

SPECIFICATION

- Part No. : **MA600.A.ABC.006**
- Product Name : MA600 Spartan Screw-mount
3in1 Combination Antenna
GPS/GLONASS/GALILEO 1575~1602MHz
Cellular – GSM/CDMA/HSPA/UMTS
2.4GHz / 5GHz
- Feature : High performance outdoor antenna
Custom cables and connectors available
RoHS ✓



MA.600

1. Introduction

The Spartan MA.600 antenna is a heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications.

The Spartan is unique in the market because it combines a 3in1 GPS/GLONASS/GALILEO, Cellular (2G and 3G) and Wi-Fi, heavy-duty antenna with high efficiency in a compact format. The antenna screws down permanently onto a roof or metal panel and can be pole or wall-mounted with a metal bracket.

For industries such as commercial vehicle telematics, remote monitoring, smart meter systems and construction equipment, the Spartan provides a robust, rugged antenna that is durable, even in extreme environments.

All while still maintaining 20dB isolation between antennas. It uses high-shielded PTFE dielectric ultra low-loss cables that maintain low attenuation at all frequency bands, with an average 0.3dB per meter (0.1dB per foot), compared to 0.7dB for RG58 and 1.2dB for RG174. Because of this, the Spartan maximizes chances of passing PTCRB and network approvals first time. The Spartan also has excellent GPS/GLONASS/GALILEO reception without need to attach to an external ground-plane due to coupling to its unique own metal base.

Note: for ground-isolation antennas use the MA.605 version with Isolation Gaskets.

2. Specification

| GPS-GLONASS-GALILEO | | | | | | |
|-----------------------|----------------------------------------|-------------|----------------------------------|-------------|----------------------------------|-------------|
| Centre Frequency | 1575.42MHz / 1602MHz | | | | | |
| Bandwidth | 10MHz | | | | | |
| Radiation Efficiency | 50(without cable) | | | | | |
| Passive Gain @ Zenith | 4.0 typ(with $\psi=140$ mm ground) | | | | | |
| VSWR | 2 | | | | | |
| Impedance | 50 Ω | | | | | |
| DC Power Input Range | 3 ~ 5V | | | | | |
| DC input | 3.3V | | 4.0V | | 5.5V | |
| MHz | 1575.42 | 1602 | 1575.42 | 1602 | 1575.42 | 1602 |
| VSWR | 2 | 2 | 2 | 2 | 2 | 2 |
| LNA Gain | 29.2 | 29 | 31 | 31 | 32.3 | 32 |
| Noise Figure | 3.1 | 3.1 | 3.2 | 3.2 | 3.4 | 3.4 |
| Power Consumption | 7.5 | 7.5 | 9.4 | 9.4 | 15 | 15 |
| Band Attenuation | 1520MHz: -20dB 1642MHz: -20dB | | 1520MHz: -20dB 1642MHz: -20dB | | 1520MHz: -20dB 1642MHz: -20dB | |
| Cable | 3m RG-174 standard, fully customizable | | | | | |
| Connector | SMA(M) standard, fully customizable | | | | | |

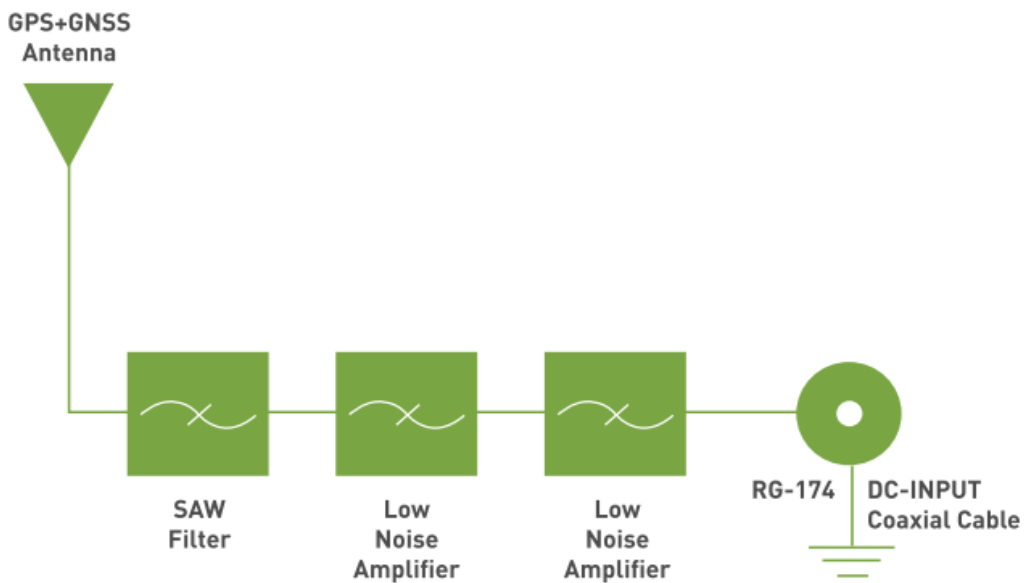
| CELLULAR | | | | | |
|-------------------|----------------------------------------|---------|-----------|-----------|-----------|
| Frequency (GHz) | 824~896 | 880~960 | 1710~1880 | 1850~1990 | 1710~2170 |
| Peak Gain (dBi) | 2.1 | -0.2 | 2.9 | 3.0 | 5.1 |
| Average (dBi) | -4.7 | -7.5 | -2.7 | -3.1 | -3.1 |
| Efficiency | 35% | 20% | 51% | 49% | 49% |
| Impedance | 50 Ω | | | | |
| Polarization | Linear | | | | |
| Radiation Pattern | Omni | | | | |
| Cable | 3m CFD200 standard, fully customizable | | | | |
| Connector | SMA(M) standard, fully customizable | | | | |

| Wi-Fi | | | | |
|--------------------|-----------------------------------------------|---------|---------|---------|
| Frequency (GHz) | 2.4~2.5 | 4.7~5.0 | 5.0~5.4 | 5.4~5.9 |
| Peak Gain (dBi) | 2.1 | 2.9 | 3.8 | 2.8 |
| Average Gain (dBi) | -2.3 | -3.6 | -3.3 | -3.8 |
| Efficiency | 60% | 44% | 46% | 42% |
| VSWR | <=1.6:1 | | | |
| Impedance | 50Ω | | | |
| Polarization | Linear | | | |
| Radiation Pattern | Omni | | | |
| Cable | 3m CFD200 standard, fully customizable | | | |
| Connector | SMA(M) standard, standard, fully customizable | | | |
| MECHANICAL | | | | |
| Dimensions | Profile 39.5mm x Diameter 145.6mm | | | |
| Casing | UV resistant PVC | | | |
| Base and thread | Nickel Plated Zinc | | | |
| Thread diameter | 30mm | | | |
| Waterproof | IP67 | | | |
| ENVIRONMENTAL | | | | |
| Temperature Range | -40°C to 85°C | | | |
| Humidity | Non-condensing 65°C 95% RH | | | |

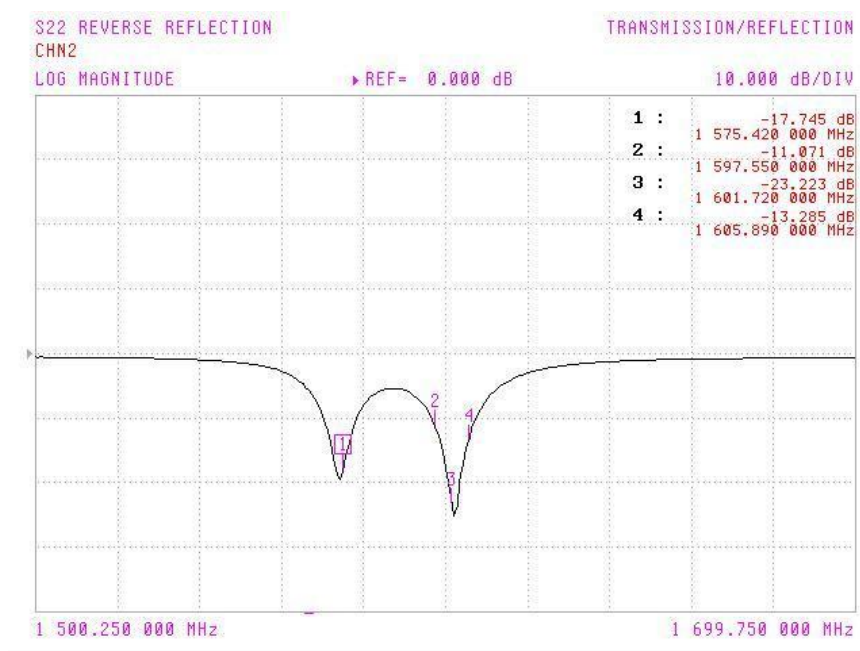
* All measurements are done in free space with standard cables

