

Specification

- Part No. : **MA650.A.AB.002**
- Product Name : Spartan Antenna 2in1 MA650 with 10M cable length
- Feature : Cellular 850/900/1700/1800/2100MHz
GSM/CDMA/UMTS/HSPA
GPS/GLONASS/GALILEO – 5dBiC
IP67 Waterproof
High Efficiency / Peak Gain Outdoor Antenna
Advanced RF Design and Materials
Heavy Duty – Integrated Metal Base/
Ground-plane
Standard 10 meters low loss cables
Custom cables and connectors available
RoHS Compliant



1. Introduction

The Spartan MA650 antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications. With a standard length of 10 meters of very low loss cable it is specially designed suitable for e-Bus or train telematics applications where long cable lengths are needed.

The Spartan MA650 antenna is unique in the market because it combines 2in1 GPS/GALILEO, Cellular (3G and 2G) antennas in a heavy-duty structure with high efficiency in a low profile compact format. The antenna screws down permanently onto a roof or metal panel and can be pole or wall-mounted. The antennas are designed to be isolated from each other to prevent cross-interference.

For industries such as commercial vehicle telematics, remote monitoring, smart meter systems, construction equipment, at only 40mm high, the Spartan provides an unobtrusive, robust, rugged antenna that is durable even in extreme environments.

2. Specification Table

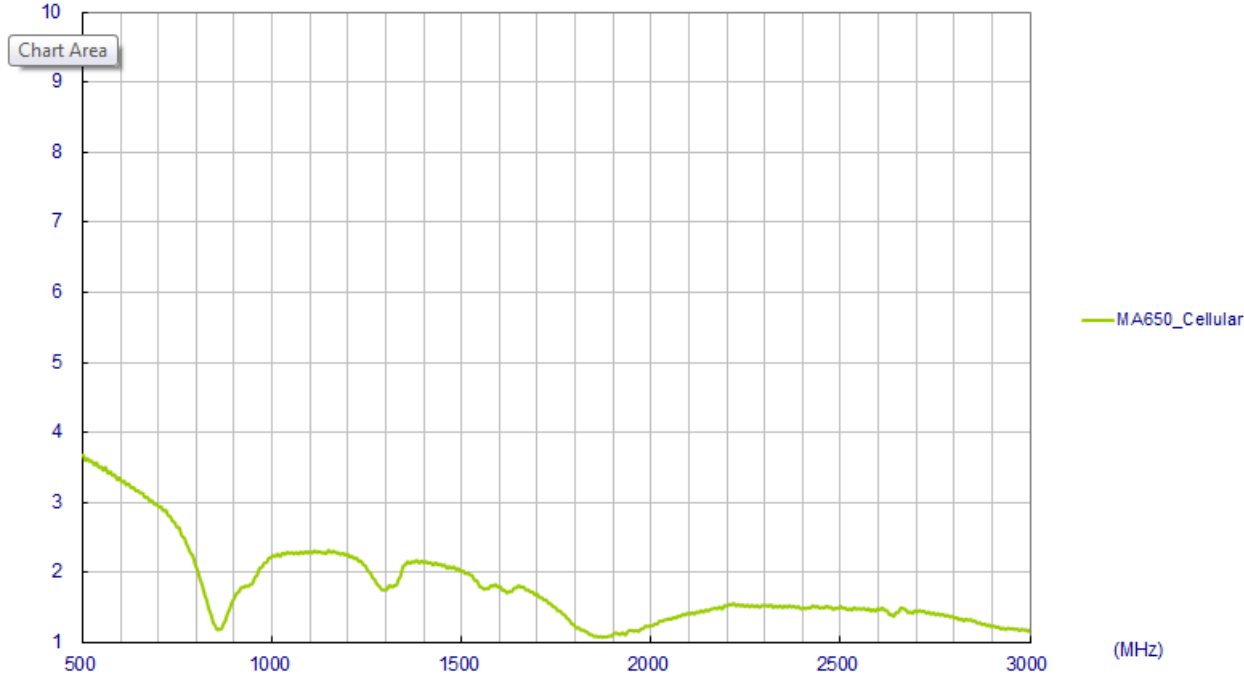
| ELECTRICAL – GPS/GLONASS/GALILEO Passive Antenna | |
|--|-------------------------------|
| Frequency | 1575.42 ± 3MHz 1602 ± 3MHz |
| Radiation Efficiency | 50% |
| Peak Gain | 4 ±1 dBic typ. |
| VSWR | 2:1 Max |
| Polarization | Linear |
| Impedance | 50Ω |

| ELECTRICAL - LNA | | | |
|-------------------|-------------------------------|--------|---------|
| Frequency | 1575.42 ± 3MHz 1602 ± 3MHz | | |
| Impedance | 50 Ω | | |
| VSWR | 2:1 Max | | |
| DC Power Input | 3.3V | 4V | 5V |
| Gain @3.3V | 28dB | 28dB | 28dB |
| Noise Figure | 1.50dB | 1.55dB | 1.62dB |
| Power Consumption | 8mA | 10mA | 13mA |
| Band Attenuation | ±50MHz | ±70MHz | ±100MHz |
| | 30dB | 30dB | 30dB |

