SPECIFICATION

Model No.	:	**MA501.C.AC.001**
Product Name	:	Heavy Duty Screw Mount Antenna – GPS-GALILEO / Dual-Band 2.4~5.2GHz
Description	:	2.4GHz~5.2GHz suitable for ISM Bands/ZigBee/WLAN/Bluetooth IEEE.802.11/IEEE.802.15 UV and vandal resistant PC housing IP67 & IP69K Waterproof Compliance Height 29mm Diameter 49mm RoHS Compliant

1. Introduction

MA.501 is a combination of high performance GPS/GALILEO and dual band Wi-Fi (2.4~2.5/5.2GHz) antenna solution for reliable location information with localised data transfer via WLAN, Zigbee or Wi-Fi. This product incorporates the industry's most advanced GPS/GALILEO active ceramic patch technology (XtremeGain™) allowing for gains of up to 300% in accuracy compared to traditional antennas. Time to first fix is under 1 minute with all of the industry leading GPS/GALILEO receivers. XtremeGain technology means the antenna has been tuned for the Hercules environment giving you the optimum antenna solution to enable elimination of data gaps.

The 2.4/5.2GHz antenna inside has also been tuned for this enclosure; hence performance is excellent at all bands meaning the antenna works worldwide.

It was designed mainly for commercial vehicle and outdoor equipment installations, with extra thick threads, with the cables exiting through the bottom for ease of install. Durable and robust UV resistant PVC housing is resistant to vandalism and direct attack. It is designed for covert mounting as it is only 3cm high when mounted, thus complies with the latest EU directives for height restrictions.

The antenna housing is completely waterproof to IP67, and also to IP69K, which means it is waterproof against high pressure water jets used in industrial environments for cleaning.

1.1. Features

GPS / GALILEO

- High LNA Gain up to 32 dB ± 2 dB
- Miniaturized – diameter 49mm
- Low Noise (1.5 dB max)
- Resides in its own chamber and is tuned for the Hercules environment to enhance performance

WLAN / Wi-Fi

- Advanced dual-band antenna for worldwide application
- Tuned for the Hercules environment to enhance performance

Other

- Weatherproof (IP67 & IP69K) with robust foam seal
- Quality textured covert and low profile design

- UV and Vandal resistant PC housing

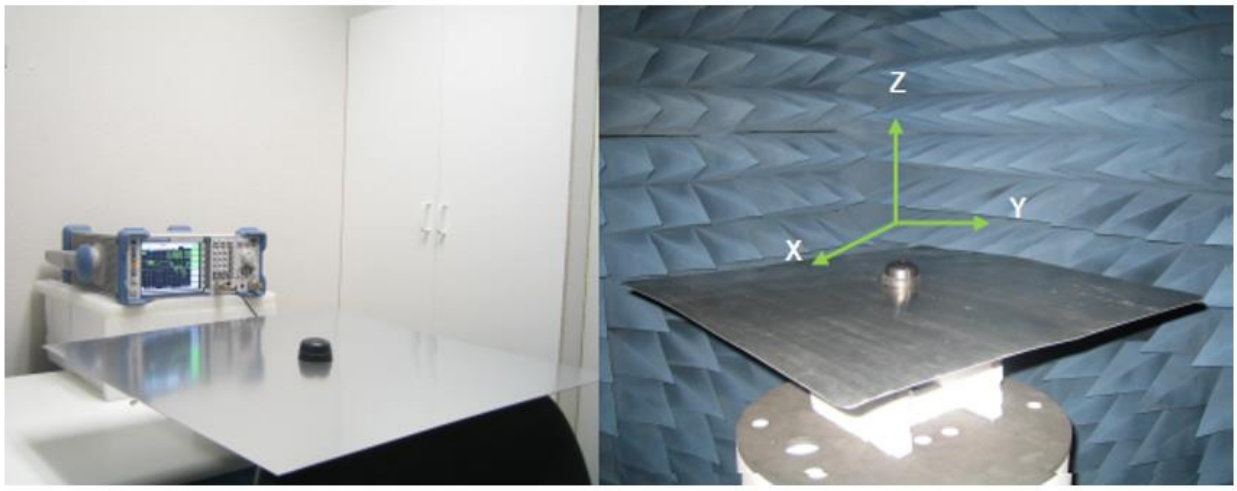
2. Specifications

GPS/GALILEO						
Frequency	1575.42MHz					
Average Gain	32dB typ.					
Gain @ Zenith	2.0dBi min.					
Gain @ 10 o Elevation	-4.0dBi min.					
Axial Ratio	3.0dB max.					
Polarization	Right Hand Circular					
VSWR	<=2.0:1					
Impedance	50Ω					
Noise Figure	1.5dB max.					
Bandwidth	10Mhz min.					
LNA Out-band Attenuation	fo = 1575.42MHz fo ± 30 MHz 5dB Min. fo ± 50 MHz 20dB Min. fo ± 100 MHz 25dB Min.					
Input Voltage	Min:1.8V		Typ. 3.0V		Max: 5.5V	
Total Gain @ Zenith	25dBic		30dBic		32dBic	
Current Consumption	6mA		12mA		30mA	
Noise Figure	2.7dB		3.0dB		3.7dB	
Cable	3m RG174 standard, fully customizable					
Connector	SMA(M) standard, standard, fully customizable					
Wi-Fi						
Frequency (GHz)	2.40	2.45	2.50	5.15	5.25	5.35
Average Gain (dBi)	-2.24	-2.06	-2.19	-3.74	-4.26	-3.84
Peak Gain (dBi)	3.05	4.05	4.11	4.74	4.37	4.71
Efficiency	63.3%	68.9%	66.4%	50.0%	41.6%	47.5 %
Return Loss (dB)	-14.5	-12.1	-12.7	-11.4	-15.3	-14.2
VSWR	<=1.8:1					
Impedance	50Ω					
Polarization	Linear - Horizontal					
Radiation Pattern	Omni					
Cable	3m NFC-200 standard, fully customizable					
Connector	RP-SMA(M) standard, standard, fully customizable					

