



TAOGLAS®



Datasheet

MA245.LBIC.002

Description:

Genesis 4in1 GNSS, 2*LTE & Wi-Fi Low Profile Adhesive Mount Antenna

Features:

Adhesive Mount Combination Antenna

1*GNSS: 3 Meter RG-174 FAKRA Code C Jack Blue

2*LTE: 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

RoHS & Reach Compliant

1. Introduction	3
2. Specifications	4
3. Antenna Characteristics	7
4. 2D Radiation Patterns	16
5. 3D Radiation Patterns	25
6. Mechanical Drawing	30
7. Packaging	31
8. Application Note	32
<hr/>	
Changelog	39

Taoglas makes no warranties based on the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. Taoglas reserves all rights to this document and the information contained herein.

Reproduction, use or disclosure to third parties without express permission is strictly prohibited.

Copyright © Taoglas Ltd.



1. Introduction



The Taoglas MA245 4in1 Genesis is an omni-directional, fully IP65 waterproof external M2M antenna for use in telematics, transportation, and remote monitoring applications.

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 sales office for support.

2. Specifications

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
Cable	3m RG174 standard, Fully customizable
Connector	FAKRA Code C Jack, standard, Fully customizable
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

2G/3G/4G LTE Antenna									
Frequency (MHz)		LTE700	GSM850	GSM900	DCS	PCS	UMTS1	LTE2600	LTE3500
		698~803	824~894	880~960	1710~1880	1850~1990	1920~2170	2300~2690	3300~3500
Efficiency (%)									
MIMO_1	0.3m	67.53	81.45	56.48	50.09	66.46	73.69	70.13	43.87
	1m	63.96	77.79	53.94	45.68	60.61	67.73	63.96	39.10
	2m	59.68	71.42	49.20	40.72	53.24	59.32	55.38	33.11
	3m	55.24	66.21	45.69	36.20	47.14	52.47	48.10	27.98
	5m	47.73	56.35	38.66	28.54	36.94	40.87	36.31	20.18
MIMO_2	0.3m	56.32	58.92	58.21	55.94	78.35	77.28	79.55	51.68
	1m	53.18	56.27	55.59	51.02	71.45	71.03	72.55	46.06
	2m	49.64	51.64	50.71	45.45	62.81	62.17	62.81	38.97
	3m	46.03	47.89	47.05	40.40	55.58	55.05	54.55	32.91
	5m	39.80	40.76	39.72	31.84	43.56	42.90	41.20	23.69
Average Gain (dB)									
MIMO_1	0.3m	-1.70	-0.89	-2.48	-3.00	-1.77	-1.33	-1.54	-3.58
	1m	-1.94	-1.09	-2.68	-3.40	-2.17	-1.69	-1.94	-4.08
	2m	-2.24	-1.46	-3.08	-3.90	-2.74	-2.27	-2.57	-4.80
	3m	-2.58	-1.79	-3.40	-4.41	-3.27	-2.80	-3.18	-5.53
	5m	-3.21	-2.49	-4.13	-5.44	-4.33	-3.89	-4.40	-6.95
MIMO_2	0.3m	-2.49	-2.30	-2.35	-2.52	-1.06	-1.12	-0.99	-2.87
	1m	-2.74	-2.50	-2.55	-2.92	-1.46	-1.49	-1.39	-3.37
	2m	-3.04	-2.87	-2.95	-3.42	-2.02	-2.06	-2.02	-4.09
	3m	-3.37	-3.20	-3.27	-3.94	-2.55	-2.59	-2.63	-4.83
	5m	-4.00	-3.90	-4.01	-4.97	-3.61	-3.68	-3.85	-6.25
Peak Gain (dBi)									
MIMO_1	0.3m	4.34	4.94	3.88	2.94	4.14	4.62	5.02	3.53
	1m	4.14	4.74	3.68	2.54	3.74	4.28	4.62	3.03
	2m	3.84	4.44	3.28	2.04	3.14	3.72	3.92	2.33
	3m	3.44	4.04	2.98	1.54	2.64	3.18	3.32	1.63
	5m	3.04	3.65	2.68	1.04	2.14	2.68	2.72	0.93
MIMO_2	0.3m	4.75	4.92	3.52	3.79	5.40	5.40	5.42	3.07
	1m	4.45	4.72	3.32	3.39	5.00	5.00	5.02	2.57
	2m	4.15	4.32	2.92	2.89	4.40	4.40	4.32	1.87
	3m	3.85	4.02	2.62	2.29	3.90	3.90	3.72	1.17
	5m	3.55	3.72	2.32	1.69	3.40	3.40	3.12	0.47
Impedance			50 Ω						
Polarization			Linear						
VSWR			< -3						
Envelope Correlation Coefficient			696MHz-960MHz <0.5 1700MHz-3500MHz <0.3						
Cable			3m CFD200, Fully customizable						
Connector			FAKRA Code D, Fully customizable						

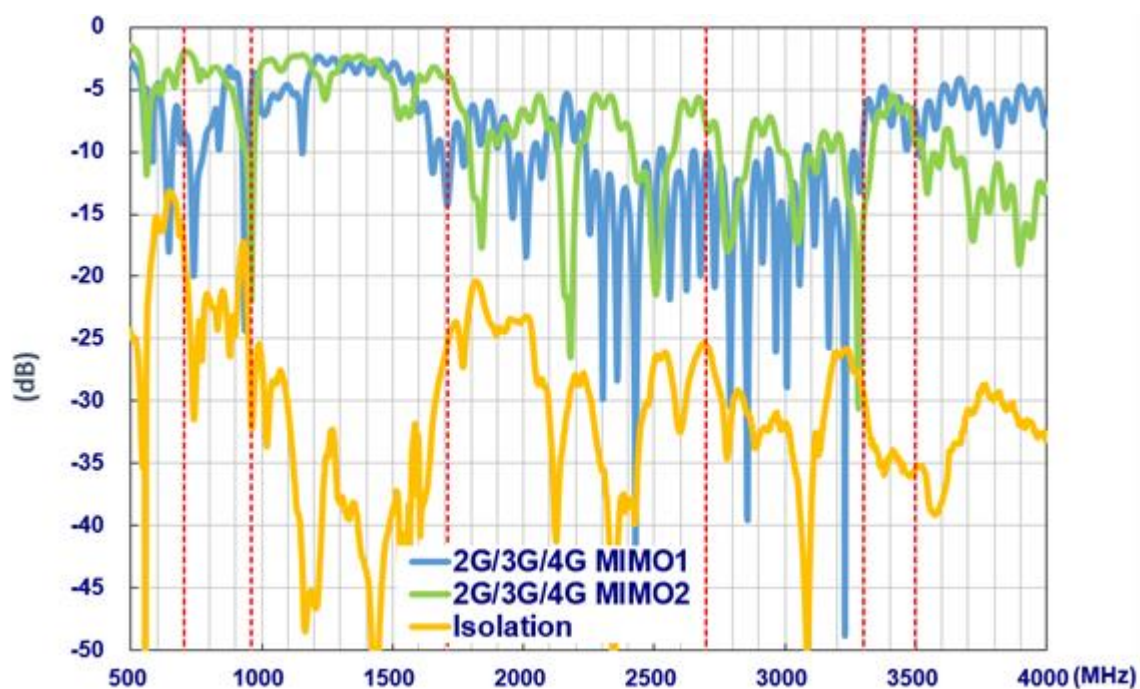
2.4GHz/5.8GHz Wi-Fi Antenna		
Frequency (MHz)	2400~2500	4900~5850
Efficiency (%)		
0.3m	81.06	75.79
1m	73.94	65.18
2m	64.40	52.81
3m	56.09	42.82
5m	42.55	28.10
Average Gain (dB)		
0.3m	-0.91	-1.20
1m	-1.31	-1.86
2m	-1.91	-2.77
3m	-2.51	-3.68
5m	-3.71	-5.51
Peak Gain (dBi)		
0.3m	5.06	5.63
1m	4.66	4.93
2m	4.06	3.43
3m	3.46	3.03
5m	2.26	1.13
Impedance	50 Ω	
Polarization	Linear	
VSWR	< 3	
Cable	3m CFD200 standard, Fully customizable	
Connector	FAKRA CODE I, Fully customizable	

Mechanical	
Antenna Dimensions	205.8 x 68 x 12.4mm
Housing	ABS
Ingress Protection Rating	IP65
Weight	300g
Environmental	
Operating Temperature	-40°C to 80°C
Storage Temperature	-40°C to 80°C
Humidity	Non-condensing 65°C 95% RH