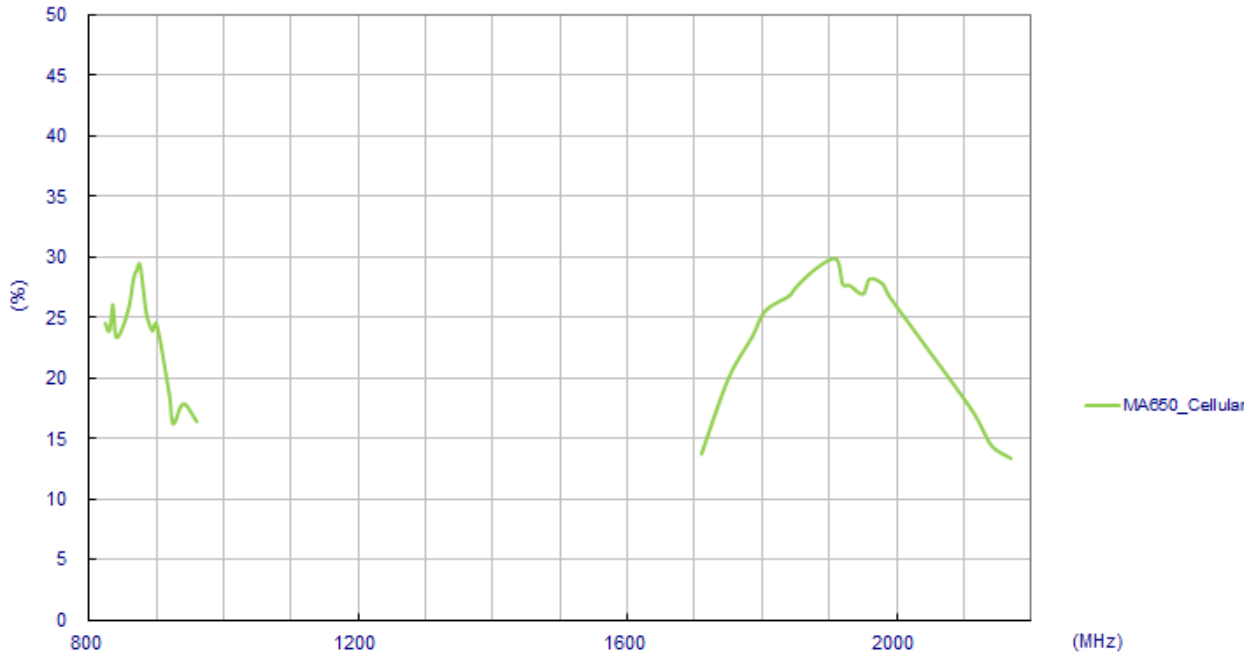
| ELECTRICAL – Cellular Antenna | | | | | |
|---------------------------------|------------------------------|---------|-----------|-----------|-----------|
| Frequency (GHz) | 824~896 | 880~960 | 1710~1880 | 1850~1990 | 1920~2170 |
| Peak Gain (dBi) * | -0.5 | -0.5 | -1.0 | -0.5 | -0.8 |
| Avg. Gain (dBi) * | -5.8 | -5.6 | -5.4 | -5.3 | -5.5 |
| Efficiency (%) * | 29 | 28 | 30 | 27.9 | 28 |
| VSWR | 3 Max | | | | |
| Polarization | Linear | | | | |
| Radiation pattern | Omni | | | | |
| *Including 10 meters cable loss | | | | | |
| MECHANICAL | | | | | |
| Antenna Dimensions | Height 50mm x Diameter 150mm | | | | |
| Housing | PC | | | | |
| Base and thread | Nickel plated Zinc | | | | |
| Waterproof | IP67 | | | | |
| ENVIRONMENTAL | | | | | |
| Operating Temperature | -40°C to 85°C | | | | |
| Storage Temperature | -40°C to 80°C | | | | |
| Humidity | Non-condensing 65°C 95% RH | | | | |

