

5 in 1 external antenna (HM15HF)

Engineering Specification

1. Product Number

H 2 M A 3 0 5 D 1 0 1 1 0 0



2. Features

- * IP67 Antenna
- * 2 * 4G MIMO LTE Antenna: 698 to 960 & 1710 to 2700 & 3400 to 3800MHz
- * 2 * WiFi dual band antenna: 2400 to 2484 & 5150 to 5850MHz
- * GPS-GLONASS-GALILILEO High gain LNA up to 30 dB
- * Dimensions: 150 x 64 x 17 mm
- * RoHS compliant.

3. Applications

- * Automotive telematics
- * Fleet management.
- * Teleportation.

4. Description

The HM15HF External antenna is an omni-directional, IP67 waterproof M2M external antenna, combines 5 of high performance cellular LTE full band antenna & WiFi dual band and GNSS navigation antenna, covering LTE bands 698 to 960 & 1710 to 2700 & 3400 to 3800MHz, WiFi band 2400 to 2484 & 5150~5850 MHz and GPS-GLONASS-GALILILEO-Beidou navigations.

The HM15H is ideal for use on non-metal surface.



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Prepared by : Xenia

Designed by : Allen

Checked by : Mike

Approved by : Herbert

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5. Electrical Specifications

CELLULAR/4G LTE ANTENNA 1

Frequency(MHz)		698~960	1710~2170	2300~2400	2490~2690	3400~3800
Efficiency (%)	1M	60.3	59.5	56.9	50.2	43.0
	2M	50.9	51.1	50.3	40.6	34.2
Average gain (dB)	1M	-2.2	-2.3	-2.4	-3.0	-3.7
	2M	-2.9	-2.9	-3.0	-3.9	-4.7
Peak gain (dBi)	1M	4.0	4.2	2.5	2.7	2.2
	2M	3.1	3.2	2.4	1.5	1.4
Impedance(Ω)	50					
Polarization	Linear					
V.S.W.R.	<5	<3				
Cable	KSR200 low loss cable					
Connector	SMA(M) ST					



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CELLULAR/4G LTE ANTENNA 2

Frequency(MHz)		698~960	1710~2170	2300~2400	2490~2690	3400~3800
Efficiency (%)	1M	57.0	51.6	55.6	49.1	33.3
	2M	50.0	42.5	48.0	38.9	27.0
Average gain (dB)	1M	-2.4	-2.9	-2.5	-3.1	-4.8
	2M	-3.0	-3.7	-3.2	-4.1	-5.7
Peak gain (dBi)	1M	3.8	3.8	1.4	2.4	1.9
	2M	3.1	3.2	1.2	1.4	1.1
Impedance(Ω)	50					
Polarization	Linear					
V.S.W.R.	<5	<3				
Cable	KSR200 low loss cable					
Connector	SMA(M) ST					



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WiFi dual band / WiFi ANTENNA 1

Frequency(MHz)		2400~2484	5150~5850
Efficiency (%)	1M	55.8	49.7
	2M	47.7	40.3
Average gain (dB)	1M	-2.5	-3.0
	2M	-3.2	-3.9
Peak gain (dBi)	1M	3.2	3.1
	2M	2.6	1.8
Impedance(Ω)		50	
Polarization		Linear	
V.S.W.R.		<3	
Cable		KSR200 low loss cable	
Connector		SMA(M) ST	



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WiFi dual band / WiFi ANTENNA 2

Frequency(MHz)		2400~2484	5150~5850
Efficiency (%)	1M	51.9	50.7
	2M	42.3	42.7
Average gain (dB)	1M	-2.8	-2.9
	2M	-3.7	-3.7
Peak gain (dBi)	1M	3.6	3.0
	2M	2.0	1.5
Impedance(Ω)	50		
Polarization	Linear		
V.S.W.R.	<3		
Cable	KSR200 low loss cable		
Connector	SMA(M) ST		



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GNSS NAVIGATION ANTENNA

Navigation	BeiDou	GPS/QZSS/GALILEO	GLONASS
Center Frequency(MHz)	1561	1575.42	1602
Gain(dBiC)	2.5 Typ.		
VSWR	< 2.0		
Impedance(Ω)	50		
Polarization	RHCP		
Cable	2M RG174		
Connector	SMA(M) ST		

LNA ELECTRICAL PROPERTIES

Gain(dB)	30 Typ.
Noise Figure(dB)	1.8 Typ.
Output VSWR	< 2.0
DC Input Voltage(V)	3~24
Current Consumption	9 mA Typ. @ 3V



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MECHANICAL

Antenna Dimensions	150 * 64 * 17 mm
Waterproof	IP67
Cable type*	KSR200
Cable Length*	2M
Connector*	SMA(M) ST
Mounting Type	Adhesive mount

*The connector, cable length, and cable type can be tailor made upon request.

ENVIRONMENTAL

Operation Temperature	-40~+85 °C
Storage Temperature	-40~+85 °C



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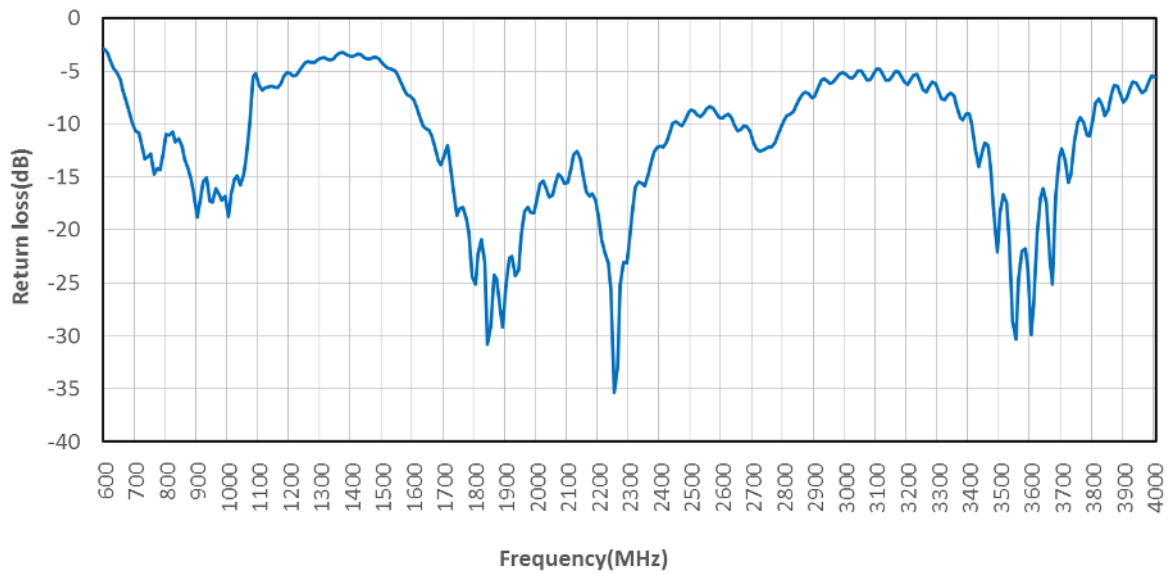
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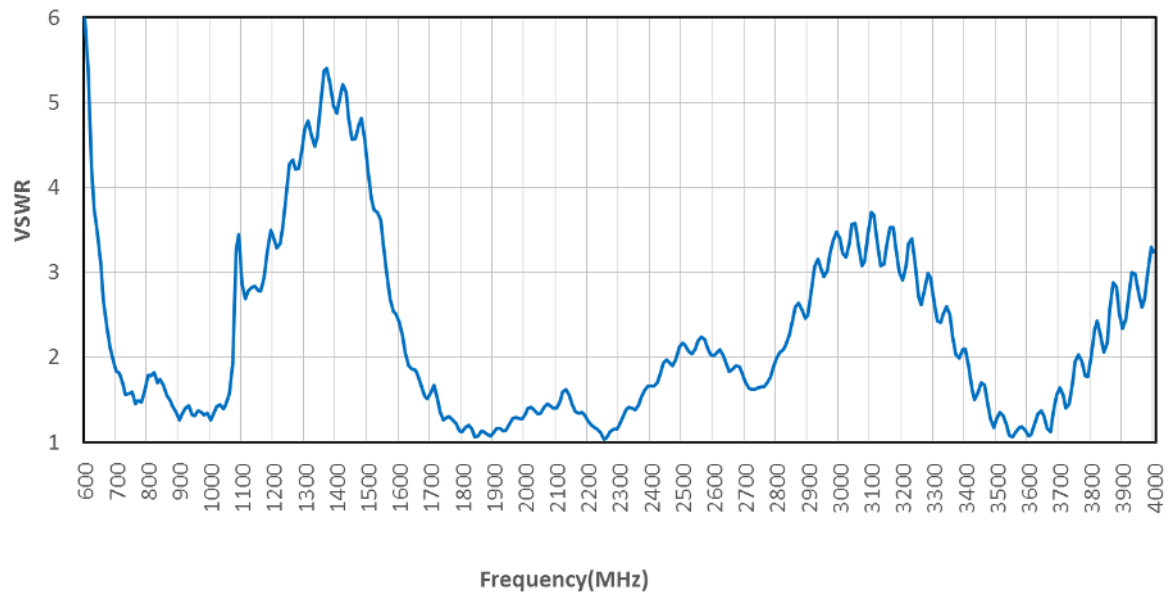
6. Antenna Characteristics.

6.1 Cellular/LTE Antenna 1

6.1.1 Return Loss



6.1.2 VSWR



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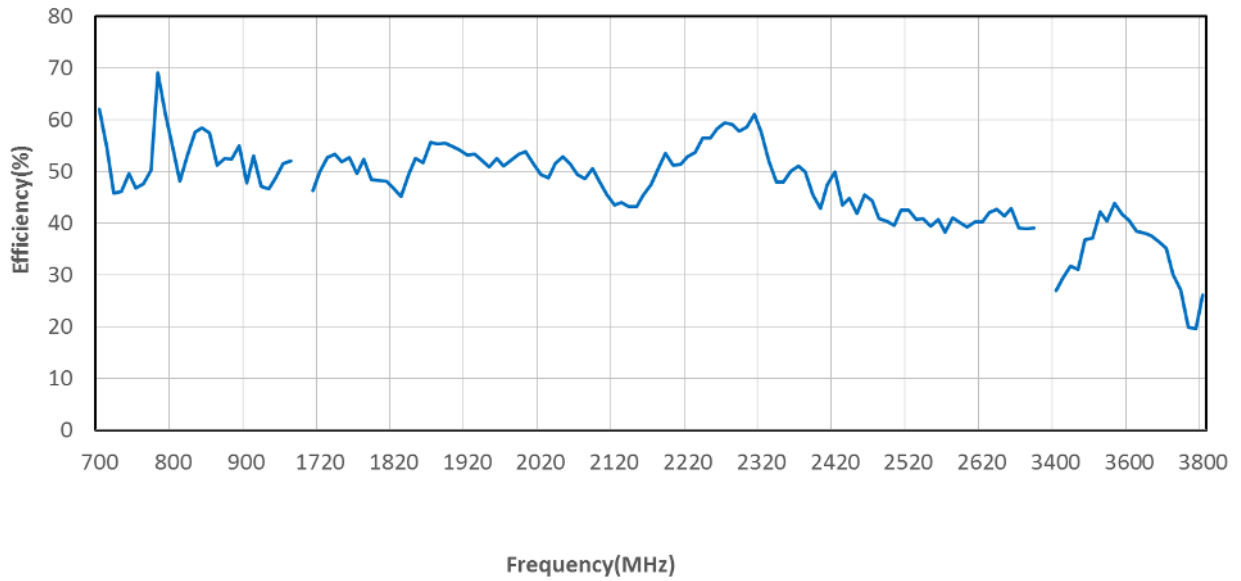
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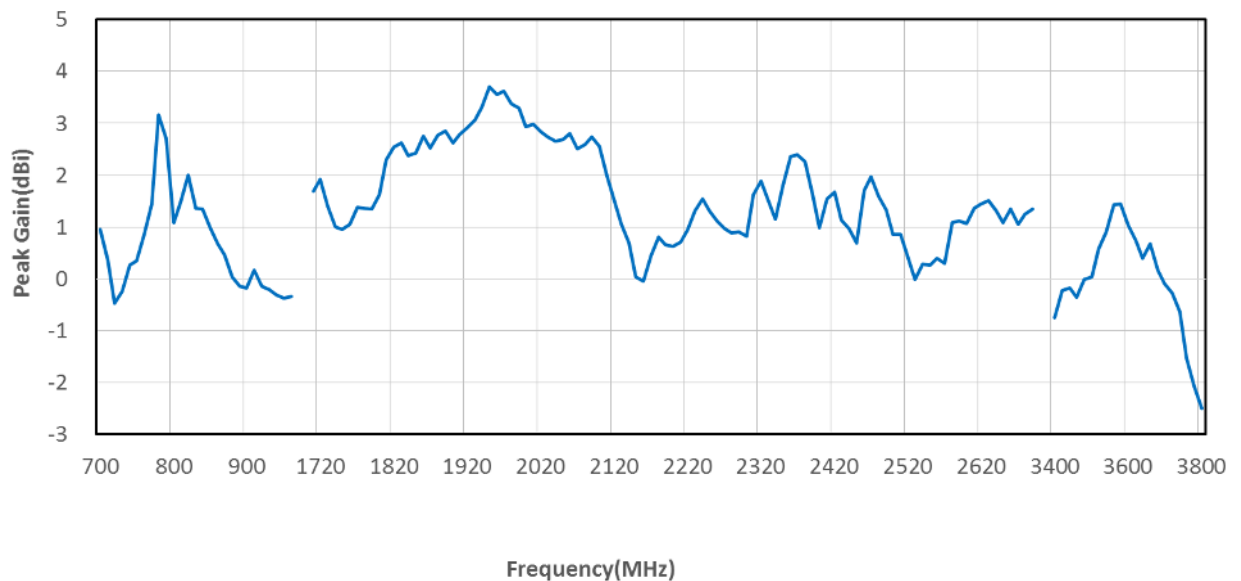
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6.1.3 Efficiency