MECHANICAL	
Dimensions	Height 29mm x Diameter 49mm
Casing	UV resistant PC
Base and thread	Nickel plated Zinc Alloy
Thread diameter	18mm
Weather proof gasket	CR4305 foam with 3M9448B double-side adhesive
Cable pull	8 Kgf
Weight	0.475kg
Recommended Mounting Torque	24.5N·m
Maximum Mounting Torque	29.4N·m
ENVIRONMENTAL	
Waterproof	IP67 & IP69K
Corrosion	5% NaCl for 48hrs - Nickel plated zinc alloy base and thread
Temperature Range	-40°C to +85°C
Thermal Shock	100 cycles -40°C to +80°C
Humidity	Non-condensing 65°C 95% RH
Shock (drop test)	1m drop on concrete 6 axes

3. Antenna Characteristics (Wi-Fi / WLAN)

3.1. Test Setup



3.2. S11 Return Loss (Wi-Fi / WLAN)

3.3. VSWR (Wi-Fi / WLAN)

3.4. Radiation Patterns Wi-Fi

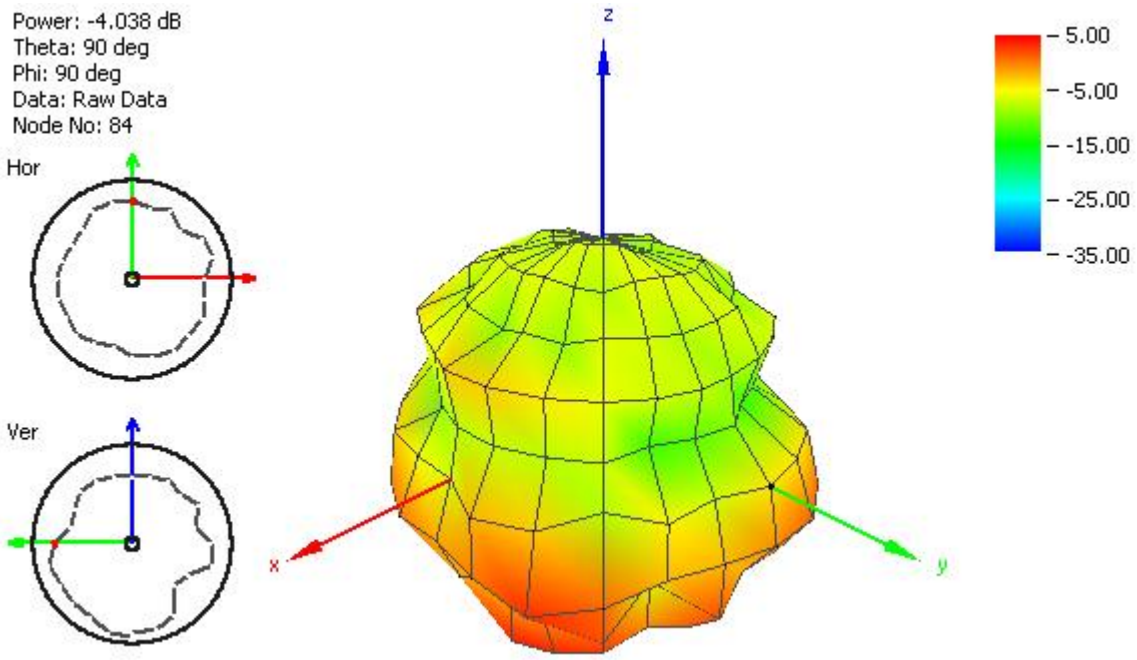


Figure 1. Radiation Pattern of the antenna MA501 at 2400 MHz on metal plate 60*60 cm.

