

## SPECIFICATION

- Model No. : **MA501.C.AC.001**
- Product Name : Heavy Duty Screw Mount Antenna – GPS/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 ABS housing  
IP67 & IP69K Waterproof Compliance  
Height 29mm Diameter 49mm  
**RoHS Compliant**



## 1. Introduction

MA.501 is a combination of high performance GPS 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 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 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.

## 2. Features

### **GPS**

- High LNA Gain up to 32 dB  $\pm$  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**

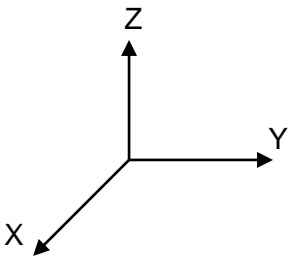
- Weatherproof (IP67 & IP69K) with robust foam seal
- Quality textured covert and low profile design
- UV and Vandal resistant PVC housing

### 3. Specifications

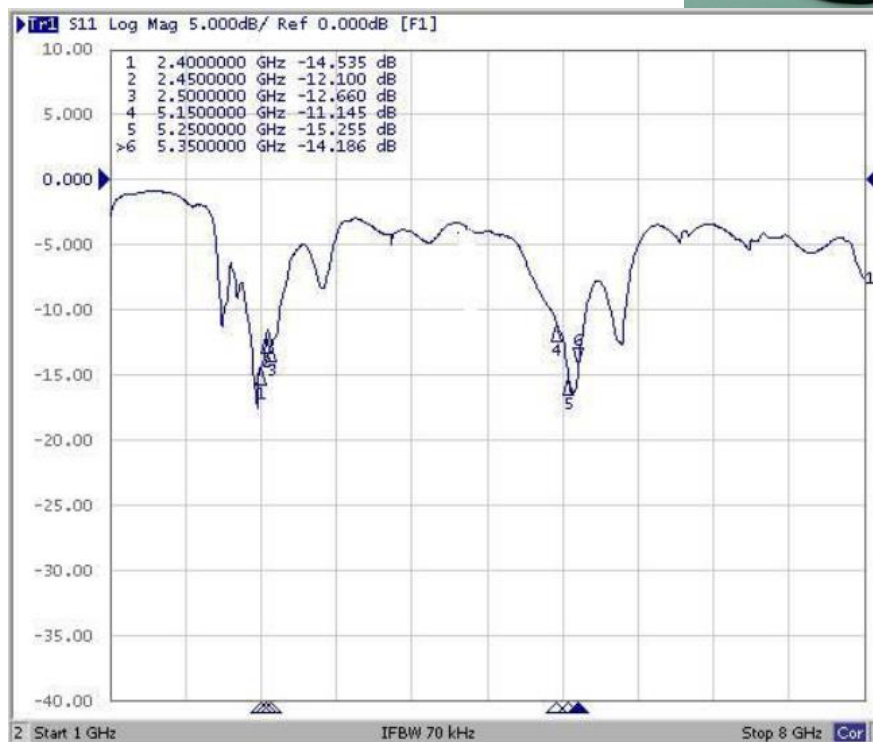
GPS						
Frequency	1575.42MHz					
Average Gain	32dB typ.					
Gain @ Zenith	2.0dBi min.					
Gain @ 10 o Elevation	-4.0dBi min.					
Axial Ratio	3.0dB max.					
Polarization	Right Hand Circular					
VSWR	<=2.0:1					
Impedance	50Ω					
Noise Figure	1.5dB max.					
Bandwidth	10Mhz min.					
LNA Out-band 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					
WiFi						
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 CFD-200 standard, fully customizable
Connector	RP-SMA(M) standard, standard, fully customizable
<b>MECHANICAL</b>	
Dimensions	Height 29mm x Diameter 49mm
Casing	UV resistant PVC
Base and thread	Nickel plated Zinc Alloy
Thread diameter	18mm
Weather proof gasket	CR4305 foam with 3M9448B double-side adhesive
Cable pull	8 Kgf
Recommended Mounting Torque	95Nm
Maximum Mounting Torque	135Nm
<b>ENVIRONMENTAL</b>	
Waterproof	IP67 & IP69K
Corrosion	5% NaCl for 96hrs - 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