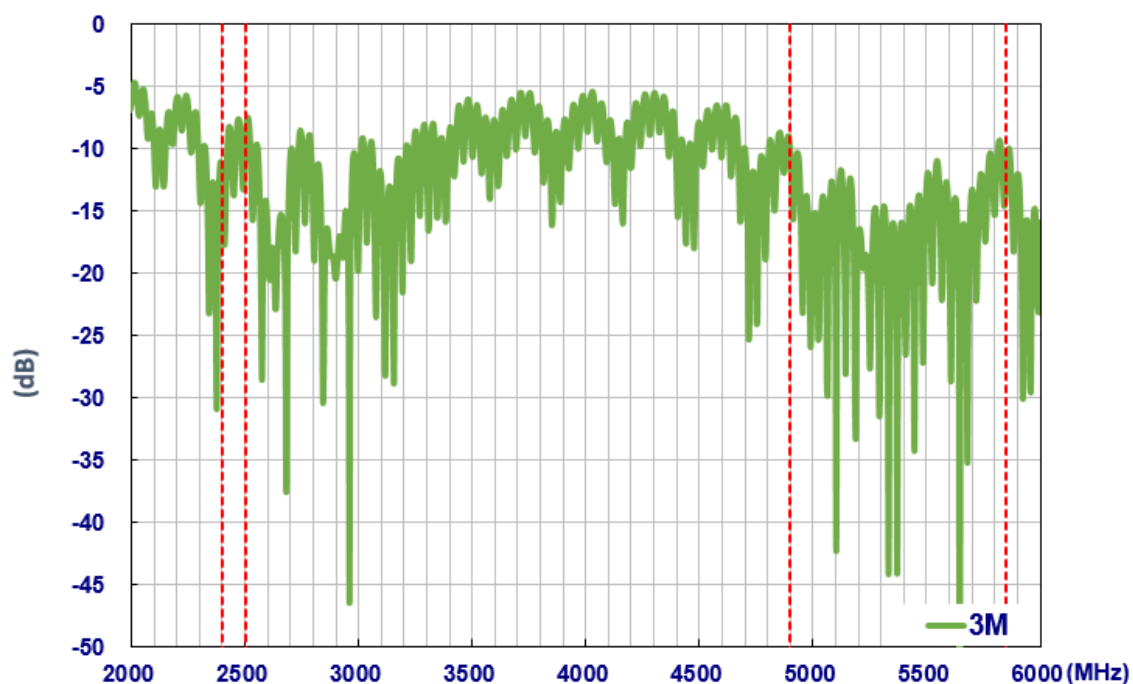
3. Antenna Characteristics

3.1 Return Loss

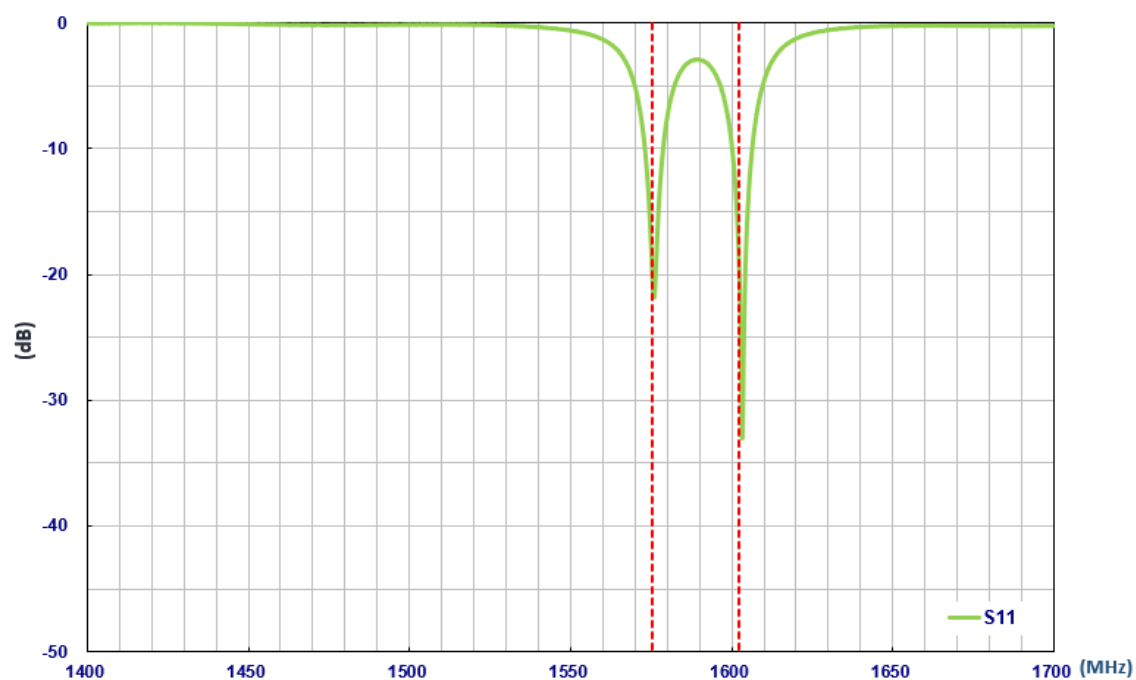
LTE



Wi-Fi

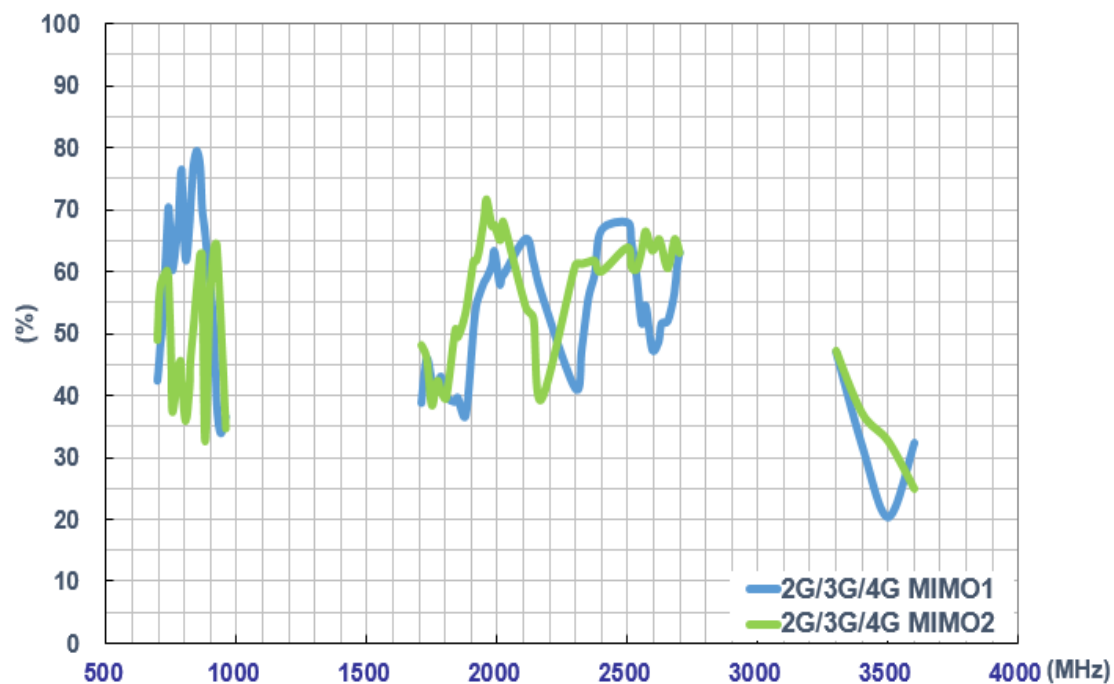


GNSS

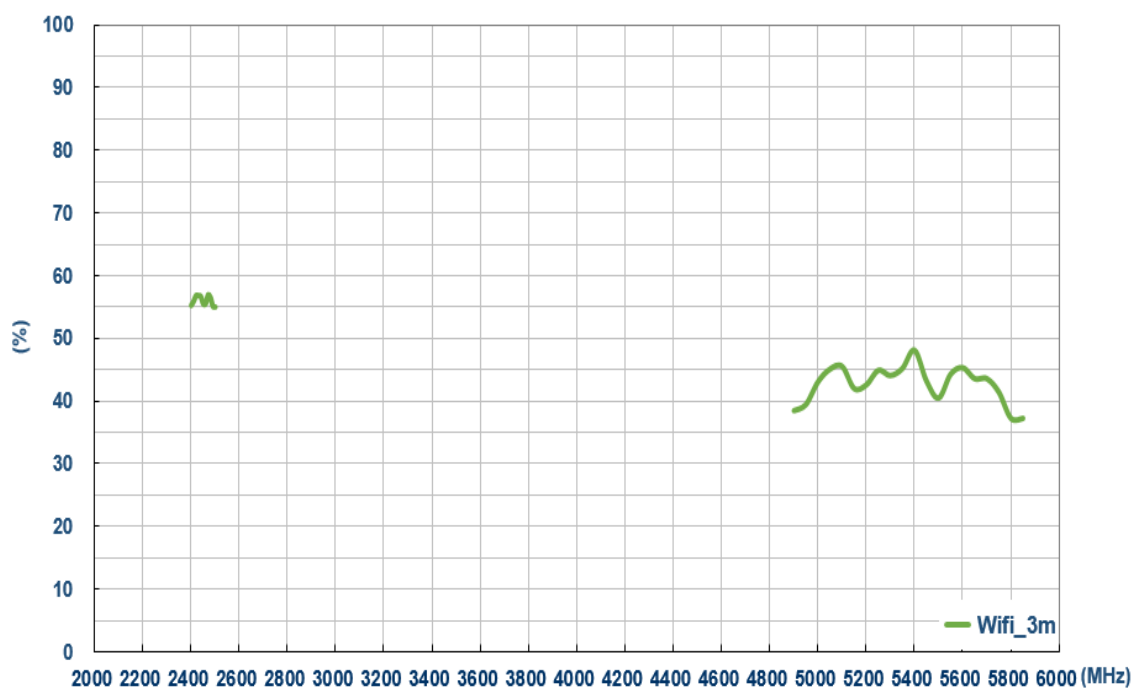


3.2 Efficiency

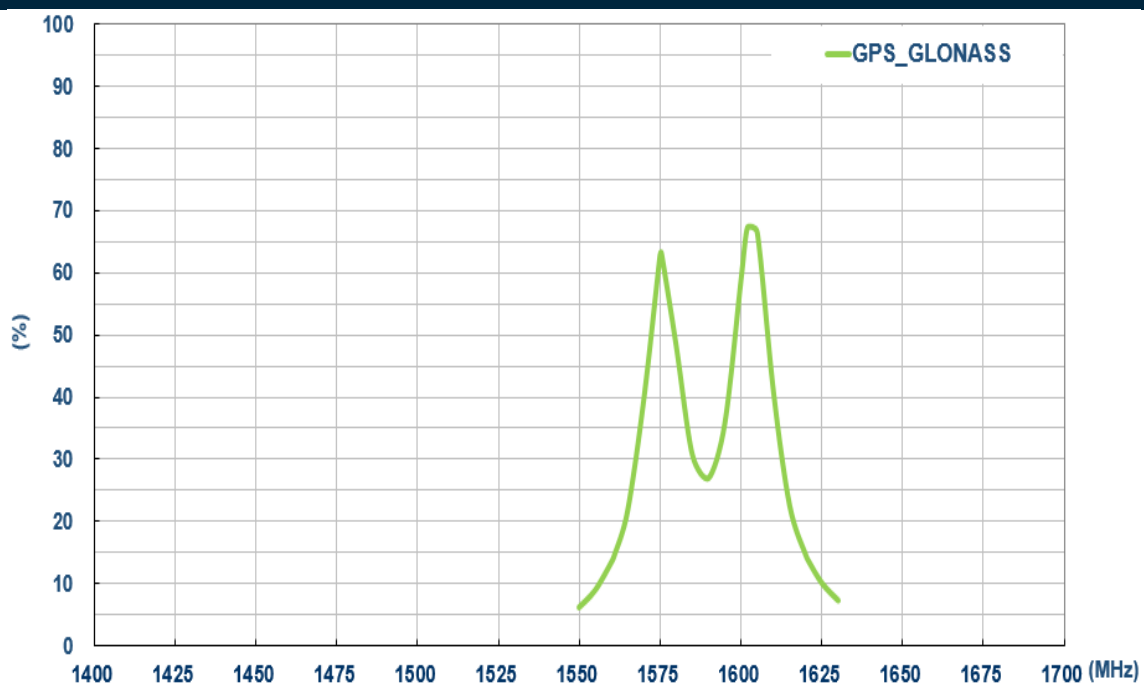
LTE



Wi-Fi

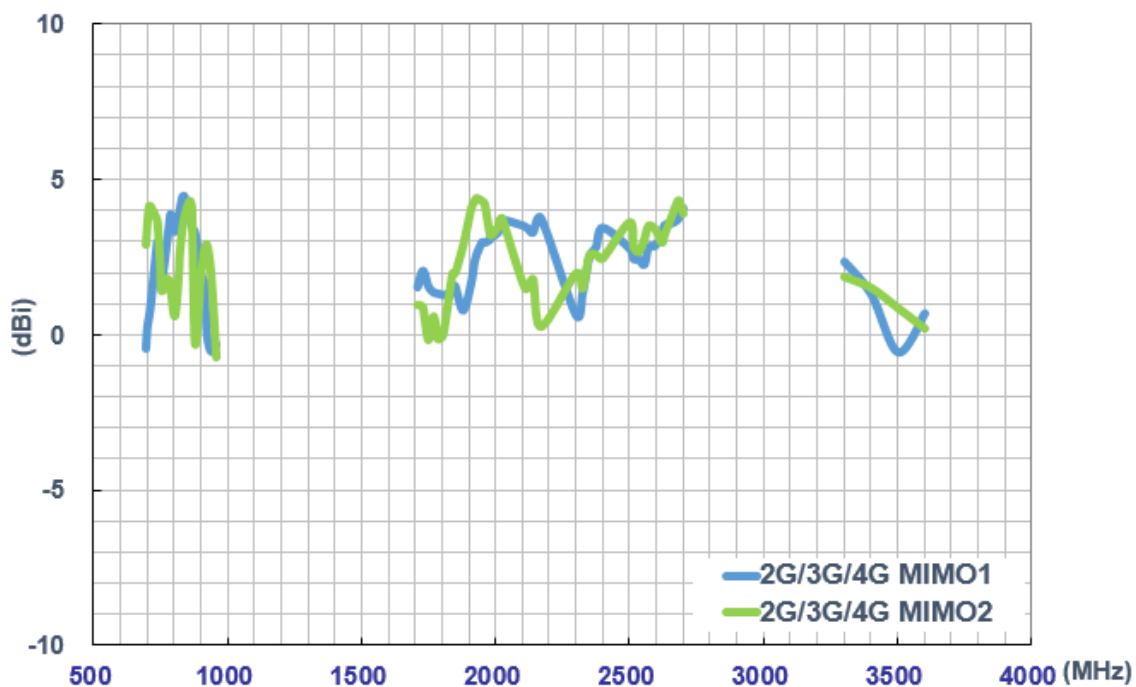


GNSS

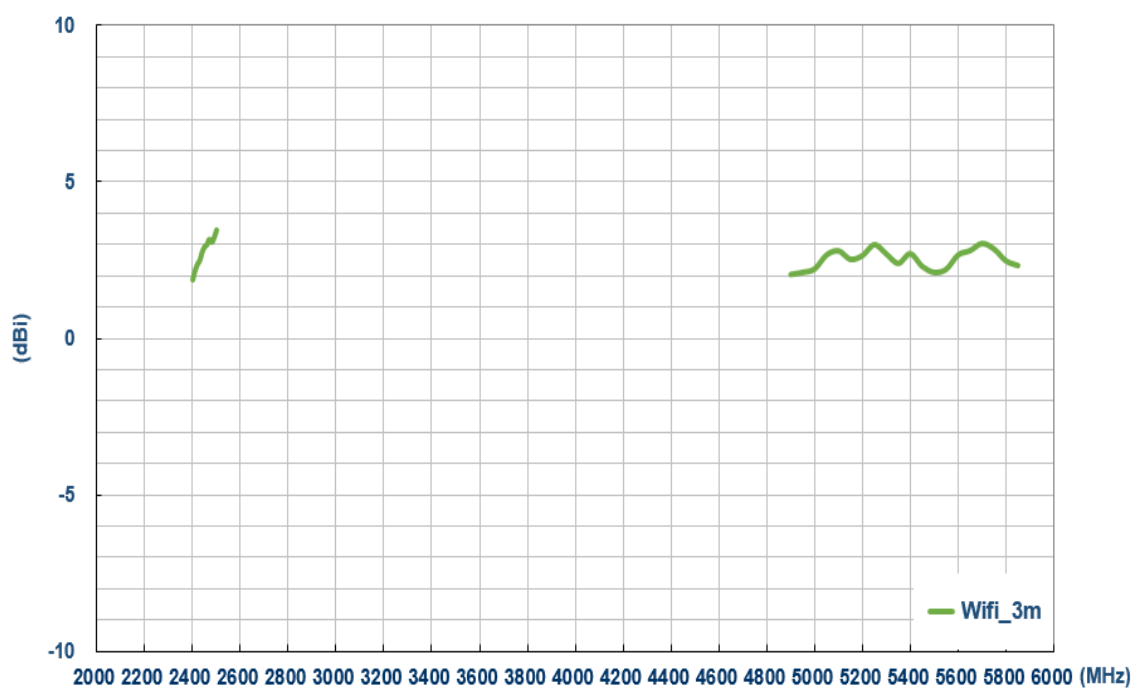


3.3 Peak Gain

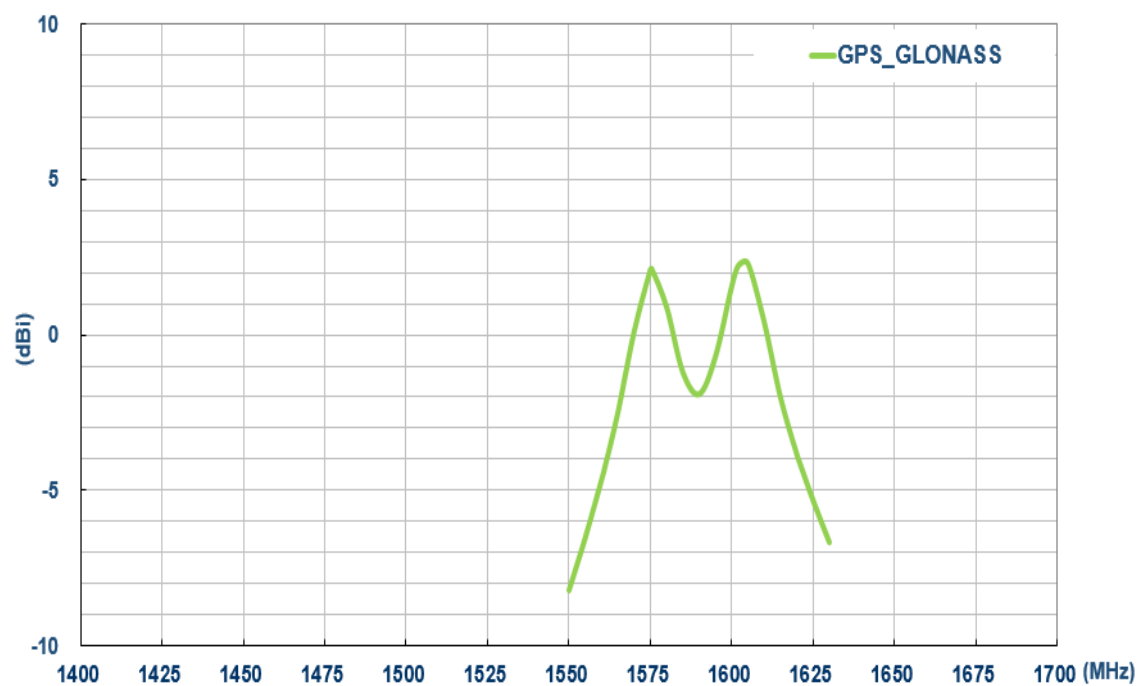
LTE



Wi-Fi

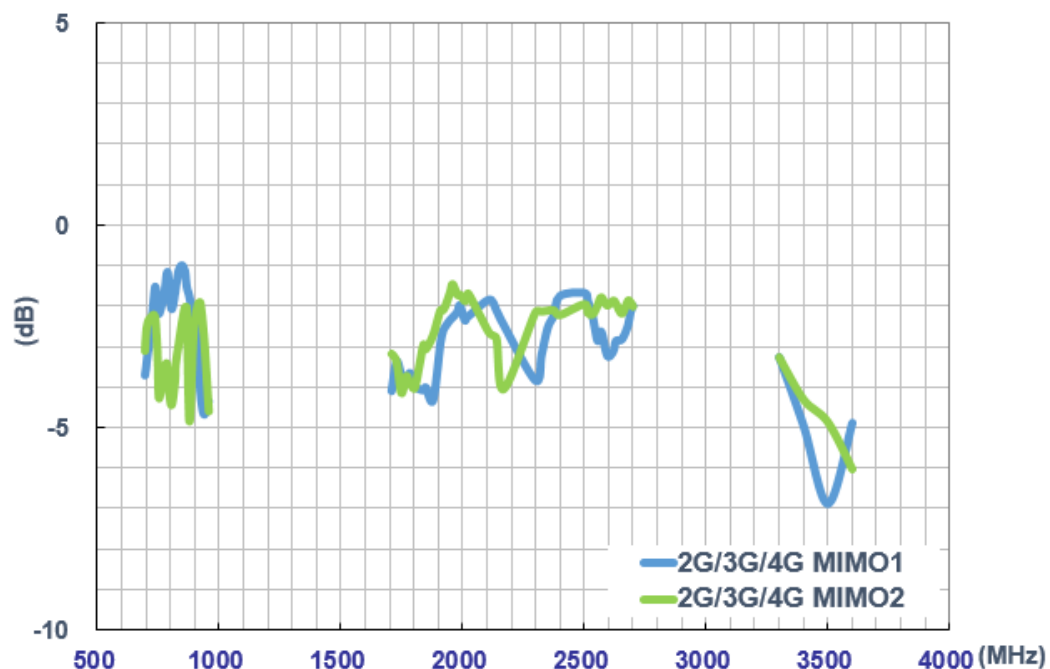


GNSS

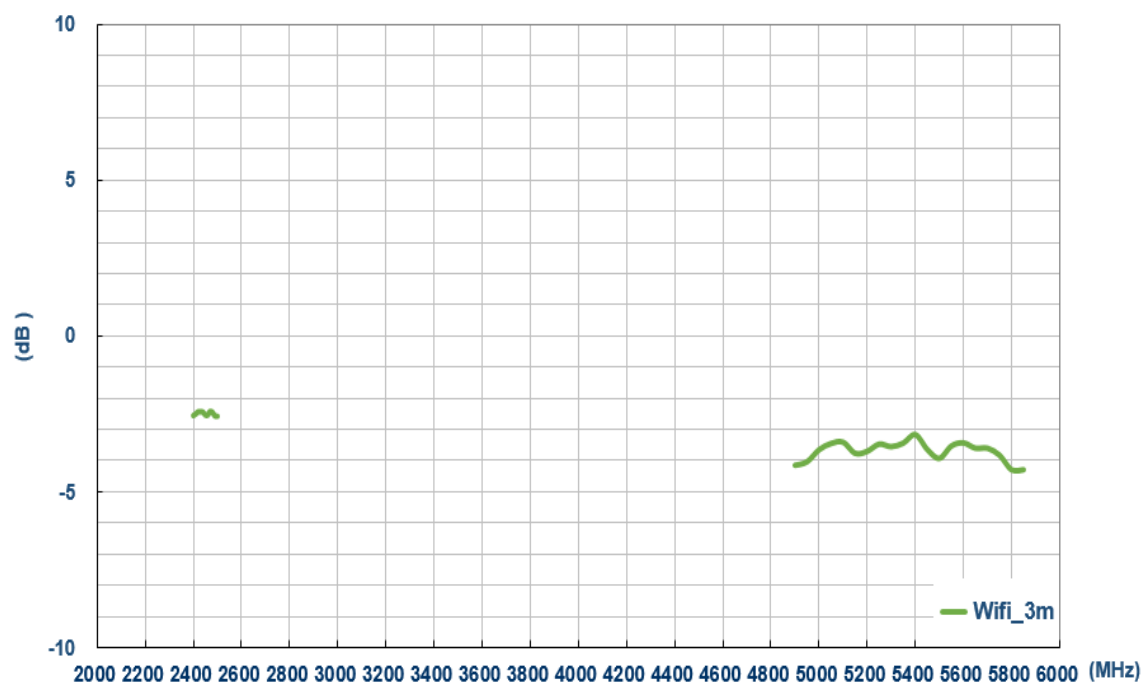


3.4 Average Gain

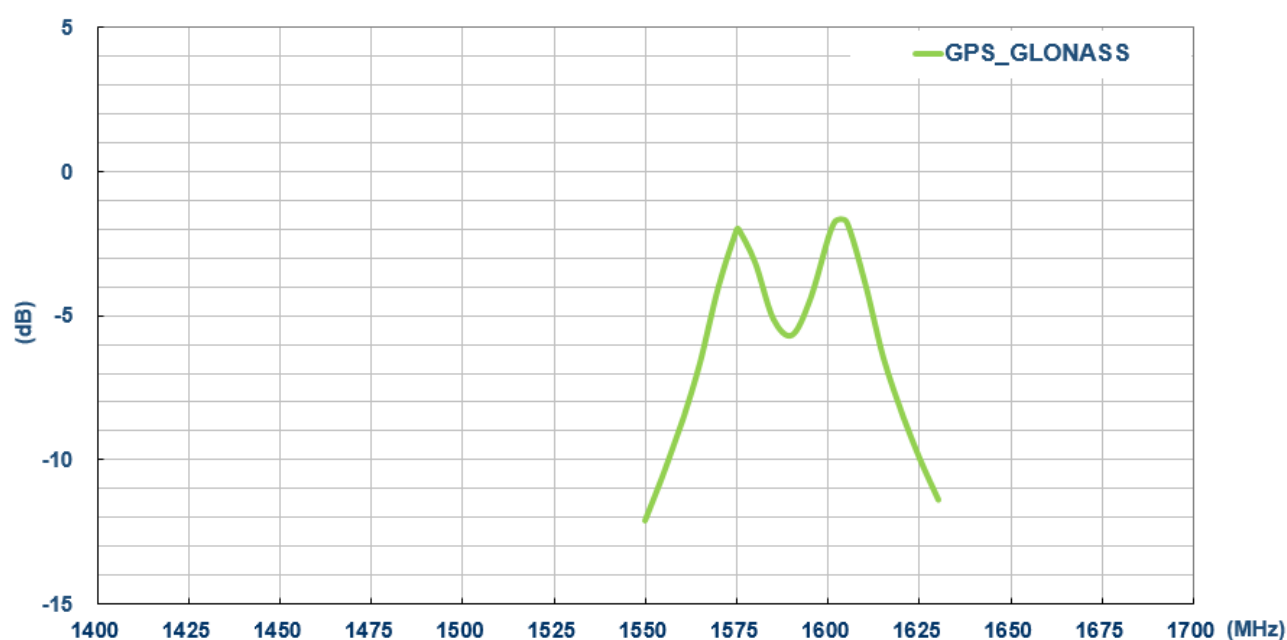
