



TAOGLAS®



Datasheet

QHA.50.A.301111 - Colosseum

Description:

GPS L1, L2, L5 Passive Quad Helix Antenna
Including GLONASS, Galileo, BeiDou & QZSS Band Operation

Features:

Permanent Mount Robust Enclosure

- GPS/QZSS (L1/L2)
- GPS/QZSS/IRNSS (L5)
- QZSS (L6)
- Galileo (E1/E5a/E5b/E6)
- GLONASS (G1/G2/G3)
- BeiDou (B1/B2a/B2b/B3)

IP67 Rated Waterproof ASA Enclosure

Cable: 3m RG-174

Connector: SMA(M)ST

Dimensions: \varnothing 94 x 57mm

RoHS & REACH Compliant

| | | |
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1. Introduction



The Colosseum QHA.50.A.301111 is a passive Quad Helix Antenna which has been carefully designed to work across all major GNSS bands, leading to higher location accuracy and stability of tracking in urban environments. The quad helix antenna design has an even gain across the hemisphere giving almost perfect Axial Ratio which makes it resilient to multipath rejection.

The QHA.50 is a new passive GNSS external product which has been added to Taoglas' already extensive High Precision antenna range. The Colosseum QHA.50 covers all major GNSS bands including: GPS L1/L2/L5/L6, GLONASS L1/L2/L3, Galileo E5A/E5B/E6, BeiDou B1/B1-2/B2/B3. The QHA.50 is a new passive GNSS external product which has been added to Taoglas' already extensive High Precision antenna range.

Typical Applications include:

- Agriculture
- Asset Tracking
- Autonomous Driving

The QHA.50, IP67 rated enclosure is manufactured from UV resistant ASA making it an ideal solution for external applications operating in harsh environments.

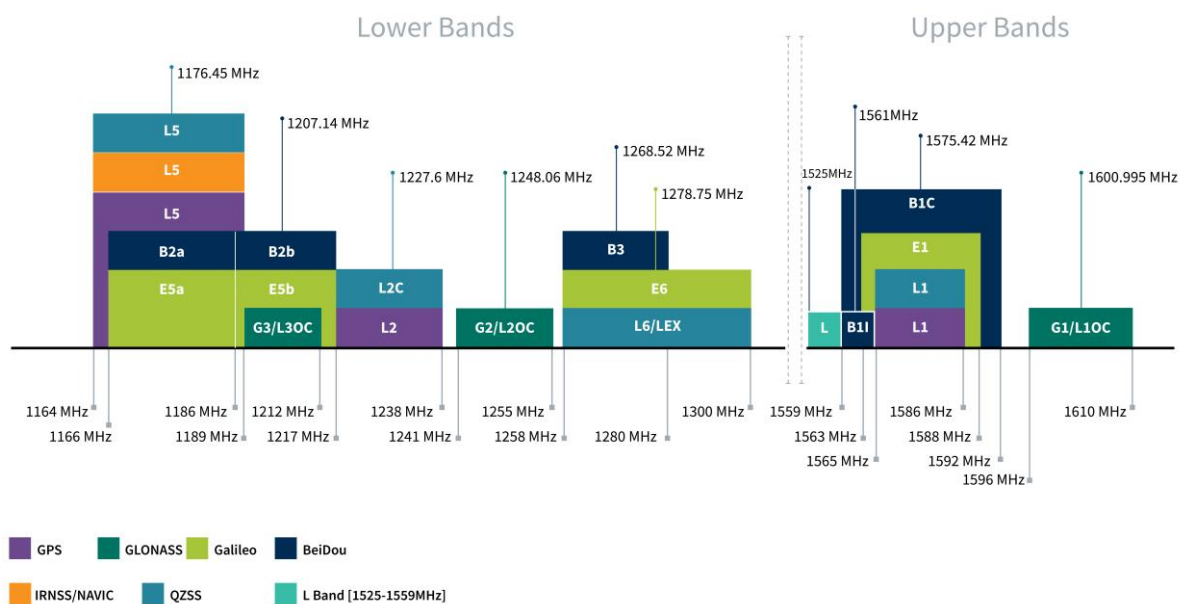
For Cable runs longer than 3 meters, Taoglas recommends using the Active version of the Colosseum, AQHA.50.A.301111.

The Cable length and connector are fully customizable. For Further information please contact your regional Taoglas Customer Support Team.

2. Specifications

| GNSS Frequency Bands Covered | | | | | | |
|------------------------------|----------|------------|-----|----|----|--|
| GPS | L1 | L2 | L5 | | | |
| | ■ | ■ | ■ | | | |
| GLONASS | G1 | G2 | G3 | | | |
| | ■ | ■ | ■ | | | |
| Galileo | E1 | E5a | E5b | E6 | | |
| | ■ | ■ | ■ | ■ | | |
| BeiDou | B1 | B2a | B2b | B3 | | |
| | ■ | ■ | ■ | ■ | | |
| QZSS (Regional) | L1 | L2C | L5 | L6 | | |
| | ■ | ■ | ■ | ■ | | |
| IRNSS (Regional) | L5 | | | | | |
| | ■ | | | | | |
| SBAS | L1/E1/B1 | L5/B2a/E5a | G1 | G2 | G3 | |
| | ■ | ■ | ■ | ■ | ■ | |

*SBAS systems: WASS(L1/L5), EGNOS(E1/E5a), SDCM(G1/G2/G3), SNAS(B1,B2a), GAGAN(L1/L5), QZSS(L1/L5), KAZZ(L1/L5).

