



3D View  
(This side faces the sky)



Underside View  
(Magnet)

MA301.A.AB.010

## Specification

<b>Part No.</b>	<b>MA301.A.AB.010</b>
<b>Product Name</b>	MA.301 GPS/Penta-band Cellular Magnetic Antenna
<b>Feature</b>	<p>IP65 - Waterproof</p> <p>GPS - High gain LNA up to 32dB</p> <p>Penta-band 850/900/1800/1900/2100 MHz</p> <p>GSM/CDMA/PCS/DCS/UMTS/HSPA</p> <p>Low Profile</p> <p>Height 10.8mm Diameter 55.1mm</p> <p>RoHS Compliant</p>

## 1. Introduction

The MA.301 is a combination small form factor high performance GPS and Penta-band Cellular (GSM/CDMA/PCS/DCS/WCDMA/UMTS) antenna to simplify AVL or Fleet management antenna systems worldwide.

It comes with magnet mount as standard. An internal O-ring meets stringent IP-65 waterproof standards. With the strongest GPS and Cellular antenna design team in the industry and rigorous testing Taoglas offers guaranteed performance with your system and your environment.

The standard version comes with 3 metres RG174 cable and Fakra connectors for both GPS and Cellular feeds. Cables and connectors are customizable upon request.

## 2. Features

### GPS

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High LNA Gain up to 32 dB

Antenna Gain  $28 \pm 2$  dB

Miniaturized to 56.3 x 17.3 mm

Low Noise 1.5 dB max

Ultra-Low Power Consumption 6mA typ ( at 2.7V~3.3V dc)

### Cellular

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Advanced penta-band cellular antenna  
(GSM/CDMA/PCS/DCS/WCDMA/UMTS)

### Other

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IP65 Water Resistant due to Internal O-Ring Structure

Quality textured covert design. Low profile

UV resistant ABS housing

Optional - high grade 3M double sided tape for quick and easy mounting

Optional cables and connectors

ROHS Compliant

### 3. Performance Specification

Parameter	GPS Antenna	Cellular Antenna
<b>Features</b>	High performance GPS ceramic patch antenna with cutting edge low noise amplifier	CDMA: 824~896 MHz GSM: 880~960 MHz PCS: 1850~1990 MHz DCS: 1710~1880 MHz UMTS/WCDMA
<b>Frequency</b>	1575.42 MHz ± 2MHz	As above
<b>Gain</b>	28 dB typ. Gain at Zenith: -3 dBi min Axial Ratio: 3.0 dB max	As patterns --- ---
<b>Noise Figure</b>	1.5 dB max	---
<b>Polarization</b>	RHCP	Linear
<b>Bandwidth</b>	10 MHz min @ -10 dB	As S11
<b>VSWR</b>	1.92 max	<=2.5
<b>Impedance</b>	50Ω	50Ω
<b>Power Consumption</b>	6mA (at 2.7 ~ 3.3V dc)	---
<b>Cable / Connector</b>	Standard 2/3/5m RG-174 Cables and Connectors Fully Customisable	Standard 2/3/5m RG-174 Cables and Connectors Fully Customisable
<b>Operating Temperature</b>	-40°C ~ +85°C	-40°C ~ +85°C
<b>Storage Temperature</b>	-40°C ~ +90°C	-40°C ~ +90°C
<b>Size</b>	56.3mm * 17.3mm	
<b>O-Ring</b>	Embedded	
<b>Housing</b>	UV resistant ABS	

\*Note: specifications may be subject to change

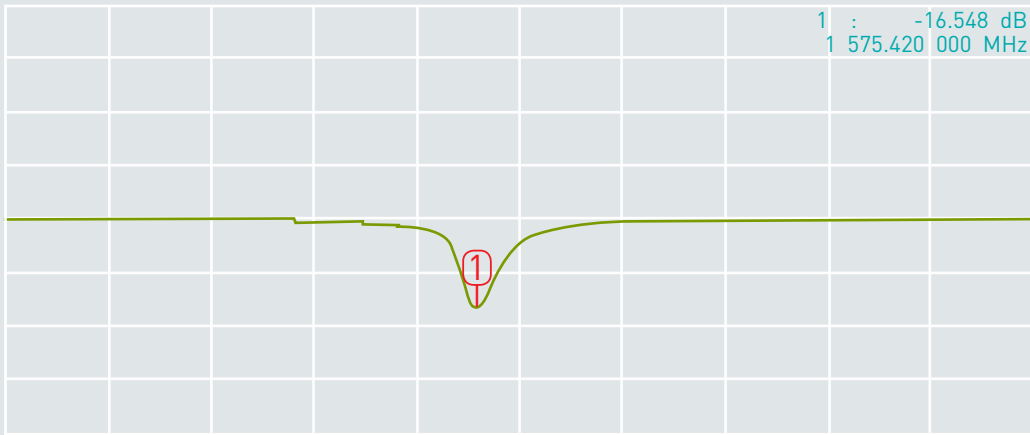
**Note**

1. The antenna is measured mounted on a 39 (L) × 34.5 (W) cm metal ground
2. All data are measured with RG-174 cable (length = 3M), excluding the LNA data
3. RG-174 cable attenuation (dB/100mm)

