



MULTI-FREQUENCY, MULTI-GNSS SMART ANTENNA



The S321+ is Hemisphere's all-new multi-GNSS, multi-frequency smart antenna. The S321+ provides robust performance and high precision in a compact and rugged package. With multiple wireless communication ports and an open GNSS interface, the S321+ can be used in a variety of operating modes. Use the S321+ as a precise base station sending RTK to your existing rover network. Turn S321+ into a lightweight and easy to use rover by connecting it to your base via UHF radio or Wi-Fi network. The built-in web user interface (WebUI) can be used to control and manage the receiver status and operation, as well as to upgrade the S321+ with new firmware and activations. S321+ is Athena-enabled and Atlas-capable (subscription required).

The S321+ receiver is powered by Athena RTK technology. With Athena, S321+ provides state-of-the-art RTK performance when receiving corrections from a static base station or network RTK correction system. With multiple connectivity options, the S321+ allows for RTK corrections to be received over radio, cell modem, Wi-Fi, Bluetooth, or serial connection. S321+ delivers centimeter-level accuracy with virtually instantaneous initialization times and cutting-edge robustness in challenging environments.

The S321+ receiver also enables users to work with Atlas. Atlas is Hemisphere's industry-leading global correction service, which can be added as a subscription to the S321+. Atlas delivers world-wide centimeter-level correction data over L-band communication satellites. With Atlas, S321+ users are able to experience sub-decimeter positioning performance anywhere on earth, without the need to be near a GNSS or communication infrastructure.

Key Features

- Multi-Frequency, Multi-GNSS (GPS, GLONASS, BeiDou, Galileo, QZSS)
- Athena™ RTK engine and Atlas® L-band global corrections
- Dual hot-swappable lithium batteries provide 12 hours of battery life
- Wi-Fi, UHF, Cellular, and Bluetooth wireless communication
- Powerful WebUI control accessed via Wi-Fi
- 8 GB internal memory for data logging, download, and upload
- Internal tilt sensor corrects the collected point coordinates, to a maximum inclination of 15°, in accordance with the tilt angle and direction of the range pole ^{5,6}

GNSS Receiver Specifications

Receiver Type: Multi-Frequency GNSS
Signals Received: RTK, L-band, DGNSS, SBAS, Autonomous
Channels: 572 / 488
RTK Formats: RTCM3, ROX, CMR, CMR+⁴
L-Band Formats: Atlas H100, Atlas H30, Atlas H10
Update Rate/Recording Intervals: Selectable from 1, 2, 4, 5, 10 Hz (20 Hz available)

Accuracy

Positioning:	RMS (67%)	2DRMS (95%)
Autonomous, no SA: ¹	1.2 m	2.4 m
SBAS: ¹	0.3 m	0.6 m
Atlas: ^{1,3}	0.08 m	0.16 m
RTK: ^{1,2}	8 mm + 1 ppm	15 mm + 1 ppm
Static Performance (Long Occupation): ¹		
Static Performance (Rapid Occupation): ¹	3 mm + 0.1 ppm	3.5 mm + 0.4 ppm
	3 mm + 0.5 ppm	5 mm + 0.5 ppm

Satellite Tracking

GPS: L1CA, L1P, L2P, L2C, L5
GLONASS: G1, G2, P1, P2
BeiDou: B1, B2
QZSS: L1C, L1CA, L2C, L5
Galileo: E1BC, E5a, E5b
SBAS: MSAS, WAAS, EGNOS, GAGAN

Communications

Connectors I/O: 5-pin Lemo connector for external power supply, Serial communication, and external radio devices
7-pin Lemo connector for USB OTG connection and troubleshooting
1 SMA antenna connector for internal radio
1 SMA antenna connector for modem module

WebUI: To upgrade the software, manage the status and settings, data download, via smart phone, tablet or other electronic device, configure advanced radio settings

TTS: Smart voice broadcast system "Speaking" receiver

Reference Outputs: RTCM2.1, RTCM2.3, RTCM3.0, RTCM3.1, RTCM3.2 including MSM

Radio

Frequency Range: 410 - 470 MHz
Channel Spacing: 12.5KHz / 25 KHz
Transmitting Power: 0.5 / 1 W
Operating Range: 3 - 5 km typical/10 km optimal (Depends on terrain and operating environment)

Wireless Module

Wi-Fi: Integrated module with internal Wi-Fi antenna
Bluetooth: Bluetooth 2.1 + EDR Integrated Bluetooth (BT) communication module with internal BT antenna

Communications

PLS8-E (International): **4G-** Penta Band LTE - 800/900/1800/2100/2600 MHz - FDD-Band (20, 8, 3, 7, 1)
3G- Tri Band UMTS (WCDMA) - 900/1800/2100 MHz - FDD-Band (8, 3, 1)
2G- Dual Band GSM/GPRS/EDGE - 900/1800 MHz

PLS8-X

(North America): **4G-** Penta Band LTE - 700/700/850/AWS (1700/2100)/1900 MHz - FDD-Band (13, 17, 5, 4, 2)
3G- Tri Band UMTS (WCDMA) - 850/AWS (1700/2100)/1900 MHz - FDD-Band (5, 4, 2)
2G- Quad Band GSM/GPRS/EDGE - 850/900/1800/1900 MHz

Power

Battery: Hot-swappable 11.1 V - 37.74 Wh intelligent lithium (2 per kit)
Battery life: 12 hour operation from two batteries with UHF radio in Rx mode
Voltage: 9 to 22V DC external power input with over-voltage protection (5-pin Lemo)
Charge Time: Typically 7 hours

Memory

SIM Card: User accessible SIM card slot
Memory: Internal 8 GB, accessible through USB and Wi-Fi
SD Card: External Micro SD card slot, supports up to 64 GB

Environmental

Operating Temperature: -30°C to 60°C (-22°F to 140°F)
Storage Temperature: -40°C to 80°C (-40°F to 176°F)
Waterproof/Dustproof: IP67. Protected from temporary immersion to a depth of 1 meter

Shock Resistance: MIL-STD-810G, method 516.6
Designed to survive a 2 m pole drop on concrete floor
Designed to survive a 1 m free drop on hardwood floor

Vibration: MIL-STD-810G, method 514.6E-I
Humidity: Up to 100%
Inflammability: UL recognized, 94HB Flame Class Rating (3) 1.49 mm

Chemical Resistance: Cleaning agents, soapy water, industrial alcohol, water vapor, solar radiation (UV)

Aiding Devices

Size: 14.6 D x 14.8 H (cm)
5.75 D x 5.83 H (in)
Weight: <1.38 kgs (<3.05 lbs)
Mounting: 5/8"x11, 55° thread angle, stainless steel insert
Phase Center Offset: GPS L1 and L2 offset below 2.5mm

1. Depends on multipath environment, number of satellites in view, satellite geometry, and ionospheric activity
2. Depends also on baseline length
3. Requires a subscription from Hemisphere GNSS
4. CMR and CMR+ do not cover proprietary messages outside of the typical standard
5. Magnetic interference impacts performance
6. Requires support of third party survey software

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