



Spartan

MA603.A.ABK.001

Specification

Part No.	MA603.A.ABK.001
Product Name	Spartan 3in1 MA.603 Low Profile Screw Mount (Permanent Mount) GPS/GLONASS/Cellular/915MHz Combination Antenna
Feature	Cellular • 850/900/1700/1800/2100MHz • GSM/CDMA/UMTS/HSPA GPS/GLONASS – 1575~1602MHz 5dBiC 915MHz (902MHz~928 MHz) 3dBi (incl. 3M cable) IP67 Waterproof High Efficiency / Peak Gain Outdoor Antenna Advanced RF Design and Materials Heavy Duty – Integrated Metal Base / Ground-plane Standard 3 meters low loss cables Custom cables and connectors available RoHS Compliant

1. Introduction

The Spartan MA603 antenna is a low profile, heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications.

The Spartan MA603 antenna is unique in the market because it combines 3in1 GPS/GLONASS, Cellular (2G and 3G) and 915MHz antennas in a heavy-duty structure with high efficiency in a low profile compact format at 35mm(1.38") profile Height. The antenna screws down permanently

onto a roof or metal panel and can be pole or wall-mounted.

For industries such as commercial vehicle telematics, remote monitoring, smart meter systems, construction equipment, at only 35mm high, the Spartan provides an unobtrusive, robust, rugged antenna that is durable even in extreme environments.

Custom designed integrated wall mounted and pole mounted brackets are available for the Spartan antennas.

These patent pending mounts allow for

180 degrees freedom of movement of the antennas for ease of positioning while also preventing access to the cables so they cannot be cut by vandals or thieves and also protecting the cables from long term weather exposure. The removal of unsightly cables also leads to a cleaner more professional installation and look, and makes the antenna less identifiable and more unobtrusive. Customized cable sleeves can be supplied for extra protection where required.

2. Specification

GPS-GLONASS

Centre Frequency	1575.42MHz / 1602MHz
Bandwidth	10MHz
Radiation Efficiency	50 (without cable)
Passive Gain @ Zenith	4.0 typ (with $\psi = 140\text{mm}$ 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		1520MHz: -20dB		1520MHz: -20dB	
	1642MHz: -20dB		1642MHz: -20dB		1642MHz: -20dB	

Cable	3M RG-174 standard, fully customizable
Connector	SMA(M) standard, fully customizable

2. Specification

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	50Ω				
Polarization	Linear				
Radiation Pattern	Omni				
Cable	3M CFD200 standard, fully customizable				
Connector	SMA(M) standard, fully customizable				

ELECTRICAL – 915Mhz

Frequency (MHz)	902MHz	915MHz	929MHz
Gain (dBi) *	3.2	2.3	2.7
Efficiency (%) *	49	44	42
VSWR	1.92 Max		

* Including 3 meters cable loss

Cable	3M CFD200 standard, fully customizable
Connector	SMA(M) standard, fully customizable

Mechanical

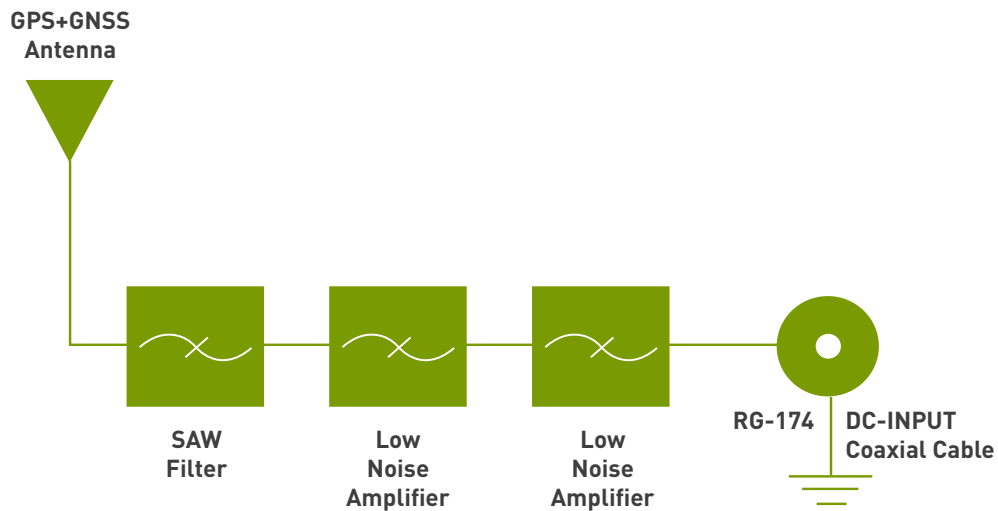
Antenna Dimensions	Height 35.1mm (1.38") x Diameter 145.6mm (5.73")
Housing	UV resistant ABS
Base and thread	Zinc
Waterproof	IP67

Environmental

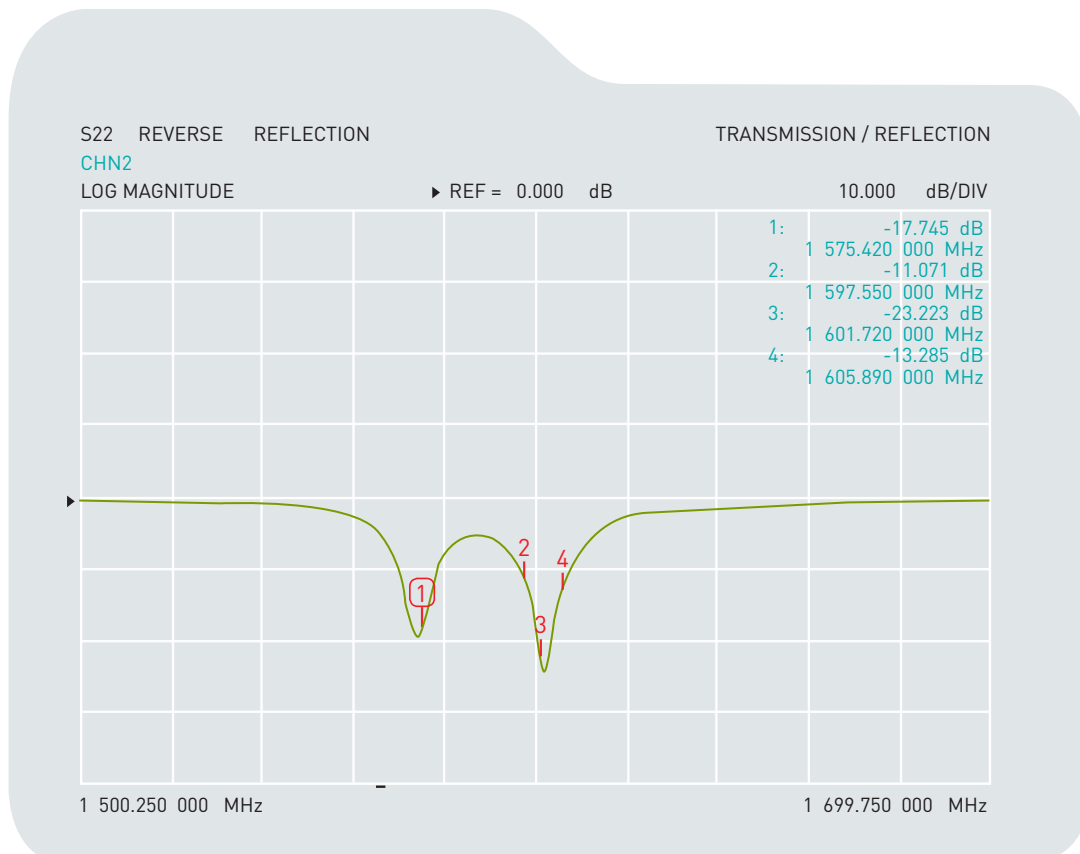
Operating Temperature	-40°C to 85°C
Storage Temperature	-40°C to 80°C
Humidity	Non-condensing 65°C 95% RH

