Datasheet

Spartan Antenna 2-in-1 MA650

Part No:
MA650.A.AB.002

Features:

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

CE Certified

RoHS & REACH Compliant

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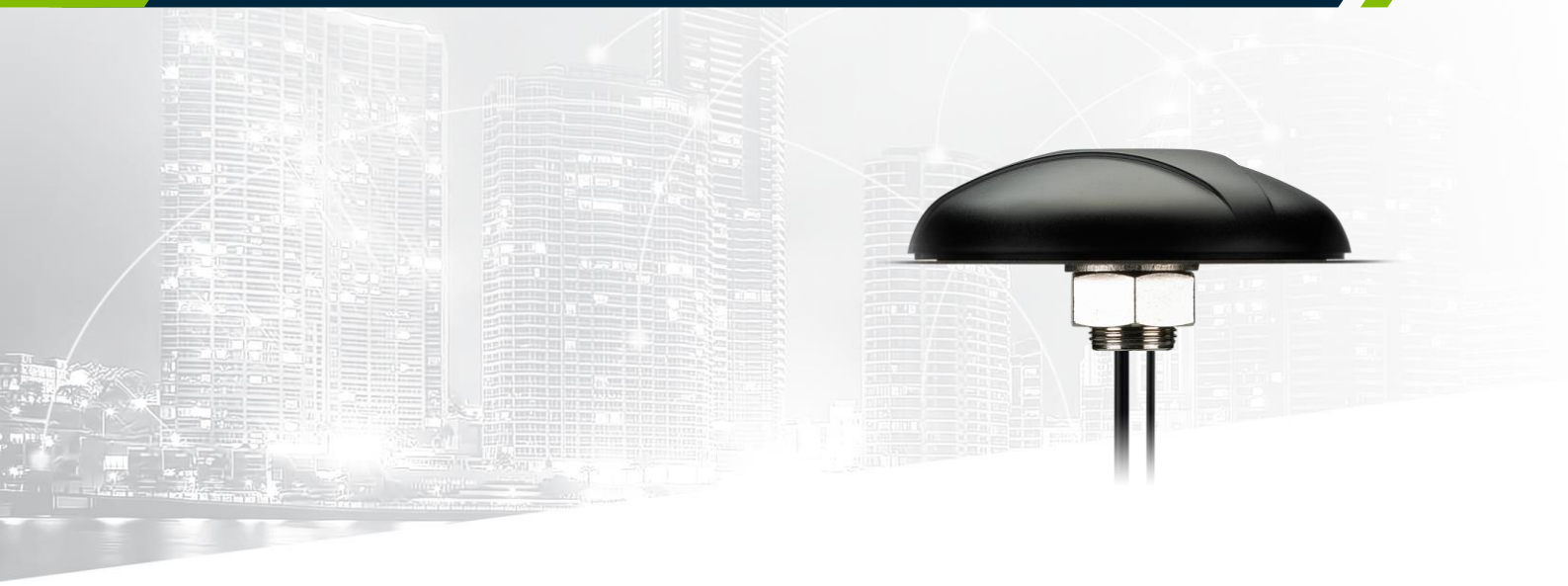
1. Introduction



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. Specifications

GNSS Frequency Bands Covered							
GPS/QZSS	L1 1575.42MHz	L2 1227.6MHz	L5 1176.45MHz	L6 1278.75MHz			
	■	□	□	□			
GLONASS	L5R 1176.45MHz	L3PT 1201.5MHz	L2PT 1246MHz	L1CR 1575.42MHz	L1PT 1602MHz		
	□	□	□	■	■		
Galileo	E5a 1176.45MHz	E5b 1201.5MHz	E4 1215MHz	E3 1256MHz	E6 1278.75MHz	E2 1561MHz	E1 1575.42MHz
	□	□	□	□	□	□	■
BeiDou	B1 1561MHz	B2 1207.14MHz	B3 1268.52MHz				
	□	□	□				
Compass	E5B(B2)/ E6(B3) 1268.56MHz	E2(B1) 1561MHz					
	□	□					
SBAS	Omnistar 1542.5MHz	WAAS/EGN OS 1575.42MHz					
	□	■					

GNSS Electrical		
Frequency (MHz)	1575.42	1602
VSWR (max.)	2:1Max	
Radiation Efficiency	50%	
Peak Gain	4 ±1 dBic typ.	
Polarization	Linear	
Impedance	50Ω	

LNA and Filter Electrical Properties			
Frequency (MHz)	1575.42	1602	
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