6.1.4 Peak Gain



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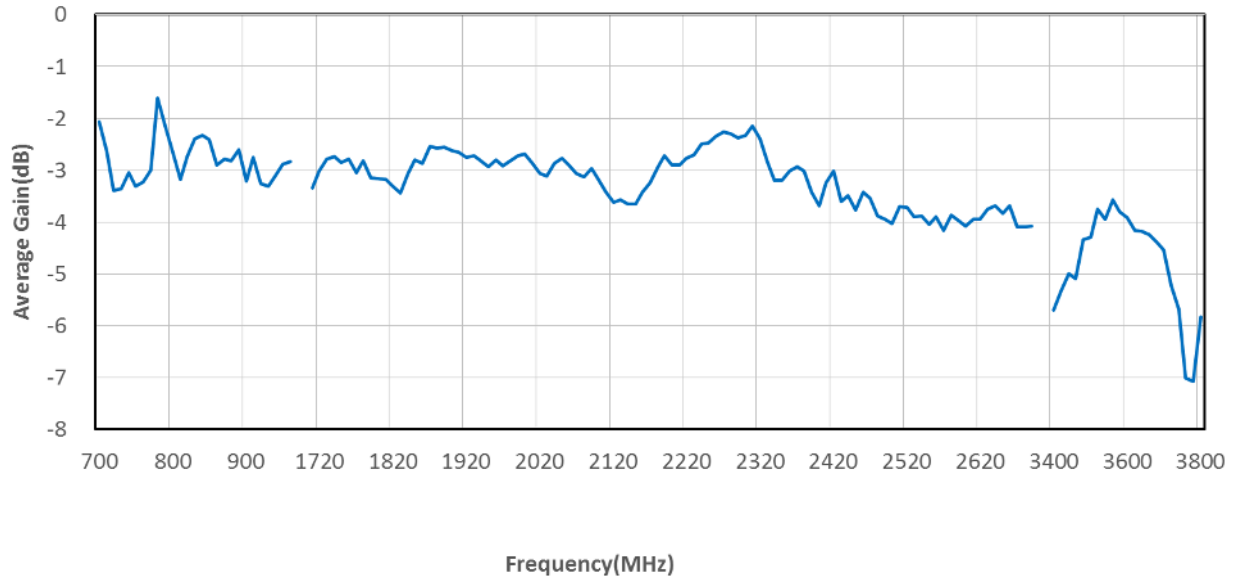
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6.1.5 Average Gain



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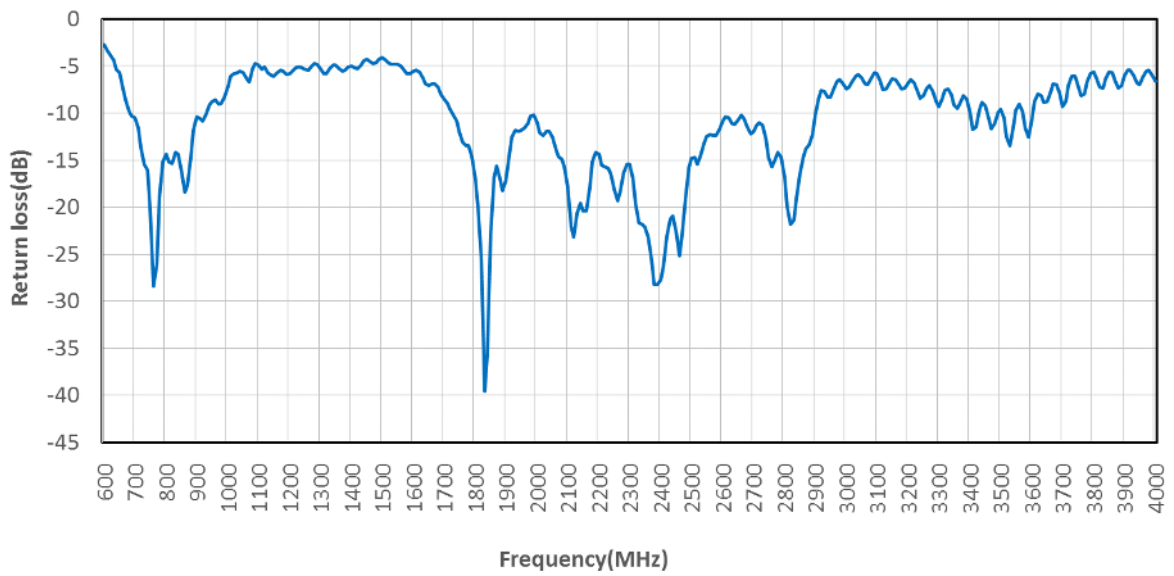
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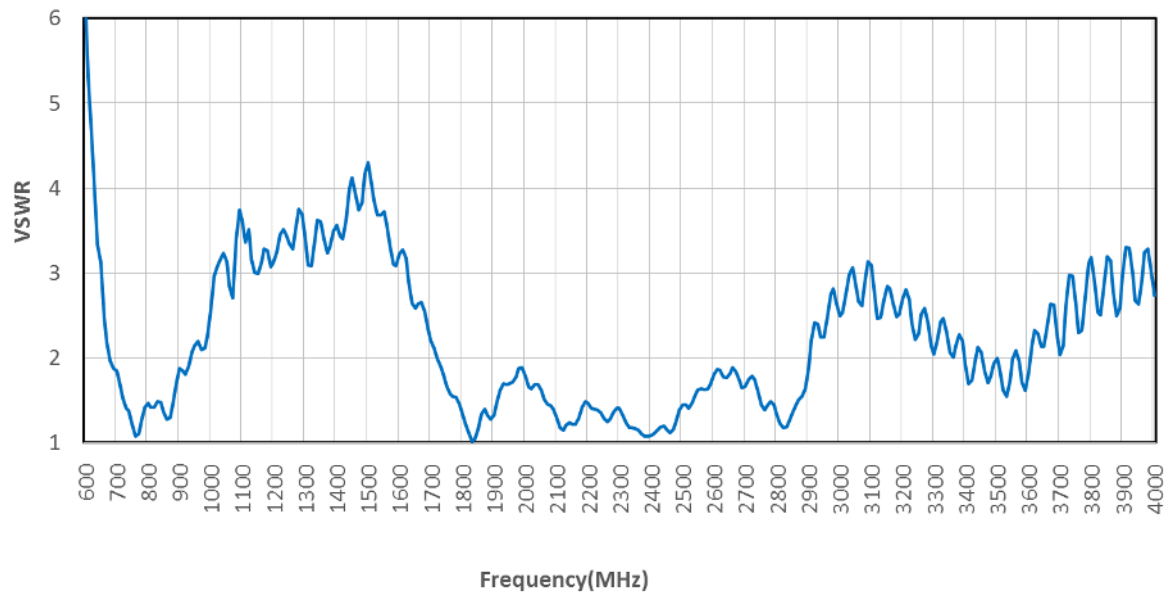
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6.2 Cellular/LTE Antenna 2

6.2.1 Return Loss



6.2.2 VSWR



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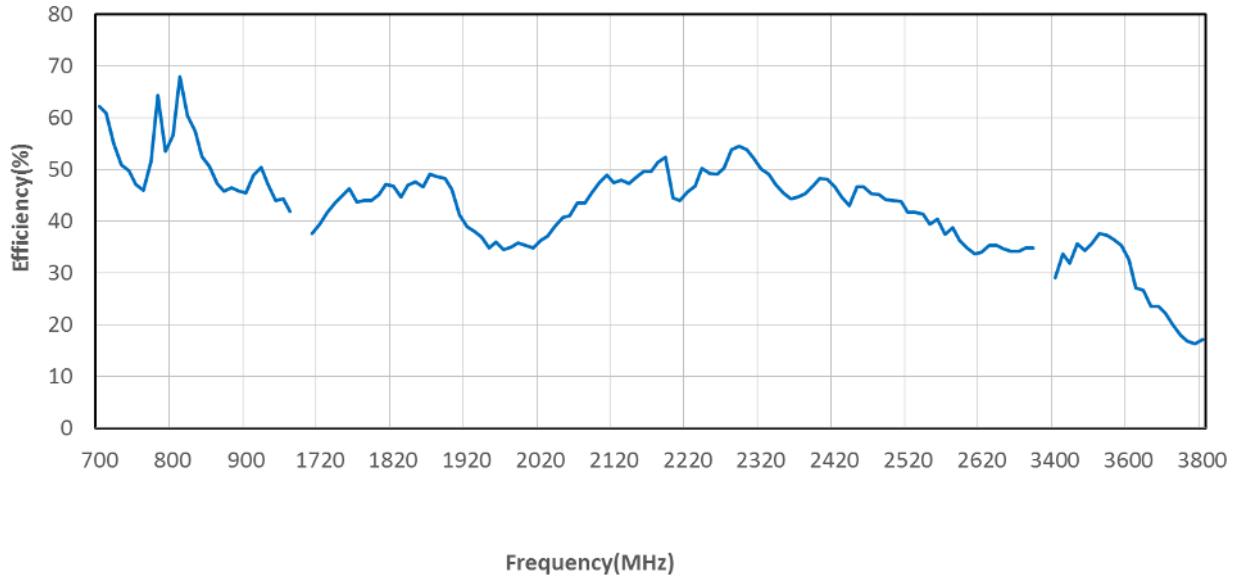
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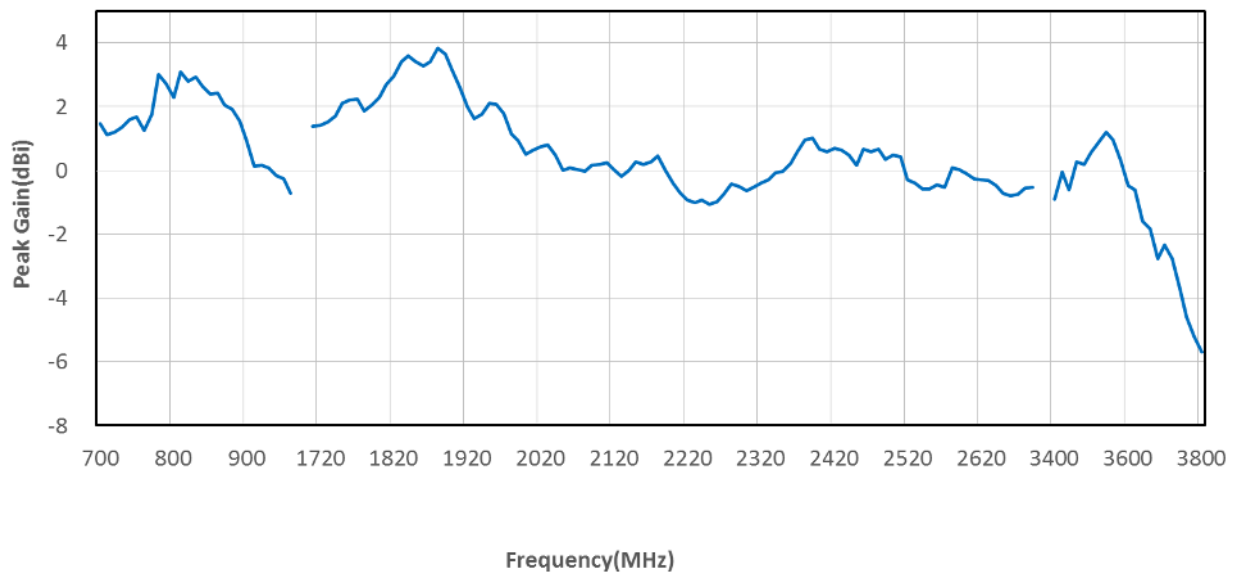
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6.2.3 Efficiency



6.2.4 Peak Gain



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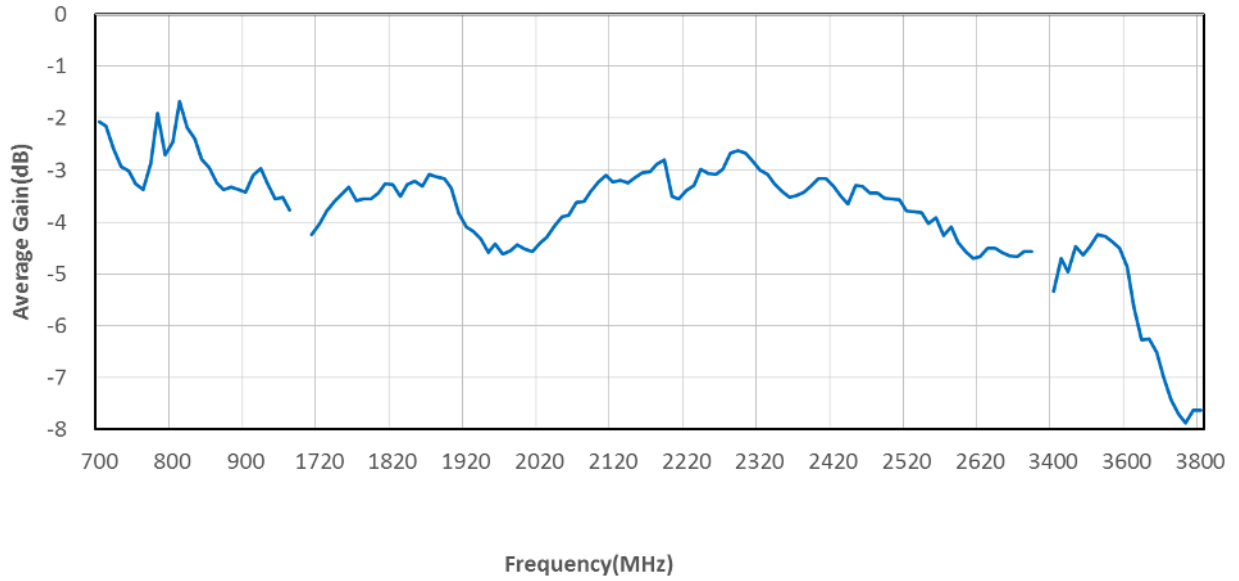
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6.2.5 Average Gain