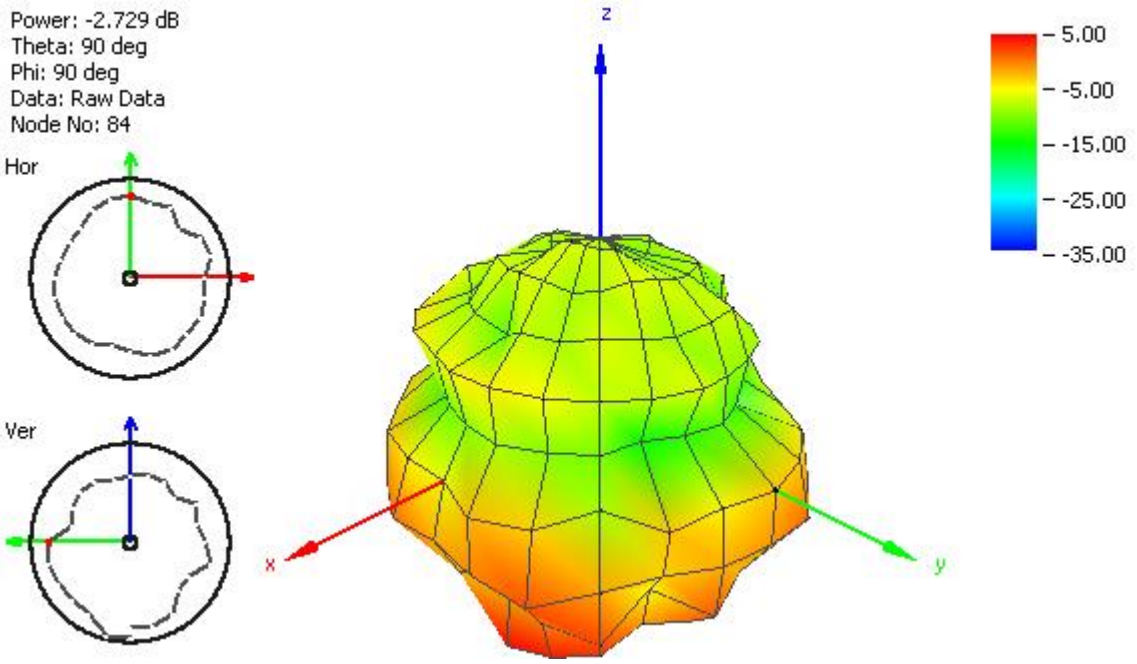


Figure 2. Radiation Pattern of the antenna MA501 at 2450 MHz on metal plate 60*60 cm.

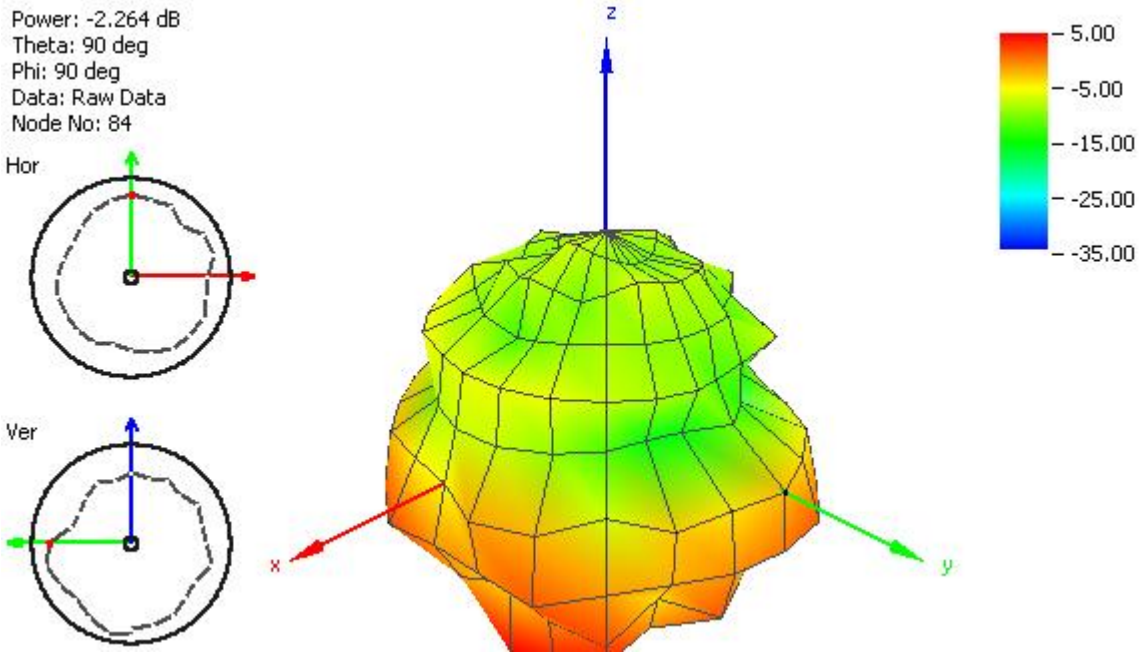


Figure 3. Radiation Pattern of the antenna MA501 at 2500 MHz on metal plate 60*60 cm.