3. Cellular Antenna Characteristics

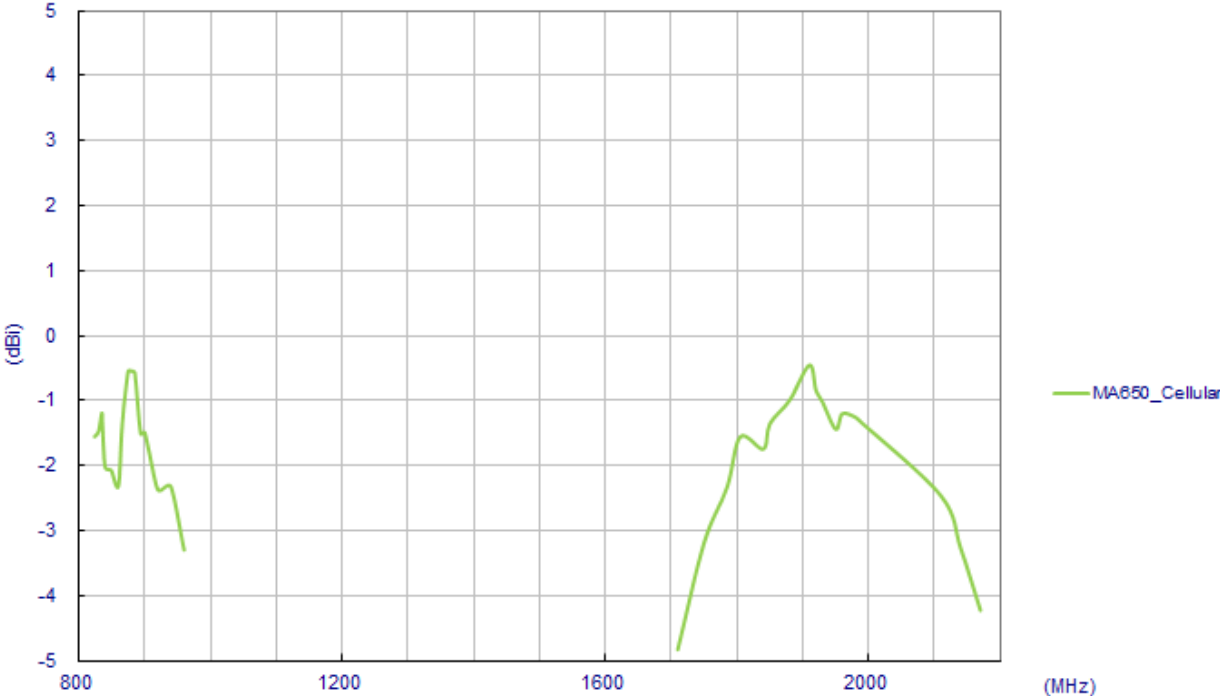
3.1. VSWR



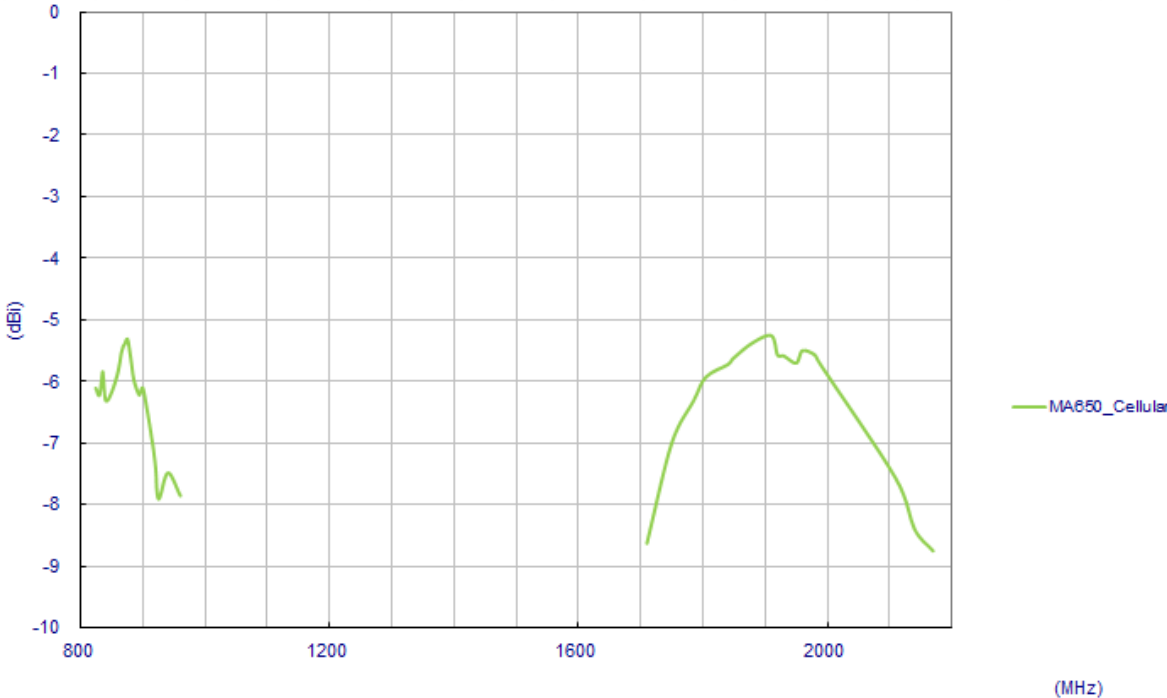
3.2. Efficiency