3. GPS/GLONASS Antenna Characteristics

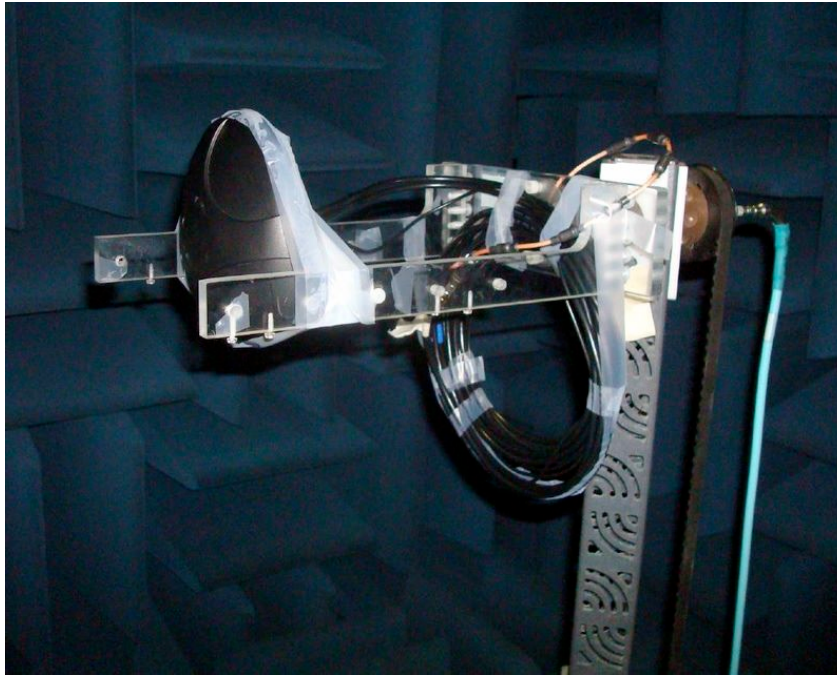
3.1 Block Diagram



3.2 Return Loss



3.3 GPS/GLONASS Antenna Radiation Pattern



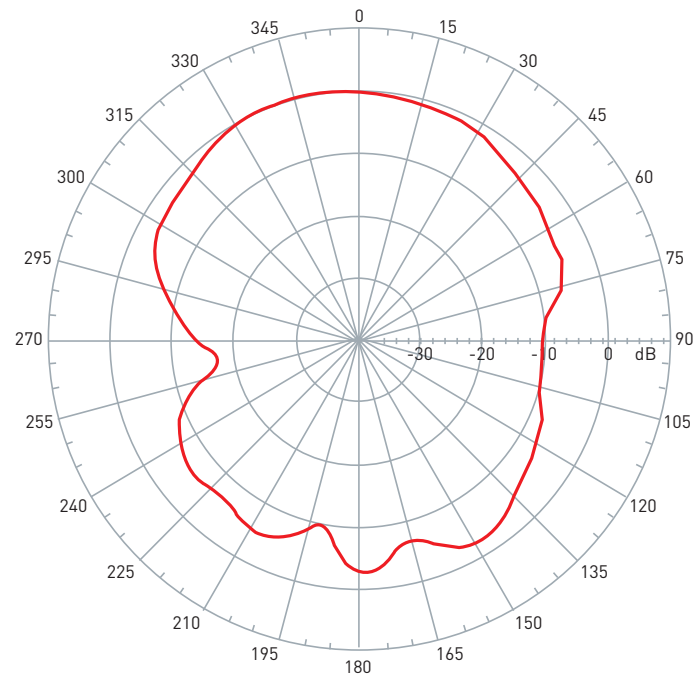
MA.600 tested in CTIA approved 3D chamber



