



TAOGLAS®



Datasheet

MA245 Genesis

Part No:
MA245.LBIC.002

Description:
4in1 GNSS, 5G/4G MIMO & Wi-Fi MIMO Adhesive Mount Combination Antenna

Features:
Adhesive Mount Combination Antenna
1*GNSS: 3 Meter RG-174 FAKRA Code C Jack Blue
2*5G/4G: 3 meter CFD-200 FAKRA Code D Jack Bordeaux Violet
1*Wi-Fi: 3 meter CFD-200 FAKRA Code I Jack Beige
IP65 Rated Enclosure
Dimensions: 205.8 x 68 x 12.4mm
CE Certified
RoHS & Reach Compliant

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1. Introduction



The Taoglas MA245 4in1 Genesis is an omni-directional, fully IP65 waterproof external antenna for use in telematics, transportation, and remote monitoring applications. It is an ideal product for the automotive industry as it utilizes

This unique antenna delivers powerful MIMO antenna technology for cellular LTE as well as GPS-GLONASS plus Wi-Fi dual-band 2.4/5 GHz for next generation multiple wireless technology systems, such as vehicle telematics.

Potential uses are new fleet management and applications that demand high speed data uplink and downlink. High efficiency and high gain MIMO antennas are necessary to achieve the required signal to noise ratio and throughput required to solve these challenges.

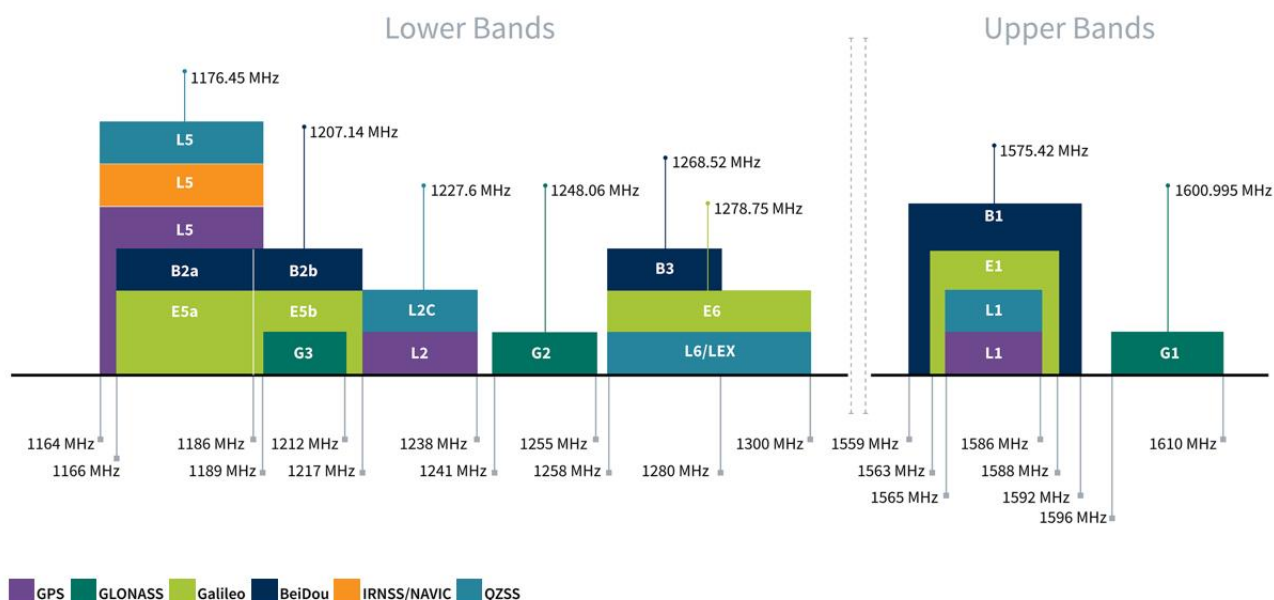
The GNSS antenna has been carefully designed to work equally well on both GPS/GALILEO and GLONASS bands, leading to higher location accuracy and stability of tracking in urban environments.

Cable length and connector types are customizable. Contact your regional Taoglas customer support team for further information.

2. Specifications

GNSS Frequency Bands Covered

GPS/QZSS	L1 1575.42MHz	L2 1227.6MHz	L5 1176.45MHz	L6 1278.75MHz			
	■	□	□	□			
GLONASS	L5R 1176.45MHz	L3PT 1201.5MHz	L2PT 1246MHz	L1CR 1575.42MHz	L1PT 1602MHz		
	□	□	□	□	■		
Galileo	E5a 1176.45MHz	E5b 1201.5MHz	E4 1215MHz	E3 1256MHz	E6 1278.75MHz	E2 1561MHz	E1 1575.42MHz
	□	□	□	□	□	□	■
BeiDou	B1 1561MHz	B2 1207.14MHz	B3 1268.52MHz				
	□	□	□				
Compass	E5B(B2)/ E6(B3) 1268.56MHz	E2(B1) 1561MHz					
	□	□					
SBAS	Omnistar 1542.5MHz	WAAS/EGN OS 1575.42MHz					
	□	■					



GNSS Bands and Constellations

GPS-GLONASS	
Center Frequency	GPS:1575.42±3 MHz GLONASS:1602±0.5 MHz
Passive Antenna Efficiency	GPS: 63.14% GLONASS: 67.16%i
Passive Antenna Average Gain	GPS: -2.00dB GLONASS: -1.73dB
Passive Antenna Peak Gain	GPS: 2.14dBi GLONASS: 2.24dBi
VSWR	2:1 Max
Polarization	RHCP
Impedance	50 Ω

LNA Electrical Properties	
Center Frequency	GPS:1575.42±3 MHz GLONASS:1602±0.5 MHz
Impedance	50 Ω
VSWR	< 1.5:1
Return Loss	10 dB Min.
Gain (at 3.3V)	30dB
Input Voltage	3.3V
Noise Figure (at 3.3V)	1.7dB
Current Consumption (at 3.3V)	15mA

5G/4G MIMO								
Band	Frequency (MHz)		Efficiency (%)	Average Gain (dB)	Peak Gain (dBi)	VSWR	Impedance	Polarization
5G NR/4G Band 5,8,12,13,14,17,18,20,26,27,28, 29,71	615~960	MIMO1	50	-3.0	4.0	<3.5:1	50Ω	Linear
		MIMO2	51	-3.0	3.6			
4G/3G Band 1,2,3,4,9,23,25,35,39,66	1710~2200	MIMO1	51	-3.0	3.7			
		MIMO2	55	-2.6	3.6			
Wi-Fi 2400	2400~2485	MIMO1	63	-2.0	3.2			
		MIMO2	60	-2.2	4.3			
4G/3G Band 7,38,41	2490~2690	MIMO1	68	-1.7	4.1			
		MIMO2	67	-1.7	4.5			
5G NR/4G Band 22,42,43,48,77,78,79	3300~5000	MIMO1	53	-3.1	5.0			
		MIMO2	45	-3.6	5.7			
LTE5200/ Wi-Fi 5800	5150~5925	MIMO1	42	-3.8	3.4			
		MIMO2	45	-3.5	4.5			

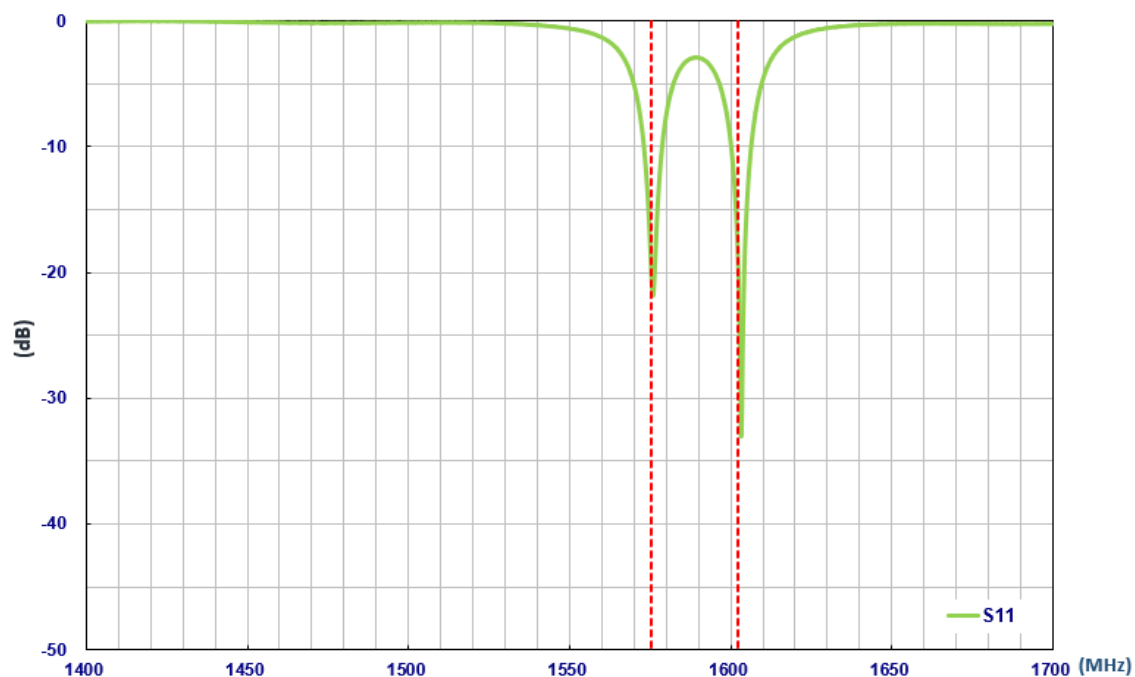
2.4GHz/5.8GHz Wi-Fi Antenna		
Frequency (MHz)	2400~2500	4900~5850
Efficiency (%)		
Freespace	56.09	42.82
Average Gain (dB)		
Freespace	-2.51	-3.68
Peak Gain (dBi)		
Freespace	3.46	3.03
Impedance	50 Ω	
Polarization	Linear	
VSWR	< 3	

Mechanical	
Antenna Dimensions	205.8 x 68 x 12.4mm
Housing	PC+ABS Alloy
Ingress Protection Rating	IP65
Cables	Cellular: 3m CFD200, Fully customizable GNSS: 3m RG174, Fully customizable Wi-Fi: 3m CFD200, Fully customizable
Connectors	Cellular: FAKRA Code D, Fully customizable GNSS: FAKRA Code C Jack, standard, Fully customizable Wi-Fi: FAKRA CODE I, Fully customizable
Environmental	
Operation Temperature	-40°C to 80°C
Storage Temperature	-40°C to 90°C
Humidity	Non-condensing 65°C 95% RH

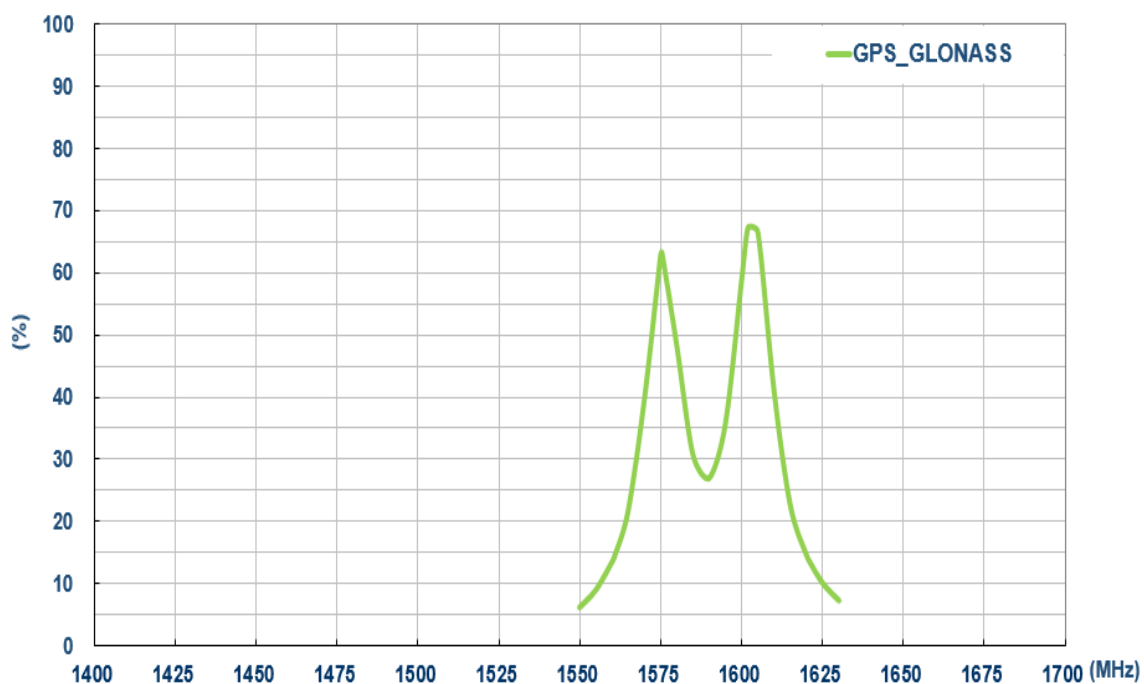
5G/4G Bands			
Band Number	5G NR / FR1 / LTE / LTE-Advanced / WCDMA / HSPA / HSPA+ / TD-SCDMA		
	Uplink	Downlink	Covered
1	UL: 1920 to 1980	DL: 2110 to 2170	✓
2	UL: 1850 to 1910	DL: 1930 to 1990	✓
3	UL: 1710 to 1785	DL: 1805 to 1880	✓
4	UL: 1710 to 1755	DL: 2110 to 2155	✓
5	UL: 824 to 849	DL: 869 to 894	✓
7	UL: 2500 to 2570	DL: 2620 to 2690	✓
8	UL: 880 to 915	DL: 925 to 960	✓
9	UL: 1749.9 to 1784.9	DL: 1844.9 to 1879.9	✓
11	UL: 1427.9 to 1447.9	DL: 1475.9 to 1495.9	✗
12	UL: 699 to 716	DL: 729 to 746	✓
13	UL: 777 to 787	DL: 746 to 756	✓
14	UL: 788 to 798	DL: 758 to 768	✓
17	UL: 704 to 716	DL: 734 to 746	✓
18	UL: 815 to 830	DL: 860 to 875	✓
19	UL: 830 to 845	DL: 875 to 890	✓
20	UL: 832 to 862	DL: 791 to 821	✓
21	UL: 1447.9 to 1462.9	DL: 1495.9 to 1510.9	✗
22	UL: 3410 to 3490	DL: 3510 to 3590	✓
23	UL: 2000 to 2020	DL: 2180 to 2200	✓
24	UL: 1625.5 to 1660.5	DL: 1525 to 1559	✗
25	UL: 1850 to 1915	DL: 1930 to 1995	✓
26	UL: 814 to 849	DL: 859 to 894	✓
27	UL: 807 to 824	DL: 852 to 869	✓
28	UL: 703 to 748	DL: 758 to 803	✓
29	UL: -	DL: 717 to 728	✓
30	UL: 2305 to 2315	DL: 2350 to 2360	✓
31	UL: 452.5 to 457.5	DL: 462.5 to 467.5	✗
32	UL: -	DL: 1452 - 1496	✗
35		1850 to 1910	✓
38		2570 to 2620	✓
39		1880 to 1920	✓
40		2300 to 2400	✓
41		2496 to 2690	✓
42		3400 to 3600	✓
43		3600 to 3800	✓
48		3550 to 3700	✓
66	UL: 1710-1780	DL: 2110-2200	✓
71		617 to 698	✓
74/75/76		1427 to 1518	✗
78		3300 to 3800	✓
79		4400 to 5000	✗
85	698-716	728-746	✓