3. GPS/GLONASS/GALILEO Antenna Characteristics

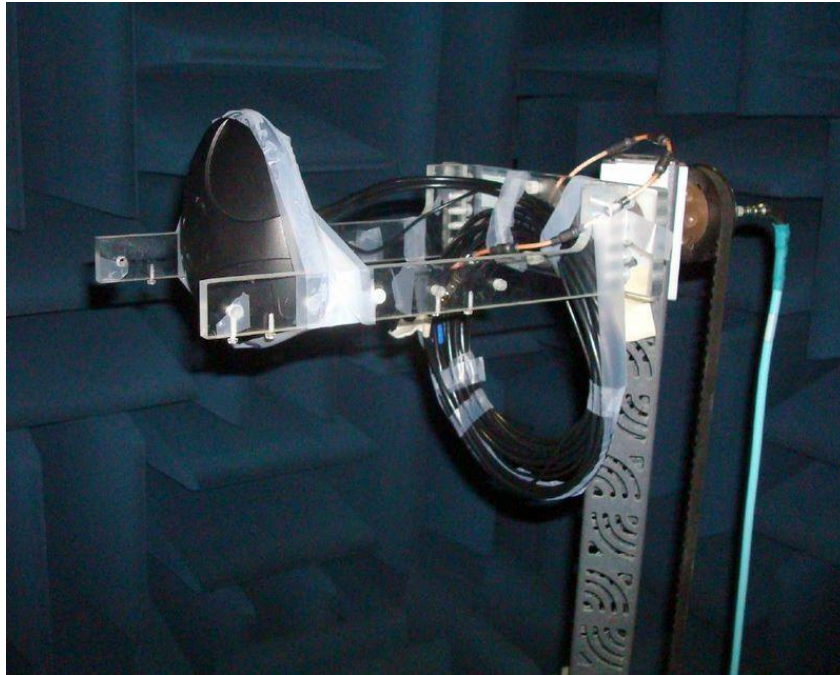
3.1 Block diagram



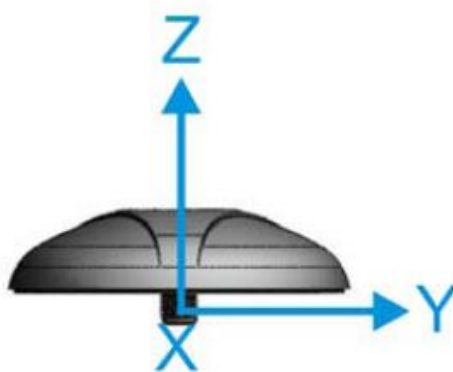
3.2 Return Loss



3.3 GPS/GLONASS/GALILEO Antenna Radiation Pattern



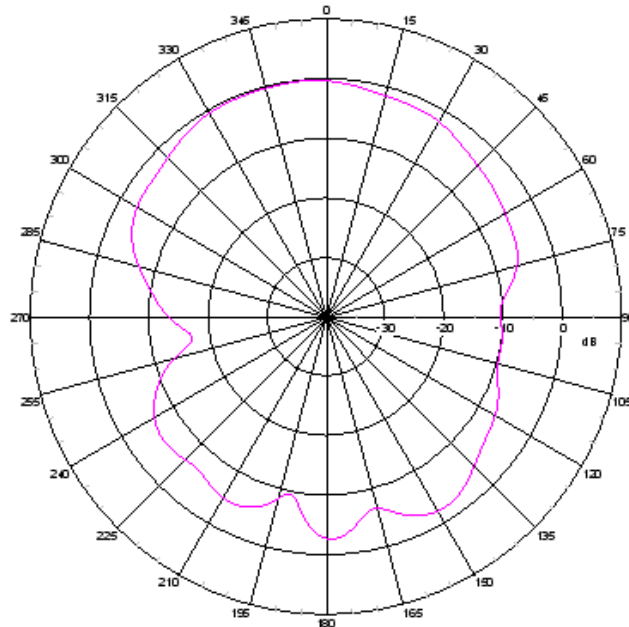
MA.600 tested in CTIA approved 3D chamber



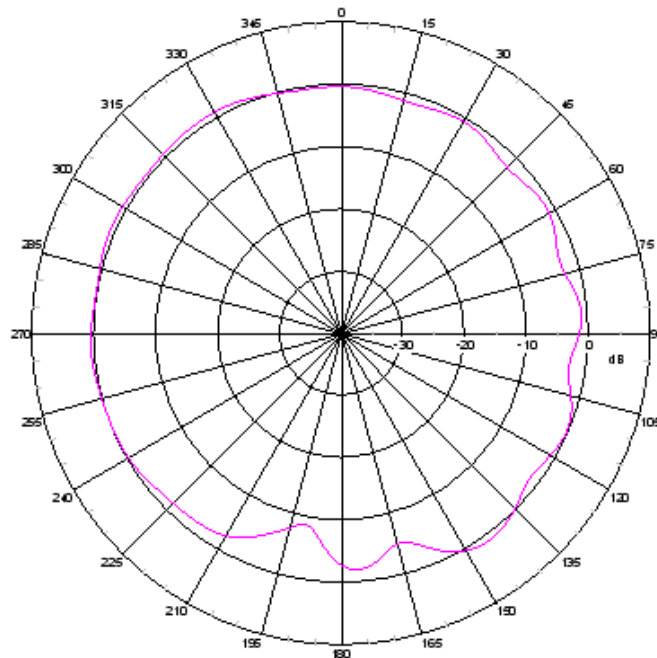
XYZ co-ordinate for reference.

3.4 Radiation Pattern

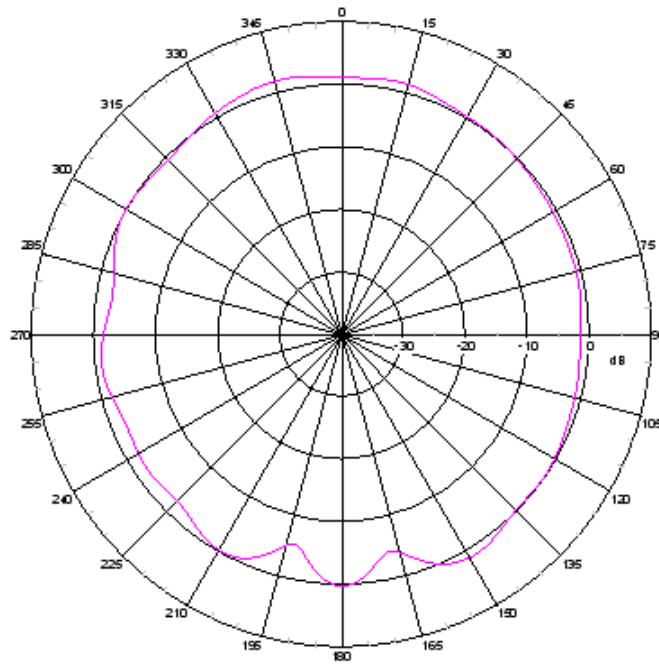
XZ Plane Free Space @1575.42MHz



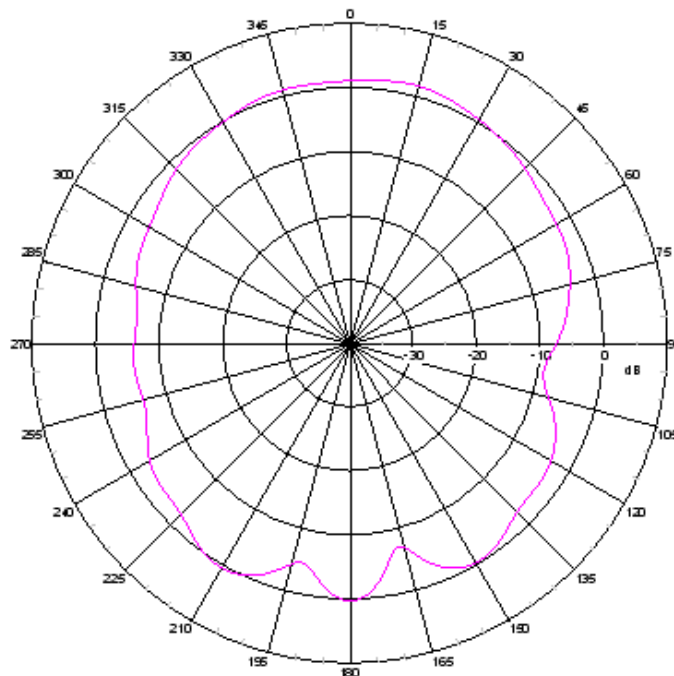
YZ Plane Free Space @1575.42MHz



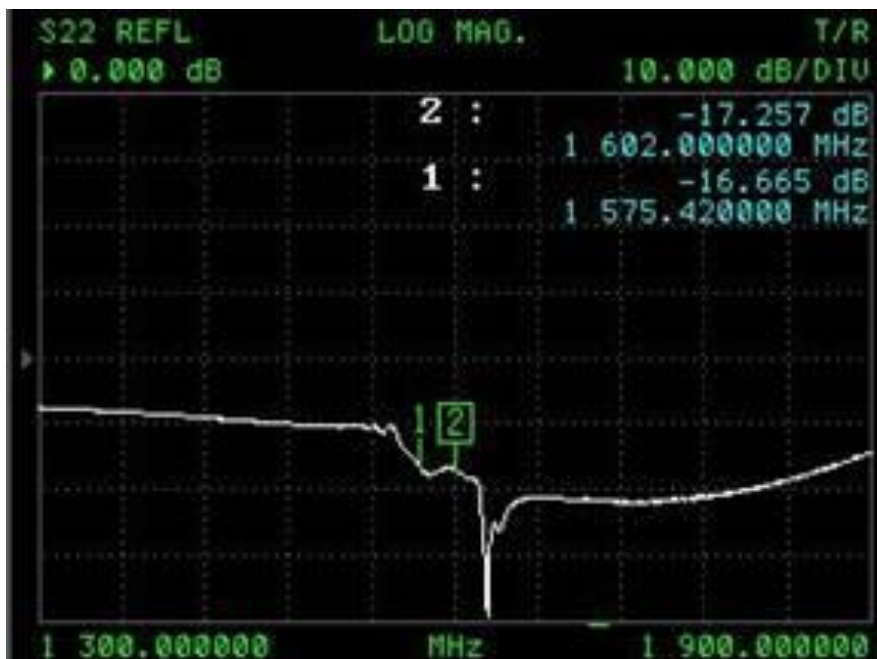
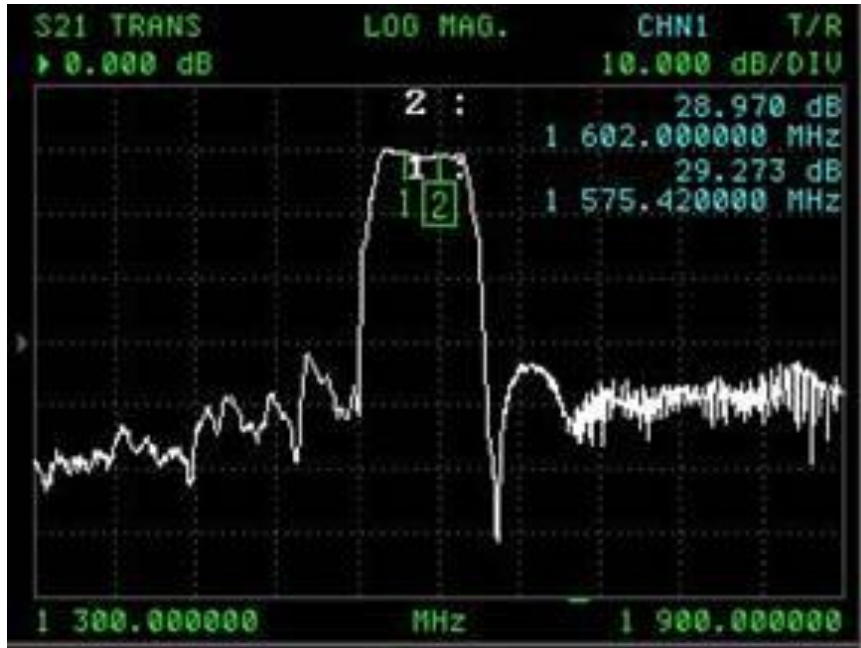
XZ-plane Free Space @1602MHz