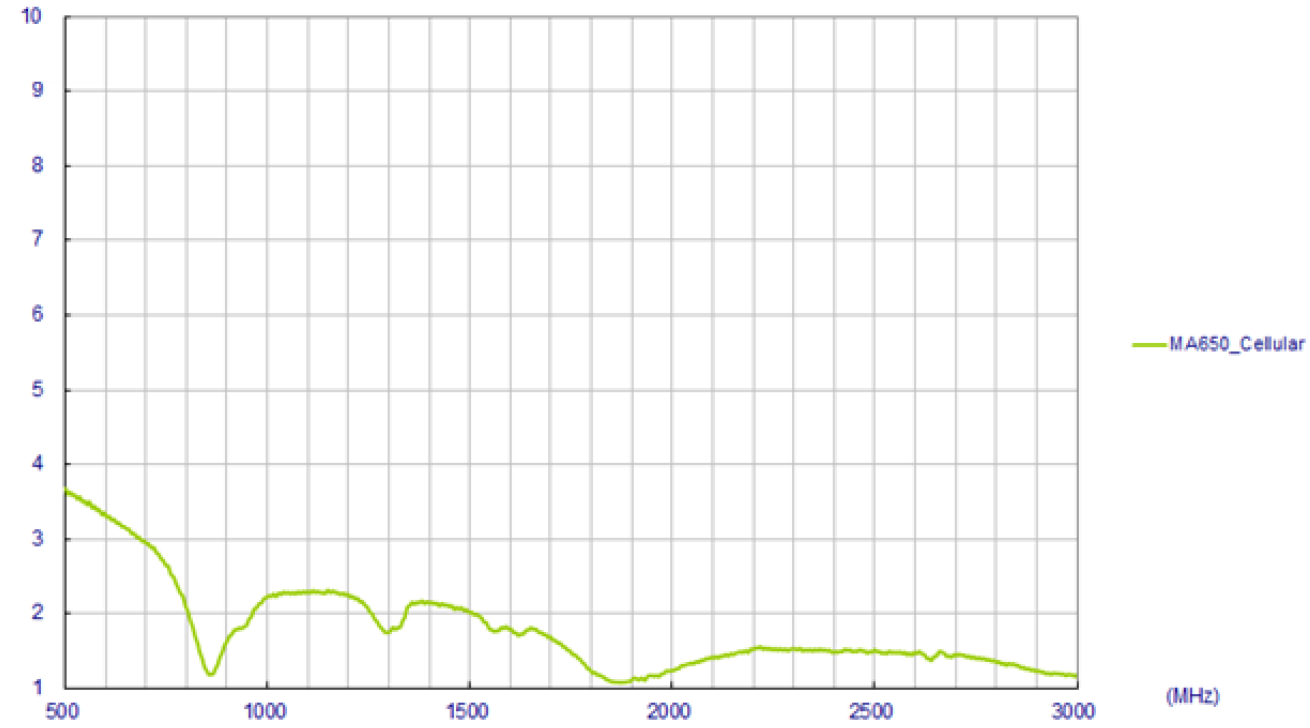
Cellular Electrical							
Band	**Frequency (MHz)**	**Efficiency (%)**	**Average Gain (dB)**	**Peak Gain (dBi)**	**Impedance**	**VSWR**	**Polarization**
GSM 850	824~894	29	-5.8	-0.5	50Ω	< 3	Linear
GSM 900	880~960	28	-5.6	-0.5			
DCS	1710~1880	30	-5.4	-1.0			
PCS	1850~1990	27.9	-5.3	-0.5			
UMTS	1920~2170	28	-5.5	-0.8			

Mechanical	
Antenna Dimensions	Height 50mm x Diameter 150mm
Housing	PC
Base and thread	Nickel plated Zinc
Waterproof	IP67

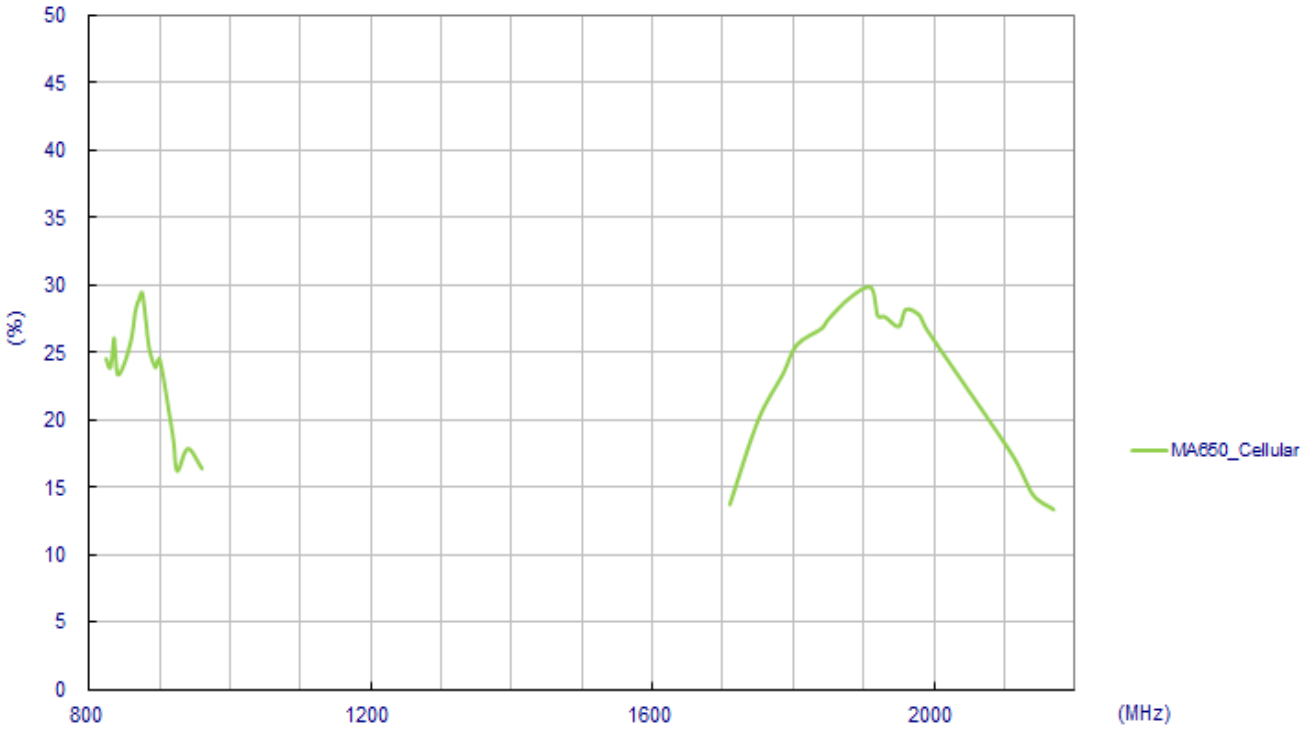
Environmental	
Operating Temperature	-40°C to 85°C
Storage Temperature	-40°C to 80°C
Humidity	Non-condensing 65°C 95% RH