3.3. Peak Gain

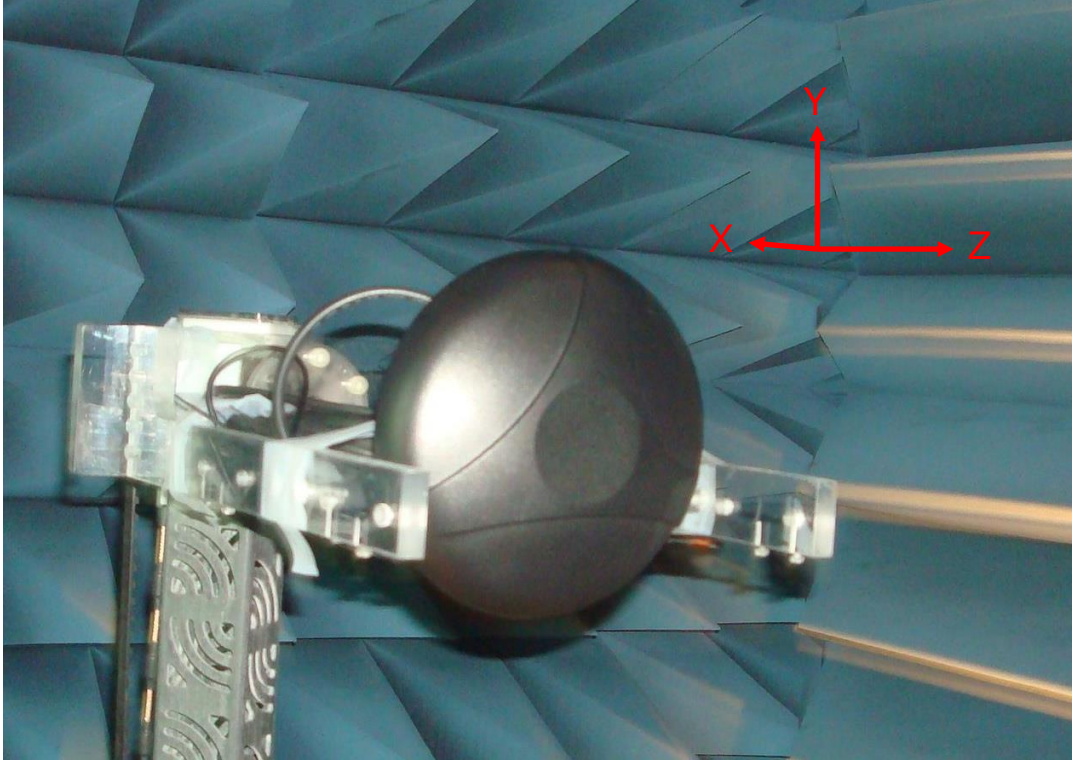


3.4. Average Gain

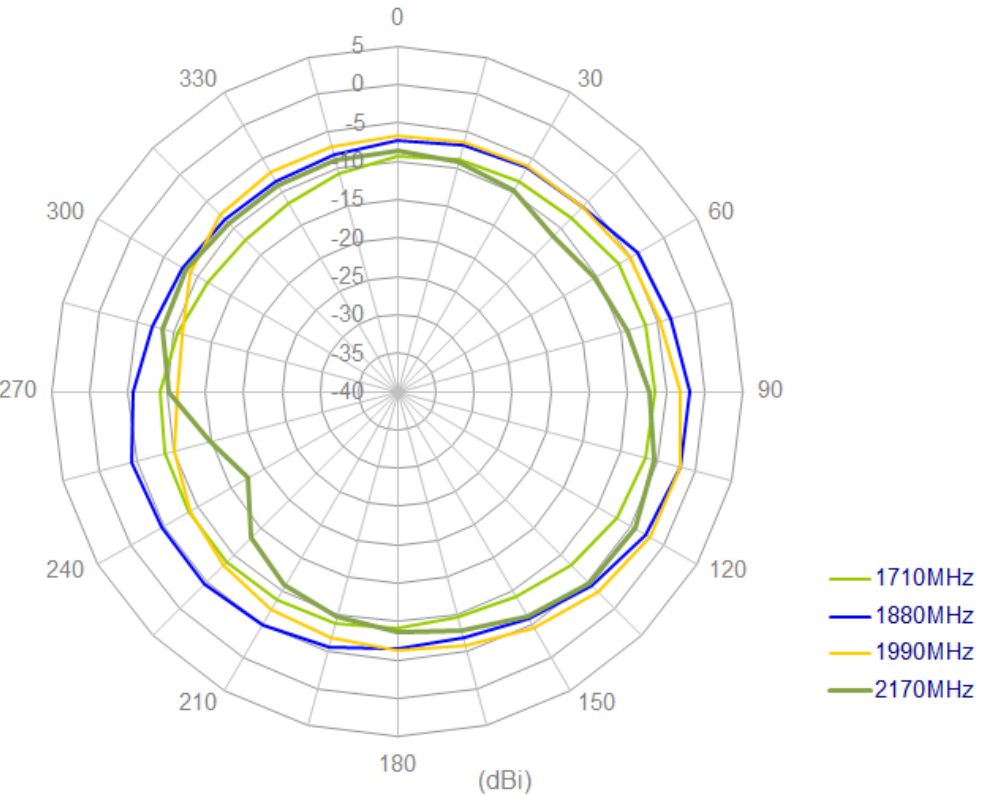
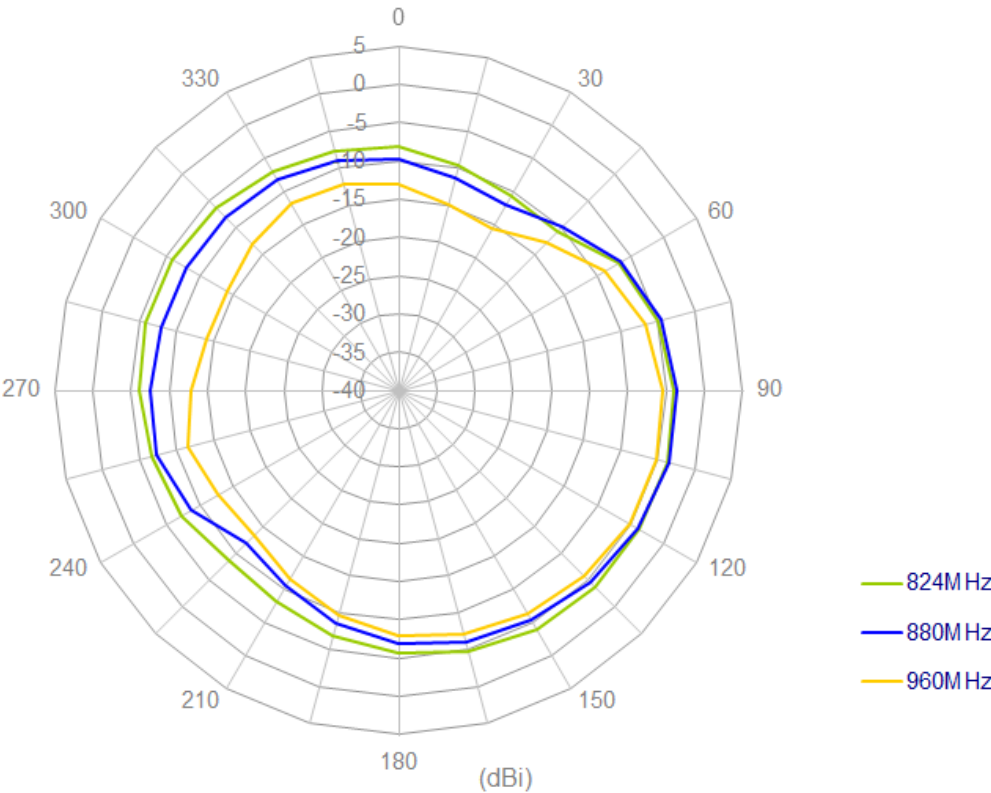