YZ-plane Free Space @1602MHz

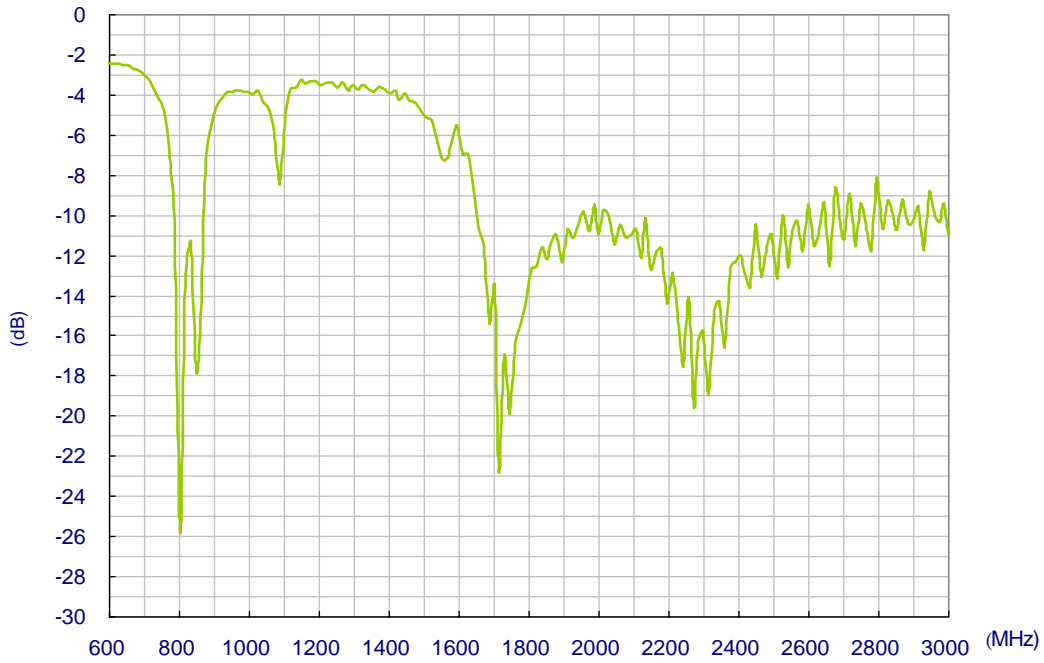


3.5 GPS/GLONASS/GALILEO LNA

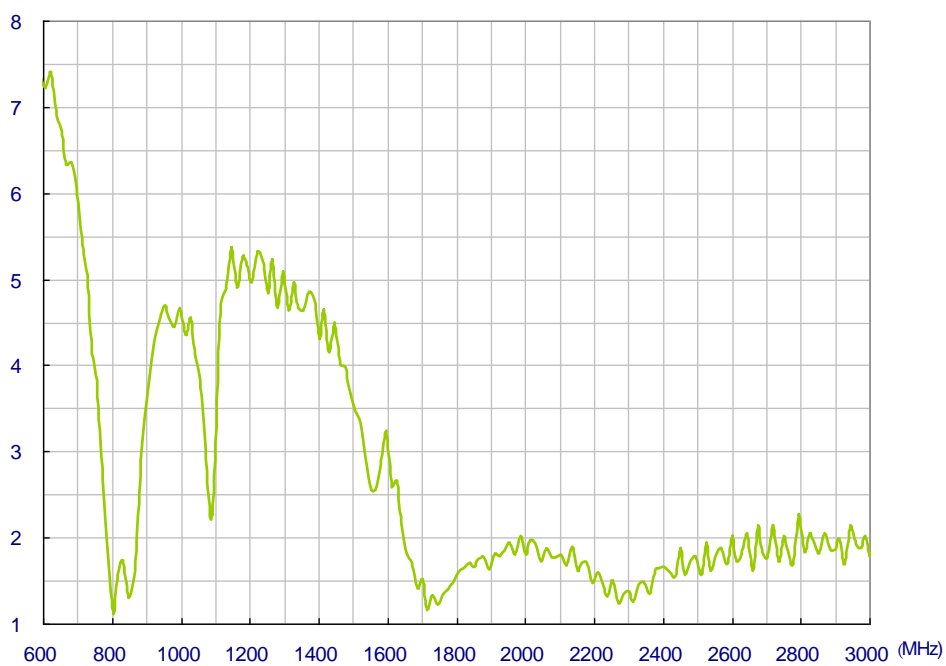


4. Cellular Antenna Characteristics

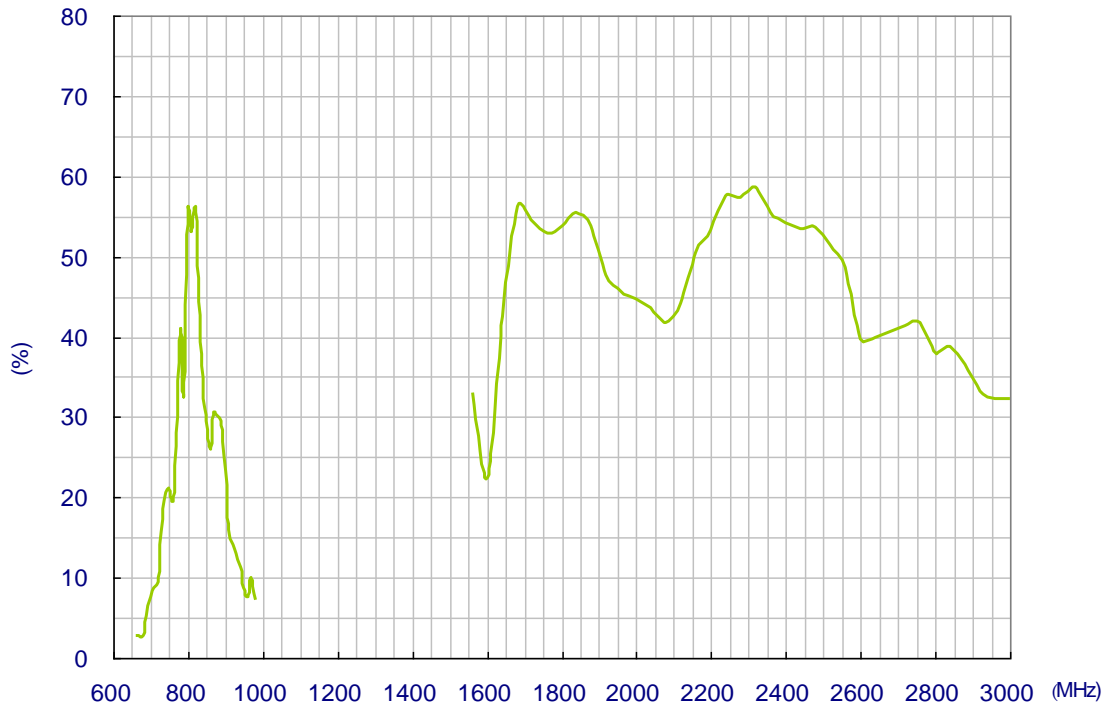
4.1 Return Loss



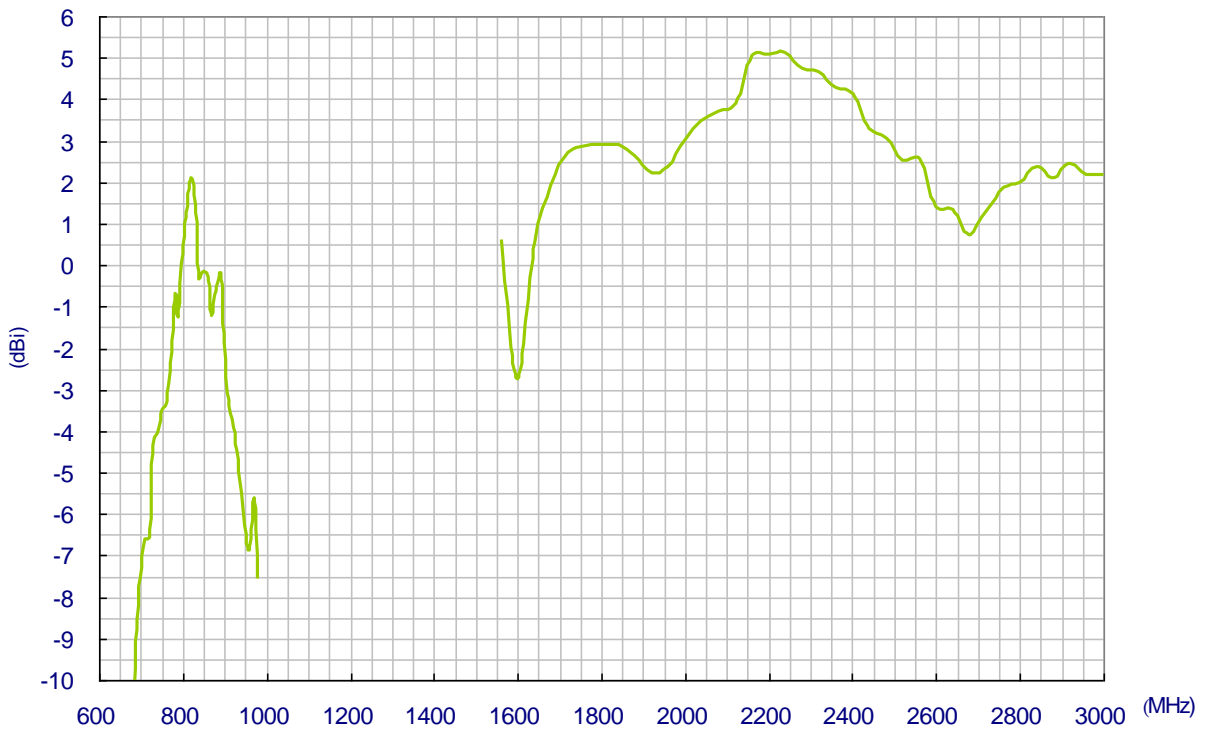
4.2 VSWR