## 4. S11 Return Loss management (Wi-Fi / WLAN)



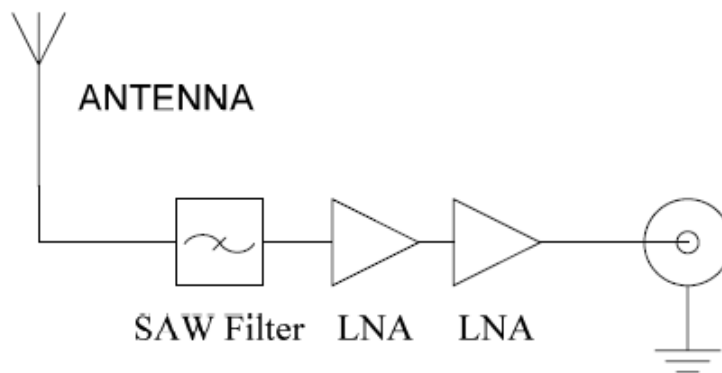
Note : 1. The upper of the PCB is X direction.  
2. Connector is toward Z direction.



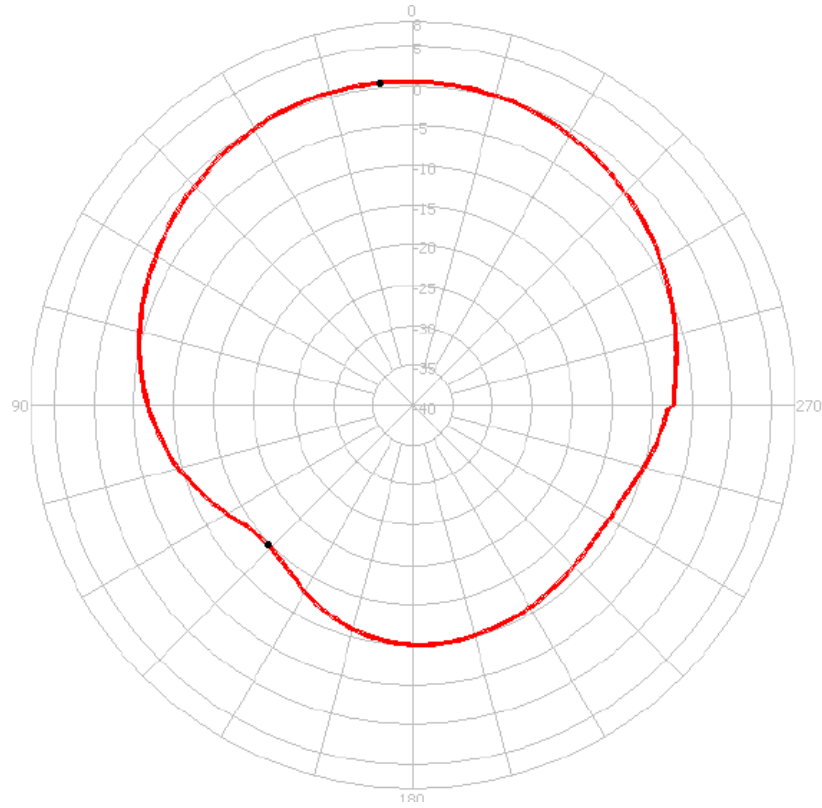
## 5. VSWR (Wi-Fi / WLAN)