3. Cellular Antenna Characteristics

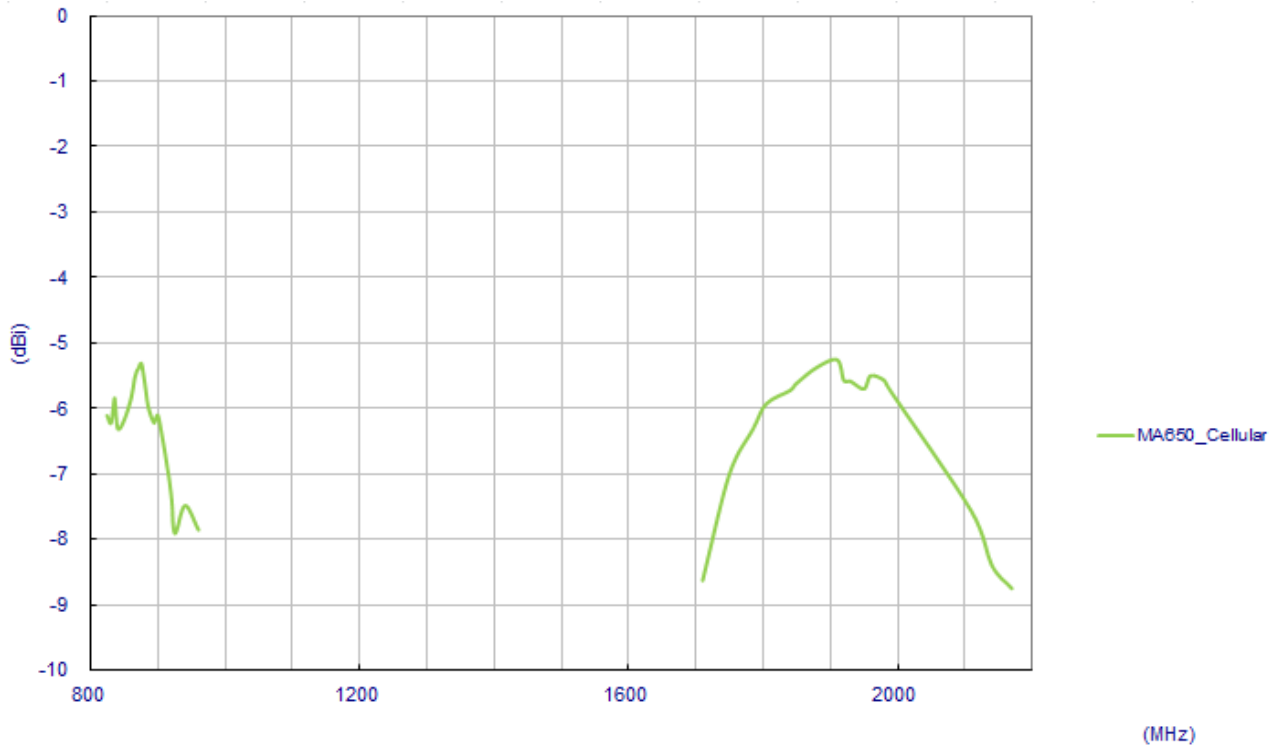
3.1 VSWR



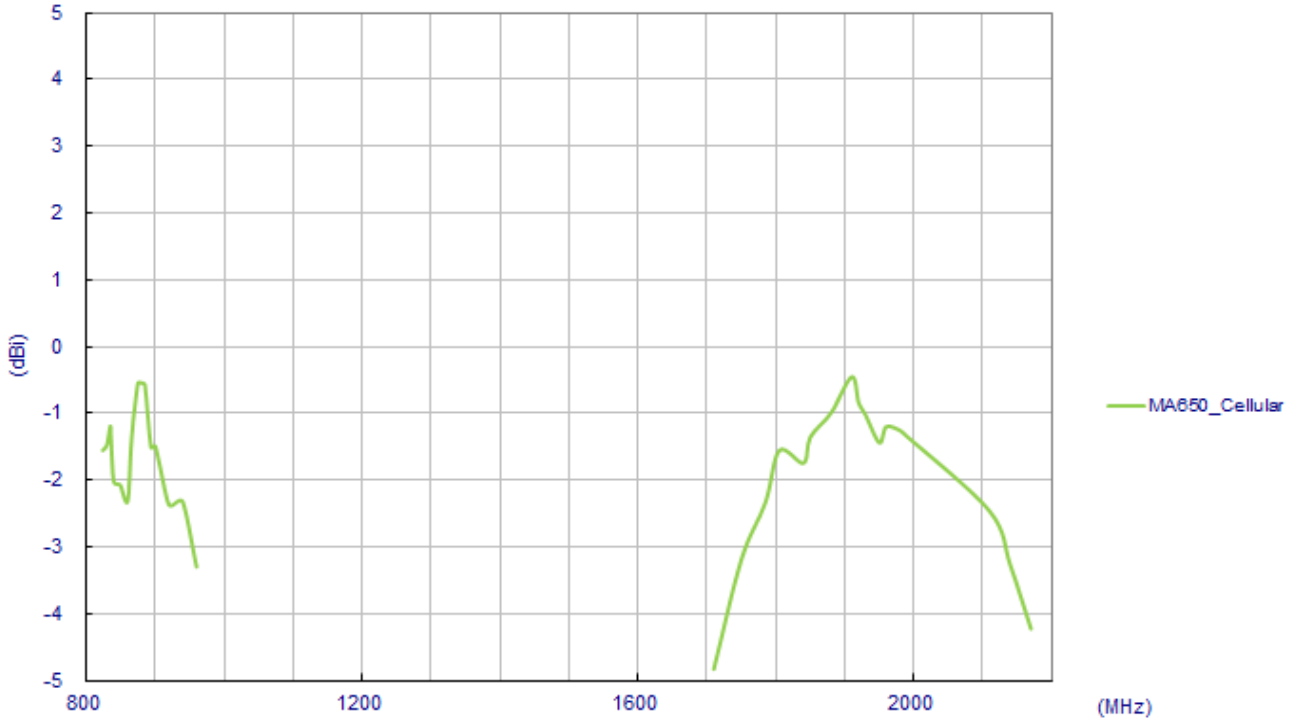
3.2 Efficiency



3.3 Average Gain

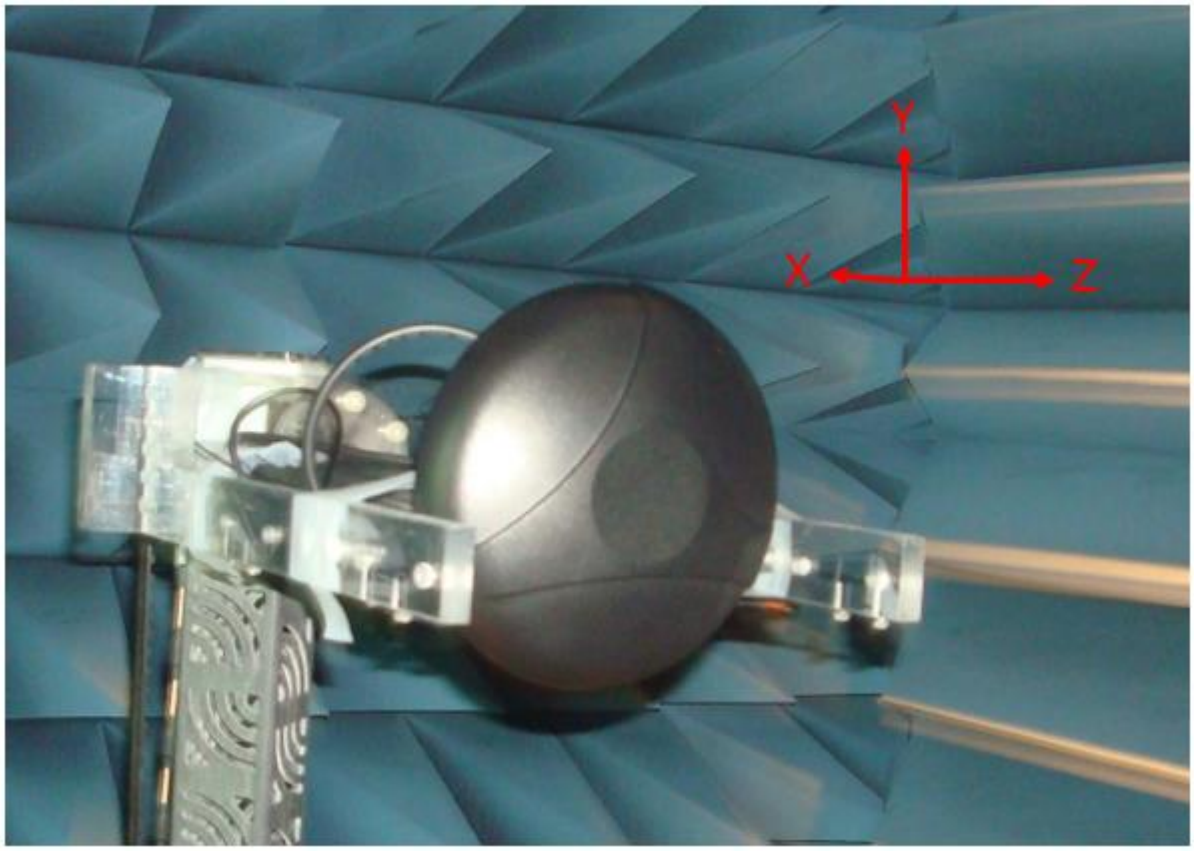


