

SPECIFICATION

Part No. : **MA700.A301111.B305111.C305111**

Product Name : Pantheon Antenna 3in1 MA.700
 Screw-Mount (Permanent Mount)
 GPS / LTE Cellular / 2.4GHz / 5GHz
 Combination Antenna

Features : Highest Efficiency/Peak Gain
 Omni-directional Outdoor IP67 Antenna
 Advanced RF Design and Materials
 Heavy Duty – Integrated Metal Base/Ground-plane
 Custom cables and connectors available
 RoHS ✓



Version	Date	Revision Description	Prepared	Approved
A	Oct 18 th 2010	New Product	TW Product Centre	Zita Lin
B	Mar 11 th 2011	Add different cable length report	TW Product Centre	Kayin Lin

I. Introduction

The Pantheon MA.700 antenna is an omni-directional heavy-duty, fully IP67 waterproof external M2M antenna for use in telematics, transportation and remote monitoring applications. The Pantheon series is designed for RF professionals who accept no performance compromises whatsoever. The MA.700 combines a 3in1 GPS, Cellular 700MHz to 2200MHz (2G/3G/4G) and 2.4GHz/5GHz antenna with the highest efficiency and peak gain possible. Unlike our competitors who don't measure cable loss the specification is measured at 3 meters (10ft) to show real performance in the field. The antenna screws down permanently onto a roof or metal panel and can be pole or wall-mounted.

All while still maintaining 20dB isolation between antennas. It uses high-shielded PTFE dielectric ultra low-loss cables that maintain low attenuation at all frequency bands, and high noise rejection, with an average loss of only 0.3dB per meter (0.1dB per foot), compared to 0.7dB for RG58 and 1.2dB for RG174. Because of this, the Pantheon maximizes chances of passing PTCRB and network approvals first time. The Pantheon also has excellent performance without need to attach to an external ground-plane due to its internal antennas coupling to its unique super strong integrated metal base. The antenna comes with a 3M adhesive waterproof layer to prevent water leaking under the antenna into the mounting hole. The Pantheon can also be supplied in single GPS, Cellular, Wi-Fi only versions, or at other frequencies.

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



II. Specification

GPS ANTENNA						
Centre Frequency	1575.42MHz \pm 2MHz					
Bandwidth	10MHz					
Average Gain	34dBic typ.					
Radiation Efficiency	50%					
Gain @ Zenith	4.0dBic typ.					
Axial Ratio	3.0dB typ.					
Polarization	Right Hand Circular					
VSWR	\leq 1.95 : 1					
Impedance	50 Ω					
DC input	3.3V		4.0V		5.0V	
LNA Gain	30dB		31dB		32dB	
Noise Figure	1.50dB		1.55dB		1.62dB	
Power Consumption	8mA		10mA		13mA	
Band Attenuation	\pm 50MHz		\pm 70MHz		\pm 100MHz	
	40dB		40dB		50dB	
Cable	3m RG174 standard, fully customizable					
Connector	SMA(M) standard, standard, fully customizable					
CELLULAR ANTENNA						
Frequency (MHz)	700~ 800	824 ~ 896	880 ~ 960	1710~ 1880	1850~1990	1710~2170
Peak Gain (dBi)	2.4	1.6	1.7	2.1	2.4	2.4
Average Gain (dBi)	-1.3	-2.0	-2.3	-2.8	-2.7	-2.7
Efficiency	73%	61%	58%	52%	52%	52%
Impedance	50 Ω					
Polarization	Linear					
Radiation Pattern	Omni					
Cable	3m CFD200 standard, fully customizable					
Connector	SMA(M) standard, standard, fully customizable					
2.4GHz / 5GHz ANTENNA						
Frequency (GHz)	2.4 ~ 2.5	4.7 ~ 5.0	5.0 ~ 5.4	5.4 ~ 5.9		
Peak Gain (dBi)	2.1	2.9	3.8	2.8		
Average Gain (dBi)	-2.3	-3.6	-3.3	-3.8		
Efficiency	60%	44%	46%	42%		
VSWR	\leq 1.7:1					
Impedance	50 Ω					
Polarization	Linear					
Radiation Pattern	Omni					
Cable	3m CFD200 standard, fully customizable					
Connector	SMA(M) standard, standard, fully customizable					
MECHANICAL						

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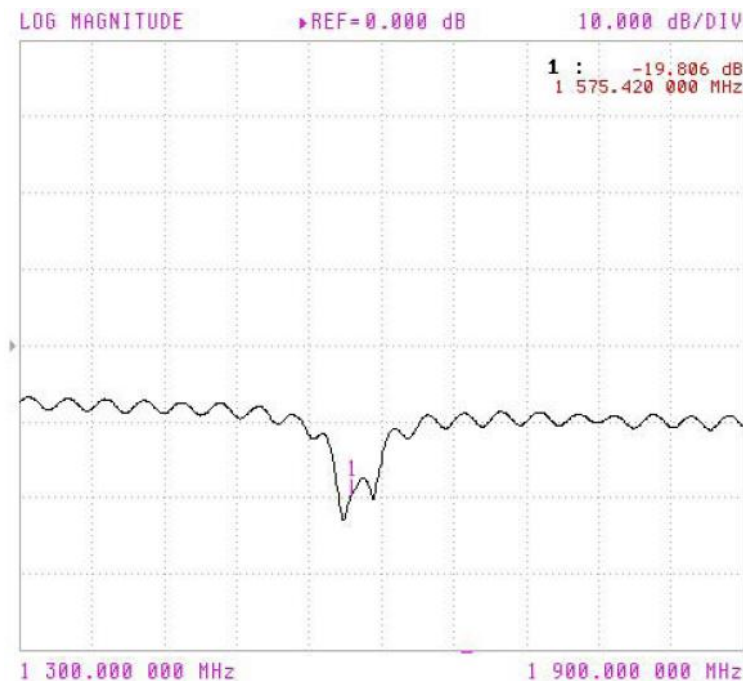
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Dimensions	Height 85.7mm x Diameter 145.6mm
Casing	Wonderloy PC-540 PC/ABS Alloy
Base and thread	CAN10 Zinc Alloy
Thread diameter	M30 x 2 (30mm)
Nut	Nickel Plated Iron
Foam	3M 9448HK
Waterproof	IP67
ENVIRONMENTAL	
Operation Temperature	-30°C to 85°C
Storage Temperature	-40°C to 90°C
Humidity	Non-condensing 65°C 95% RH

* all measurement are done in free space with 3m standard cable

III. GPS Antenna Characteristics

III.1. Return Loss



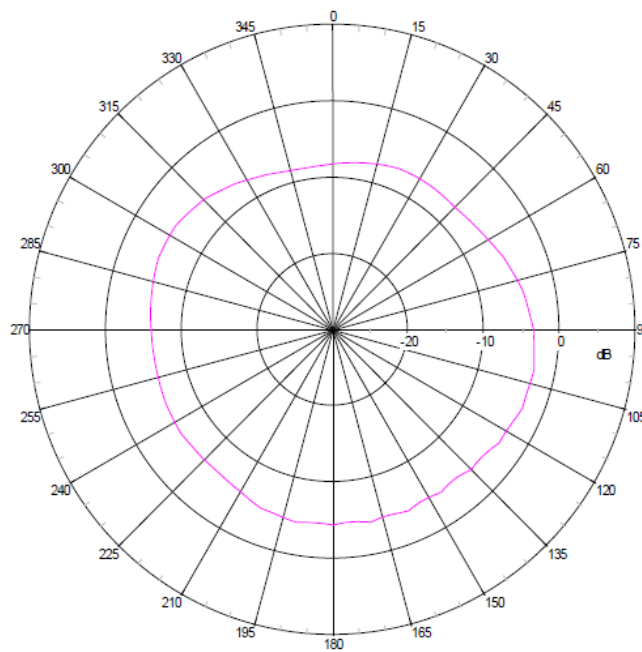
GPS Antenna Radiation Pattern



||

XYZ co-ordinate for reference.

X-Y Plane



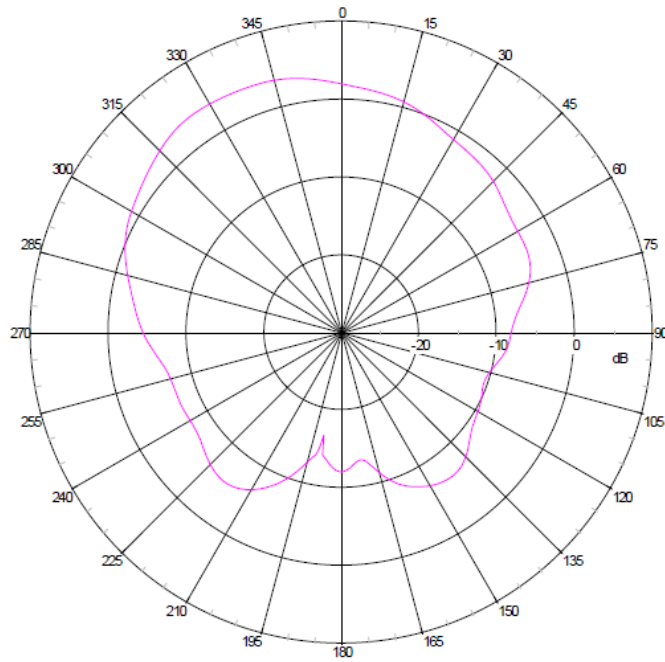
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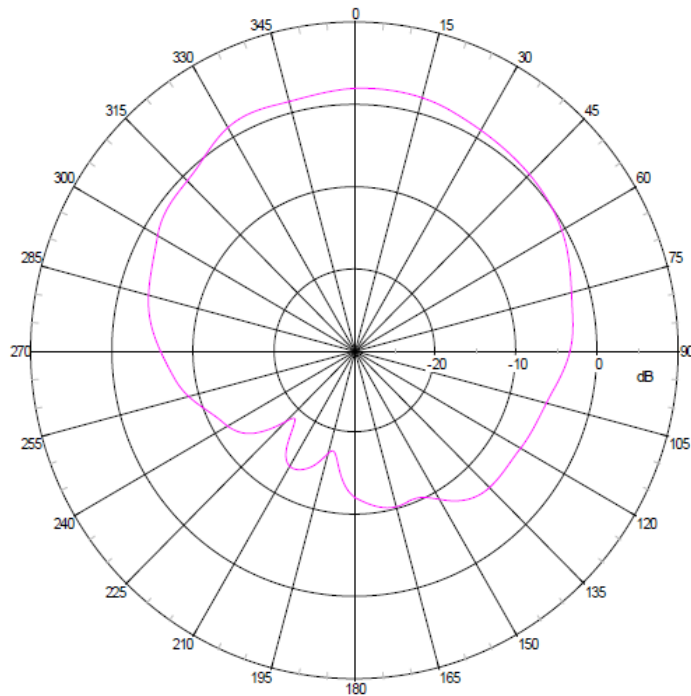
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X-Z Plane



Y-Z Plane



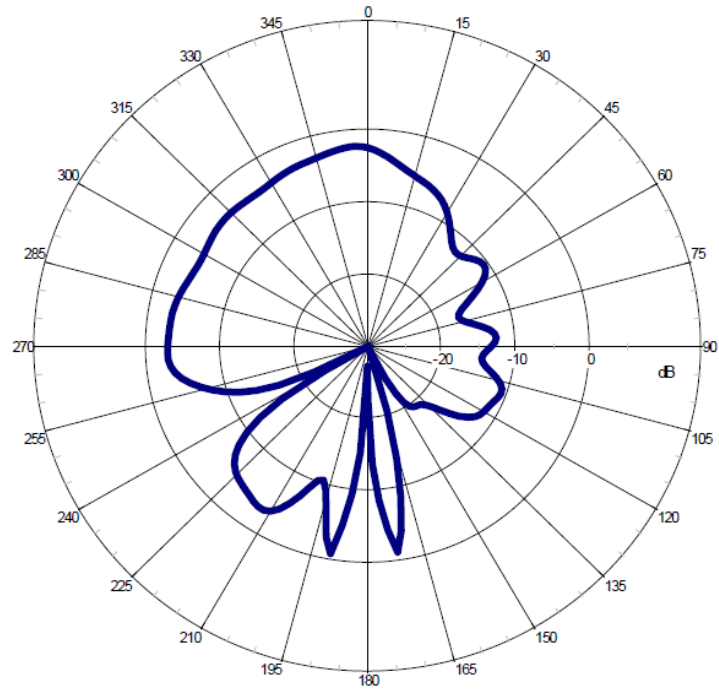
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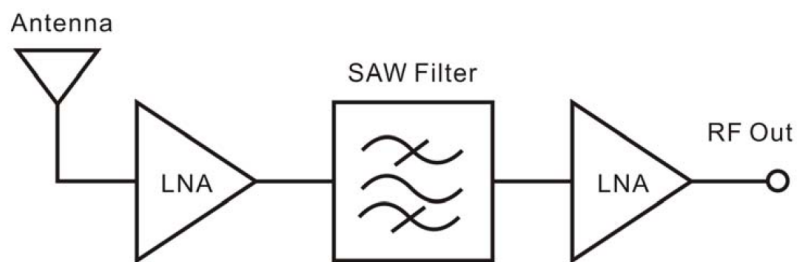
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III.2. Axial Ratio