3. Antenna Characteristics

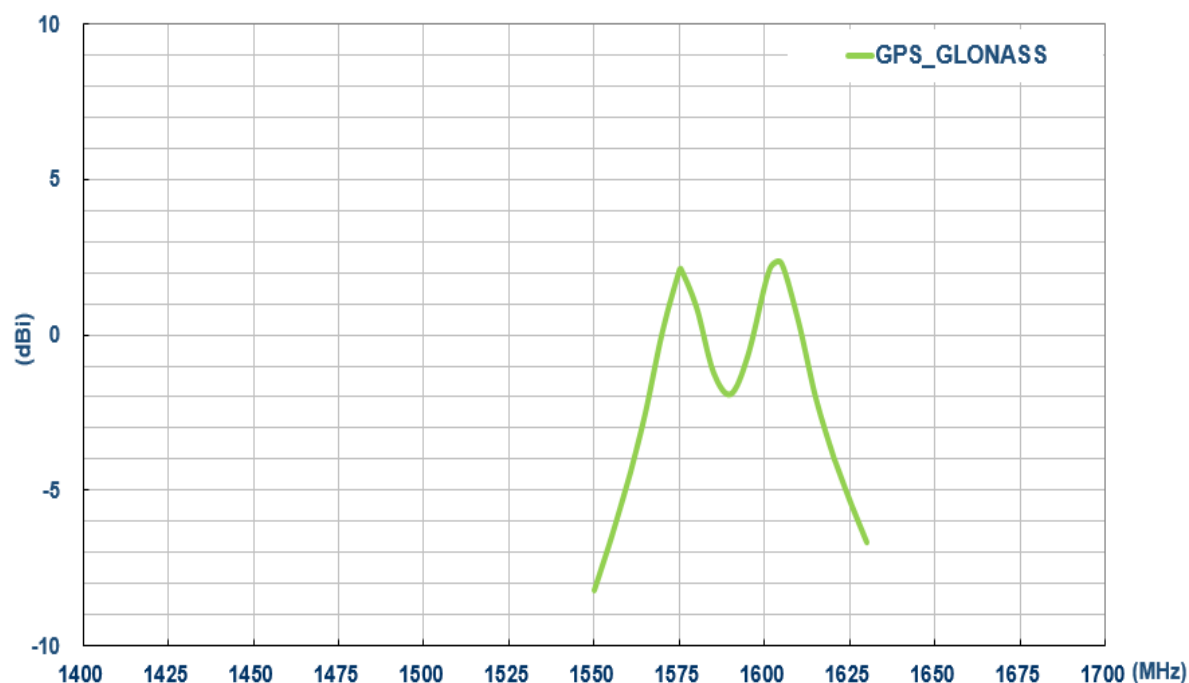
3.1 GNSS - Return Loss



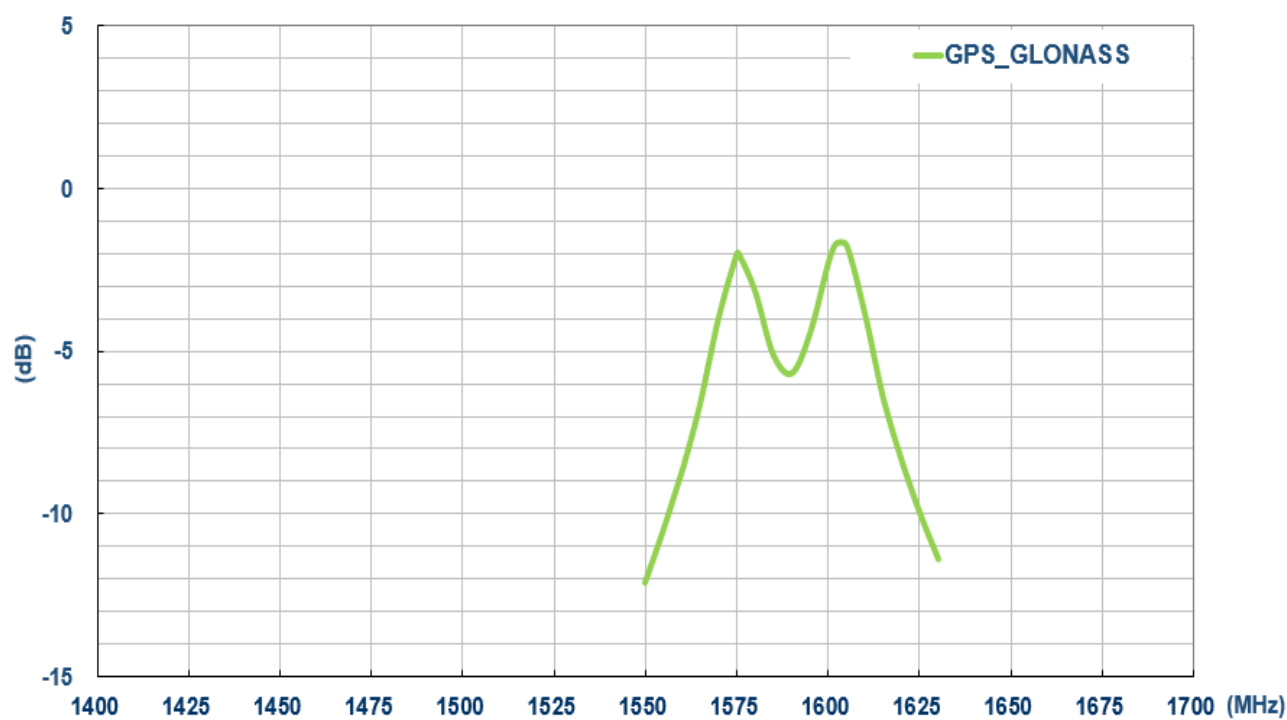
3.2 GNSS – Efficiency



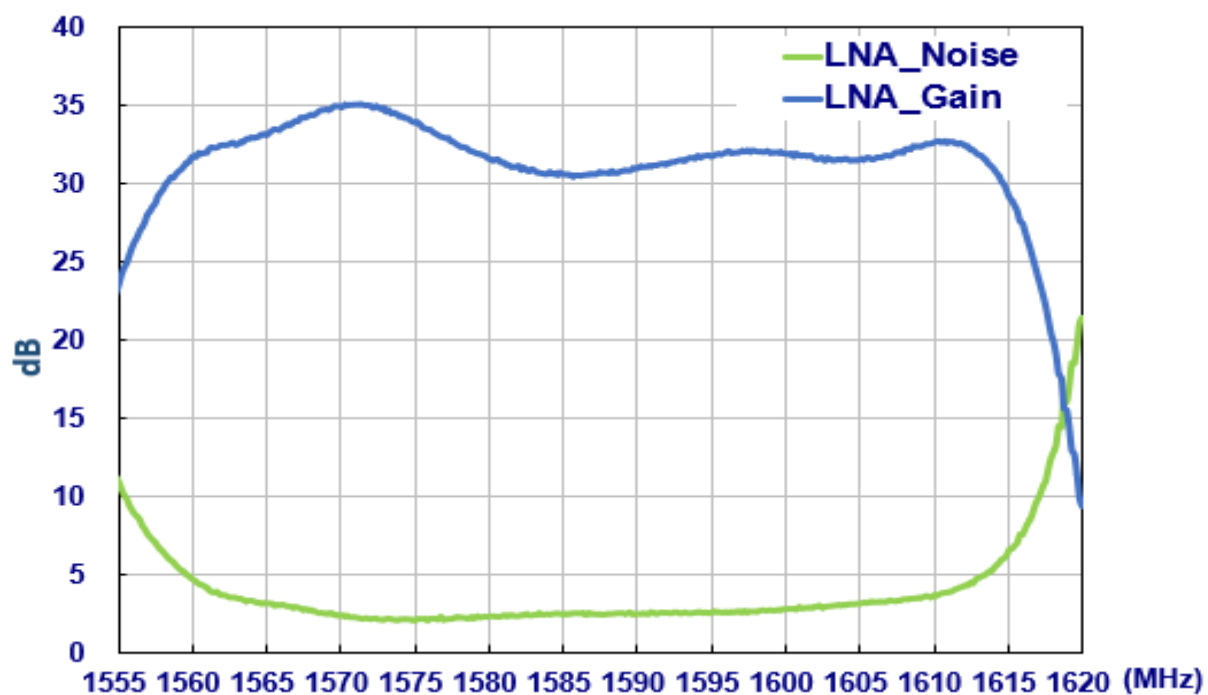
3.3 GNSS – Peak Gain



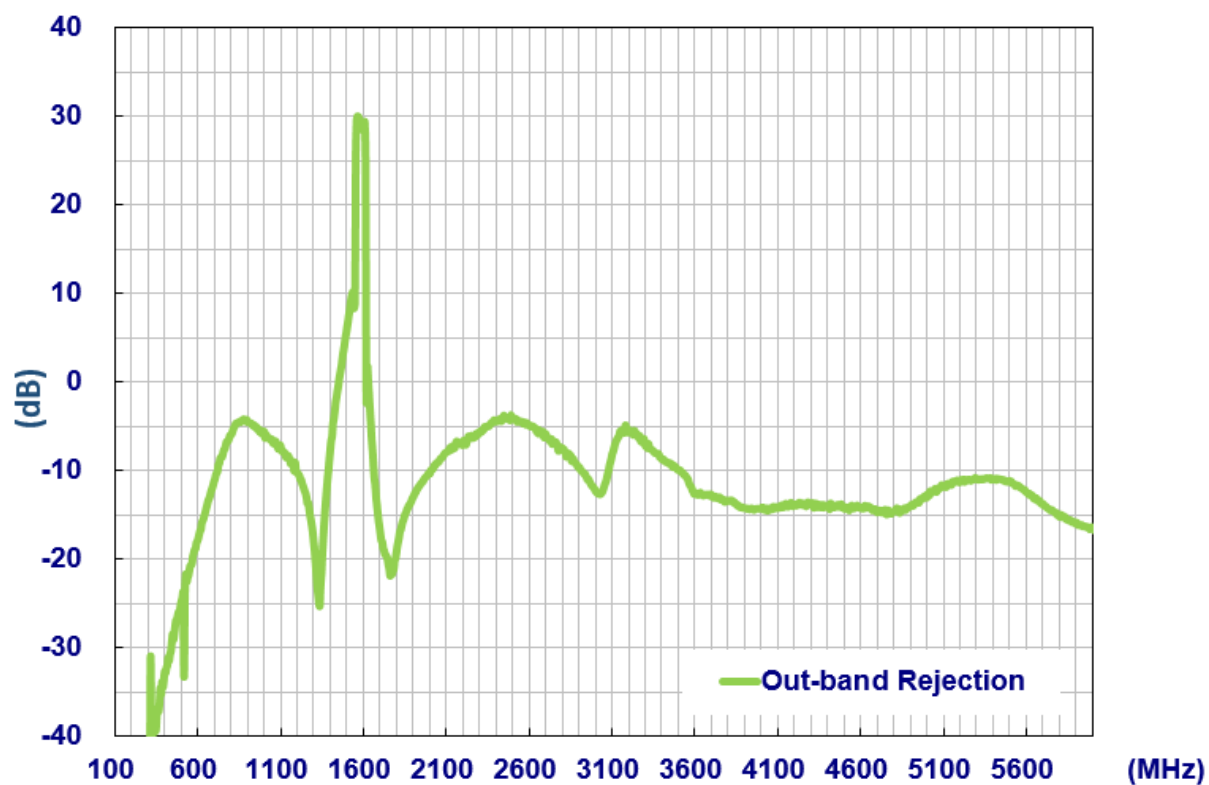
3.4 GNSS – Average Gain



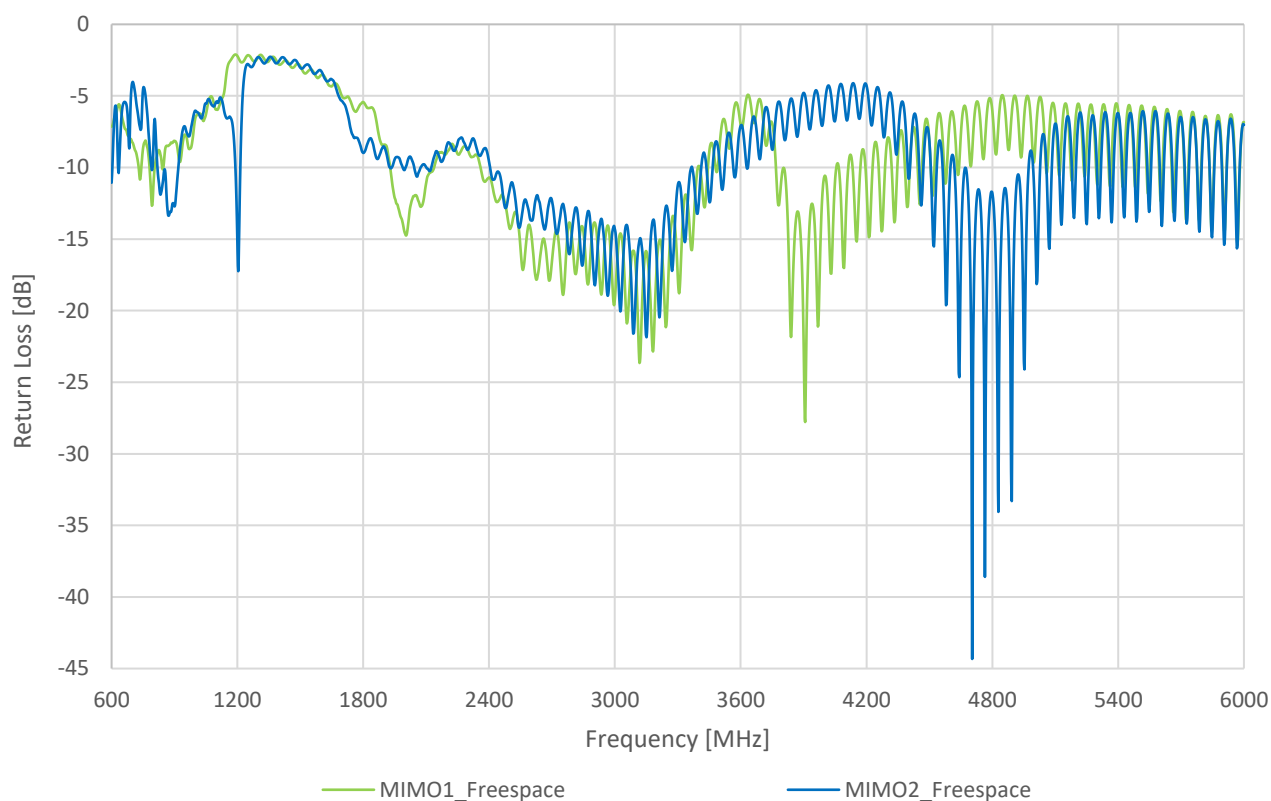
3.5 GNSS - LNA Noise Figure



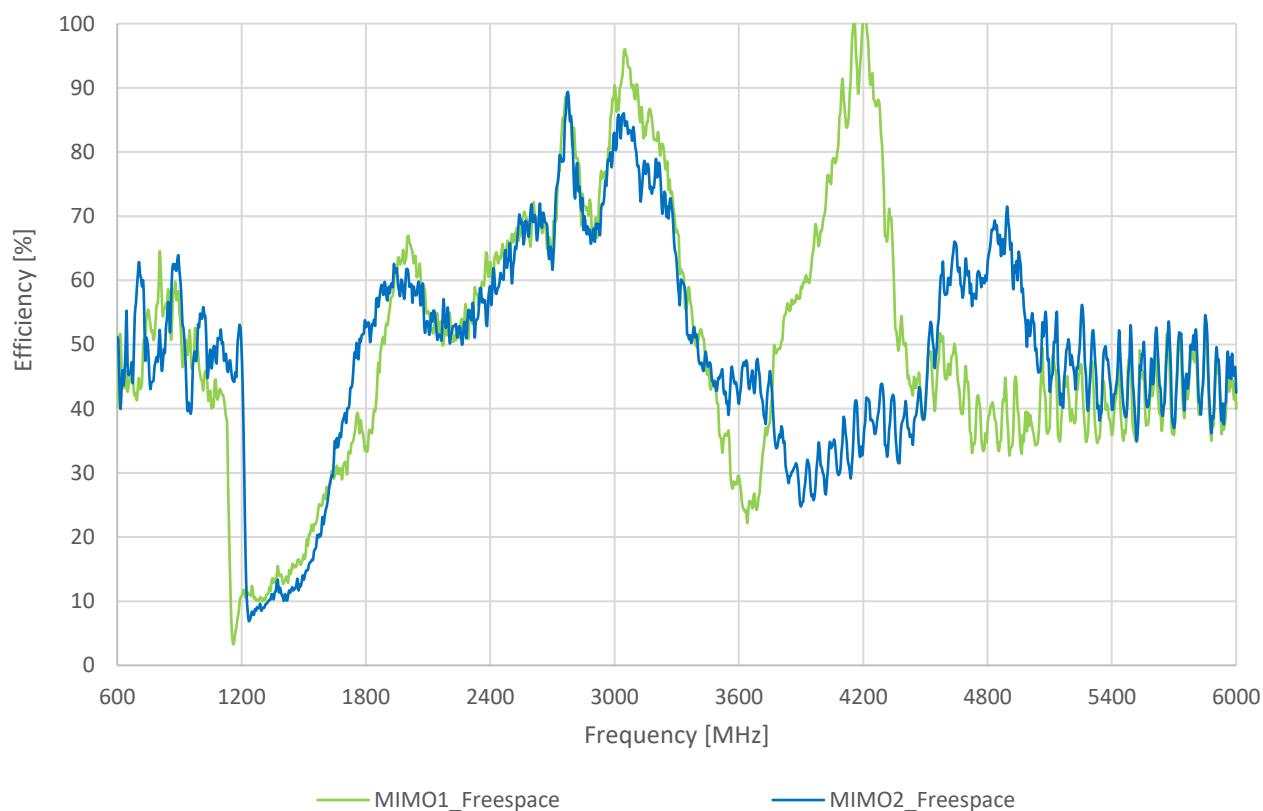
3.6 GNSS – Out of Band Rejection



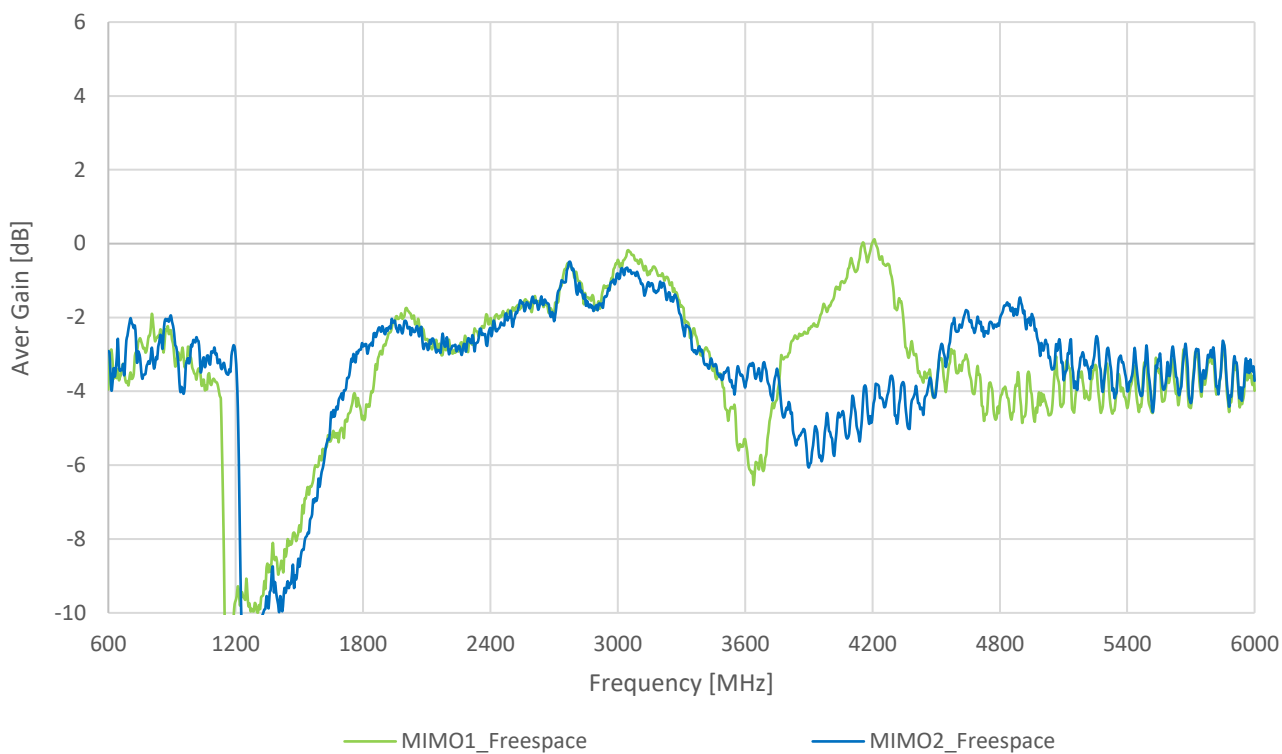
3.7 LTE - Return Loss



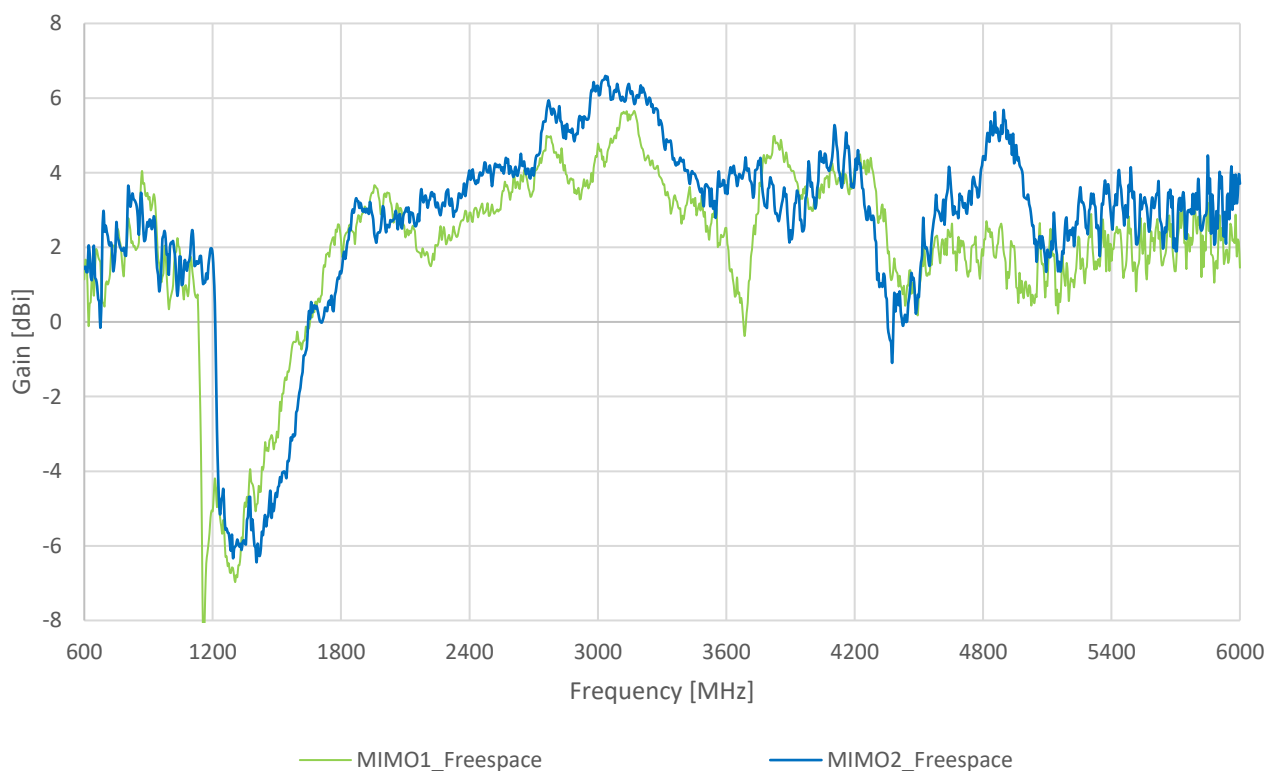
3.8 LTE - Efficiency



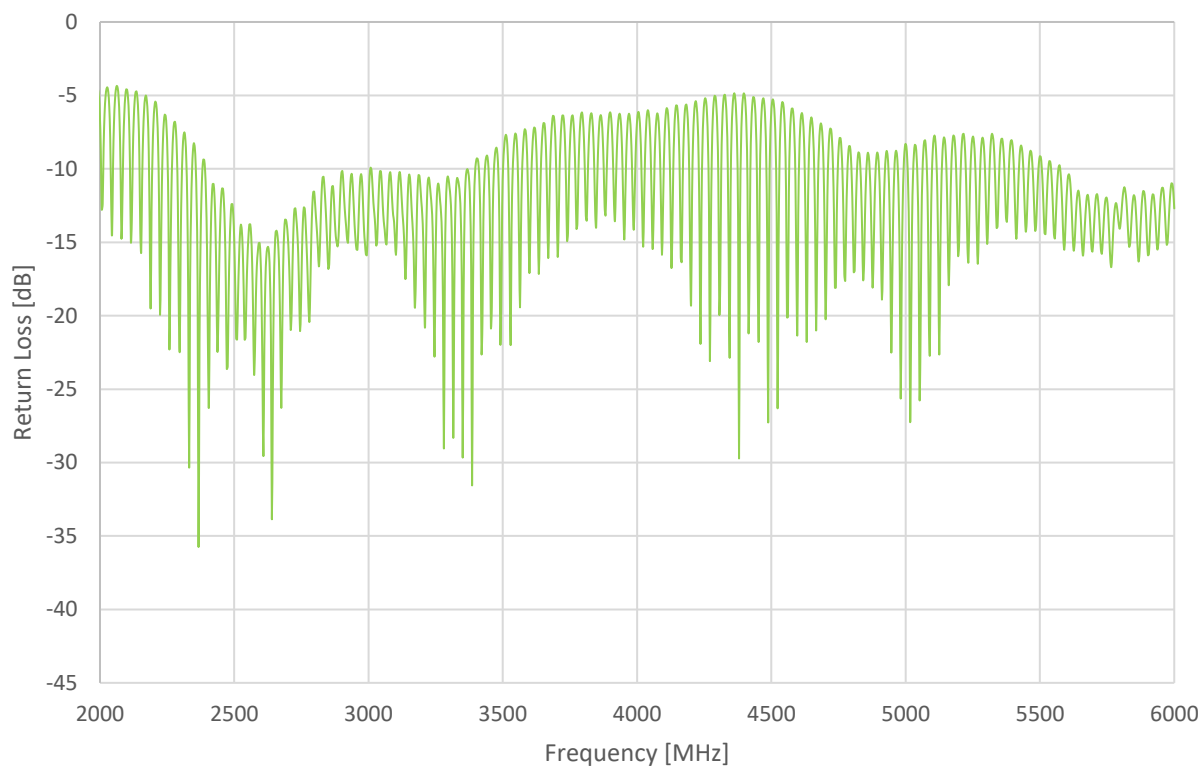
3.9 LTE - Average Gain



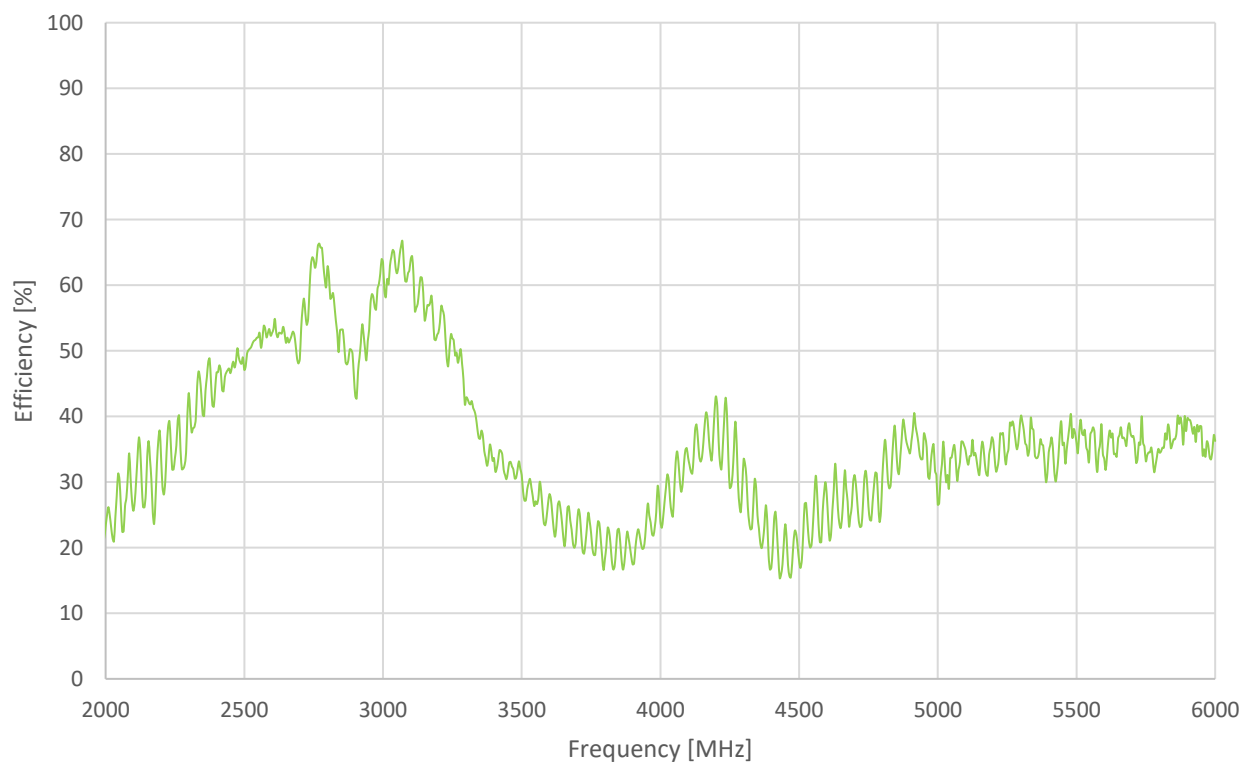
3.10 LTE - Peak Gain



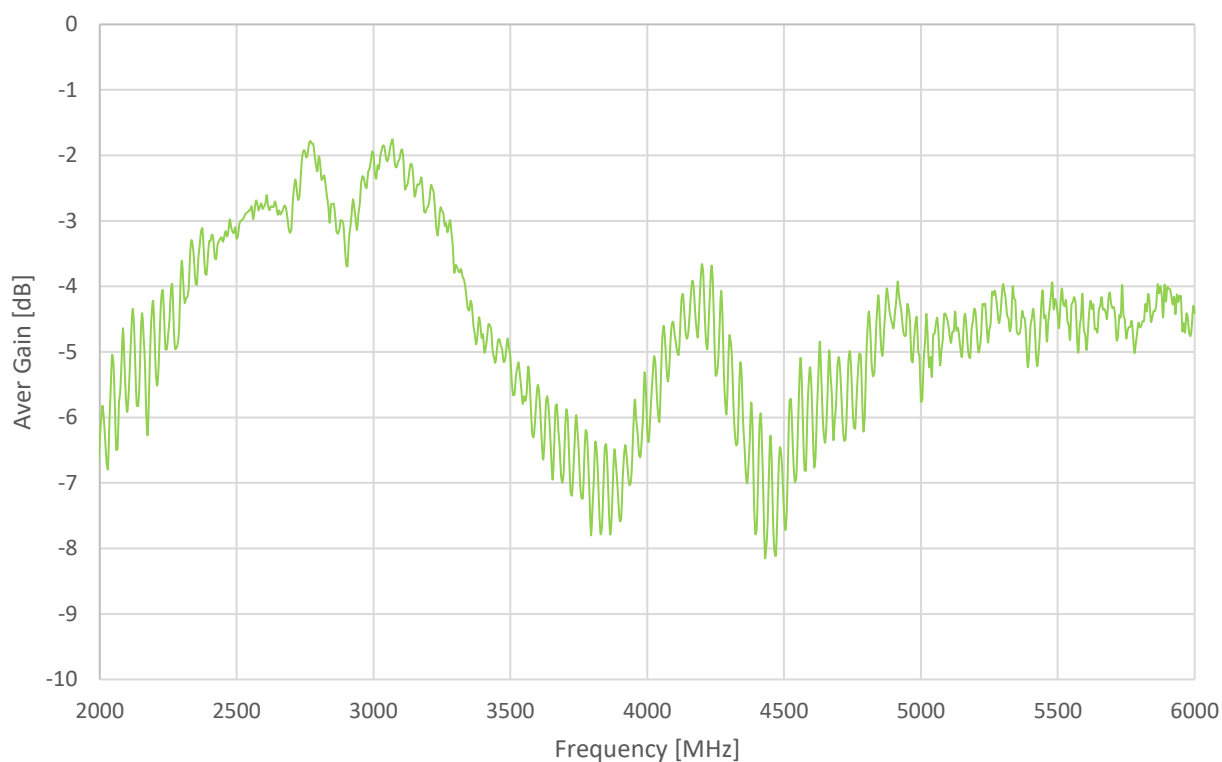
3.11 Wi-Fi - Return Loss



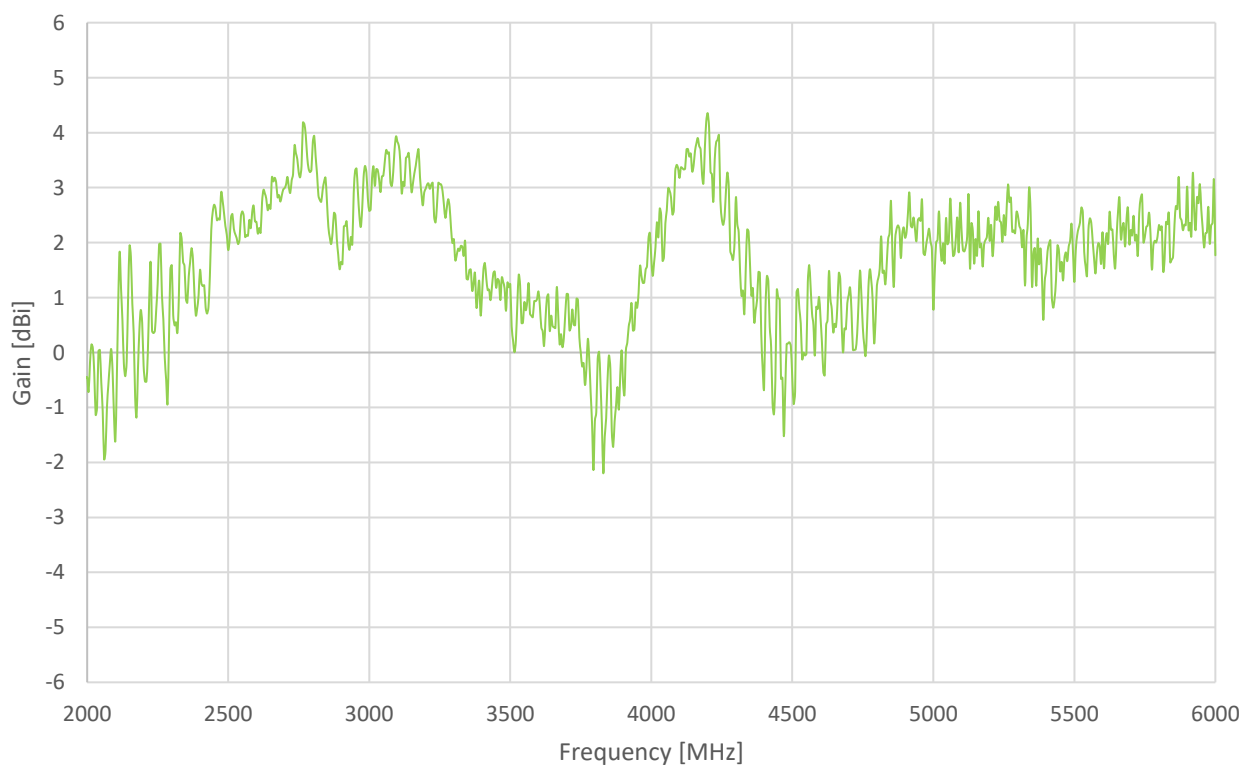
3.12 Wi-Fi - Efficiency



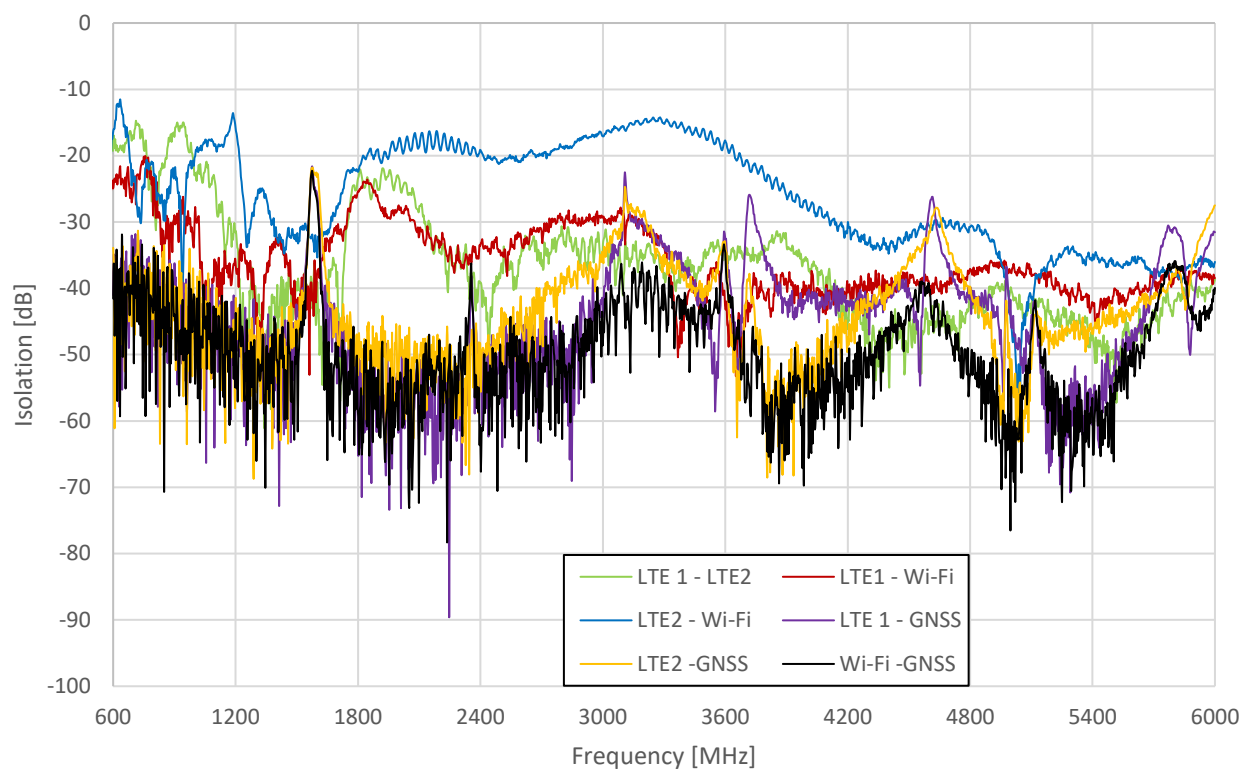
3.13 Wi-Fi - Average Gain



3.14 Wi-Fi - Peak Gain



3.15 Isolation