3.4 Peak Gain



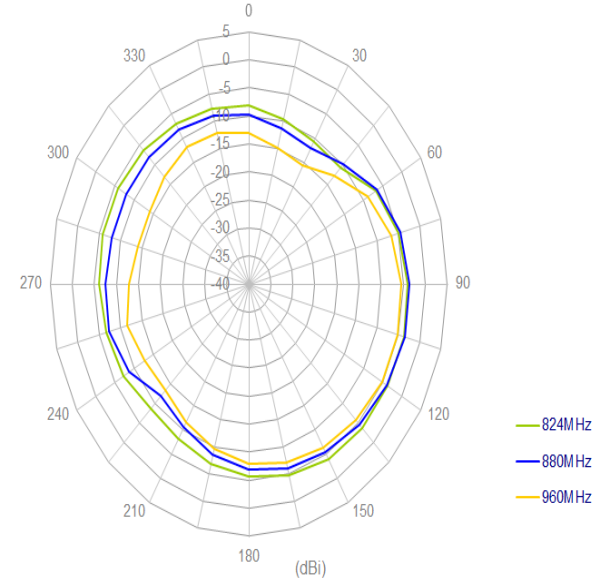
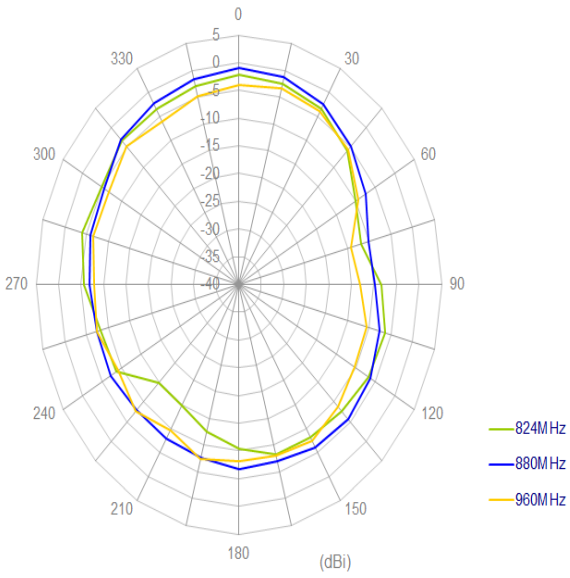
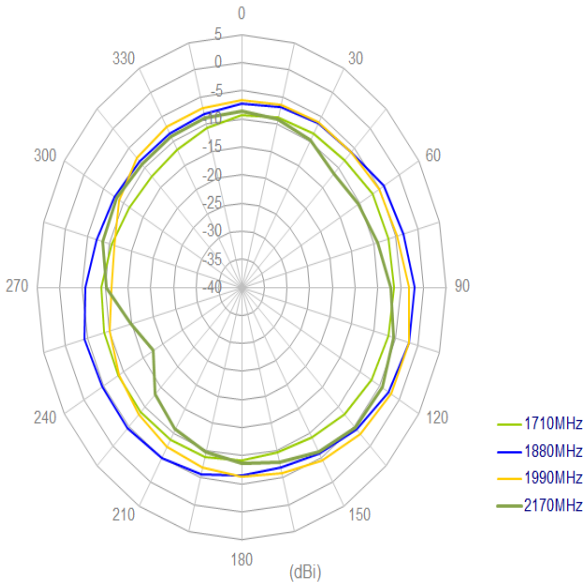
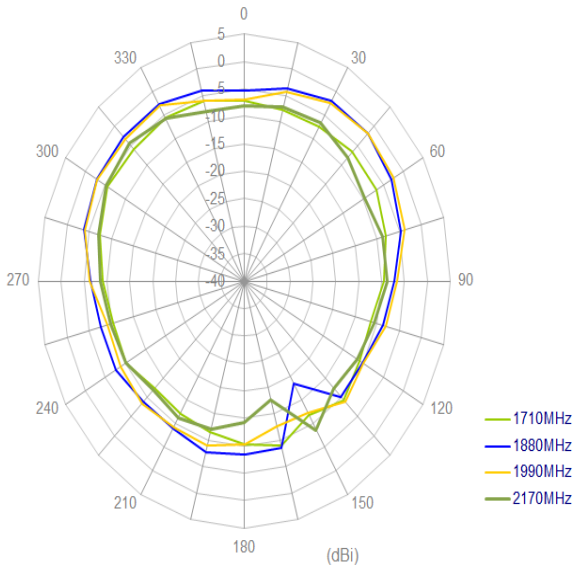
4. Cellular Radiation Patterns