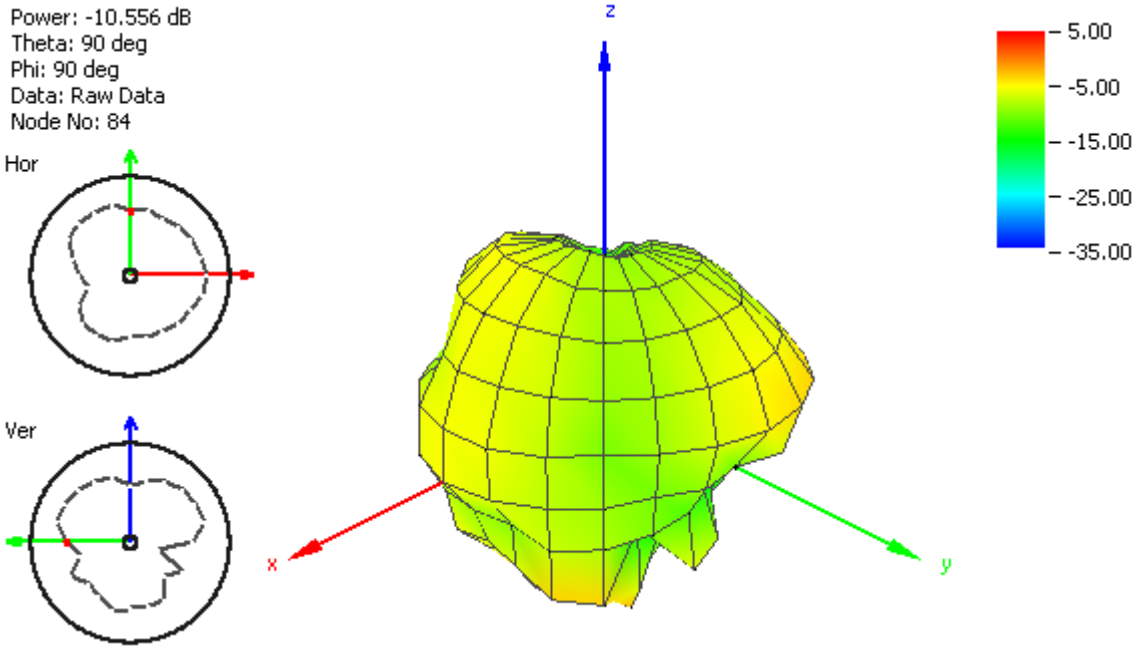


Figure 4. Radiation Pattern of the antenna MA501 at 4900 MHz on metal plate 60*60 cm.

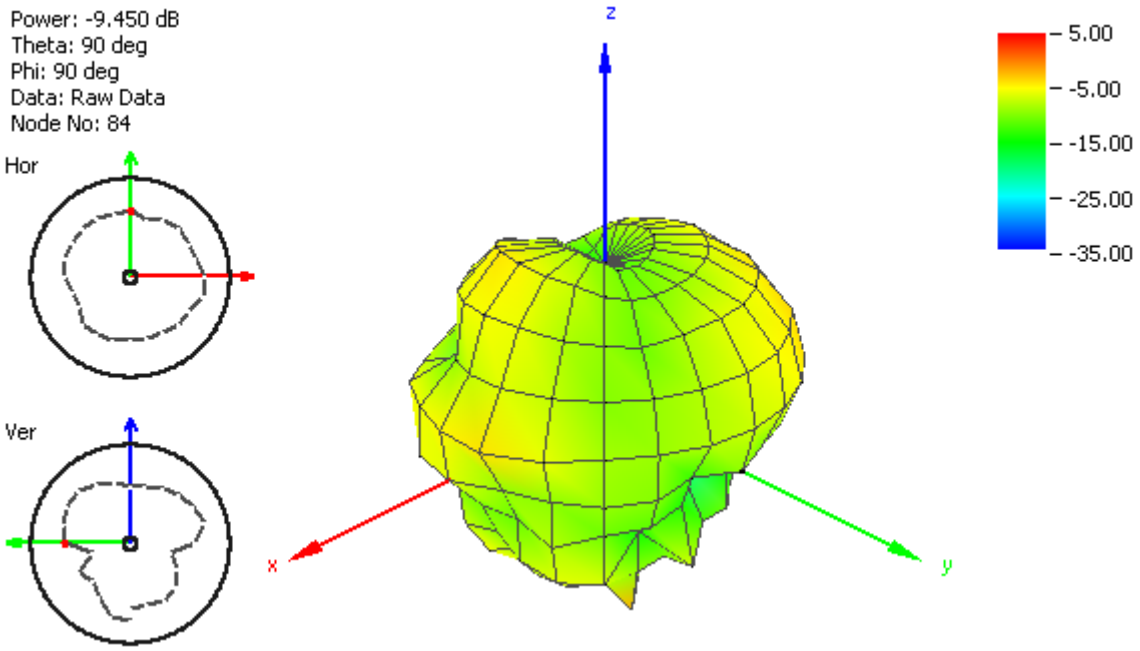


Figure 5. Radiation Pattern of the antenna MA501 at 5150 MHz on metal plate 60*60 cm.