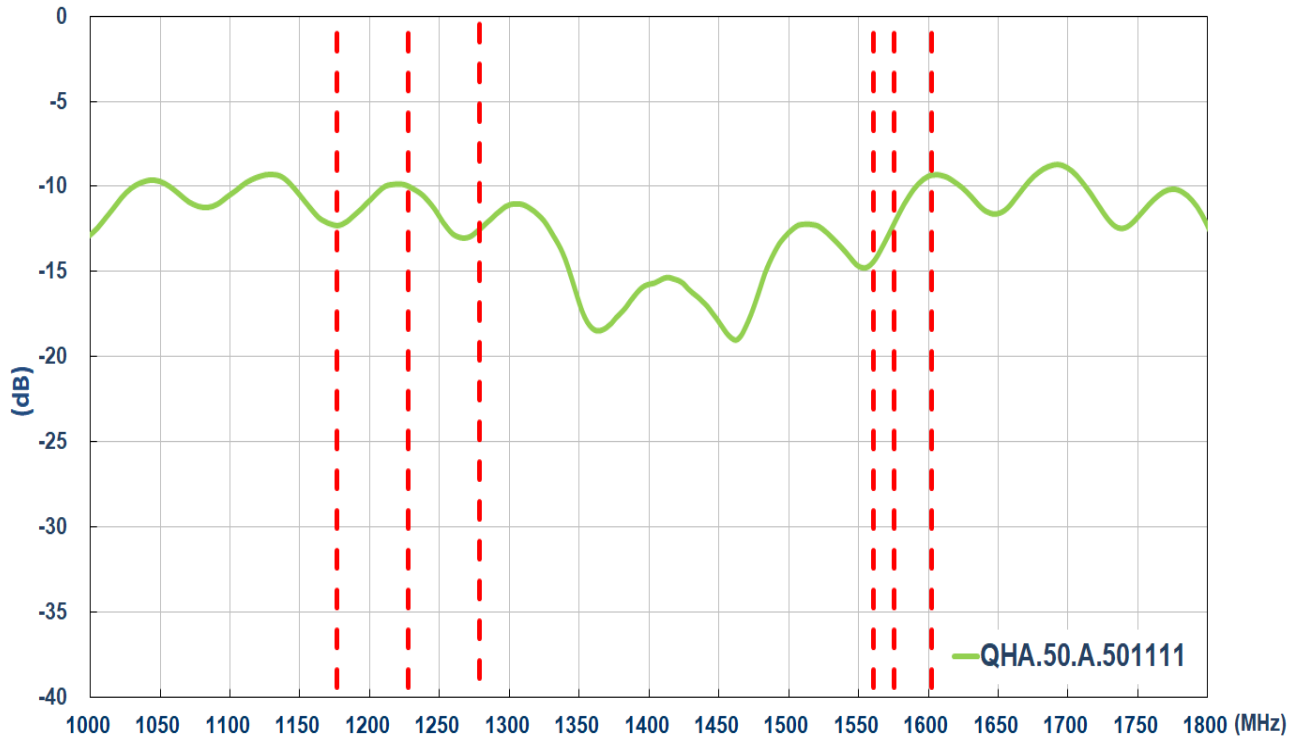


GNSS Bands and Constellations

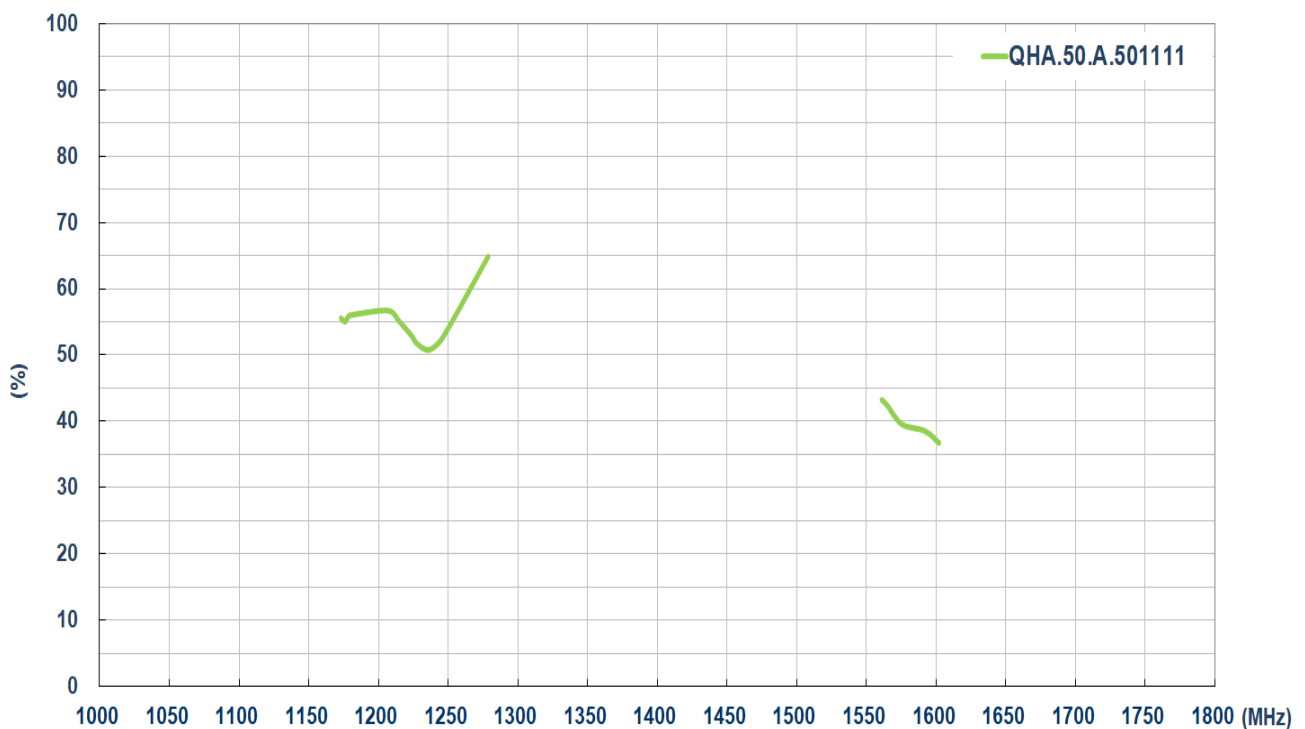
| GNSS Electrical | | | | | | |
|---------------------------|-----------------------------------|------------|------------|----------|-------------|----------|
| Frequency (MHz) | 1176.45 MHz | 1227.6 MHz | 1278.8 MHz | 1561 MHz | 1575.42 MHz | 1602 MHz |
| Efficiency (%) | 55.1 | 51.8 | 64.9 | 43.3 | 39.6 | 36.8 |
| Average Gain (dB) | -2.6 | -2.9 | -1.9 | -3.6 | -4.0 | -4.4 |
| Peak Gain (dBi) | 0.9 | 0.9 | 2.0 | 0.3 | -0.2 | -0.4 |
| Return loss (dB) | < -10 | < -10 | < -10 | < -10 | < -10 | < -10 |
| Group Delay | 0.5 | 0.4 | 0.6 | 0.8 | 0.8 | 0.8 |
| PCO | 5 | 5.5 | 5.9 | 5 | 5 | 5 |
| PCV | 1.8 | 1.8 | 1.8 | 1.4 | 1.4 | 1.6 |
| Polarization | RHCP | | | | | |
| Impedance | 50Ω | | | | | |
| Mechanical | | | | | | |
| Dimensions (mm) | Diameter: 94.3mm, Height: 57.4 mm | | | | | |
| Weight (g) | 251.7 g | | | | | |
| Base and thread | Zinc Alloy | | | | | |
| Cable | 3m RG-174 | | | | | |
| Connector | SMA(M)ST | | | | | |
| Ingress Protection Rating | IP67 | | | | | |
| Maximum Assembly Torque | 39.2 N•m | | | | | |
| Regulatory Compliance | CE, RoHS, Reach | | | | | |
| Environmental | | | | | | |
| Operating Temperature | -30°C ~ +80°C | | | | | |
| Storage Temperature | -30°C ~ +80°C | | | | | |
| Humidity RH | Non-condensing 65°C 95% RH | | | | | |