4. Radiation Patterns - Cellular

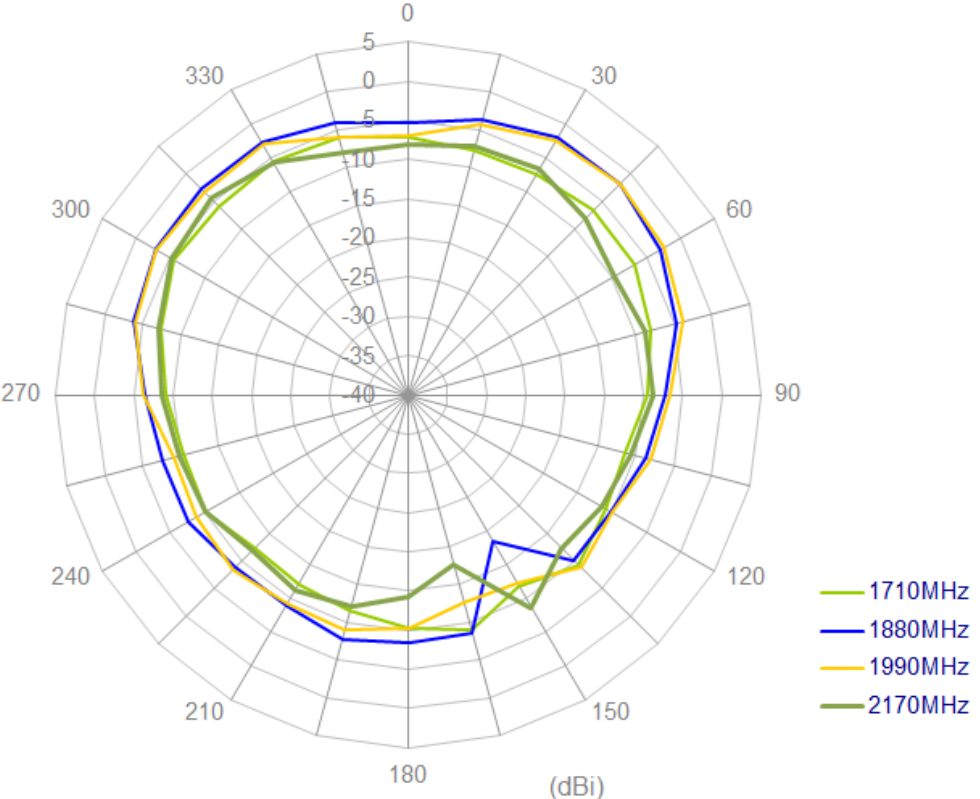
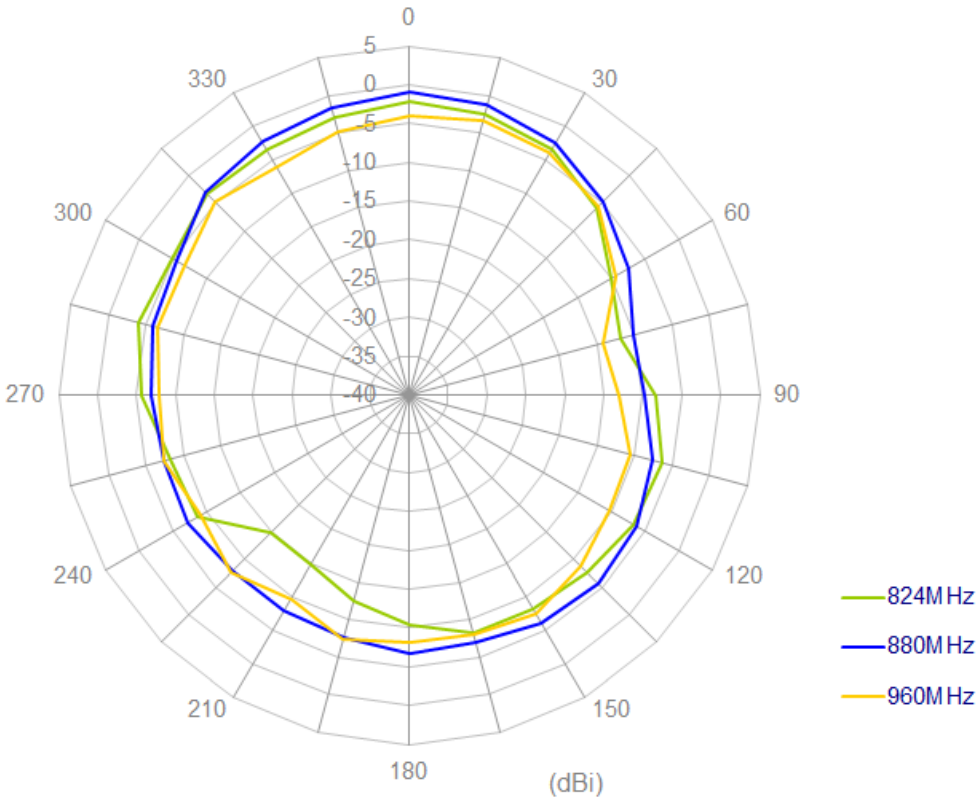
4.1. Antenna Setup