## 6. System Block Diagram

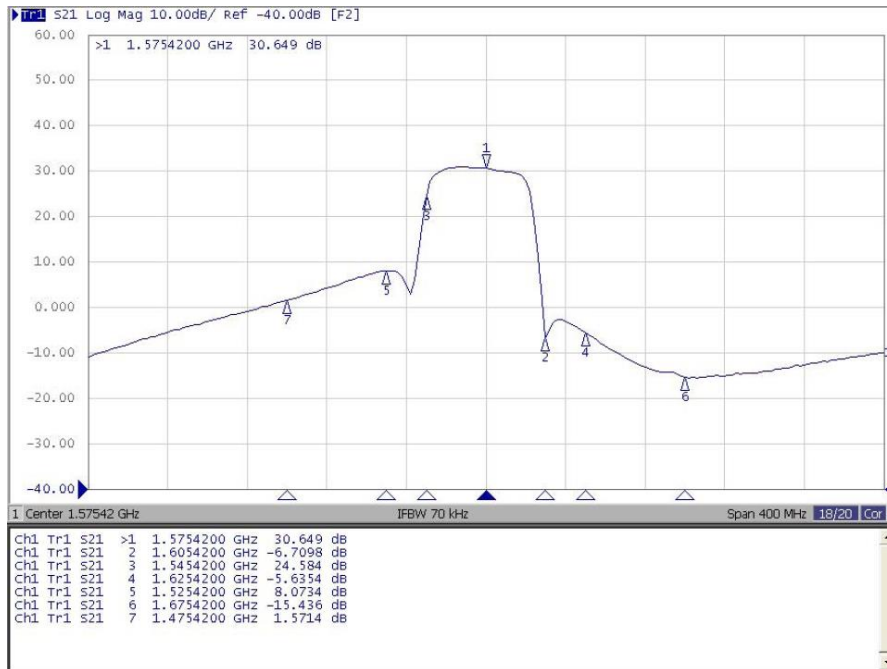


## 7. GPS Patch Radiation Pattern



## 8. LNA Properties

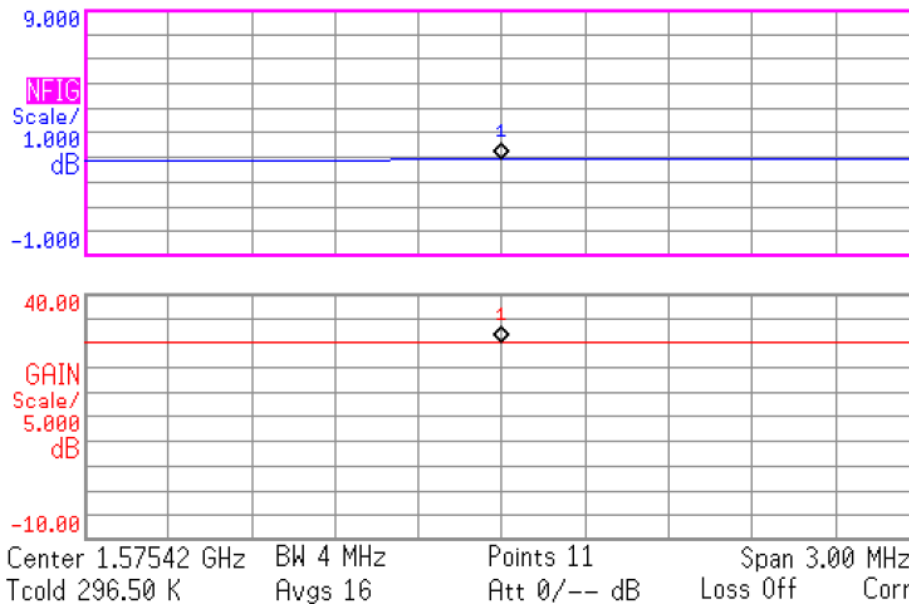
### 8.1. LNA Gain and Out-band Rejection @ 3.0V