3. Antenna Characteristics

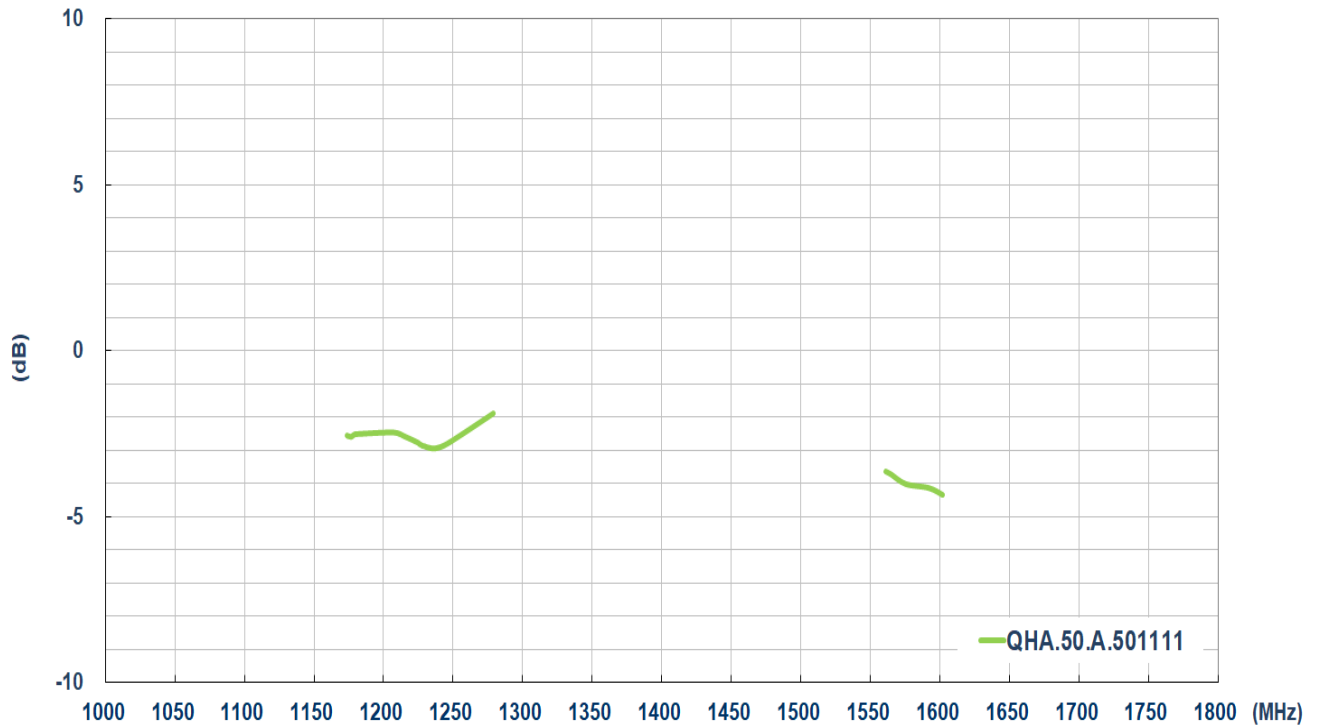
3.1 Return Loss



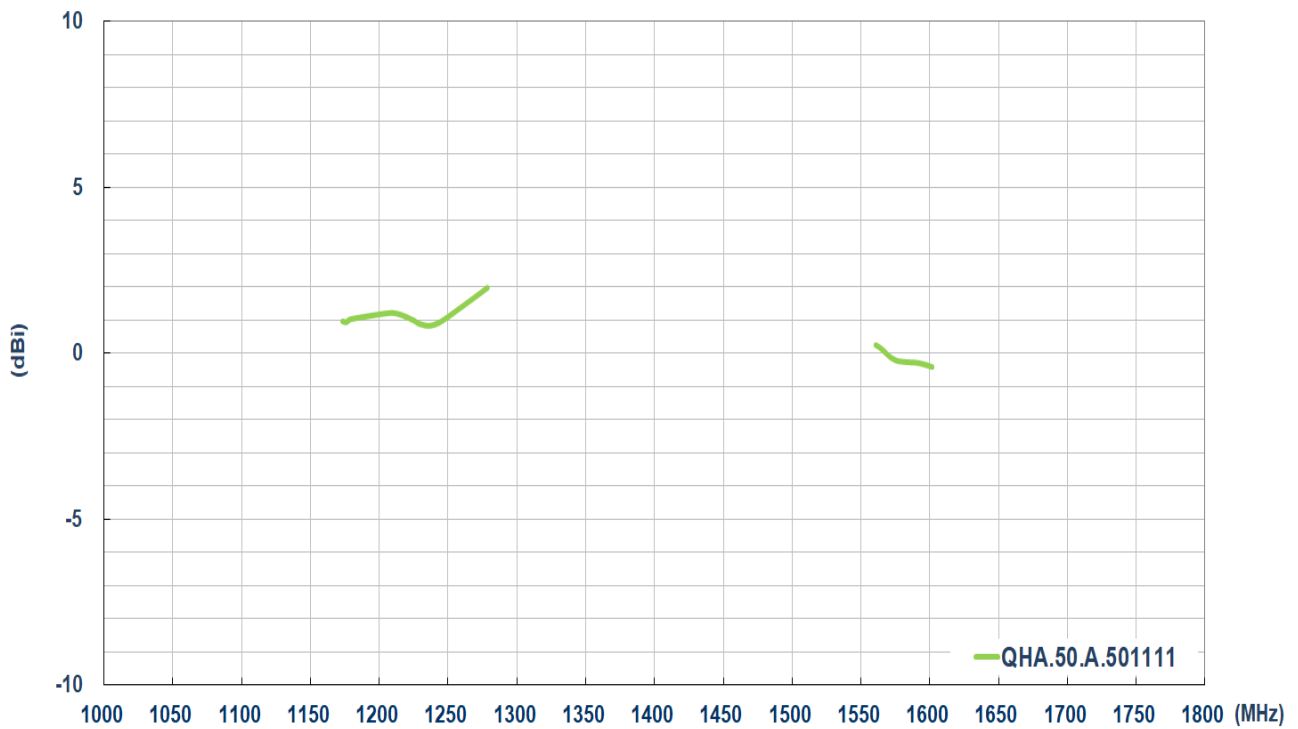
3.2 Efficiency



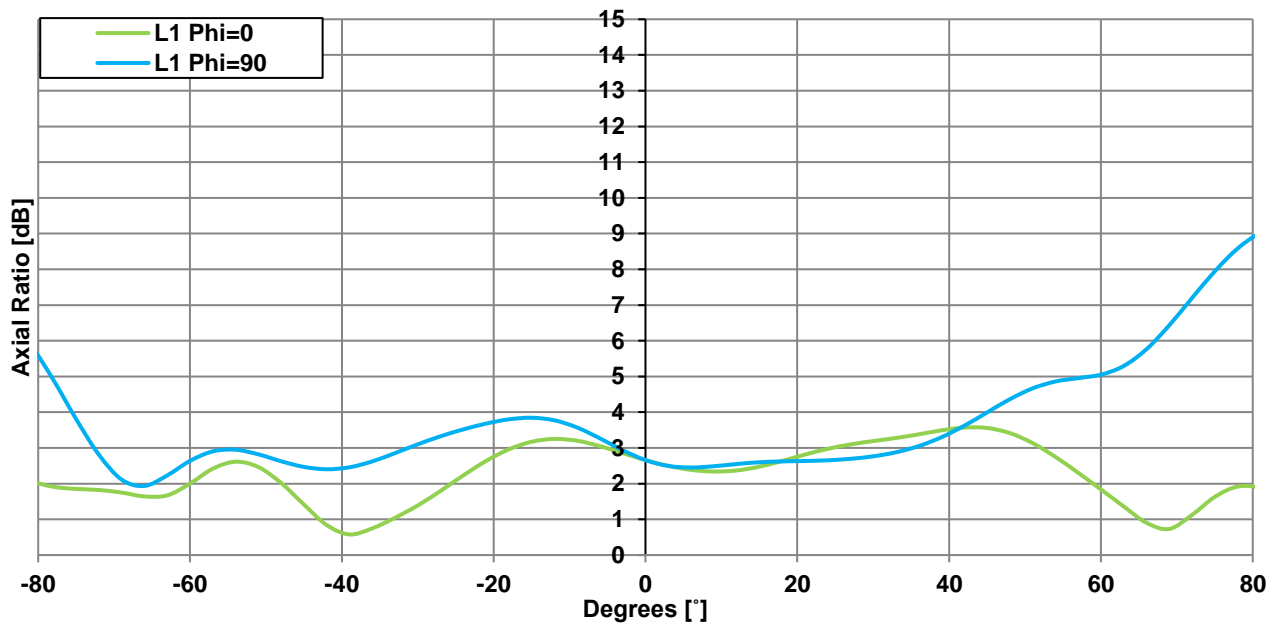