LTE



Wi-Fi

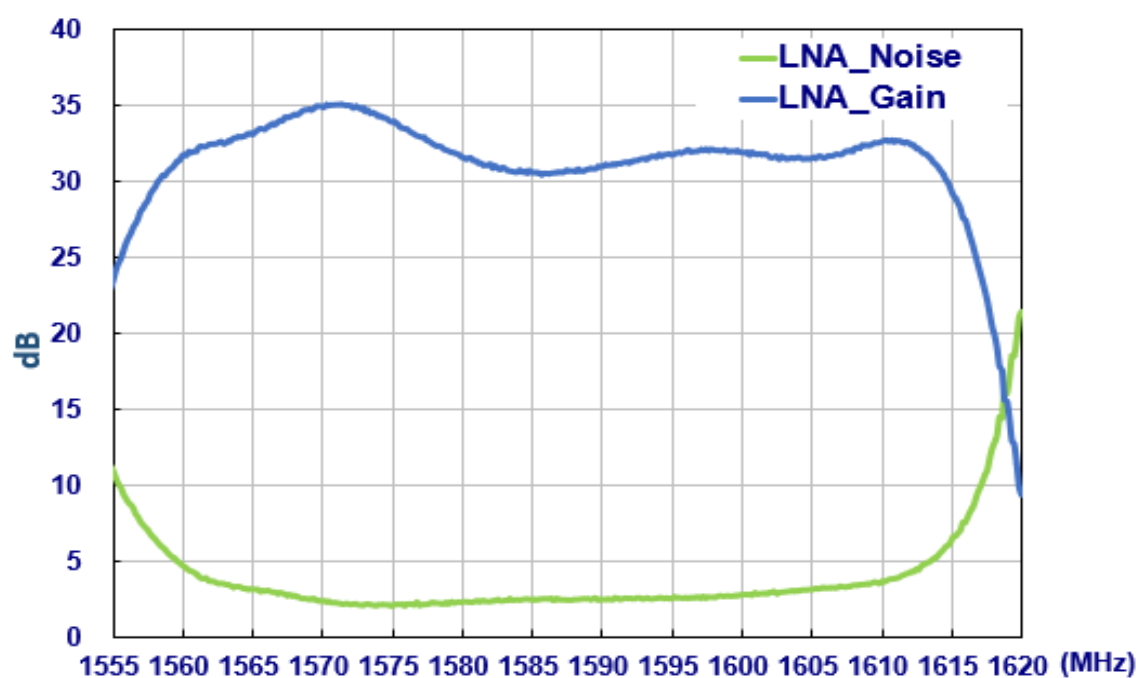


GNSS

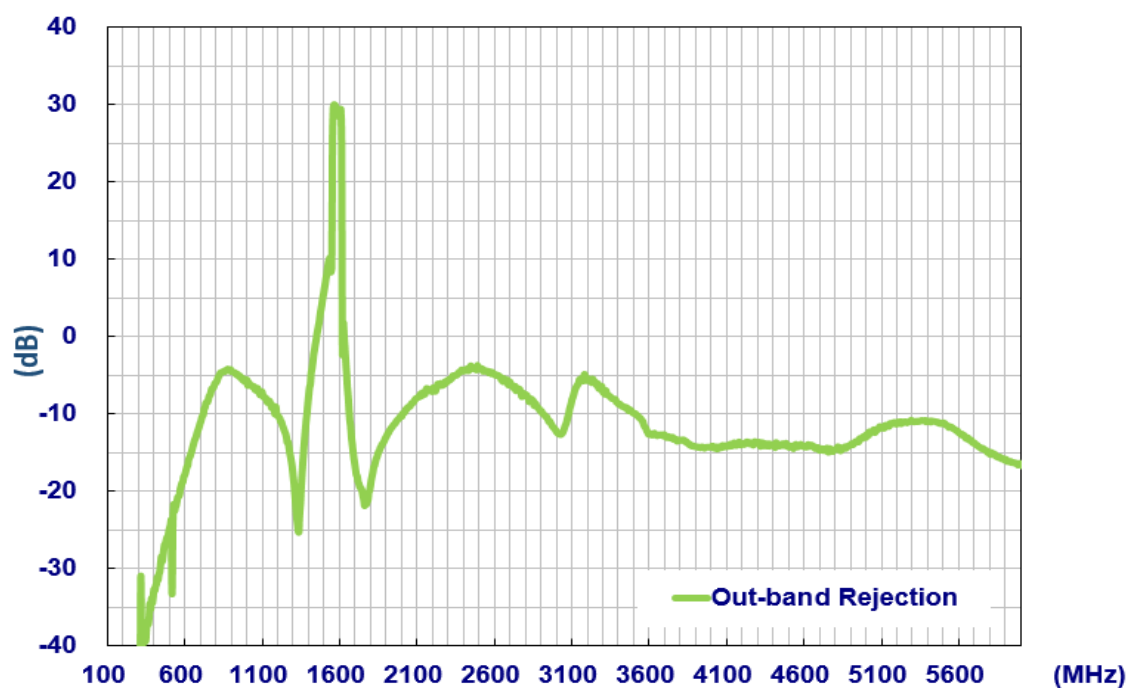


3.5 GNSS LNA Specifications

LNA Noise Figure

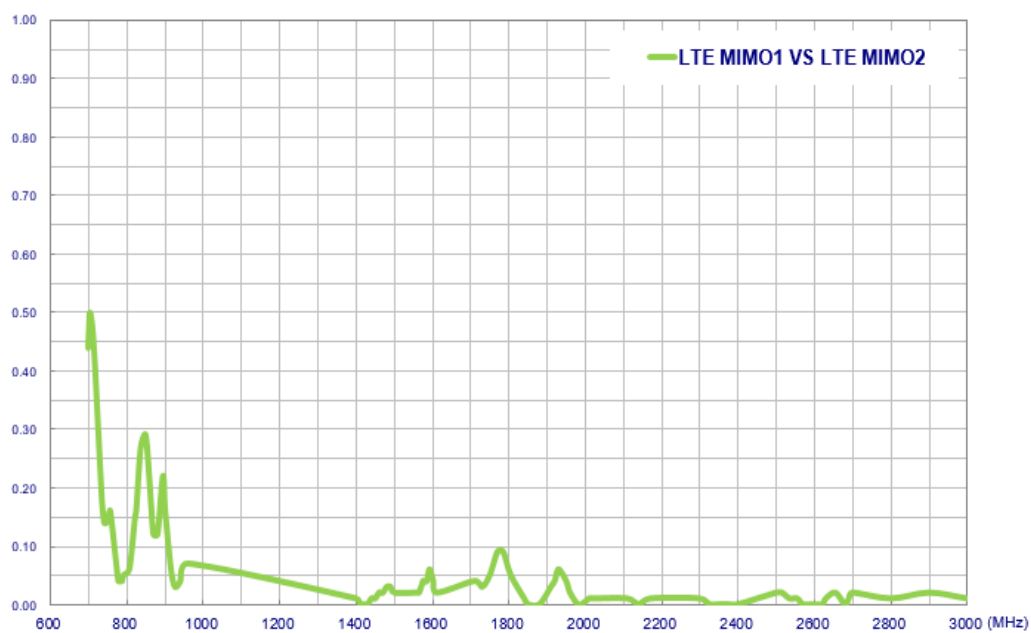


Out of Band Rejection



3.6 ECC

LTE



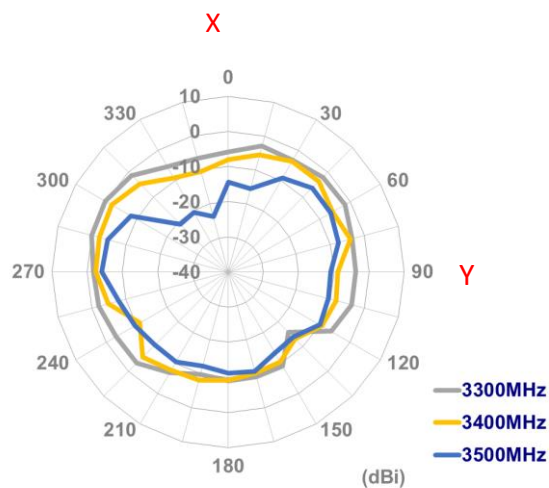
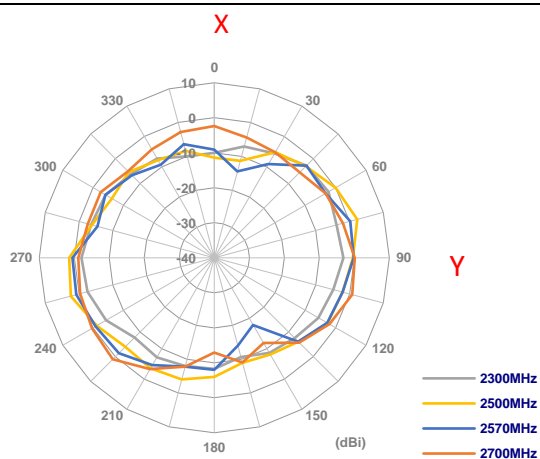
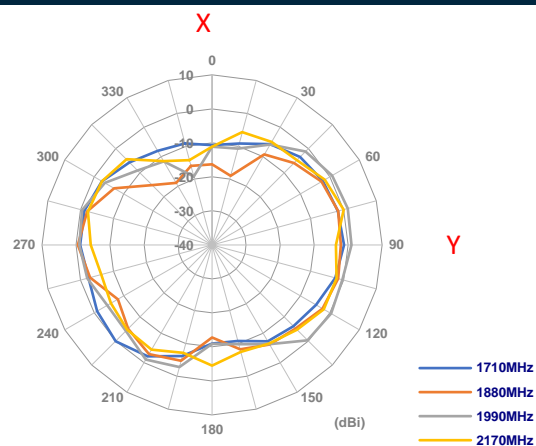
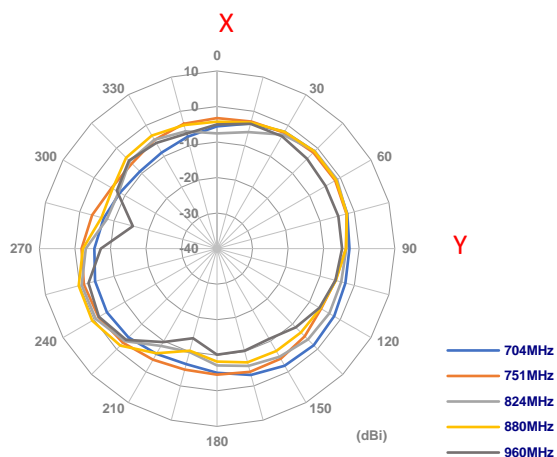
4. 2D Radiation Patterns

4.1 Test Setup

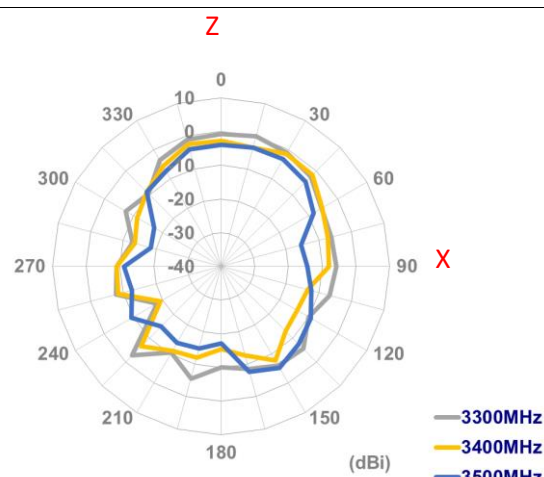
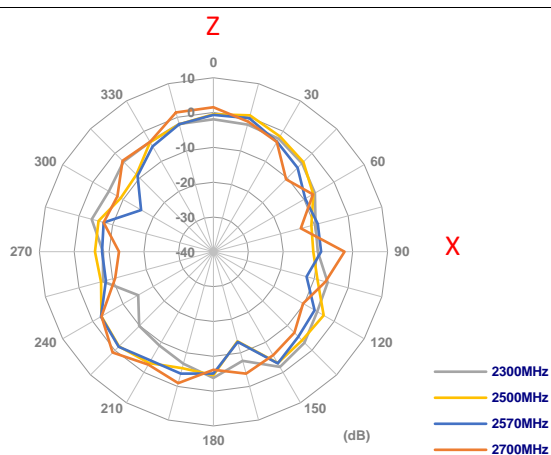
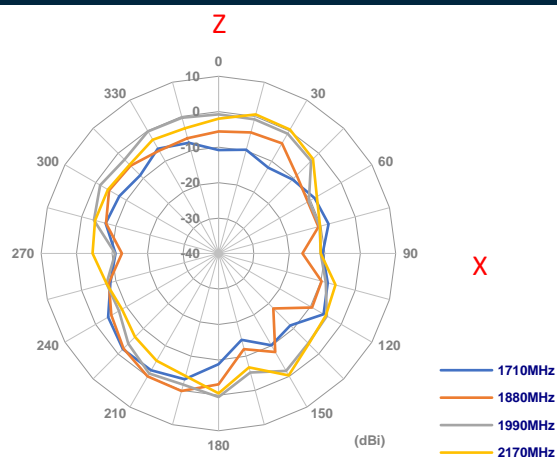
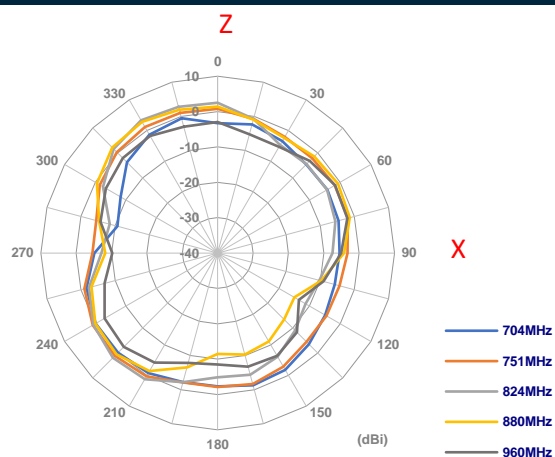