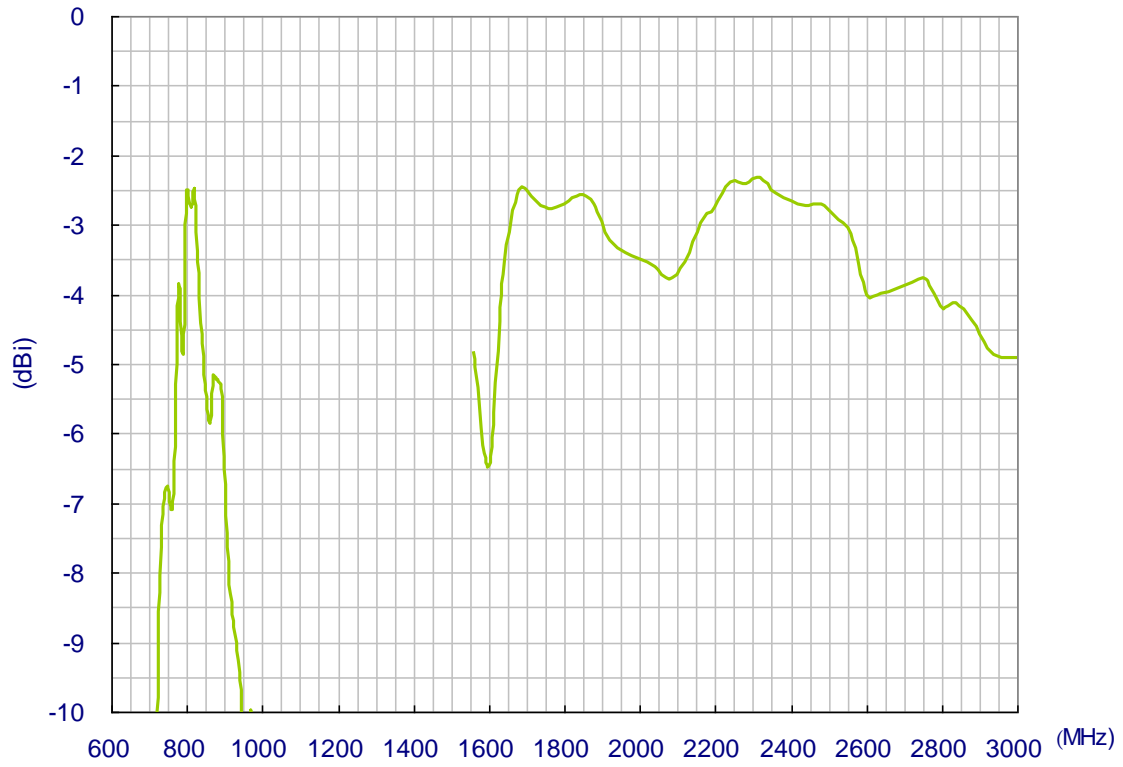
4.3 Cellular Antenna Efficiency



4.4 Cellular Antenna Peak Gain

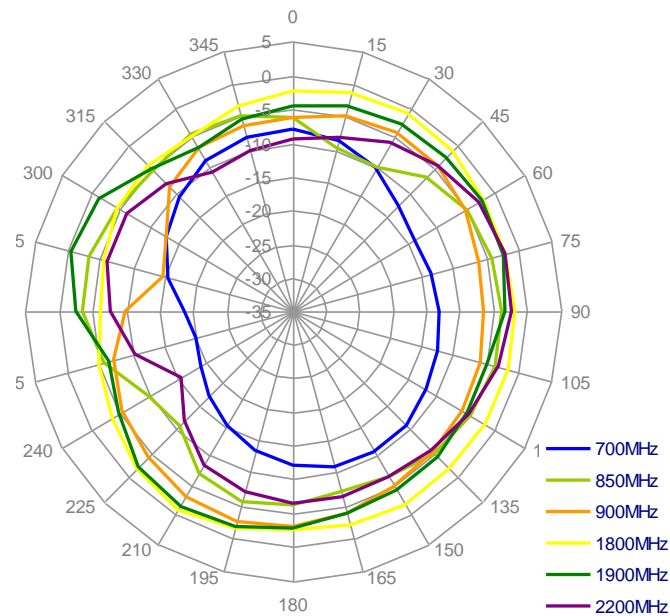


4.5 Cellular Antenna 3D Average Gain

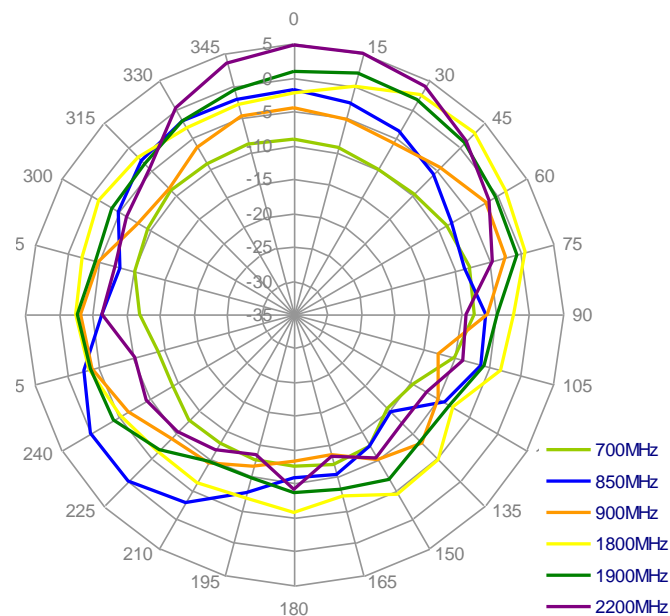


5. Cellular Antenna Radiation Pattern

5.1 XY Plane

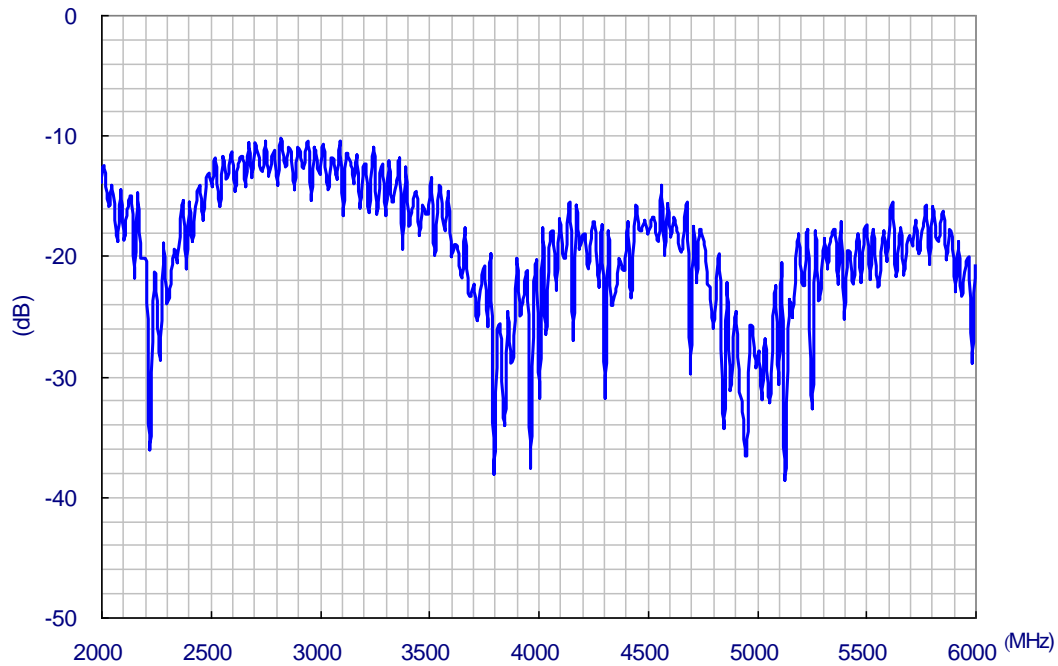