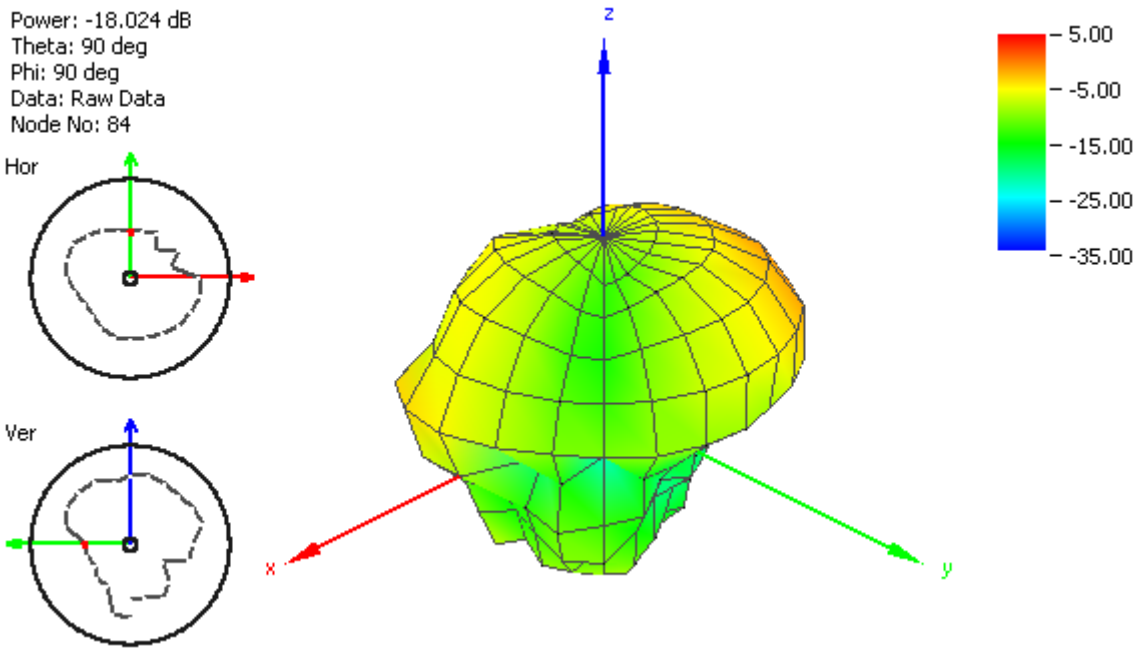


Figure 6. Radiation Pattern of the antenna MA501 at 5550MHz on metal plate 60*60 cm.

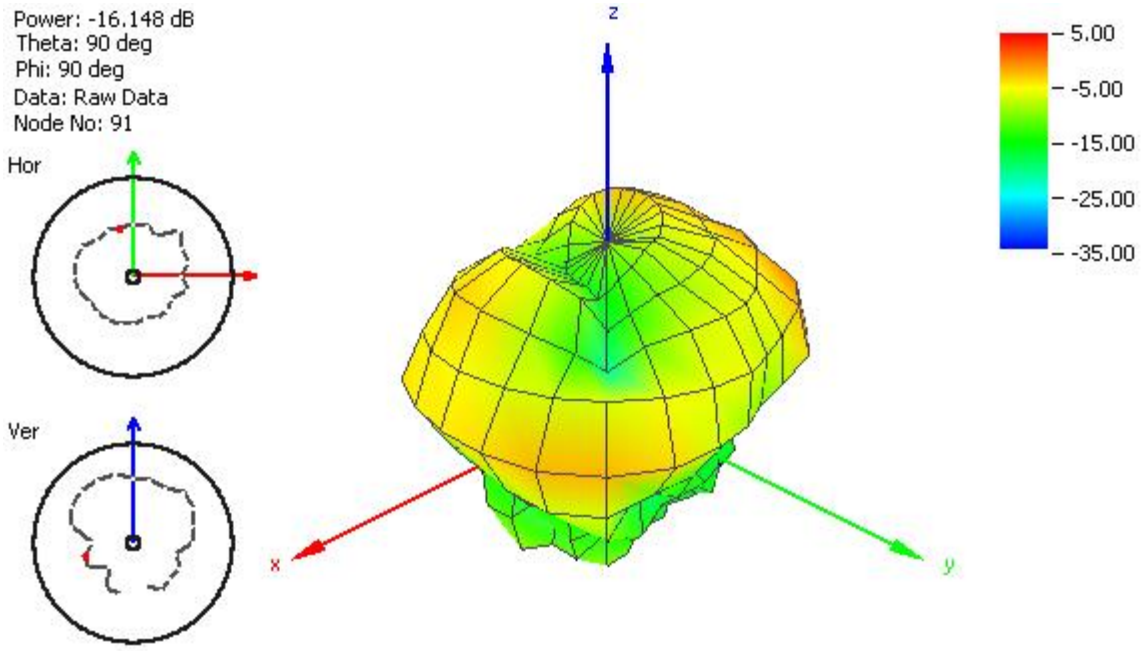
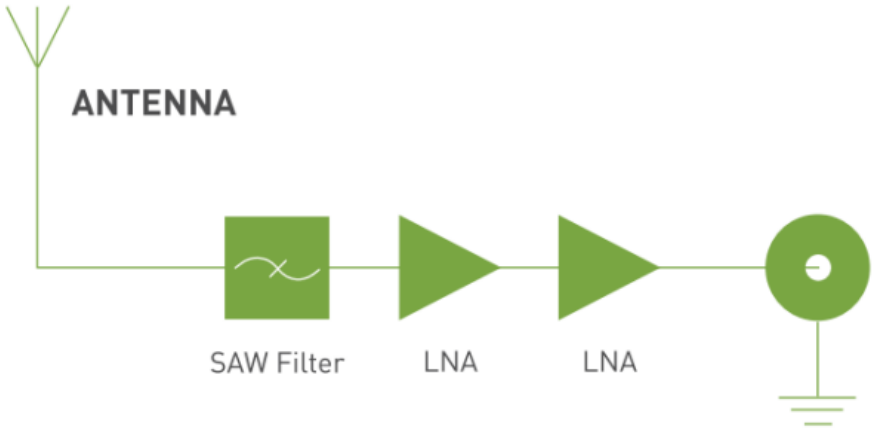


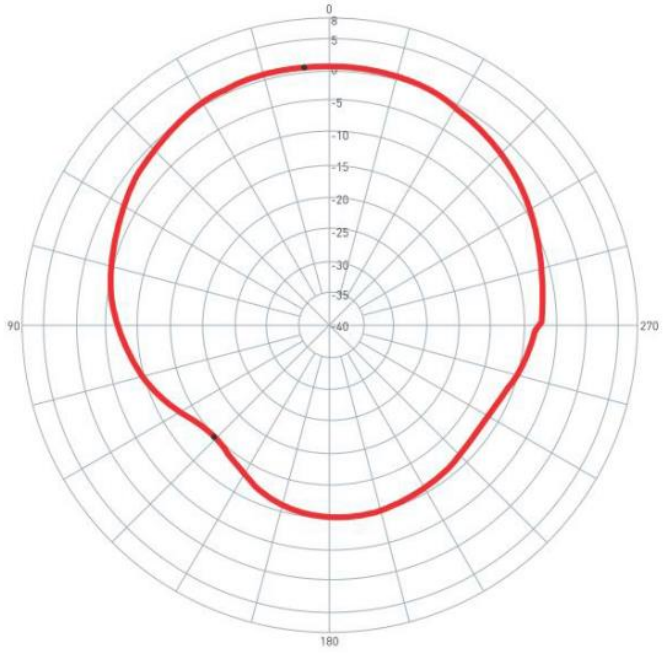
Figure 7. Radiation Pattern of the antenna MA501 at 5850MHz on metal plate 60*60 cm.