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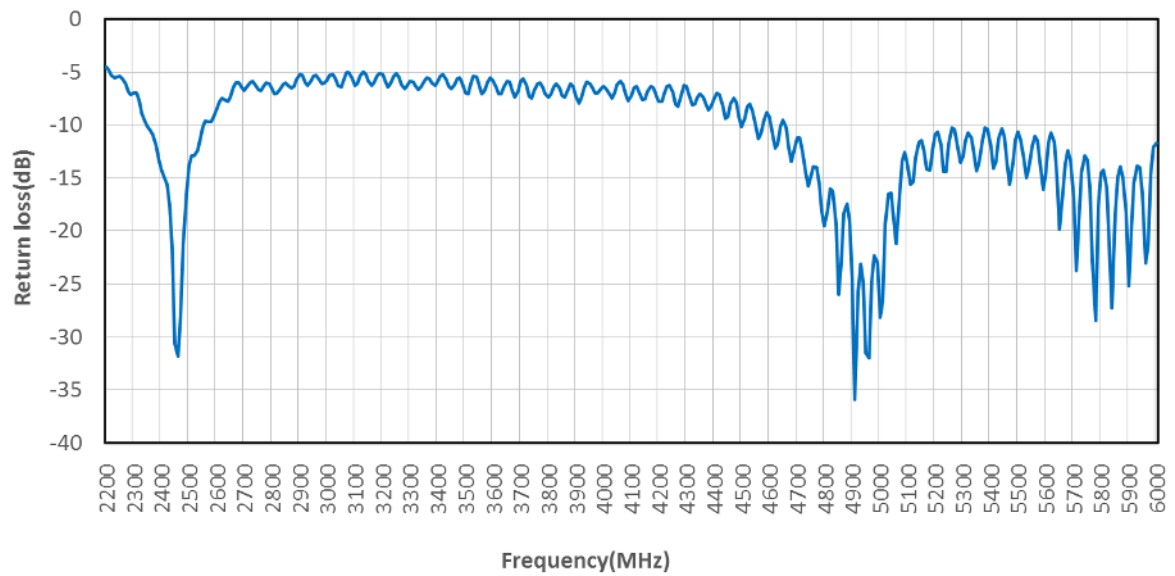
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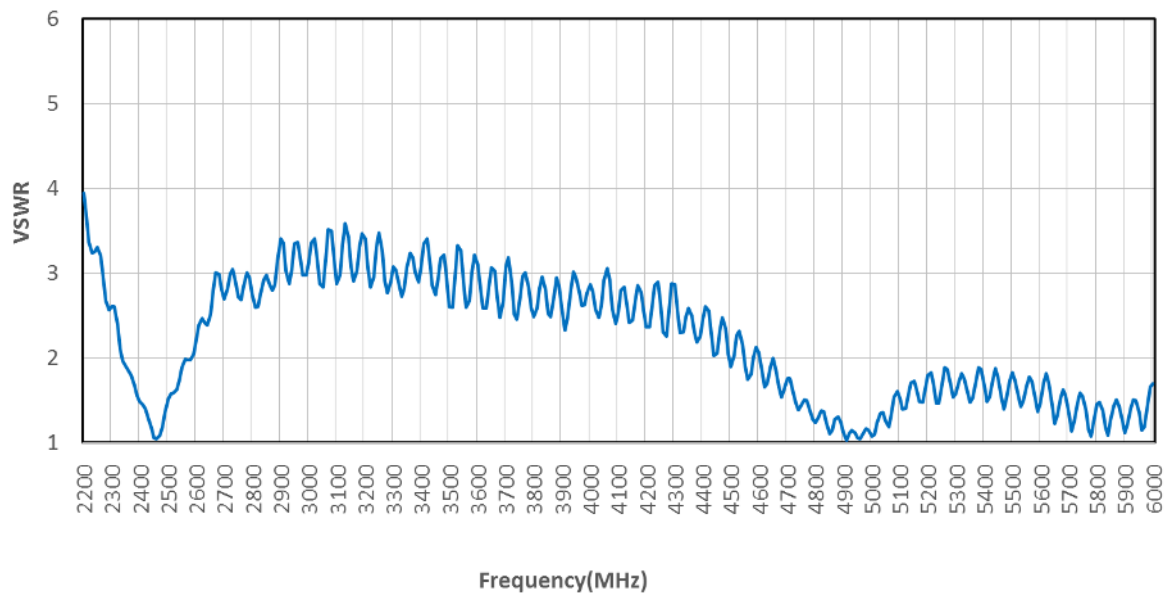
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6.3 WiFi dual band/WiFi Antenna 1

6.3.1 Return Loss



6.3.2 VSWR



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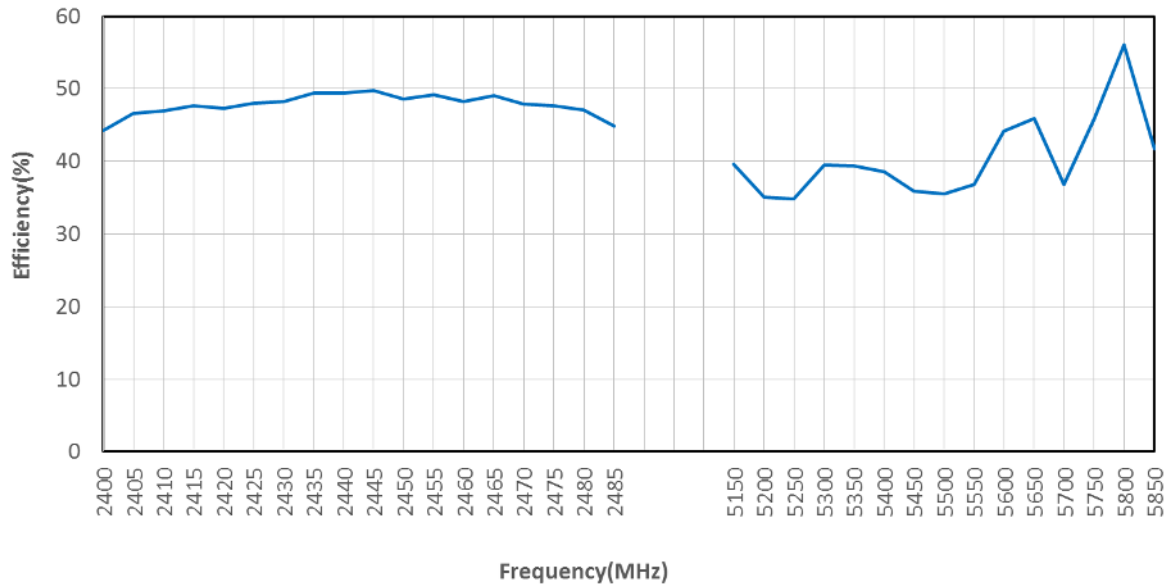
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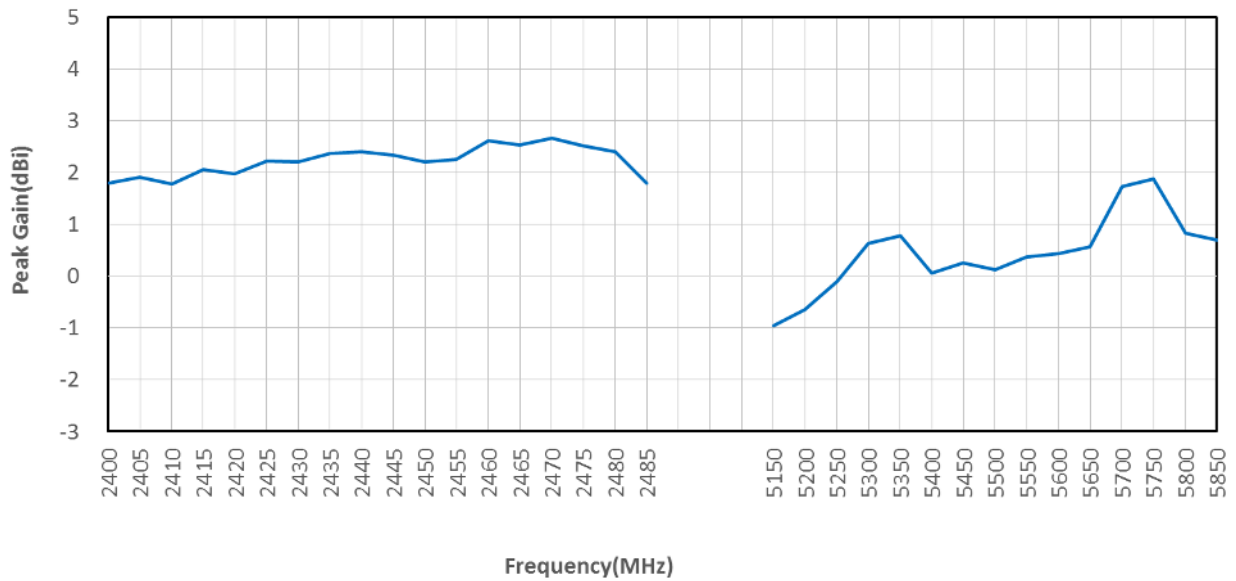
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6.3.3 Efficiency



6.3.4 Peak Gain



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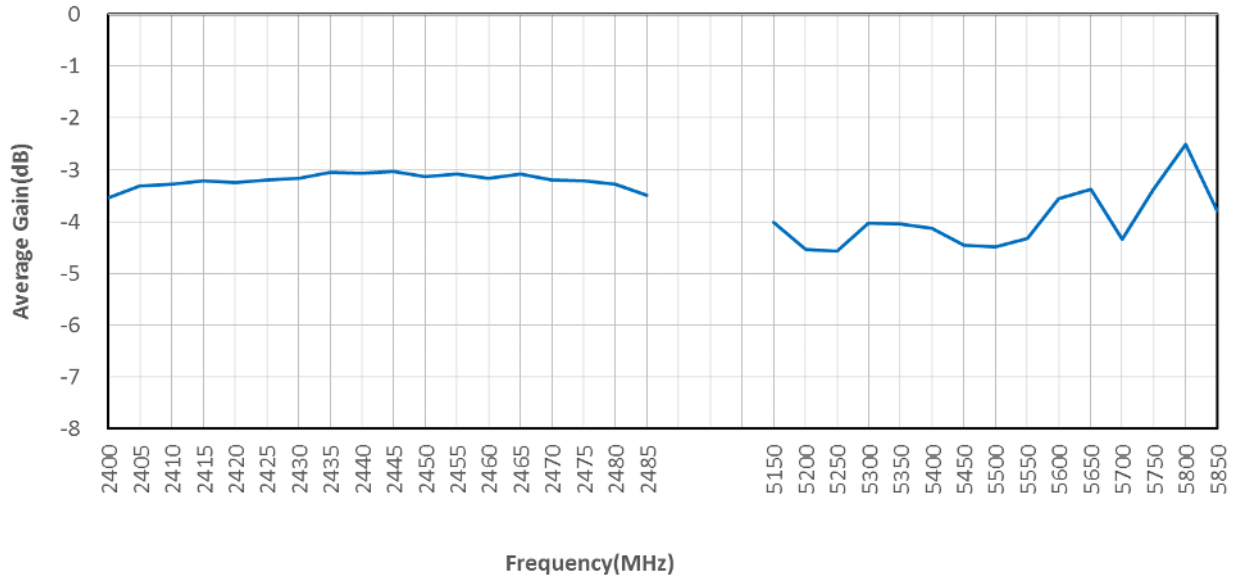
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6.3.5 Average Gain



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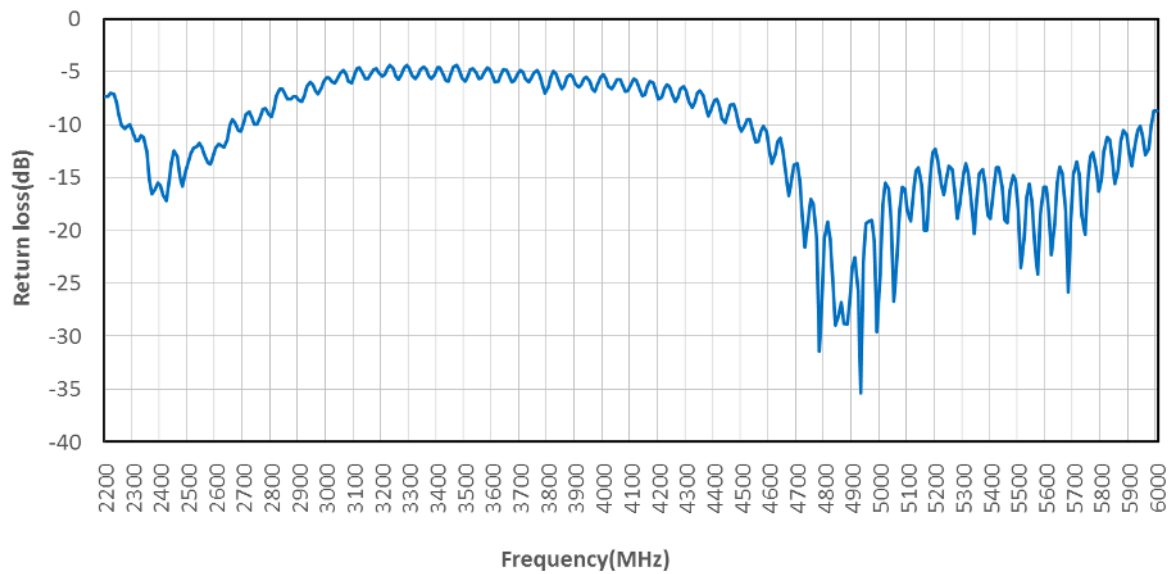
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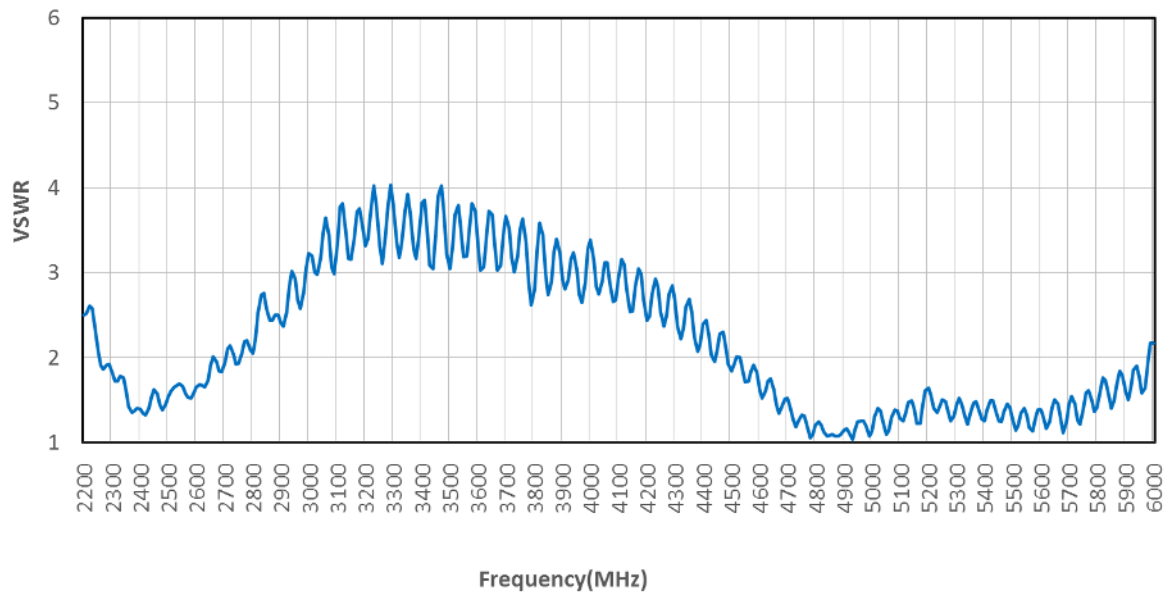
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6.4 WiFi dual band/WiFi Antenna 2