5.2 XZ Plane

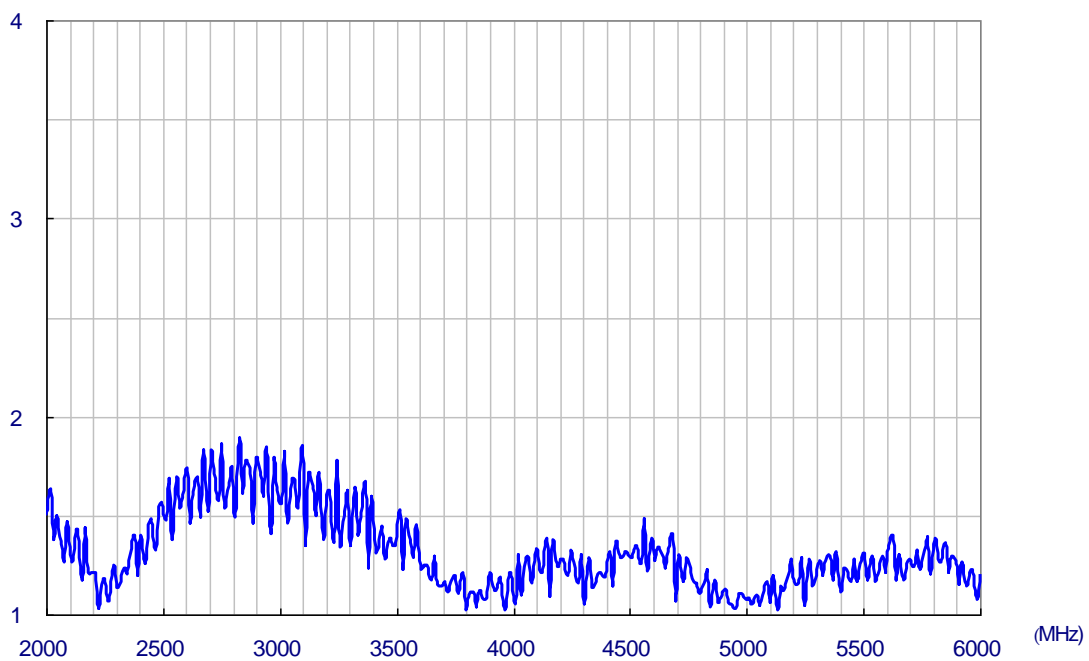


6. 2.4/5GHz Antenna Characteristics

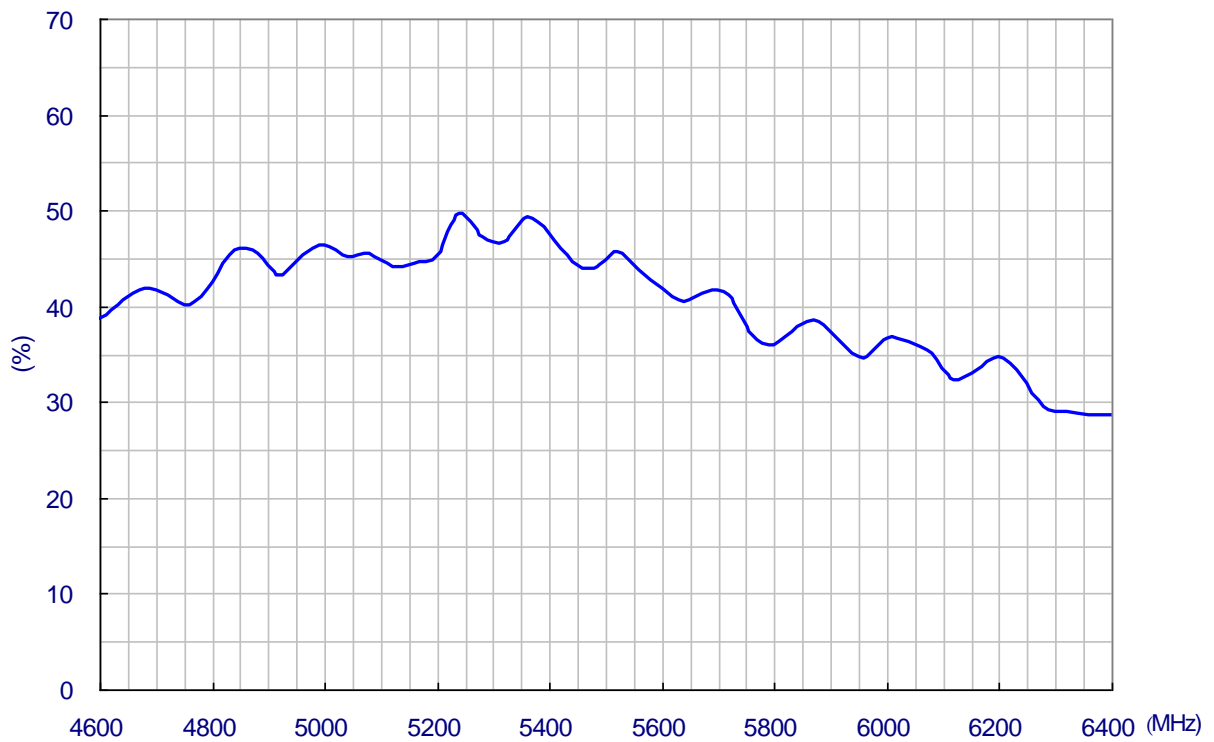
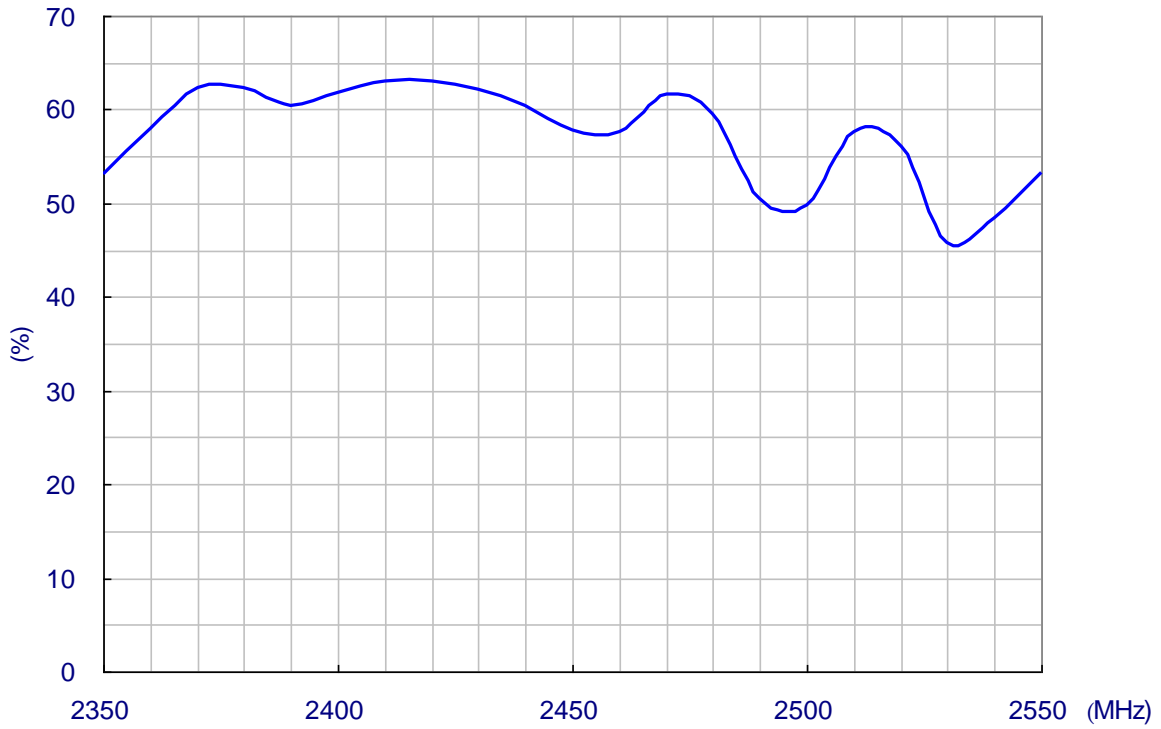
6.1 S11 Return Loss



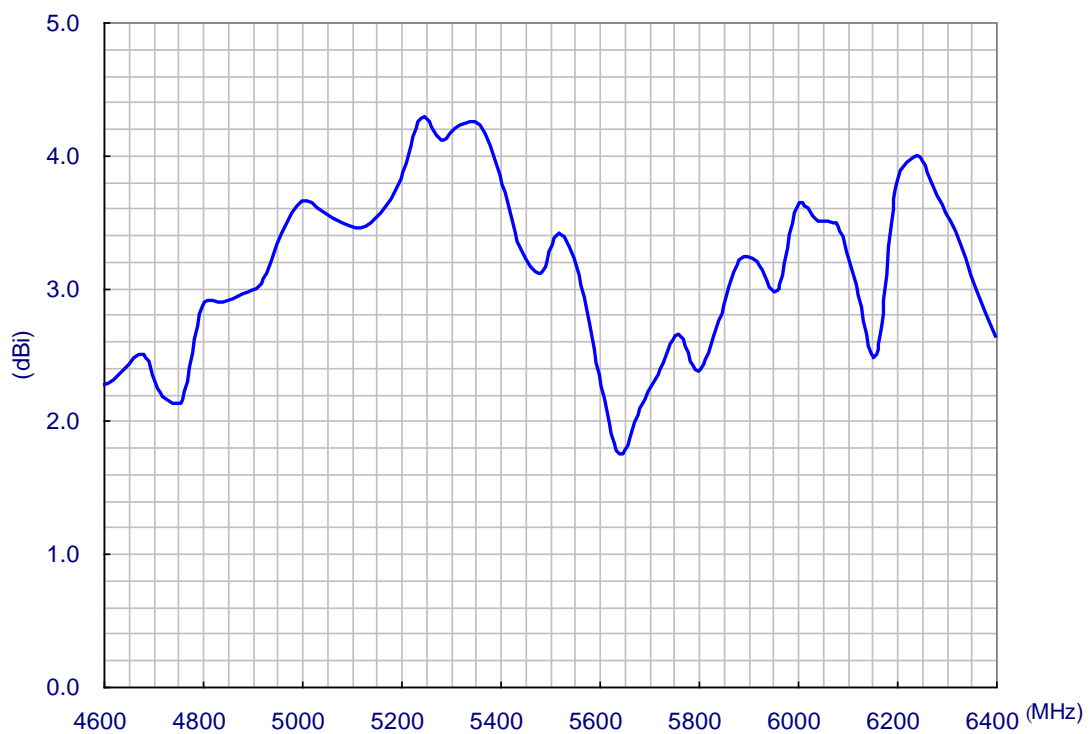
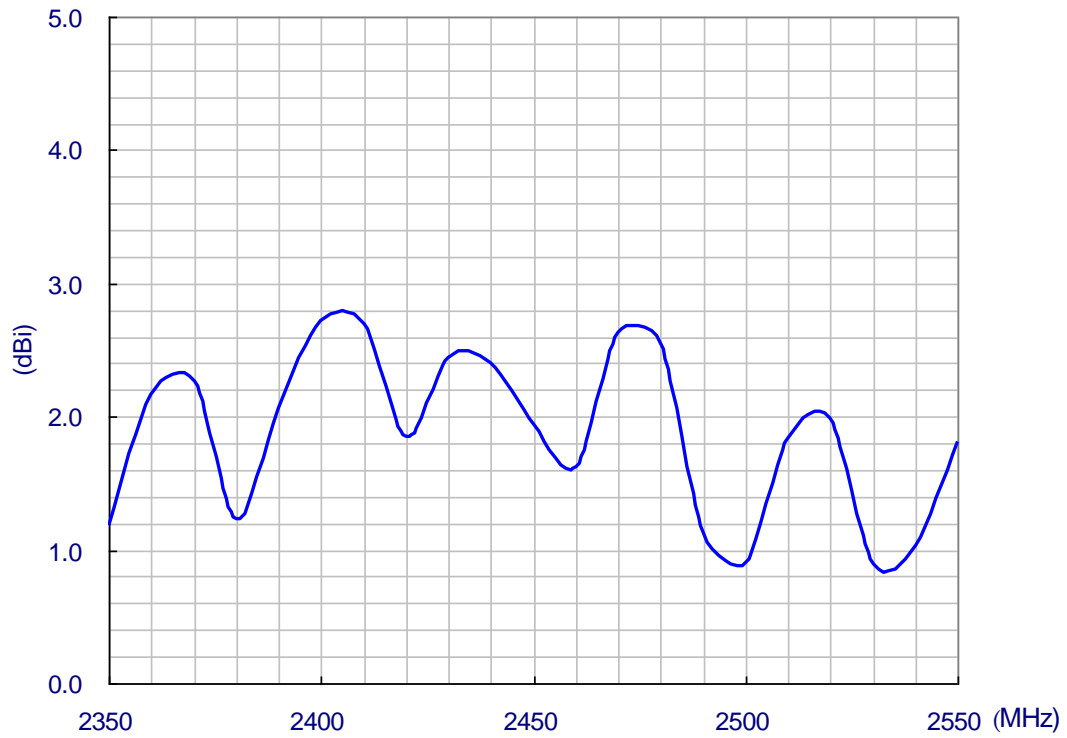
6.2 VSWR