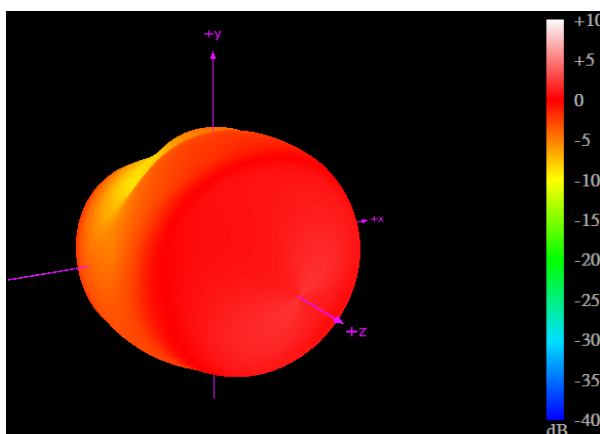


4. Radiation Patterns

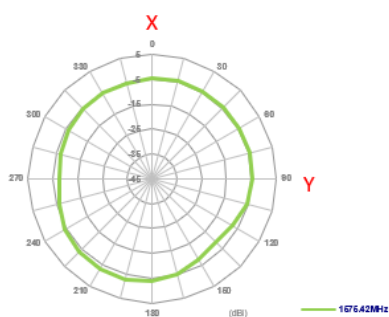
4.1 Test Setup – Freespace



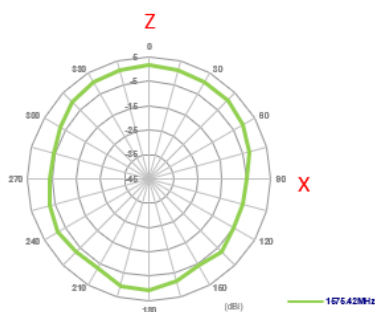
4.2 GNSS_1575.42MHz - 2D & 3D Radiation Patterns



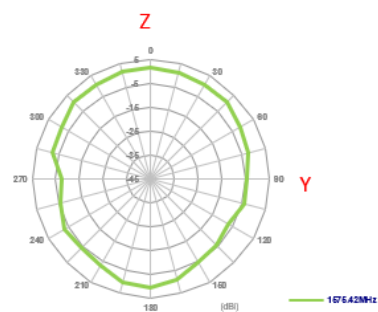
XY Plane



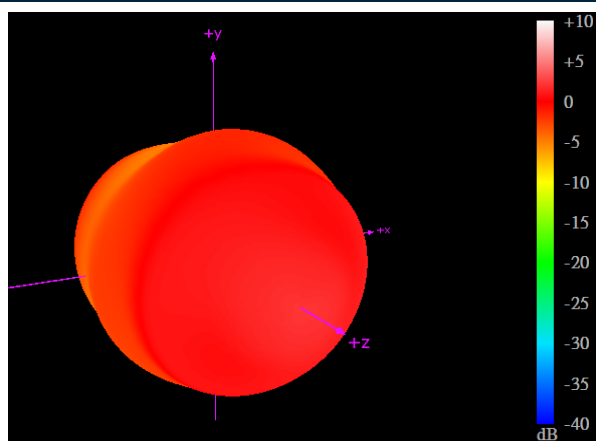
XZ Plane



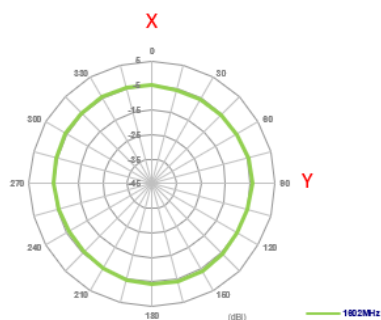
YZ Plane



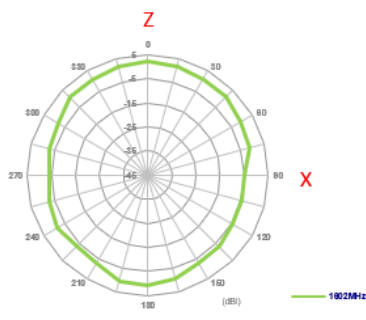
1602MHz



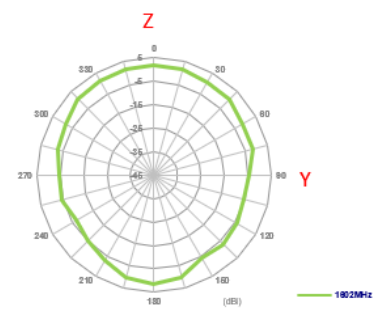
XY Plane



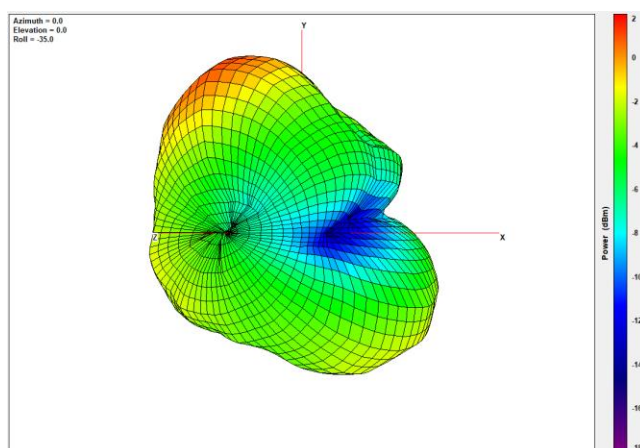
XZ Plane



YZ Plane



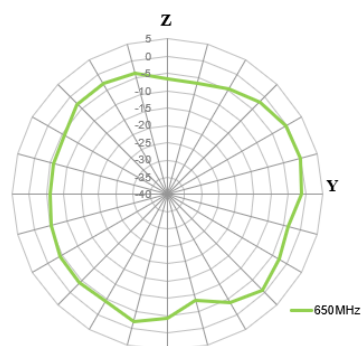
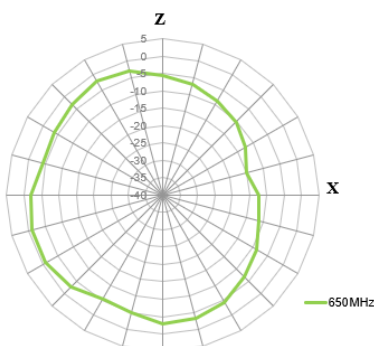
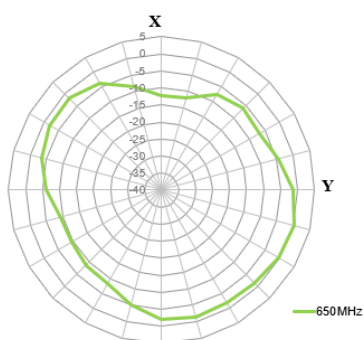
4.3 LTE_650MHz _MIMO1 - 2D & 3D Radiation Patterns



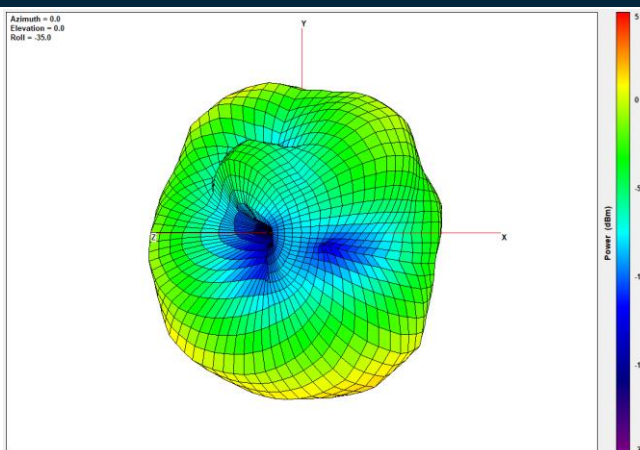
XY Plane

XZ Plane

YZ Plane



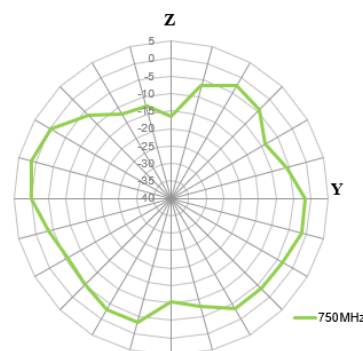
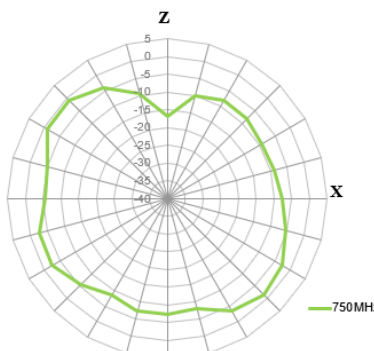
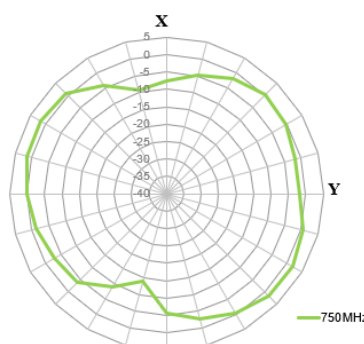
750MHz