6.4.1 Return Loss



6.4.2 VSWR



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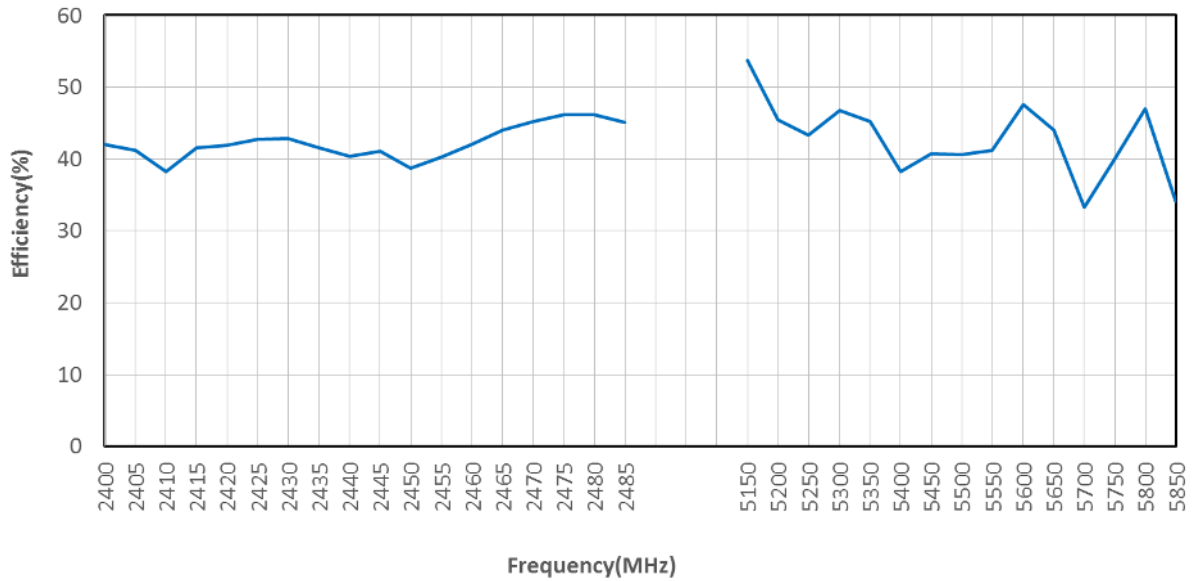
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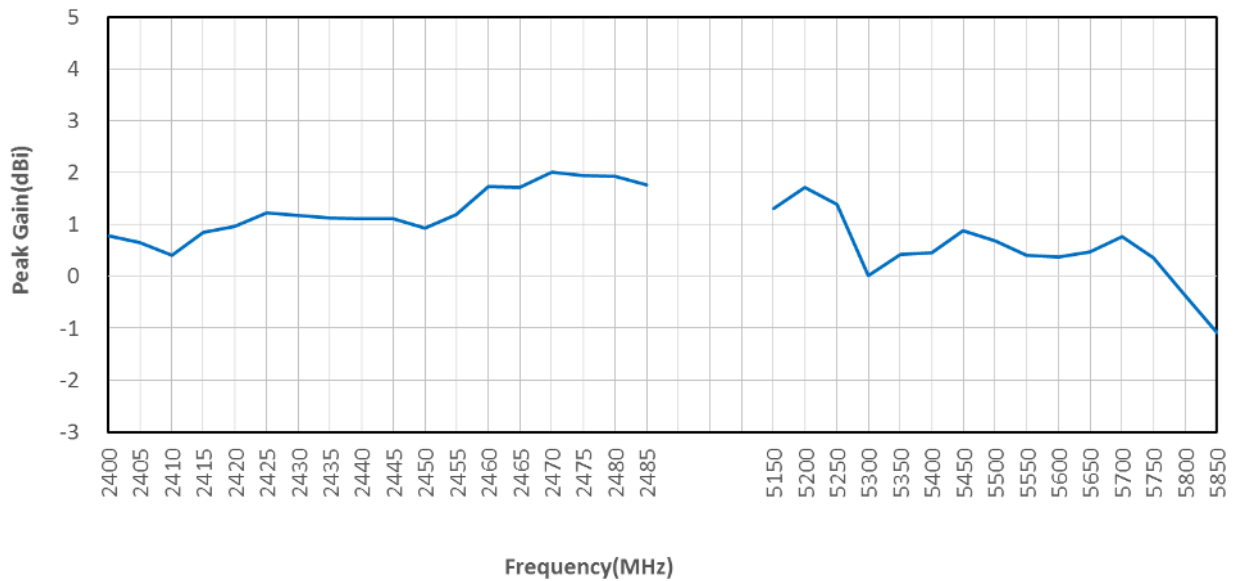
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6.4.3 Efficiency



6.4.4 Peak Gain



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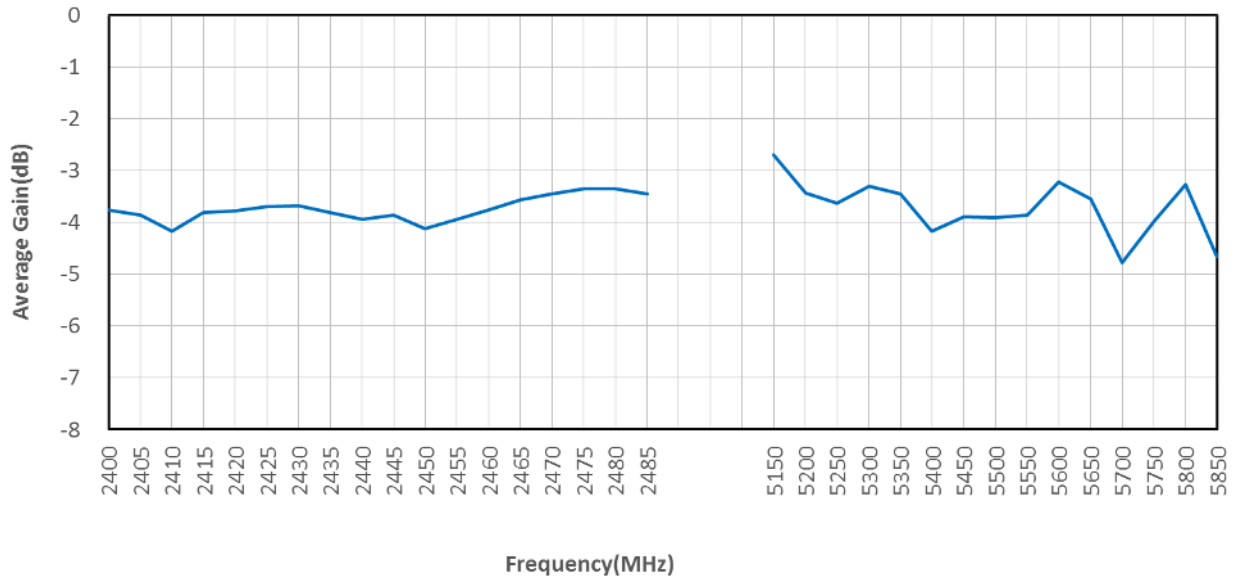
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6.4.5 Average Gain



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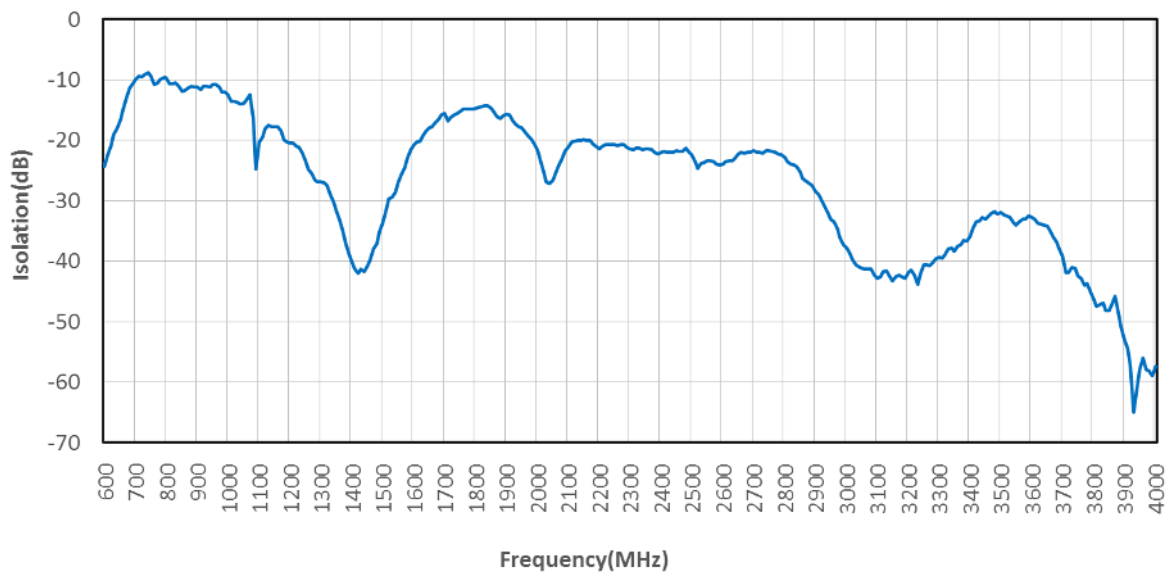
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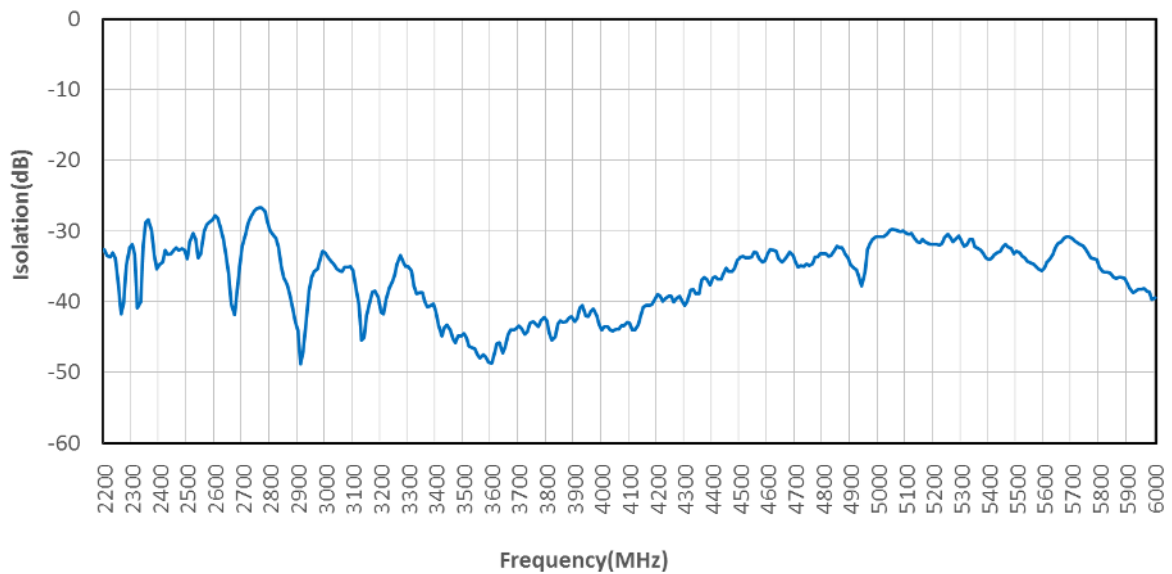
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6.5 Isolation

6.5.1 LTE antenna 1 and LTE antenna 2



6.5.2 WiFi antenna 1 and WiFi antenna 2



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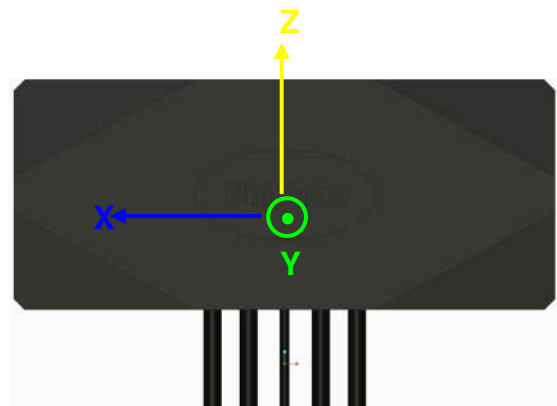
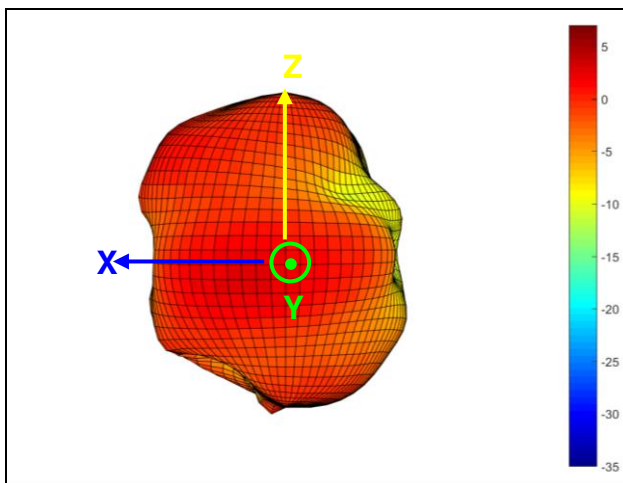
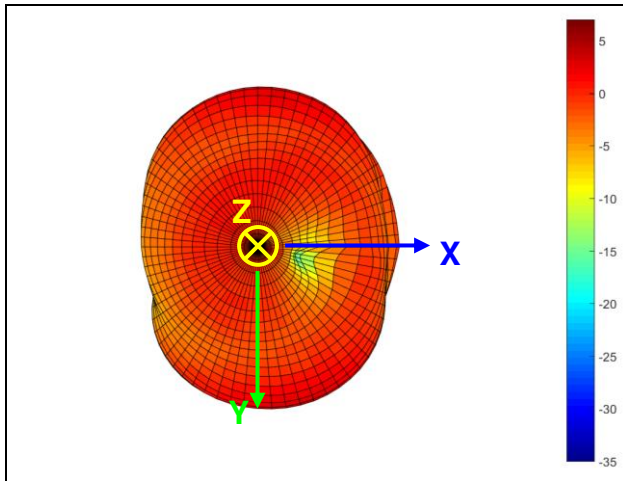
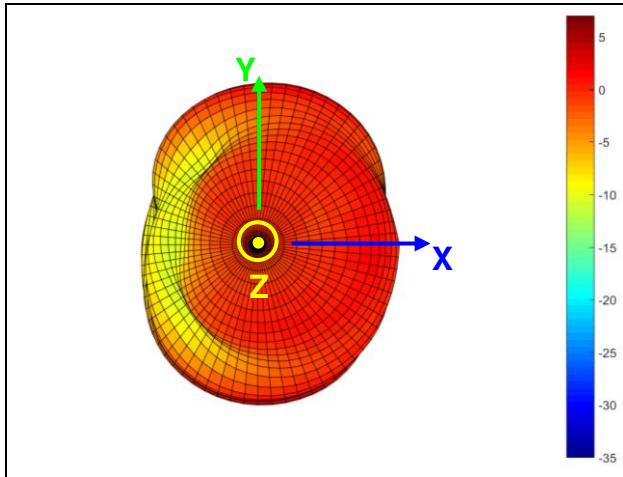
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7. Radiation Gain Pattern of LTE Antenna 1.