4.2. XY Plane



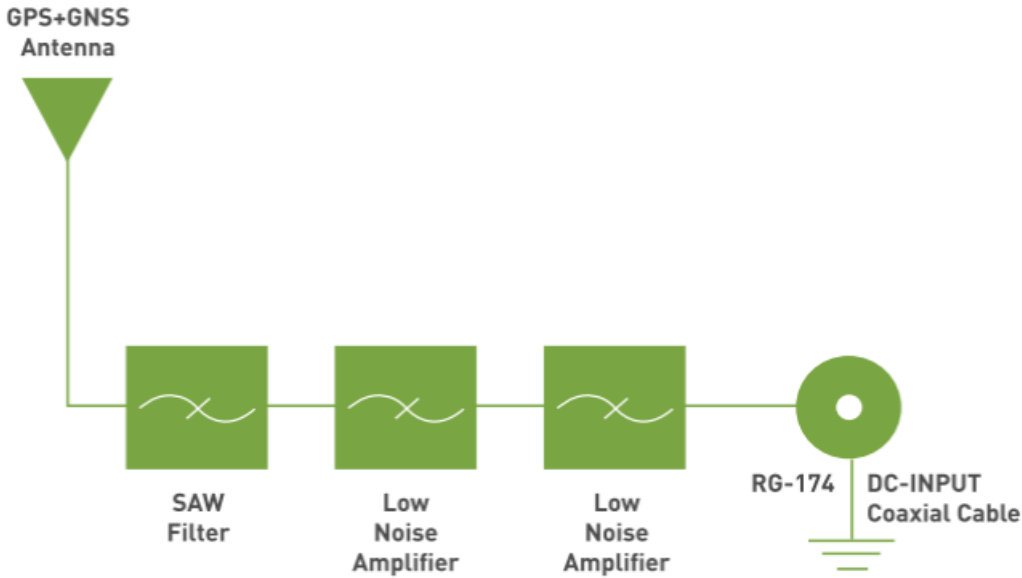
4.3. XZ Plane



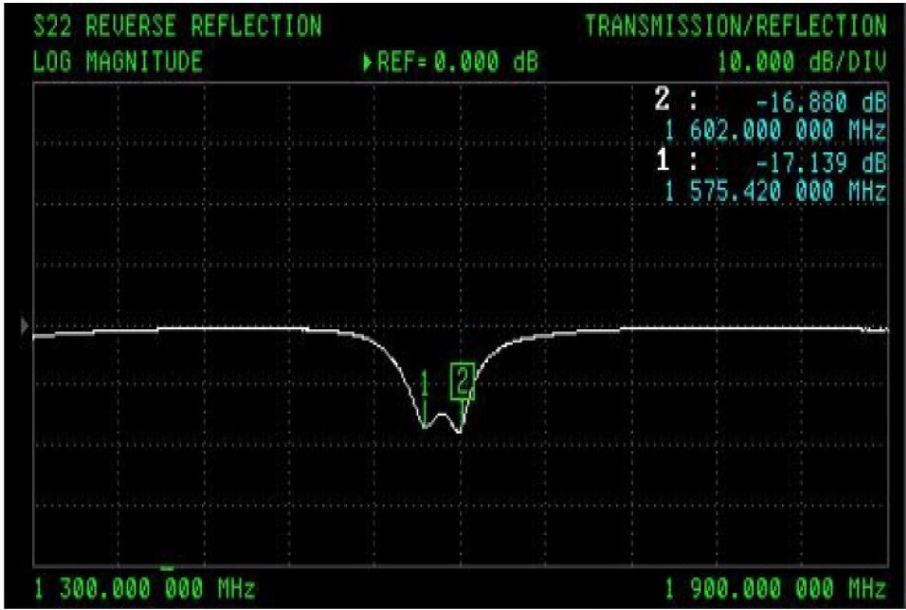
5. GPS/GLONASS/GALILEO Antenna

Characteristics

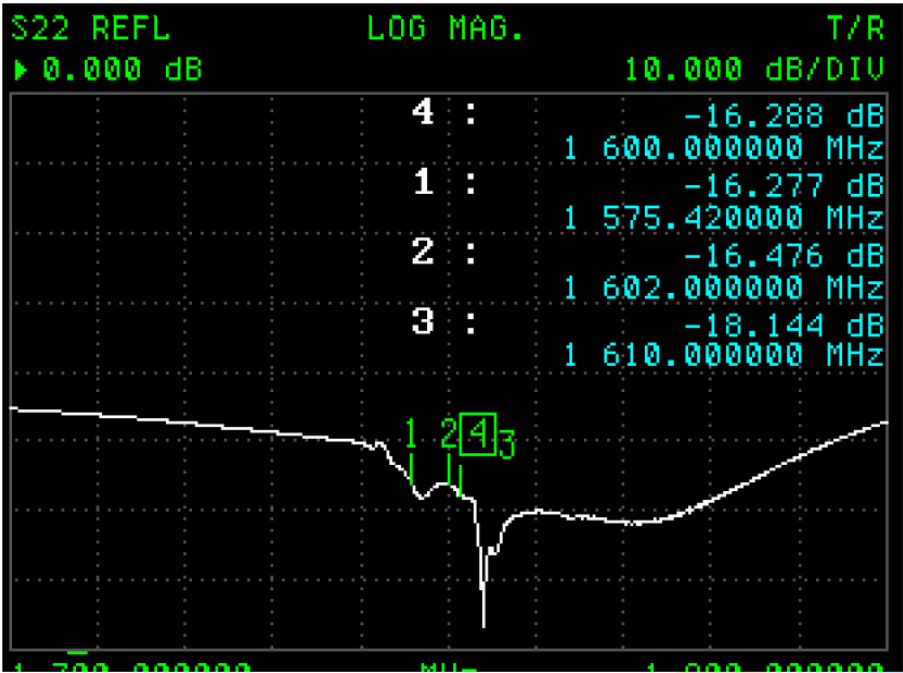
5.1. Block Diagram



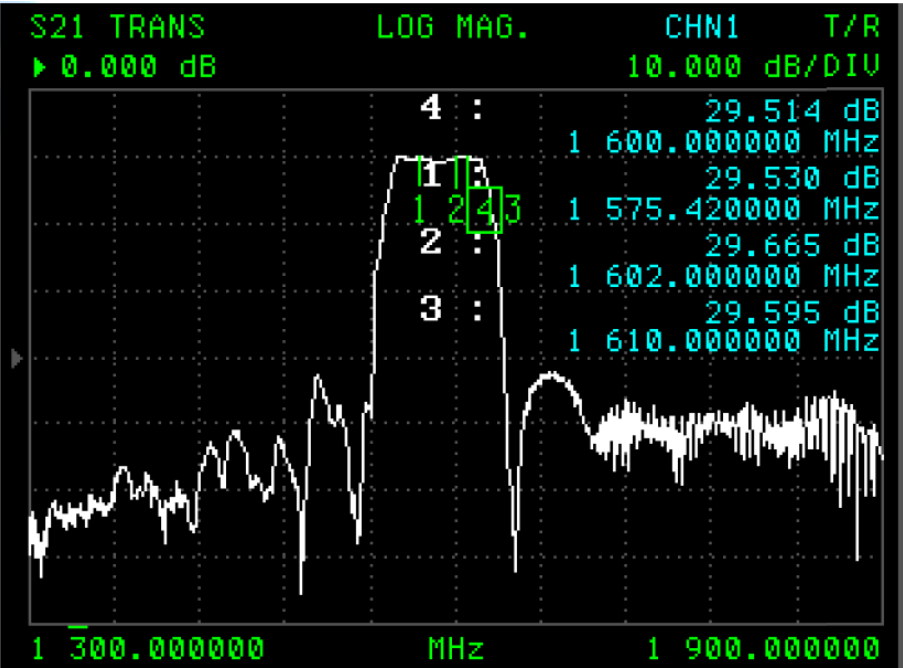
5.2. Return Loss



5.3. LNA S 22



5.4. LNA S 21



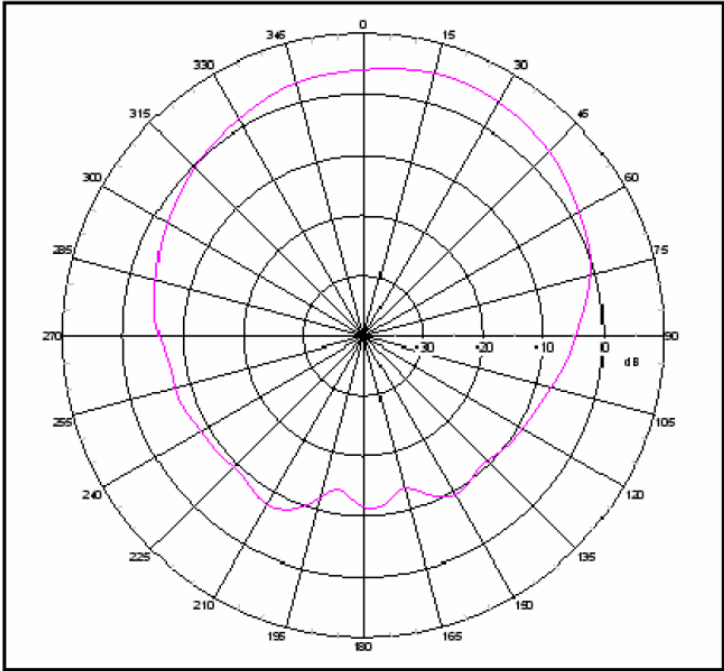
6. GPS/GLONASS/GALILEO Radiation patterns