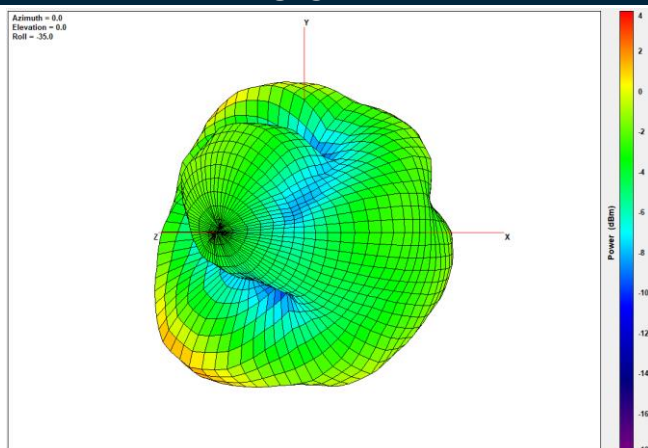
XY Plane

XZ Plane

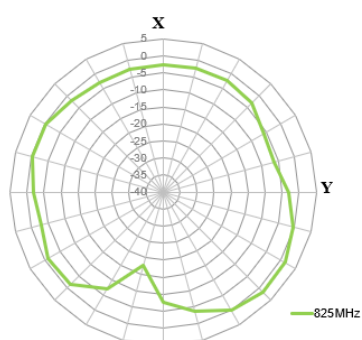
YZ Plane



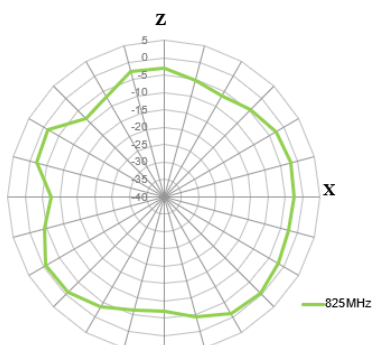
825MHz



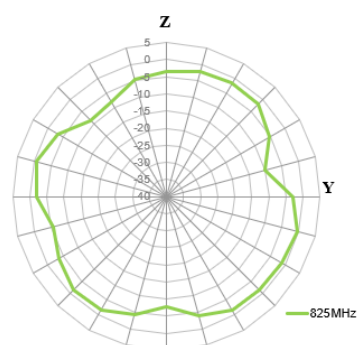
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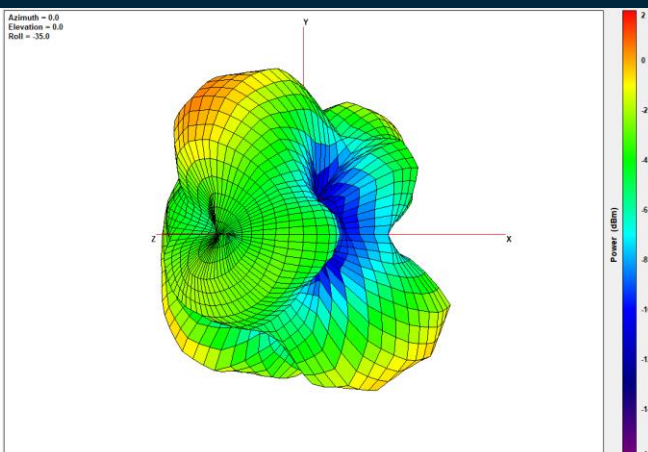
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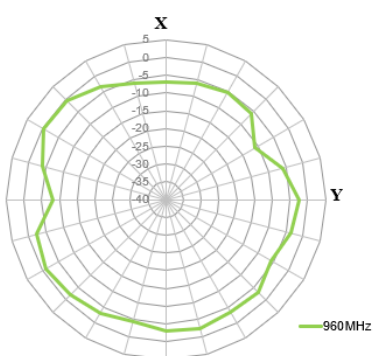
YZ Plane



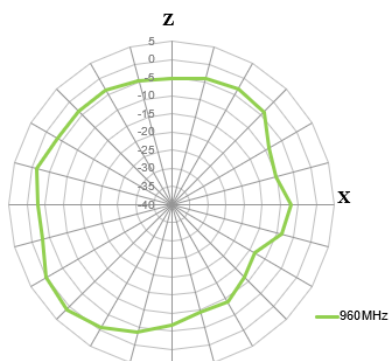
960MHz



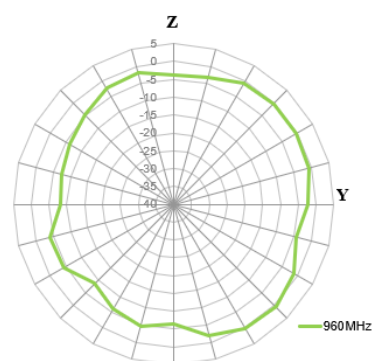
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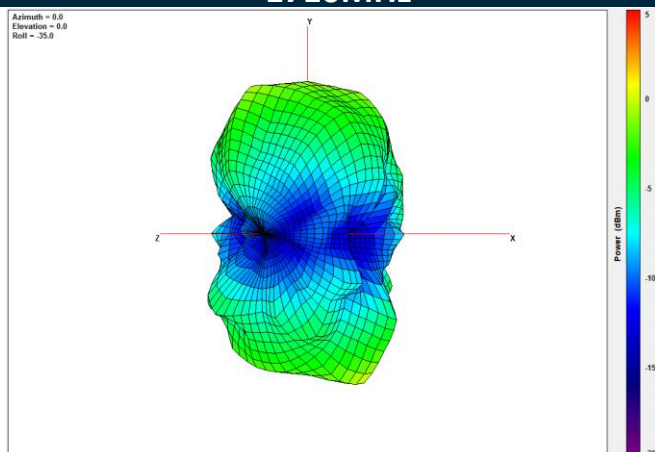
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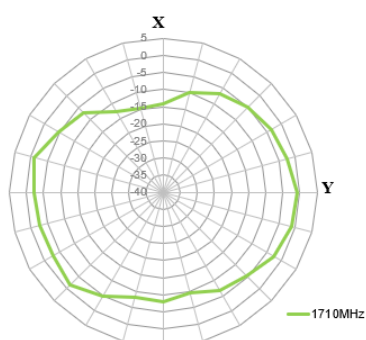
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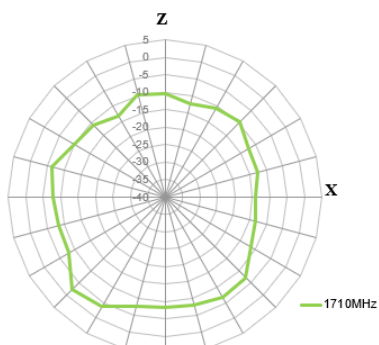
1710MHz



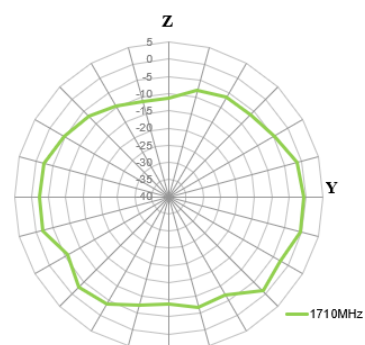
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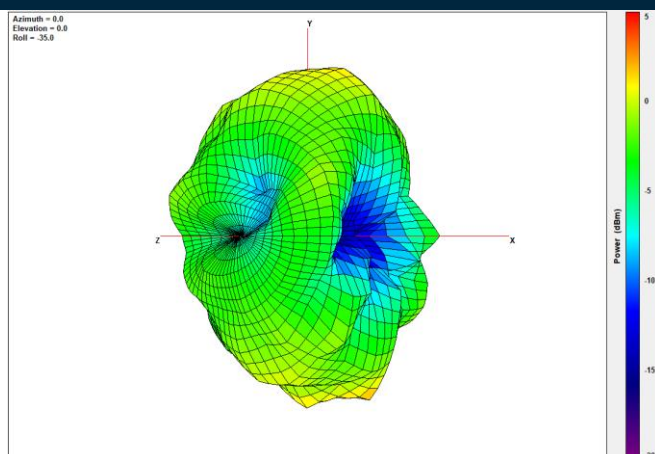
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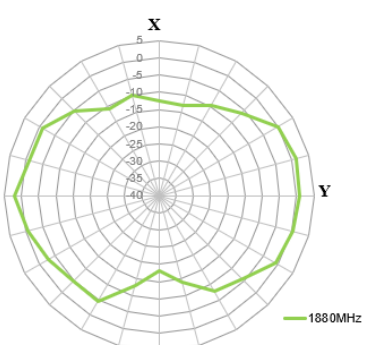
YZ Plane



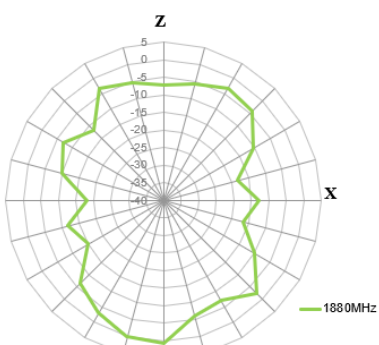
1880MHz



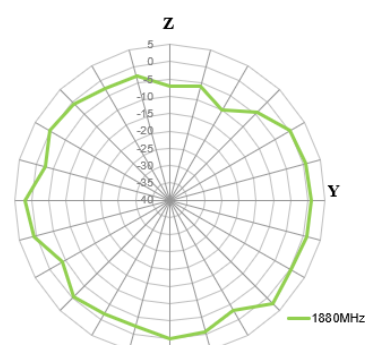
XY Plane



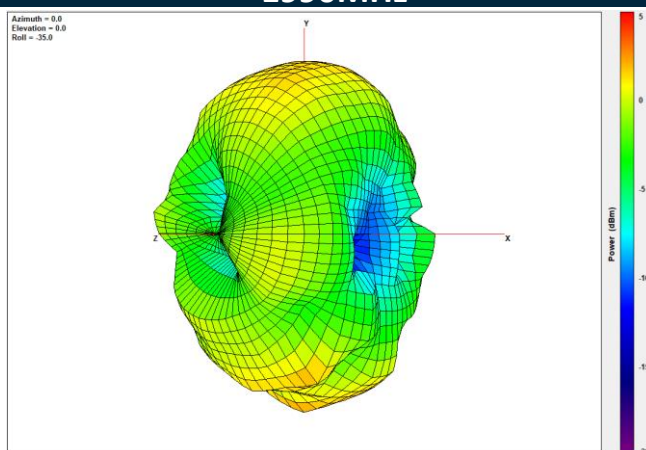
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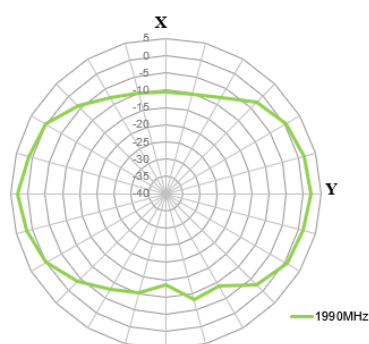
YZ Plane