7.1. 698~960MHz Band

3D Radiation Gain Pattern @ 830 MHz (Unit: dBi)



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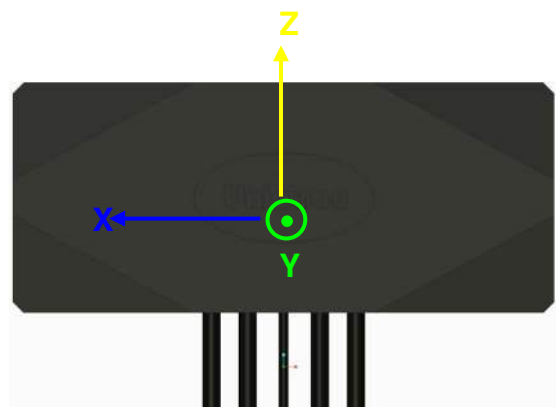
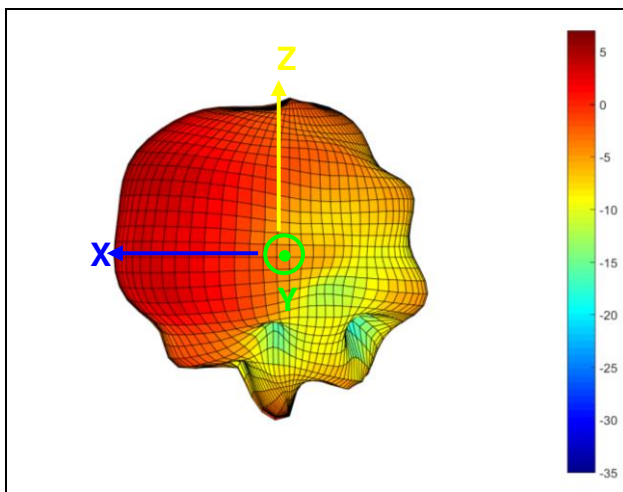
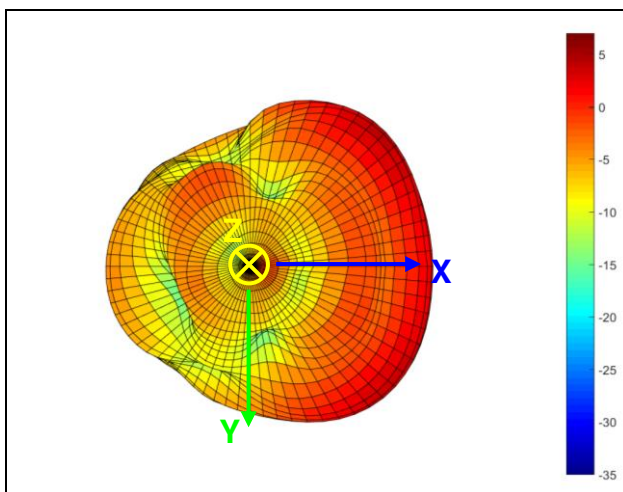
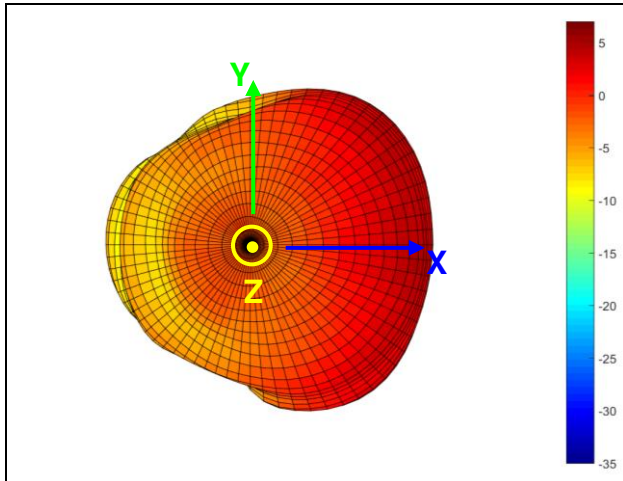
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7.2. 1710~2170MHz Band

3D Radiation Gain Pattern @ 1940 MHz (Unit: dBi)



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Approved by : Herbert

TITLE : 5 in 1 external antenna (HM15HF)

DOCUMENT
NO.

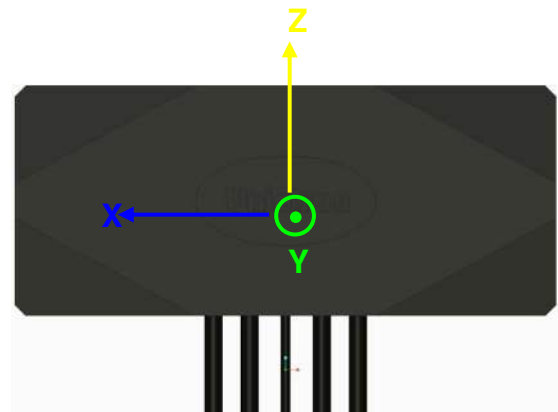
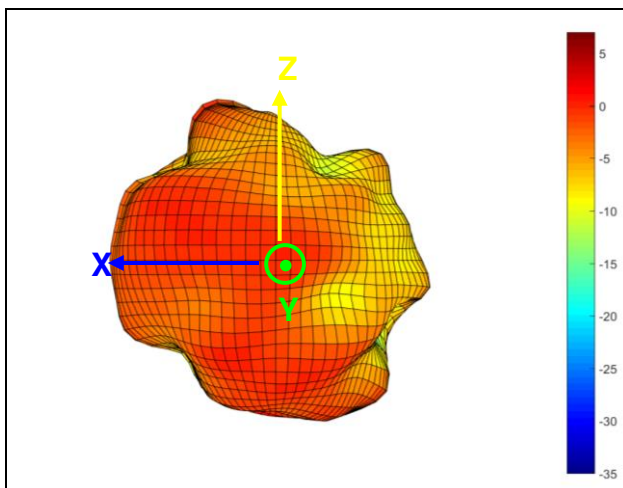
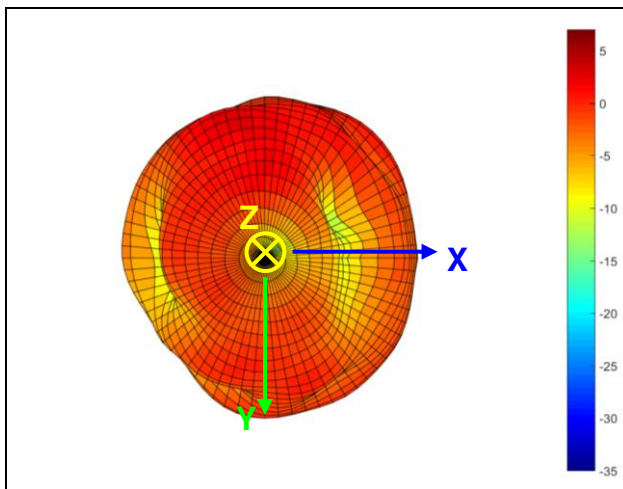
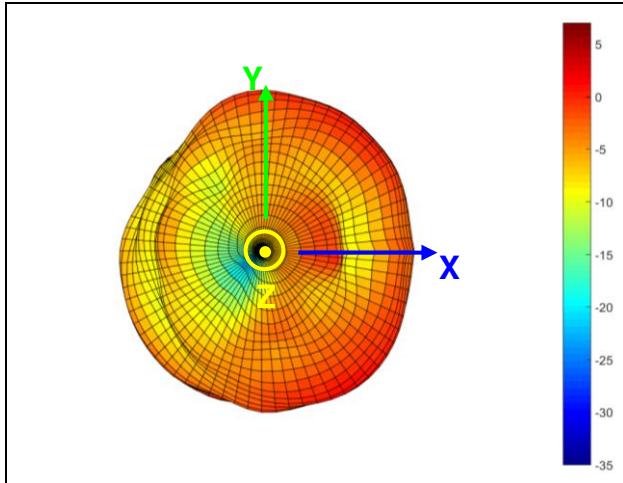
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7.3. 2300~2400MHz Band

3D Radiation Gain Pattern @ 2350 MHz (Unit: dBi)



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DOCUMENT NO.

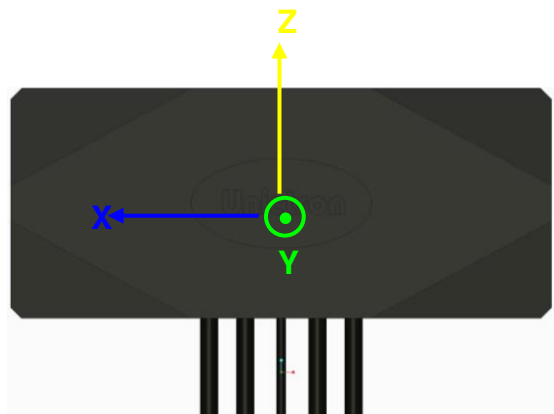
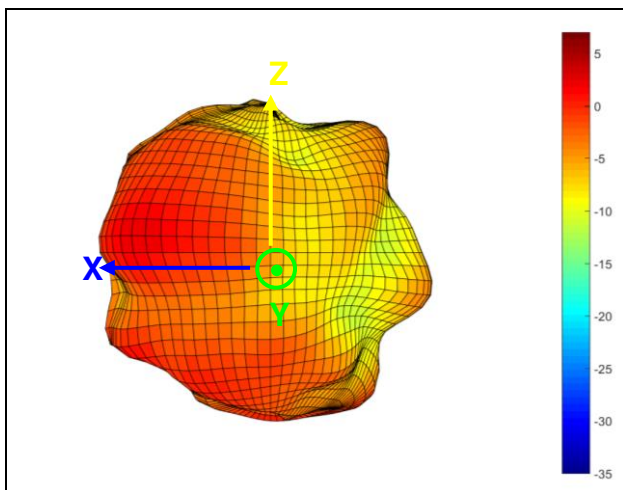
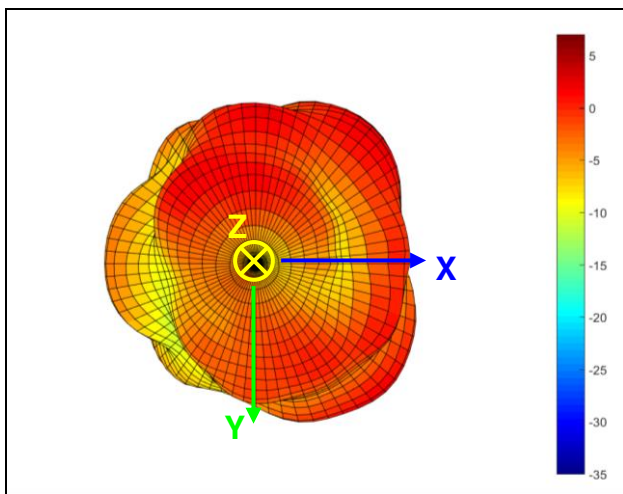
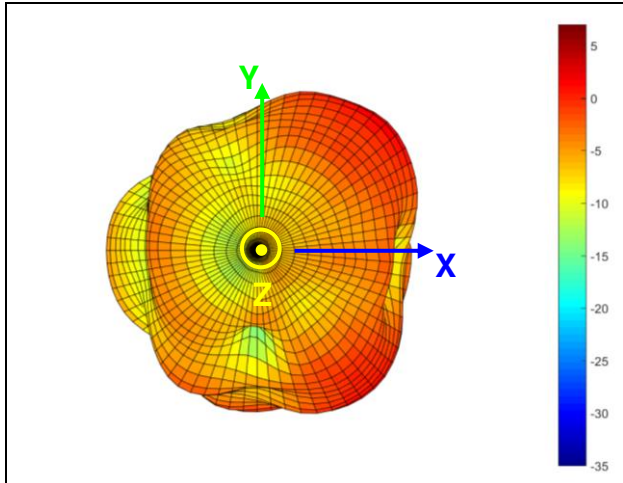
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7.4. 2490~2690MHz Band

3D Radiation Gain Pattern @ 2590 MHz (Unit: dBi)



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DOCUMENT NO.

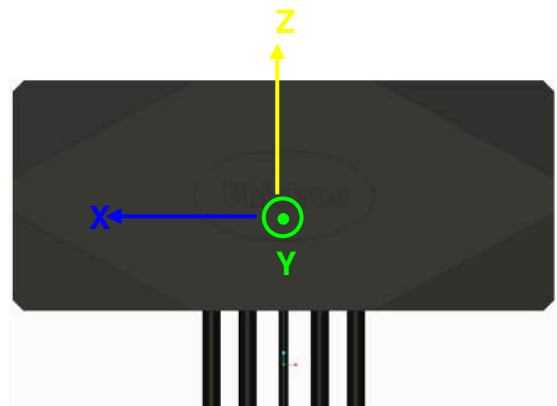
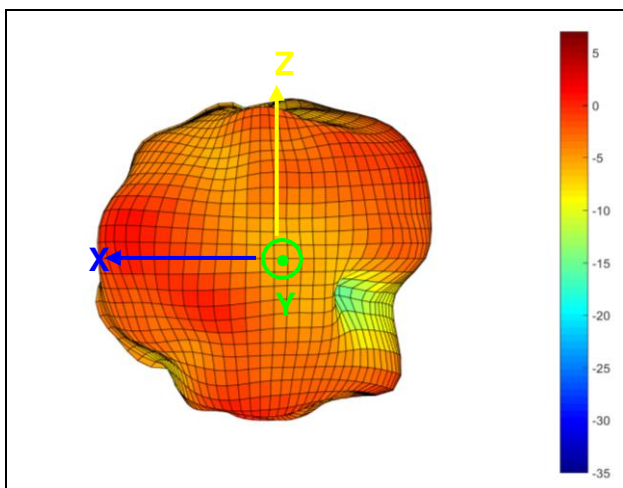
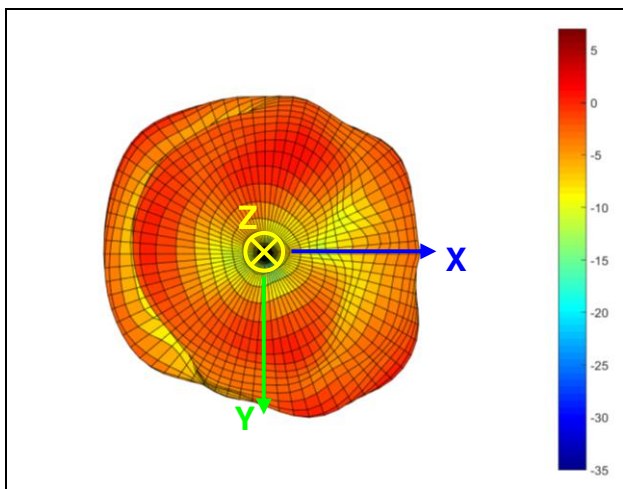
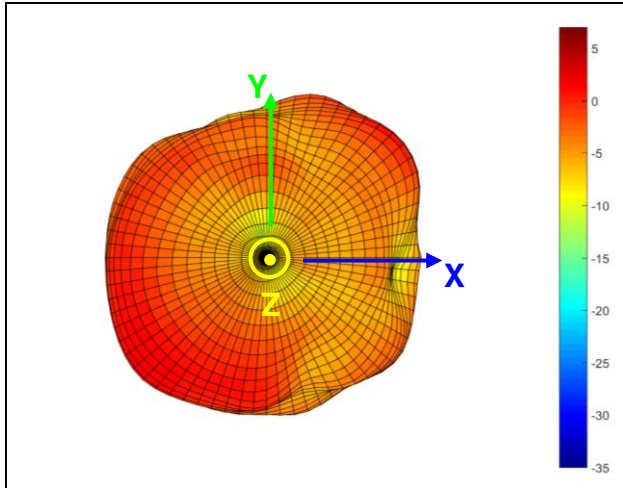
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7.5. 3400~3800MHz Band

