RTK Performance	a. GPS+Glonass+Galileo+BeiDou b. GPS+BeiDoui c. GPS Max. update rate: 8Hz@a, 10Hz@b, 10Hz@c Heading accuracy: 0.4°@a,b,c
Max. Altitude	50,000 m
Max. Velocity	500 m/s
Protocol Support	NMEA 0183 up to v 4.11, ASCII GGA, GLL, GSA, GSV, RMC, VTG UBX: u-blox proprietary, binary RTCM 3.3: binary
Augmentation System Support	QZSS: Support L1S SLAS Correction data broadcasted on L1 SBAS: WAAS, EGNOS, MSAS, GAGAN DGNSS: RTCM 10403.3 ● Rover mode messages: (RTCM) 1001~1012, 1033, 1074, 1075, 1077, 1084, 1085, 1087,1094, 1095, 1097, 1124, 1125, 1127, 1230, 4072.0 ● Base mode messages: (RTCM) 1005, 1074, 1077, 1084, 1087, 1094, 1097, 1124, 1127, 1230, 4072.0, 4072.1
Dynamics	< 4g

+ Note. According to IC Spec

BT Data+ -

Band	2.4 GHz ISM
Data Rate	350 kbps, Bluetooth LE 1 Mbps, Bluetooth BR/EDR
Output Power	8 dBm EIRP

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Sensitivity	-88 dBm

Electrical Data

Power Supply	3.3 ~ 5.5 VDC
Power Consumption (10Hz update rate)	120mA/Average tracking (USB) # of SVs tracked: L1: 37, L2: 27

Environmental Data

Operating temperature	-40 ~ 85℃ except battery: -20~60℃
Storage temperature	-40 ~ 85℃ except battery: -20~60℃
Operating humidity	5% ~ 95% non-condensing

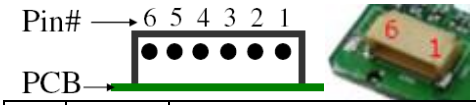
LED Indication

Green LED for GNSS fix	**ON**, position not fixed, **Blinking**, position fixed, **OFF**, power is OFF
Orange LED for RTK fix	**ON**, RTK fixed **Blinking**, RTK under fixing **OFF**, not in RTK mode, i.e. RTCM correction data is not available.

Mechanical Data:

- 70*70*13.2 mm^3
- 83 gram

6-pin Interface, pitch 1.0mm



Pin	Name	Function	I/O
1	GND	Ground	Input
2	VCC	Power supply	Input
3	D+	USB D plus	I/O
4	D-	USB D minus	I/O
5	-		
6	-		

*This document is subject to change without notice.