GHz	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
RG-174	67	110	127	153	168	183	207	229	252	272	291	311

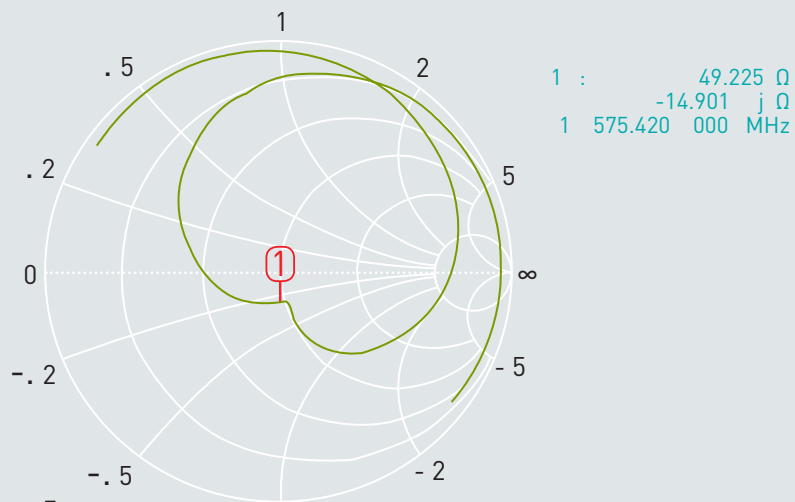
## 4. GPS Ceramic Antenna

S22 REVERSE REFLECTION CHN2 TRANSMISSION / REFLECTION  
 LOG MAGNITUDE ▶ REF = 0.000 dB 10.000 dB/DIV



1 300.000 000 MHz 1 900.000 000 MHz

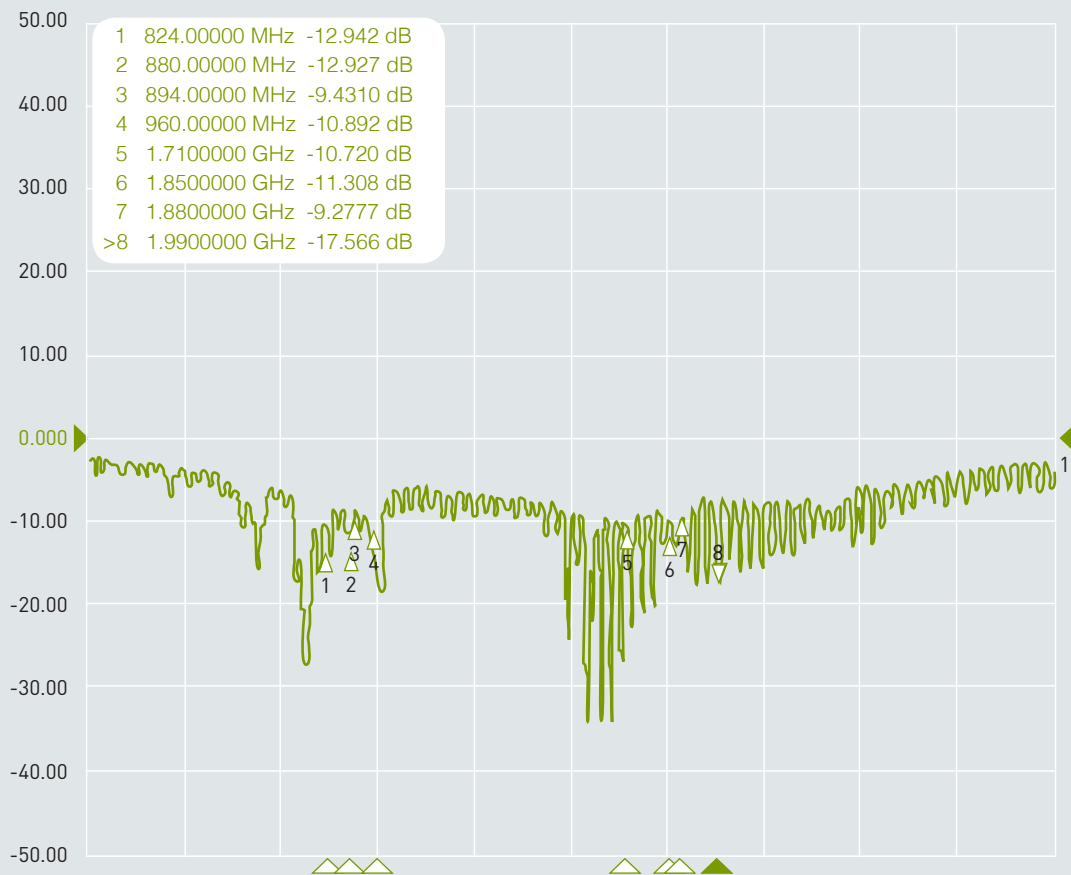
S22 REVERSE REFLECTION TRANSMISSION / REFLECTION  
 IMPEDANCE



## 5. GSM Antenna

1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State

Tr1 S11 Log Mag 10.00dB/ Ref 0.000dB (F2)