4. Antenna Characteristics (GPS/GALILEO)

4.1. System Block Diagram GPS/GALILEO



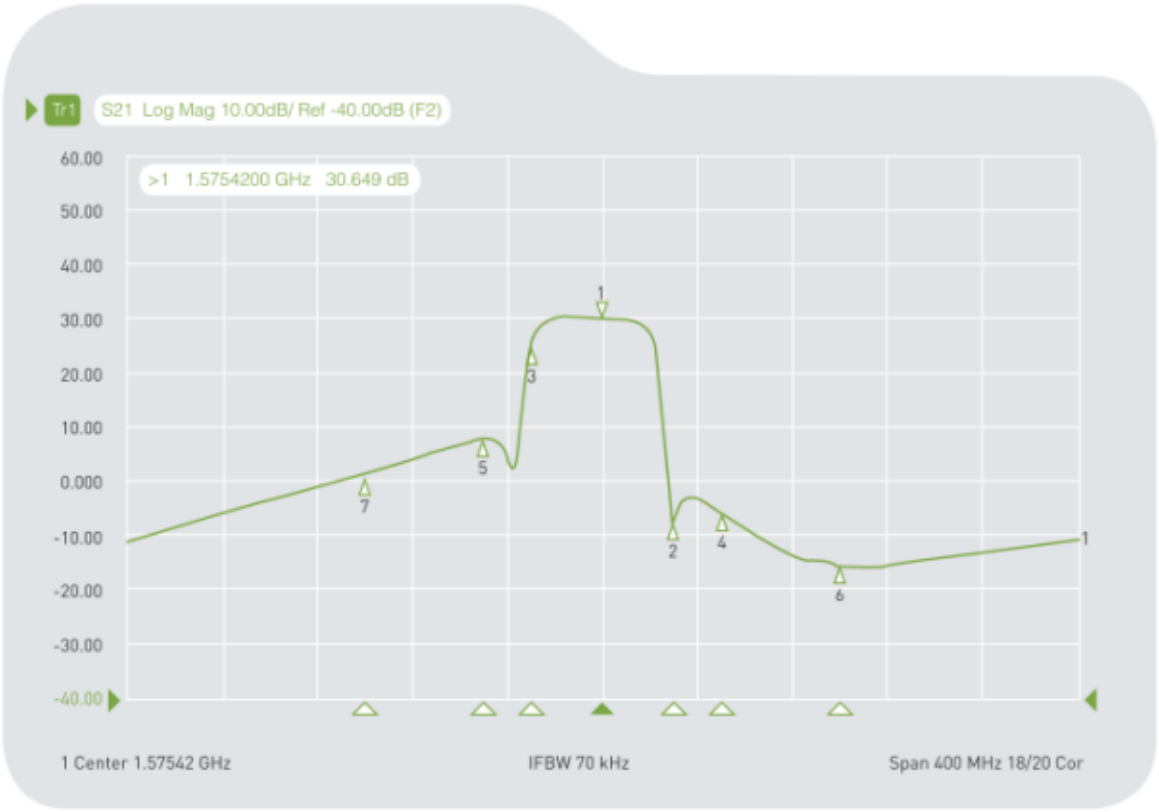
4.2. GPS/GALILEO Patch Radiation Pattern



0 degree is the top of Hercules.