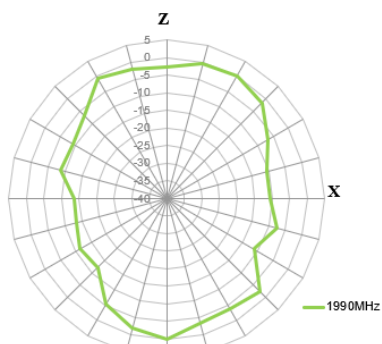
1990MHz



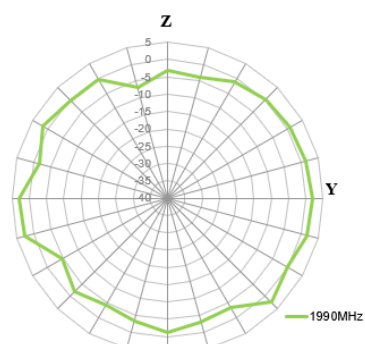
XY Plane



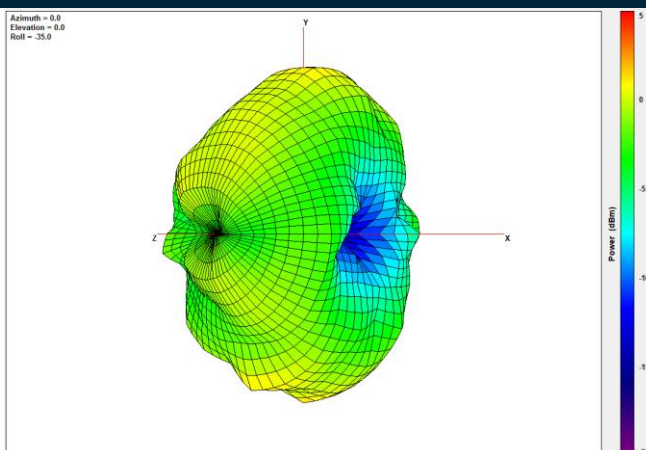
XZ Plane



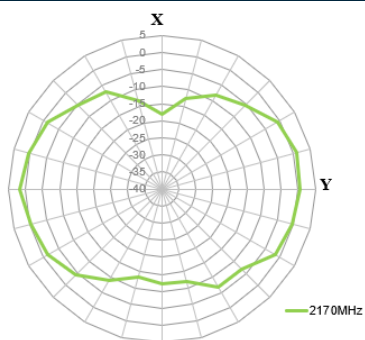
YZ Plane



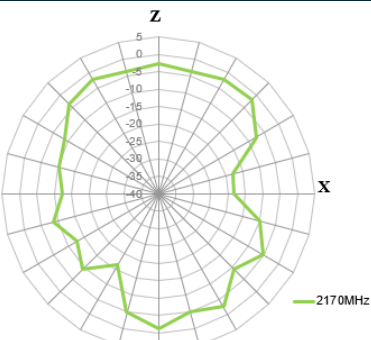
2170MHz



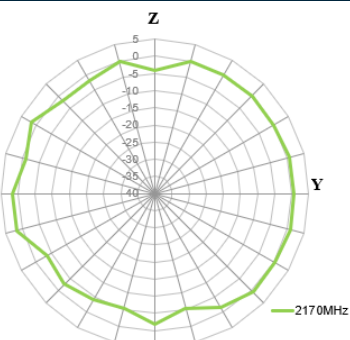
XY Plane



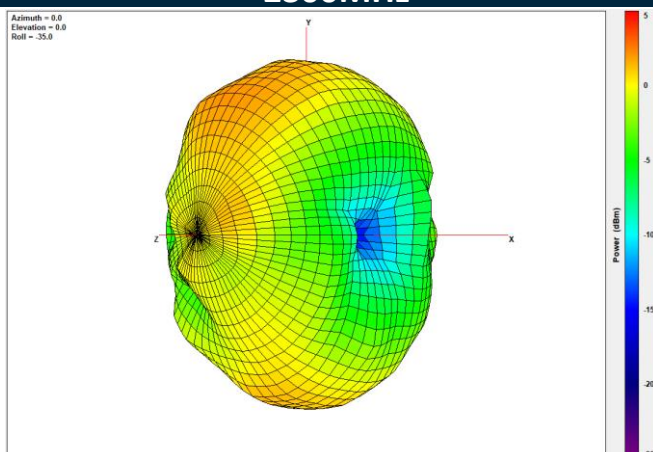
XZ Plane



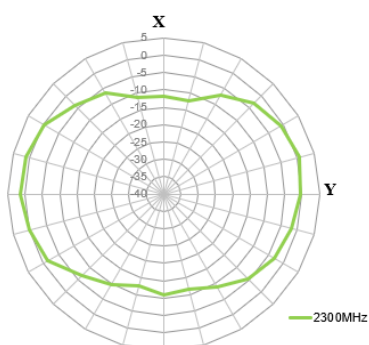
YZ Plane



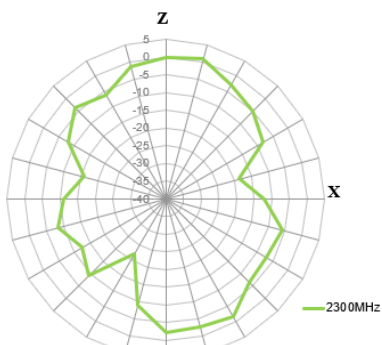
2300MHz



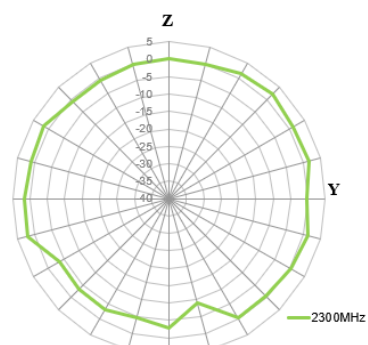
XY Plane



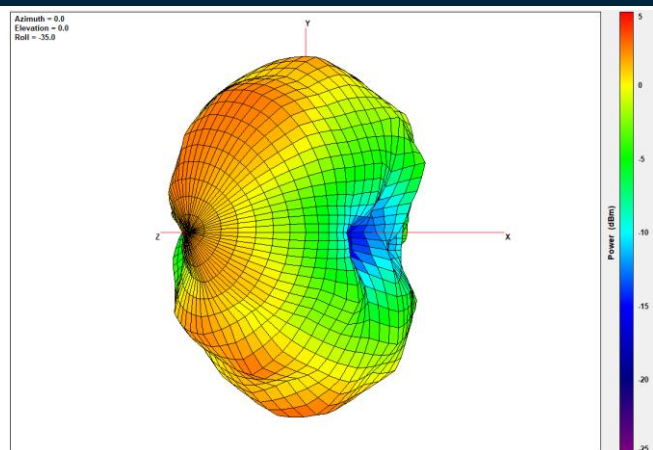
XZ Plane



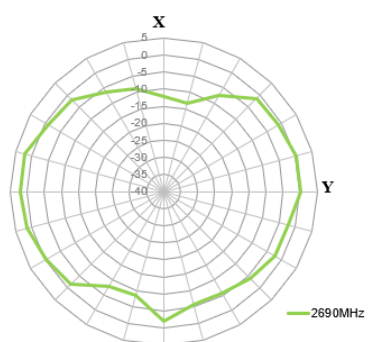
YZ Plane



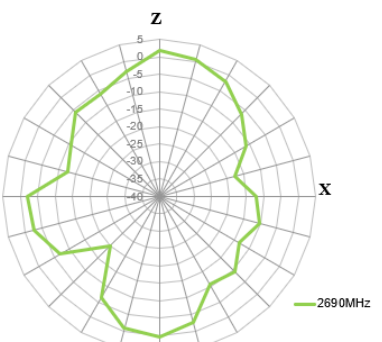
2690MHz



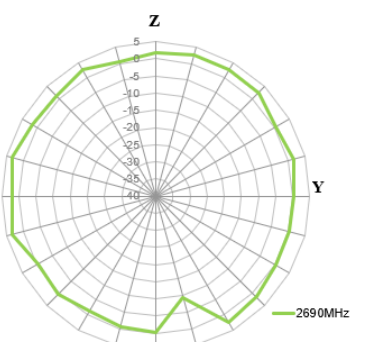
XY Plane



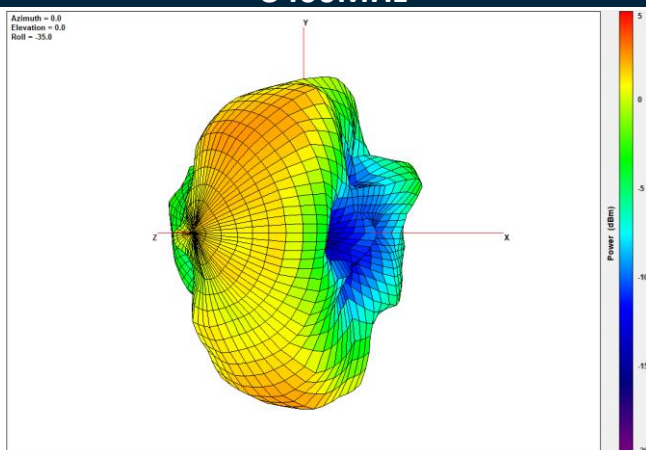
XZ Plane



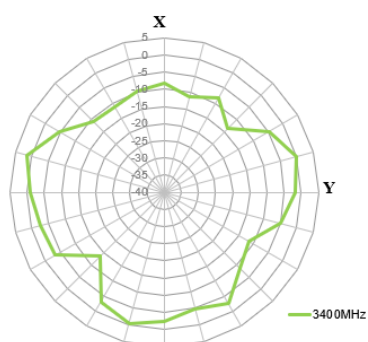
YZ Plane



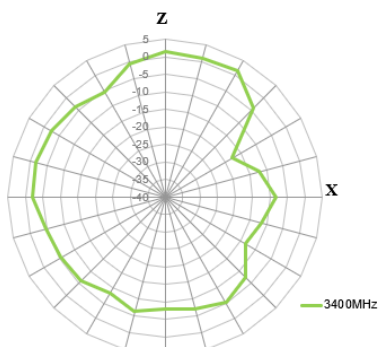
3400MHz



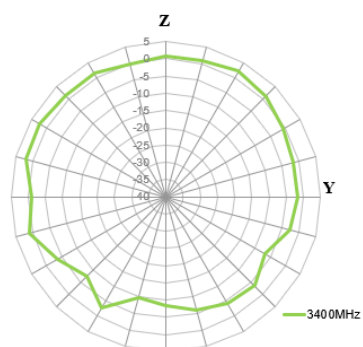
XY Plane



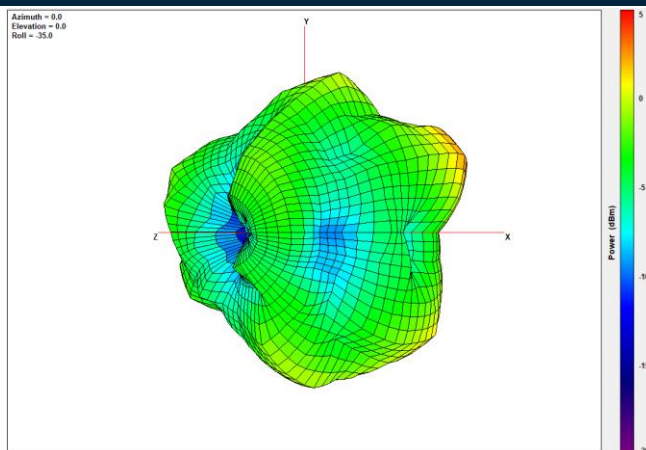
XZ Plane



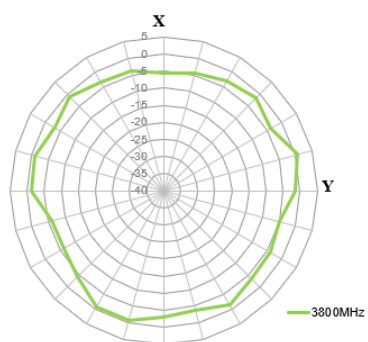
YZ Plane



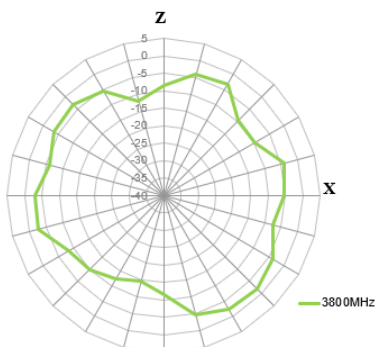
3800MHz



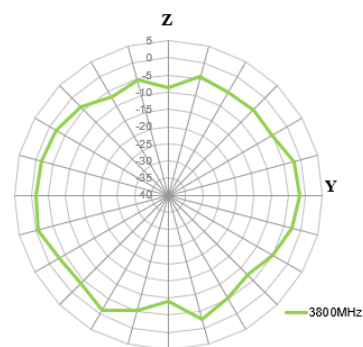
XY Plane



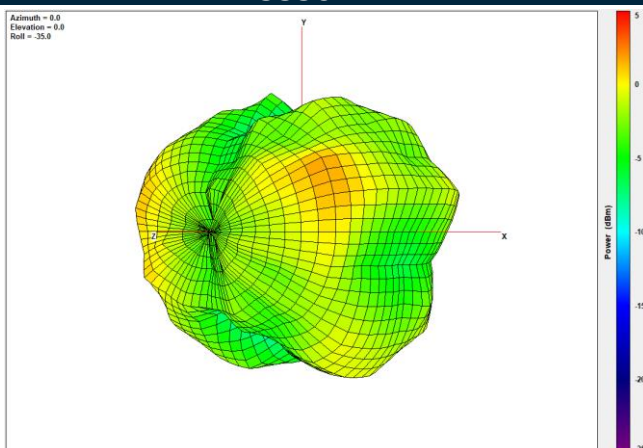
XZ Plane



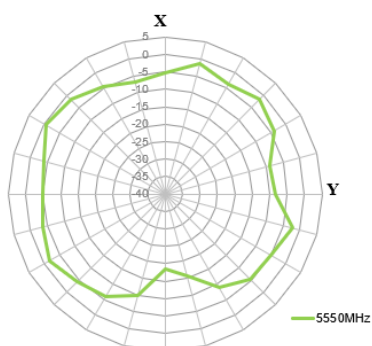
YZ Plane



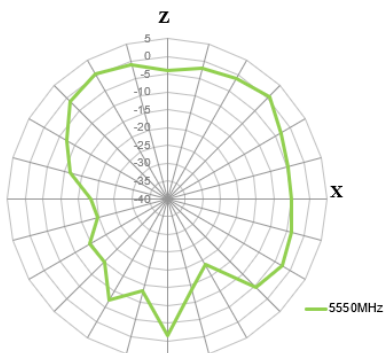
5550MHz



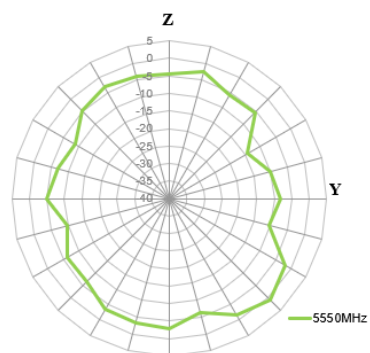
XY Plane



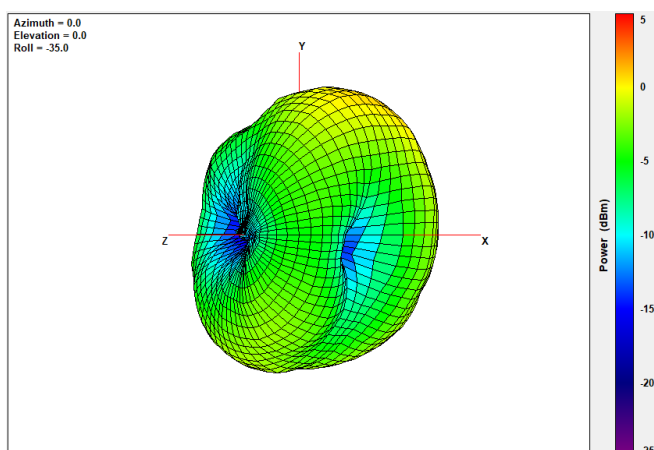
XZ Plane



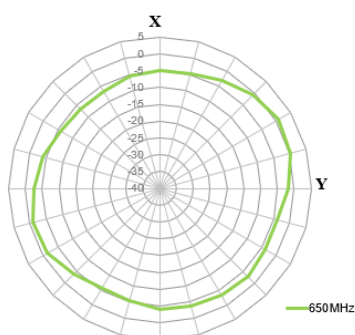
YZ Plane



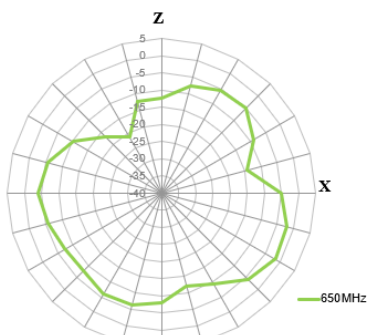
4.4 LTE_650MHz _MIMO2 - 2D & 3D Radiation Patterns