4.1 Test Setup



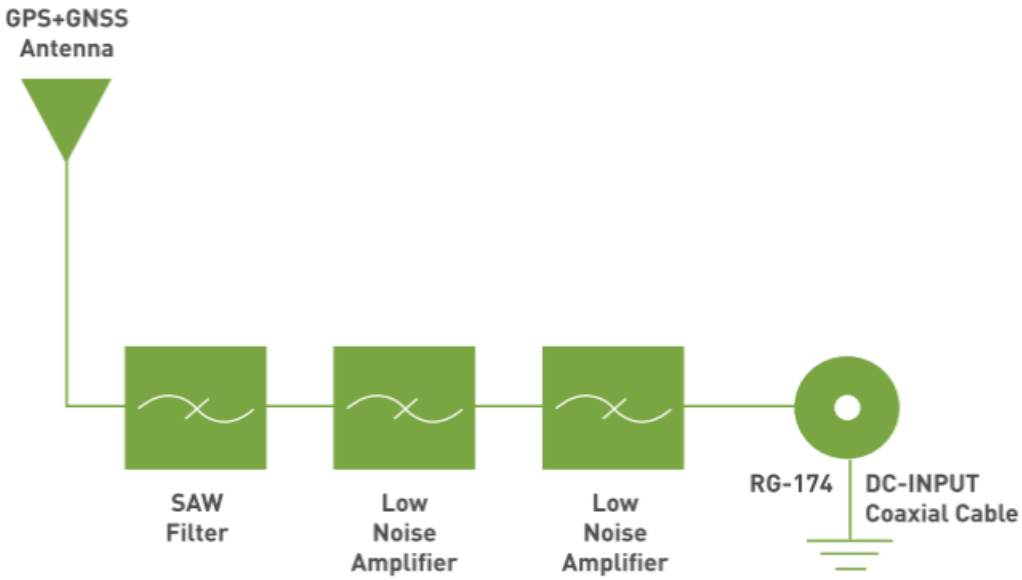
Chamber Set-up

4.2 Cellular 3D and 2D Radiation Patterns

XY Plane	XZ Plane
	
	

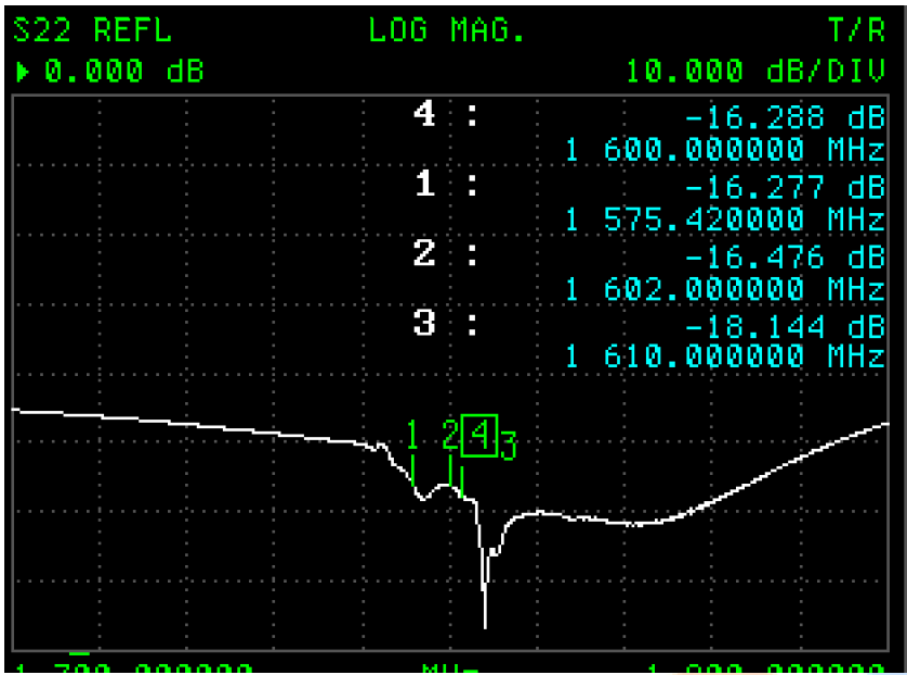
5. GPS/GLONASS/GALILEO Antenna Characteristics