6.1. Antenna Setup

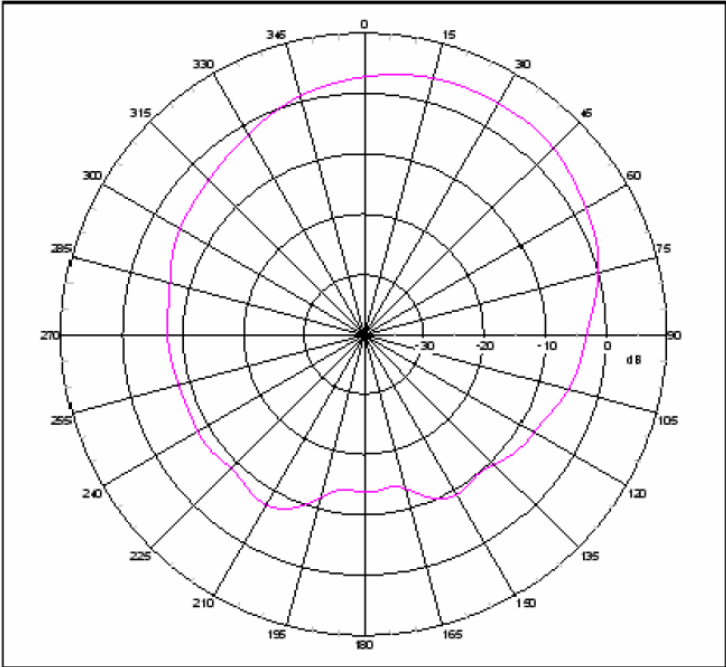


6.2. XZ Plane

6.2.1. 1575MHz

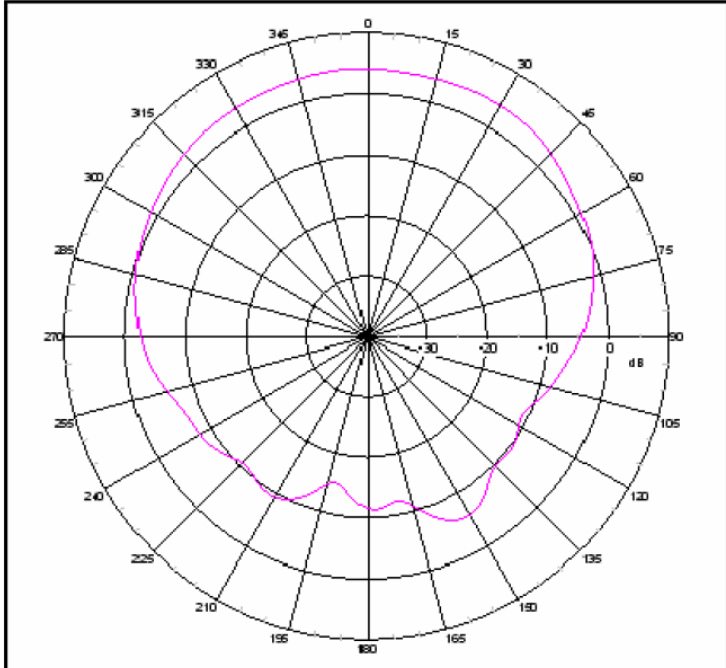


6.2.2. 1602MHz

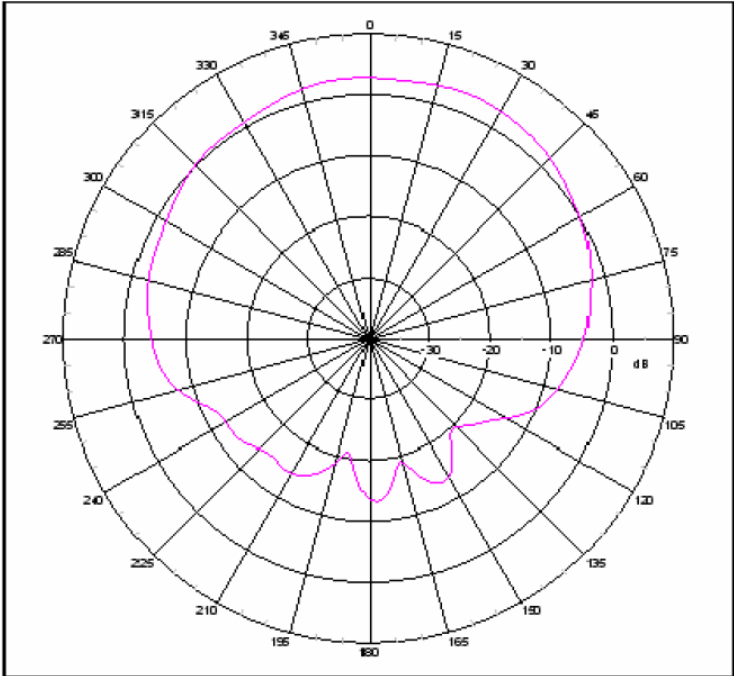


6.3. YZ Plane

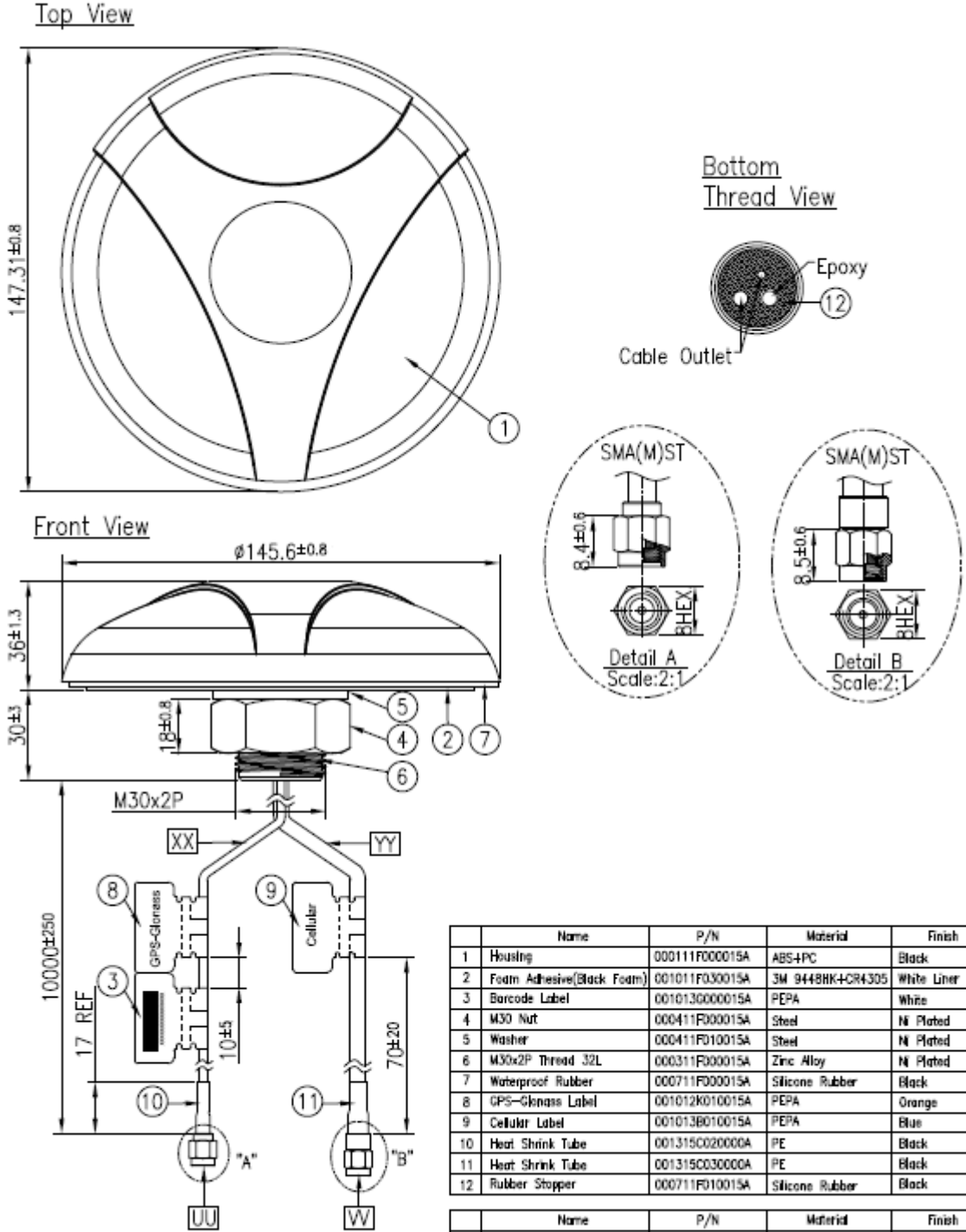
6.3.1. 1575MHz



6.3.2. 1602MHz



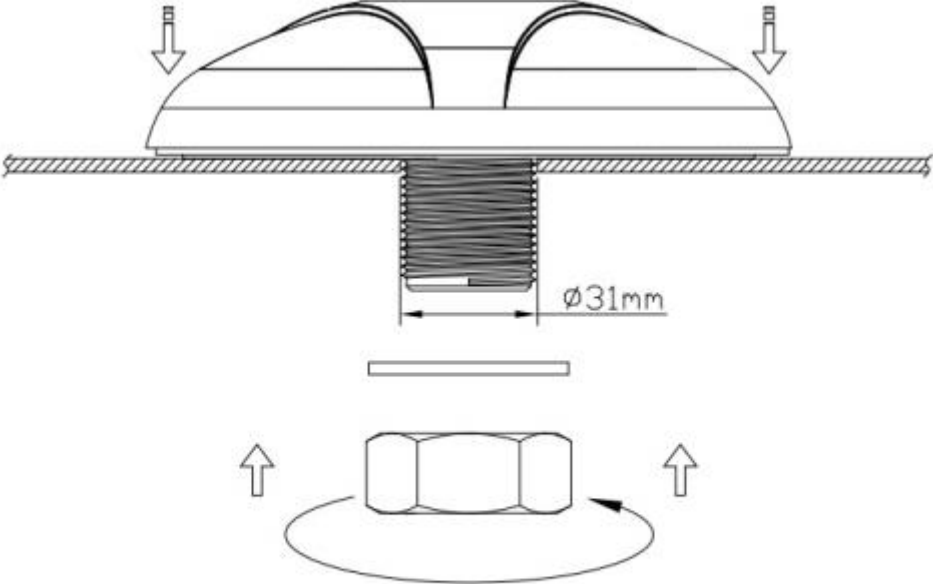
7. Drawing



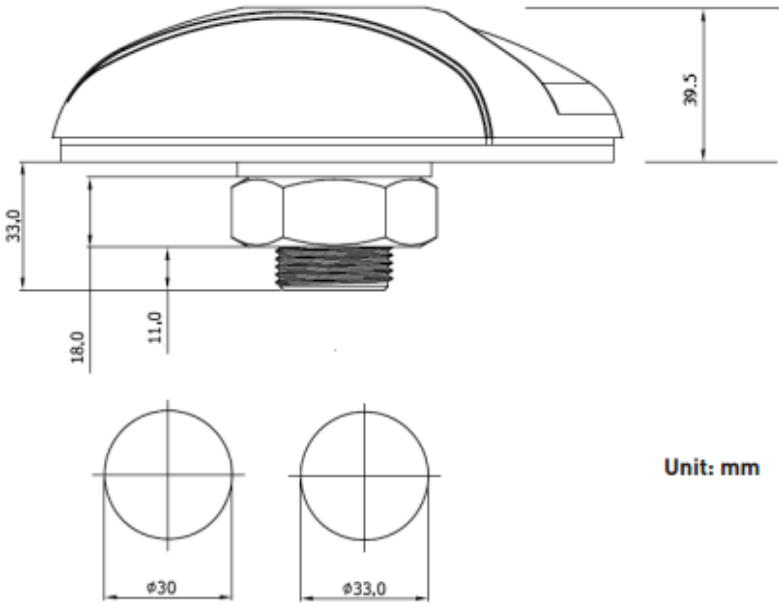
| | Name | P/N | Material | Finish | QTY |
|----|---------------------------|----------------|------------------|-------------|-----|
| 1 | Housing | 000111F000015A | ABS+PC | Black | 1 |
| 2 | Foam Adhesive(Black Foam) | 001011F030015A | 3M 9448BK+CR4305 | White Liner | 1 |
| 3 | Barcode Label | 0010130000015A | PEPA | White | 1 |
| 4 | M30 Nut | 000411F000015A | Steel | Ni Plated | 1 |
| 5 | Washer | 000411F010015A | Steel | Ni Plated | 1 |
| 6 | M30x2P Thread 32L | 000311F000015A | Zinc Alloy | Ni Plated | 1 |
| 7 | Waterproof Rubber | 000711F000015A | Silicone Rubber | Black | 1 |
| 8 | GPS-Glass Label | 001012K010015A | PEPA | Orange | 1 |
| 9 | Cellular Label | 001013B010015A | PEPA | Blue | 1 |
| 10 | Heat Shrink Tube | 001315C020000A | PE | Black | 1 |