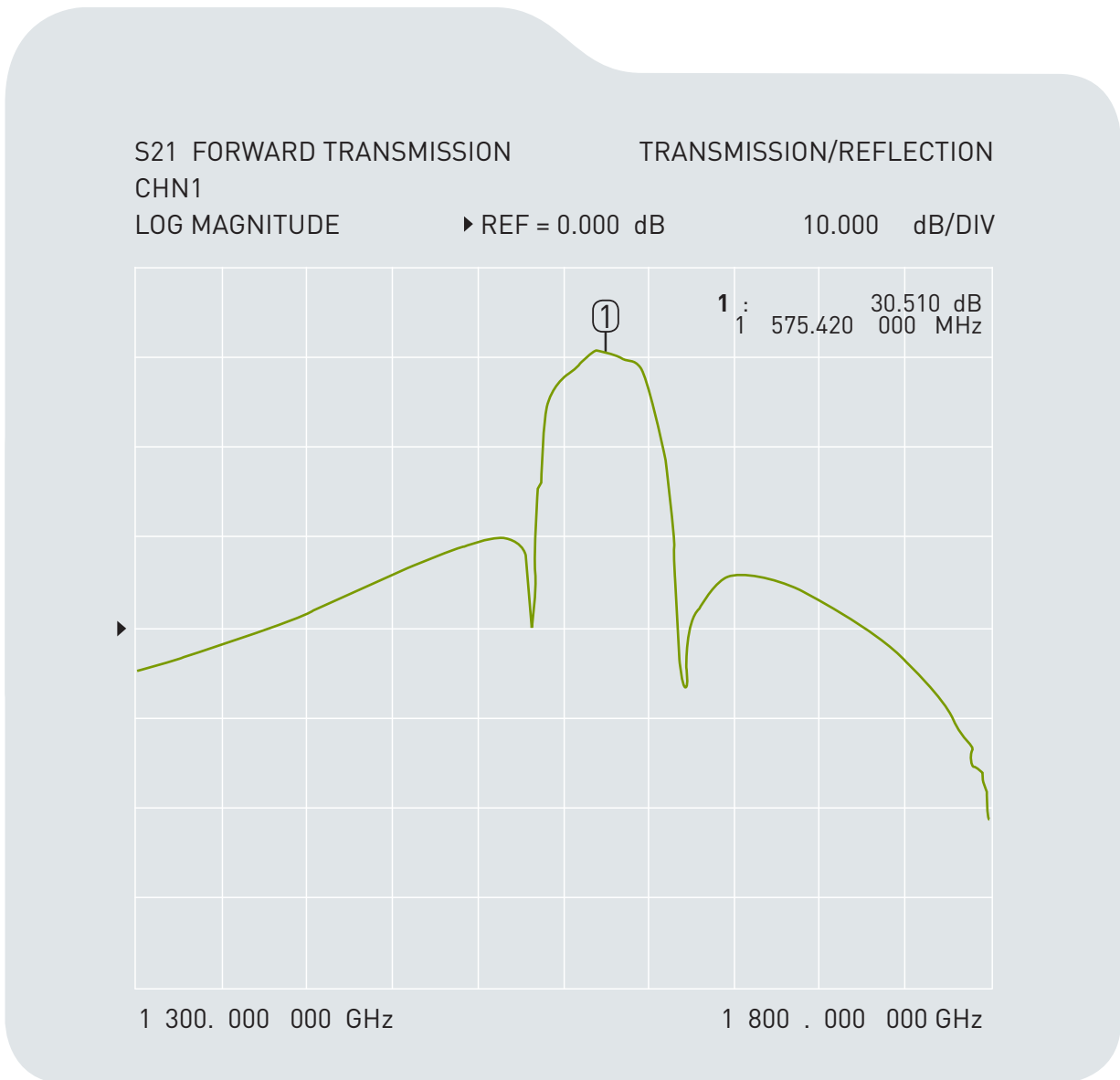


1 Start 100 MHz