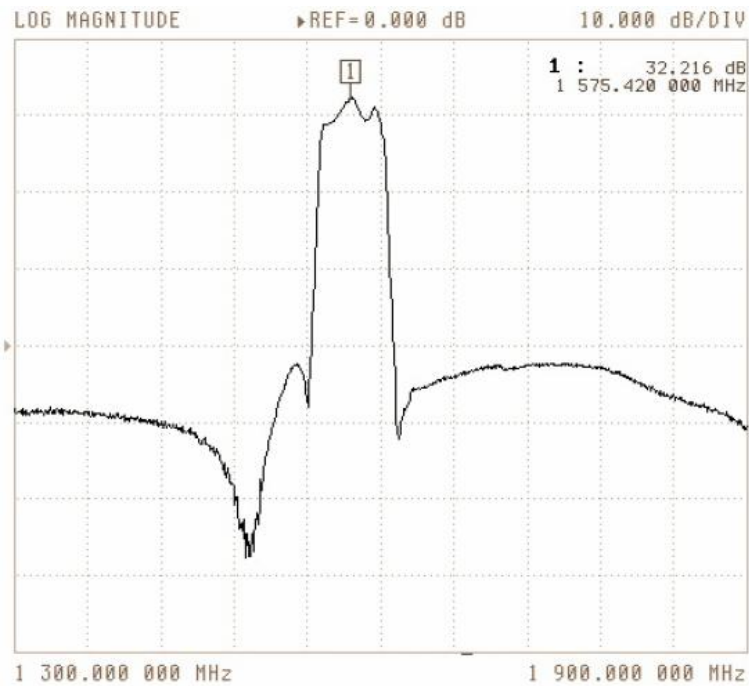


III.3. GPS LNA

Block Diagram



Forward Transmission



S22 Reverse Reflection

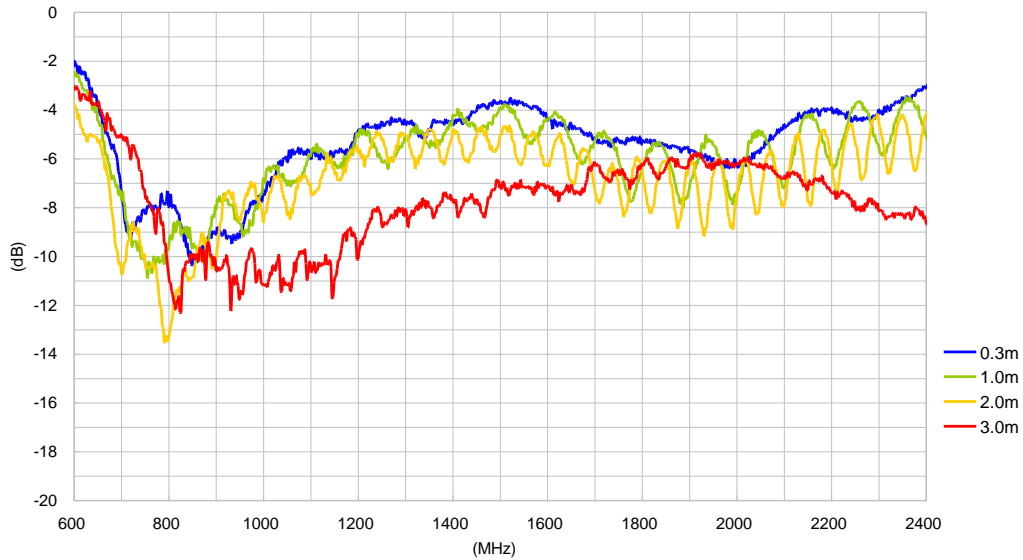


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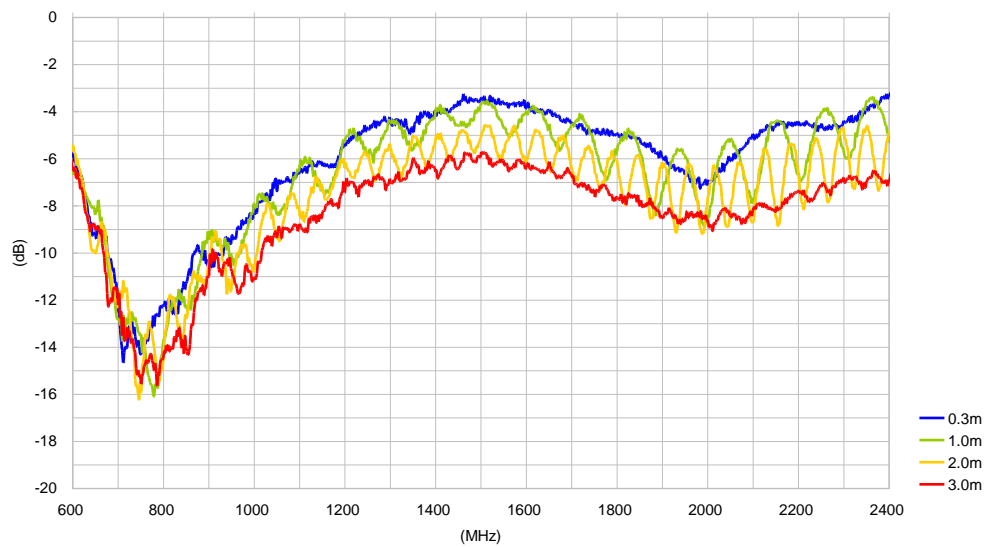
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IV. Cellular Antenna Characteristics

IV.1. Return Loss (Free Space)



IV.2. Return Loss (45 x 30cm Ground Plane)



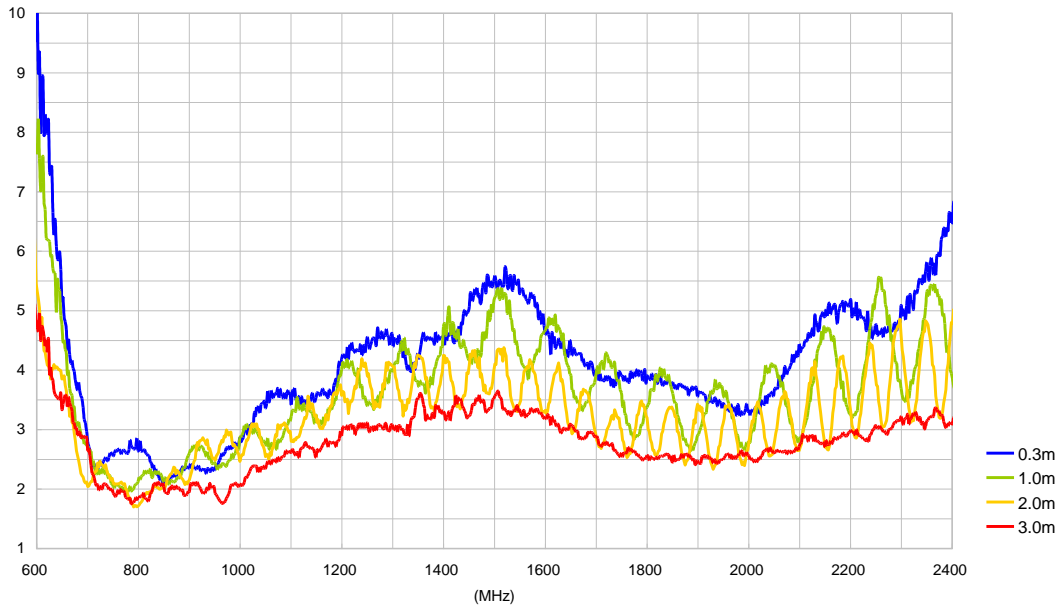
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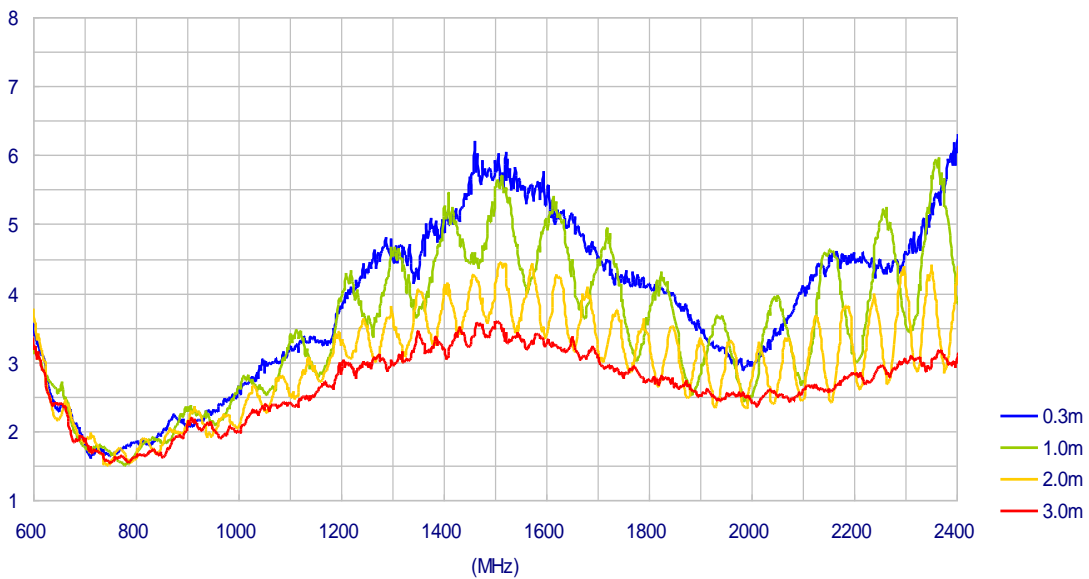
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IV.3. VSWR (Free Space)



VSWR (45cm x 30cm Ground Plane)