4.2 LTE MIMO 1 2D Radiation Patterns

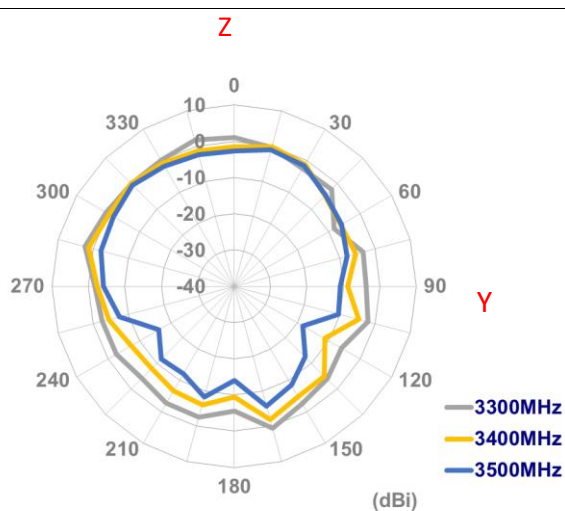
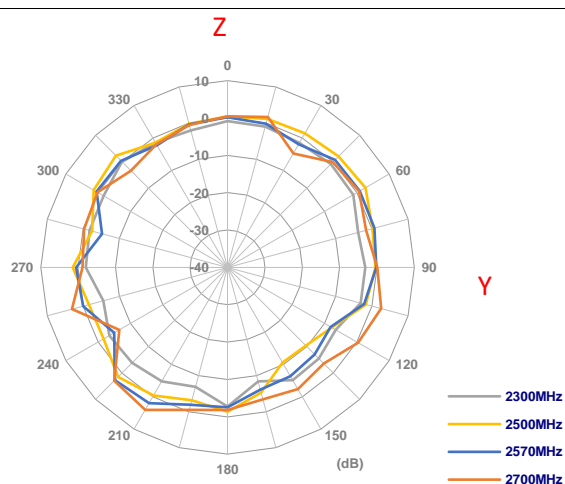
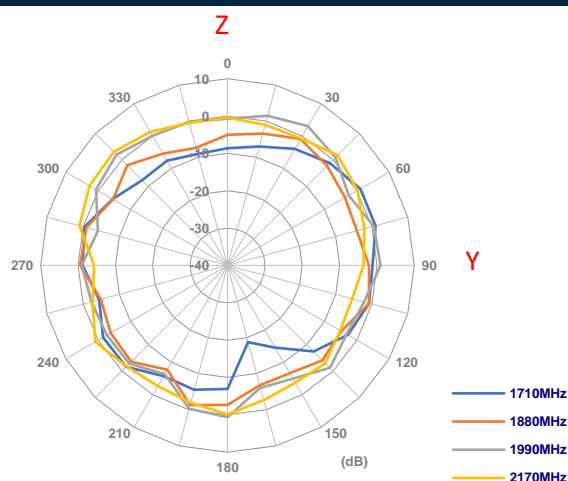
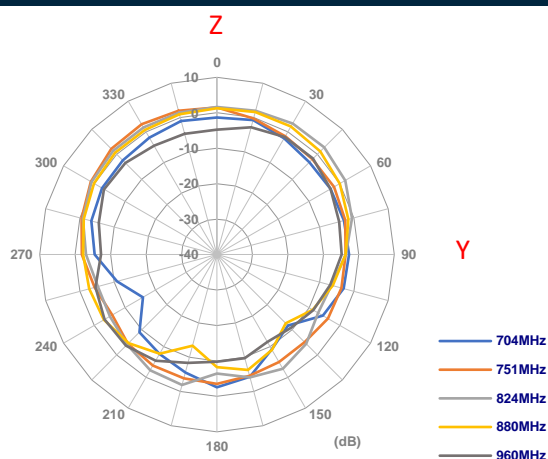
XY Plane



XZ Plane

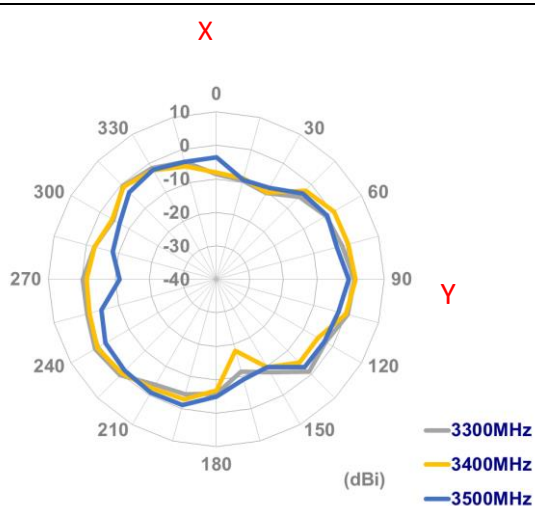
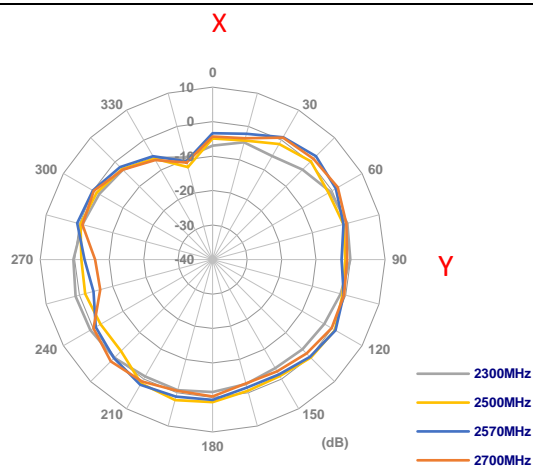
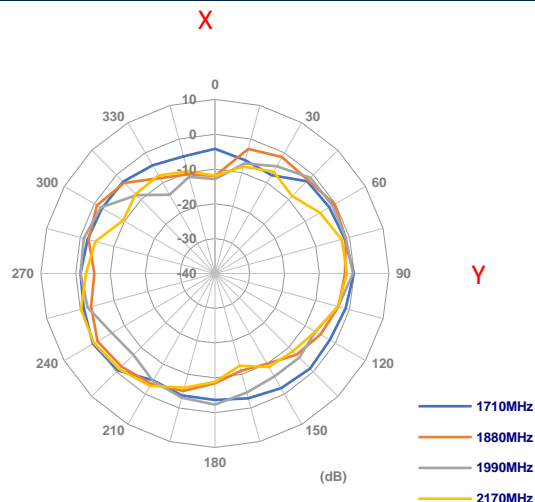
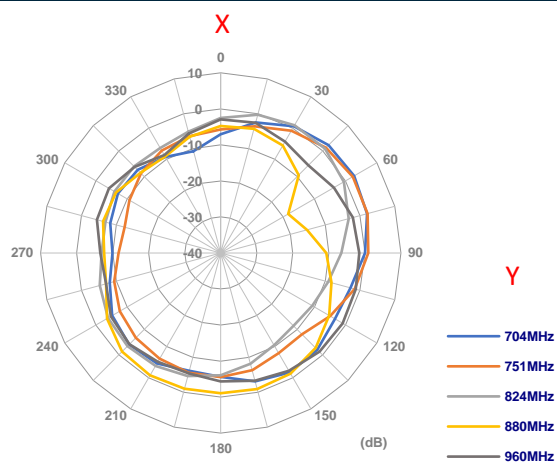


YZ Plane

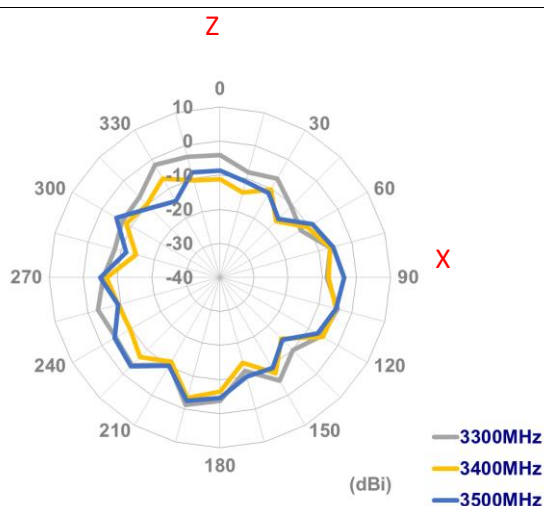
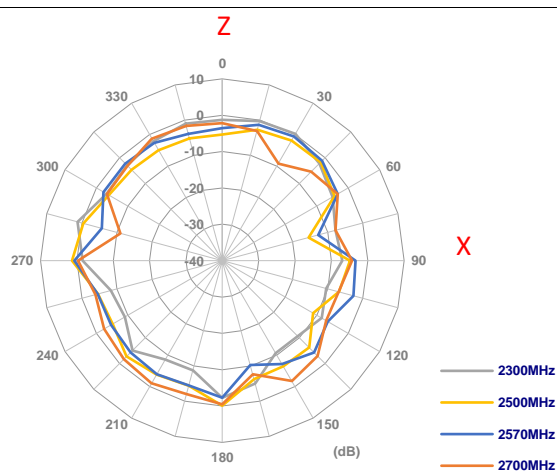
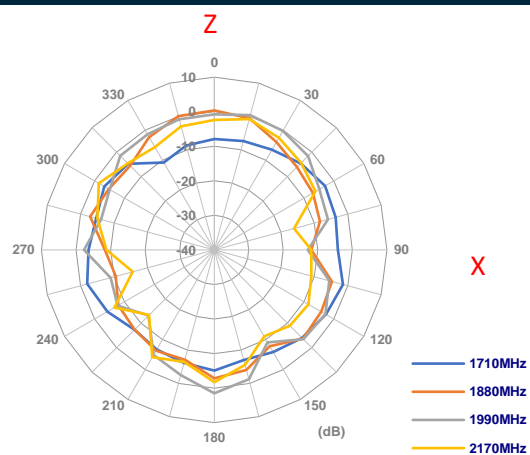
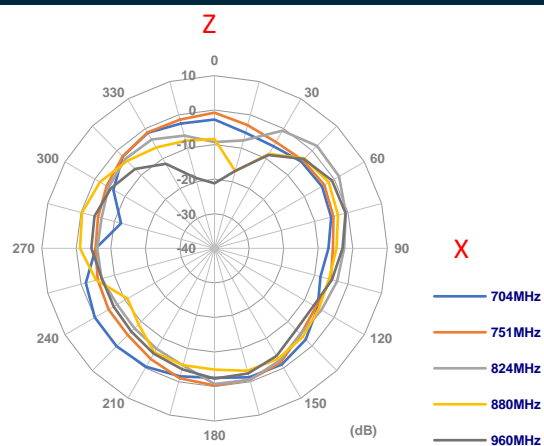


4.3 LTE MIMO 2 2D Radiation Patterns

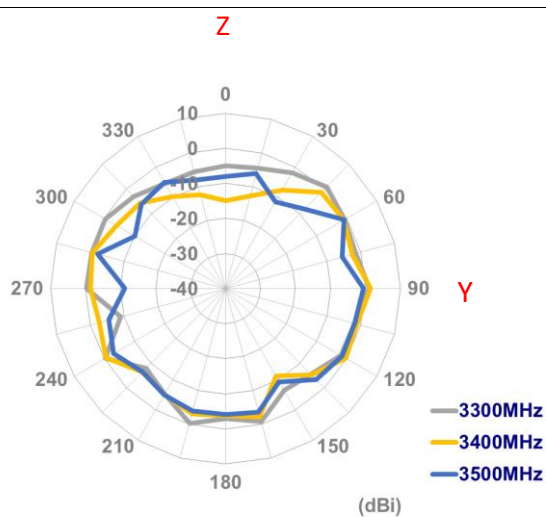
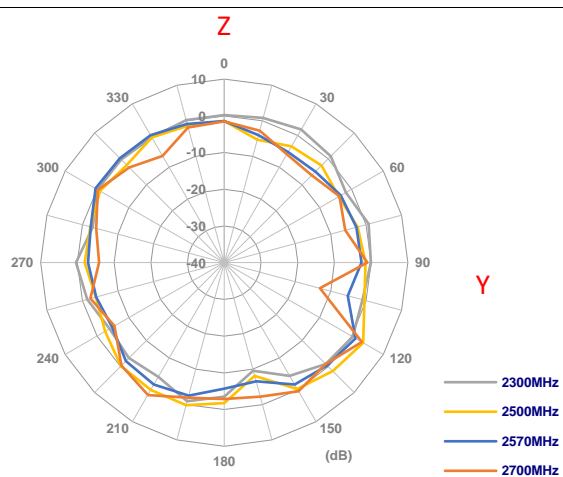
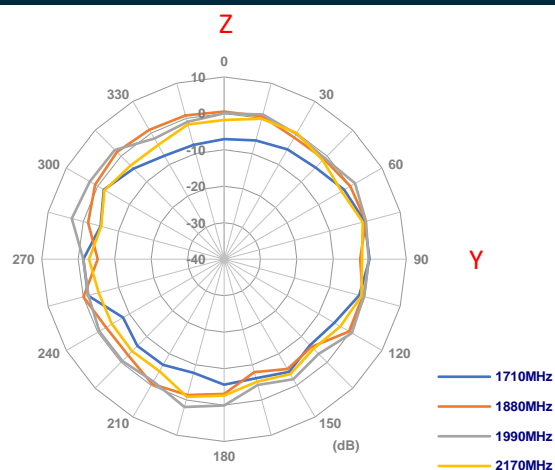
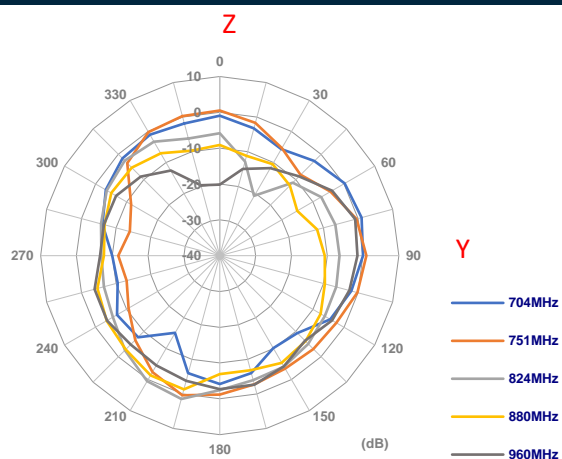
XY Plane



XZ Plane

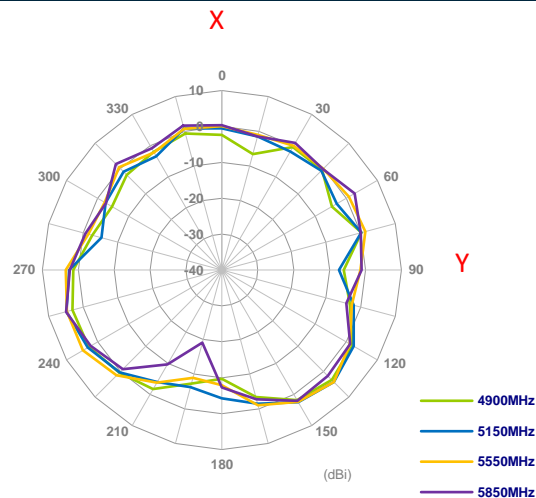
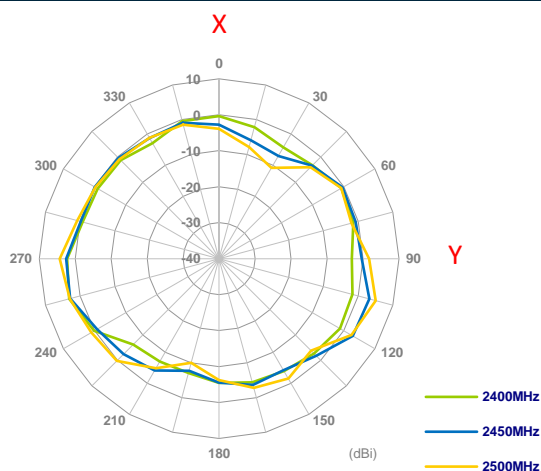


YZ Plane

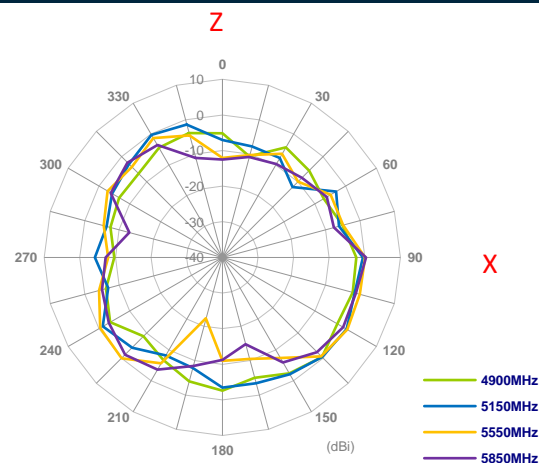
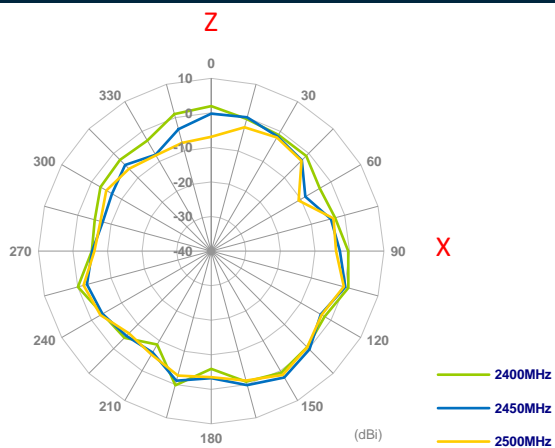