3D Radiation Gain Pattern @ 3600 MHz (Unit: dBi)



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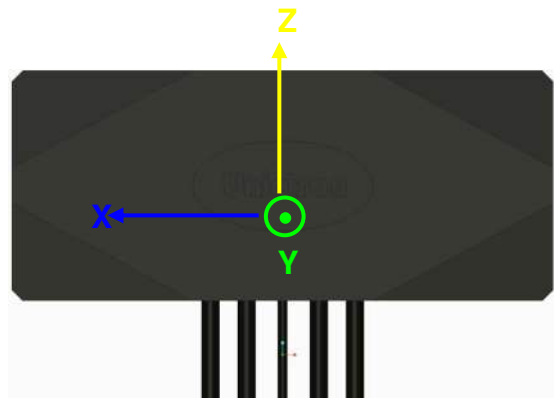
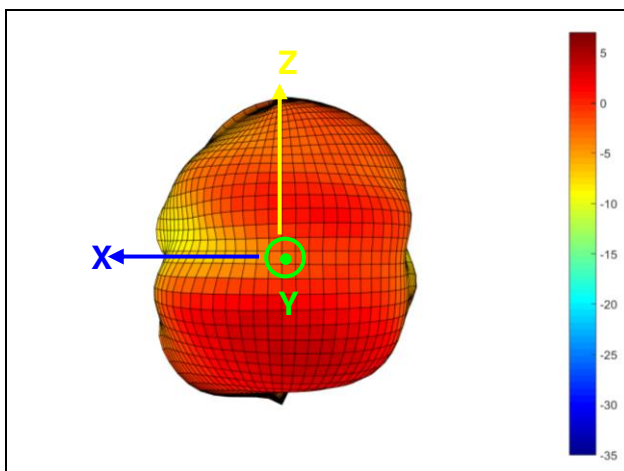
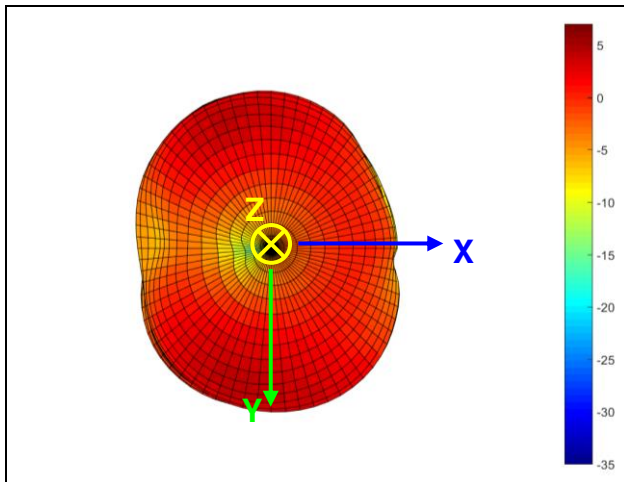
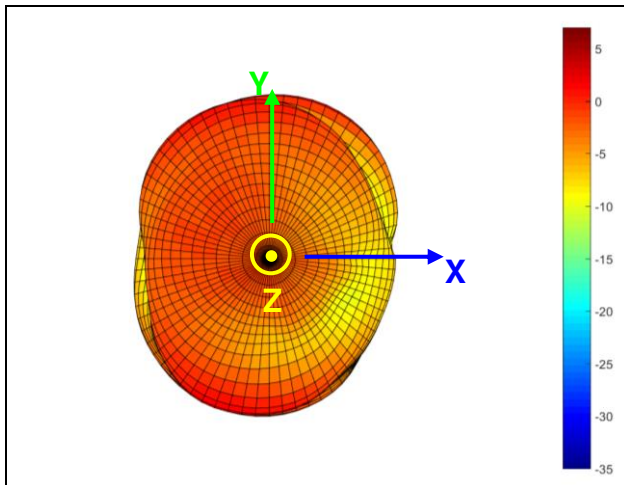
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8. Radiation Gain Pattern of LTE Antenna 2.

8.1. 698~960MHz Band

3D Radiation Gain Pattern @ 830 MHz (Unit: dBi)



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DOCUMENT
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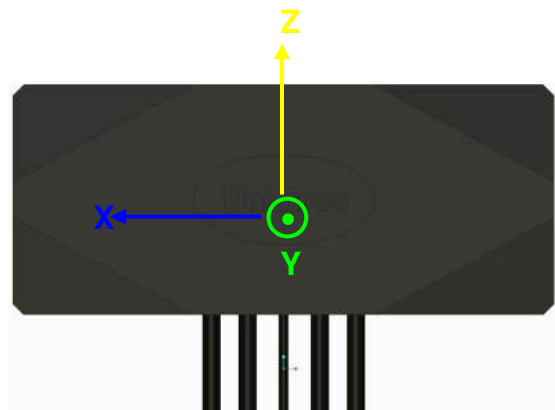
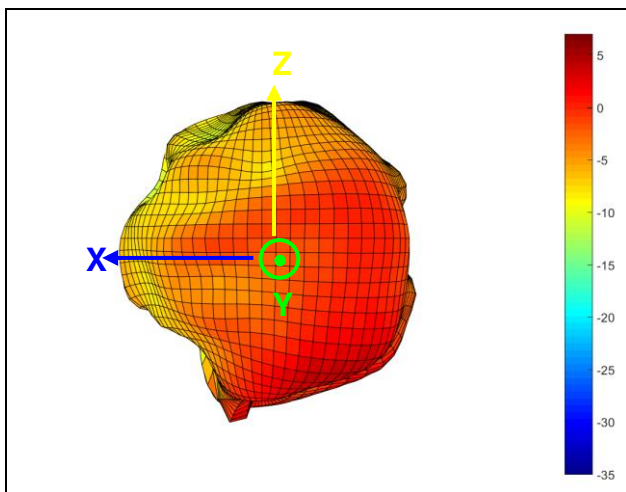
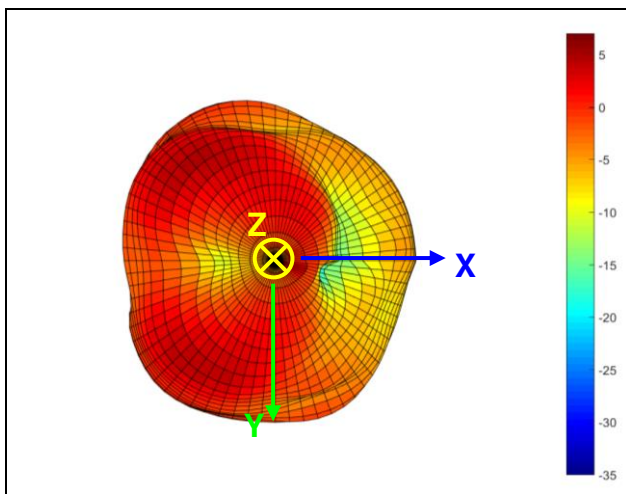
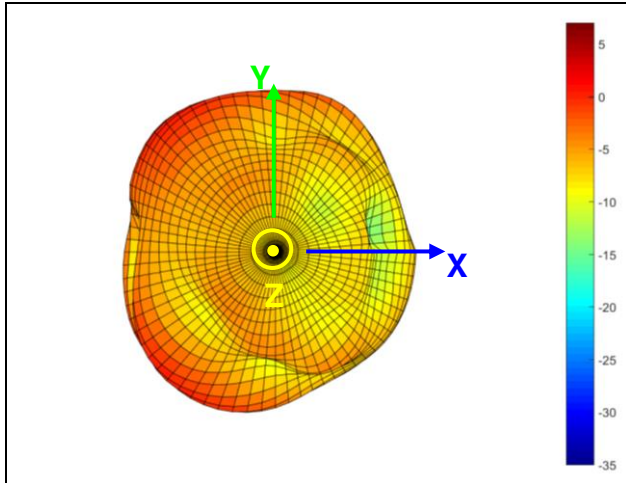
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8.2. 1710~2170MHz Band

3D Radiation Gain Pattern @ 1940 MHz (Unit: dBi)



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DOCUMENT NO.

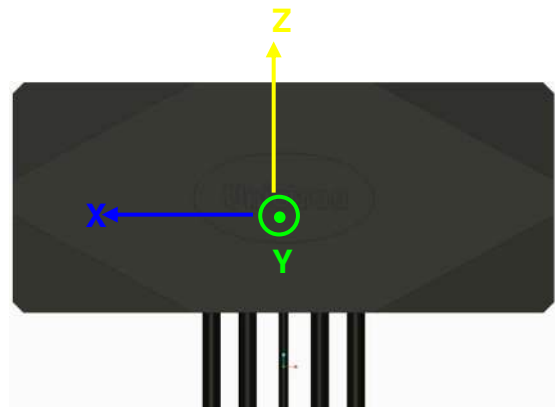
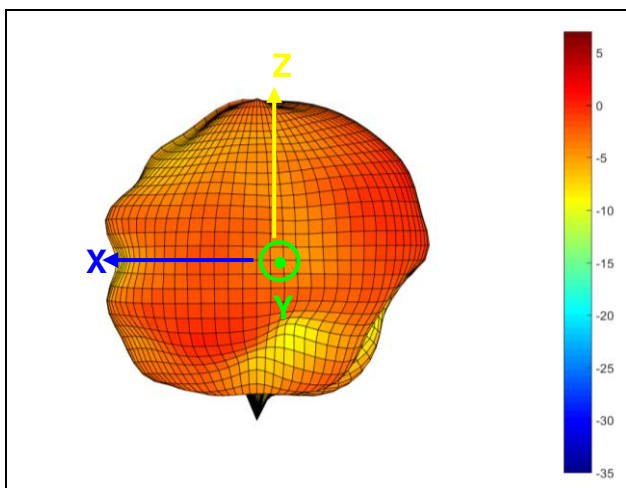
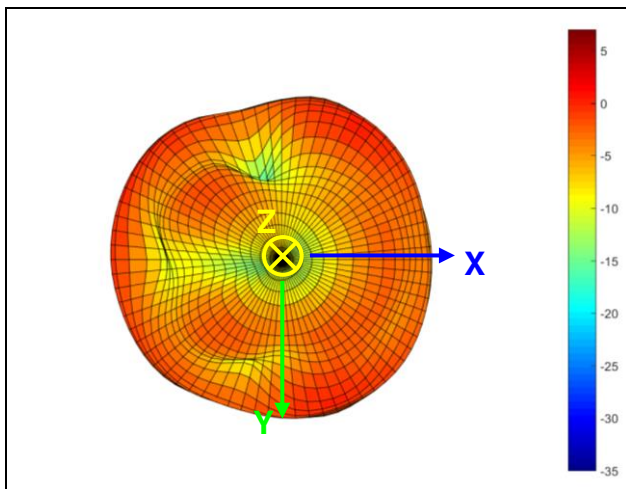
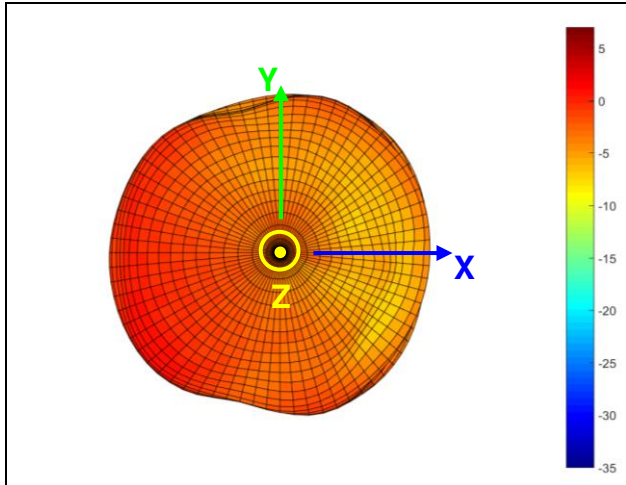
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8.3. 2300~2400MHz Band

3D Radiation Gain Pattern @ 2350 MHz (Unit: dBi)