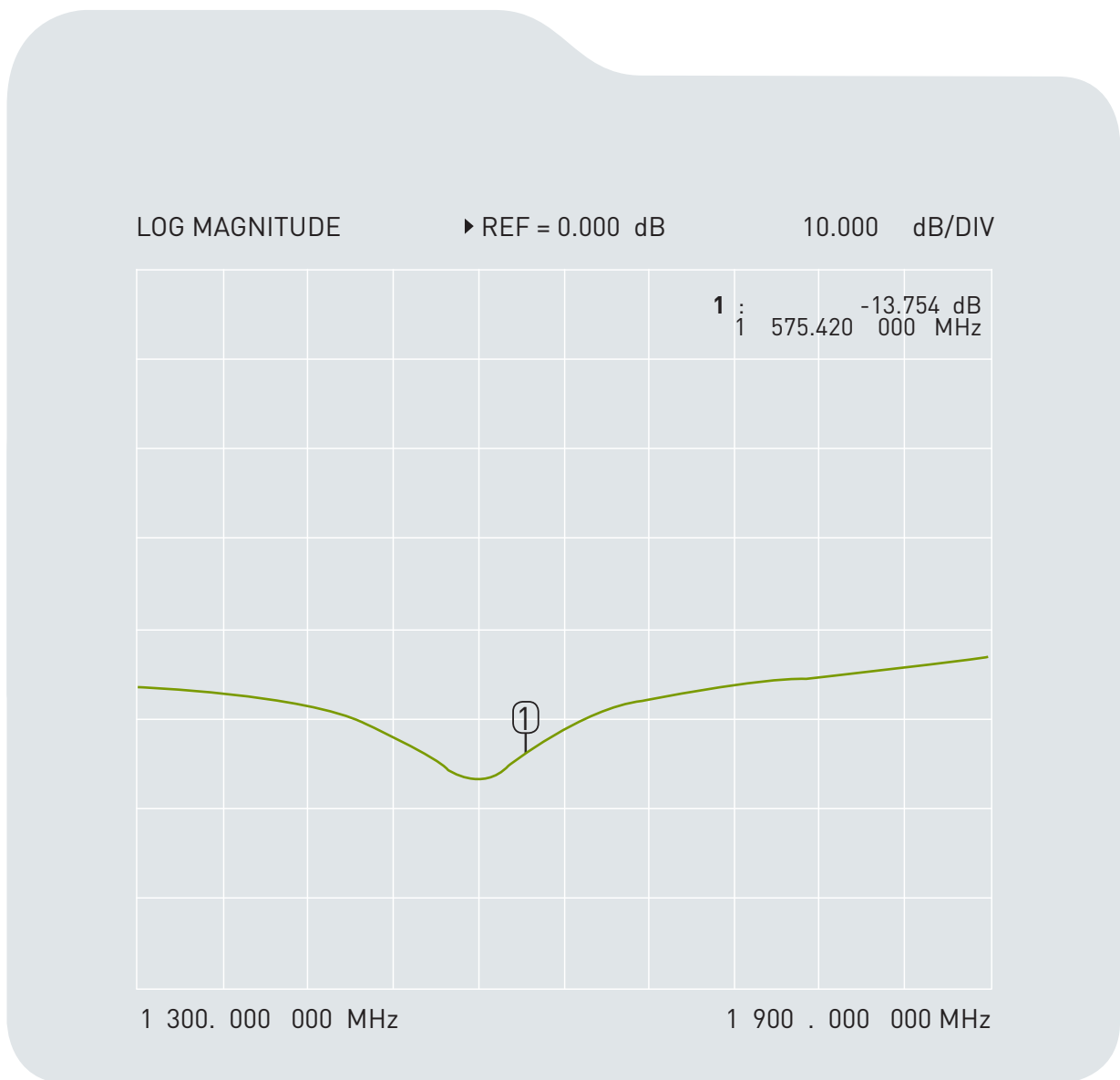
IFBW 30 kHz

Stop 3 GHz Cor !