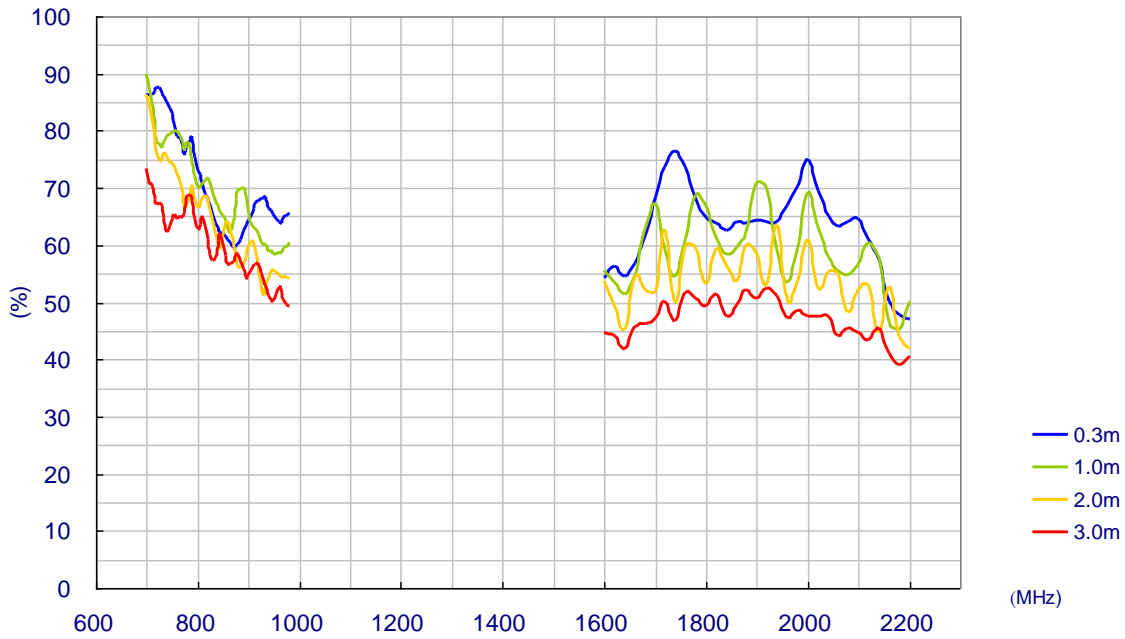
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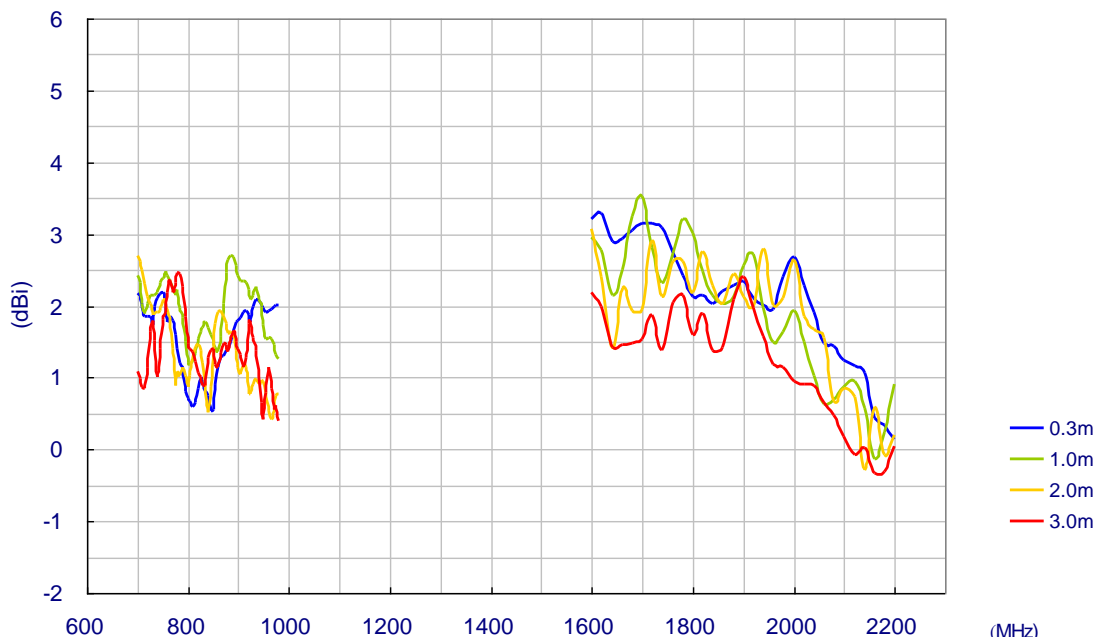
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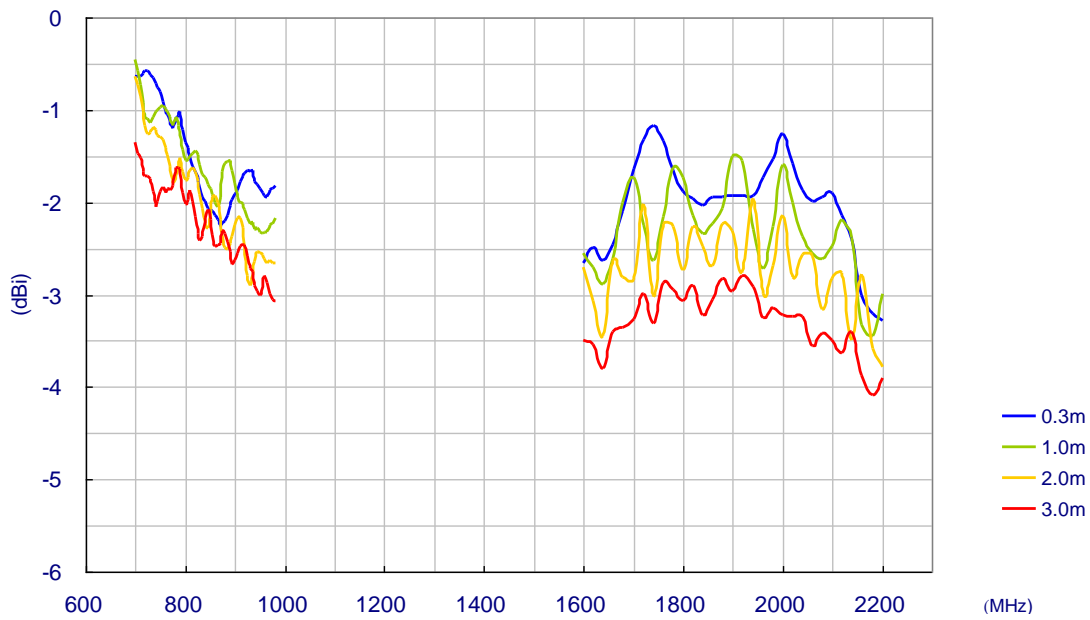
IV.4. Cellular Antenna Free Space Efficiency



IV.5. Cellular Antenna Free Space Peak Gain

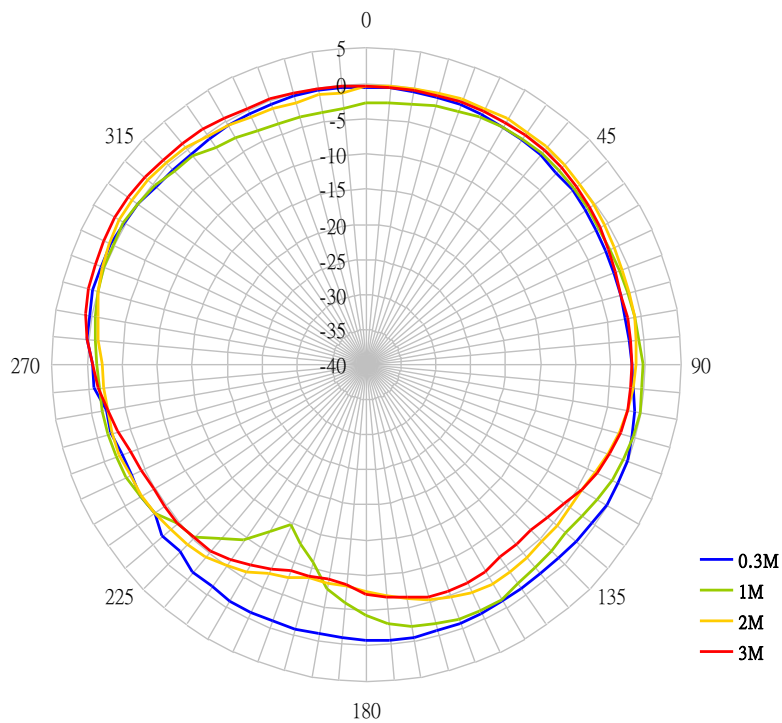


IV.6. Cellular Antenna Free Space 3D Average Gain



IV.7. Cellular Antenna Free Space Radiation

X-Z Plane at 800MHz



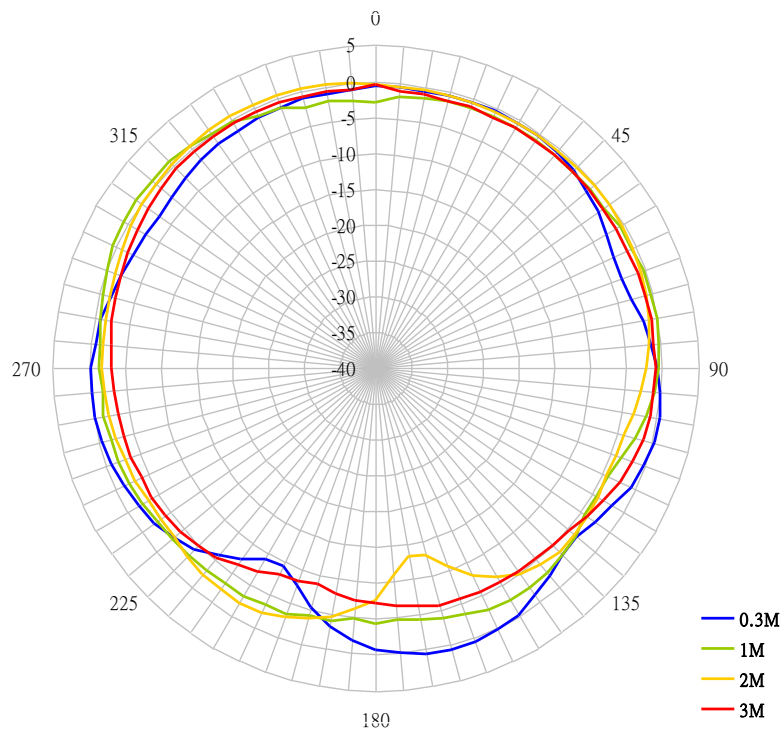
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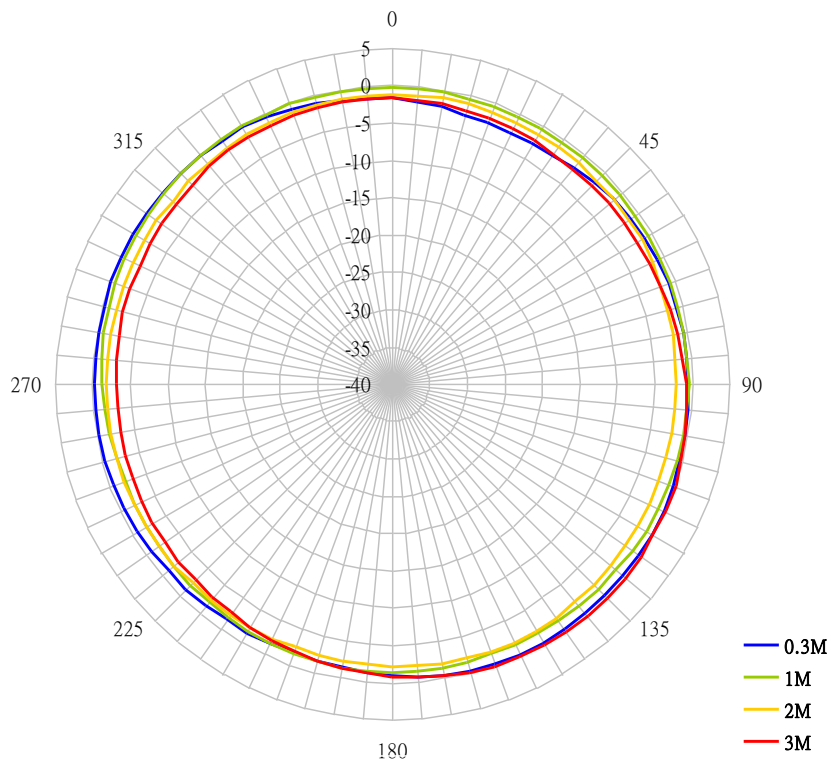
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Y-Z Plane at 800MHz