5.1 Block Diagram

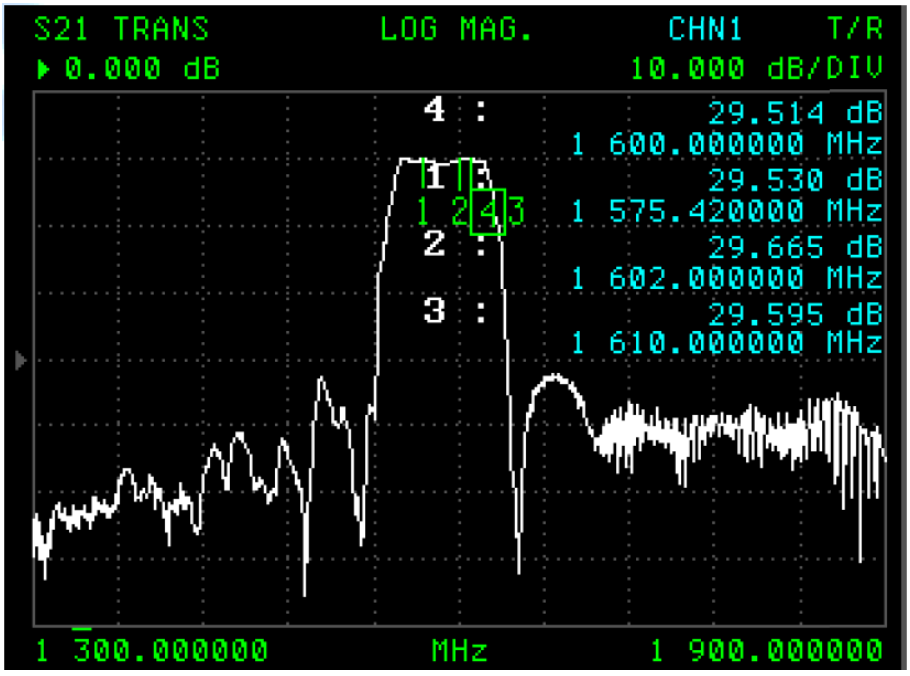


5.2 Return Loss

5.3 LNA s22



5.4 LNA s21

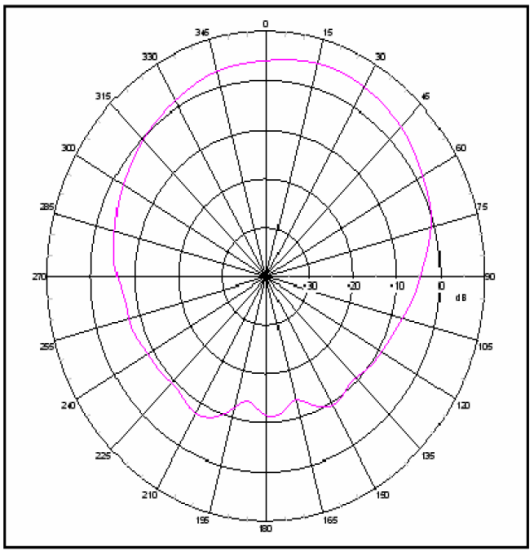
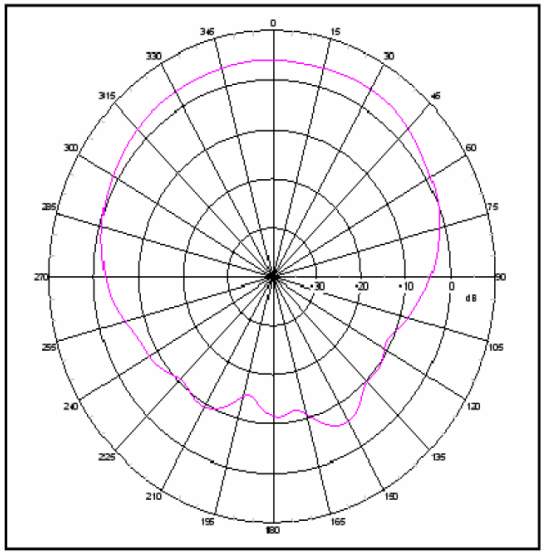
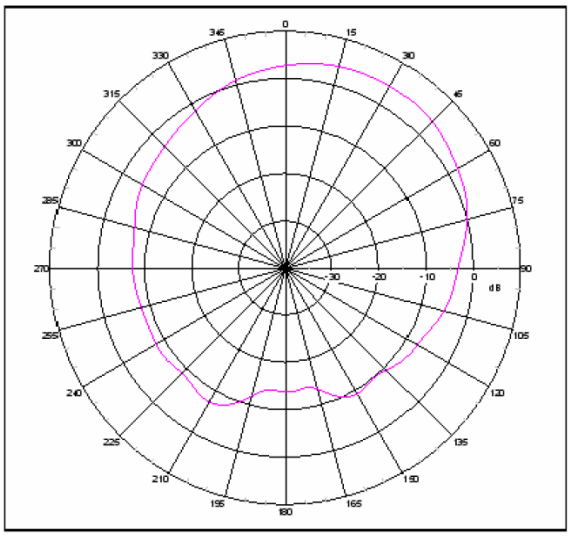
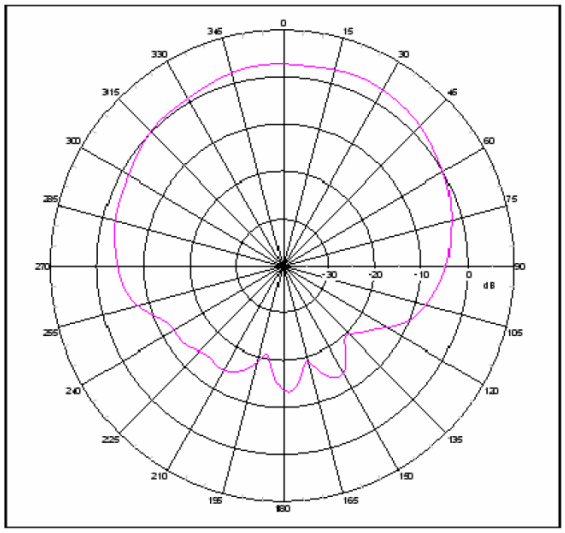