| 11 | Heat Shrink Tube | 001315C030000A | PE | Black | 1 |
| 12 | Rubber Stopper | 000711F010015A | Silicone Rubber | Black | 1 |

| | Name | P/N | Material | Finish | QTY |
|----|----------------|----------------|----------|-----------|-----|
| UU | Connector Type | 200212G000015A | SMA(M)ST | Au Plated | 1 |
| W | Connector Type | 200212G010015A | SMA(M)ST | Au Plated | 1 |
| XX | Cable Type | 301315C000000A | RG-174 | Black | 1 |
| YY | Cable Type | 301415C010000A | CFD-200 | Black | 1 |

8. Installation



Recommended Torque for Mounting 49 N·m
 Maximum Torque for Mounting 58.8 N·m

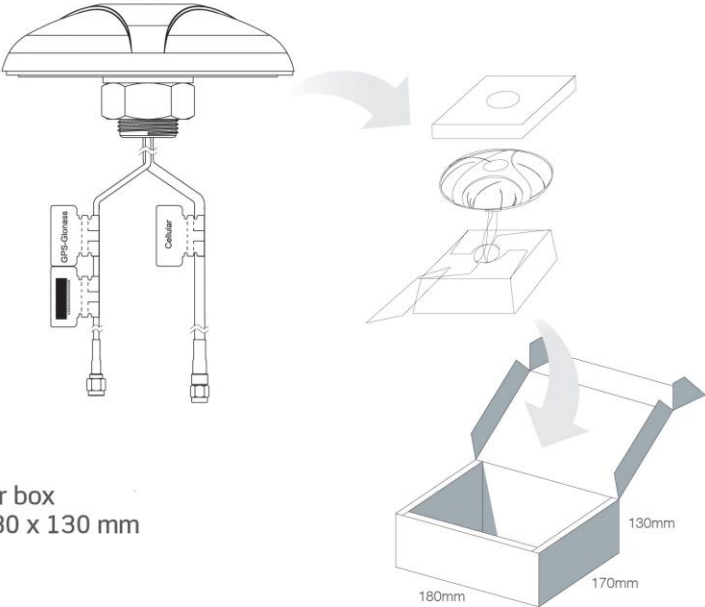


Unit: mm

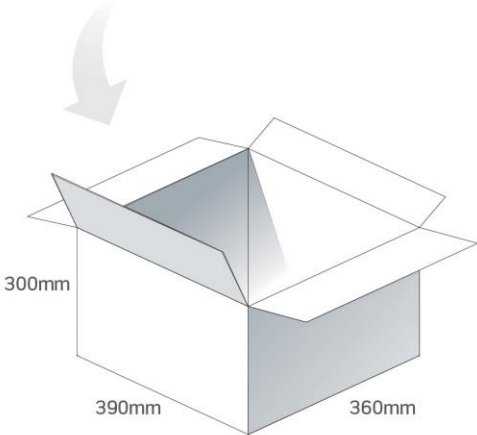
Thread Diameter

Recommended Mounting Hole

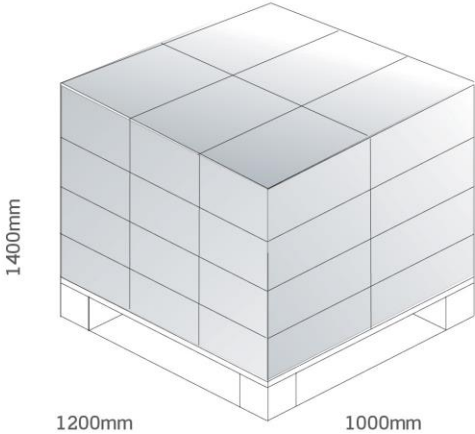
9. Packaging



1 pcs MA650.A.AB.008 per box
 Box Dimensions - 170 x 180 x 130 mm
 Weight - 1146g



8 pcs MA650.A.AB.008 per carton
 Carton - 390 x 360 x 300mm
 Weight - 10.2Kg



Pallet Dimensions 1200 x 1000 x 1400mm
 24 Cartons per Pallet
 6 Cartons per layer
 4 Layers

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