X-Y Plane at 800MHz



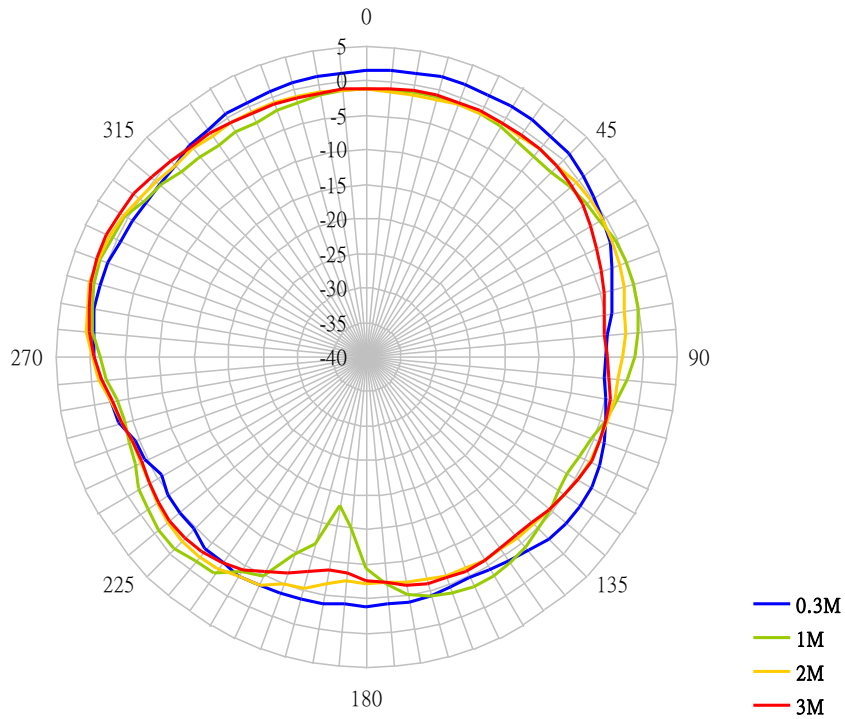
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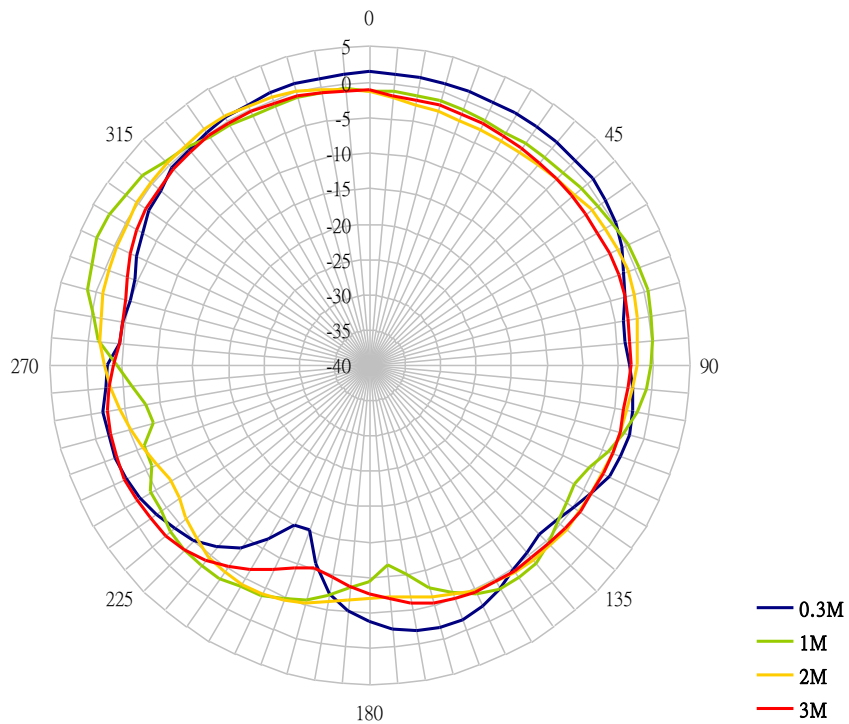
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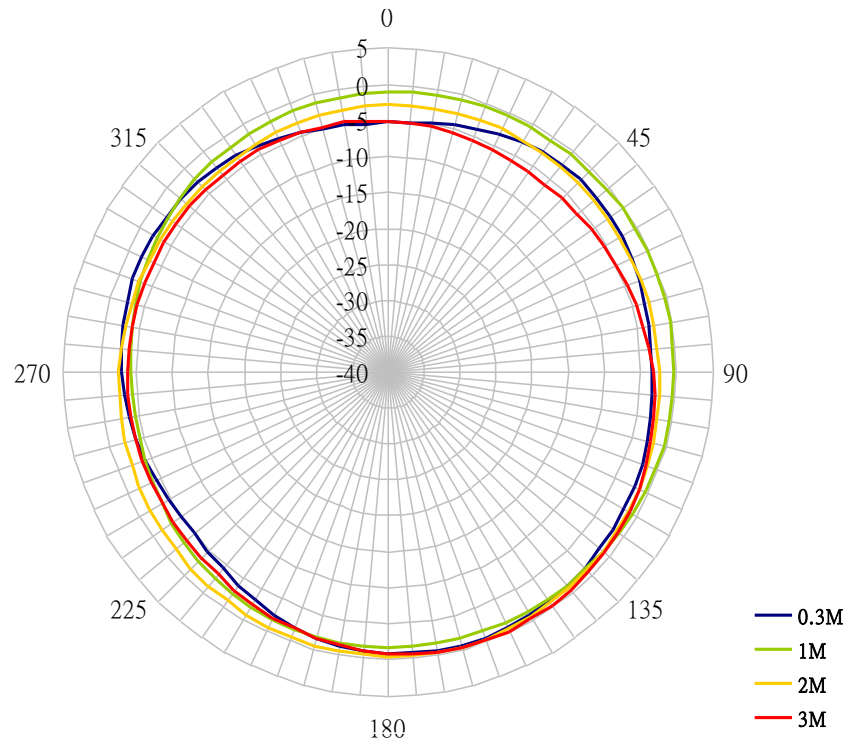
X-Z Plane at 900MHz