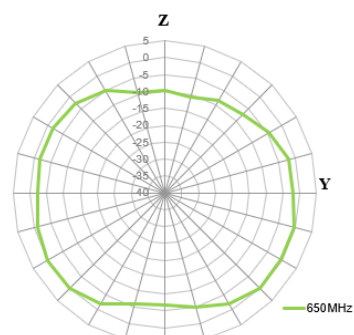
XY Plane



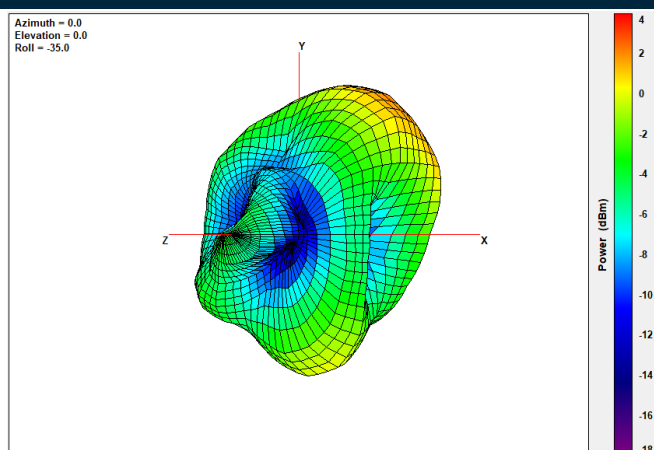
XZ Plane



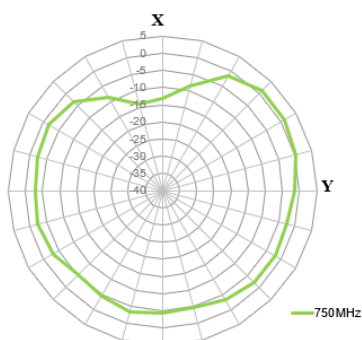
YZ Plane



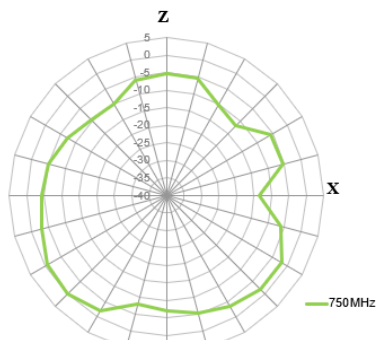
750MHz



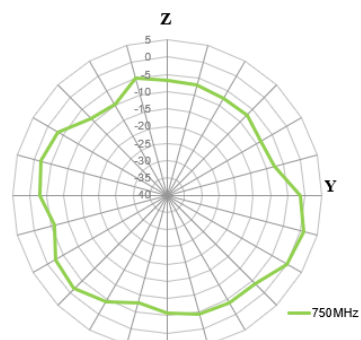
XY Plane



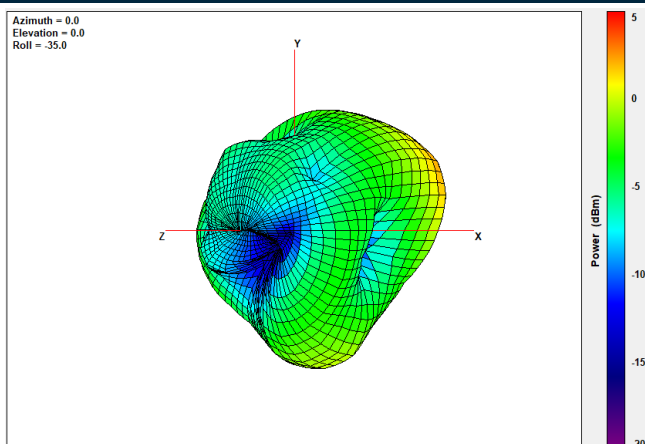
XZ Plane



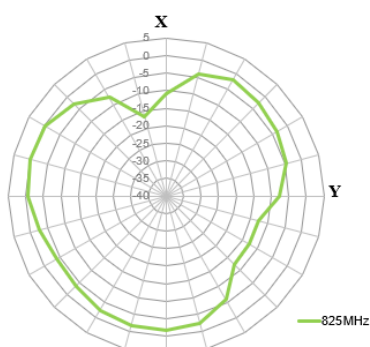
YZ Plane



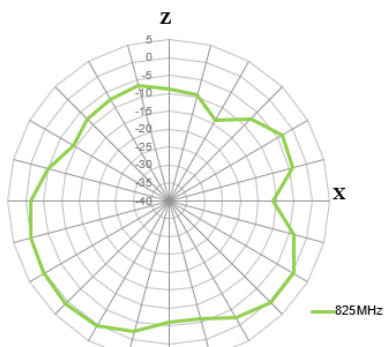
825MHz



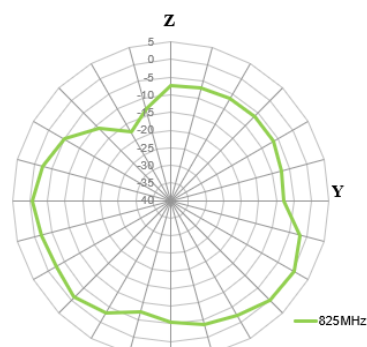
XY Plane



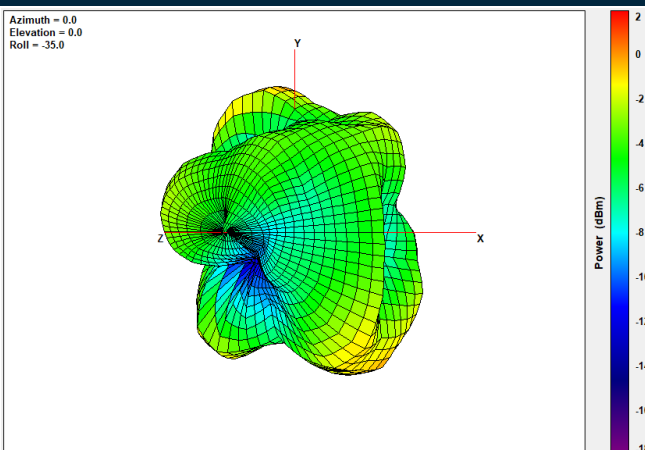
XZ Plane



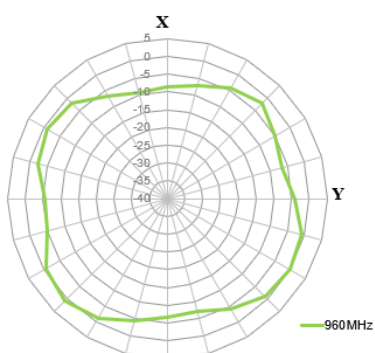
YZ Plane



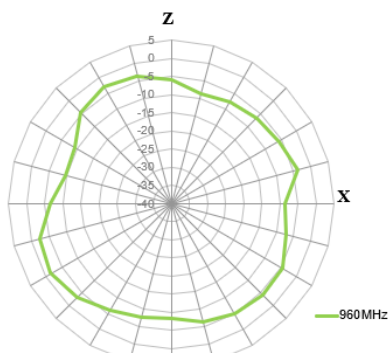
960MHz



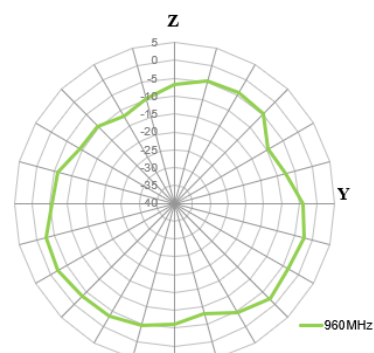
XY Plane



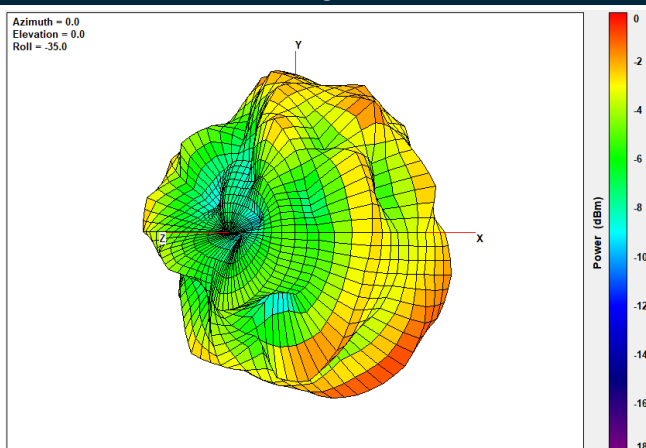
XZ Plane



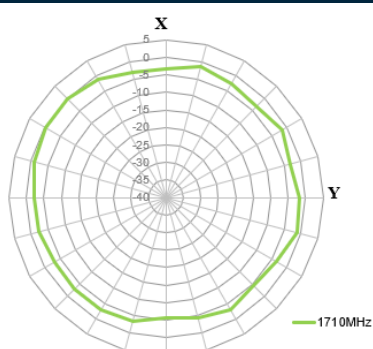
YZ Plane



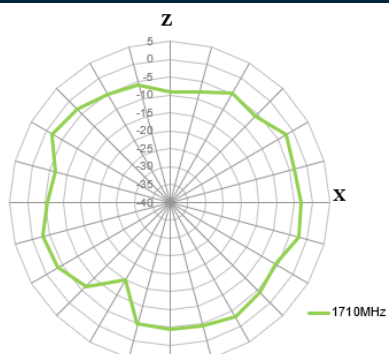
1710MHz



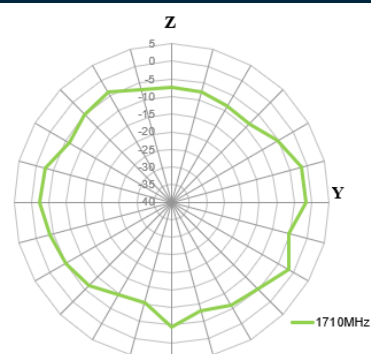
XY Plane



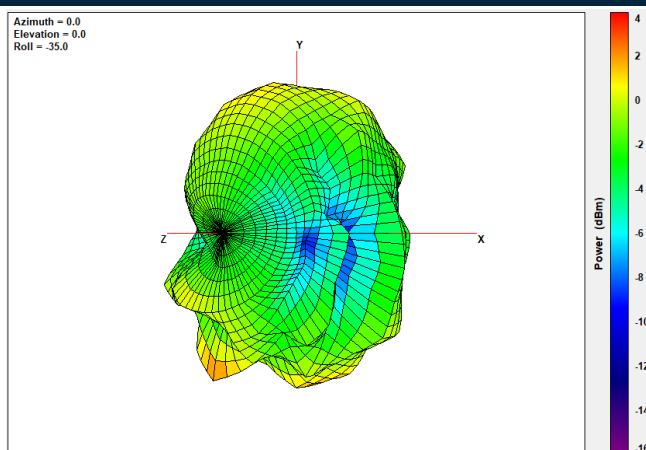
XZ Plane



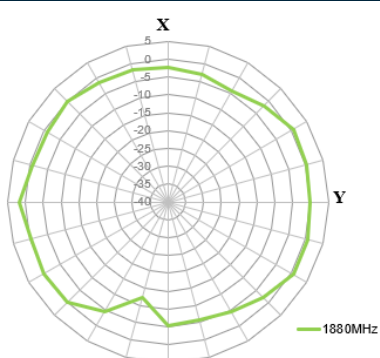
YZ Plane



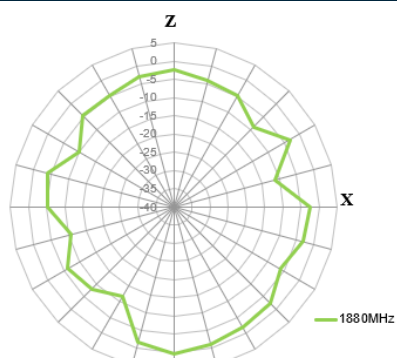
1880MHz



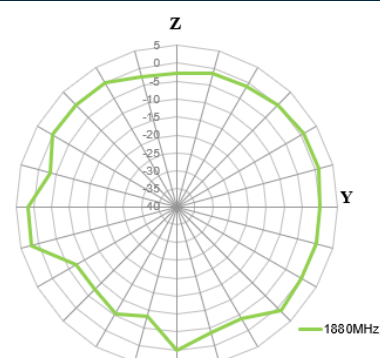
XY Plane



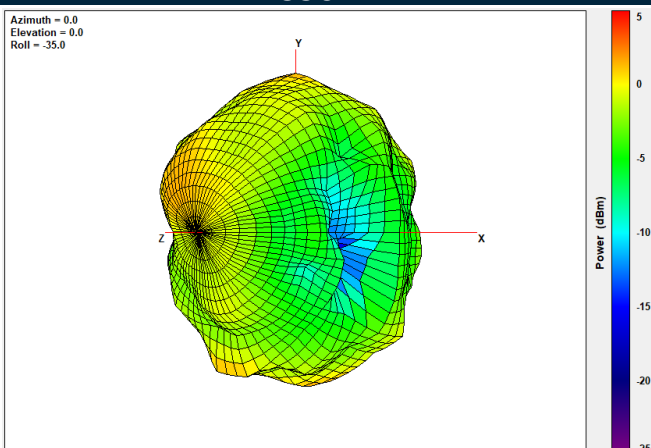
XZ Plane



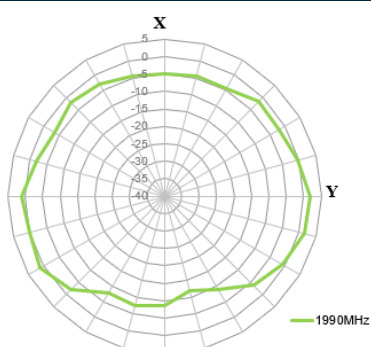
YZ Plane



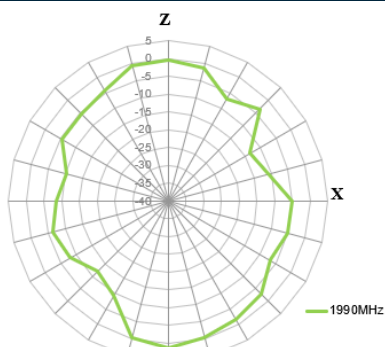
1990MHz



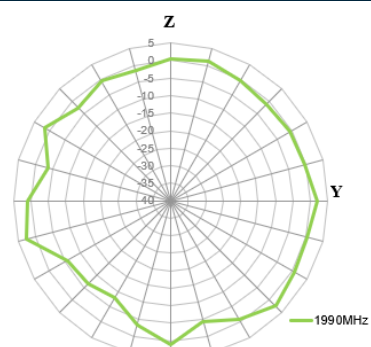
XY Plane



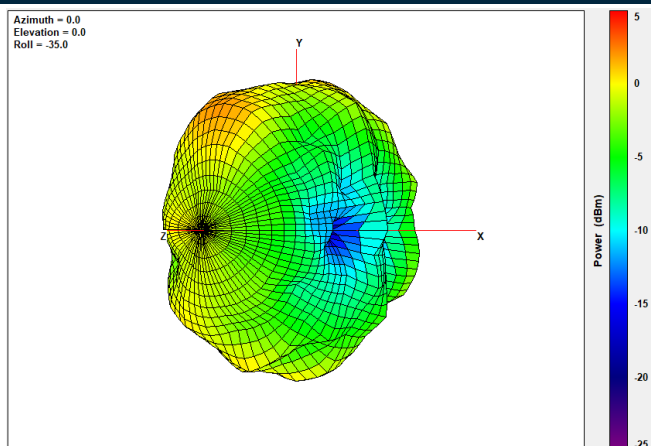
XZ Plane



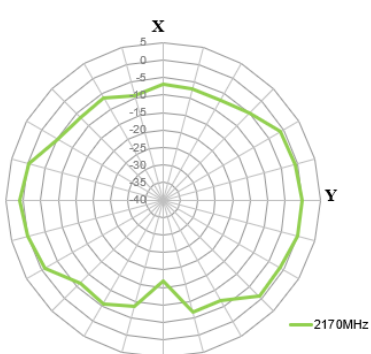
YZ Plane



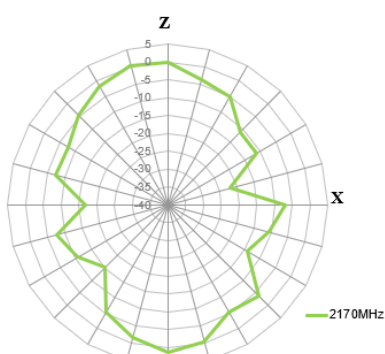
2170MHz



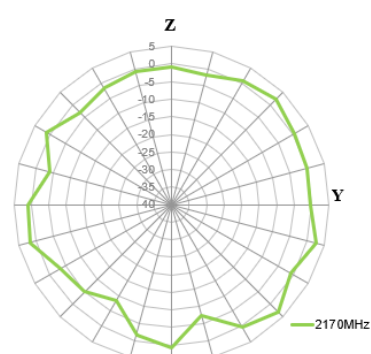
XY Plane



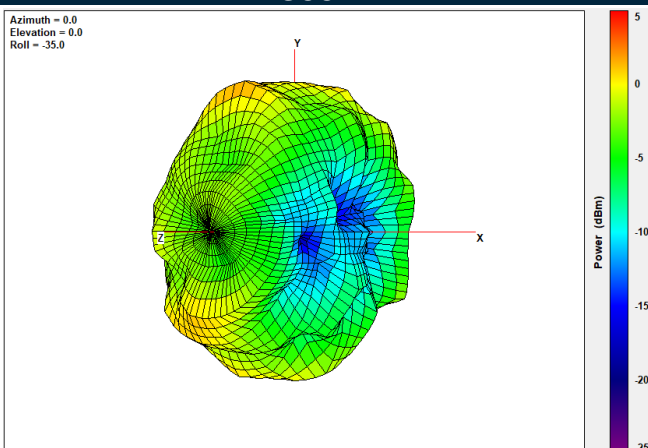
XZ Plane



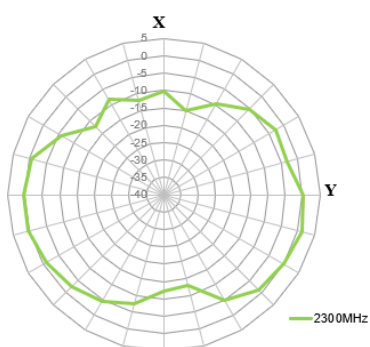
YZ Plane



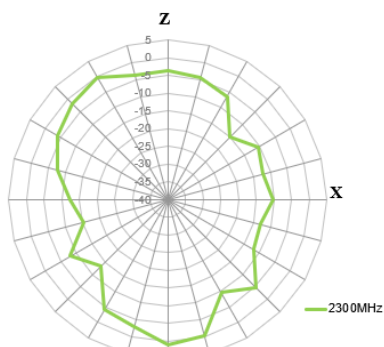
2300MHz



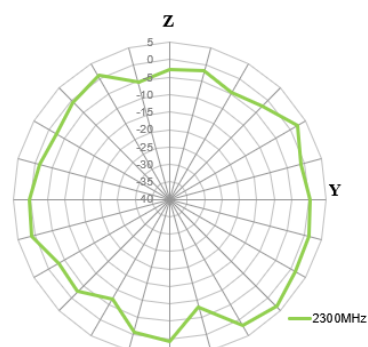
XY Plane



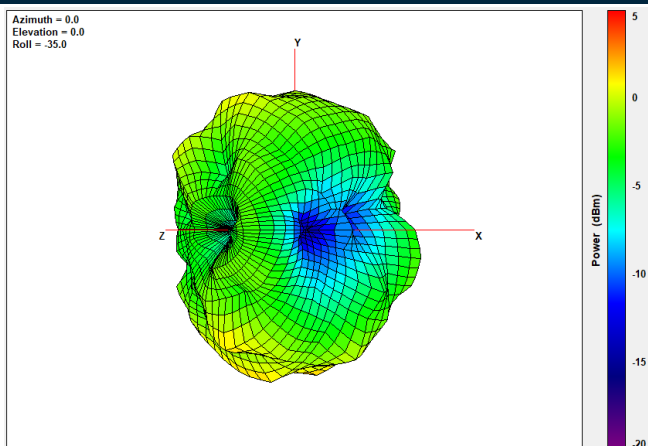
XZ Plane



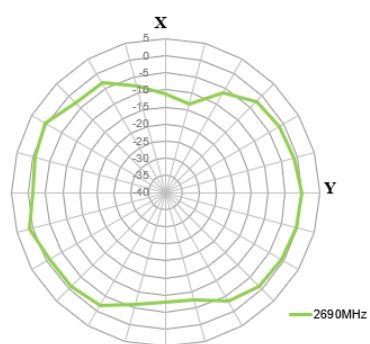
YZ Plane



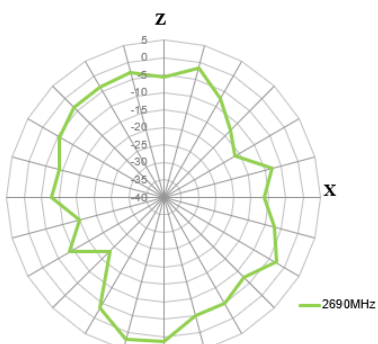
2690MHz



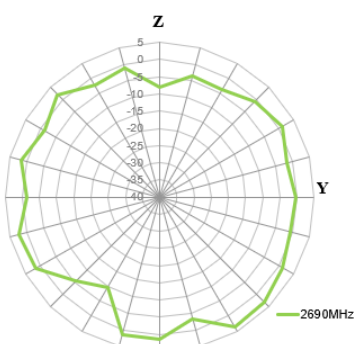
XY Plane



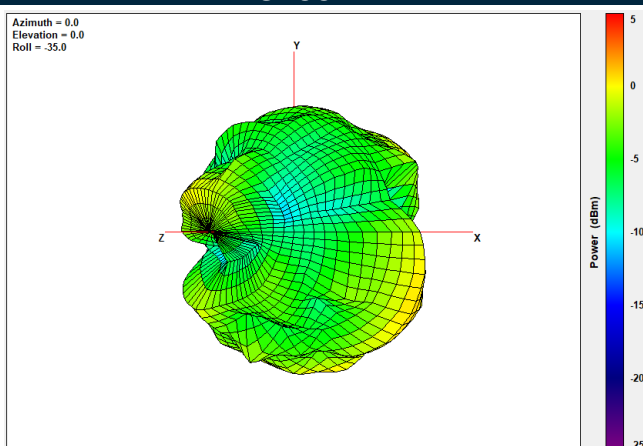
XZ Plane



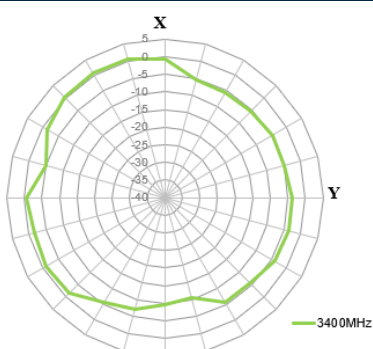
YZ Plane



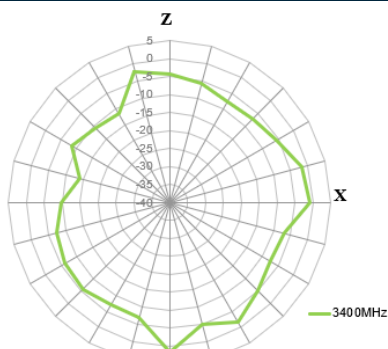
3400MHz



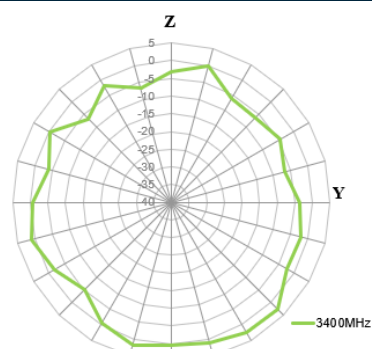
XY Plane



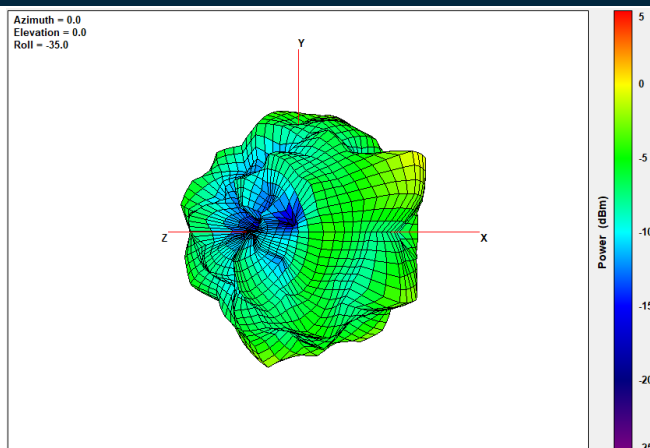
XZ Plane



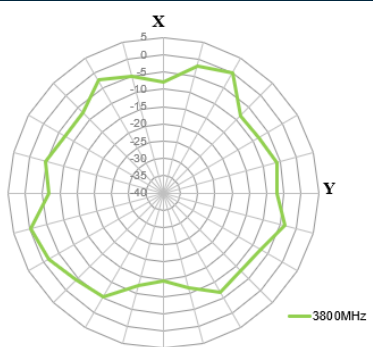
YZ Plane



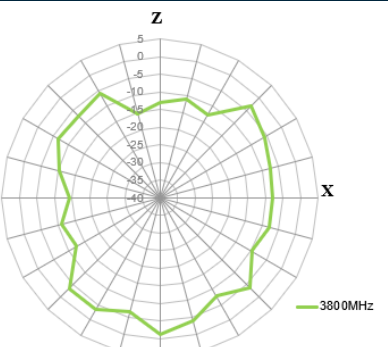
3800MHz



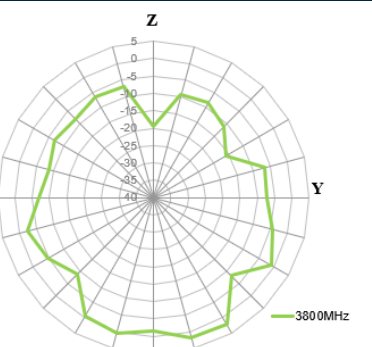
XY Plane



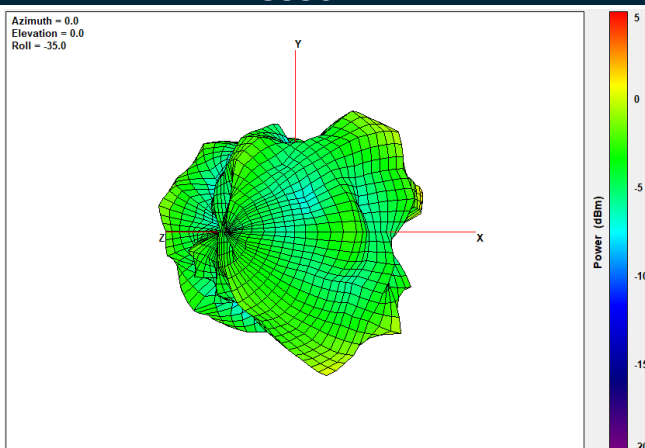
XZ Plane



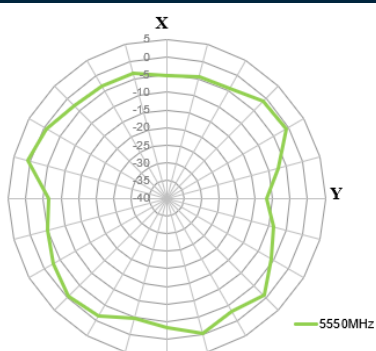
YZ Plane



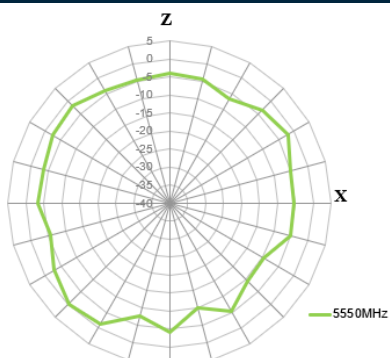
5550MHz



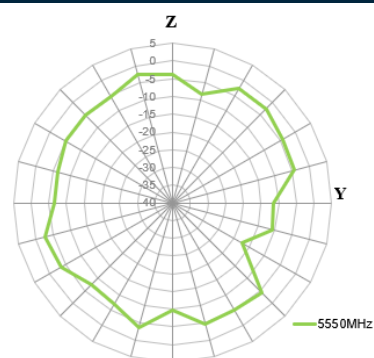
XY Plane



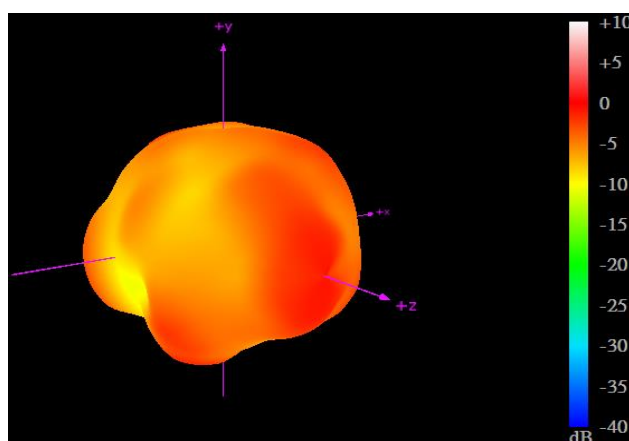
XZ Plane



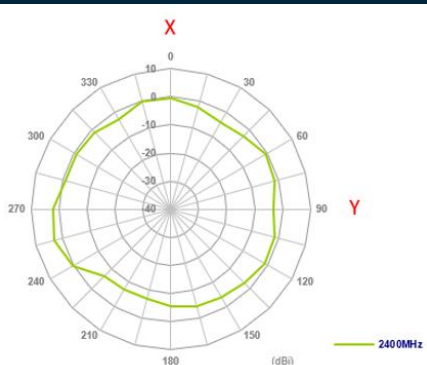
YZ Plane



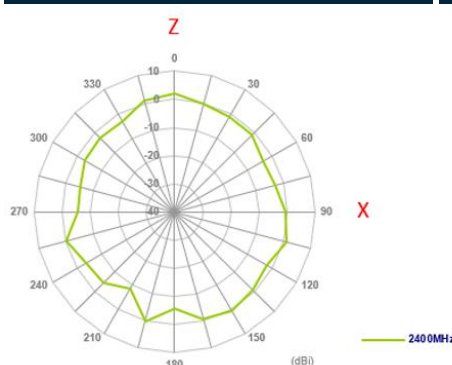
4.5 Wi-Fi_2400MHz - 2D & 3D Radiation Patterns