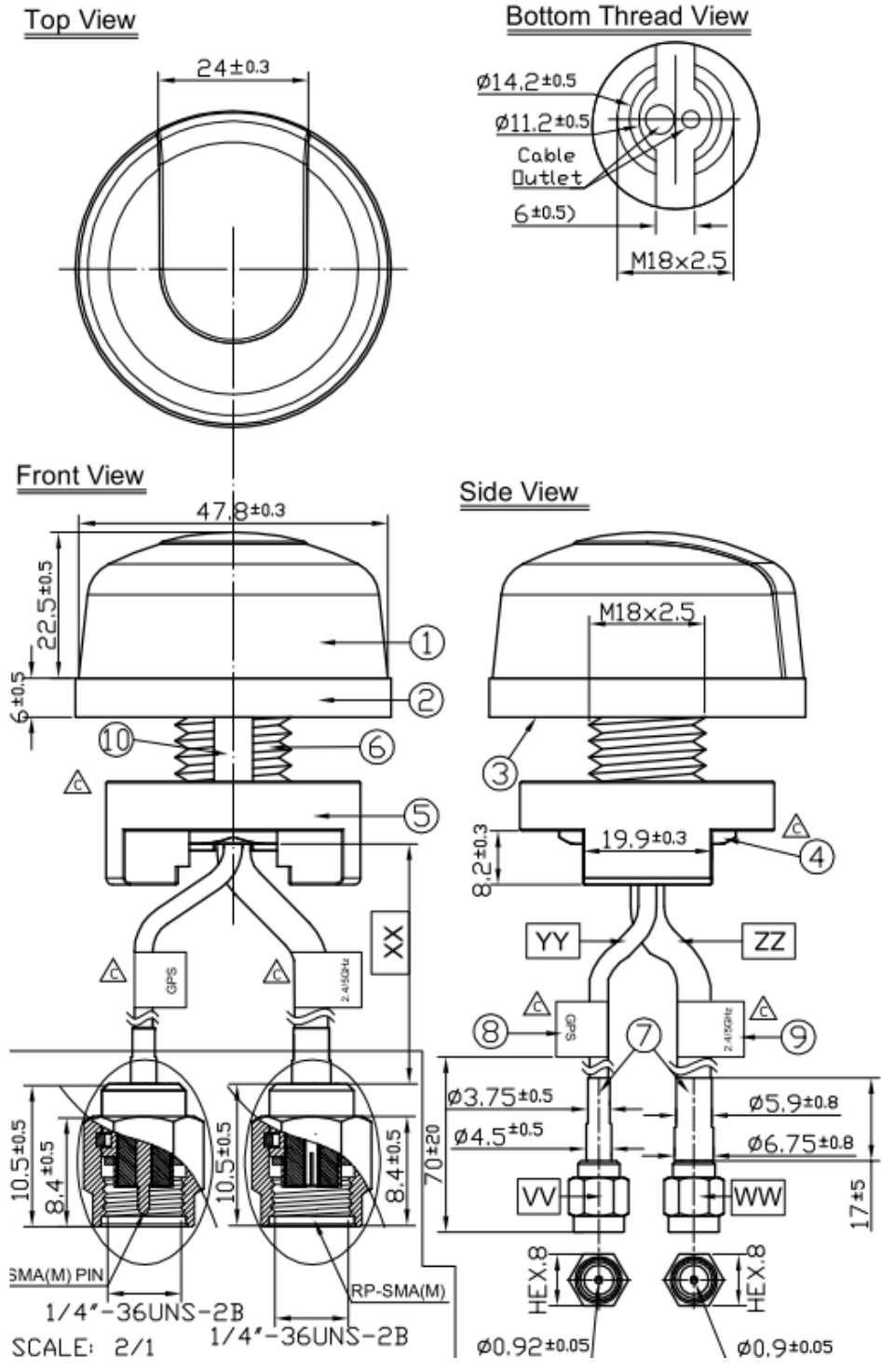


## 8.2. Noise Figure

Mkr1 1.5754 GHz 2.909 dB 30.298 dB



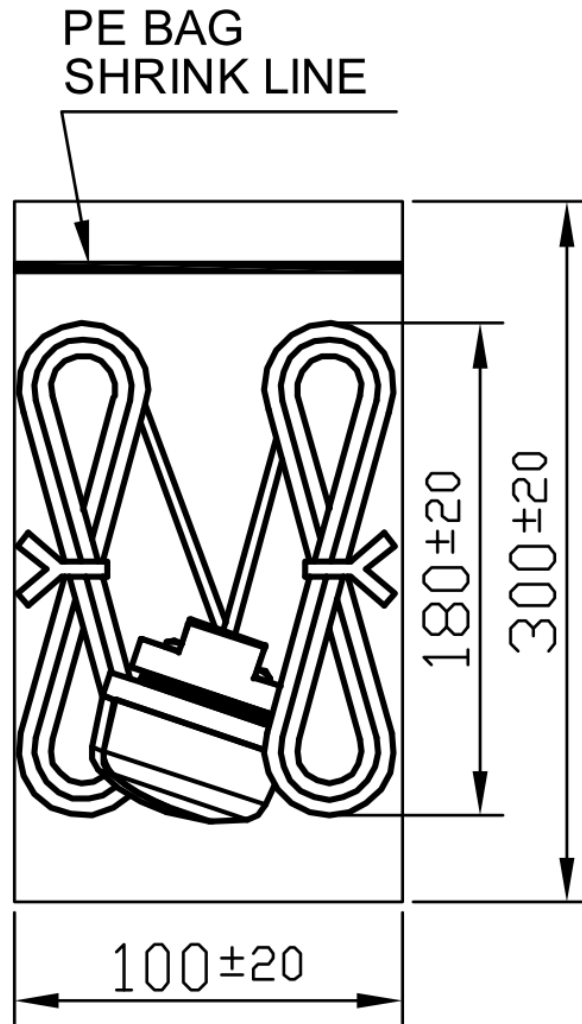
# 9. Drawings



	Name	Material	Finish	QTY
1	Housing	ABS PA-707	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	M18x2.5 Thread 14.6L	Zinc Alloy	Ni Plated	1
7	Heat Shrink Tube	PE	Black	2
8	GPS Label	Coated Paper	Orange	1
9	2.4/5GHz Label	Coated Paper	Green	1