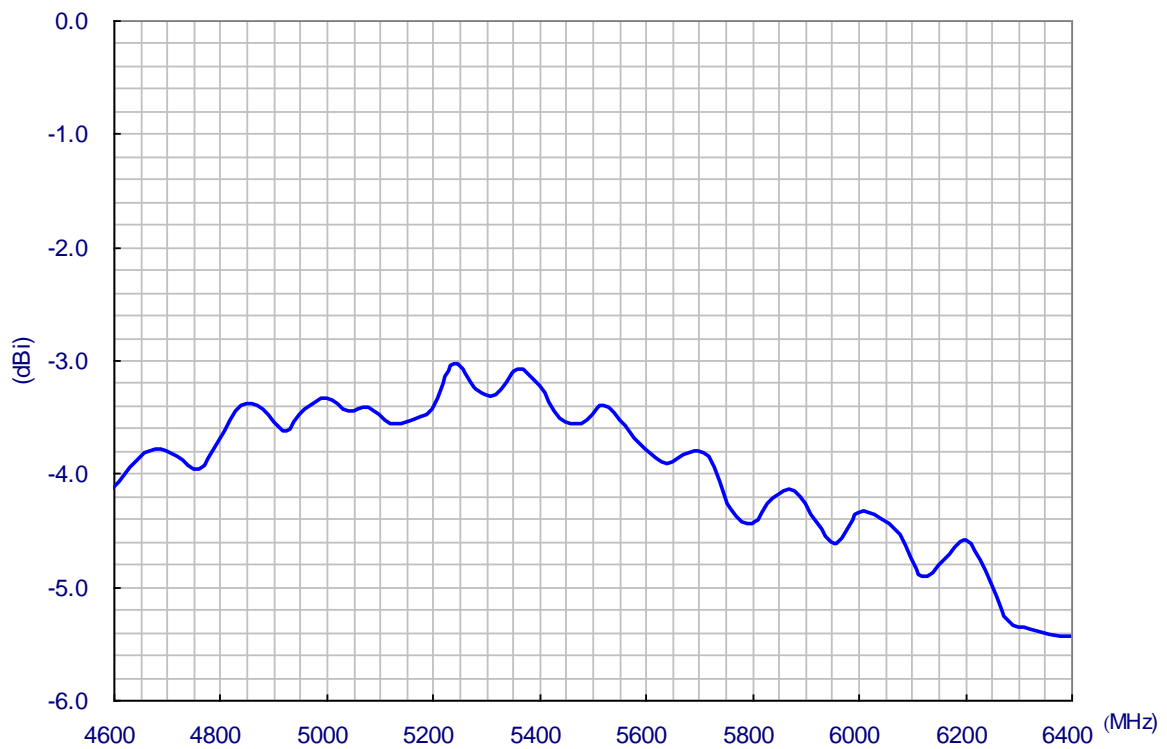
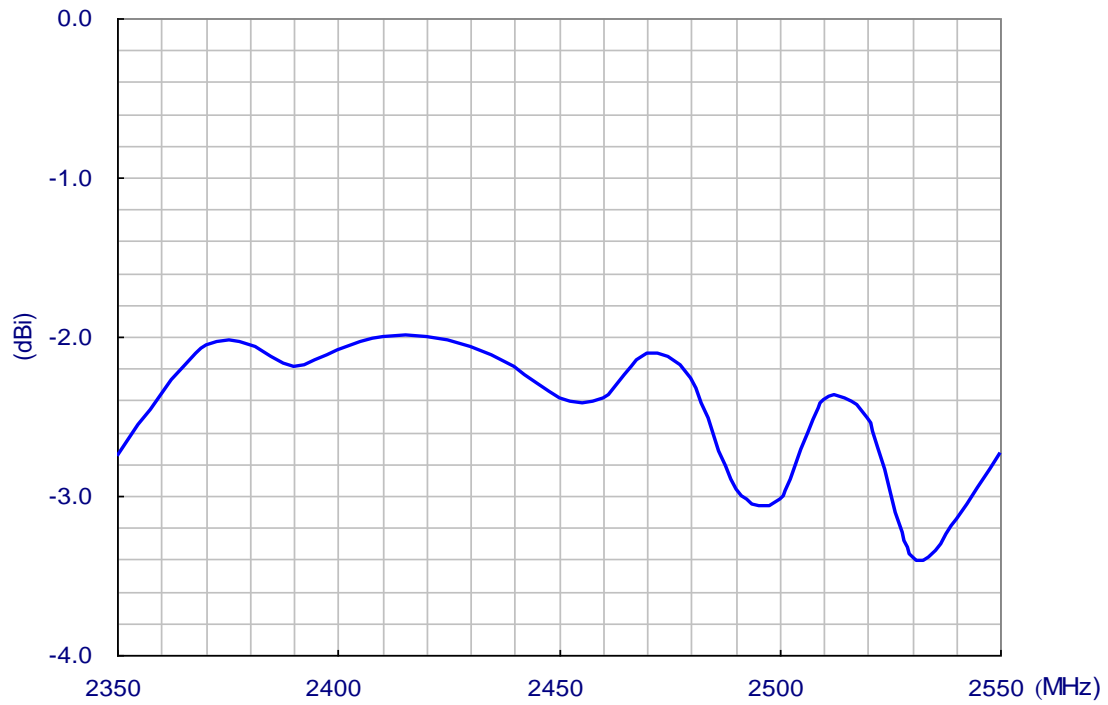
6.3 2.4/5.8GHz Antenna Efficiency



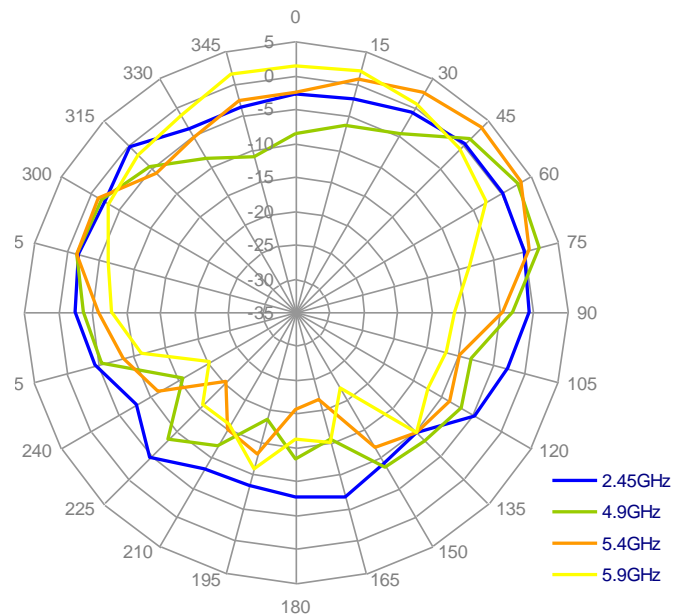
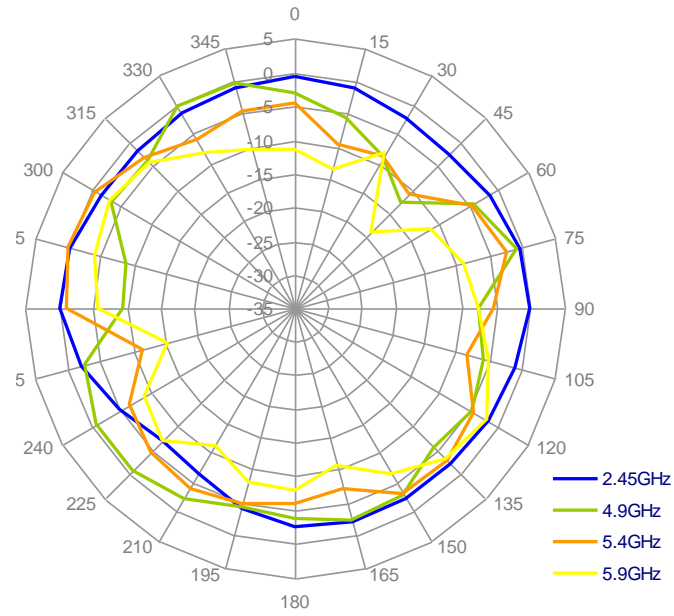
6.4 2.4/5.8GHz Antenna Peak Gain