3.3 Average Gain



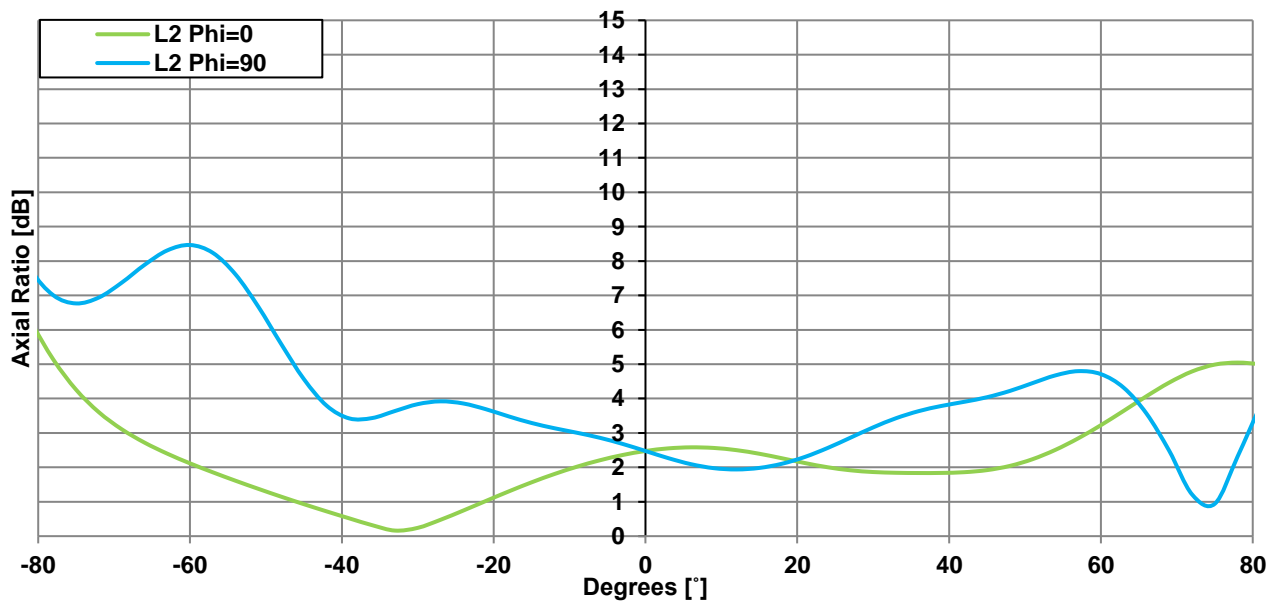
3.4 Peak Gain



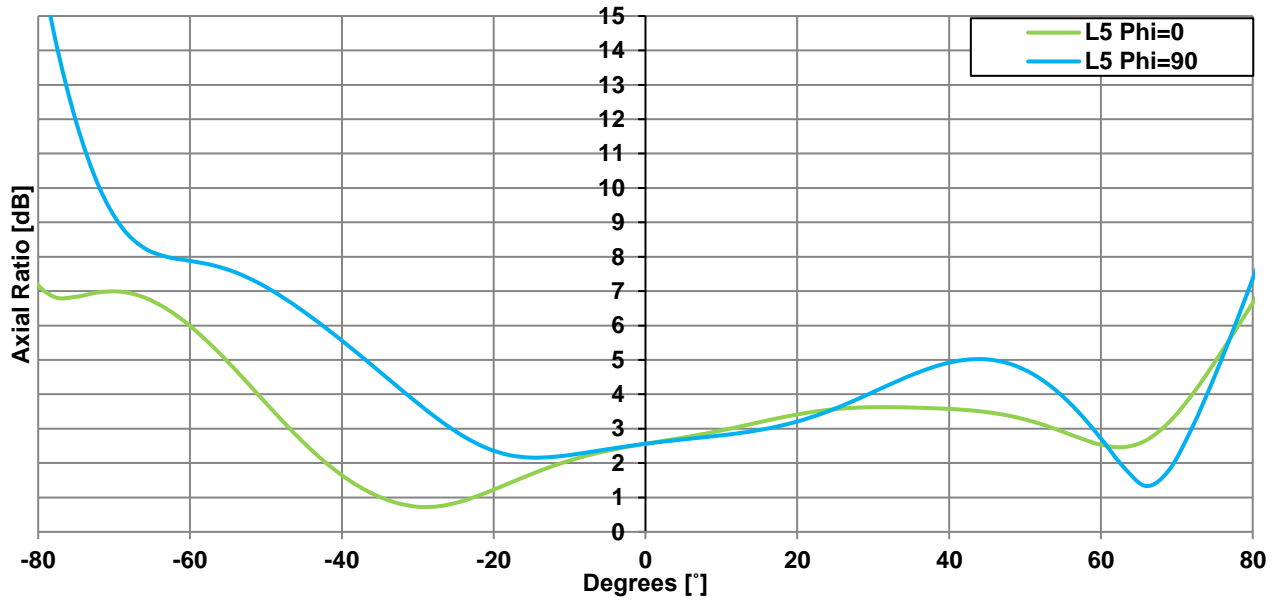
3.5 Axial Ratio @ L1



3.6 Axial Ratio @ L2



3.7 Axial Ratio @ L5