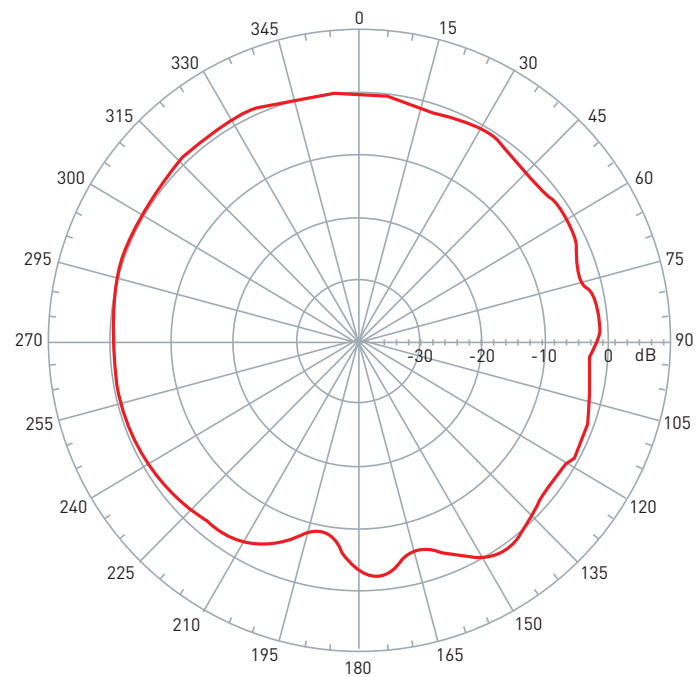
XYZ co-ordinate for reference

3.4 Radiation Pattern

XZ-plane Free Space @1575.42MHz

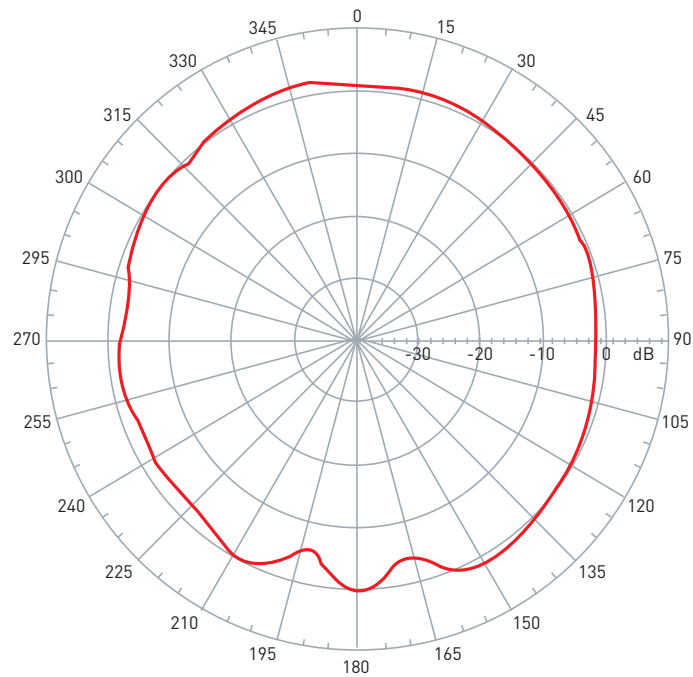


YZ-plane Free Space @1575.42MHz

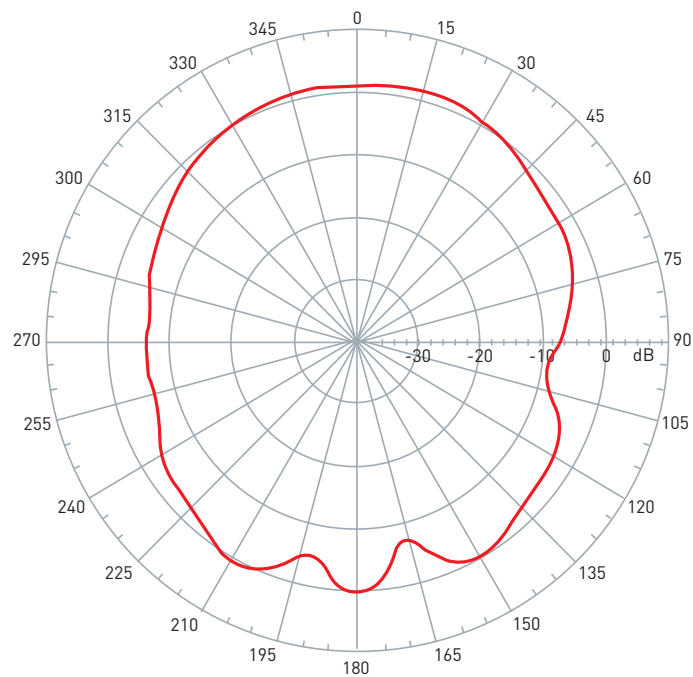


3.4 Radiation Pattern

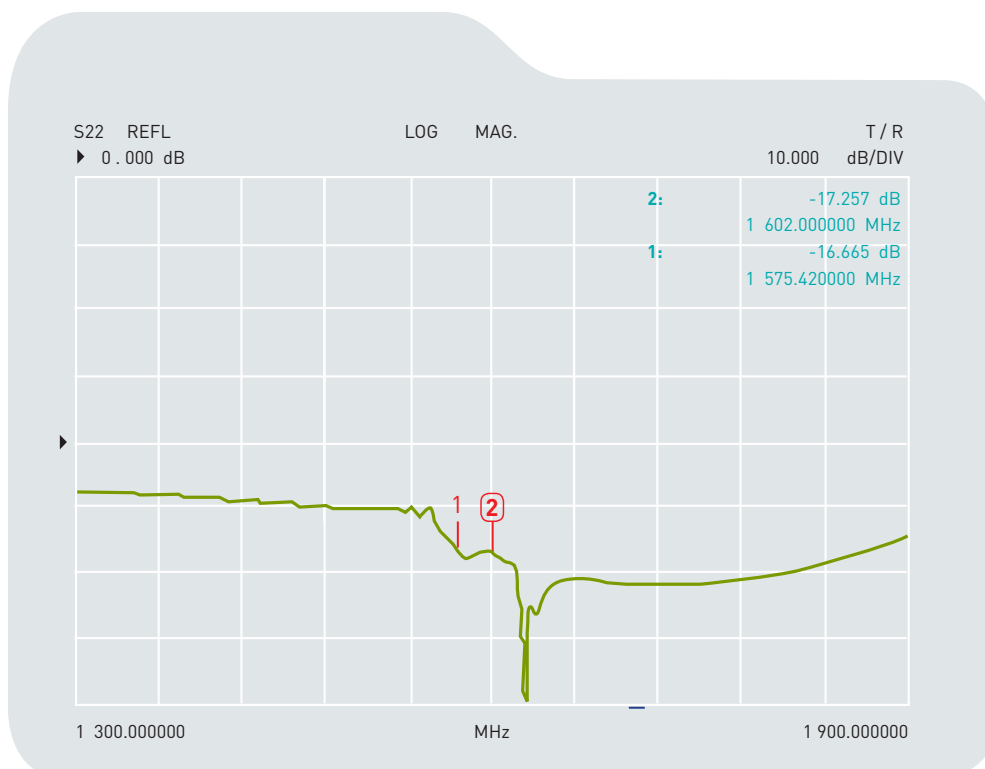
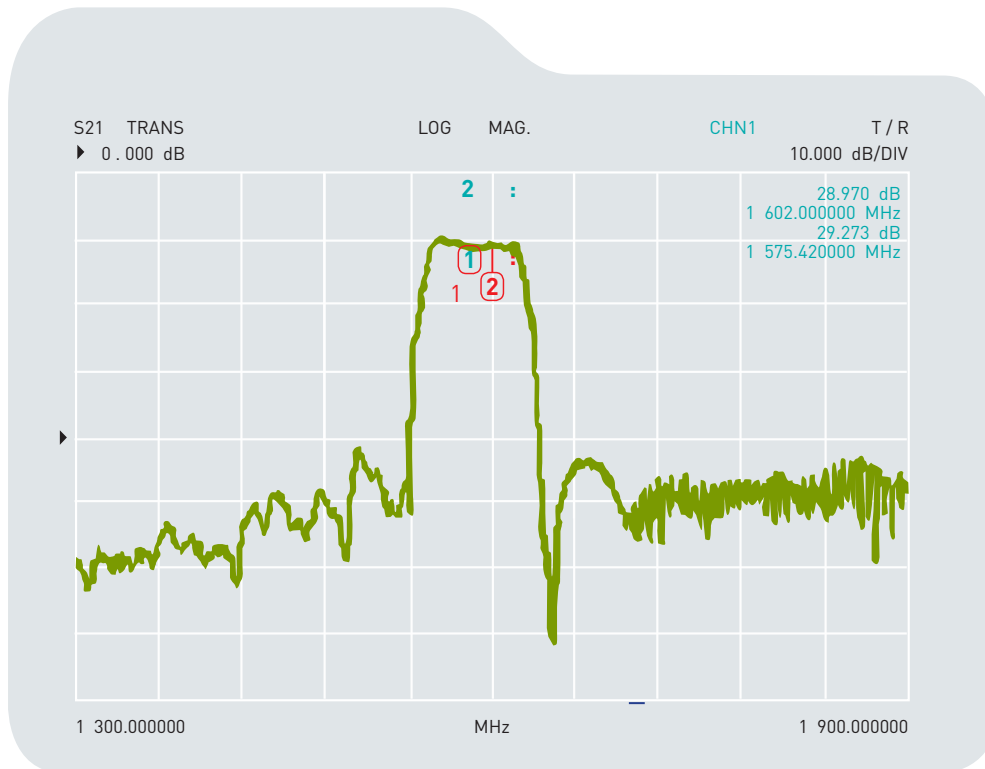
XZ-plane Free Space @1602MHz