## 6. LNA gain



## 7. LNA S22

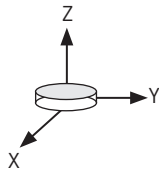


# 8.1 GSM Antenna Radiation Pattern

Frequency

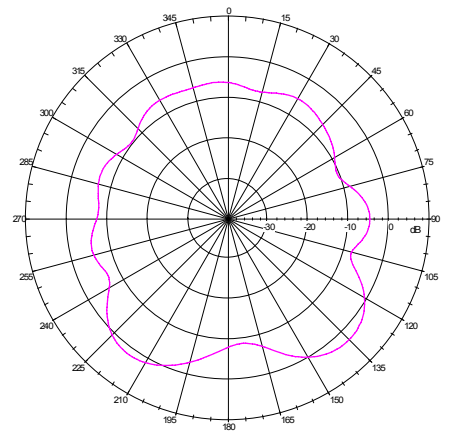
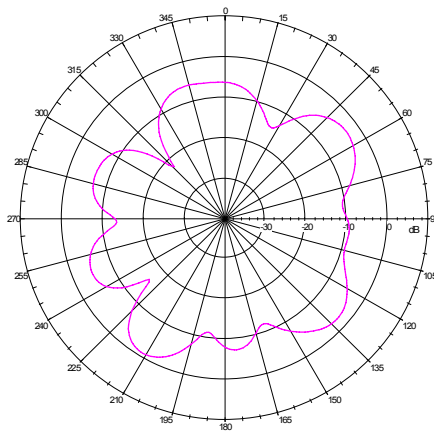
XZ Plane

YZ Plane



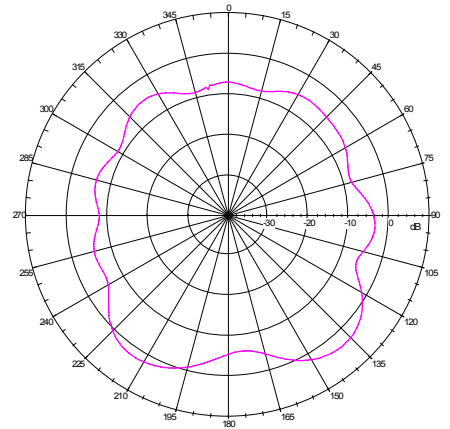
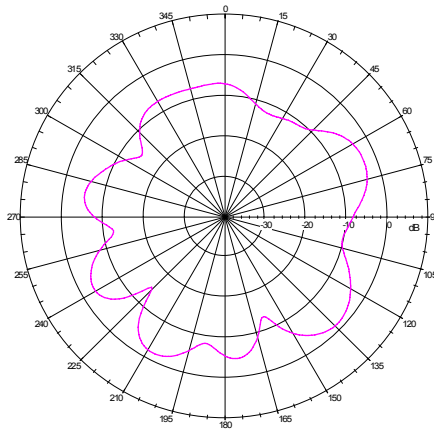
**824 MHz**

**Peak Gain: 1.526 dBi**



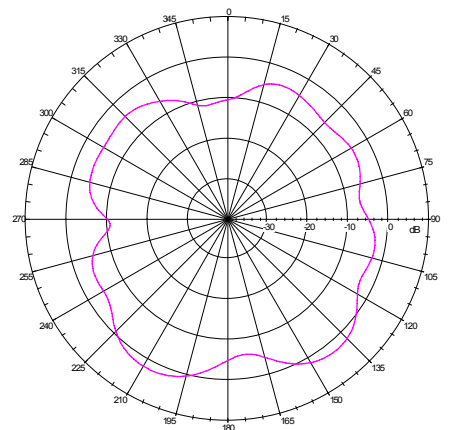
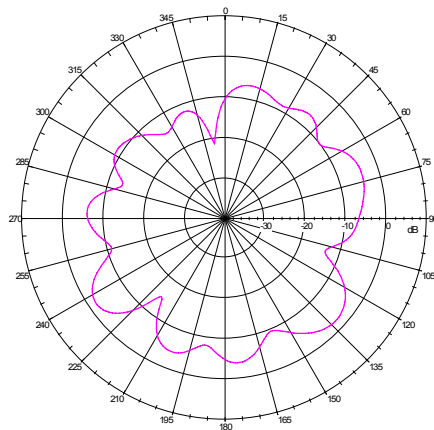
**880 MHz**

**Peak Gain: 1.996 dBi**



**960 MHz**

**Peak Gain: 1.133 dBi**



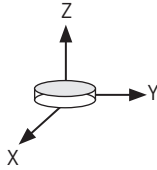


## 8.2 Cellular Antenna Radiation Pattern

Frequency

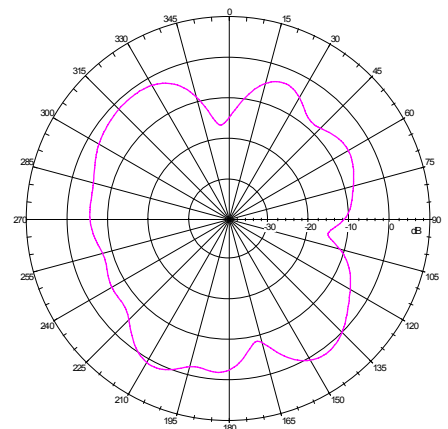
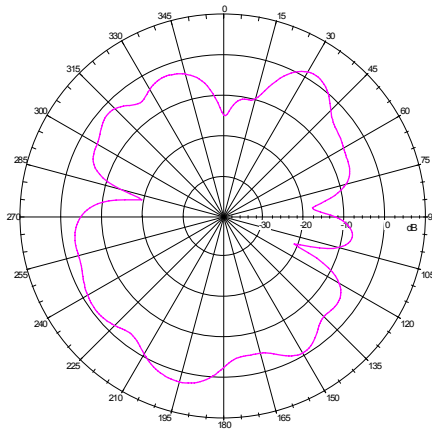
XZ Plane