4. Radiation Patterns

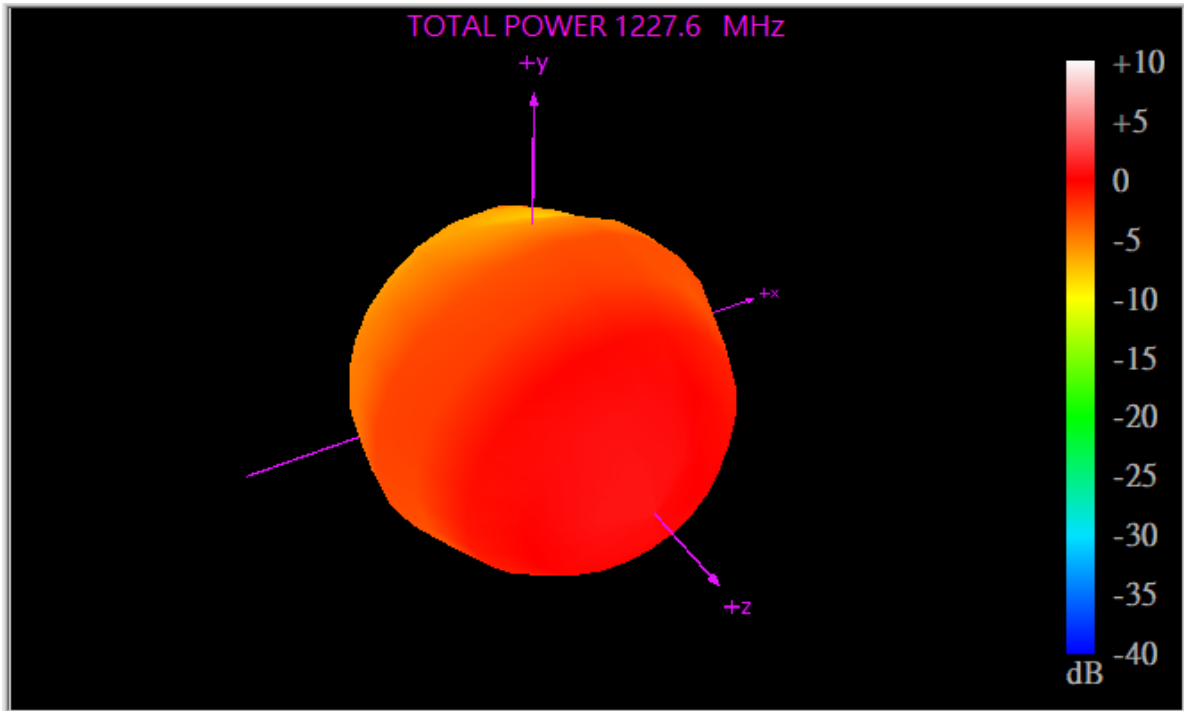
4.1 Test Setup



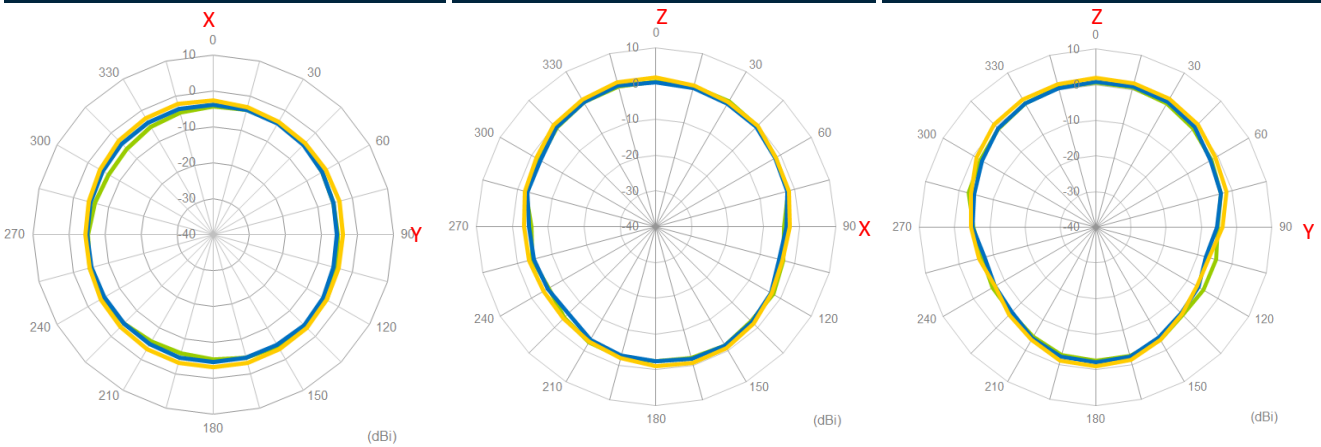
Free Space

4.2 Radiation Patterns - Free Space

1227.6MHz