YZ-plane Free Space @1602MHz

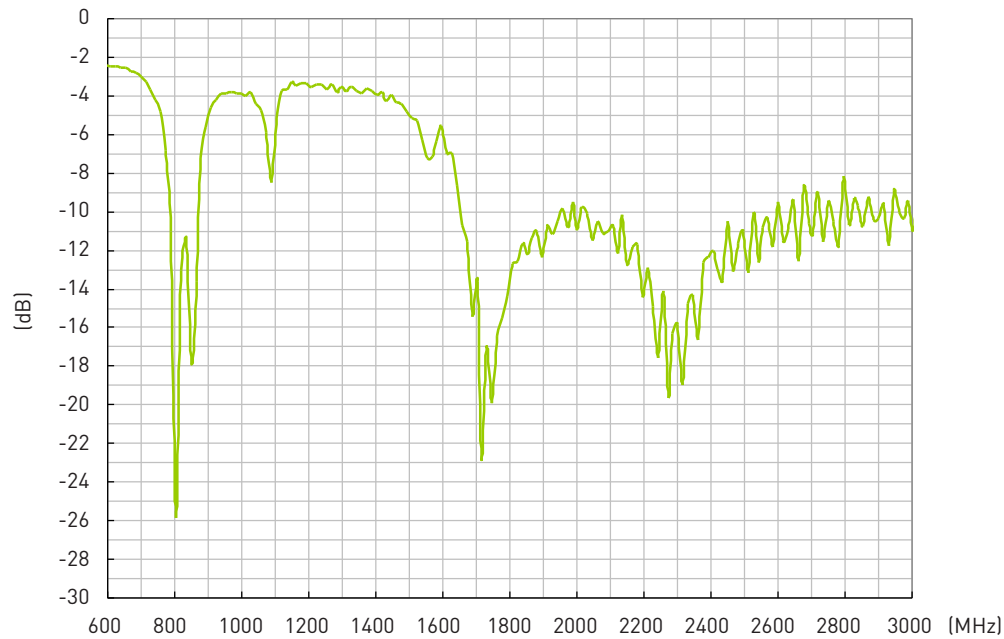


3.5 GPS/GLONASS LNA

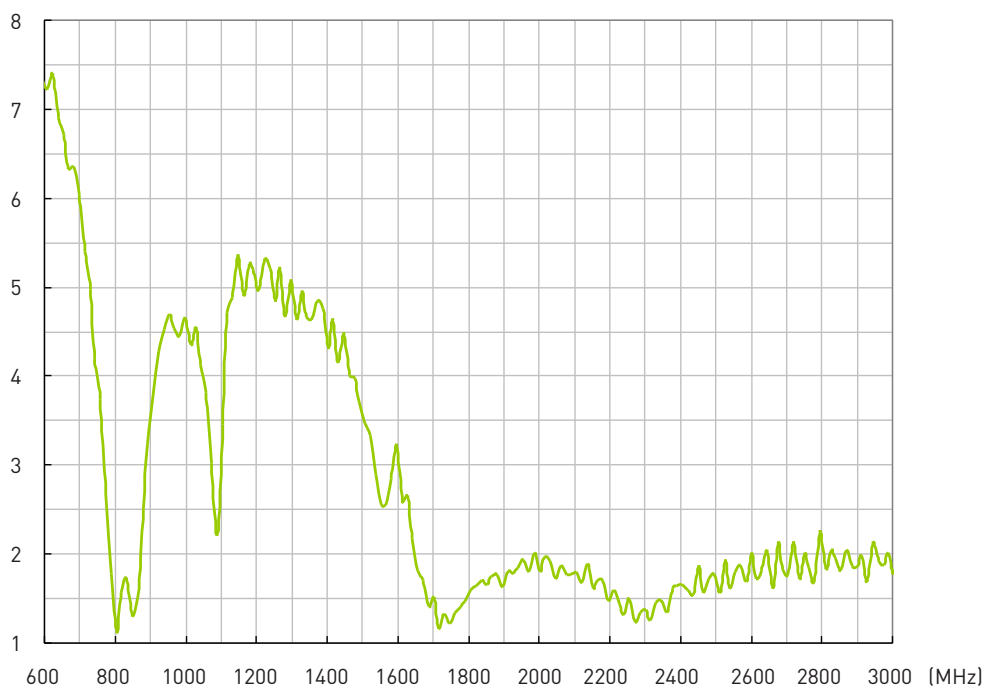


4. Cellular Antenna Characteristics

4.1 Return Loss

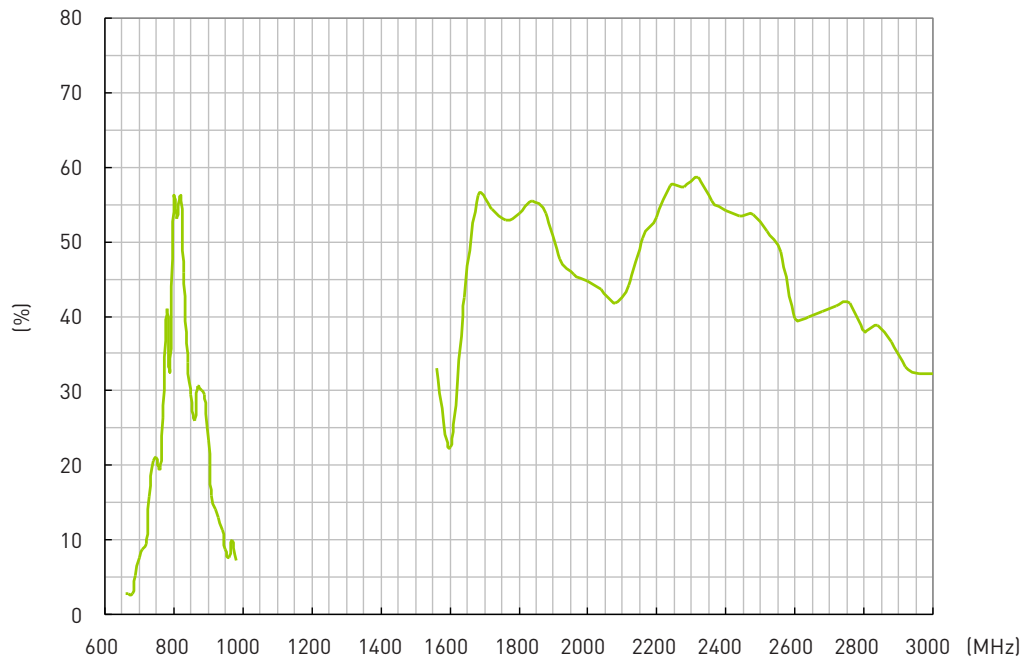