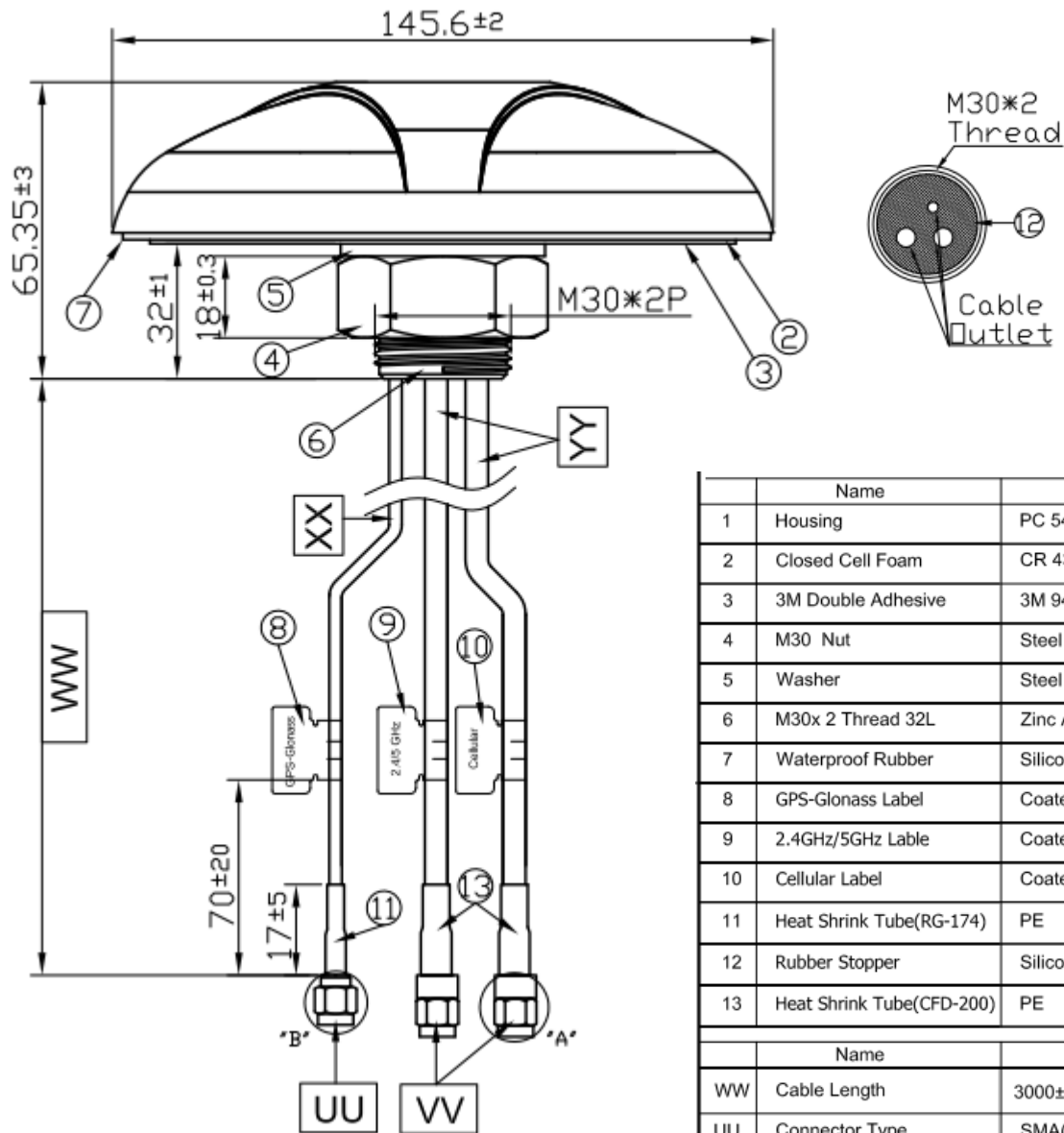
6.5 2.4/5.8GHz Antenna Peak Gain



7. 2.4/5.8GHz Antenna Radiation Pattern

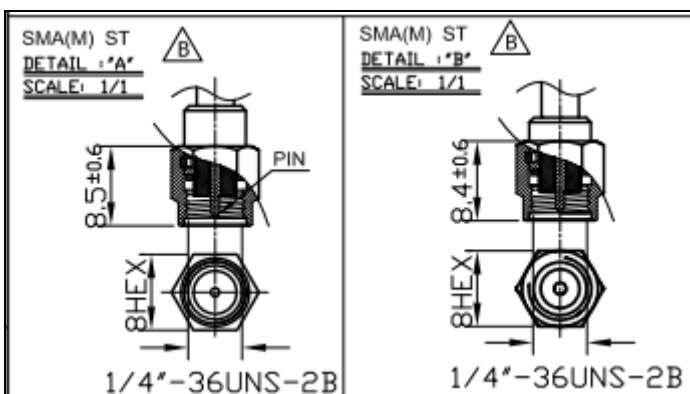


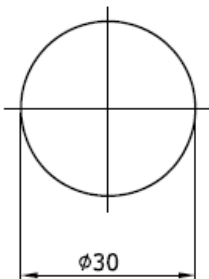
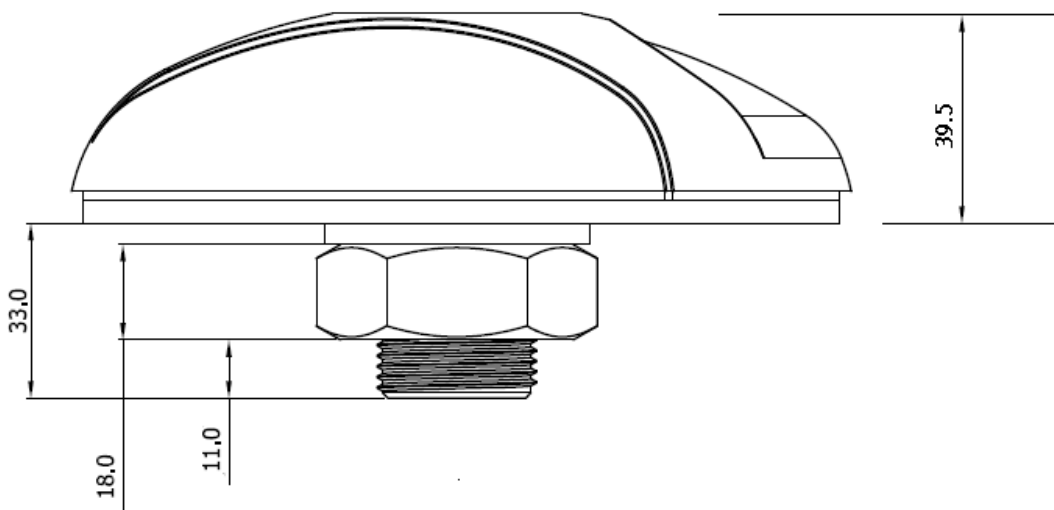
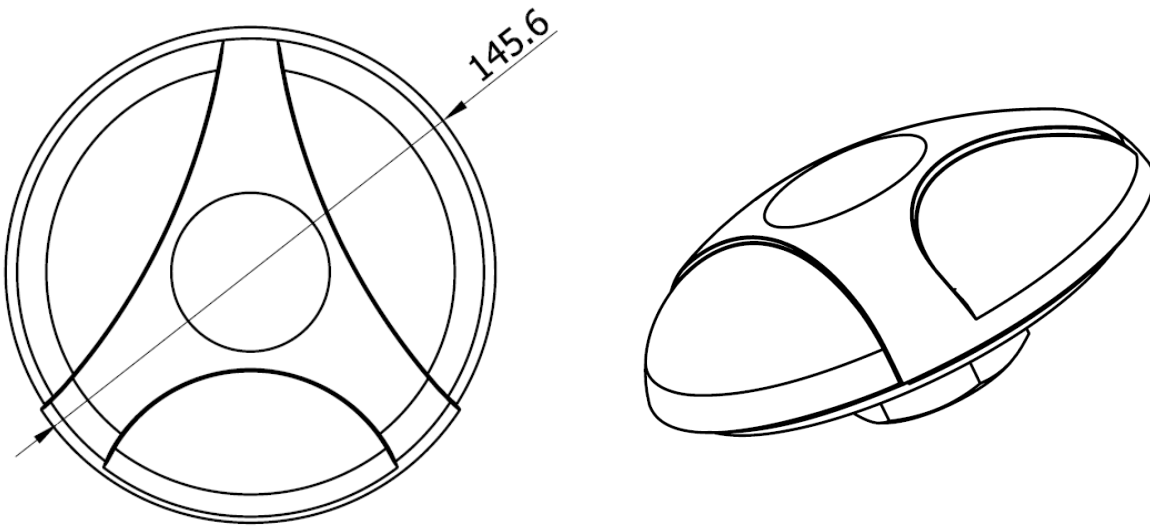
8. Mechanical Drawing



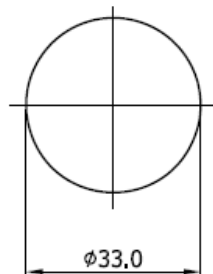
| | Name | Material | Finish | QTY |
|----|---------------------------|-----------------|-------------|-----|
| 1 | Housing | PC 540 | Black | 1 |
| 2 | Closed Cell Foam | CR 4305 | Black | 1 |
| 3 | 3M Double Adhesive | 3M 9448 HK | White Liner | 1 |
| 4 | M30 Nut | Steel AISI 1215 | Ni Plated | 1 |
| 5 | Washer | Steel AISI 1215 | Ni Plated | 1 |
| 6 | M30x 2 Thread 32L | Zinc Alloy | Ni Plated | 1 |
| 7 | Waterproof Rubber | Silicon | Black | 1 |
| 8 | GPS-Glonass Label | Coated Paper | Orange | 1 |
| 9 | 2.4GHz/5GHz Lable | Coated Paper | Green | 1 |
| 10 | Cellular Label | Coated Paper | Blue | 1 |
| 11 | Heat Shrink Tube(RG-174) | PE | Black | 1 |
| 12 | Rubber Stopper | Silicone Rubber | Black | 1 |
| 13 | Heat Shrink Tube(CFD-200) | PE | Black | 2 |

| | Name | Spec | Finish | QTY |
|----|----------------|------------|--------|-----|
| WW | Cable Length | 3000±120mm | Black | 3 |
| UU | Connector Type | SMA(M) ST | Gold | 1 |
| VV | Connector Type | SMA(M) ST | Gold | 2 |
| XX | Cable Type | RG174 | Black | 1 |
| YY | Cable Type | CFD 200 | Black | 2 |