10	Rubber Stopper	Rubber	Black	1

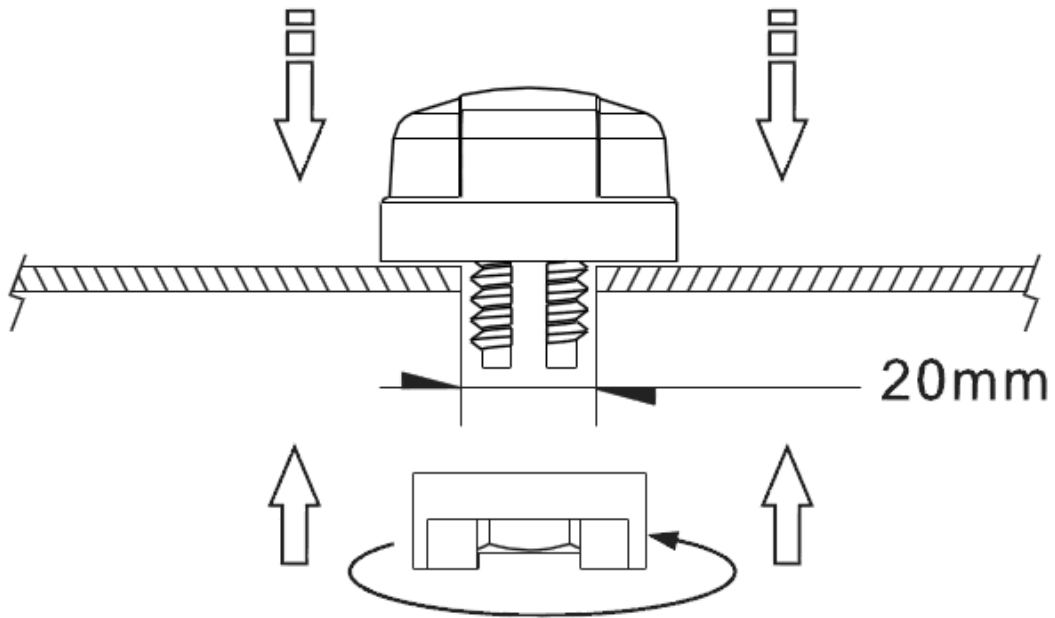
	Name	Spec	Finish	QTY
VV	Connector Type	SMA(M) ST	Gold	1
WW	Connector Type	SMA(M) RP ST	Gold	1
XX	Cable Length	3000 ±30mm		1
YY	Cable Type	RG174	Black	1
ZZ	Cable Type	CFD200	Black	1

## 10.Packaging



PACKING:1PCS/BAG

## 11. Installation



Recommended torque for mounting is 95Nm or 70ftlbs

Maximum torque for mounting is 135.6Nm or 100ft lbs