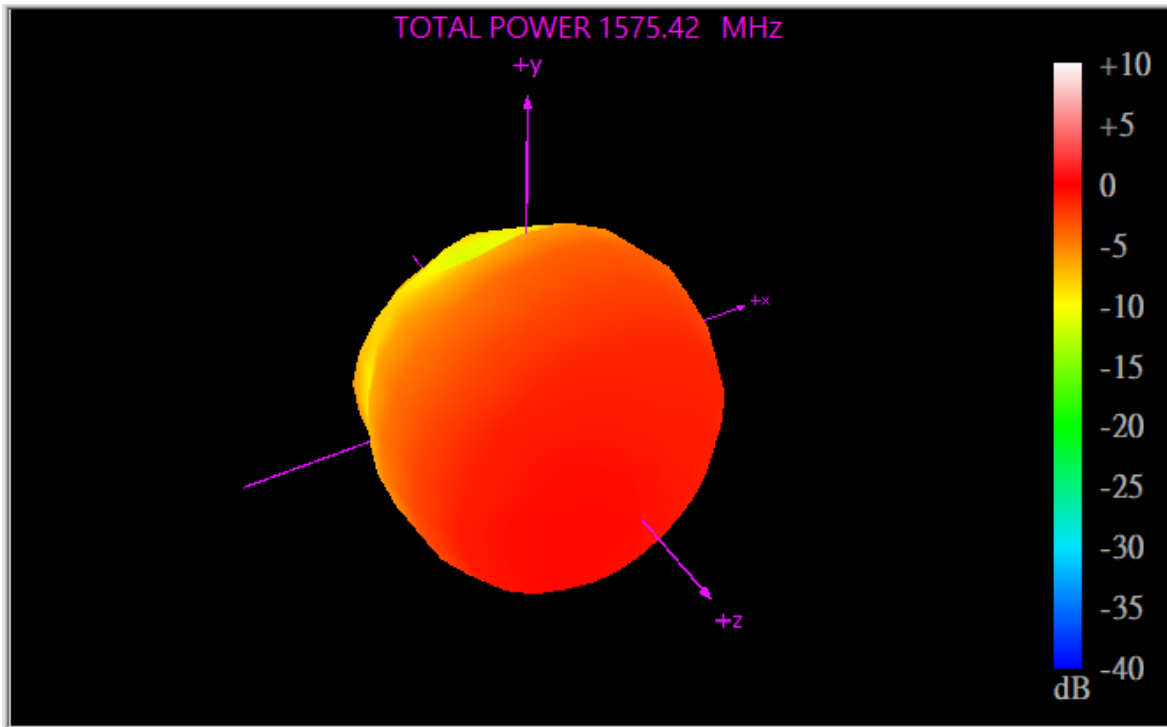


XY Plane XZ Plane YZ Plane

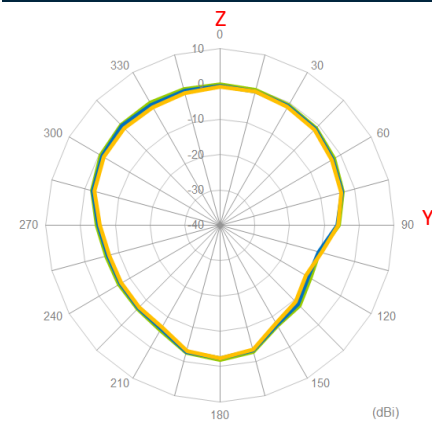
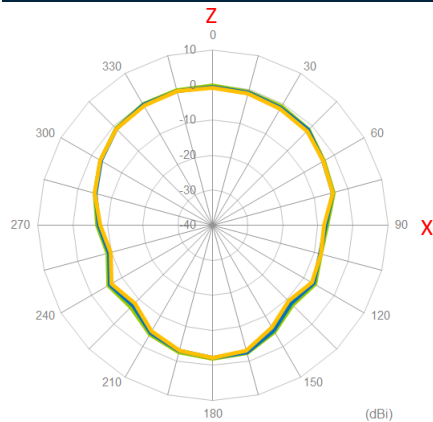
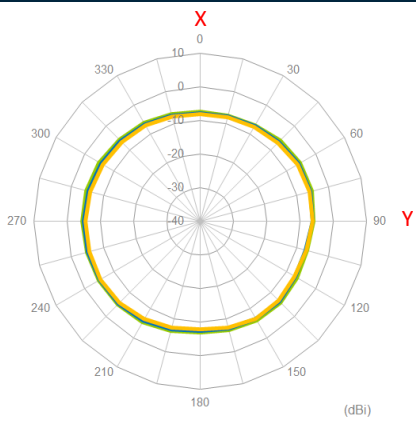