4.4 Wi-Fi 2D Radiation Patterns

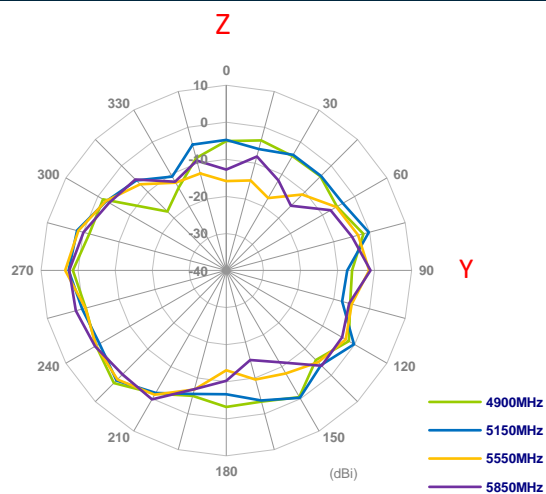
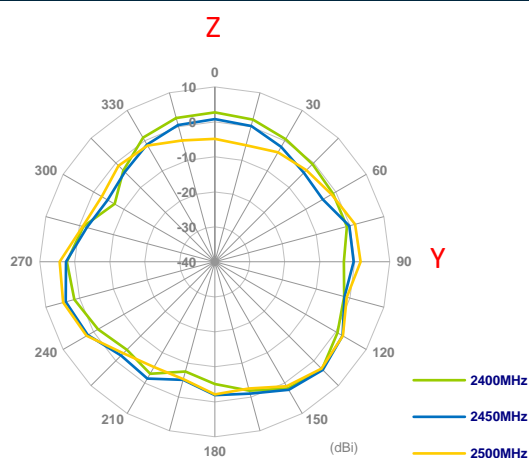
XY Plane