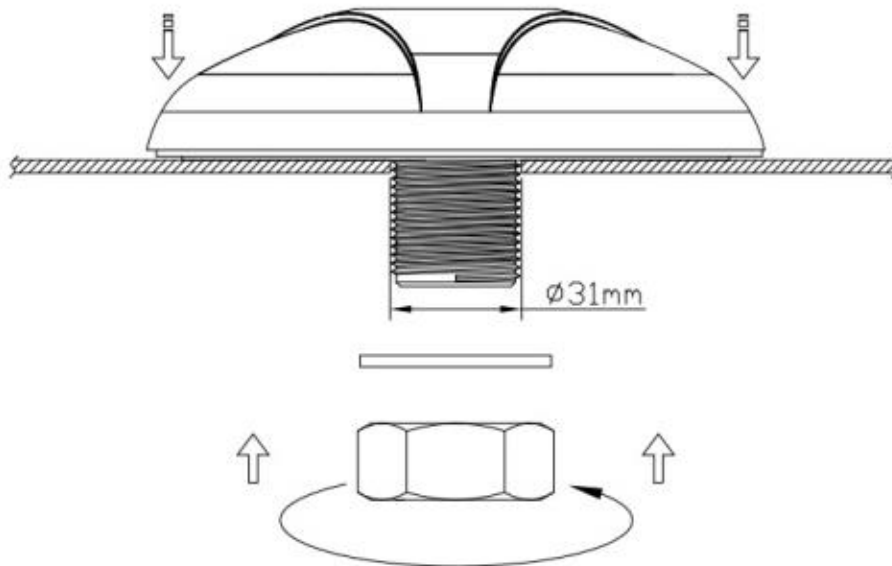
Thread
Diameter



Recommended
Mounting Hole

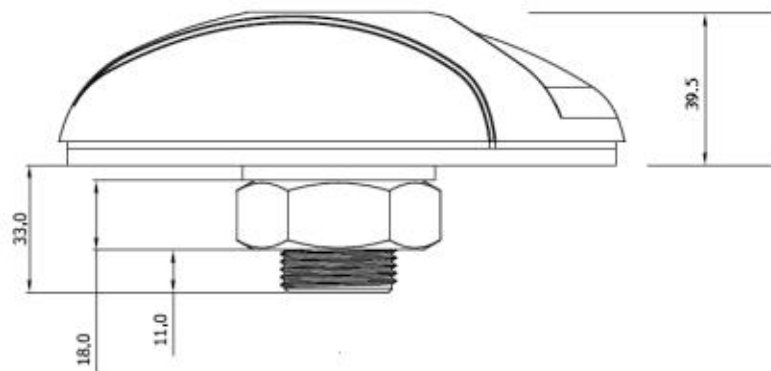
Unit: mm

9. Installation

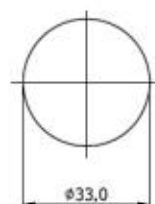


Recommended Torque for Mounting 49 N·m

Maximum Torque for Mounting 58.8 N·m

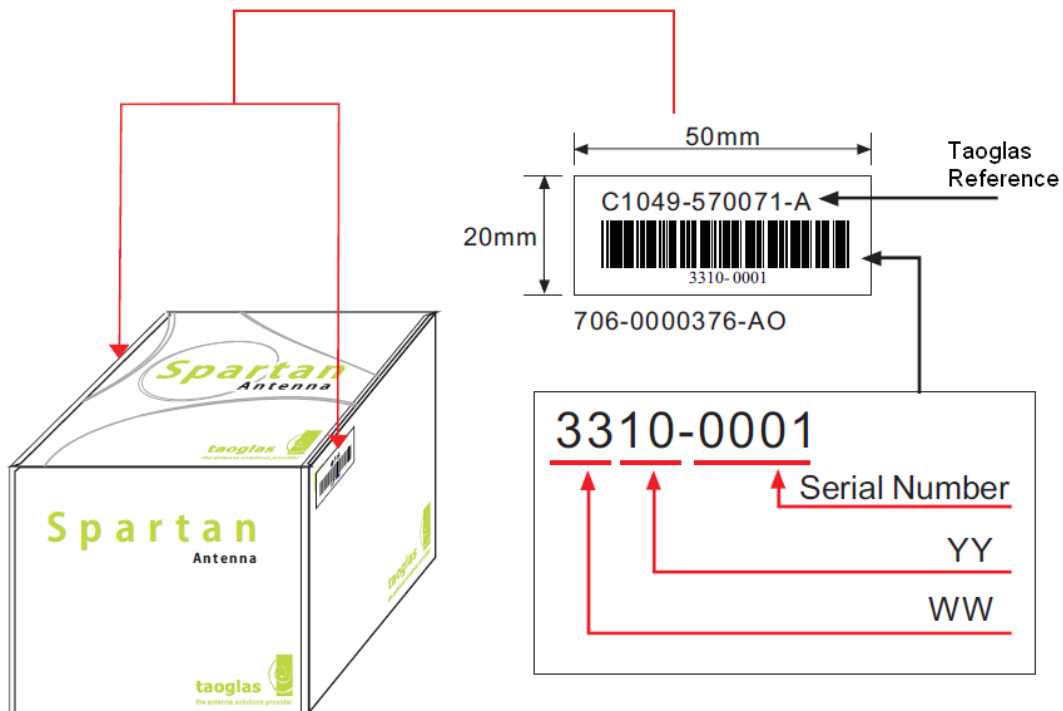
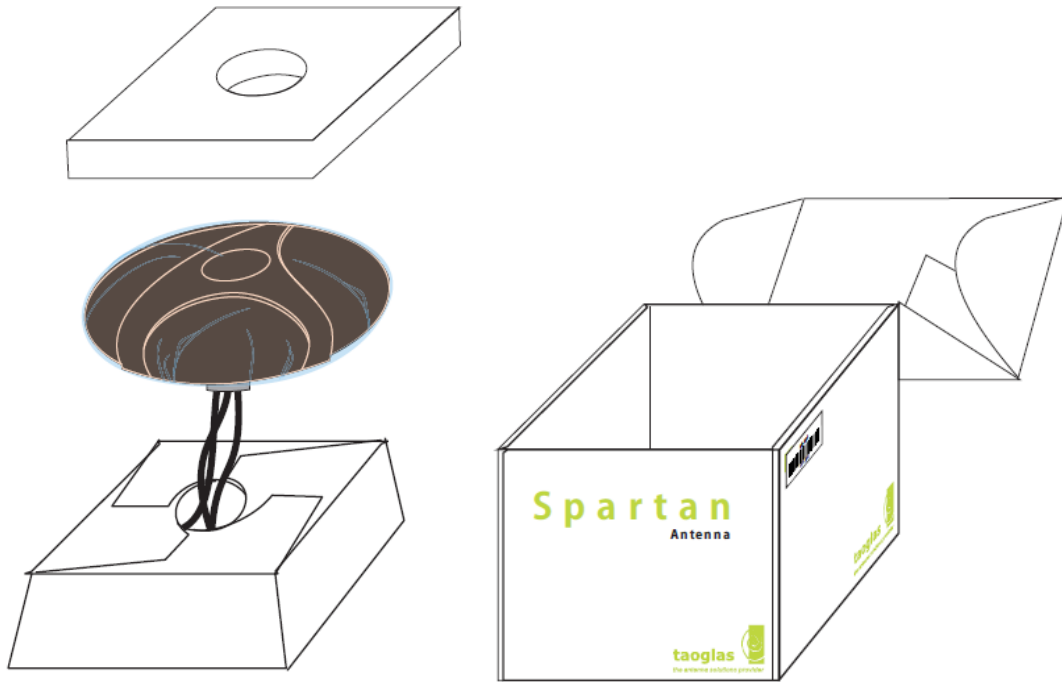


**Thread
Diameter**

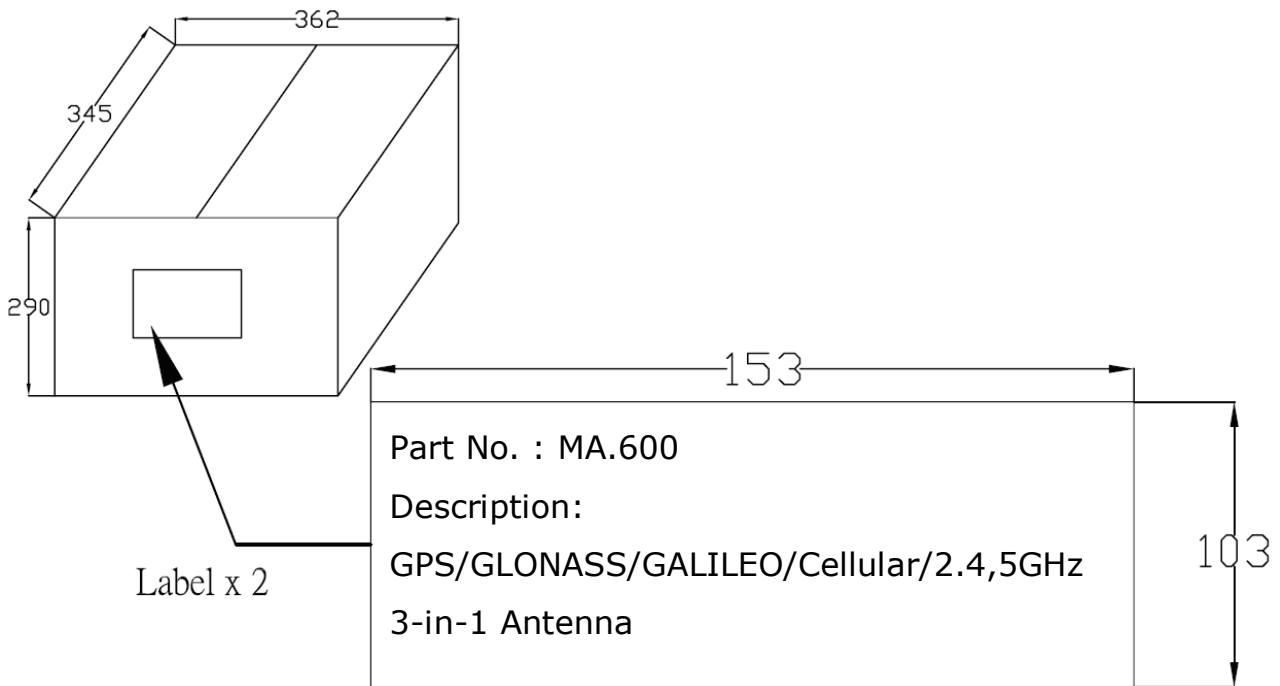


**Recommended
Mounting Hole**

10. Packaging



8 boxes per carton



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[GSA.8822.A301111](#) [TG.09.0113w](#) [CGGBPD.25.A](#) [PAD.71X.A](#) [CAB.956](#) [FW.86.B.SMA.m](#) [MA450.K.LBICG.003](#) [MA710.A.ABI.001](#)
[GW.26.0112.HT](#) [MAT.500.A](#) [MA963.A.BIVW.002](#) [MA760.A.ABIC.003](#) [GLAD.01](#) [CAB.0130](#) [SGGPD.18A](#) [SGGPD.25A](#)
[OMB.450.B06F21](#) [MA1511.AK.001](#) [FW.91.TNC.M](#) [PA.22a](#) [MA1511.IK.001](#) [FXP14R.A.07.0100A](#) [FXUB70.A.07.C.001](#)