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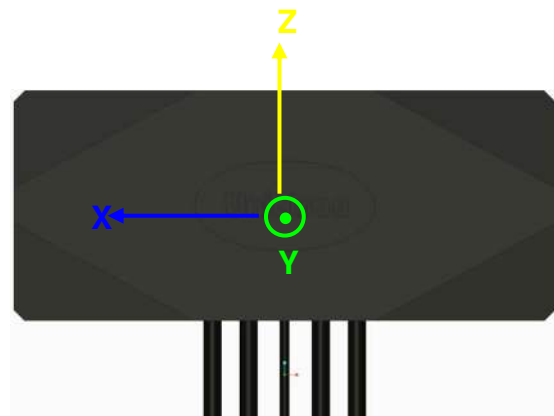
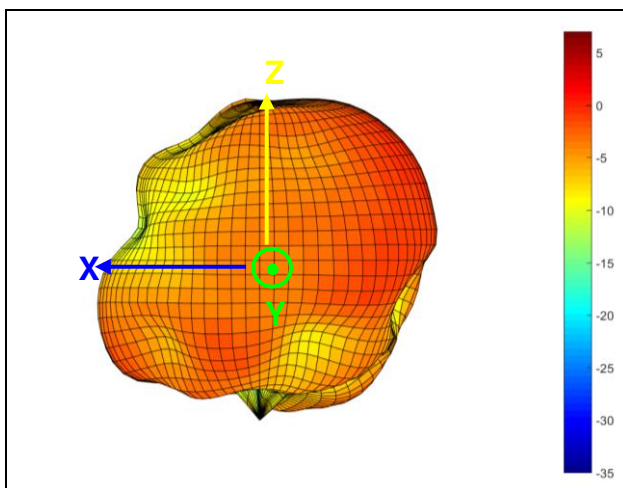
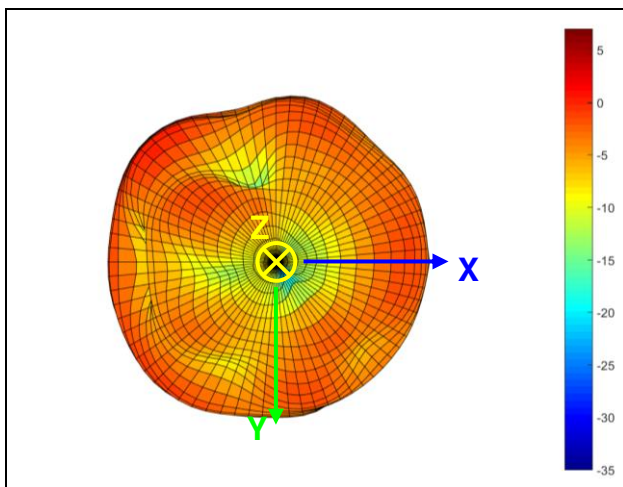
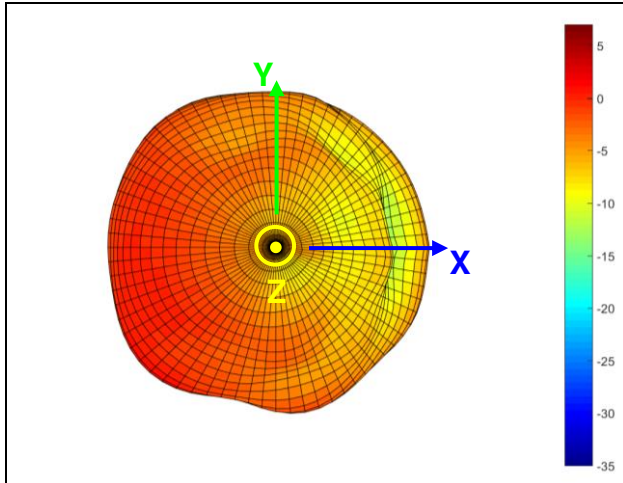
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8.4. 2490~2690MHz Band

3D Radiation Gain Pattern @ 2590 MHz (Unit: dBi)



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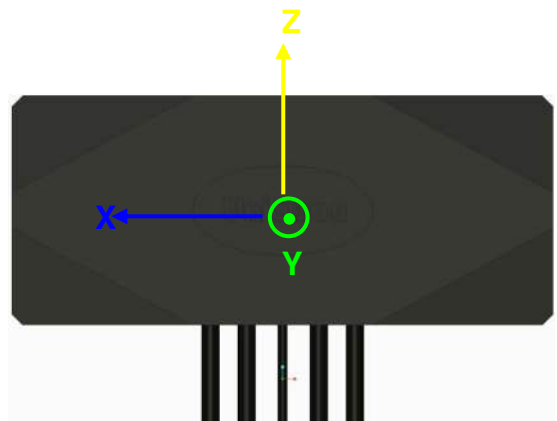
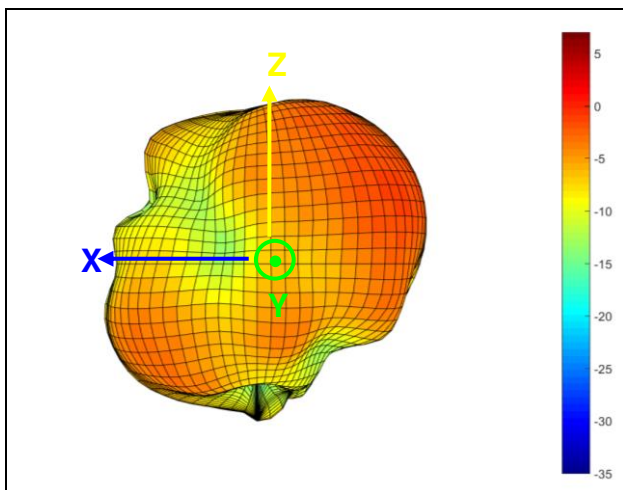
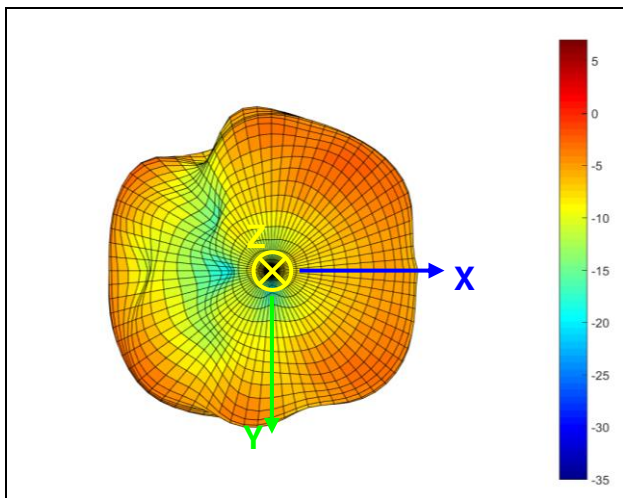
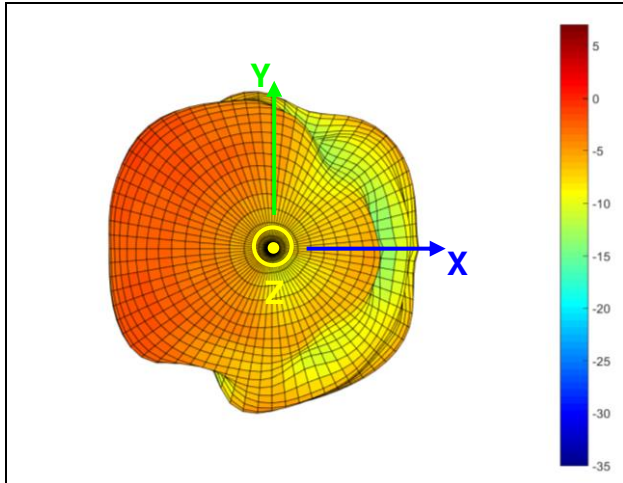
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8.5. 3400~3800MHz Band

3D Radiation Gain Pattern @ 3600 MHz (Unit: dBi)



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DOCUMENT NO.

H2MA305D101100

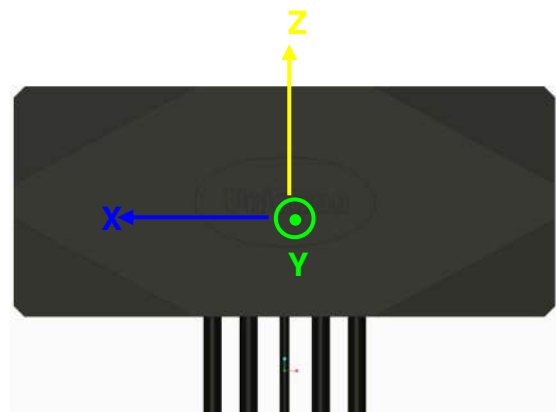
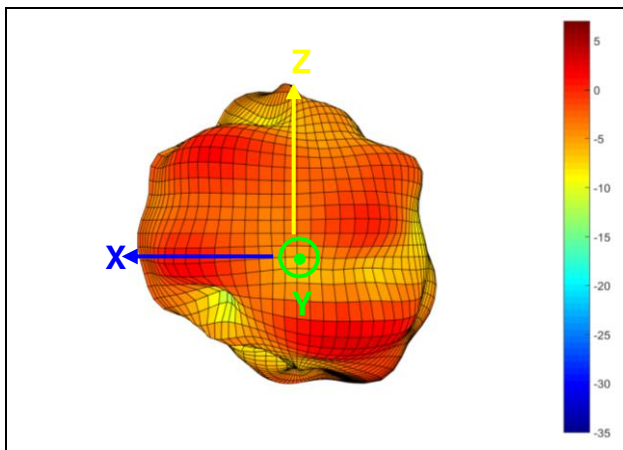
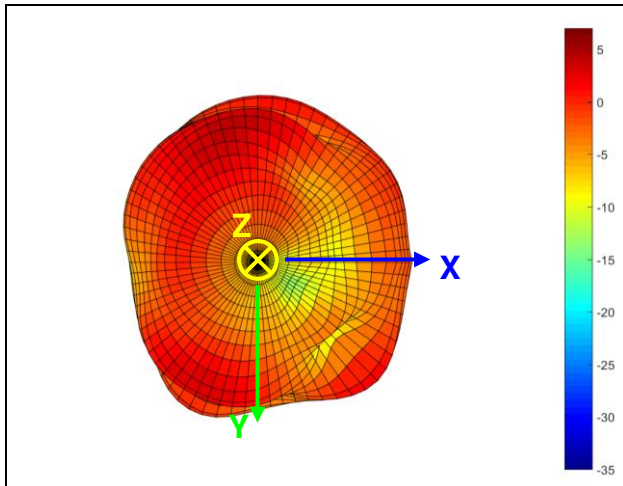
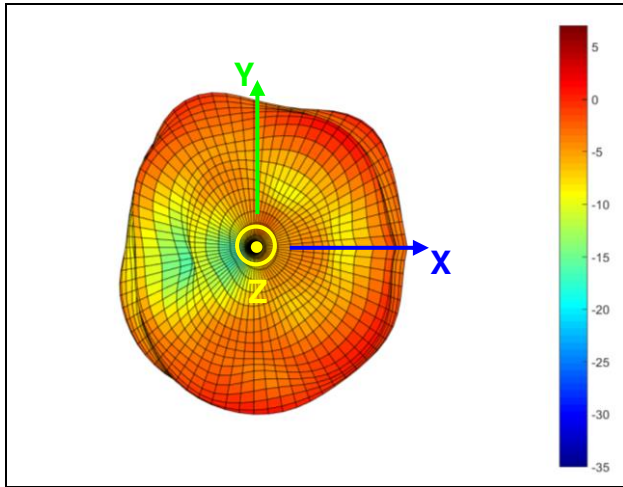
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9. Radiation Gain Pattern of WiFi Antenna 1.

9.1. 2400~2484MHz Band

3D Radiation Gain Pattern @ 2442 MHz (Unit: dBi)



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Approved by : Herbert

TITLE : 5 in 1 external antenna (HM15HF)

DOCUMENT
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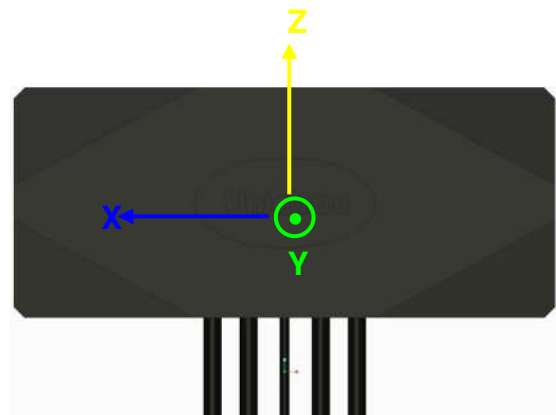
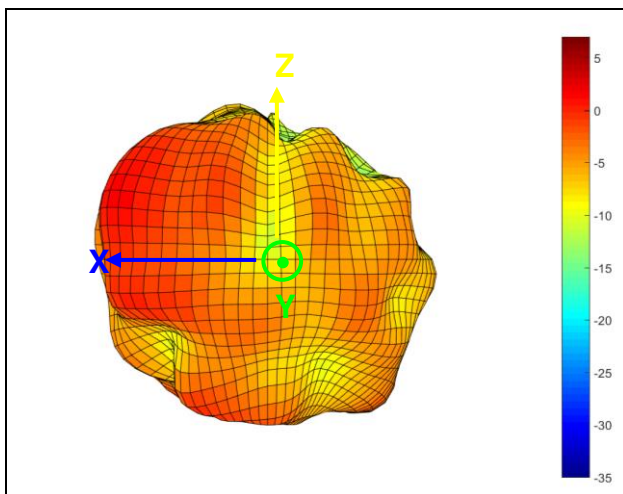
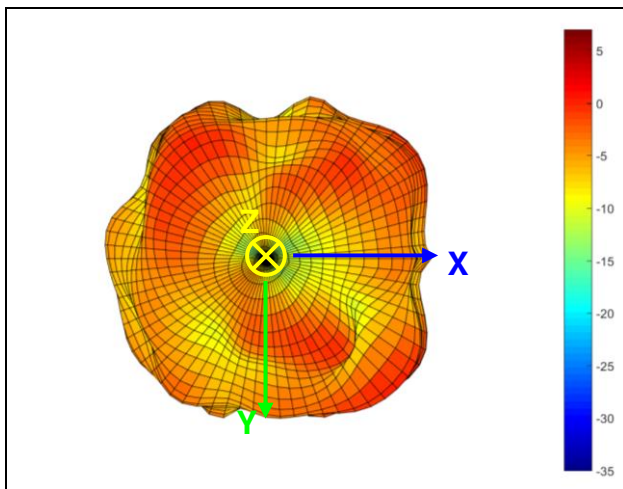
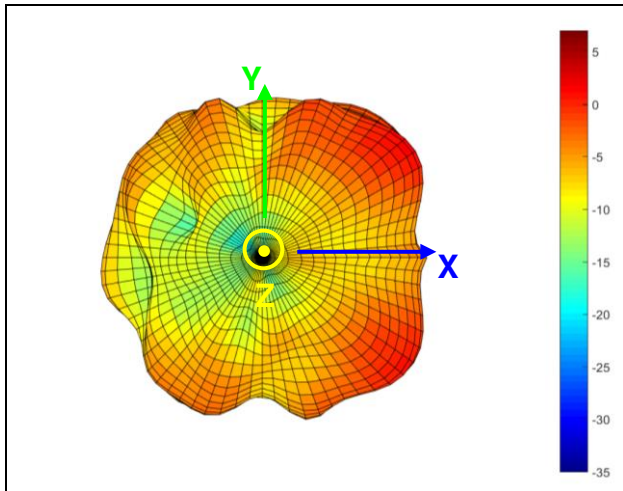
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9.2. 5150~5850MHz Band

3D Radiation Gain Pattern @ 5550 MHz (Unit: dBi)



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TITLE : 5 in 1 external antenna (HM15HF)