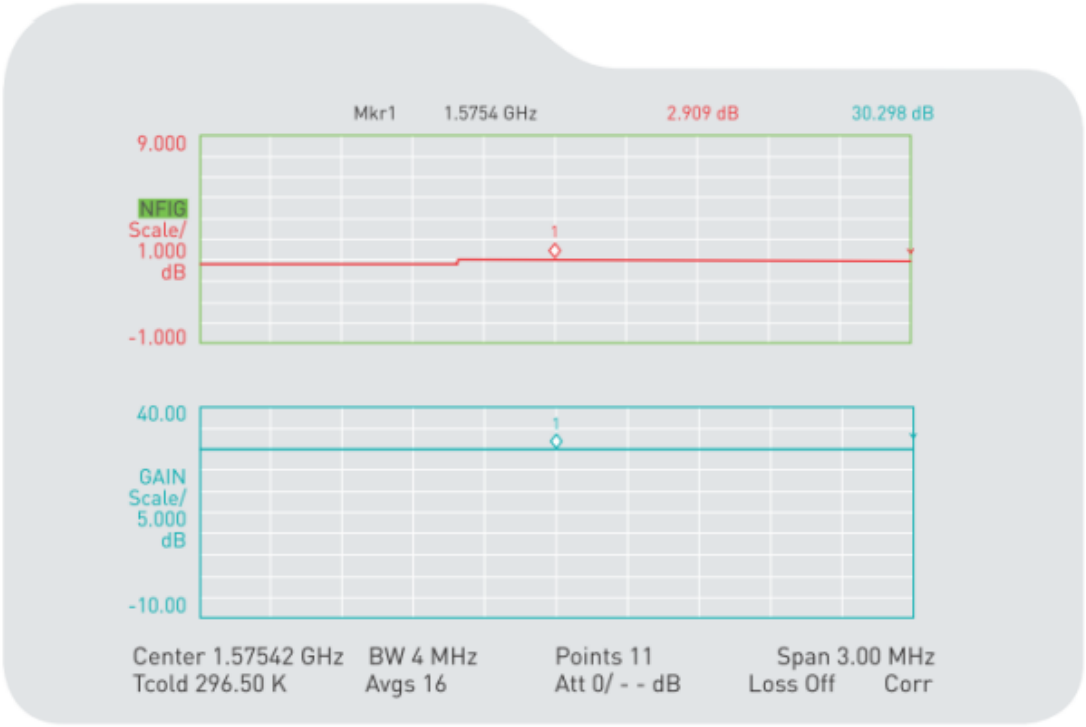
4.3. LNA Properties

4.4. LNA Gain and Out-band Rejection @ 3.0V

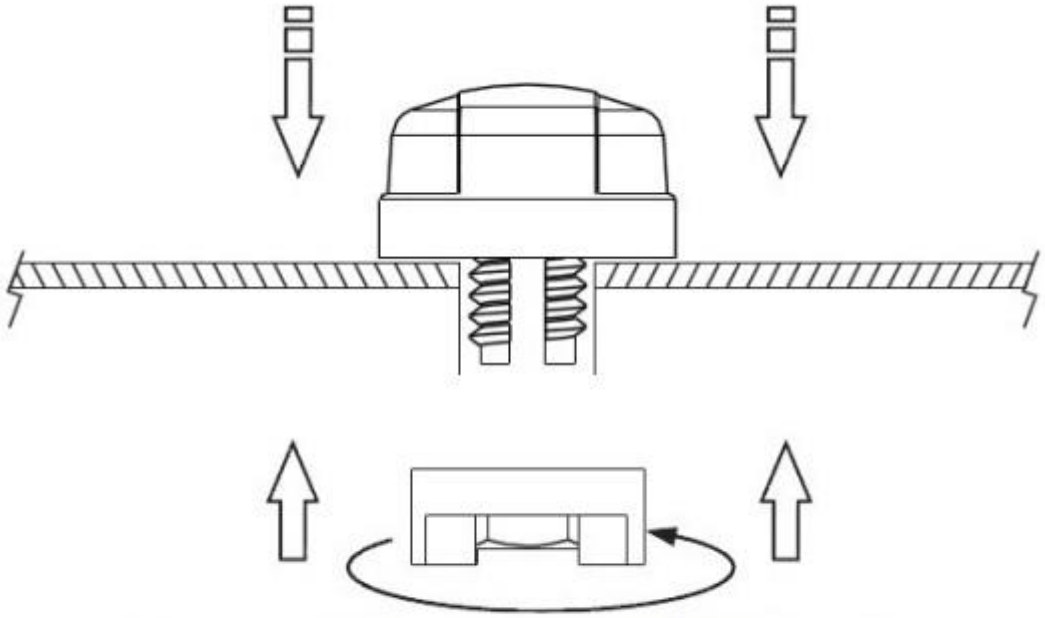


Cg1	Tr1	S21	>1	1.5754200 GHz	30.649 dB
Cg1	Tr1	S21	2	1.6054200 GHz	-6.7098 dB
Cg1	Tr1	S21	3	1.5454200 GHz	24.584 dB
Cg1	Tr1	S21	4	1.6254200 GHz	-5.6354 dB
Cg1	Tr1	S21	5	1.5254200 GHz	8.0734 dB
Cg1	Tr1	S21	6	1.6754200 GHz	-15.436 dB
Cg1	Tr1	S21	7	1.4754200 GHz	-1.5714 dB