—1176.45MHz —1227.6MHz —1278.8MHz

1575.42MHz



XY Plane XZ Plane YZ Plane



—1561MHz —1575.42MHz —1602MHz

5. Field Test Results

5.1 Rooftop test

In this section Taoglas will present the field test result for QHA.50 antenna. The test was performed when the antenna was mounted on a static rooftop test set up in an open sky environment for at least **6 hours**.

Taoglas will show the field test results using the following receiver:

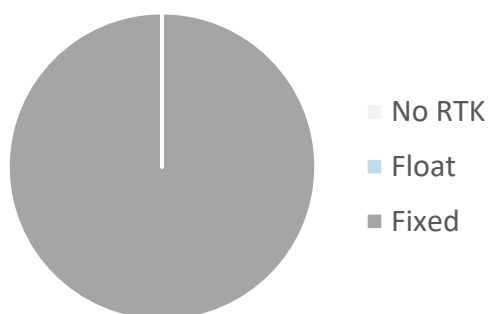
1. U-blox ZED-F9P

Receiver features:

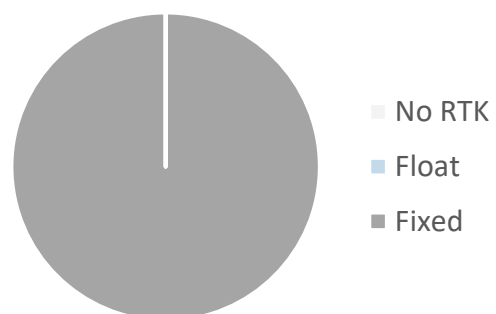
- Multi-band GNSS: 184-channel GPS L1C/A L2C, GLONASS: L1OF L2OF, Galileo: E1B/C E5b, BeiDou: B1I B2I, QZSS: L1C/A L2C
- Multi-band RTK with fast convergence times and reliable performance
- Nav. update rate RTK up to 20 Hz
- Position accuracy = RTK 0.01 m + 1 ppm CEP

| Positioning Accuracy Table (2D Accuracy) | | | | | |
|--|--------------------|-----------|------------|------------------|------------|
| Test Condition | Correction Service | CEP (50%) | DRMS (68%) | 2DRMS (95-98.2%) | TTFF (sec) |
| Free Space | RTK DISABLED | 66.97 cm | 81.64 cm | 163.27 cm | 25 |
| | RTL ENABLED | 1.09 cm | 1.32 cm | 2.64 cm | 25 |
| 30x30 cm Ground Plane | RTK DISABLED | 55.64 cm | 68.55 cm | 137.1 cm | 24.2 |
| | RTL ENABLED | 1.04 cm | 1.24 cm | 2.48 cm | 24.2 |