6. GPS/GLONASS/GALILEO Radiation Patterns

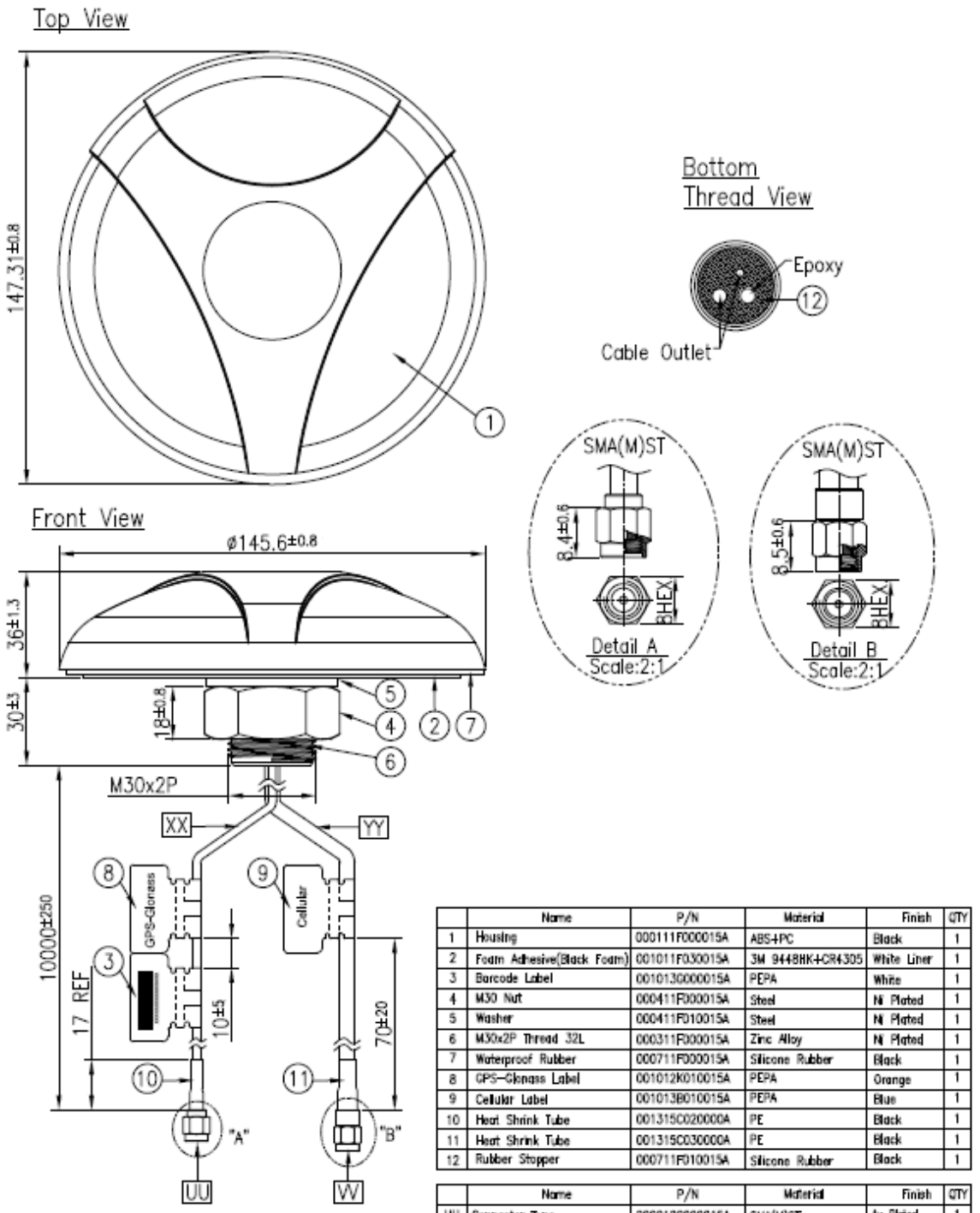
6.1 Test Setup

Chamber Set-up

6.2 GPS/GLONASS/GALILEO 3D and 2D Radiation Patterns

XZ Plane	YZ Plane
	
1575.42MHz	1575.42MHz
	
1602MHz	1602MHz

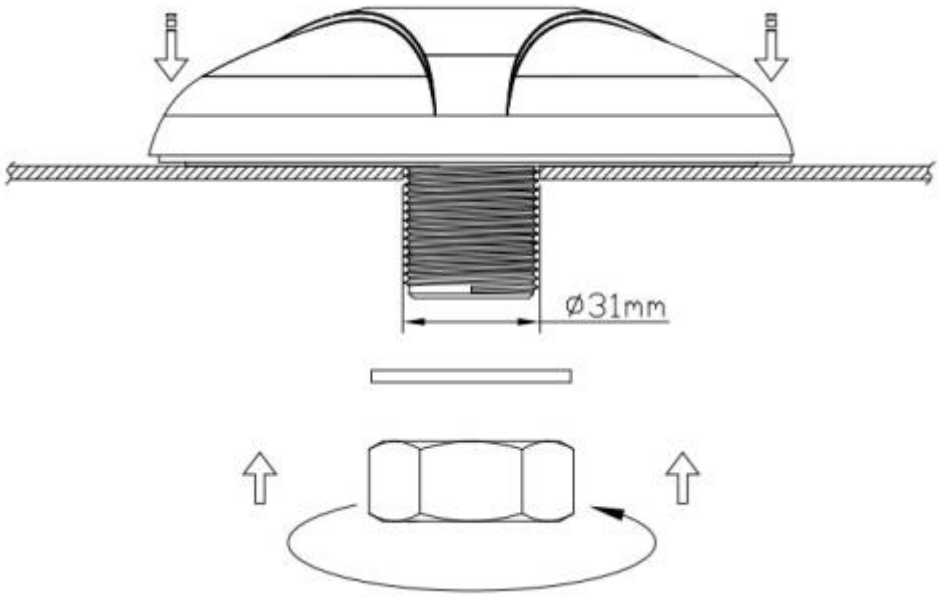
7. Mechanical Drawing (Units: mm)



	Name	P/N	Material	Finish	QTY
1	Housing	000111F000015A	ABS+PC	Black	1
2	Foam Adhesive(Black Foam)	001011F030015A	3M 9448HK+CR4305	White Liner	1
3	Barcode Label	001013G000015A	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-Glonass 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