4.5. Noise Figure

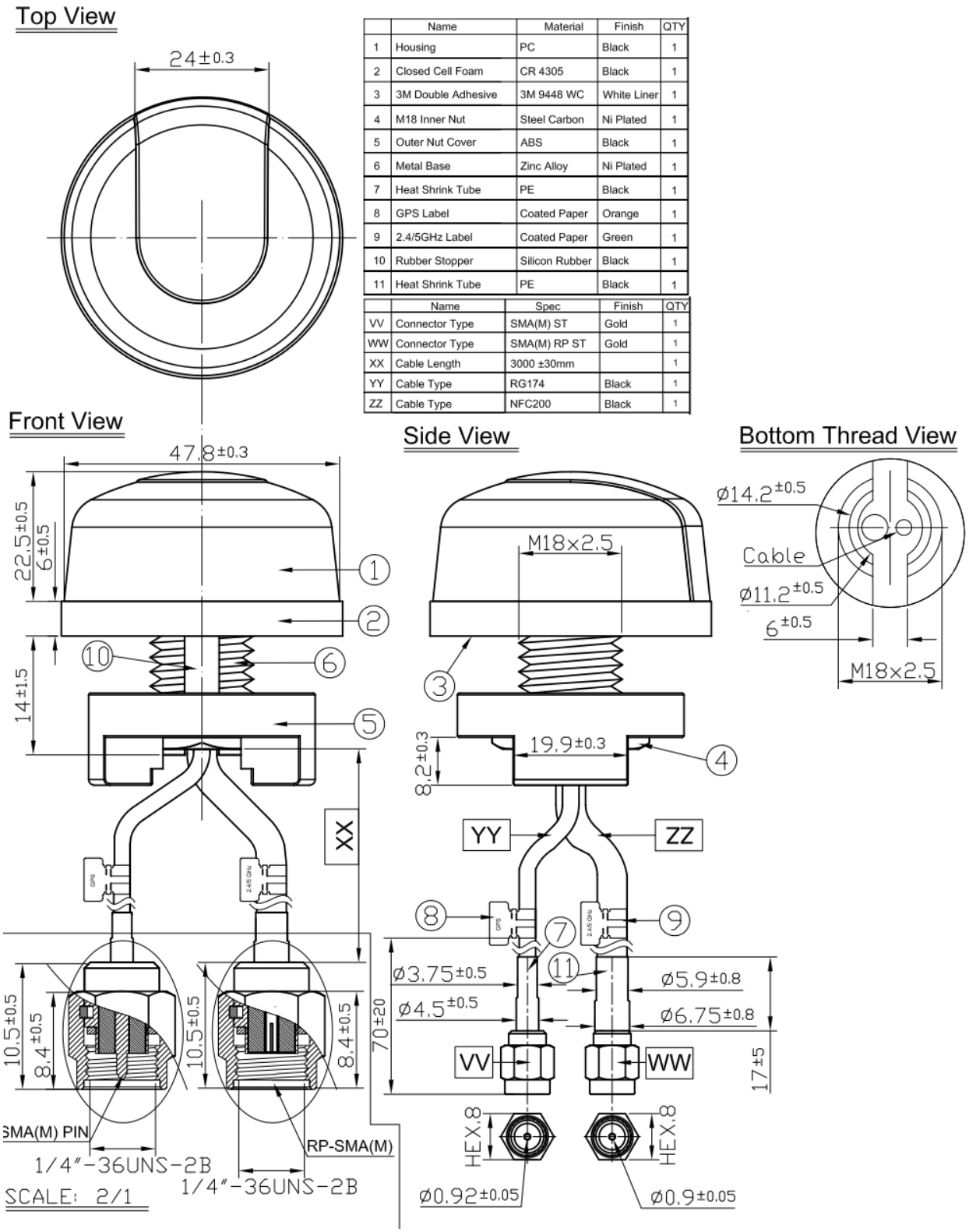


6. Installation



Recommended torque for Mounting is 24.5N·m
Maximum torque for mounting is 29.4N·m

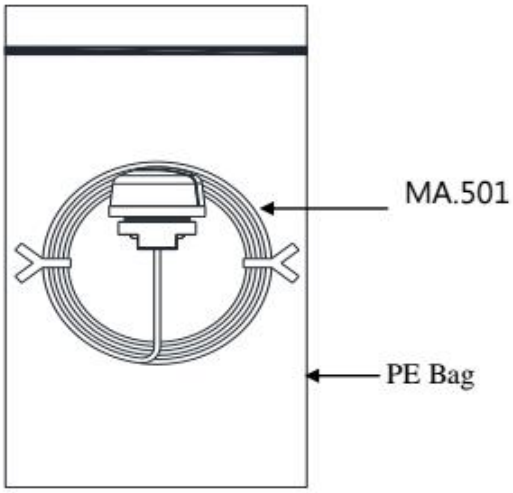
7. Drawings



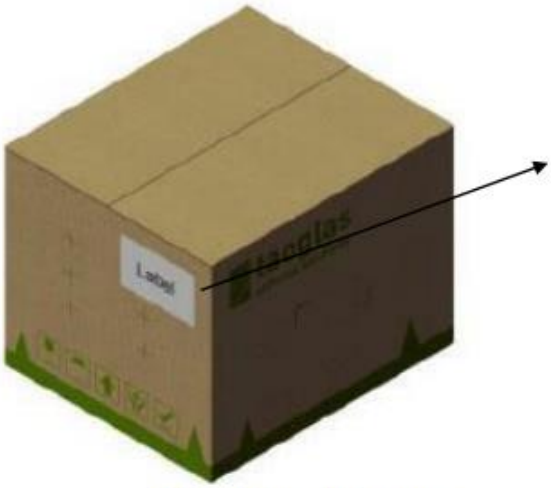
	Name	Material	Finish	QTY
1	Housing	PC	Black	1
2	Closed Cell Foam	CR 4305	Black	1
3	3M Double Adhesive	3M 9448 WC	White Liner	1
4	M18 Inner Nut	Steel Carbon	Ni Plated	1
5	Outer Nut Cover	ABS	Black	1
6	Metal Base	Zinc Alloy	Ni Plated	1
7	Heat Shrink Tube	PE	Black	1
8	GPS Label	Coated Paper	Orange	1
9	2.4/5GHz Label	Coated Paper	Green	1
10	Rubber Stopper	Silicon Rubber	Black	1
11	Heat Shrink Tube	PE	Black	1

	Name	Spec	Finish	QTY
VV	Connector Type	SMA(M) ST	Gold	1
WW	Connector Type	SMA(M) RP ST	Gold	1
XX	Cable Length	3000 ±30mm		1
YY	Cable Type	RG174	Black	1
ZZ	Cable Type	NFC200	Black	1

8. Packaging



1pcs / PE Bag (160x300mm)



Shipping Label

SPQ: 25pcs / Carton
(320*250*290mm)
Weight 8.7Kg

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