XZ Plane

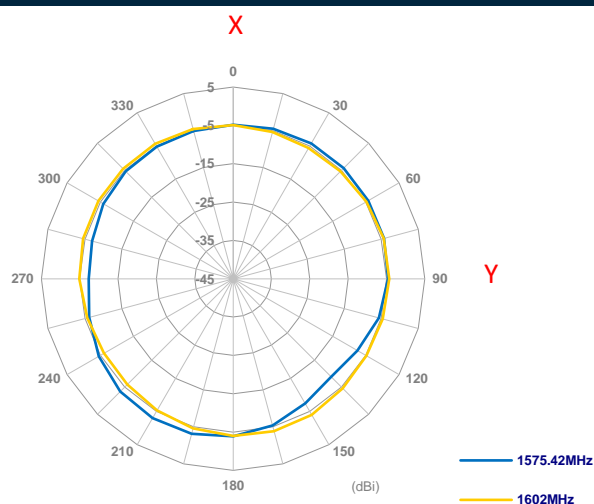


YZ Plane

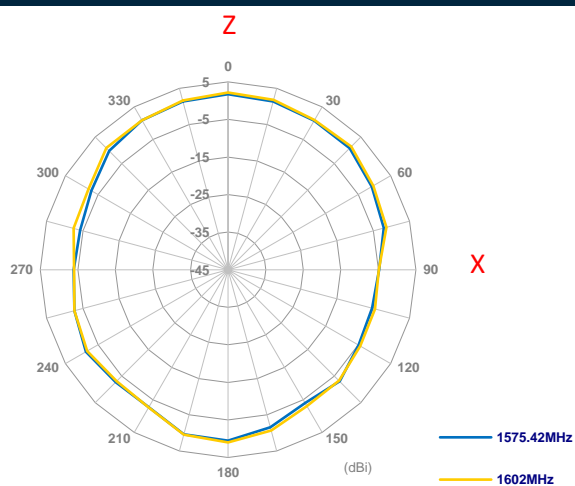


4.5 GNSS 2D Radiation Patterns

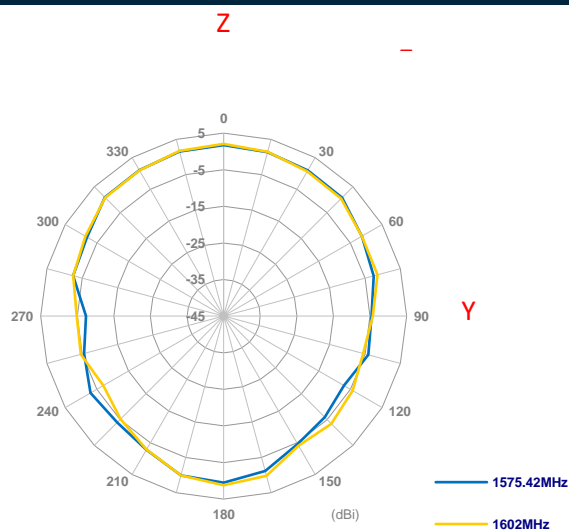
XY Plane



XZ Plane



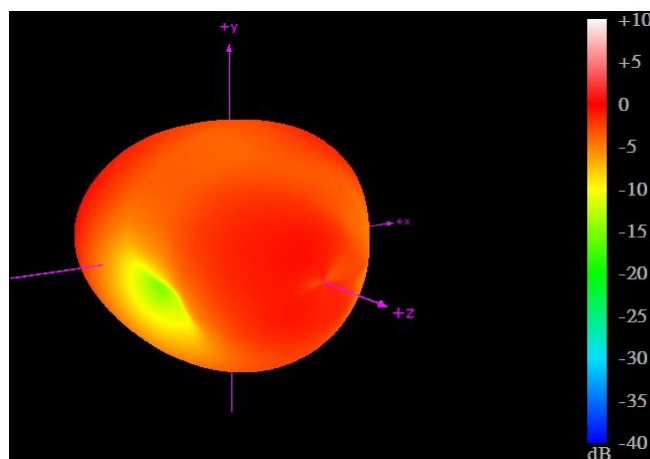
YZ Plane



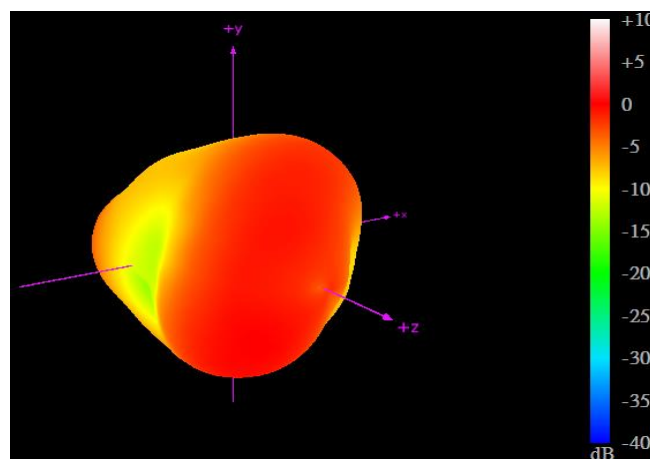
5. 3D Radiation Patterns

5.1 LTE MIMO 1 3D Radiation Patterns

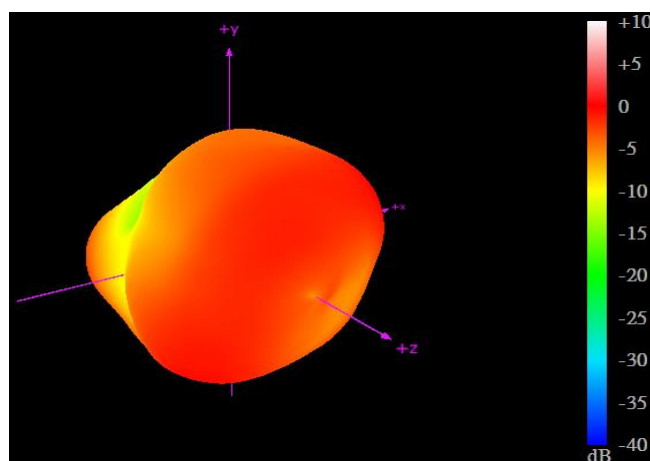
704 MHz



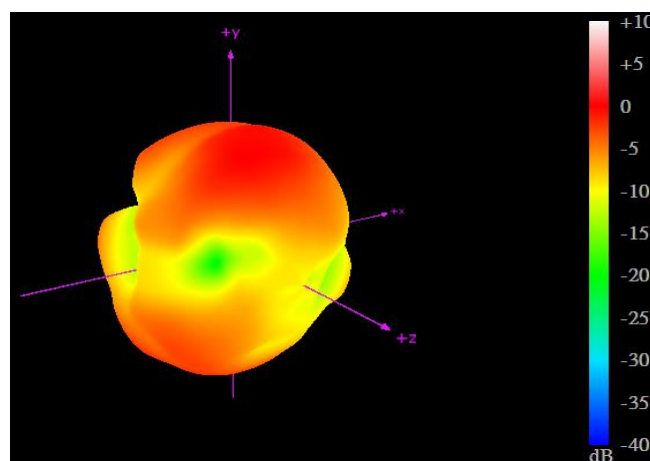
824 MHz



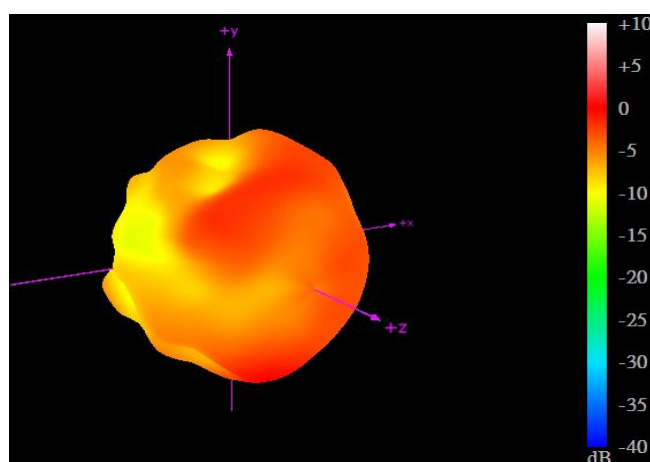
960 MHz



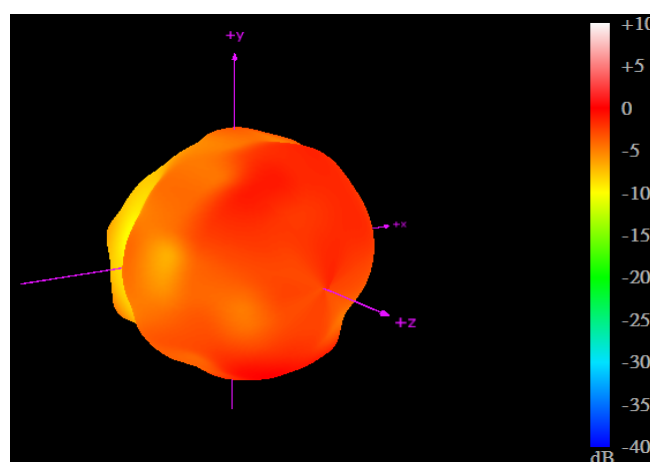
1710 MHz



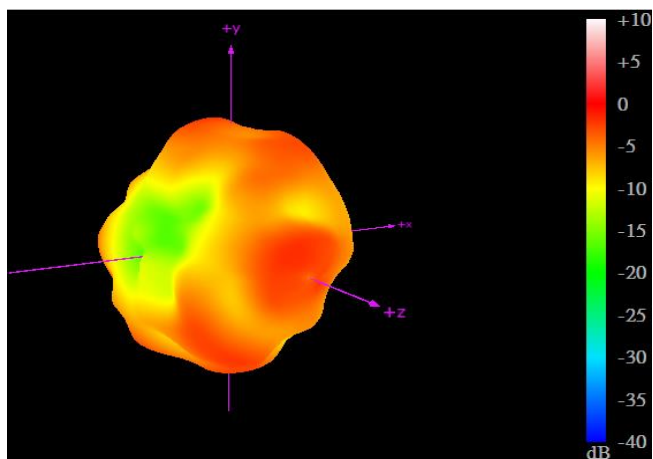
2170 MHz



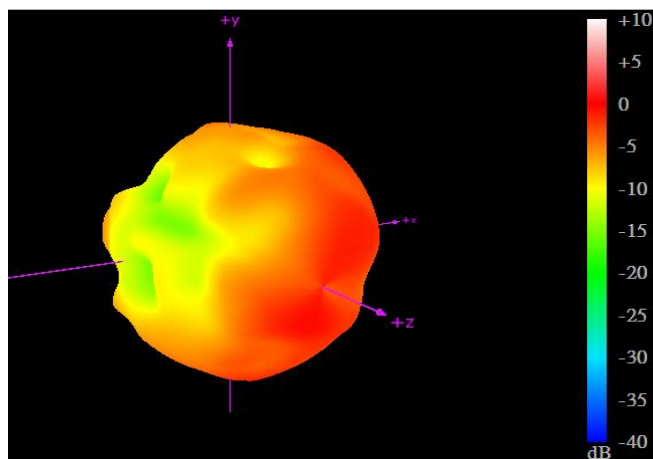
2300 MHz



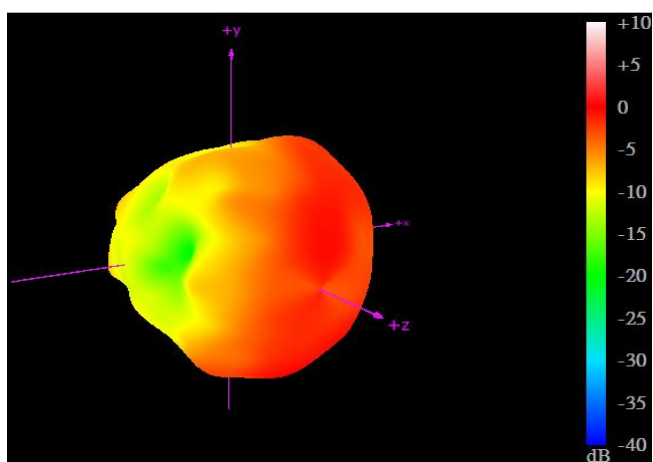
2700 MHz



3300 MHz

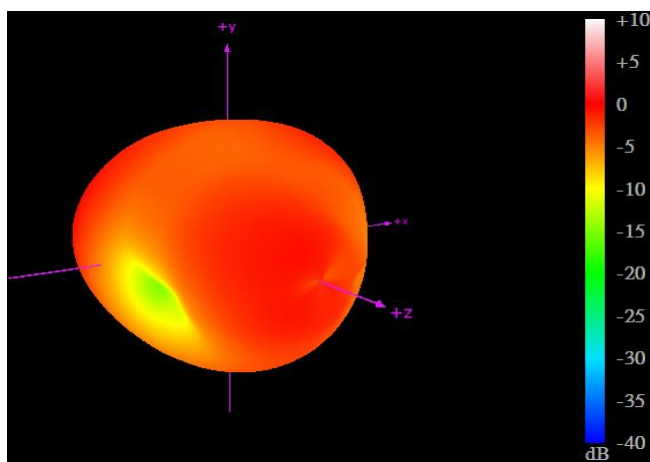


3500 MHz

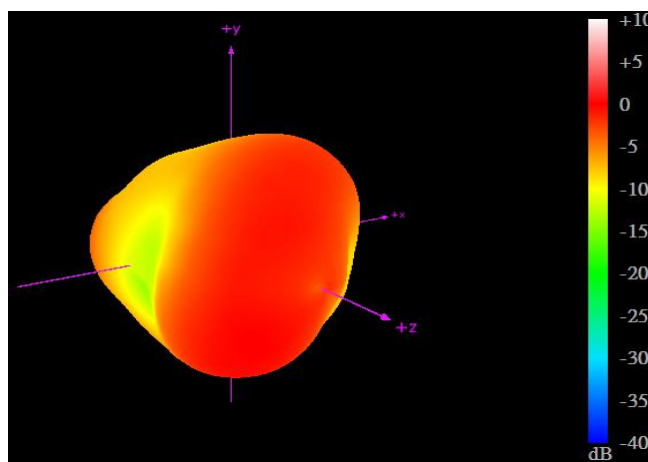


5.2 LTE MIMO 2 3D Radiation Patterns

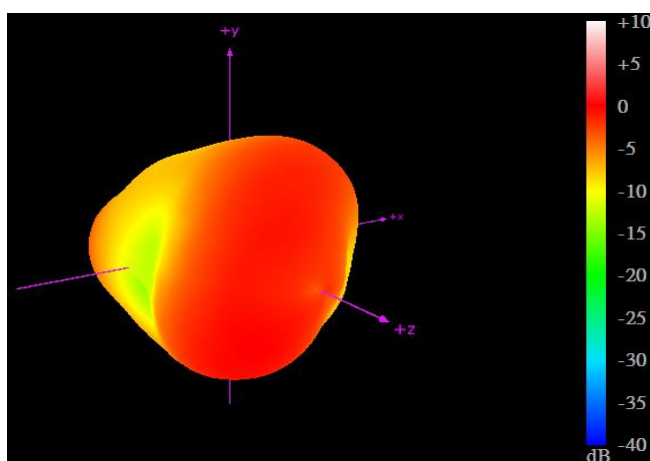
704 MHz



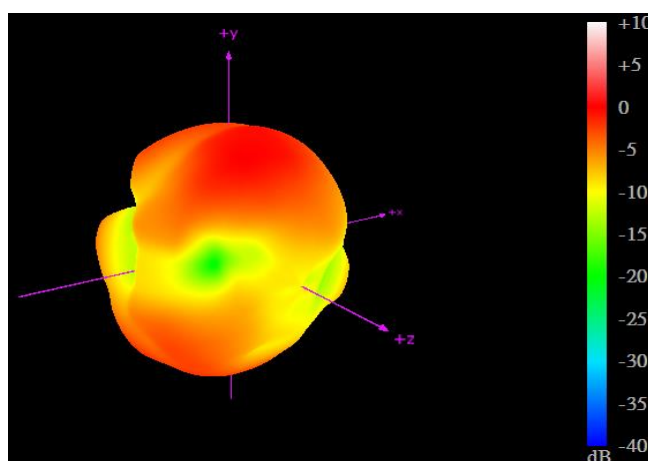
824 MHz



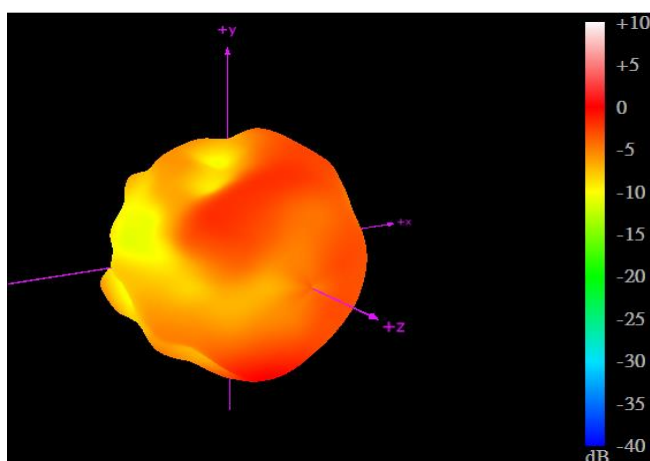
960 MHz



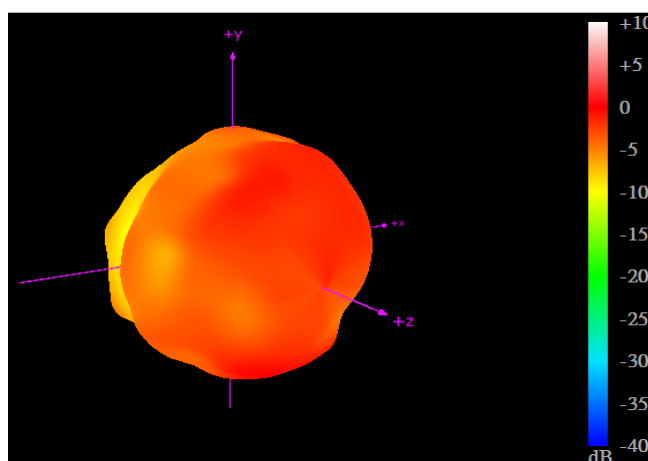
1710 MHz



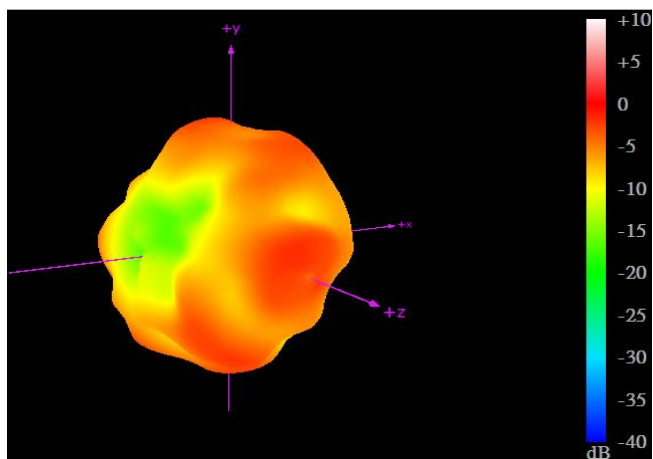
2170 MHz



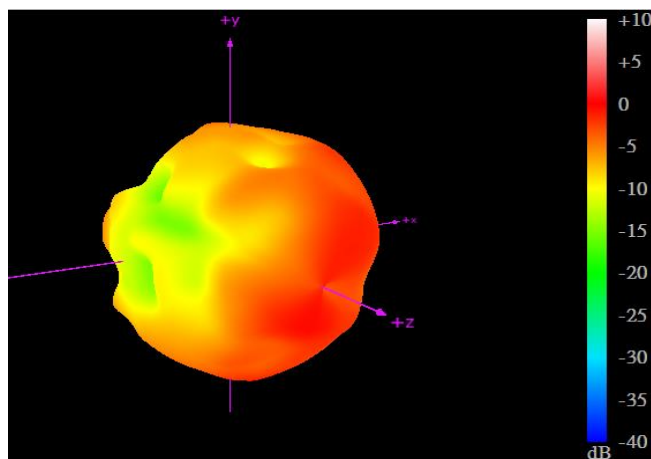
2300 MHz



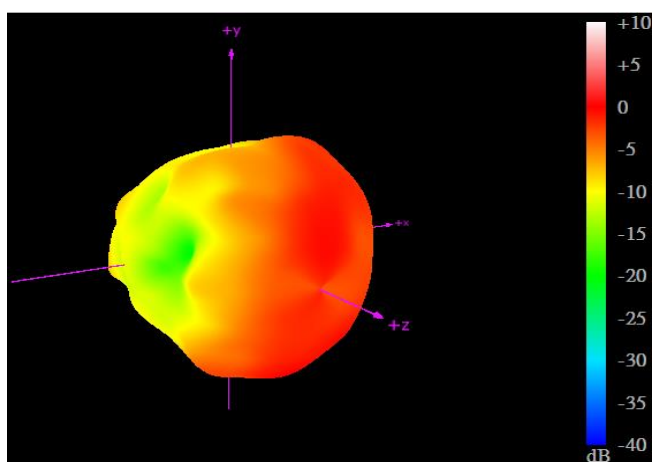
2700 MHz



3300 MHz

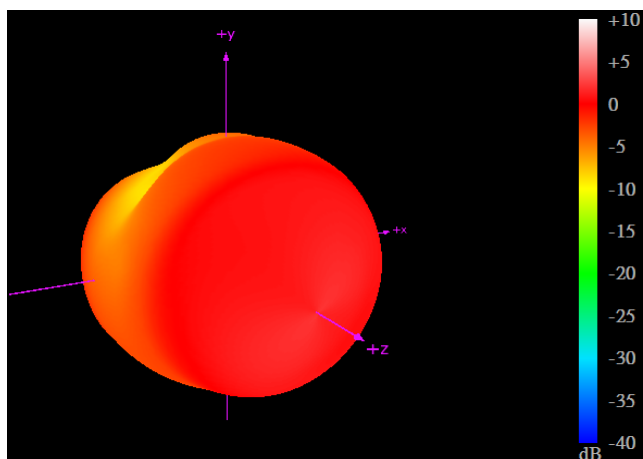


3500 MHz

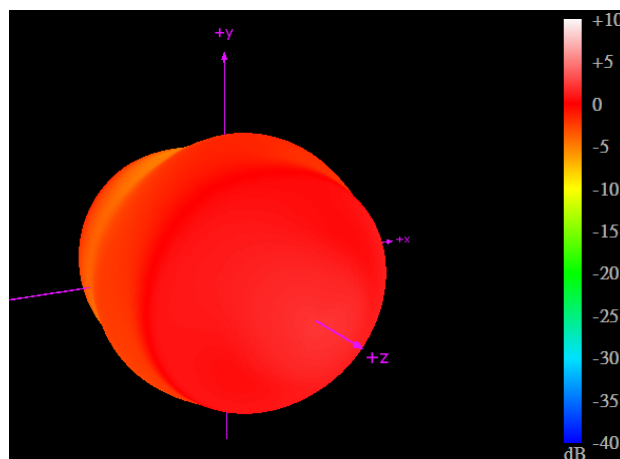


5.3 GNSS 3D Radiation Patterns

1575.42 MHz

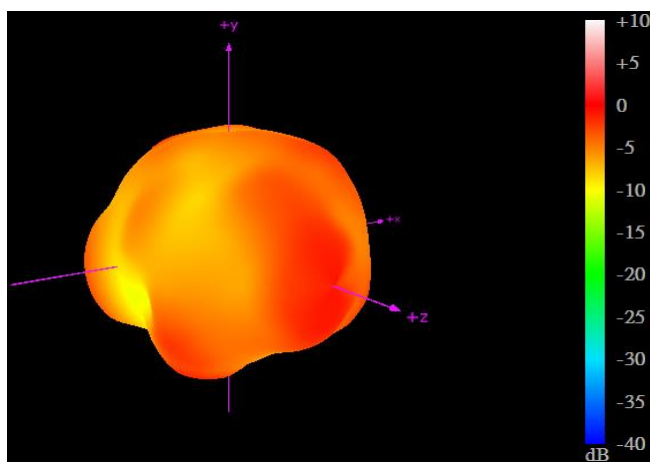


1602 MHz

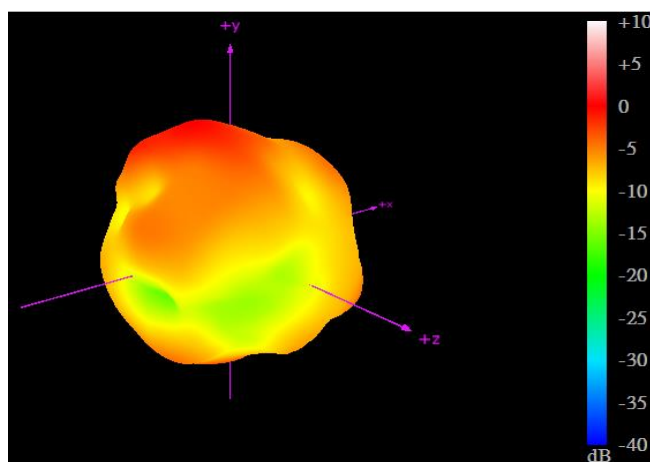


5.2 Wi-Fi 3D Radiation Patterns

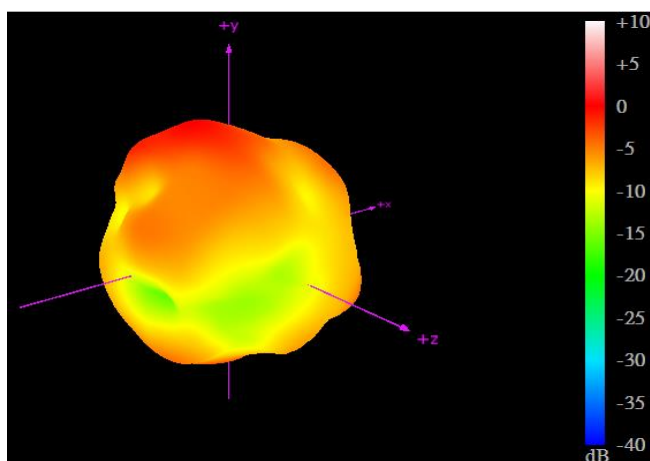
2400 MHz



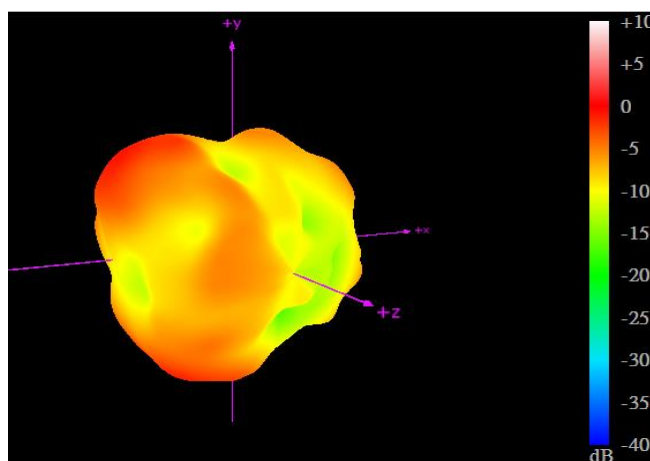
2500 MHz



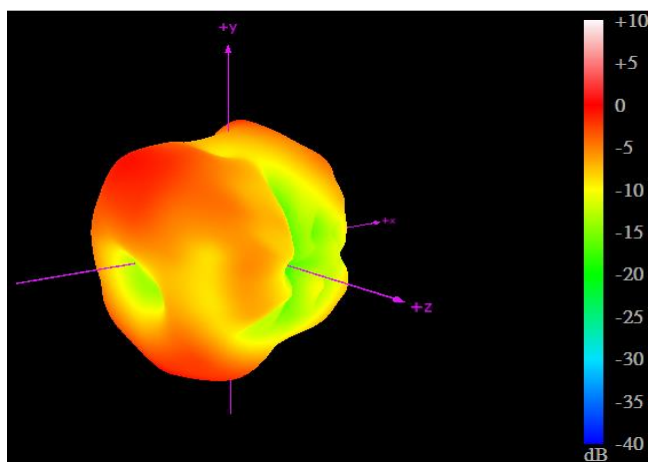
4900 MHz



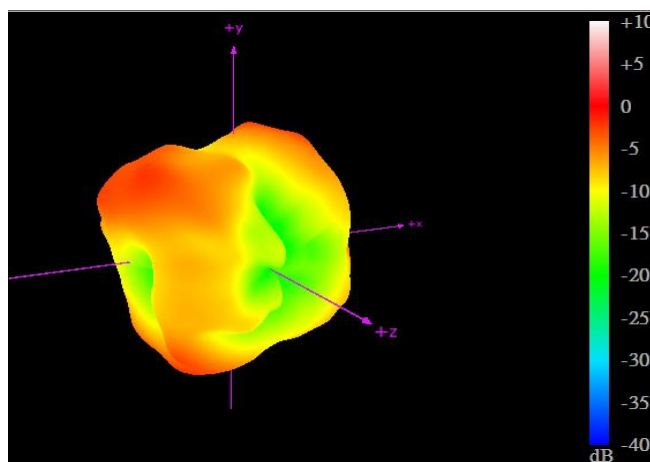
5150 MHz



5550 MHz



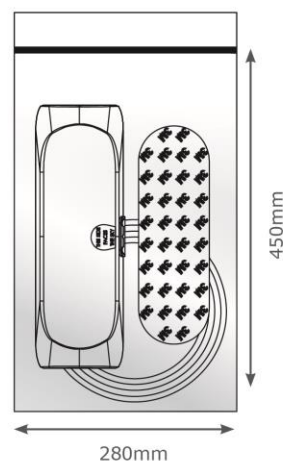
5850 MHz



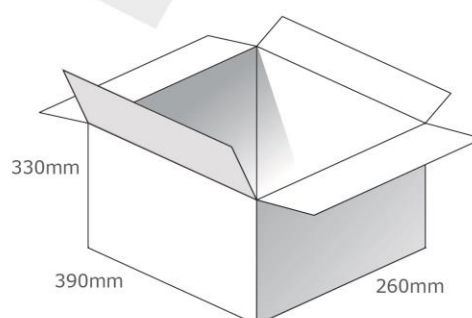


7. Packaging

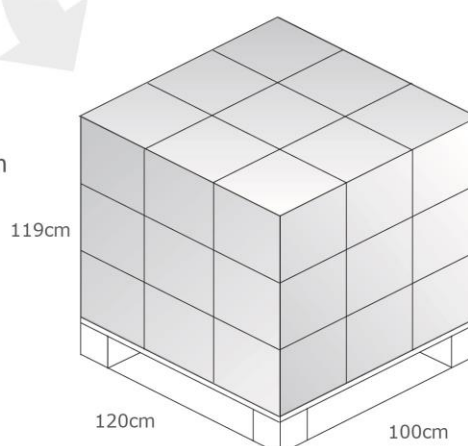
1pcs MA245.LBIC.002 per PE Bag
Bag Dimensions - 450 x 280mm
Weight - 430g