4.2 VSWR

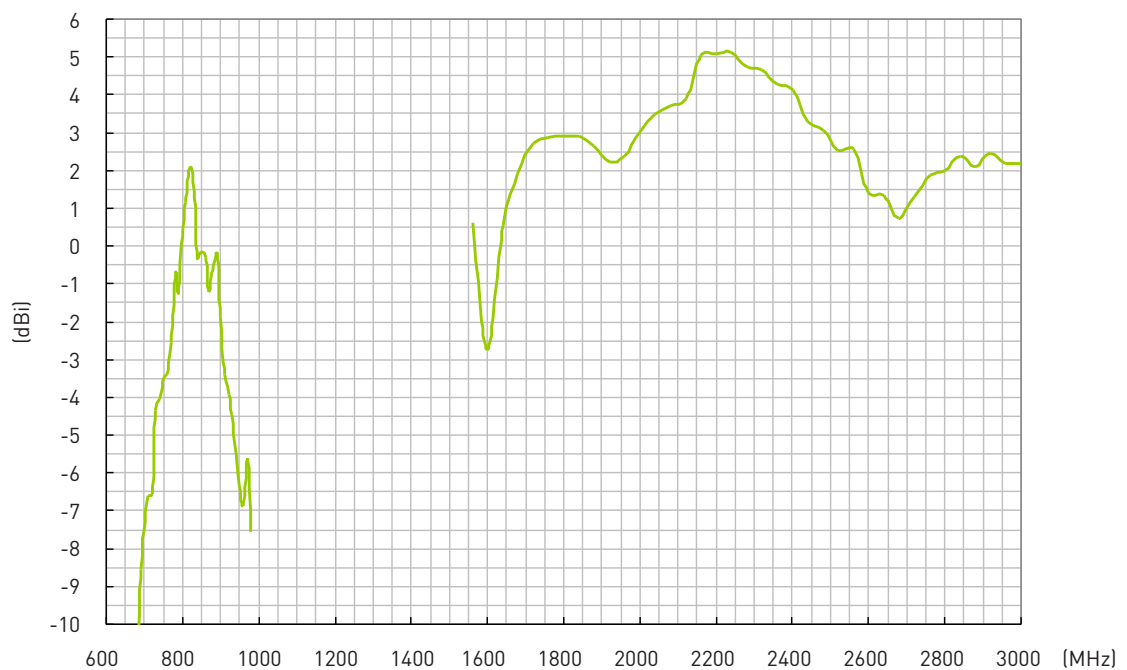


4. Cellular Antenna Characteristics

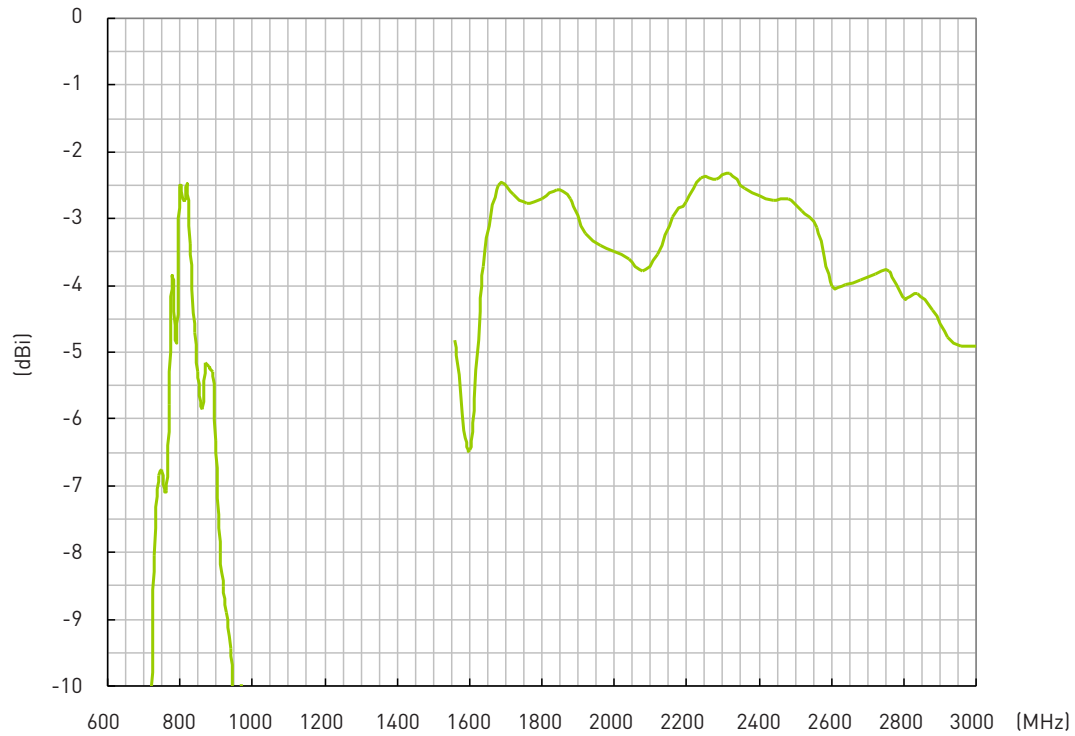
4.3 Cellular Antenna Efficiency



4.4 Cellular Antenna Peak Gain