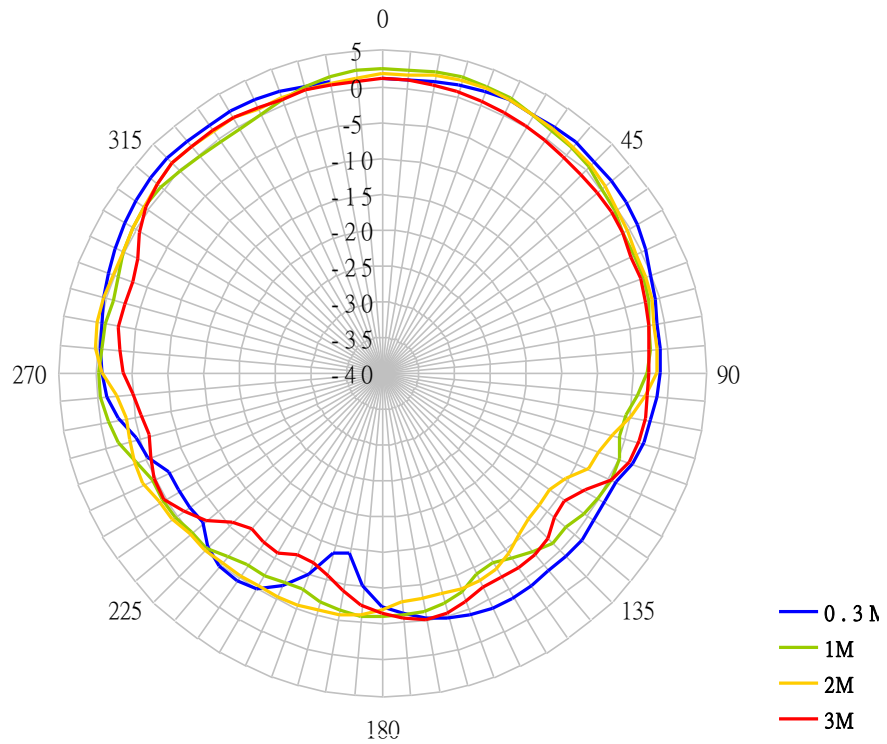
Y-Z Plane at 900MHz



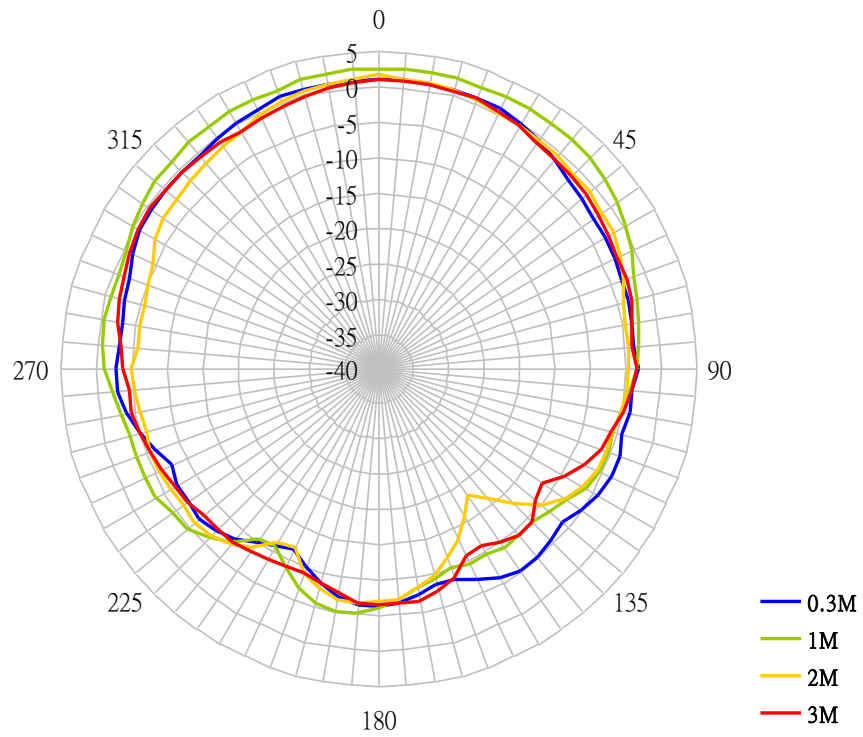
X-Y Plane at 900MHz



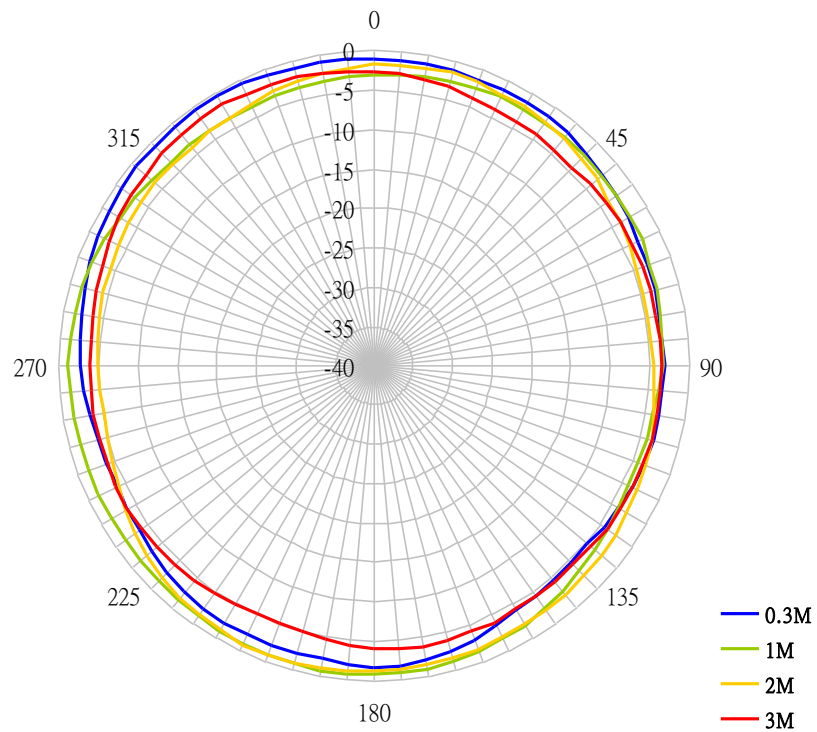
X-Z Plane at 1800MHz



Y-Z Plane at 1800MHz



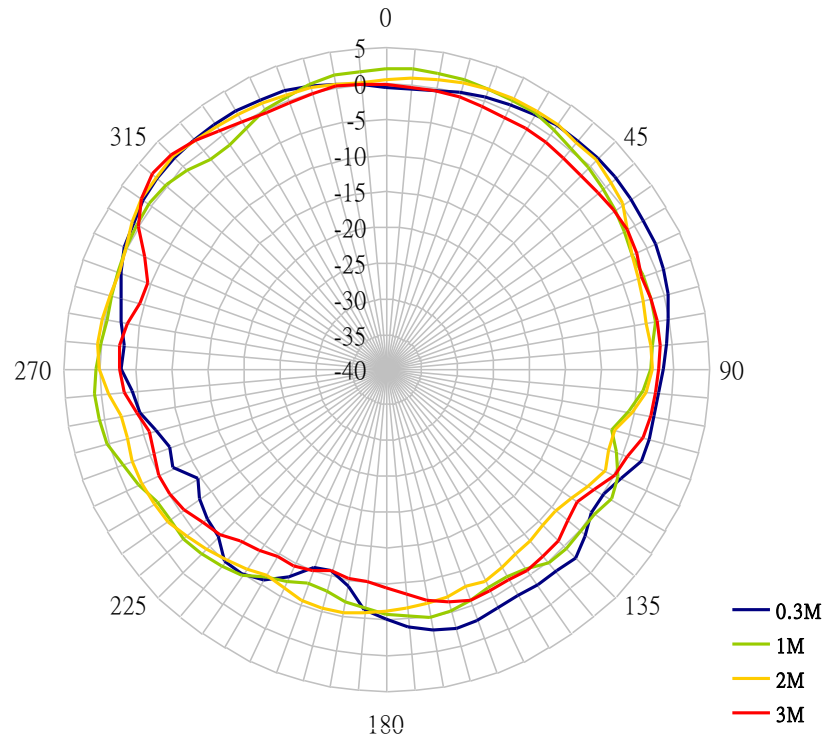
X-Y Plane at 1800MHz



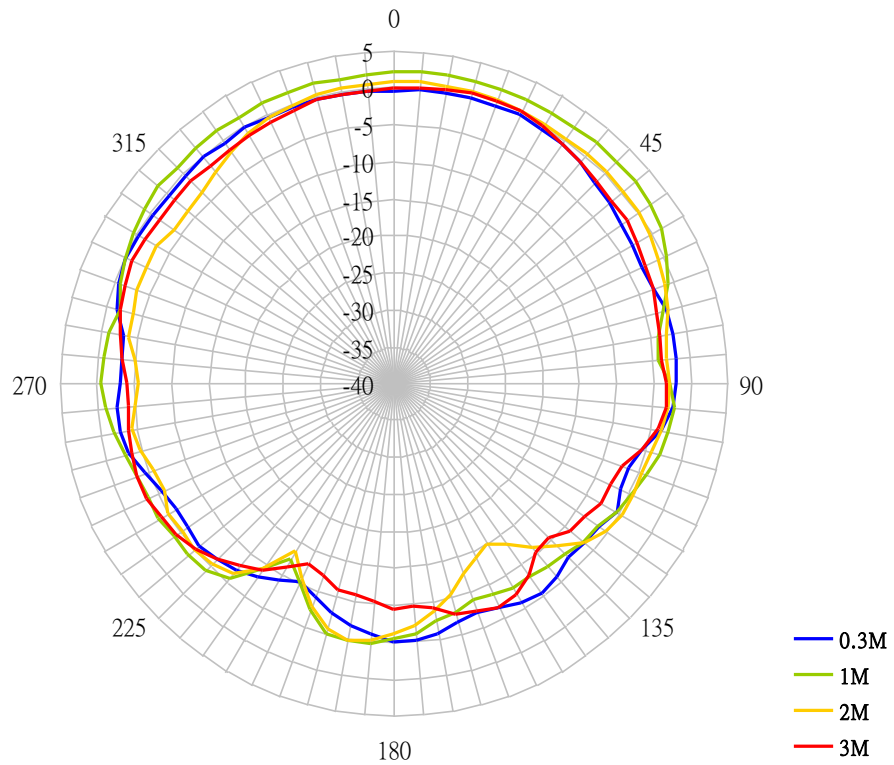
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X-Z Plane at 1900MHz



Y-Z Plane at 1900MHz



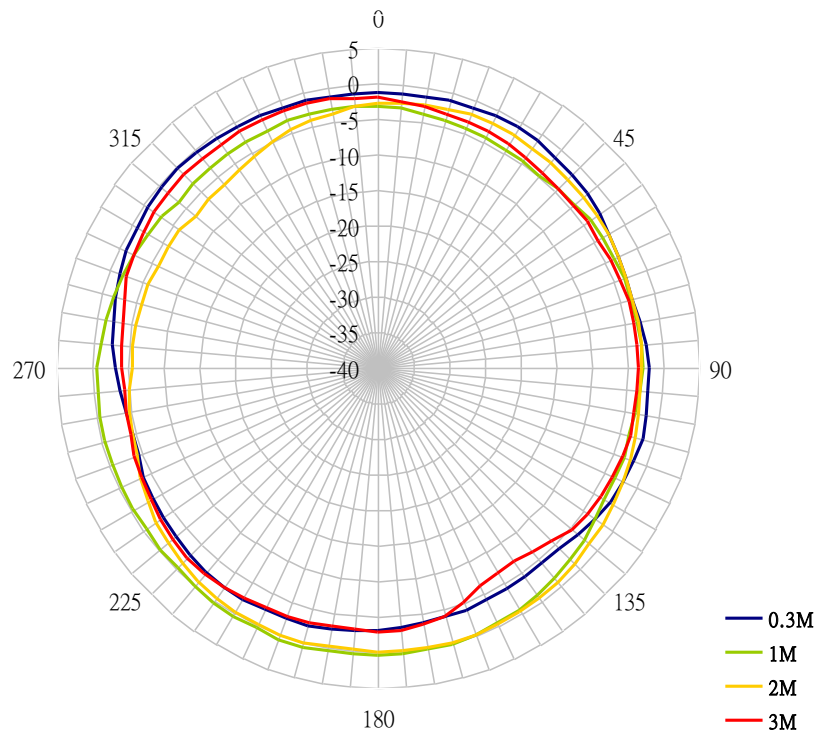
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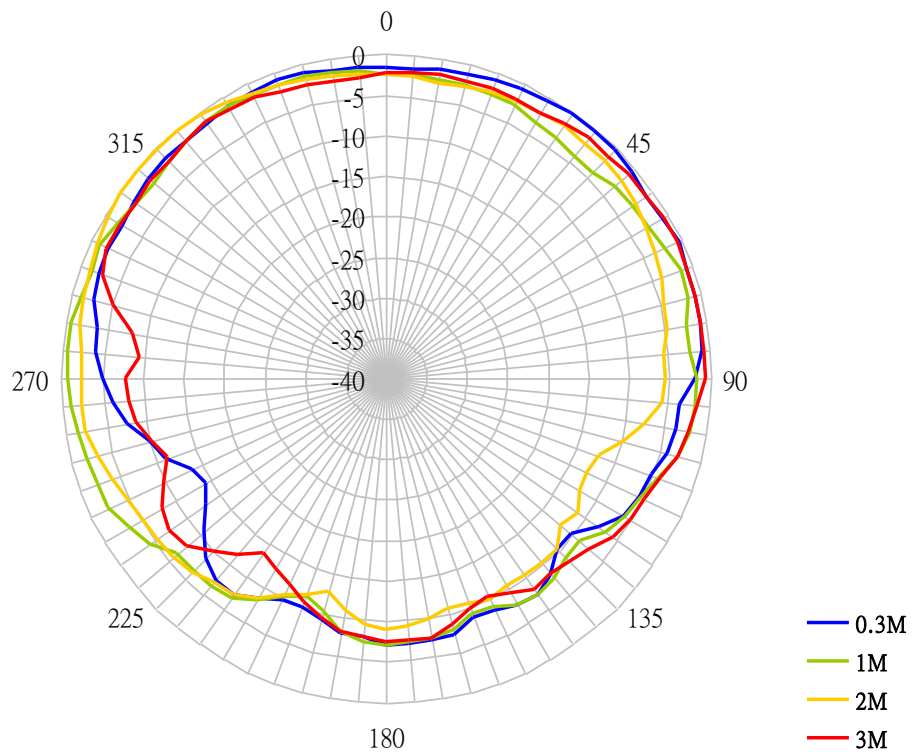
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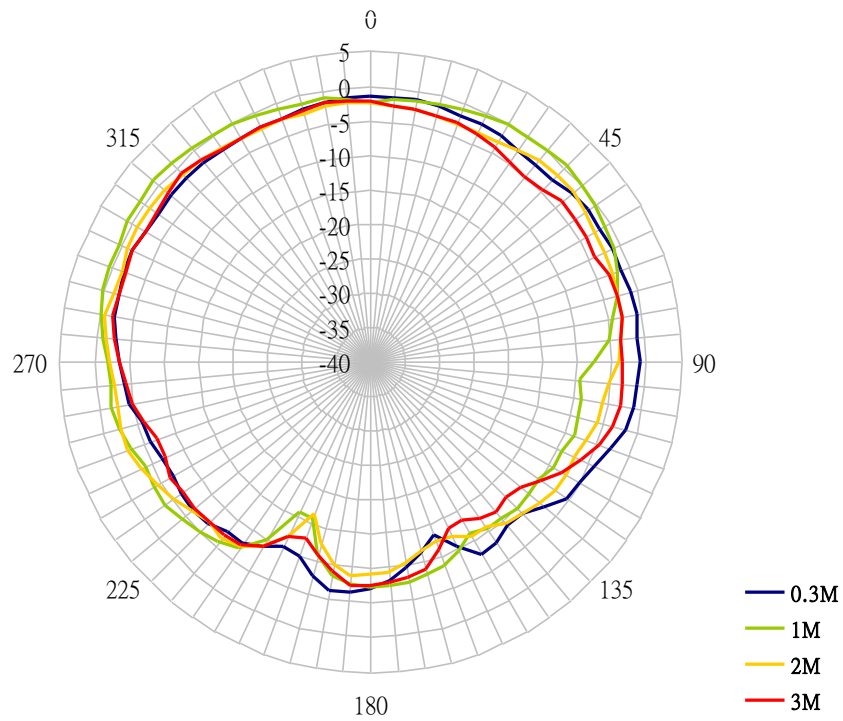
X-Y Plane at 1900MHz