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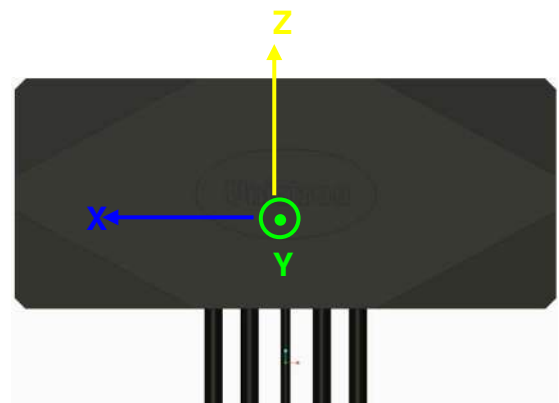
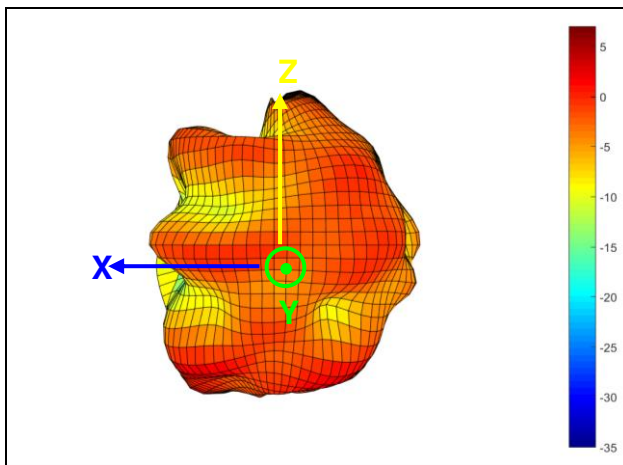
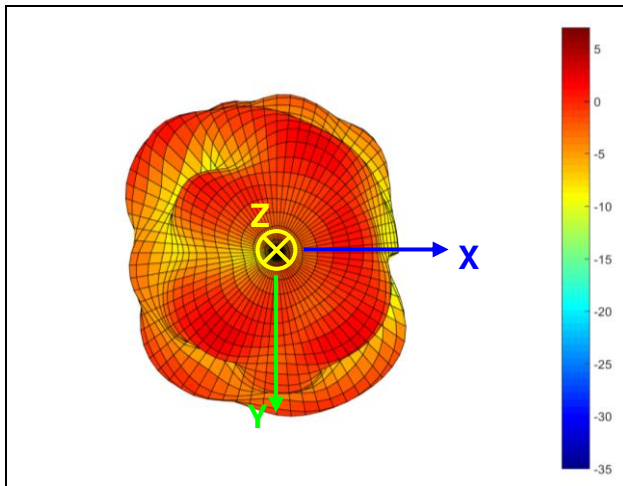
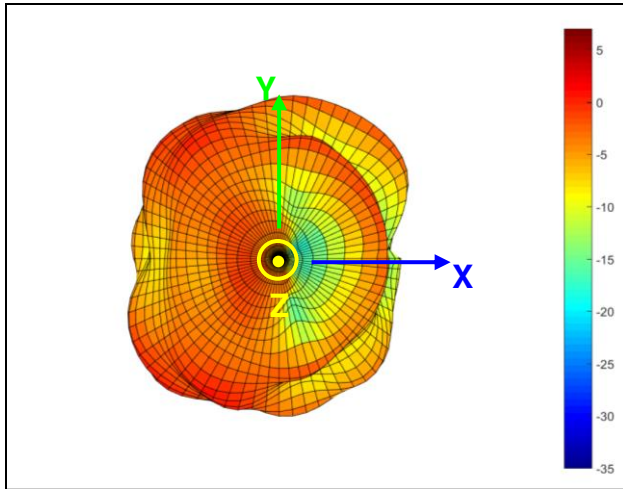
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10. Radiation Gain Pattern of WiFi Antenna 2.

10.1. 2400~2484MHz Band

3D Radiation Gain Pattern @ 2442 MHz (Unit: dBi)



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TITLE : 5 in 1 external antenna (HM15HF)

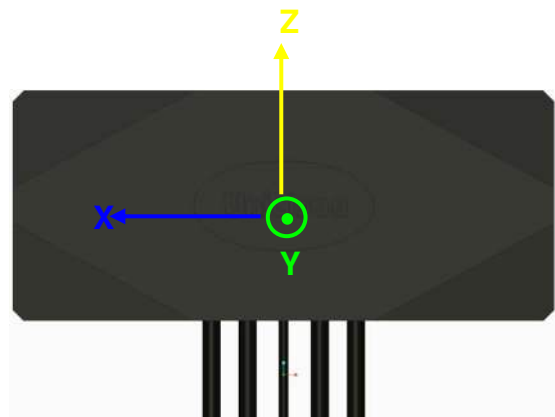
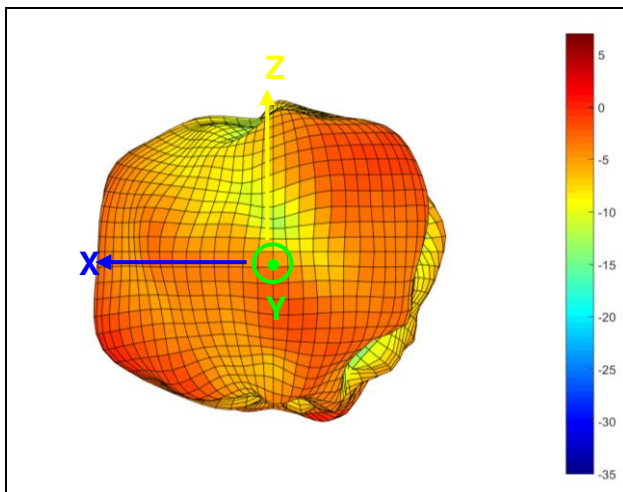
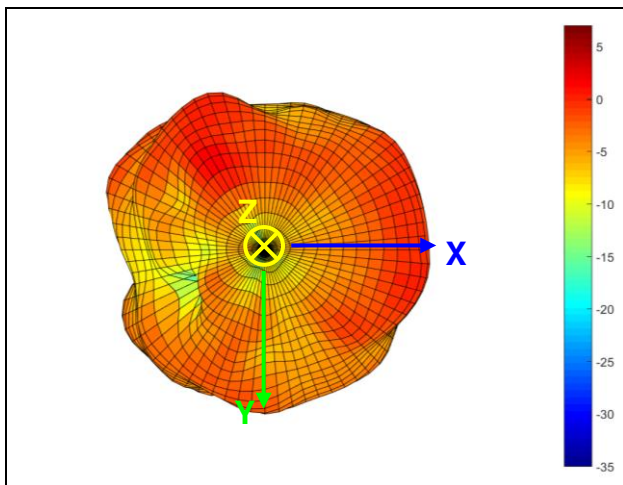
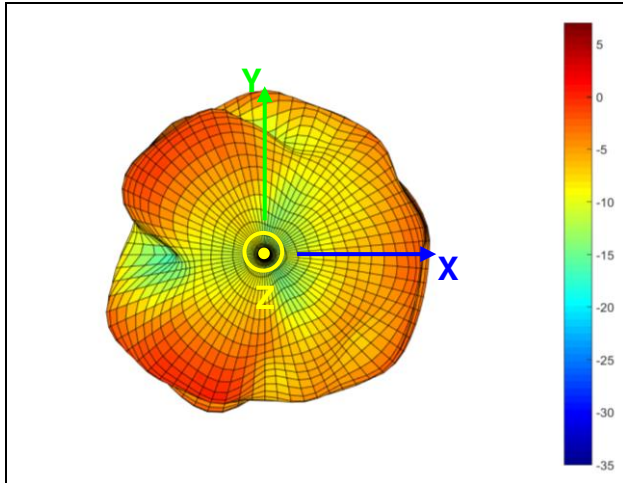
DOCUMENT NO.

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10.2. 5150~5850MHz Band

3D Radiation Gain Pattern @ 5550 MHz (Unit: dBi)



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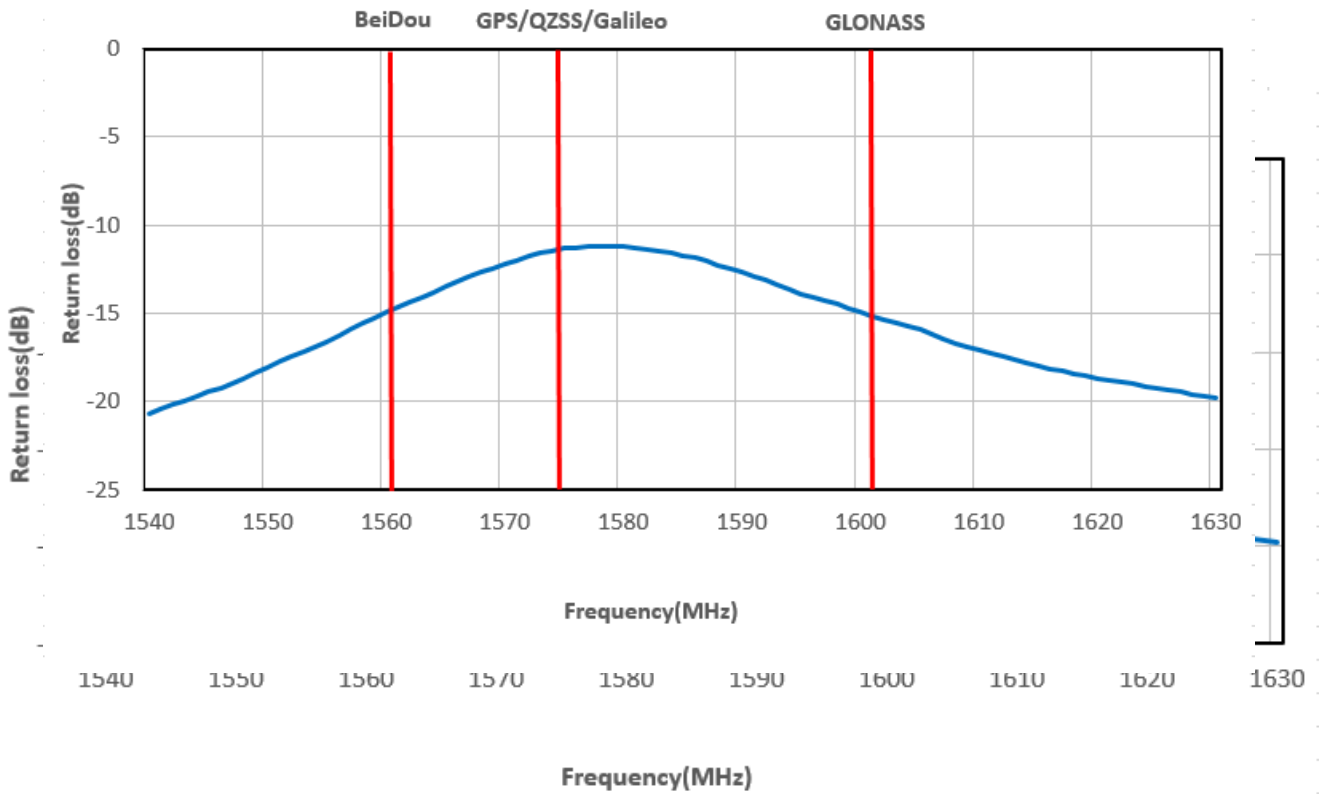
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11. GNSS Navigation Antenna Characteristics.

11.1 Return loss



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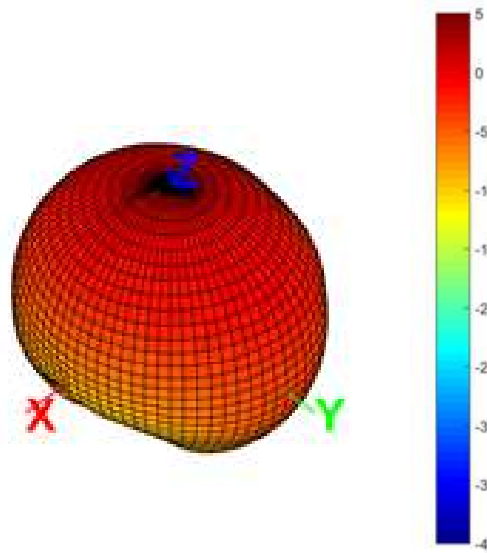
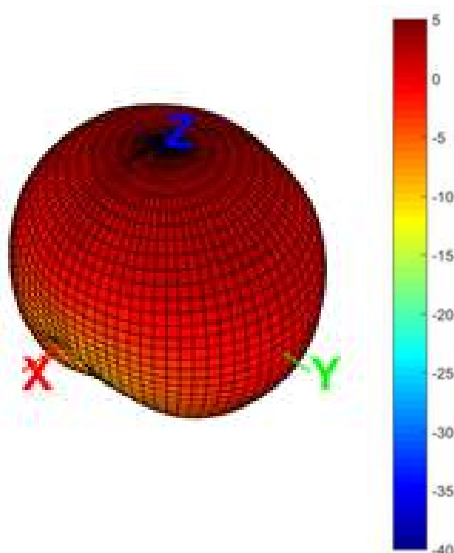
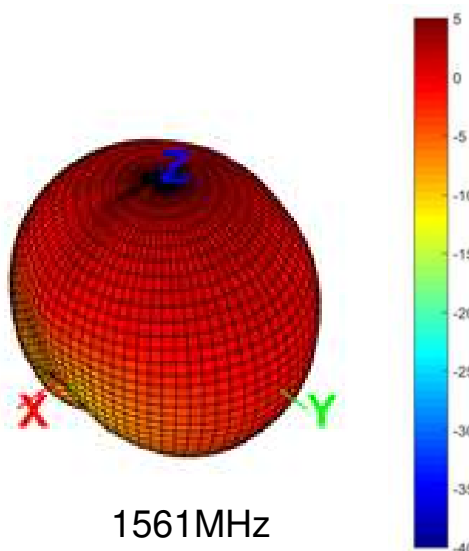
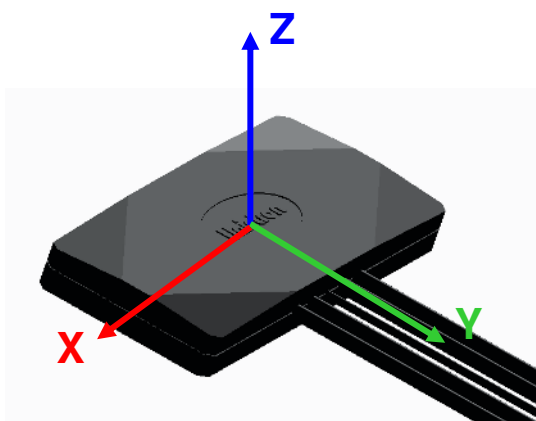
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11.2 Radiation Gain Pattern (Unit: dBi)



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