YZ Plane



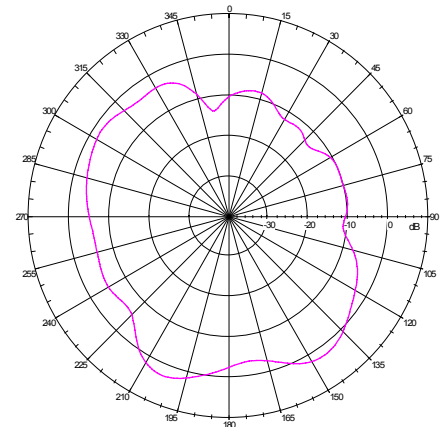
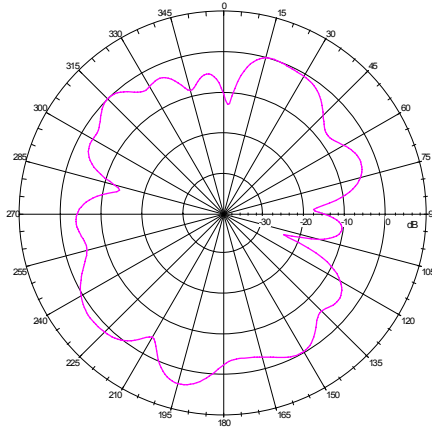
**1710 MHz**

**Peak Gain: 1.946 dBi**



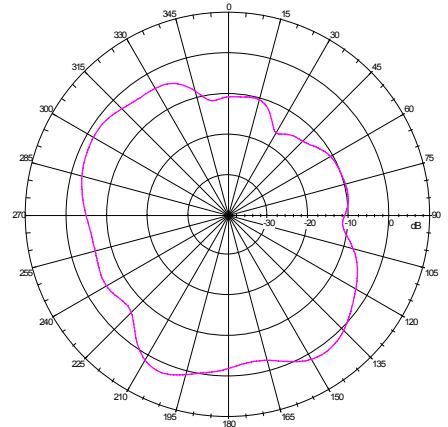
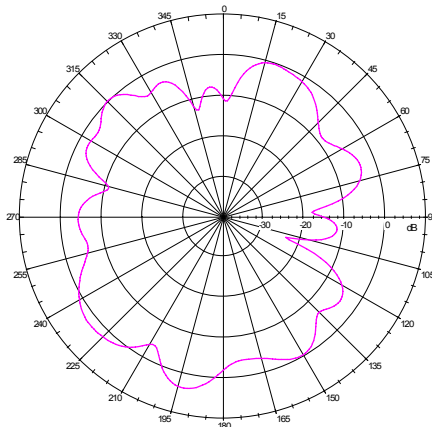
**1850 MHz**

**Peak Gain: 3.0 dBi**



**1880 MHz**

**Peak Gain: 3 dBi**

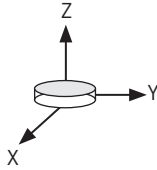


## 8.3 Cellular Antenna Radiation Pattern

Frequency

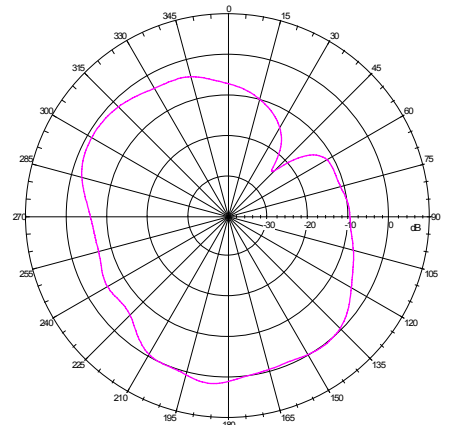
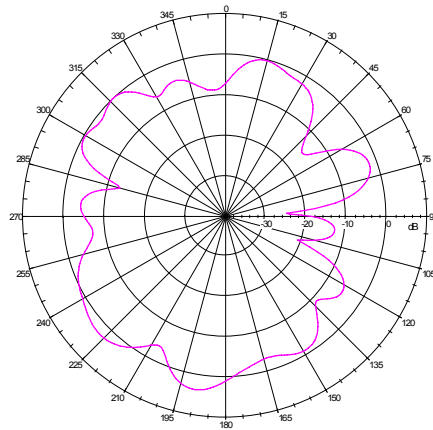
XZ Plane