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

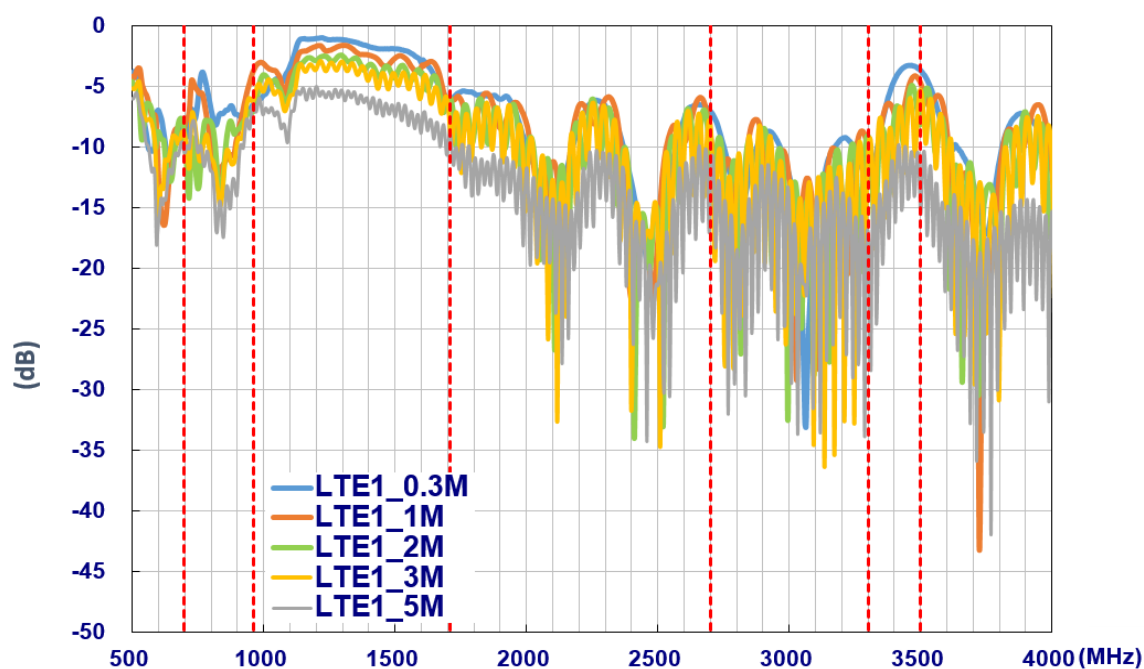


8. Application Note

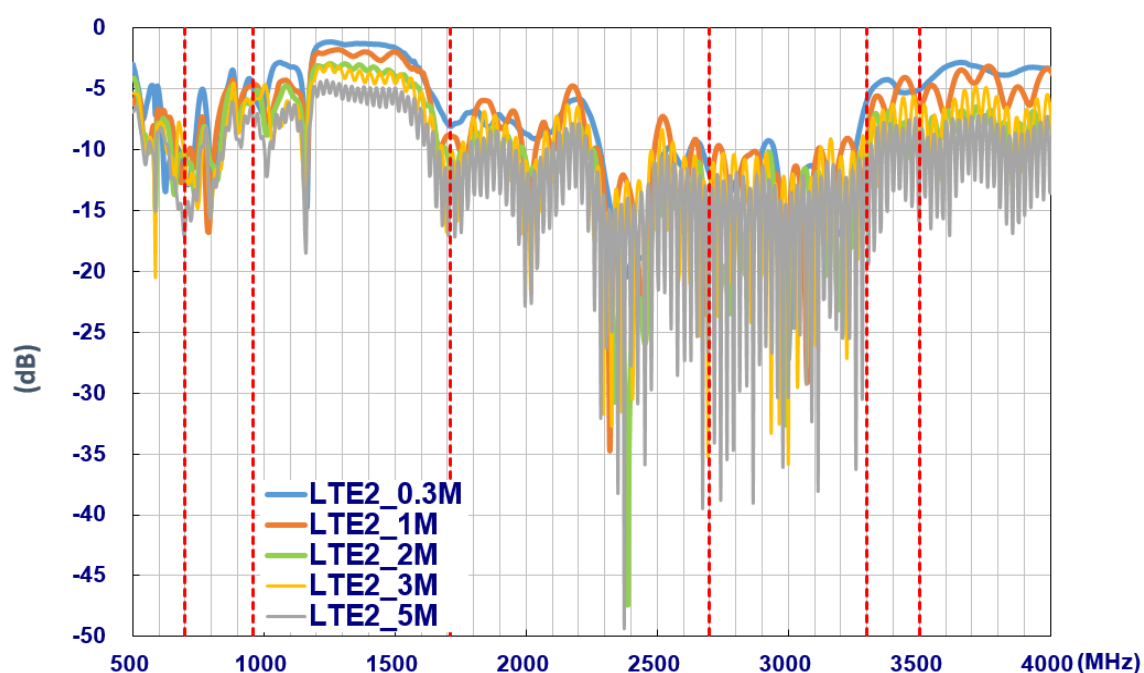
The MA245 antenna measurement with different cable length, the performance is shown below