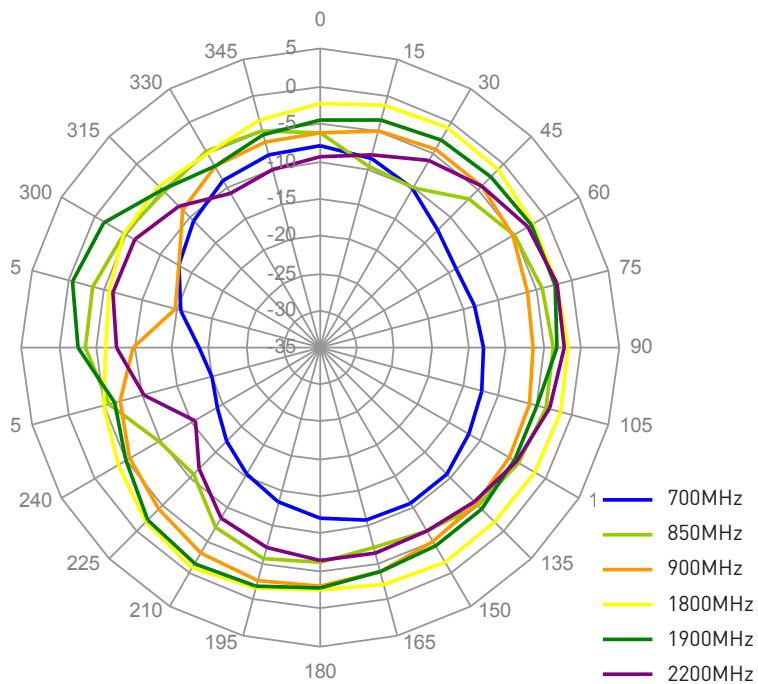


4.5 Cellular Antenna 3D Average Gain

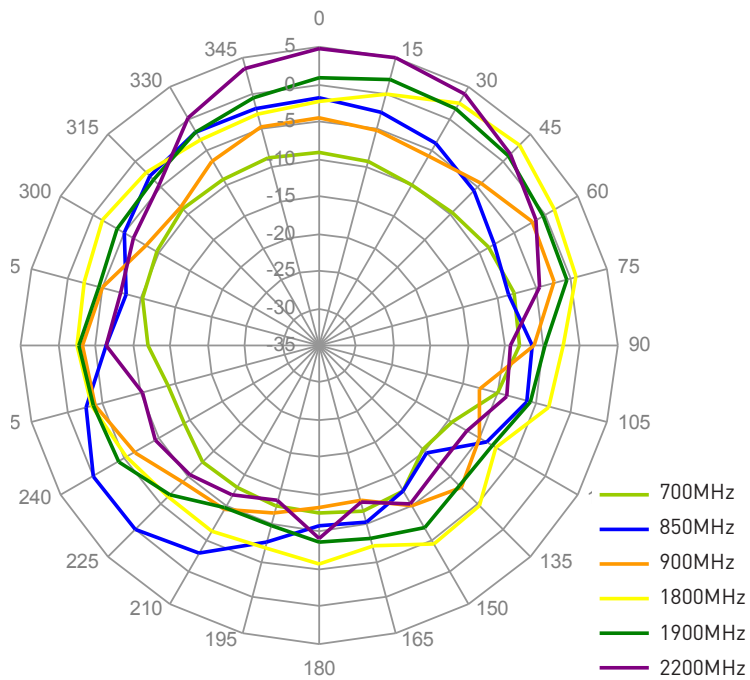


5. Cellular Antenna Radiation Pattern

5.1 XY-Plane



5.2 XZ-Plane



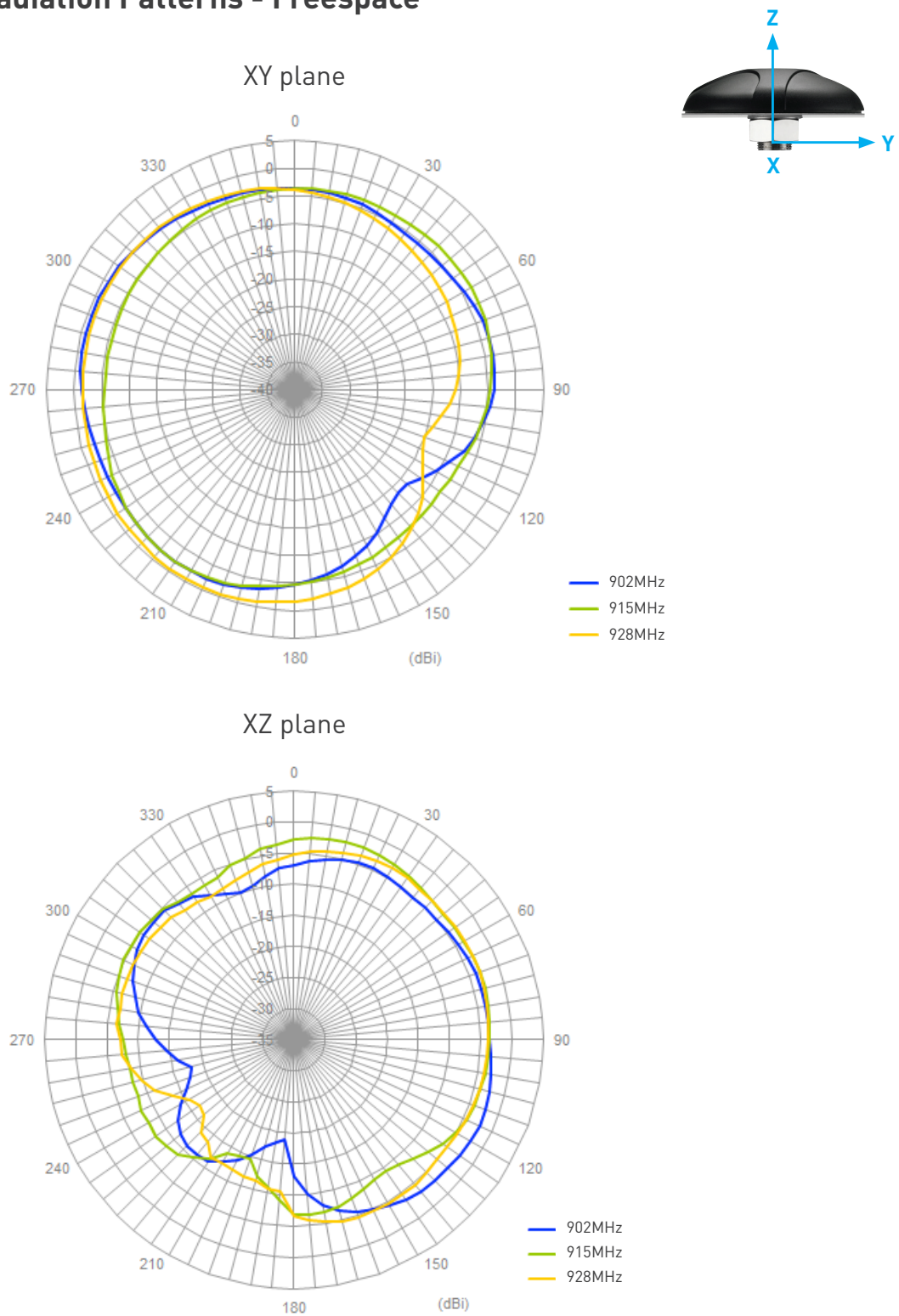