YZ Plane



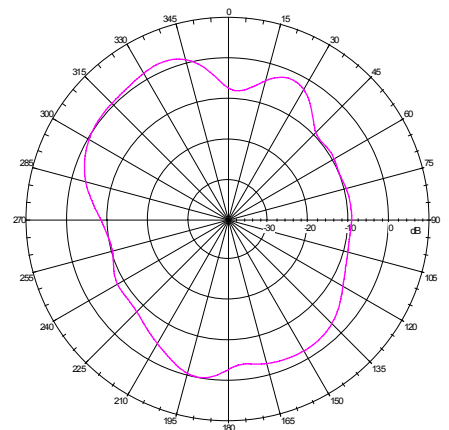
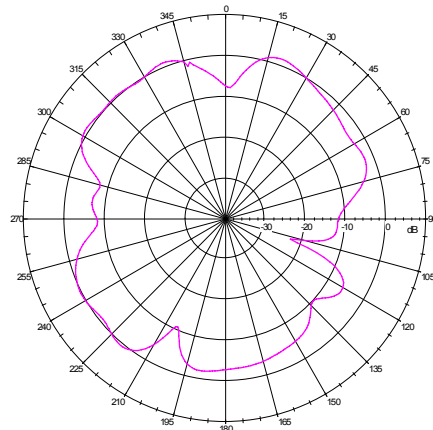
**1990 MHz**

**Peak Gain: 3.27 dBi**



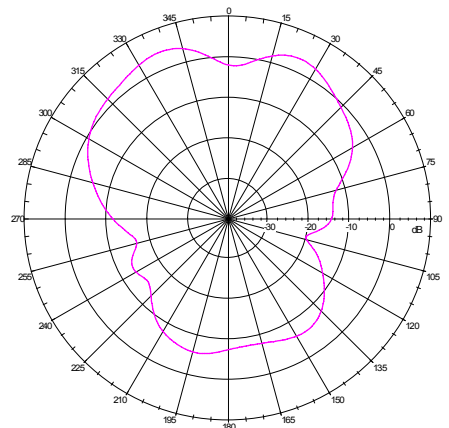
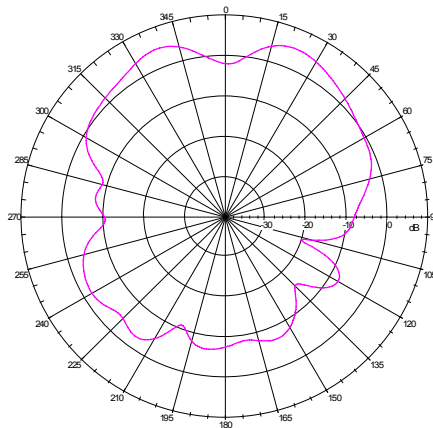
**2110 MHz**