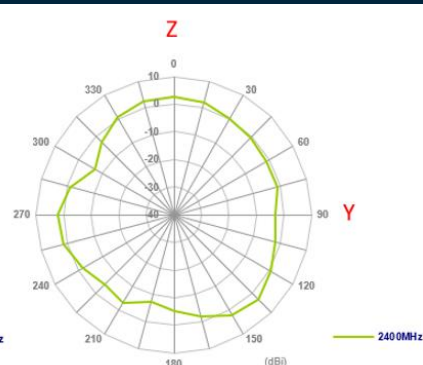
XY Plane



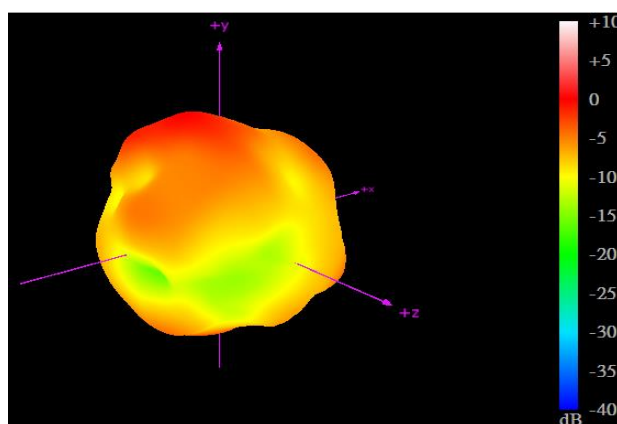
XZ Plane



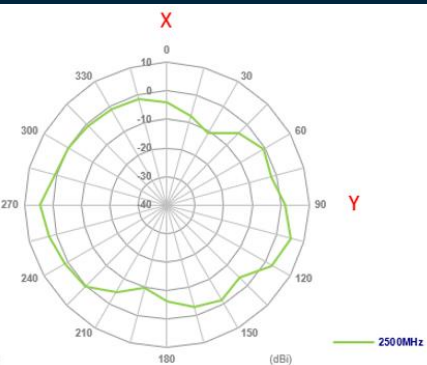
YZ Plane



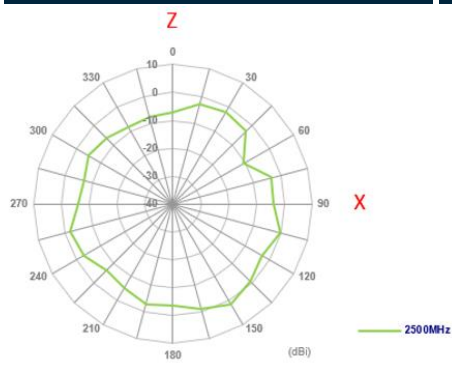
2500MHz



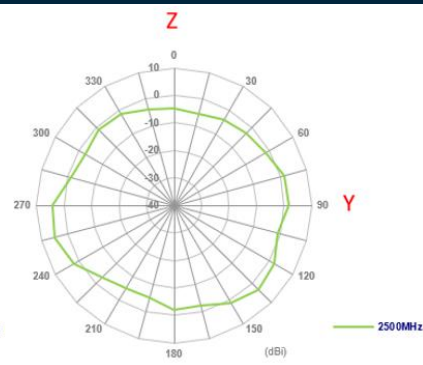
XY Plane



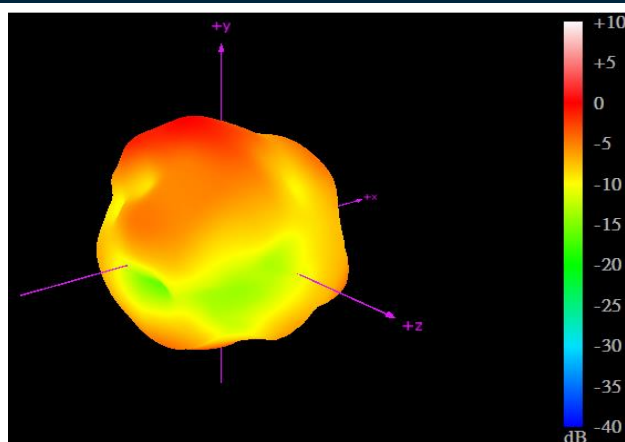
XZ Plane



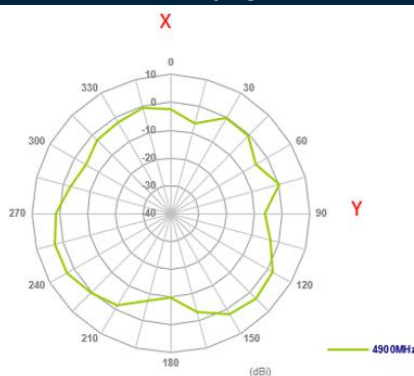
YZ Plane



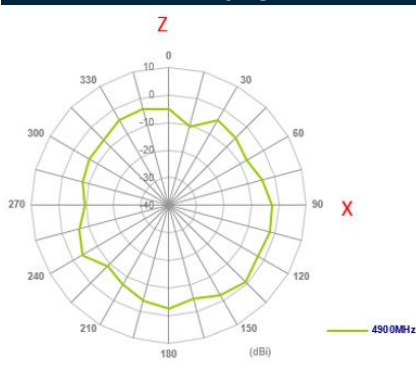
4900MHz



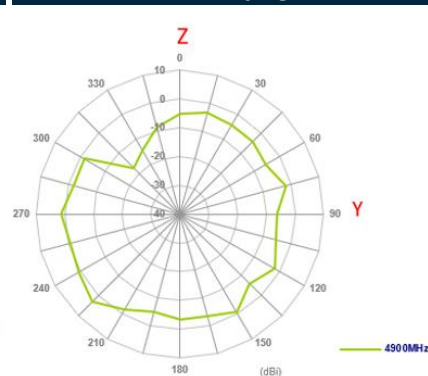
XY Plane



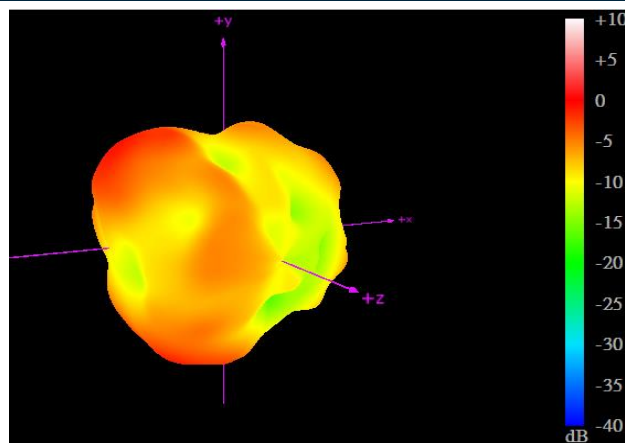
XZ Plane



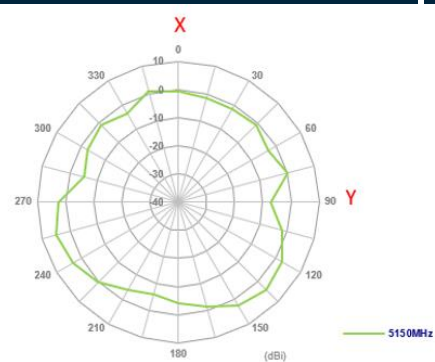
YZ Plane



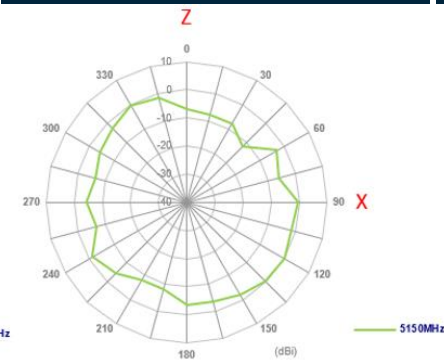
5150MHz



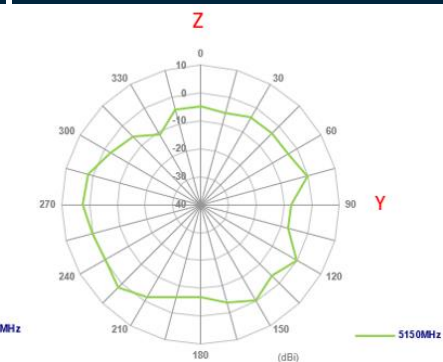
XY Plane



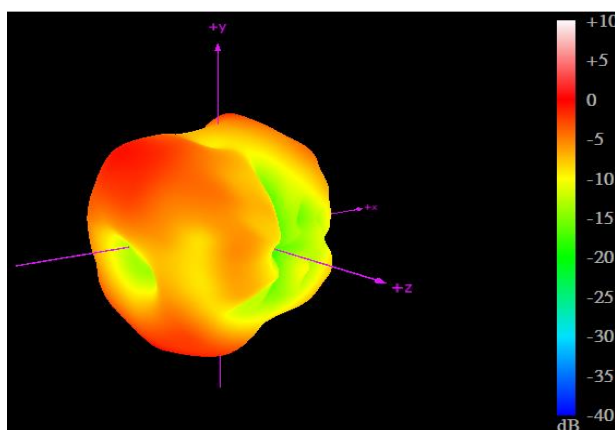
XZ Plane



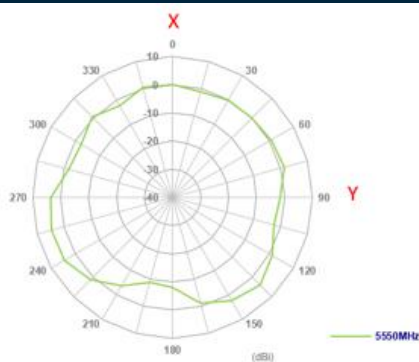
YZ Plane



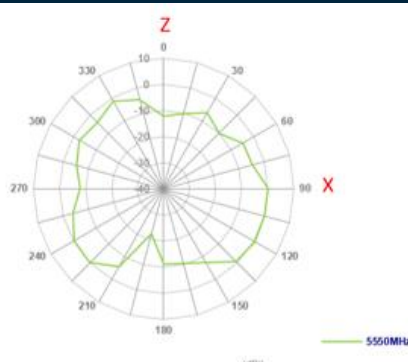
5550MHz



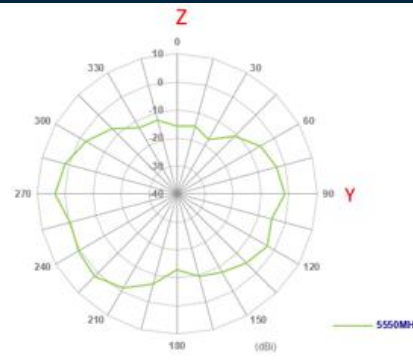
XY Plane



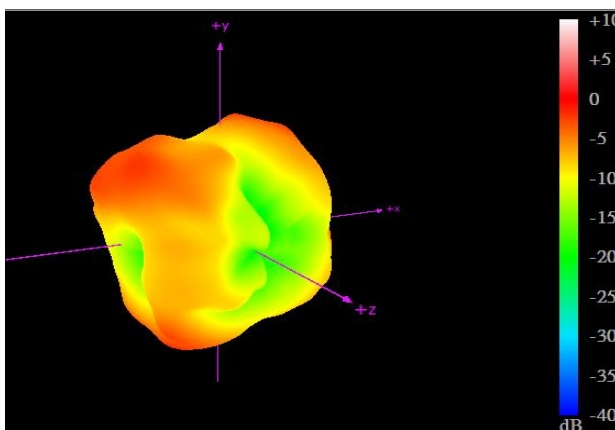
XZ Plane



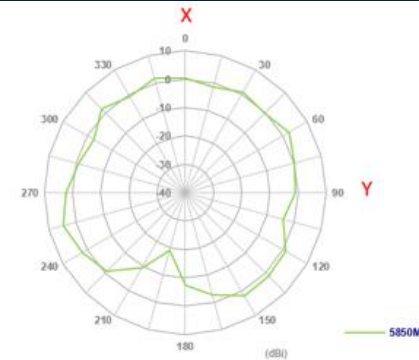
YZ Plane



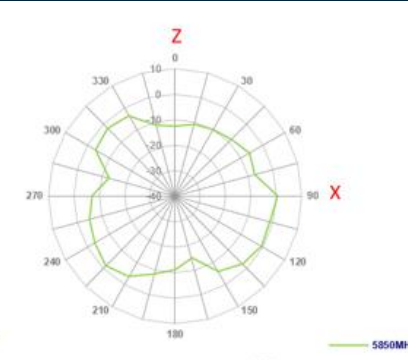
5850MHz



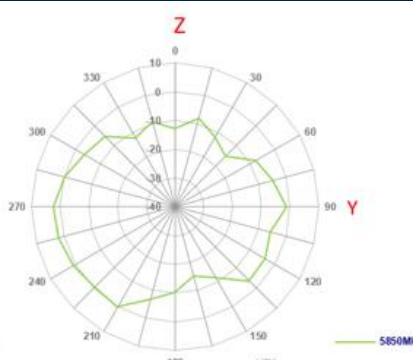
XY Plane



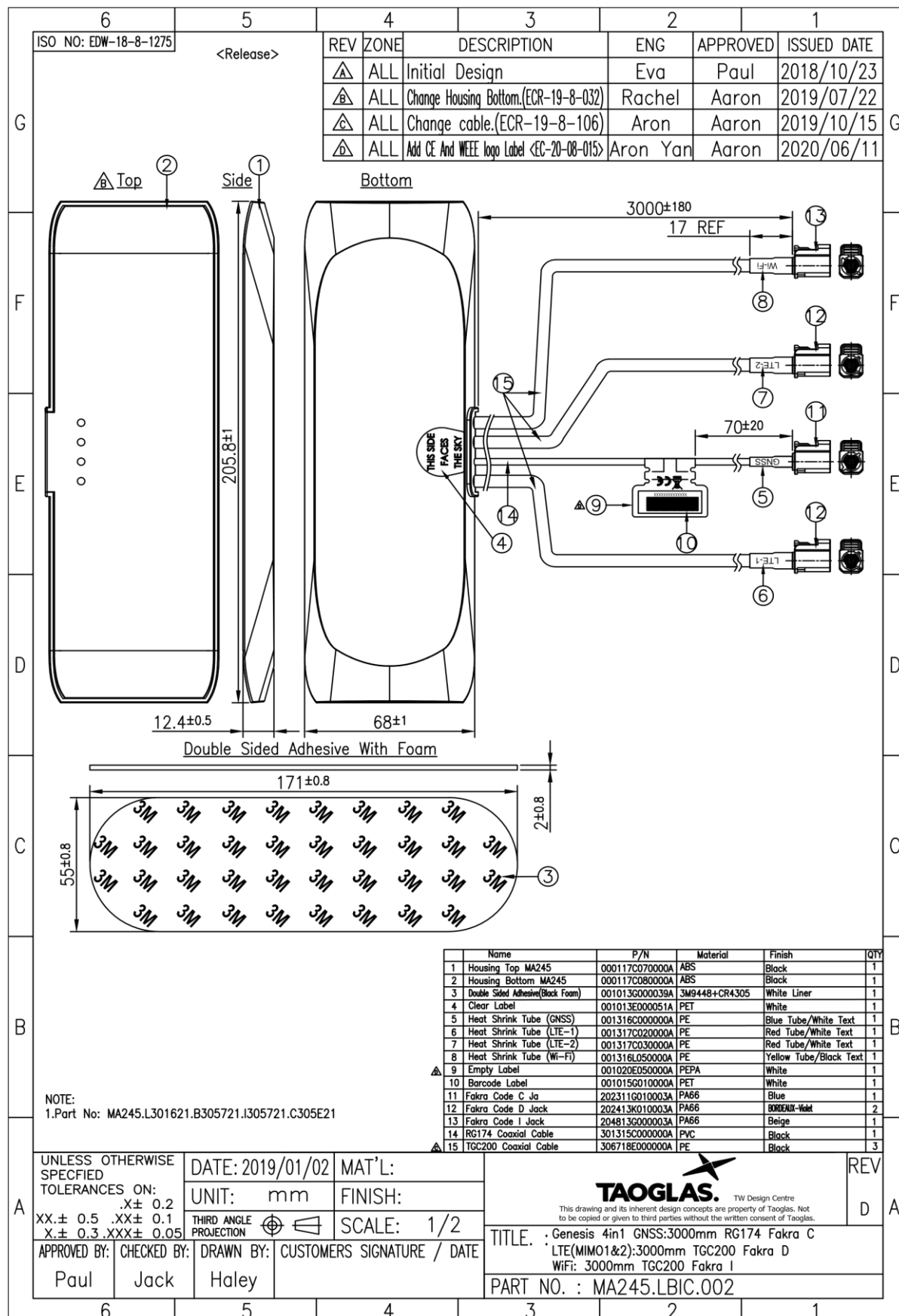
XZ Plane



YZ Plane

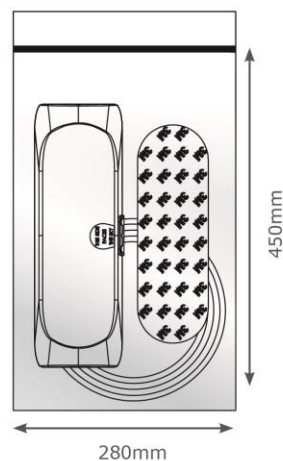


5. Mechanical Drawing (Units: mm)

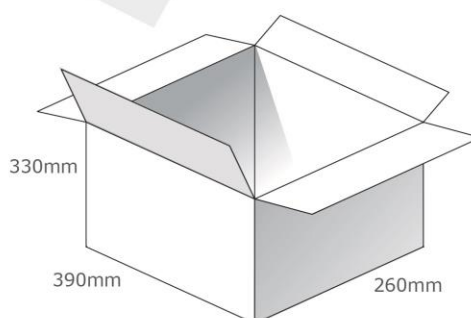


6. Packaging

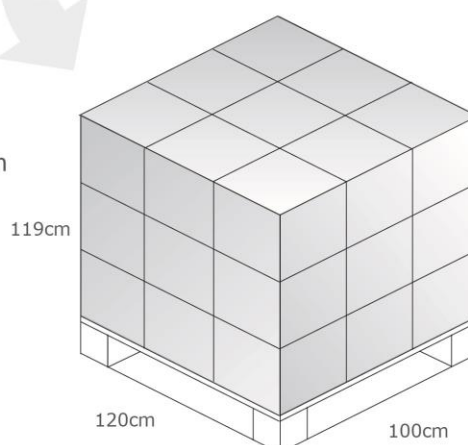
1pcs MA245.LBIC.002 per PE Bag
Bag Dimensions - 450 x 280mm
Weight - 430g



10 pcs MA245.LBIC.002 per carton
Carton - 390x 260 x 330mm
Weight - 5.20Kg



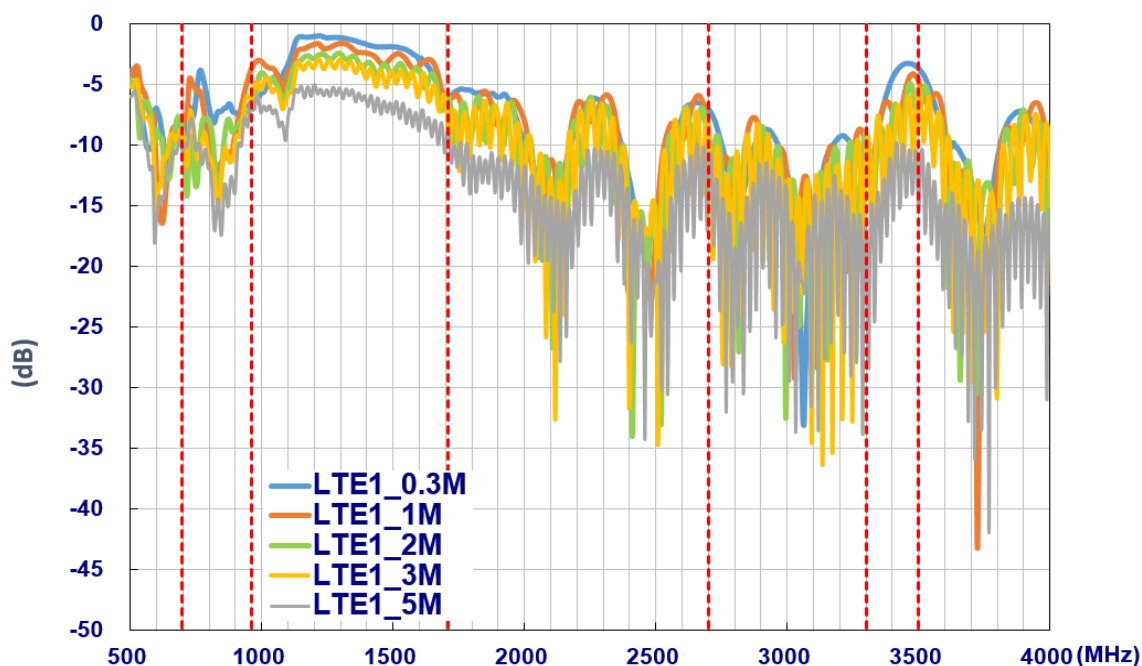
Pallet Dimensions 120 x 100 x 119cm
27 Cartons per Pallet
9 Cartons per layer
3 Layers



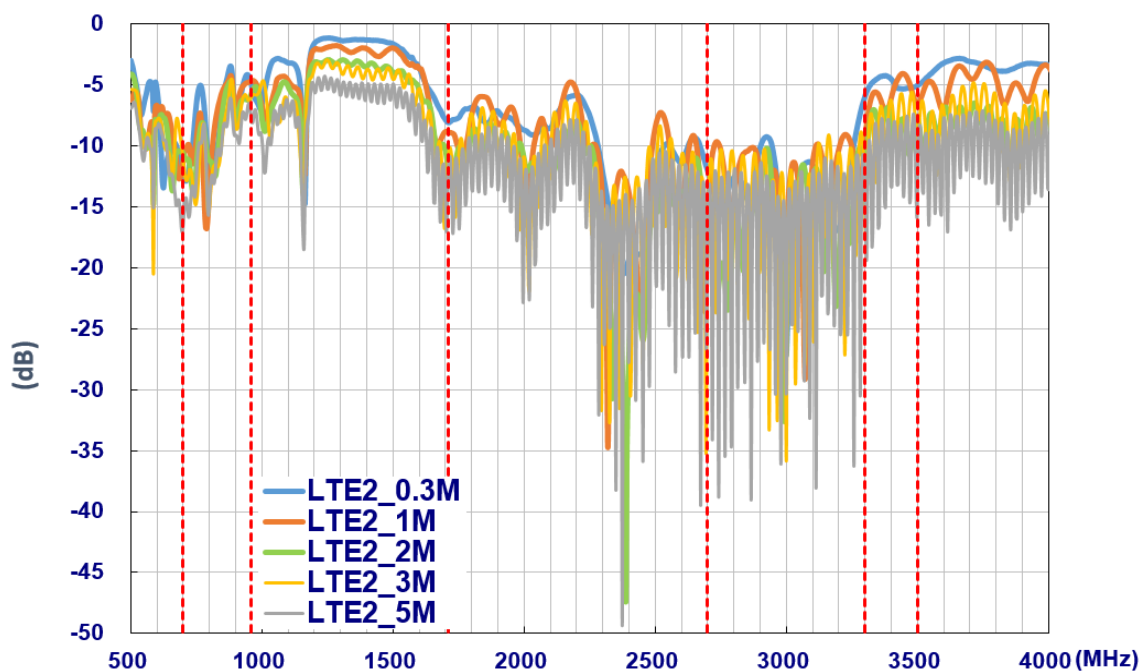
7. Application Note

The MA245 antenna measurement with different cable length, the performance is shown below