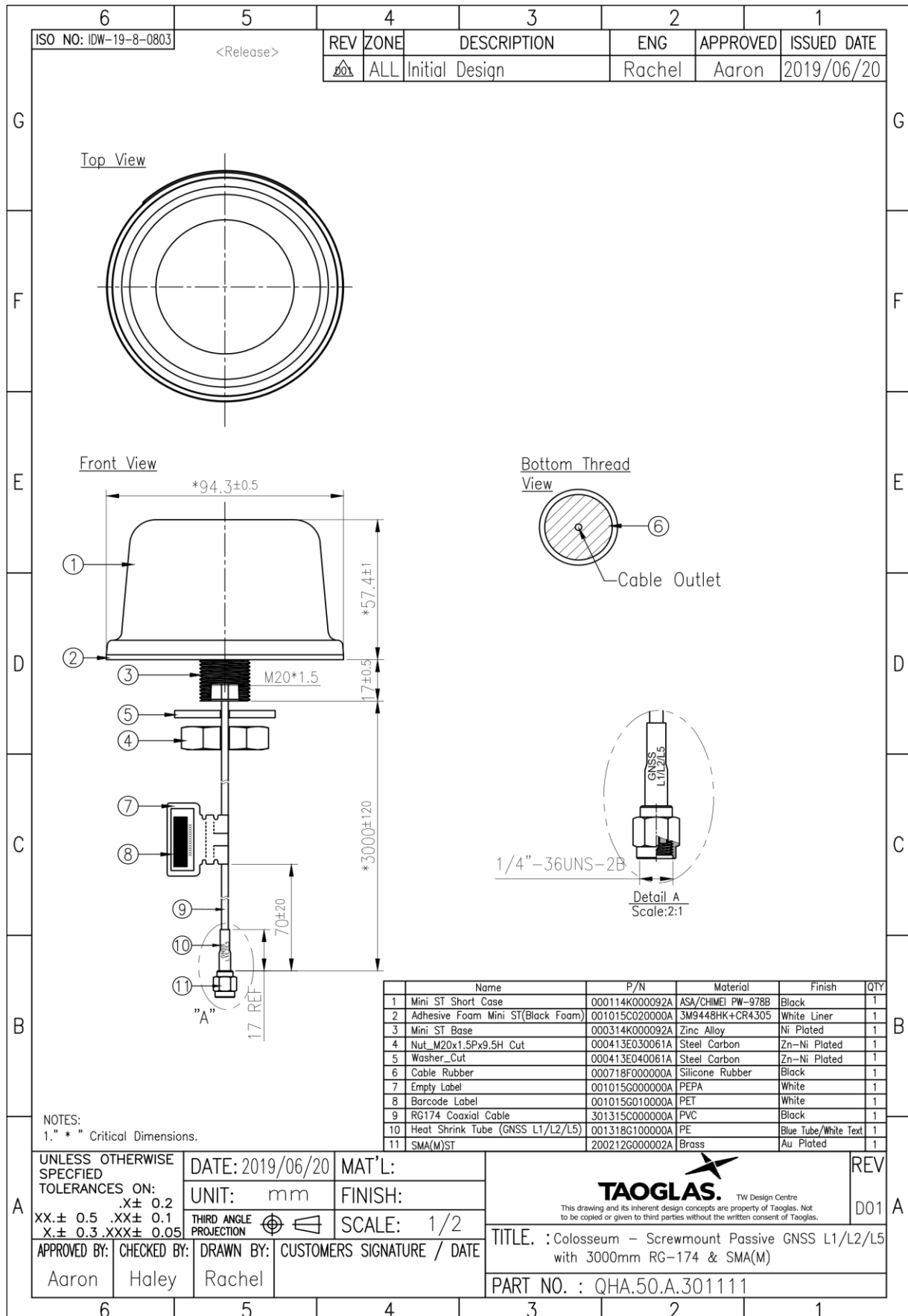
RTK Availability
Free space



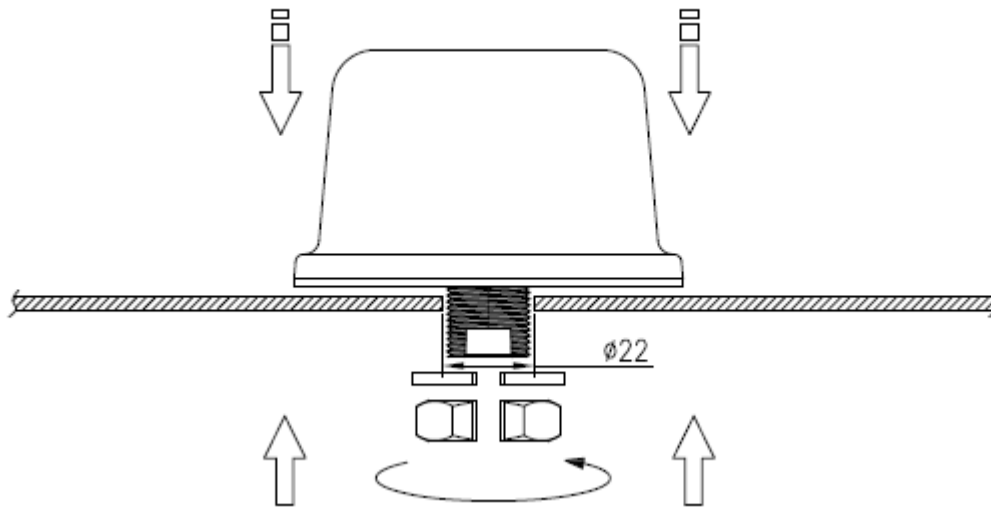
RTK Availability
30x30 cm ground plane



5. Mechanical Drawing (Units: mm)



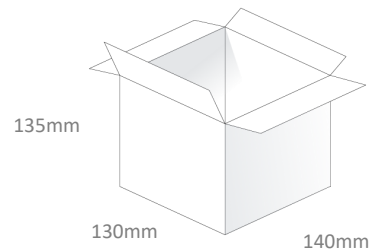
7. Installation Instructions



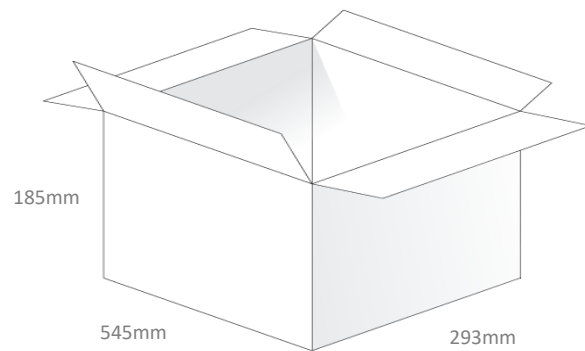
Recommended torque for mounting is 29.4N•m
 Maximum torque for mounting is 39.2 N•m

8. Packaging

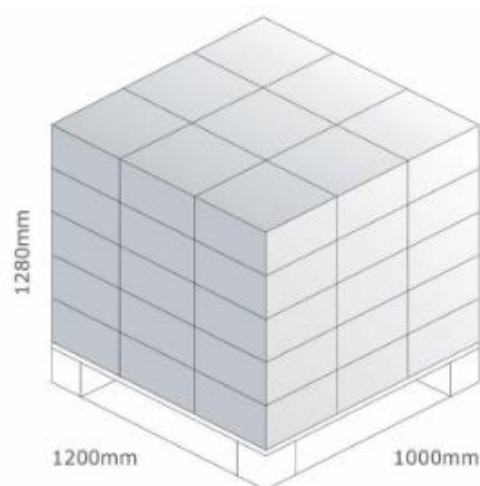
1pc QHA.50.A.301111 per Small Box
 Dimensions - 135*130*140mm
 Weight - 395g



8pcs QHA.50.A.301111 per Carton
 Dimensions - 545*293*185mm
 Weight - 3.94Kg



Pallet Dimensions:
 1100*1100*1400mm
 45 Cartons Per Pallet
 9 Cartons Per Layer, 5 Layers



Changelog for the datasheet

SPE-19-8-102 – QHA.50.301111

Revision: F (Current Version)

| | |
|------------------|--|
| Date: | 2022-02-21 |
| Changes: | Updated GNSS Bands & Constellations Graphics |
| Changes Made by: | Cesar Sousa |

Previous Revisions

Revision: D

| | |
|------------------|--------------------------|
| Date: | 2020-06-02 |
| Changes: | Added Field Test Results |
| Changes Made by: | Jack Conroy |

Revision: C

| | |
|------------------|------------------|
| Date: | 2020-03-31 |
| Changes: | Updated RTK Data |
| Changes Made by: | Jack Conroy |

Revision: B

| | |
|------------------|------------------------------------|
| Date: | 2019-11-20 |
| Changes: | Installation Instructions included |
| Changes Made by: | Russell Meyler |

Revision: A

| | |
|------------------|-------------------------------|
| Date: | 2019-09-06 |
| Changes: | Initial Specification Release |
| Changes Made by: | Jack Conroy |