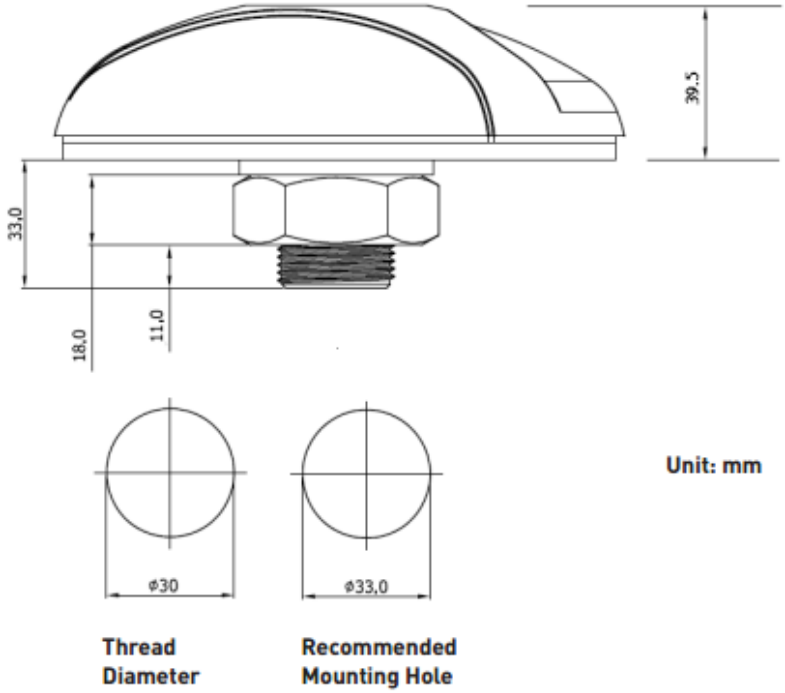
	Name	P/N	Material	Finish	QTY
UU	Connector Type	200212G000015A	SMA(M)ST	Au Plated	1
VV	Connector Type	200212G010015A	SMA(M)ST	Au Plated	1
XX	Cable Type	301315C000000A	RG-174	Black	1
YY	Cable Type	301415C010000A	CFD-200	Black	1

8. Installation Guide

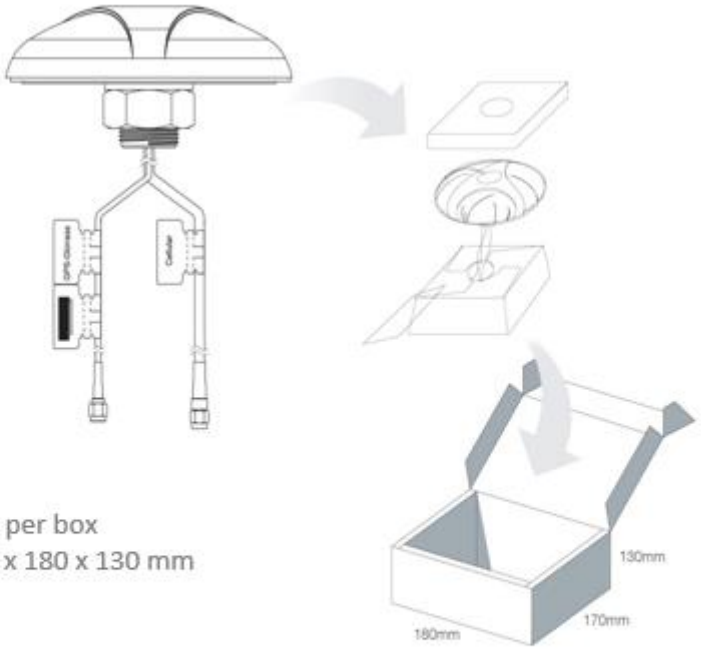


Recommended torque for mounting: 5-7Nm

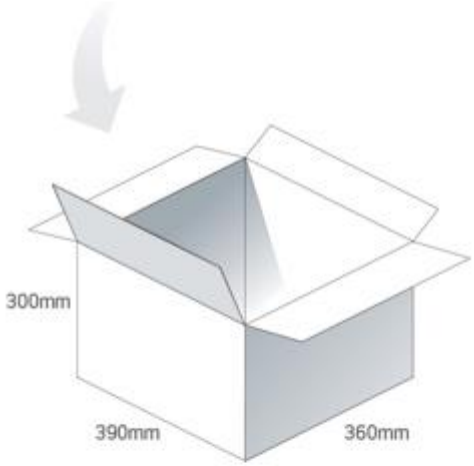
(Torque value obtained with antenna mounted on 1mm thick SUS-316 bracket)



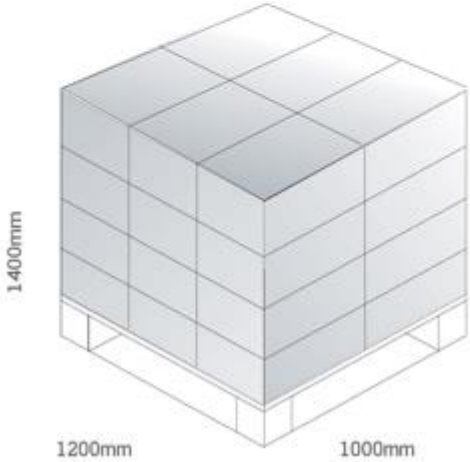
9. Packaging



1pcs MA650.A.AB.002 per box
Box Dimensions – 170 x 180 x 130 mm
Weight – 1146g



8pcs MA650.A.AB.002 per carton
Carton Dimensions – 390x360x300mm
Weight – 10.2Kg



Pallet Dimensions 1200x1000x1400mm
24 Cartons Per Pallet
4 Layers

Changelog for the datasheet

SPE-12-8-032 – MA650.A.AB.002

Revision: J (Current Version)	
Date:	2022-03-03
Changes:	Full datasheet template update
Changes Made by:	Gary West

Previous Revisions

Revision: I	
Date:	2017-10-23
Changes:	Packing and drawing updated
Changes Made by:	Carol Faughnan

Revision: H	
Date:	2017-08-16
Changes:	Updated packaging as per pcn 17-8-085
Changes Made by:	Andy Mahoney

Revision: G	
Date:	2014-05-22
Changes:	Added Torque
Changes Made by:	Aine Doyle

Revision: F	
Date:	2014-04-03
Changes:	Amended packaging and added GPS/GLONASS
Changes Made by:	Aine Doyle

Revision: E	
Date:	2013-02-06
Changes:	
Changes Made by:	Technical Writer

Revision: D	
Date:	2012-12-17
Changes:	
Changes Made by:	Technical Writer

Revision: C	
Date:	2012-09-20
Changes:	
Changes Made by:	Technical Writer

Revision: B	
Date:	2012-06-05
Changes:	
Changes Made by:	Technical Writer

Revision: A (Original First Release)	
Date:	2012-03-29
Notes:	
Author:	Technical Writer

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