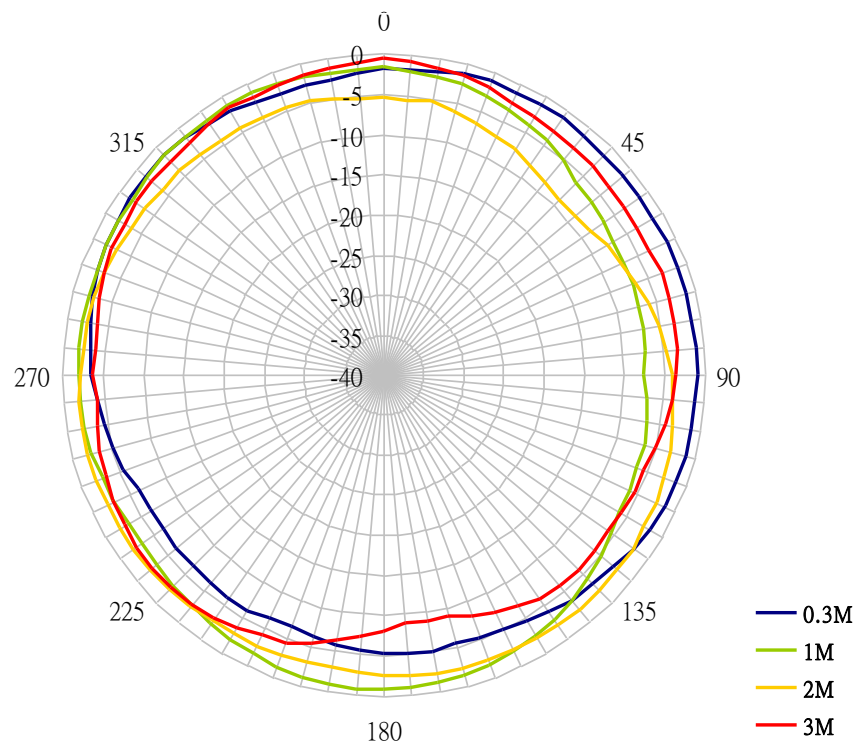
X-Z Plane at 2200MHz



Y-Z Plane at 2200MHz



X-Y Plane at 2200MHz



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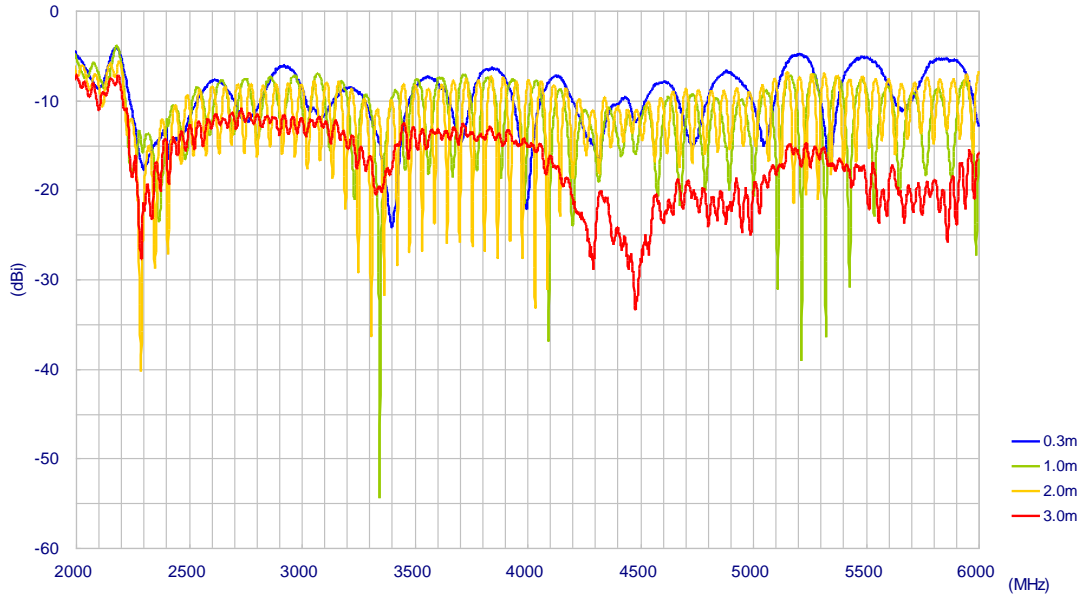
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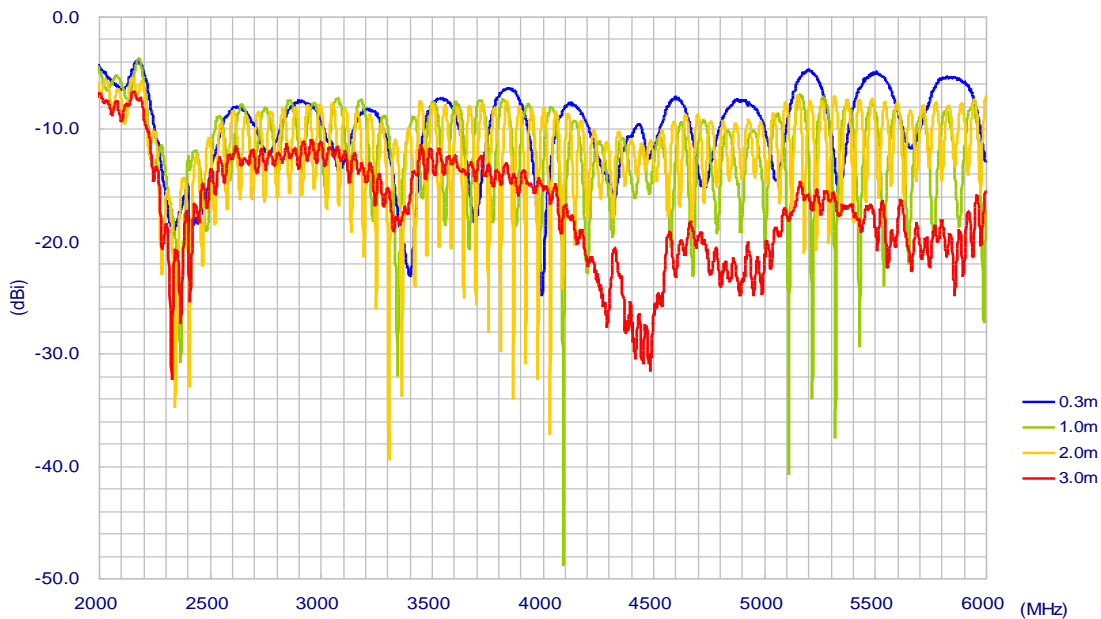
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V. 2.4/5GHz Antenna Characteristics

V.1. S11 Retune Loss (Free Space)



V.2. S11 Retune Loss (45cm x 30cm Ground Plane)



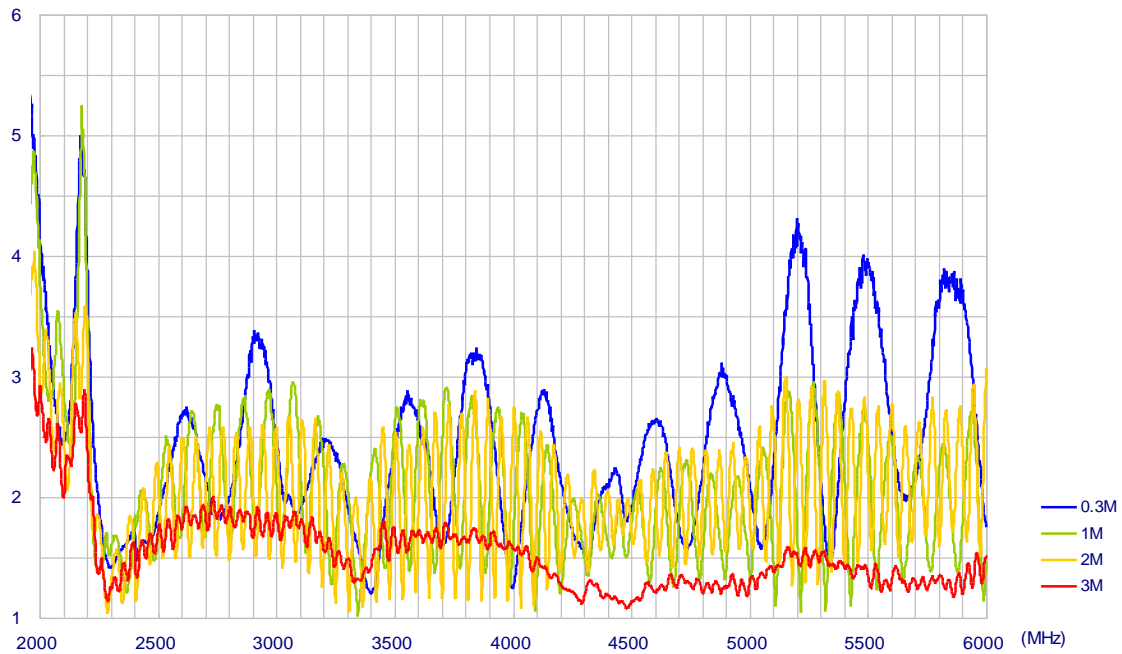
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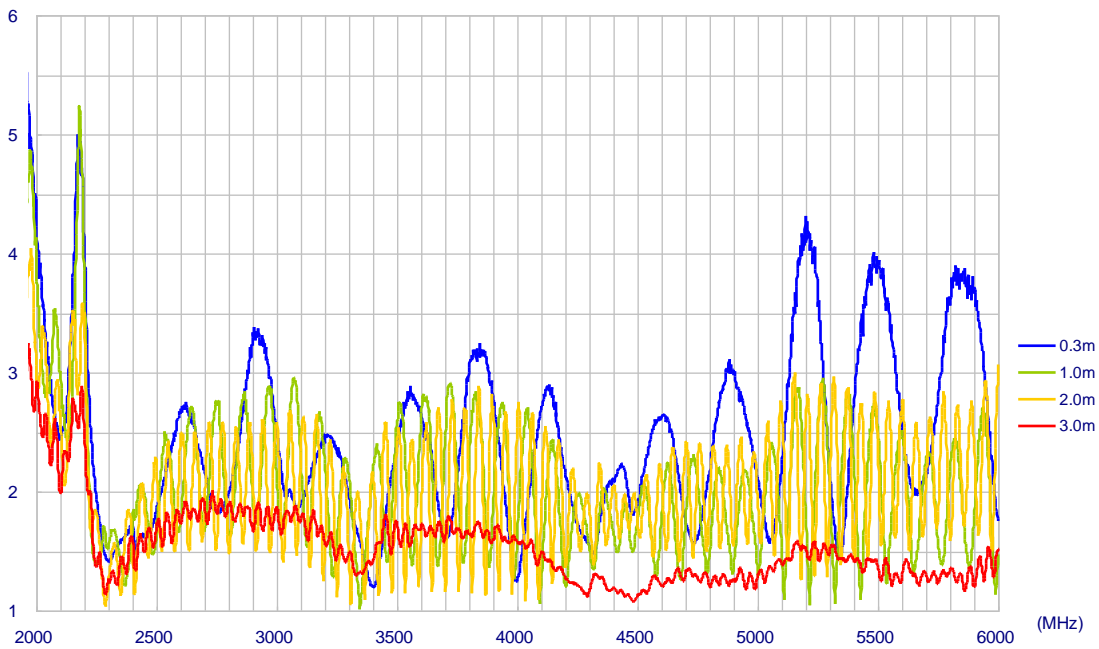
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V.3. VSWR (Free Space)



V.4. VSWR (45cm x 30cm Ground Plane)