**Peak Gain: 3.78 dBi**

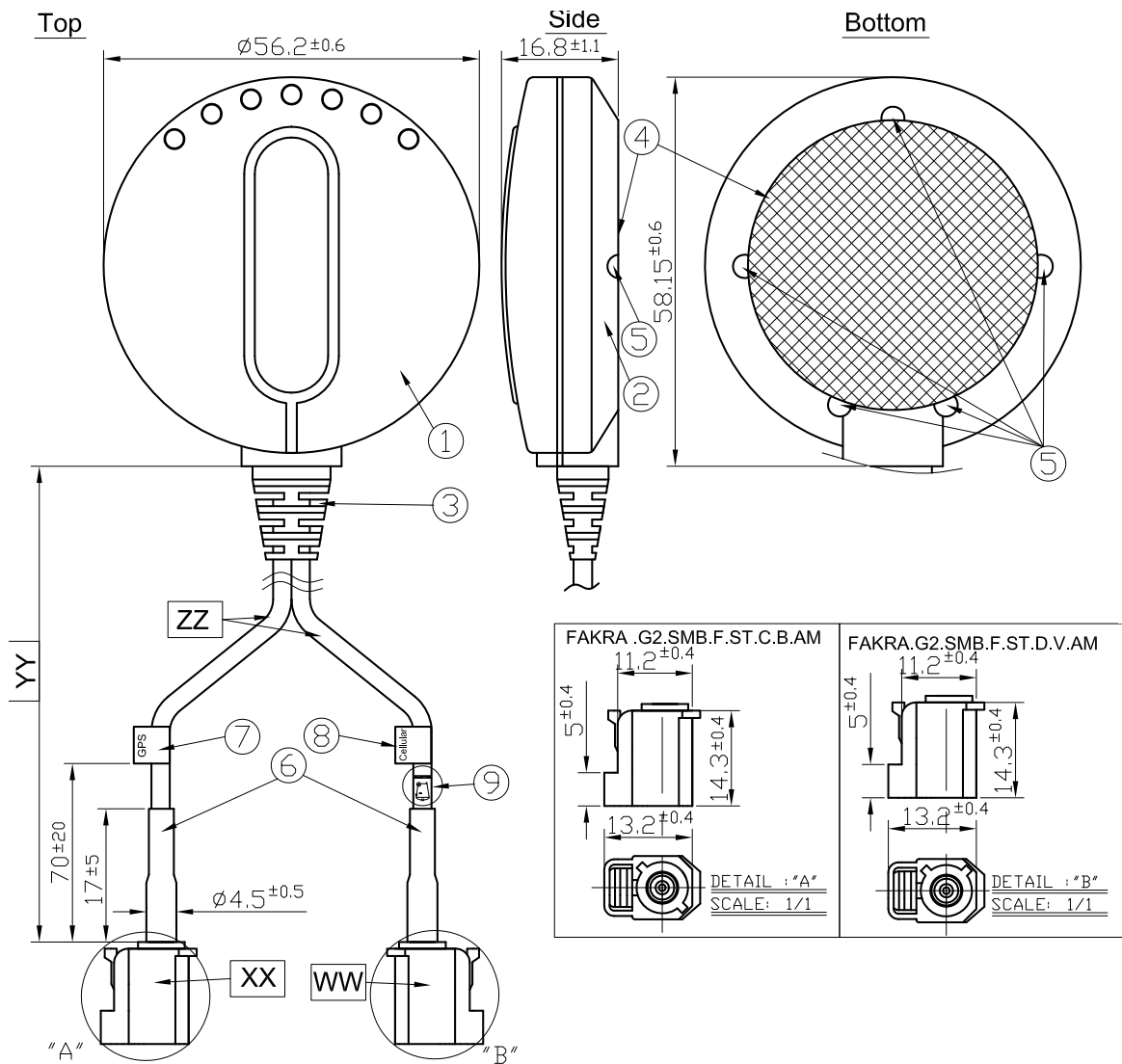


**2170 MHz**

**Peak Gain: 5.82 dBi**



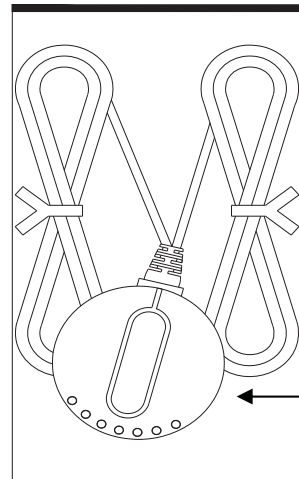
## 9. Drawing



Name	Material	Finish	QTY	Name	Material	Finish	QTY
1 Top Housing	ABS	Black	1	WW Connector Type	Fakra Code D	Violet	1
2 Bottom Housing	ABS	Black	1	XX Connector Type	Fakra Code C	Blue	1
3 SR	PVC	Black	1	YY Cable Length	3000+/-60mm		
4 Sticker	Matte Silver PET	Silver	1	ZZ Cable Type	RG-174		
5 2.6L Screw	Stainless Steel	Clear	5				
6 Heat Shrink Tube	PE	Black	2				
7 GPS Label	Coated Paper	Orange	1				
8 Cellular Label	Coated Paper	Blue	1				
9 WEEEE Label	Coated Paper	White	1				

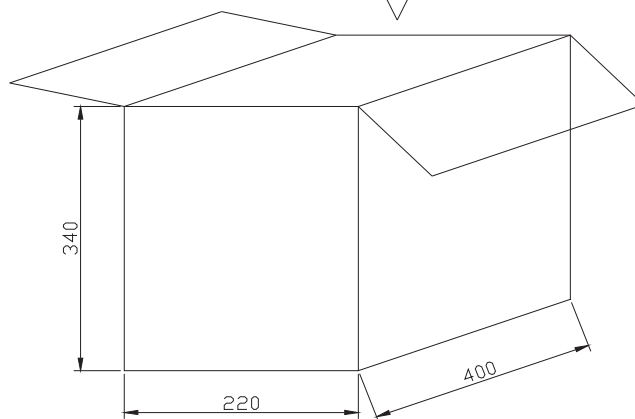
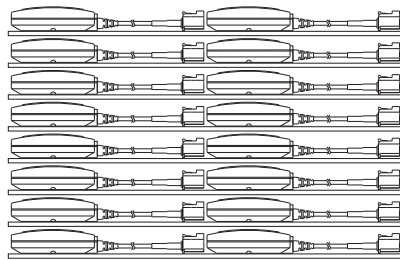
## 10. Packaging

1 pcs antenna per small PE bag  
80 small PE bag per box



MA301

Unit : mm



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