6. 915MHz Antenna

6.1 Return Loss



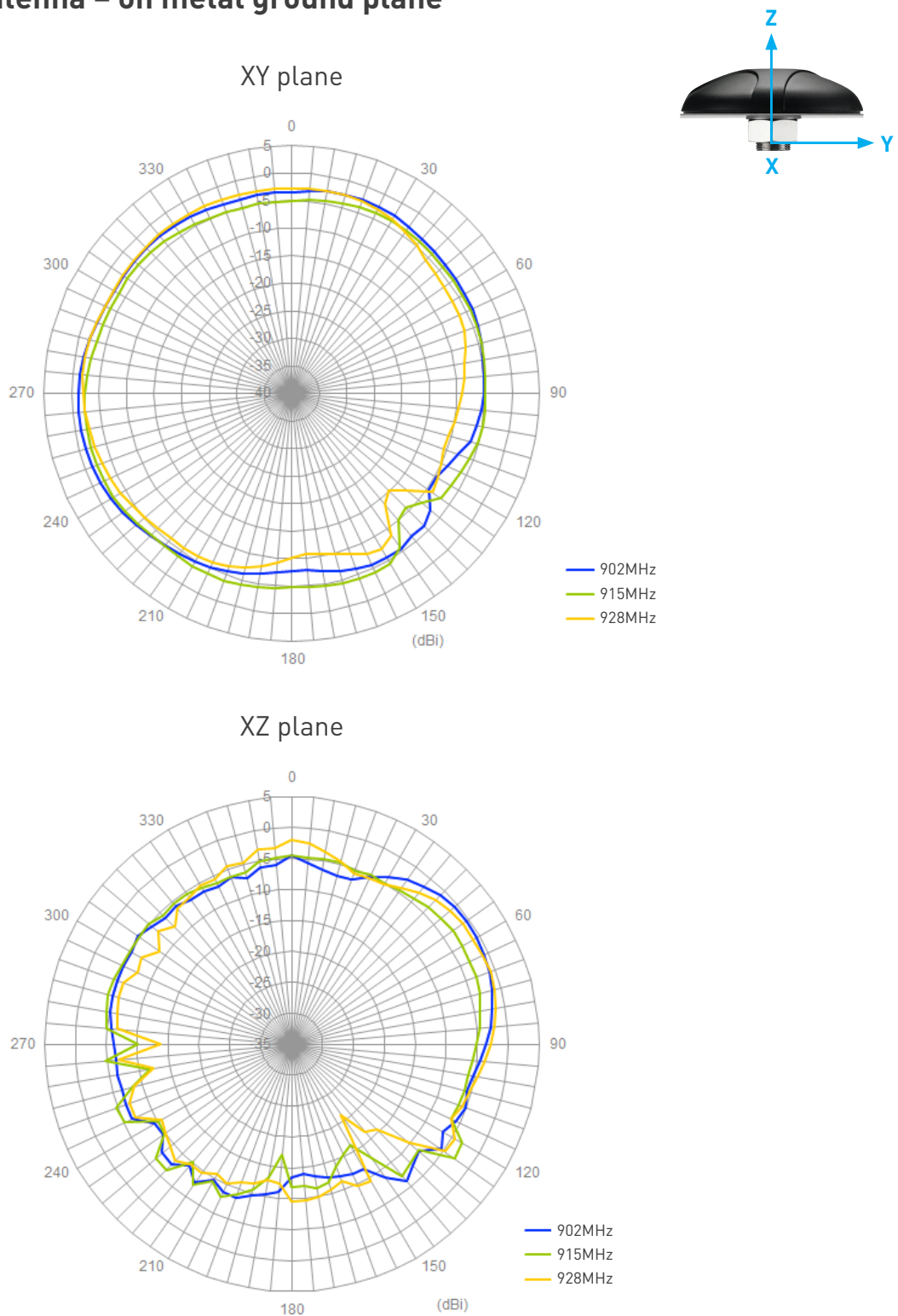
6. 915MHz Antenna

6.2 Antenna Radiation Patterns - Freespace

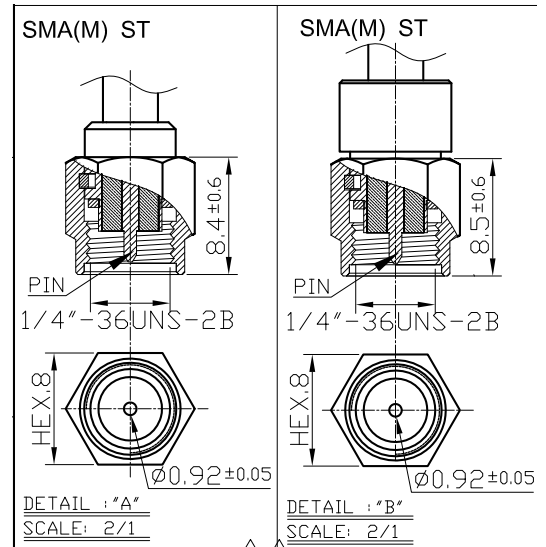
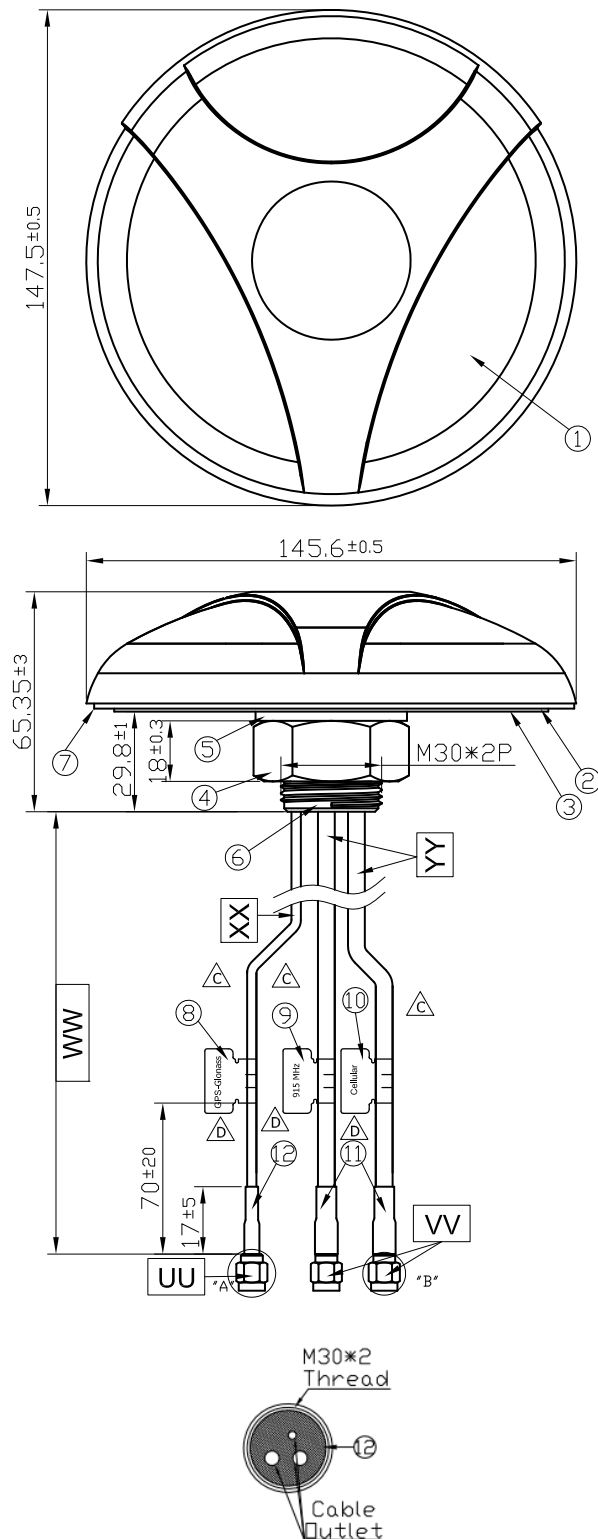