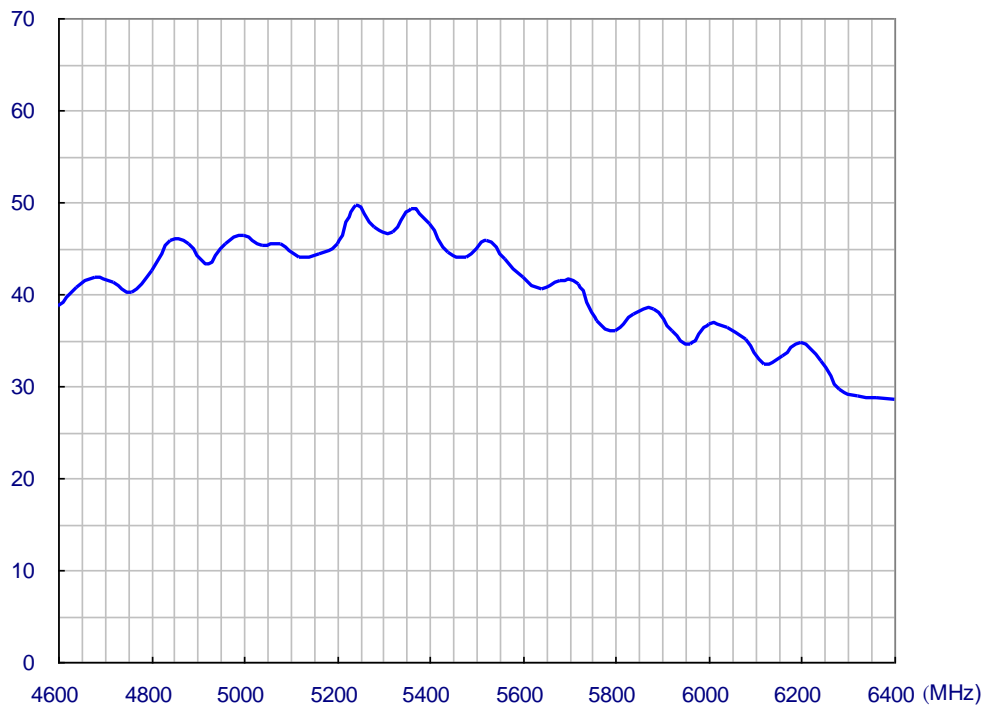
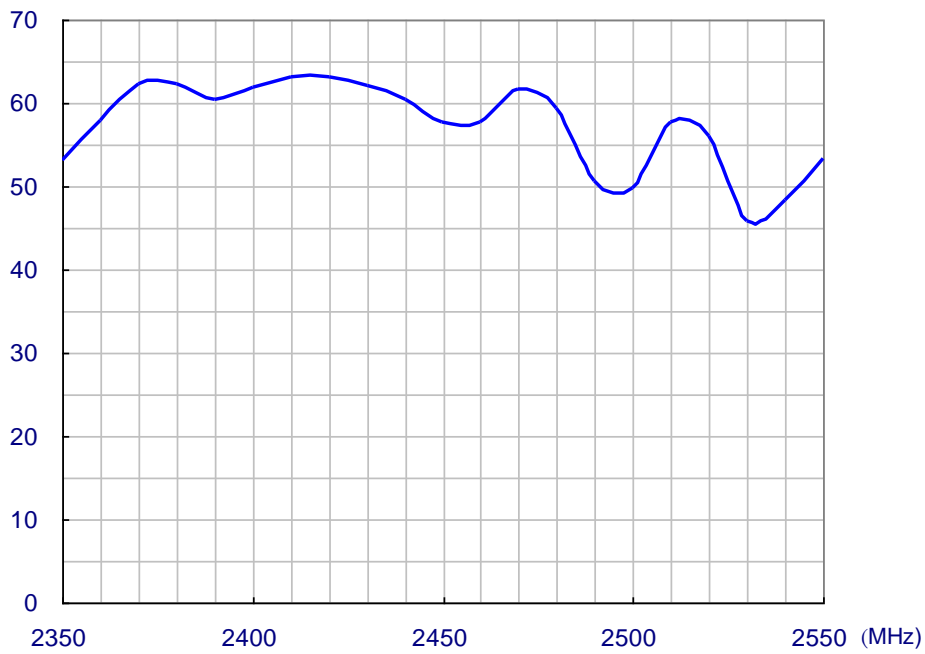
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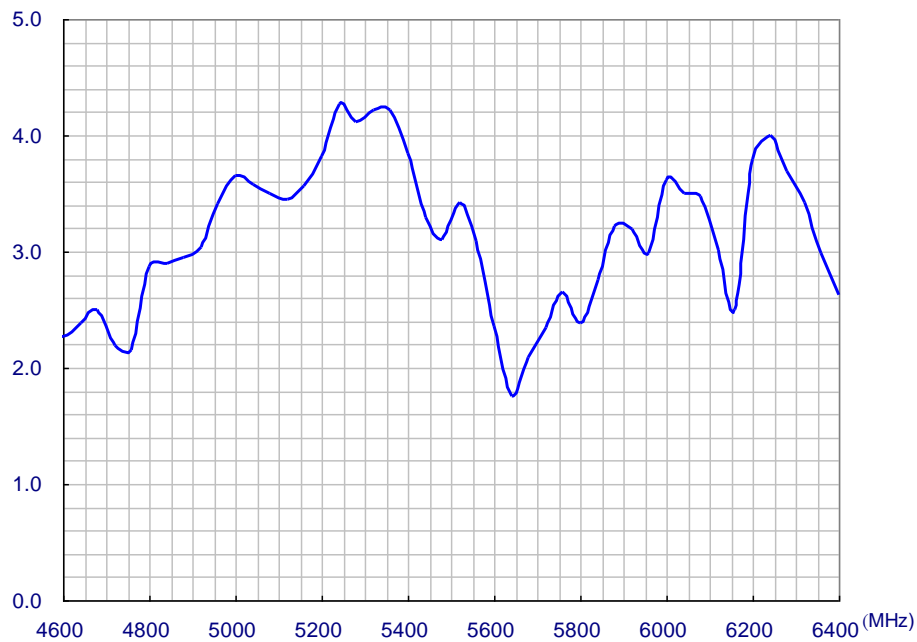
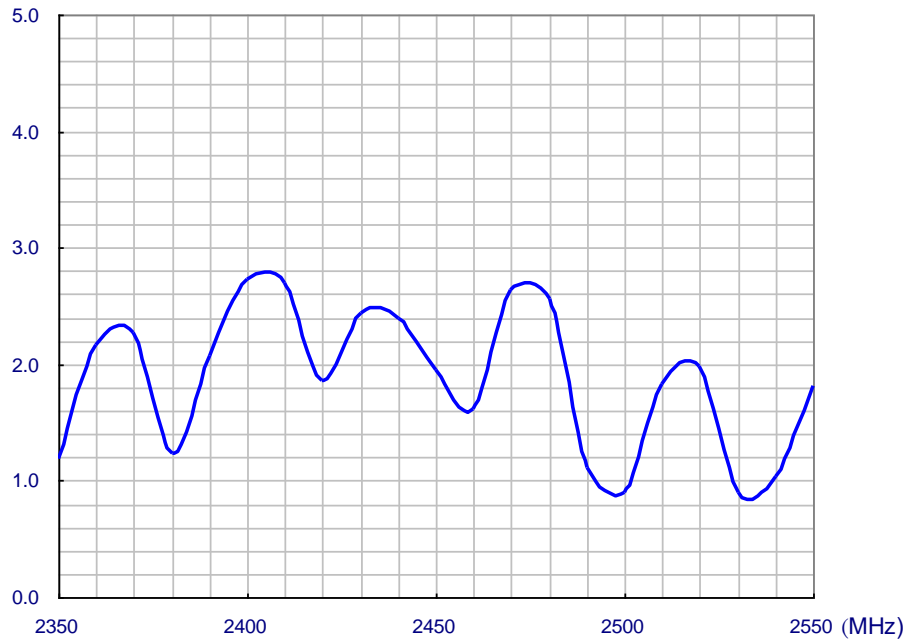
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V.5. 2.4/5GHz Antenna Free Space Efficiency (3m Cable)



V.6. 2.4/5GHz Antenna Free Space Peak Gain (3m Cable)



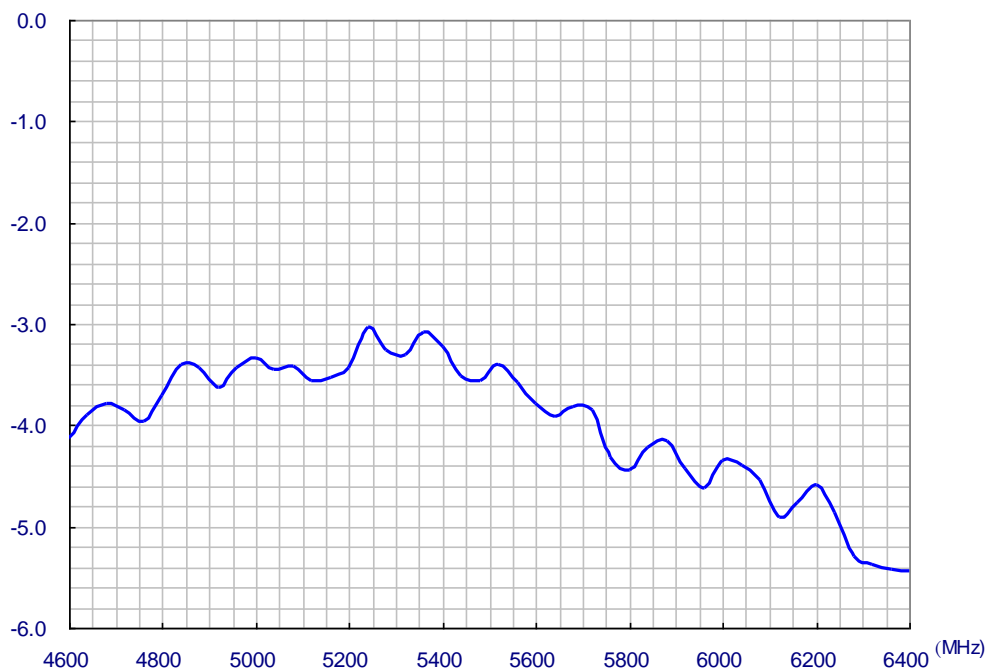
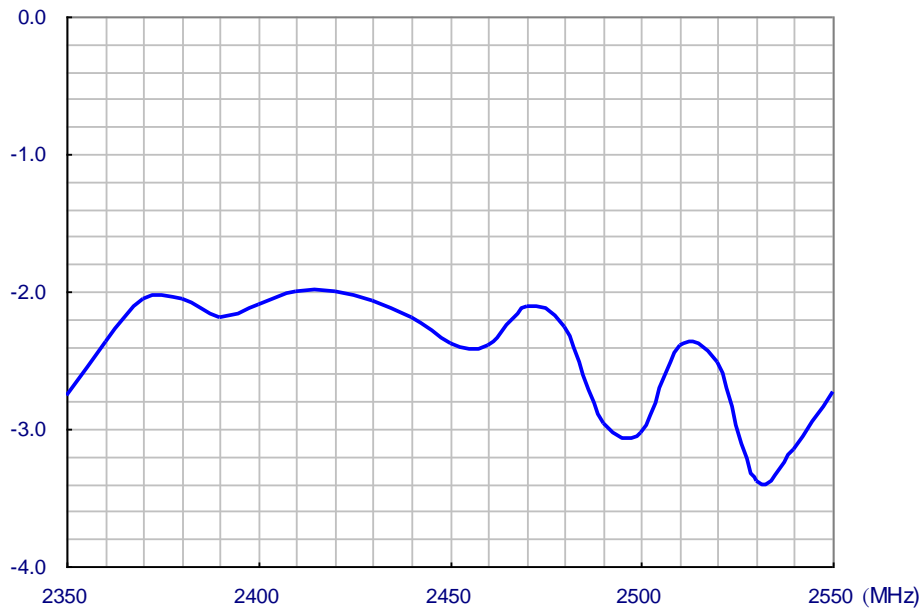
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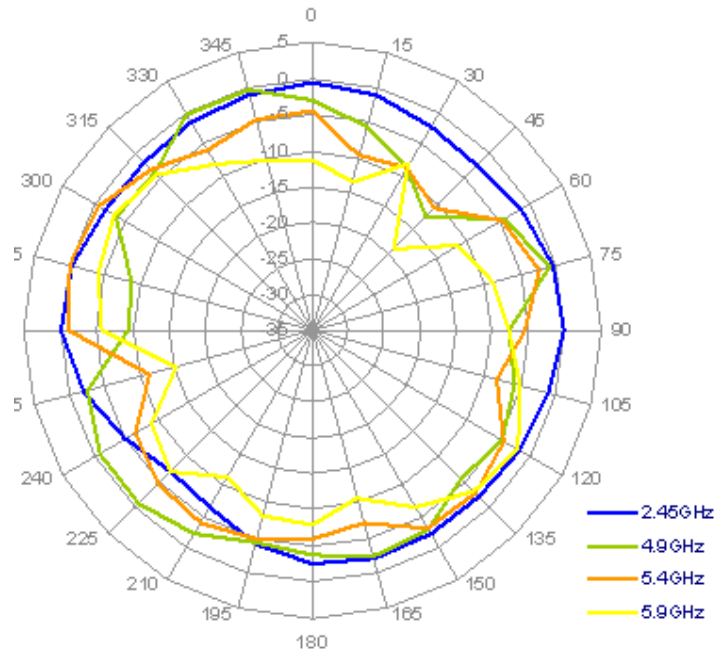
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V.7. 2.4/5GHz Antenna Free Space 3D Average Gain (3m Cable)

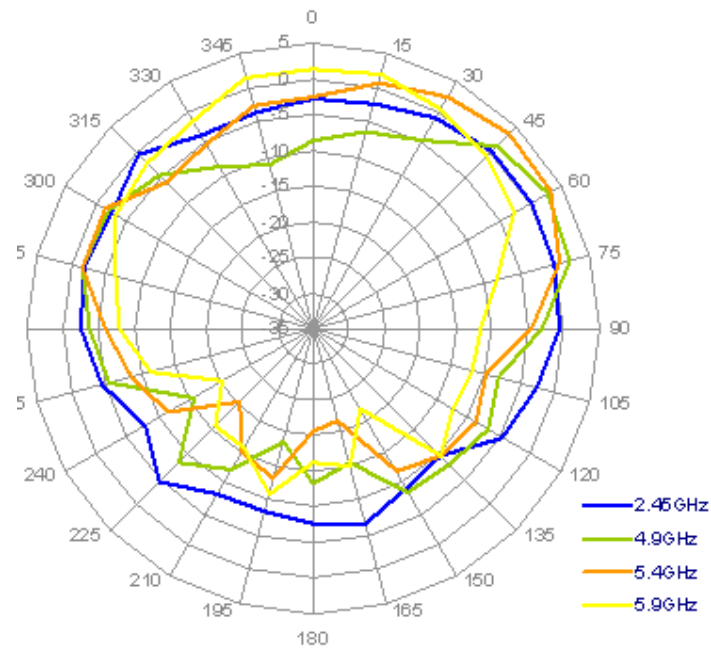


V.8. 2.4/5GHz Antenna Free Space Radiation (3m Cable)