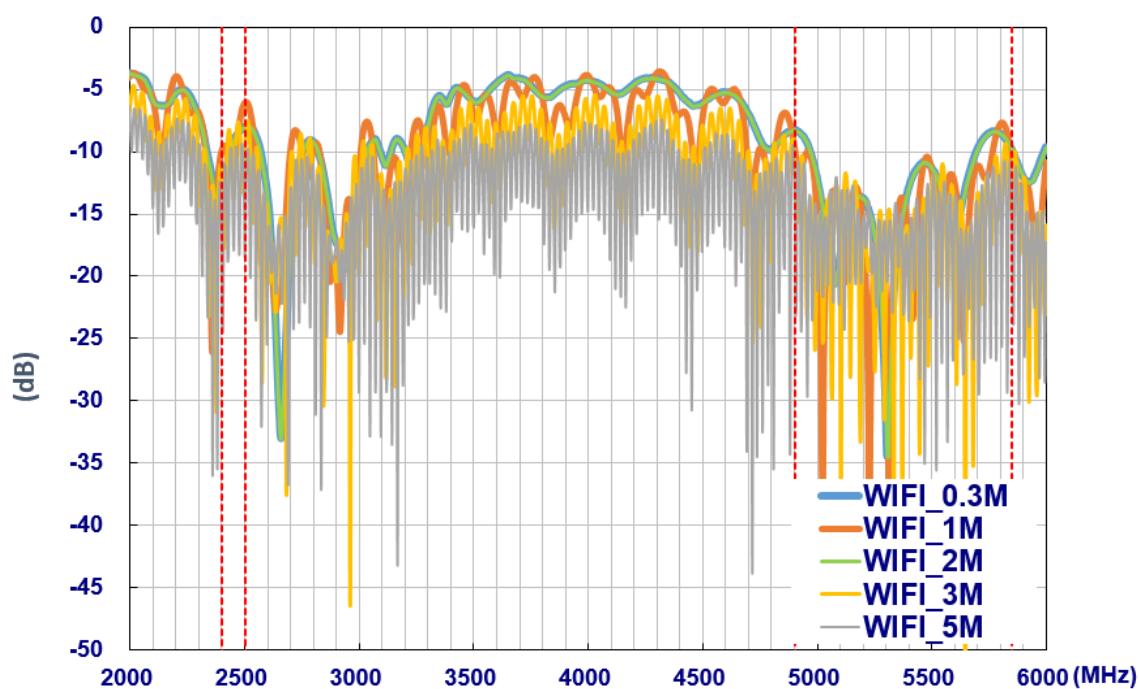
8.1 Return Loss – LTE MIMO 1



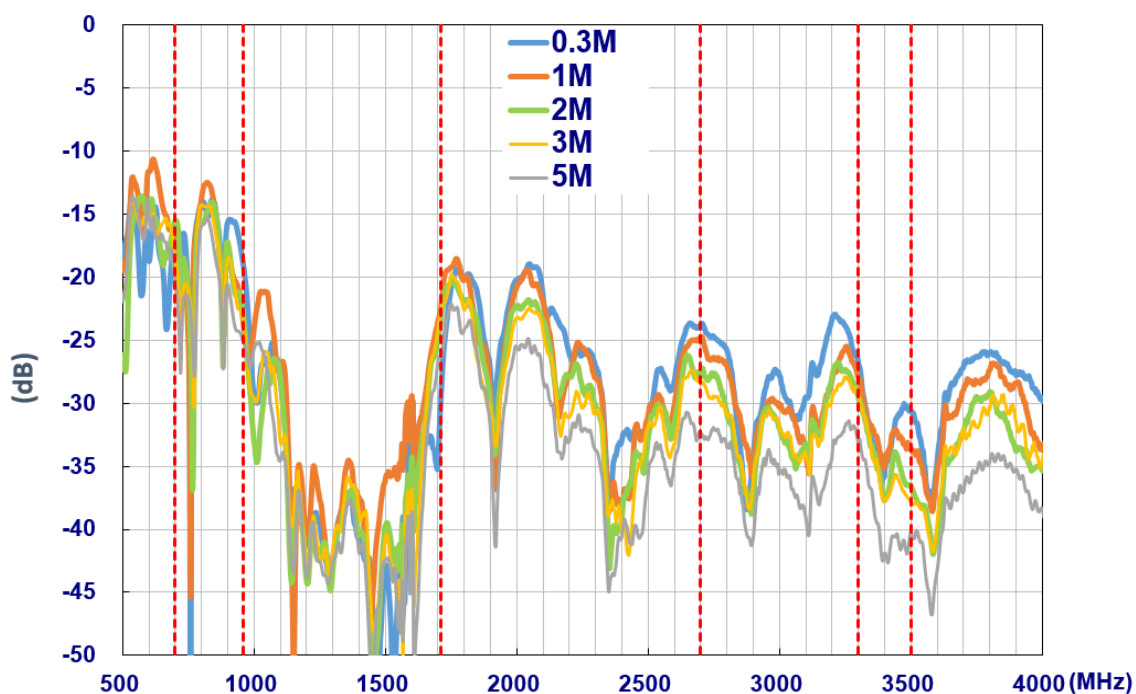
LTE MIMO 2



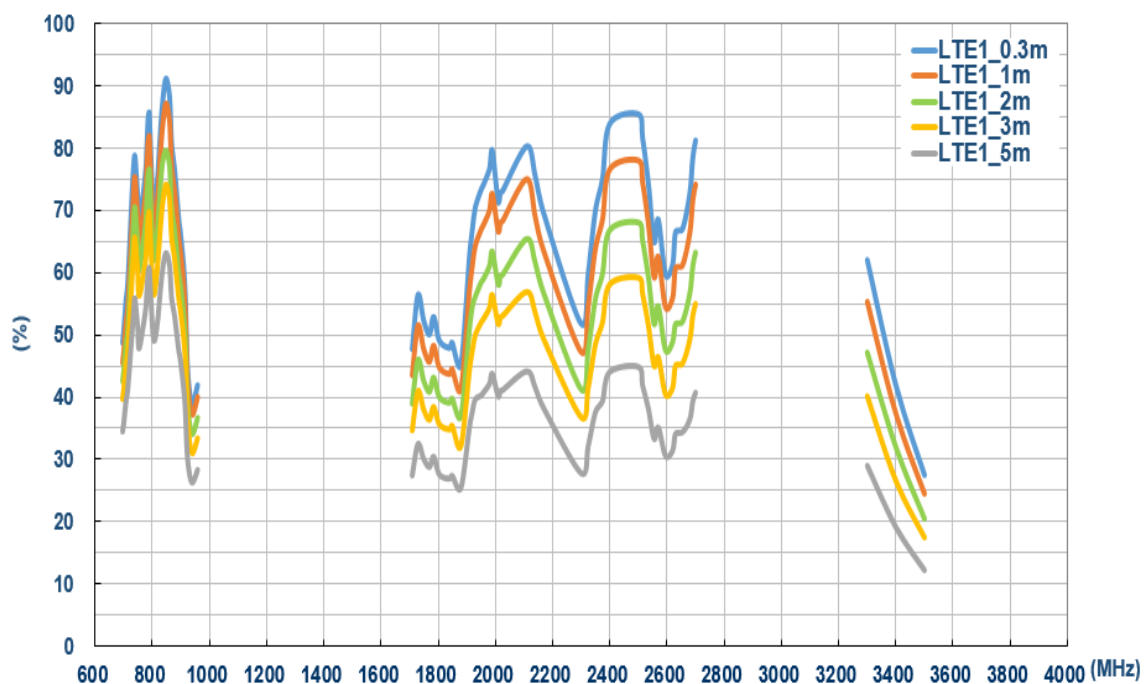
Wi-Fi



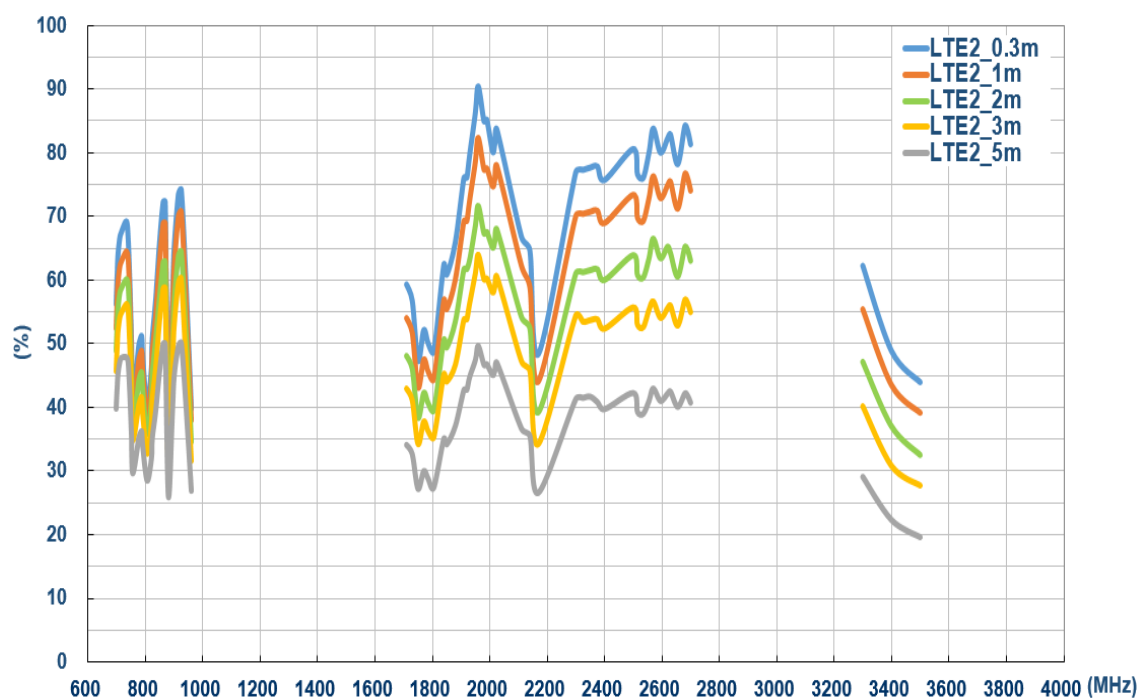
8.2 Isolation – LTE MIMO 1 & 2



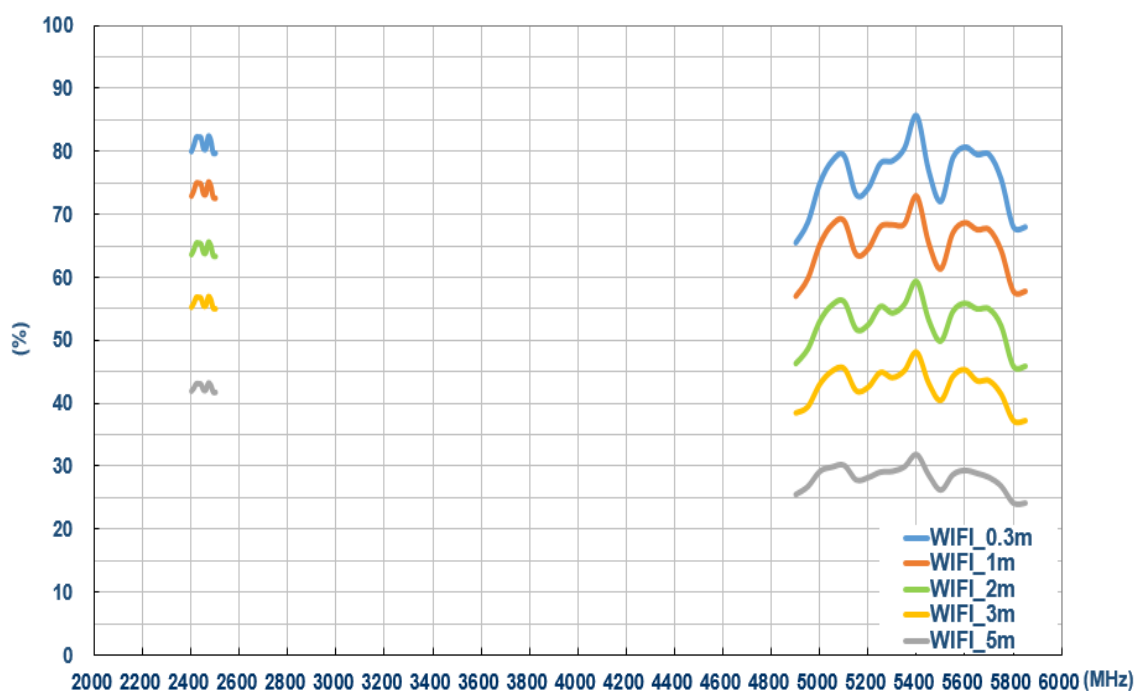
8.3 Efficiency – LTE MIMO 1



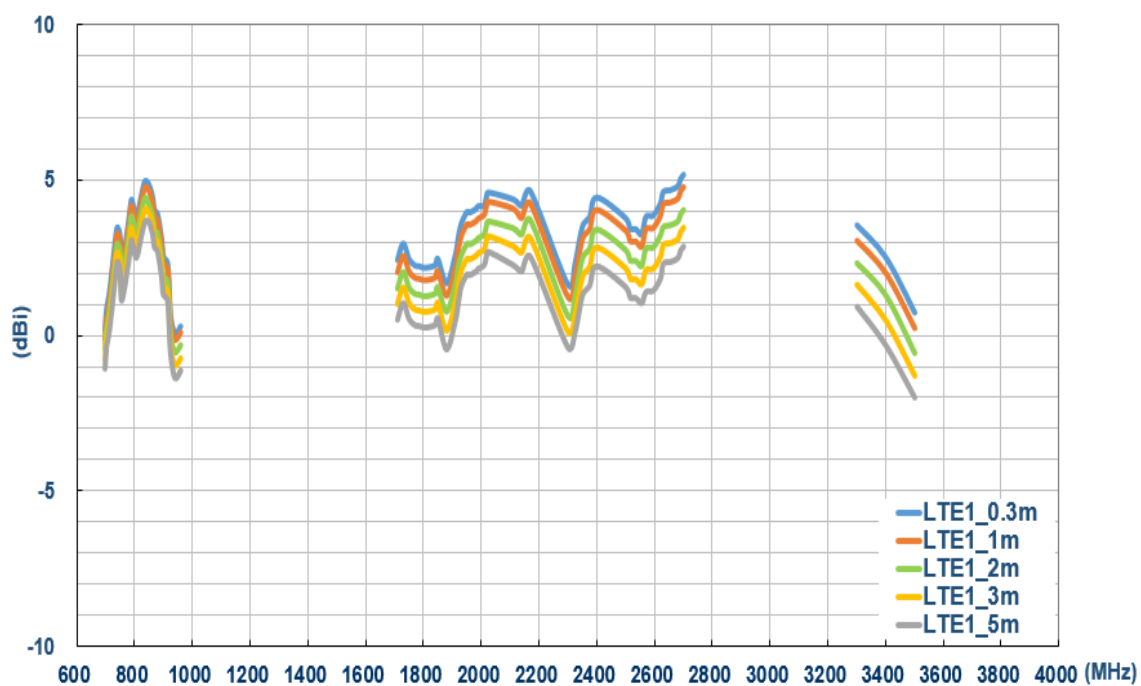
LTE MIMO 2



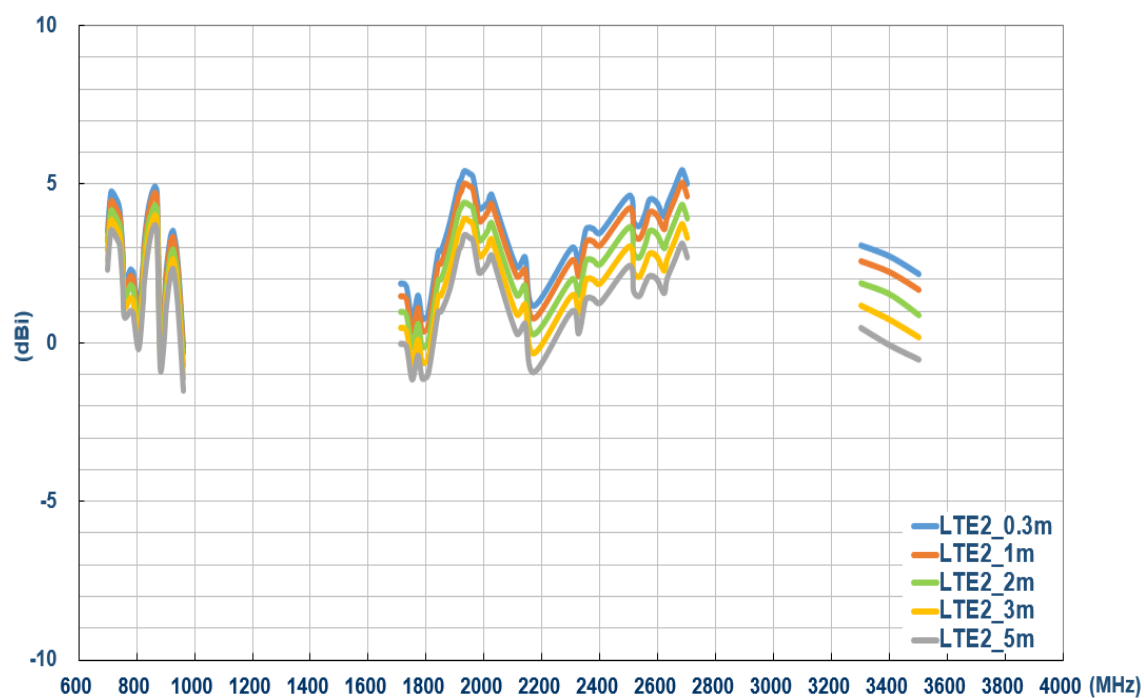
Wi-Fi



8.4 Peak Gain – LTE MIMO 1



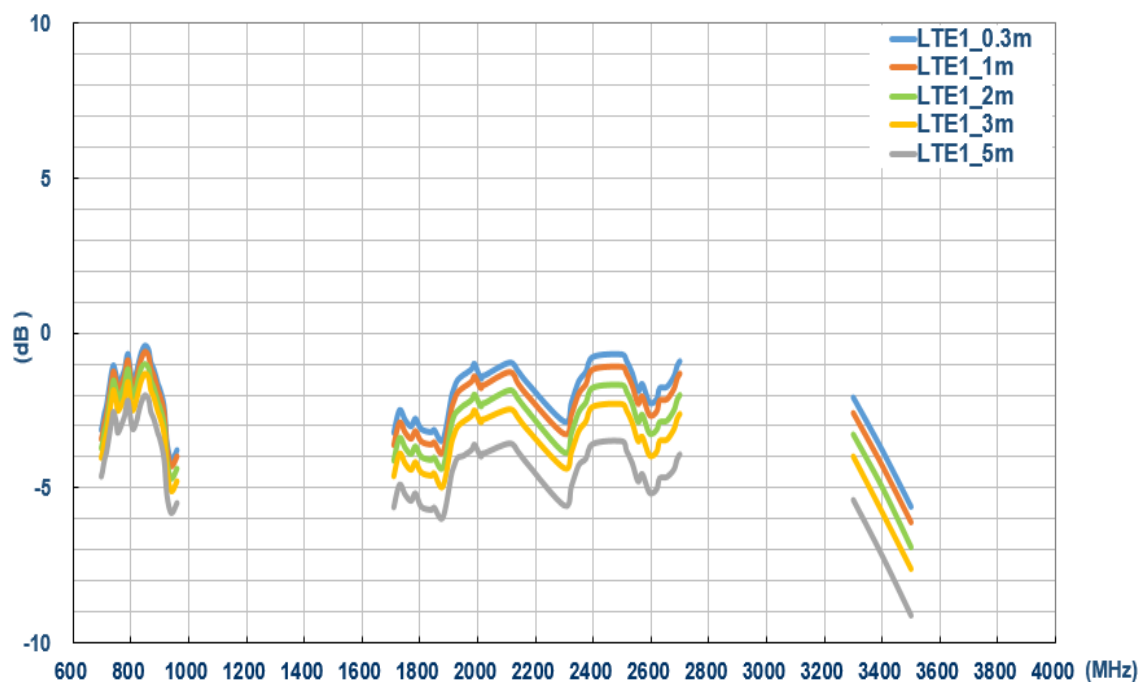
LTE MIMO 2



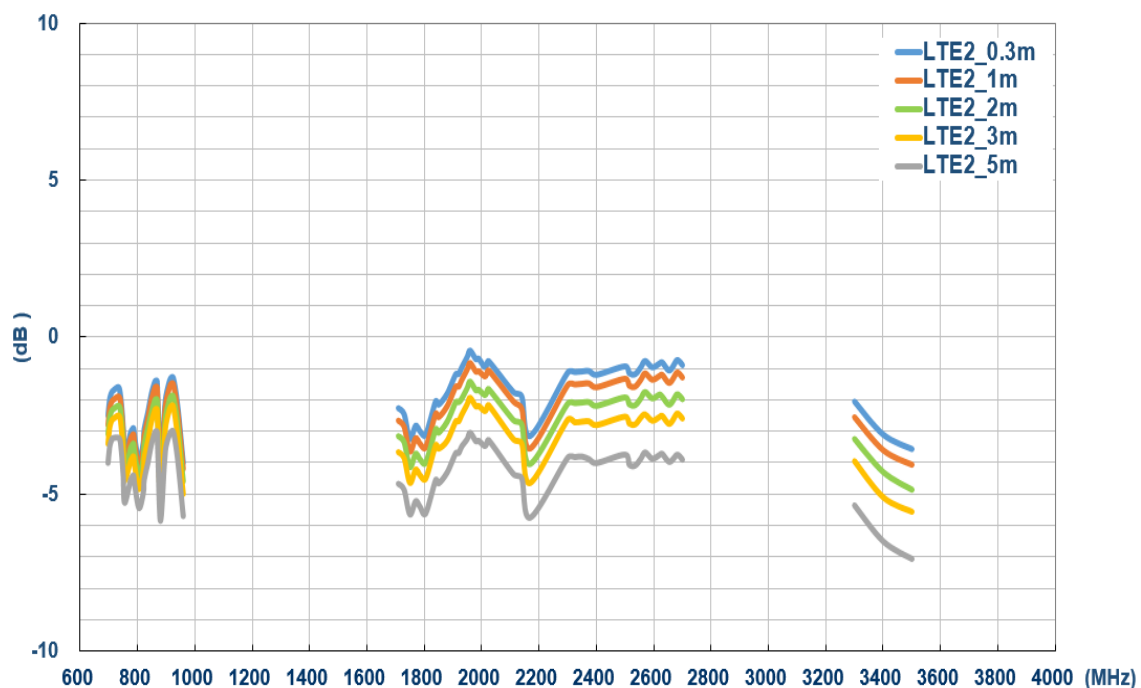
Wi-Fi



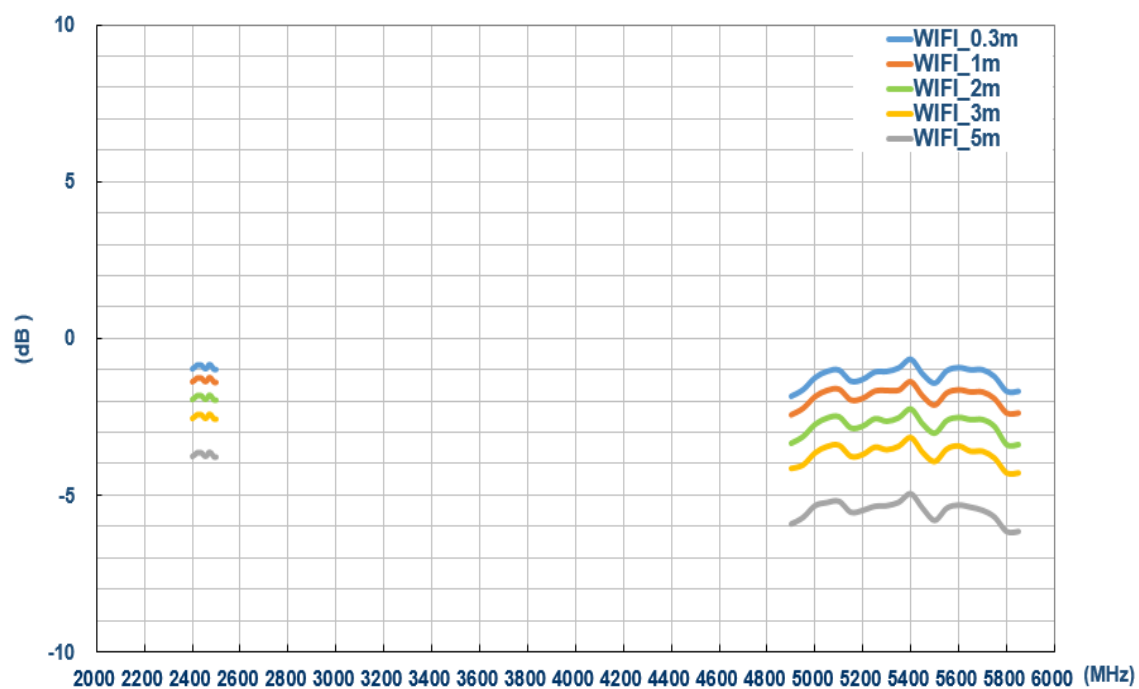
8.5 Average Gain – LTE MIMO 1



LTE MIMO 2



Wi-Fi



Changelog for the datasheet

SPE-18-8-061 – MA245.LBIC.002

Revision: F (Current Version)

Date:	2022-09-08
Changes:	Added Isolation Graph.
Changes Made by:	Gary West

Previous Revisions

Revision: E

Date:	2022-04-28
Changes:	Full datasheet update
Changes Made by:	Gary West

Revision: D

Date:	2019-07-30
Changes:	Updated Waterproof rating
Changes Made by:	Jack Conroy

Revision: C

Date:	2019-03-21
Changes:	Updated Template and Results
Changes Made by:	Yu Kai Yeung

Revision: B

Date:	2019-01-22
Changes:	Updated Table
Changes Made by:	Jack Conroy

Revision: A (Original First Release)

Date:	2018-06-08
Notes:	Initial Datasheet
Author:	Technical Writer



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