6. 915MHz Antenna

6.3 915MHz Antenna – on metal ground plane



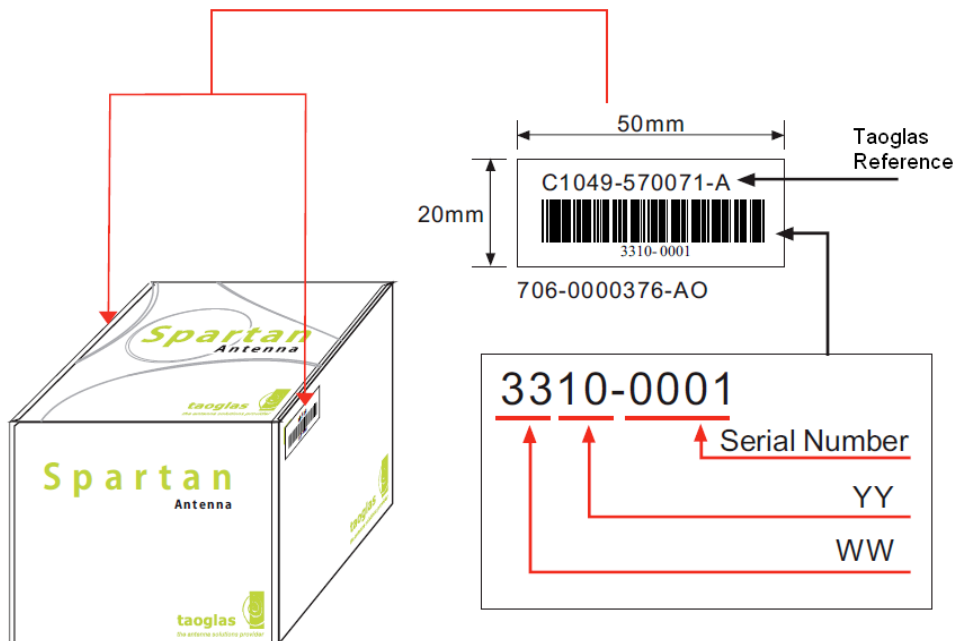
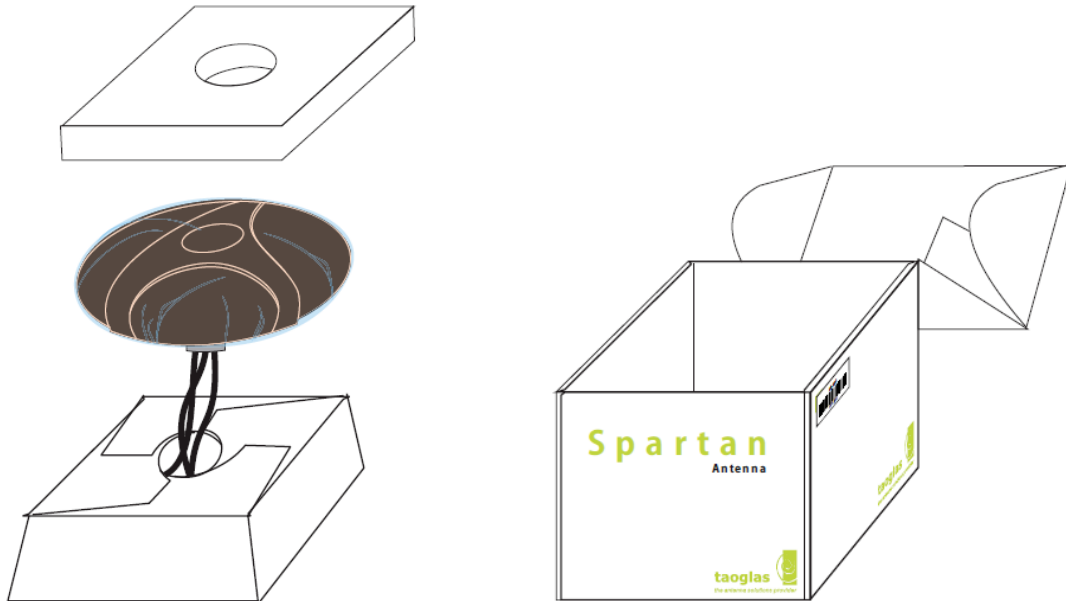
7. Mechanical Drawing



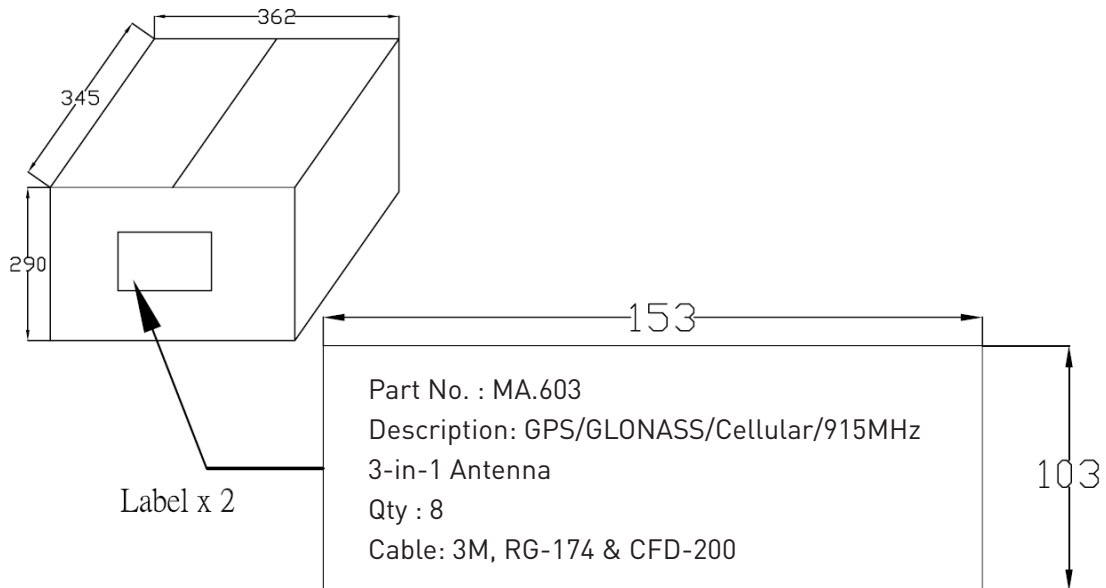
Name	Material	Finish	QTY
1 Housing	PC 540	Black	1
2 Closed Cell Foam	CR 4305	Black	1
3 3M Double Adhesive	3M 9448 HK	White Liner	1
4 M30 Nut	Steel AISI 1215	Ni Plated	1
5 Washer	Steel AISI 1215	Ni Plated	1
6 M30 x 2 Thread 32L	Zinc Alloy	Ni Plated	1
7 Waterproof Rubber	Silicon	Black	1
8 GPS-Glonass Label	Gloss Silver PET	Orange	1
9 915 MHz Label	Gloss Silver PET	Olive Drab	1
10 Cellular Label	Gloss Silver PET	Blue	1
11 Heat Shrink Tube (CFD200)	PE	Black	2
12 Heat Shrink Tube (RG174)	PE	Black	1

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

8. Packaging



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