X-Y Plane



X-Z Plane



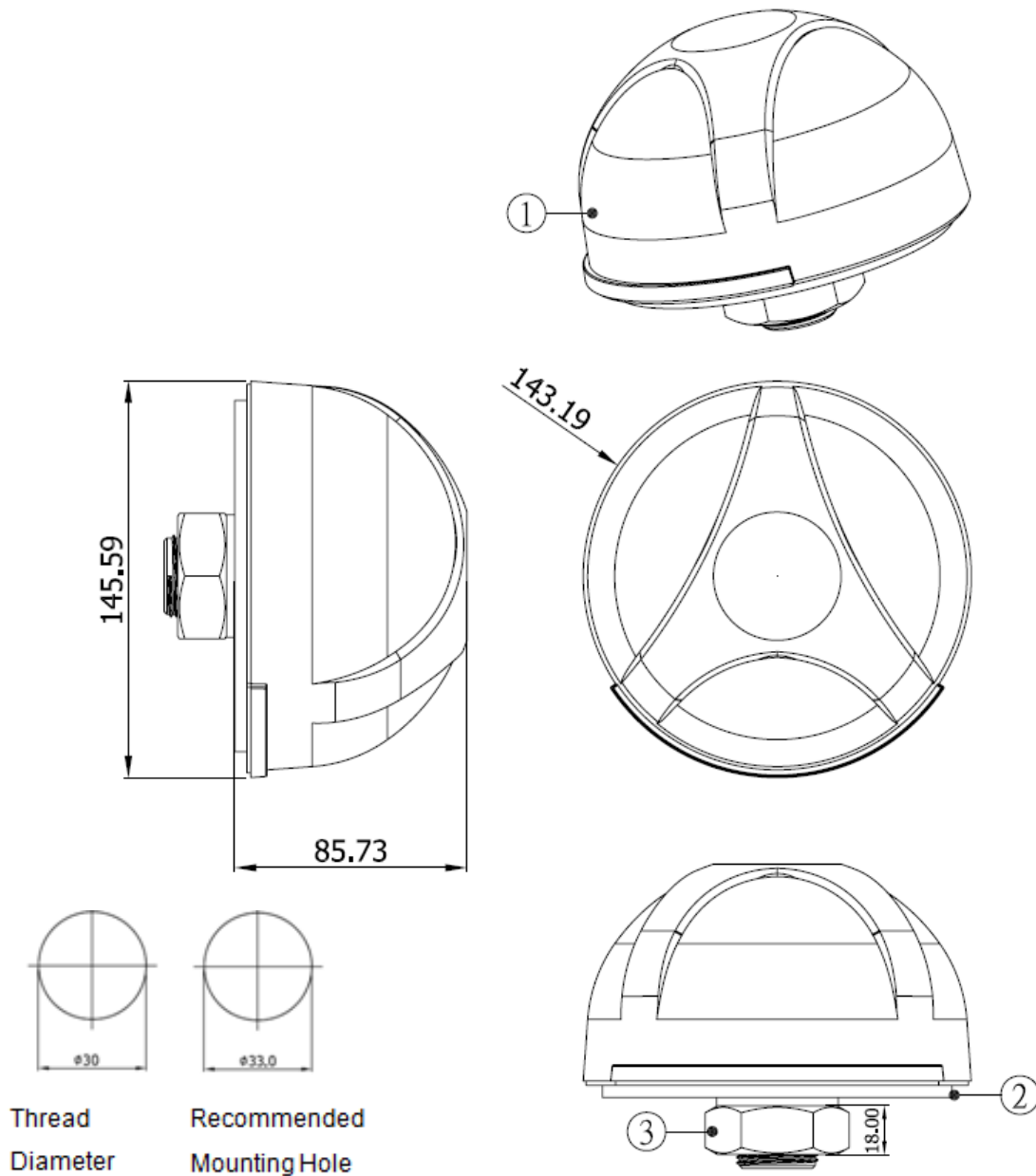
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VI. Mechanical Drawing



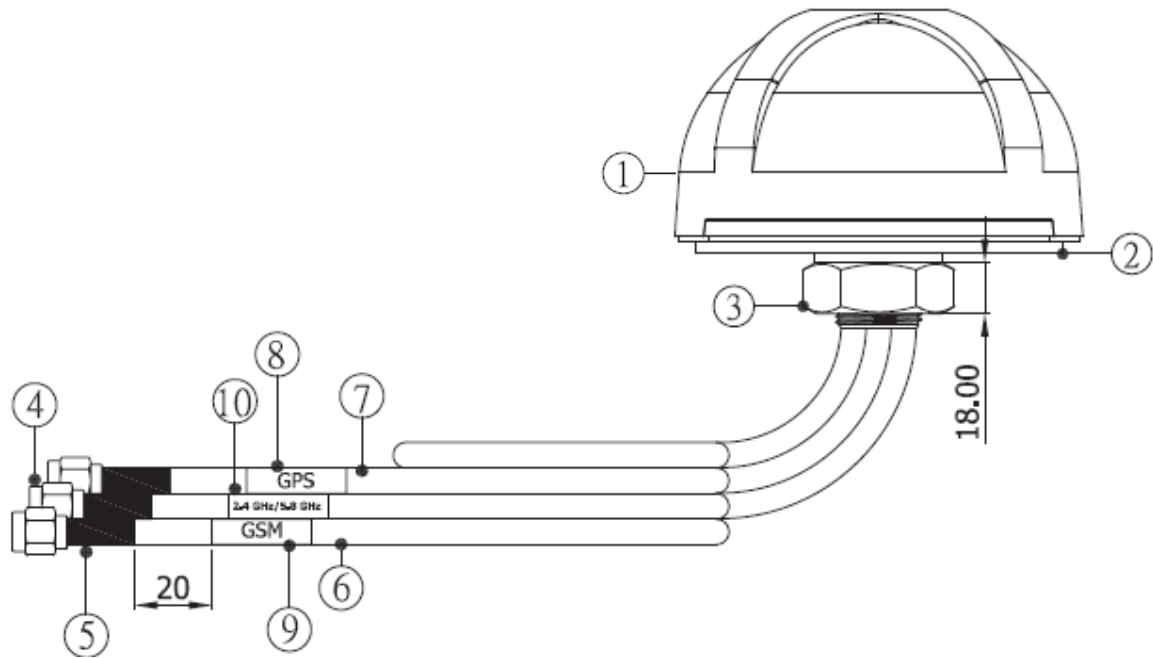
No.	Item	Description
1	Antenna Cover	Black ABS
2	Bottom Cover	Zinc Alloy
3	Hexagon Nut	M30 x 2, H18mm

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Unit:mm

No.	Item	Description
1	Antenna Cover	PC-540 Black
2	Bottom Cover	Zinc Alloy
3	Hexagon Nut	M30 x 2
4	Connector	SMA
5	Heat Shrink Tube	Black H.S tube
6	CFD 200 Cable	3M standard
7	RG.174 cable	3M standard
8	Label	GPS label, orange
9	Label	GSM label, blue
10	Label	Wi-Fi label, green

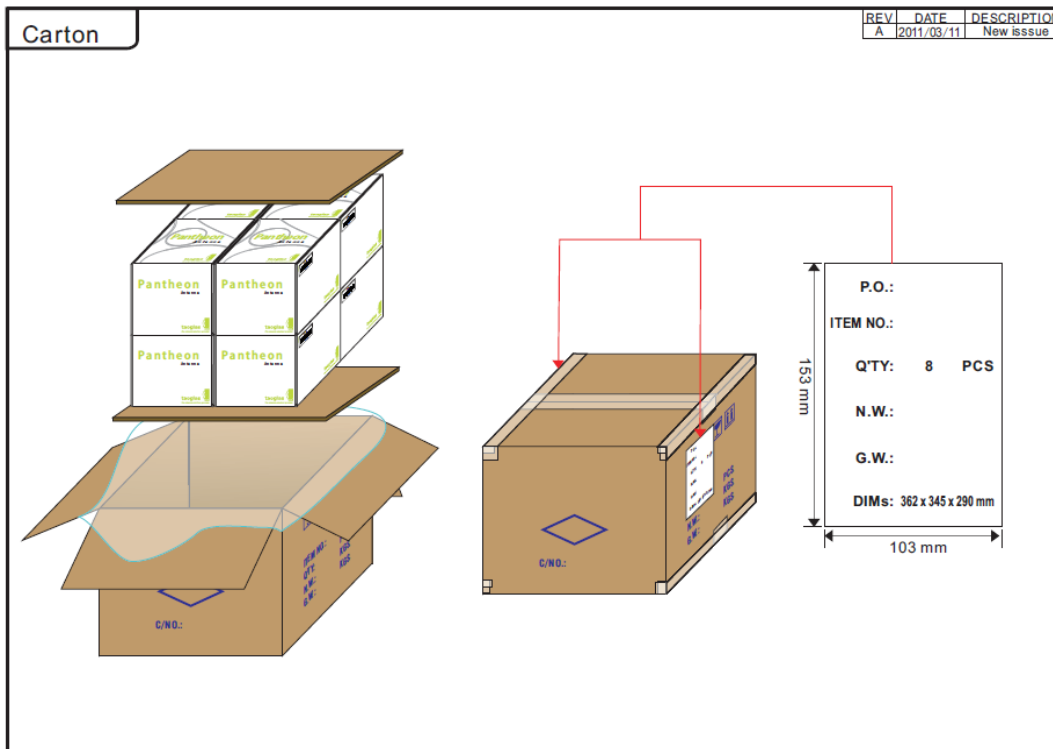
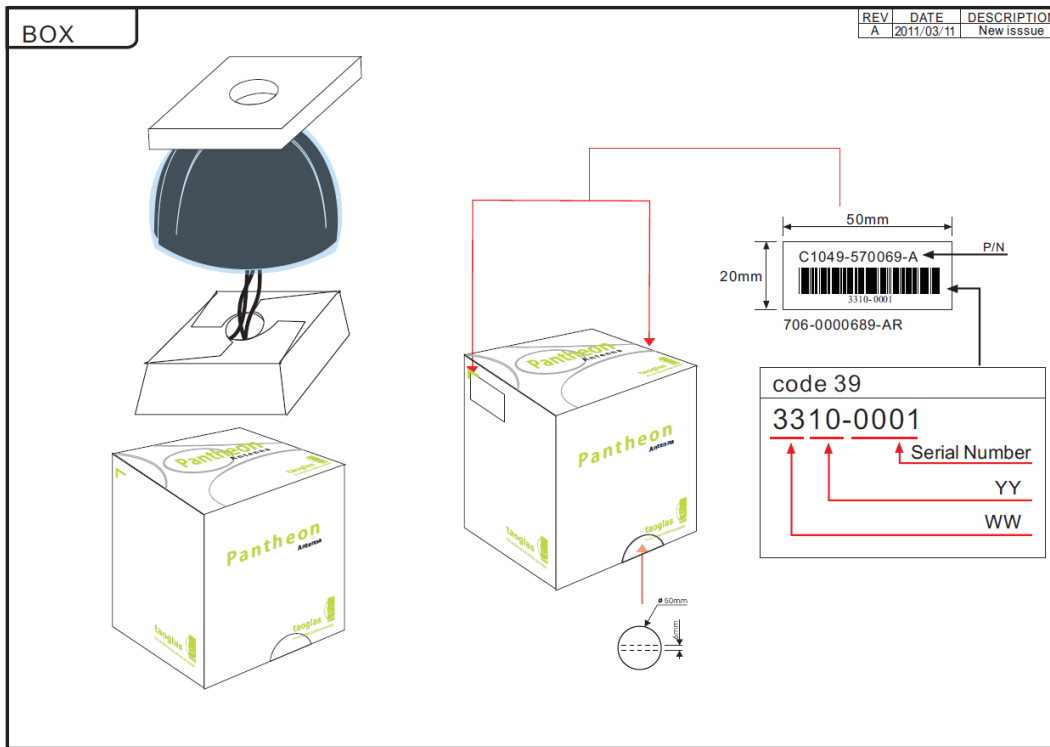
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VII. Packing



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