8.1 Return Loss

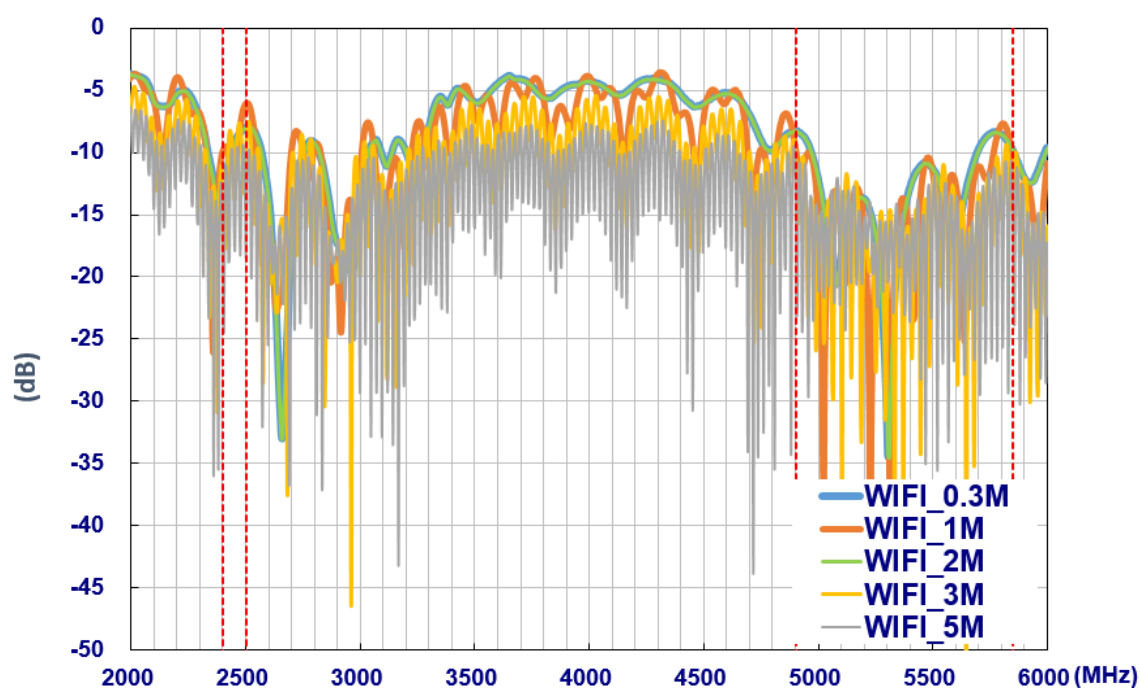
LTE MIMO 1



LTE MIMO 2

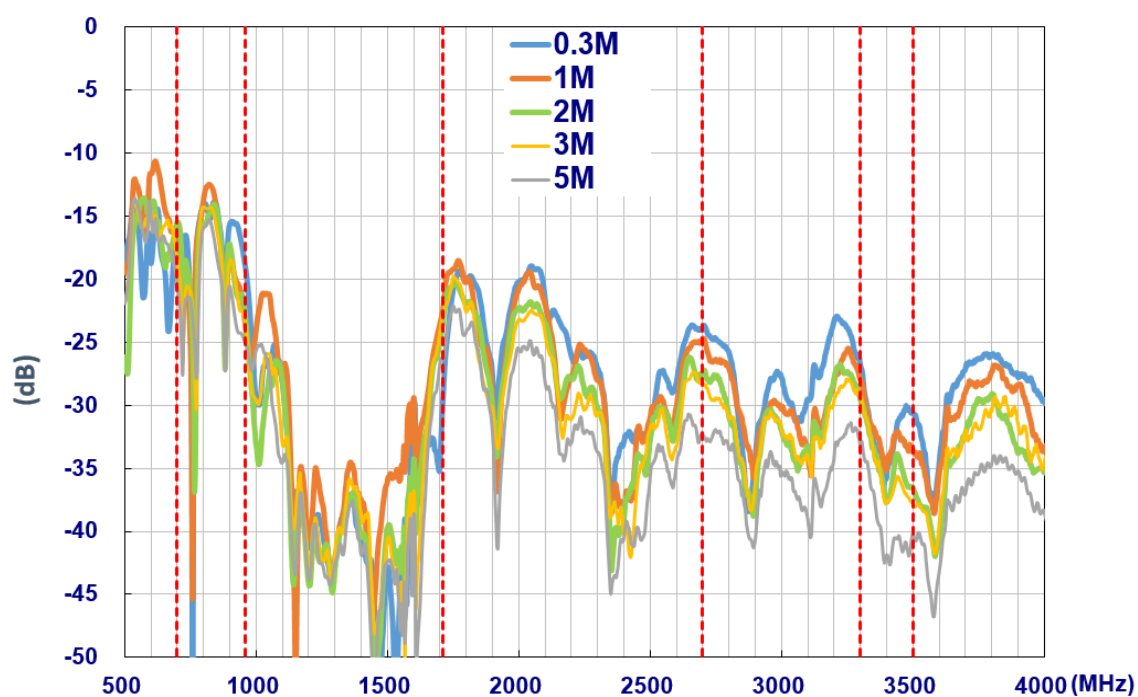


Wi-Fi



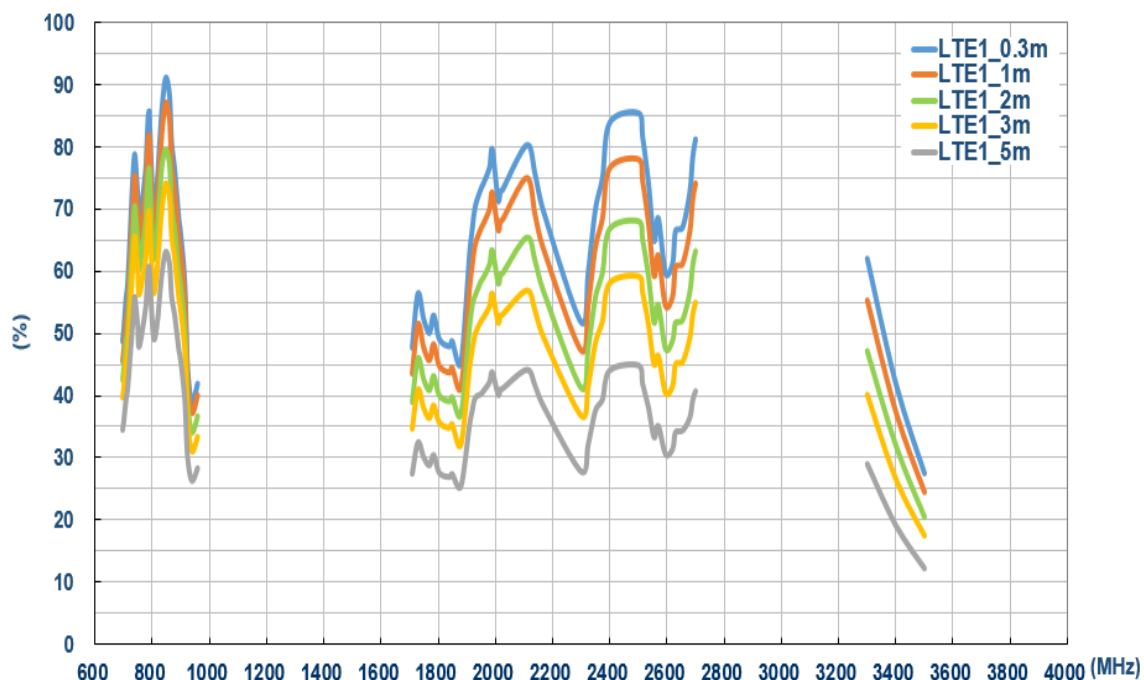
8.2 Isolation

LTE MIMO 1 & 2

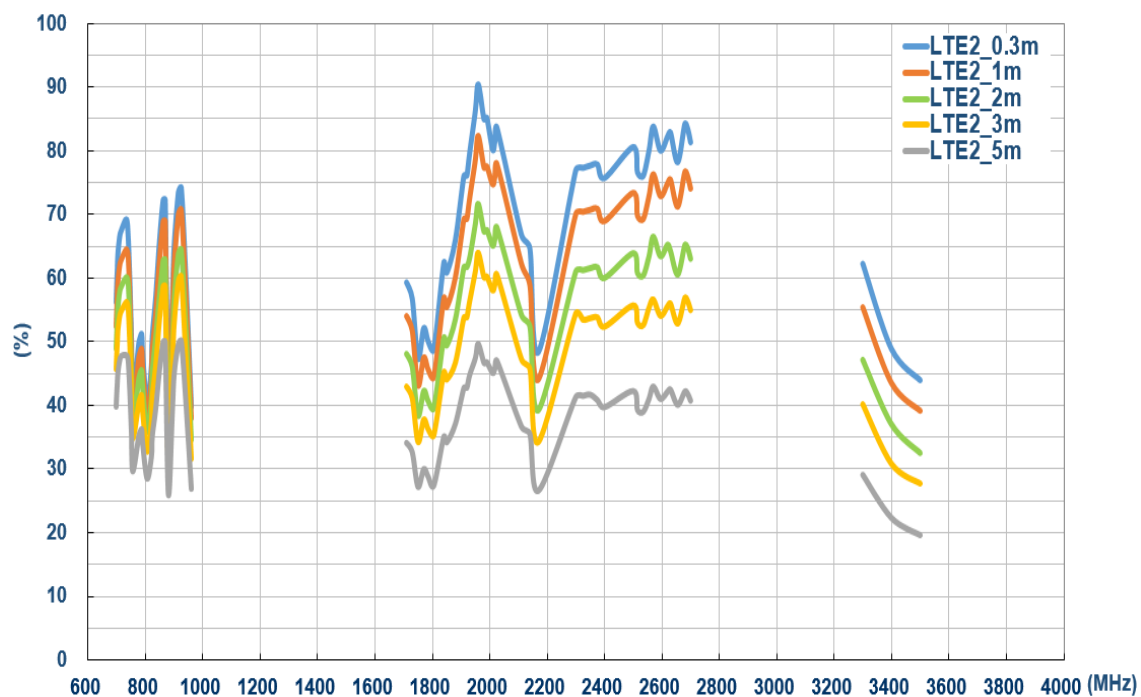


8.3 Efficiency

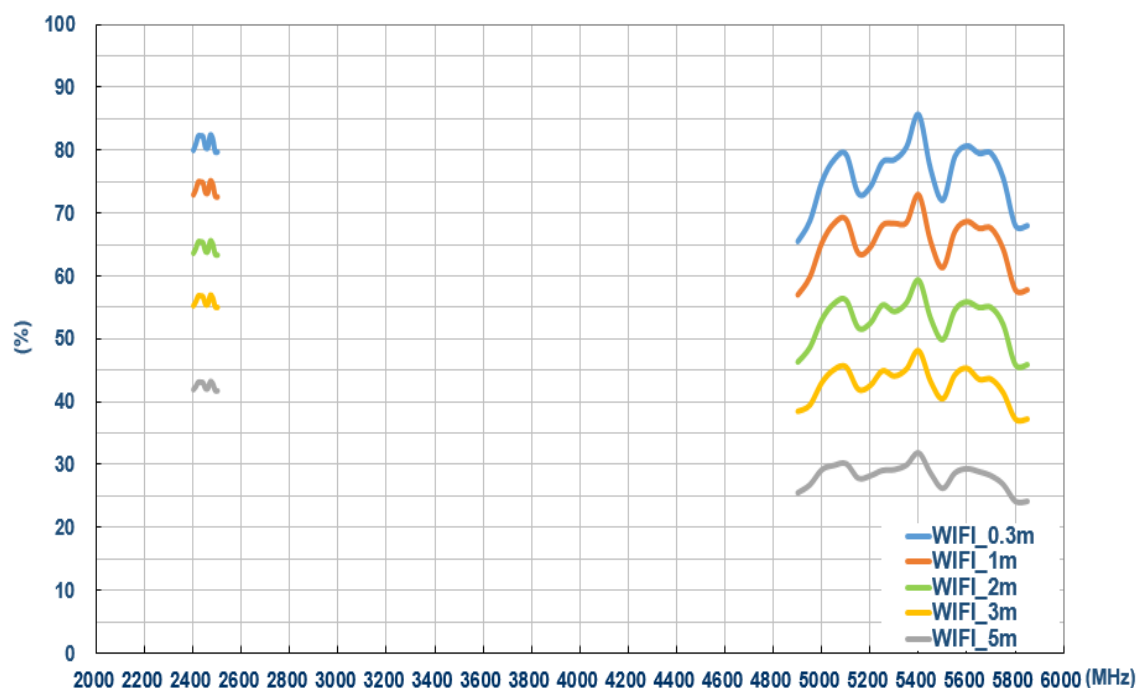
LTE MIMO 1



LTE MIMO 2

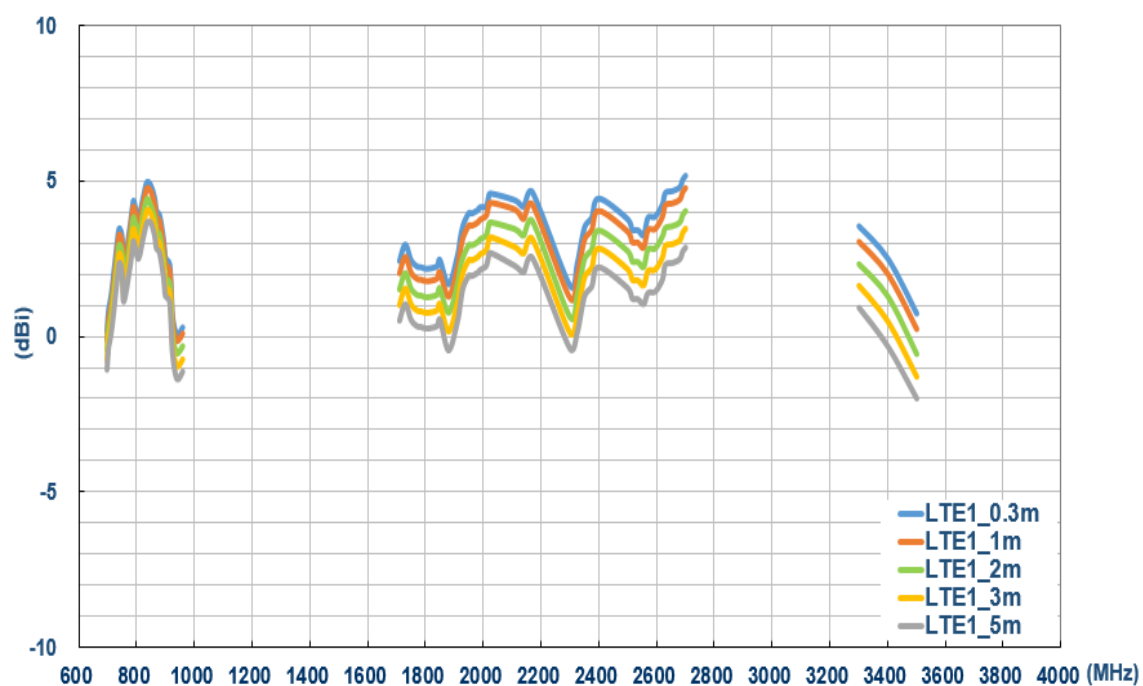


Wi-Fi

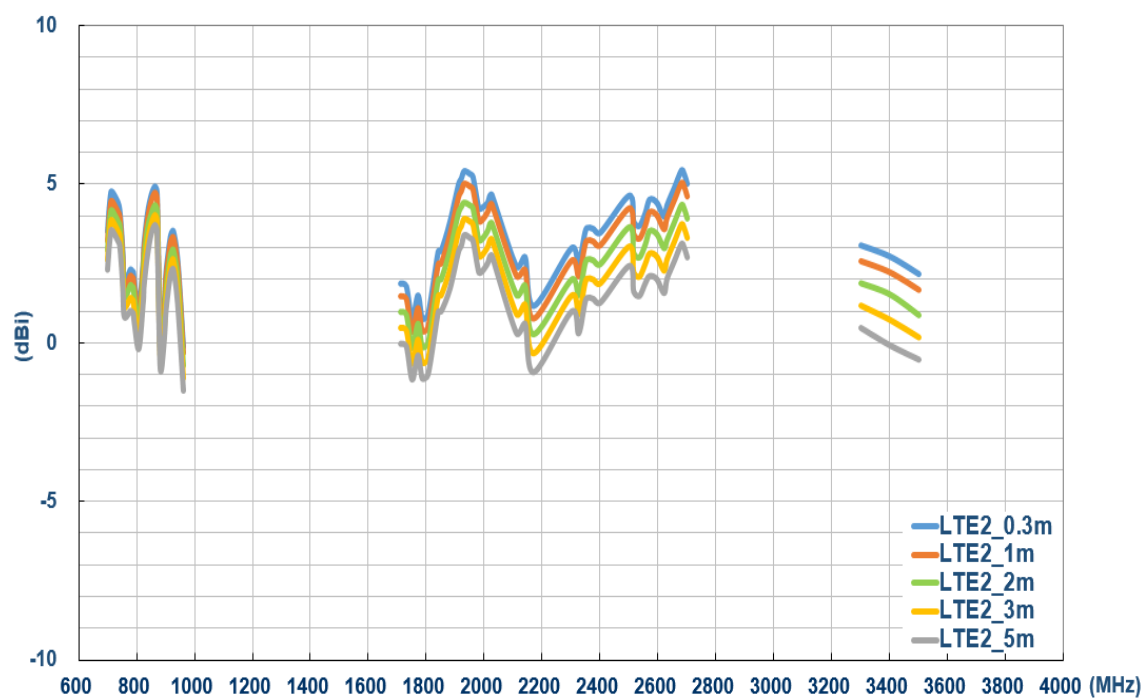


8.4 Peak Gain

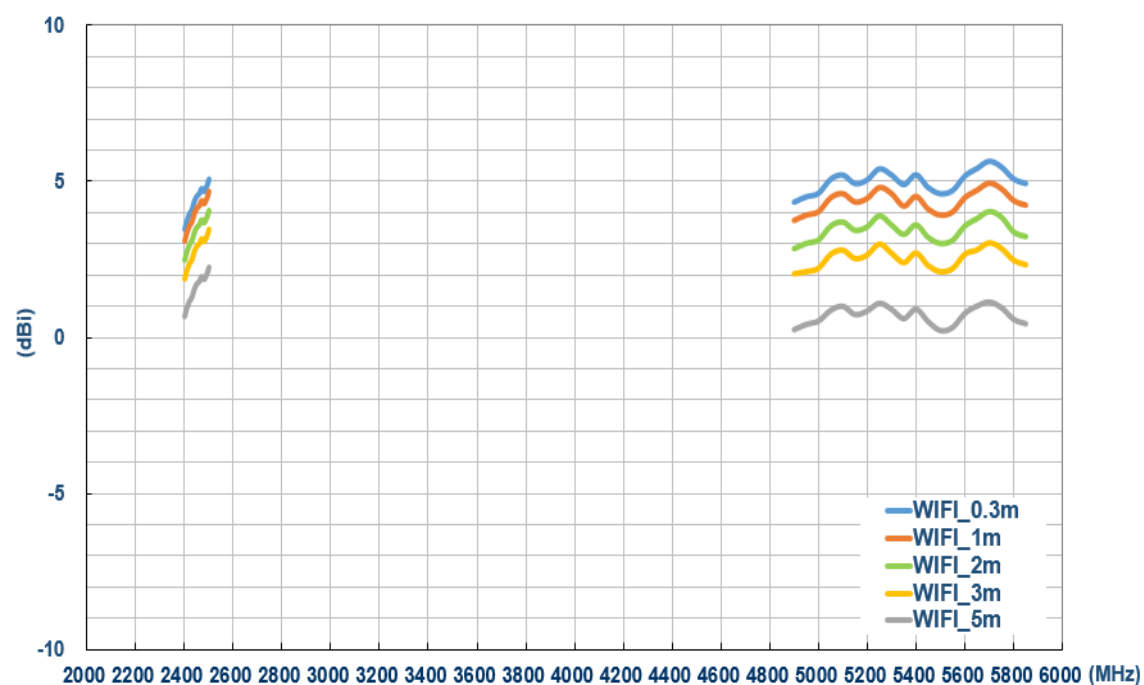
LTE MIMO 1



LTE MIMO 2

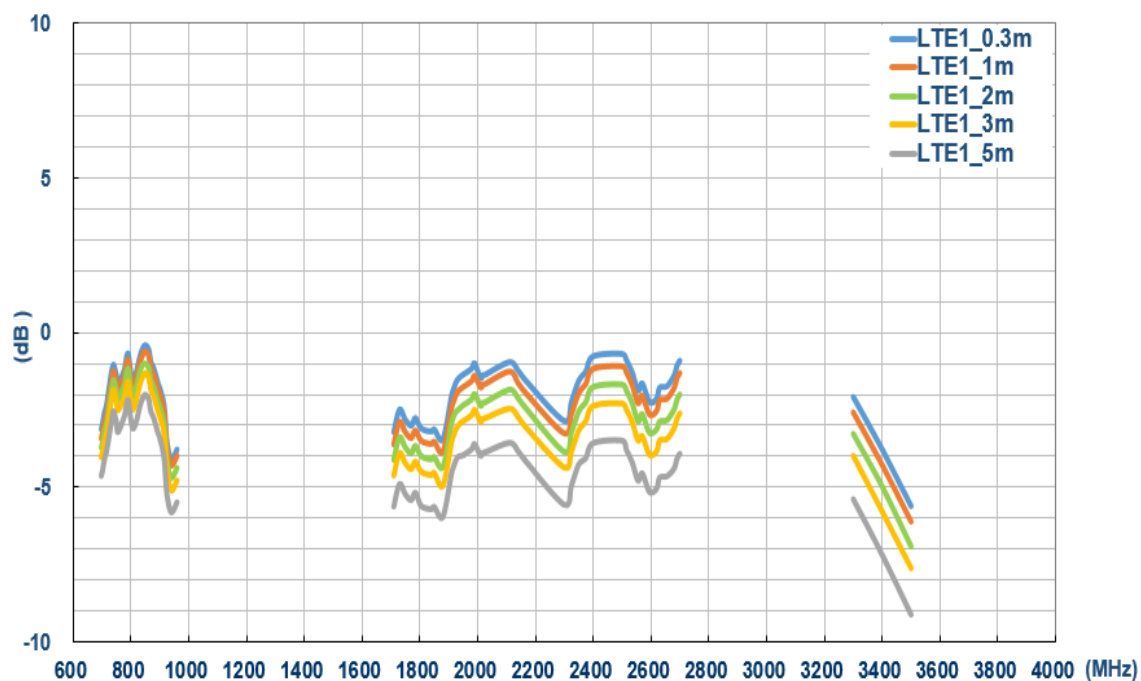


Wi-Fi

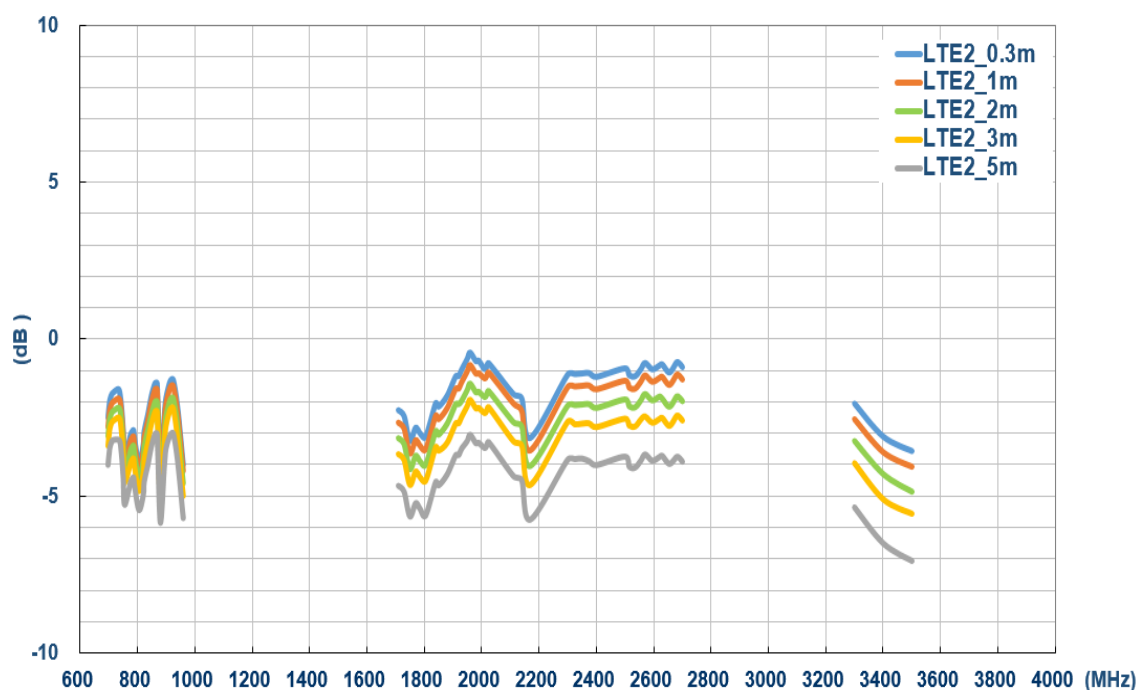


8.5 Average Gain

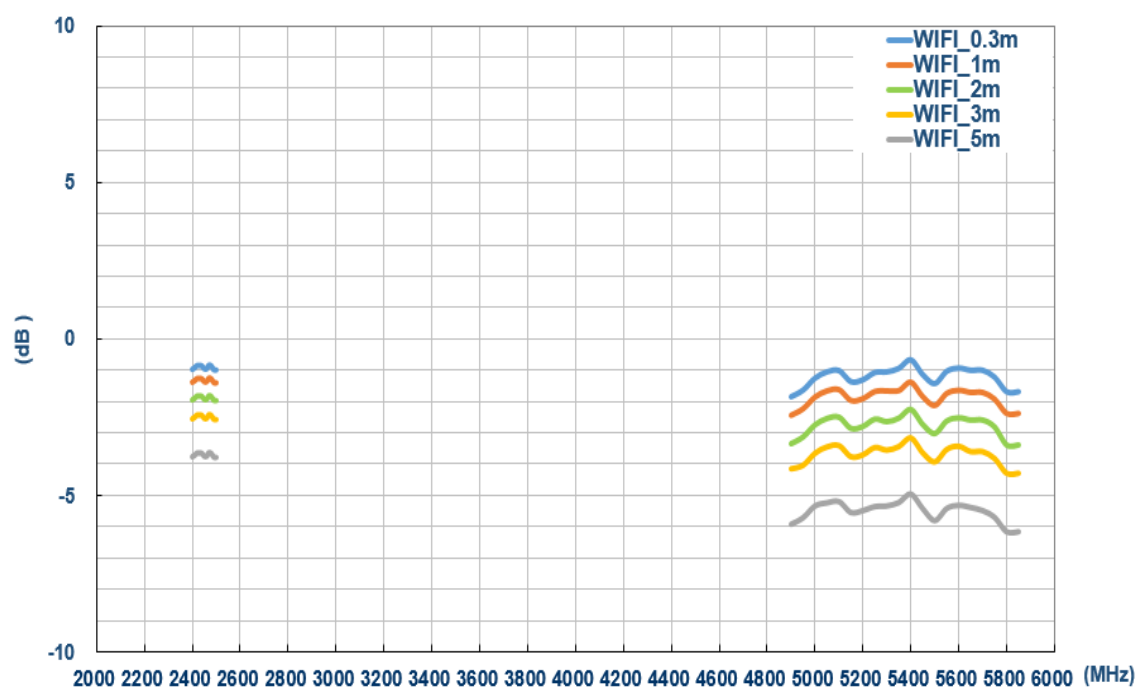
LTE MIMO 1



LTE MIMO 2



Wi-Fi



Changelog for the datasheet

SPE-18-8-061 – MA245.LBIC.002

Revision: D

Date:	2019-07-30
Notes:	Updated Waterproof Rating
Author:	Jack Conroy

Previous Revisions

Revision: C

Date:	2019-03-21
Notes:	Updated Template and Results
Author:	Yu Kai Yeung

Revision: B

Date:	2019-01-22
Notes:	Updated Table
Author:	Jack Conroy

Revision: A (Original First Release)

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



www.taoglas.com

