Specification

Part No.	:	**MA245.LBIC.002**
Product Name	:	Genesis 4in1 GNSS, 2*LTE & WiFi 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 Compliant**



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. Specification

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: -2.00dBi GLONASS: -1.73dBi
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 (dBi)									
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 and Connector	FAKRA Code D Jack, 3M CFD200 standard, fully customizable

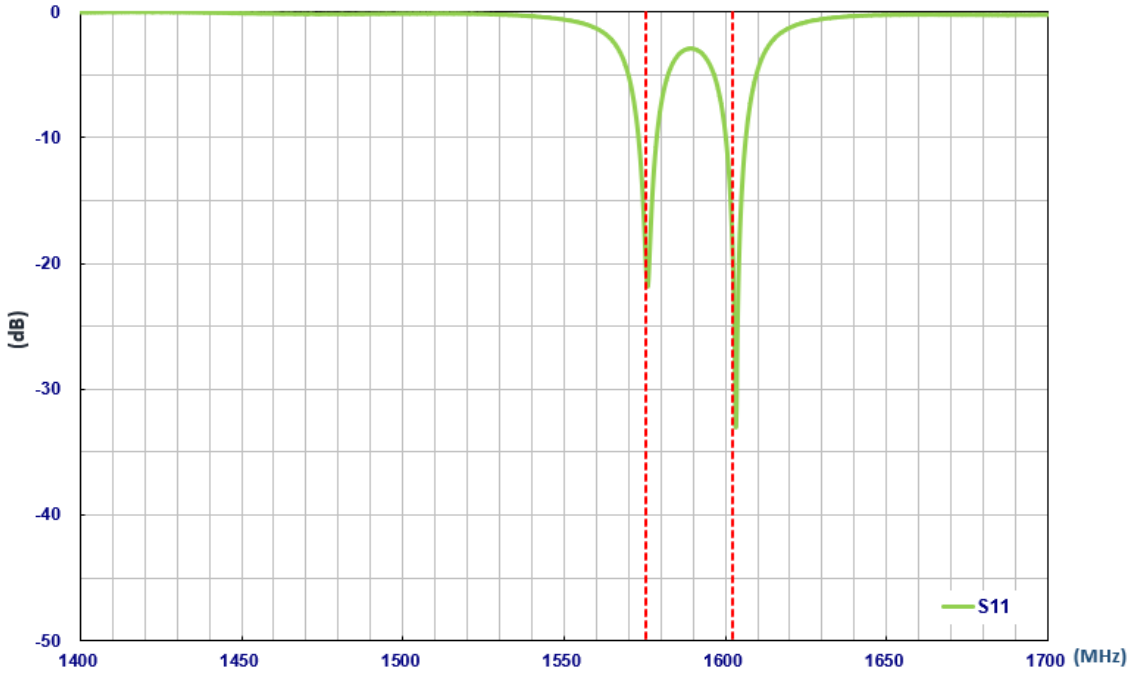
2.4GHz/5.8GHz WIFI Antenna		
Frequency (MHz)	2400~2500	4900~5850
Efficiency (%)		
0.3m	81.06	75.79
1m	73.94	65.18
2m	64.40	52.81
3m	56.09	42.82
5m	42.55	28.10
Average Gain (dBi)		
0.3m	-0.91	-1.20
1m	-1.31	-1.86
2m	-1.91	-2.77
3m	-2.51	-3.68
5m	-3.71	-5.51
Peak Gain (dBi)		
0.3m	5.06	5.63
1m	4.66	4.93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

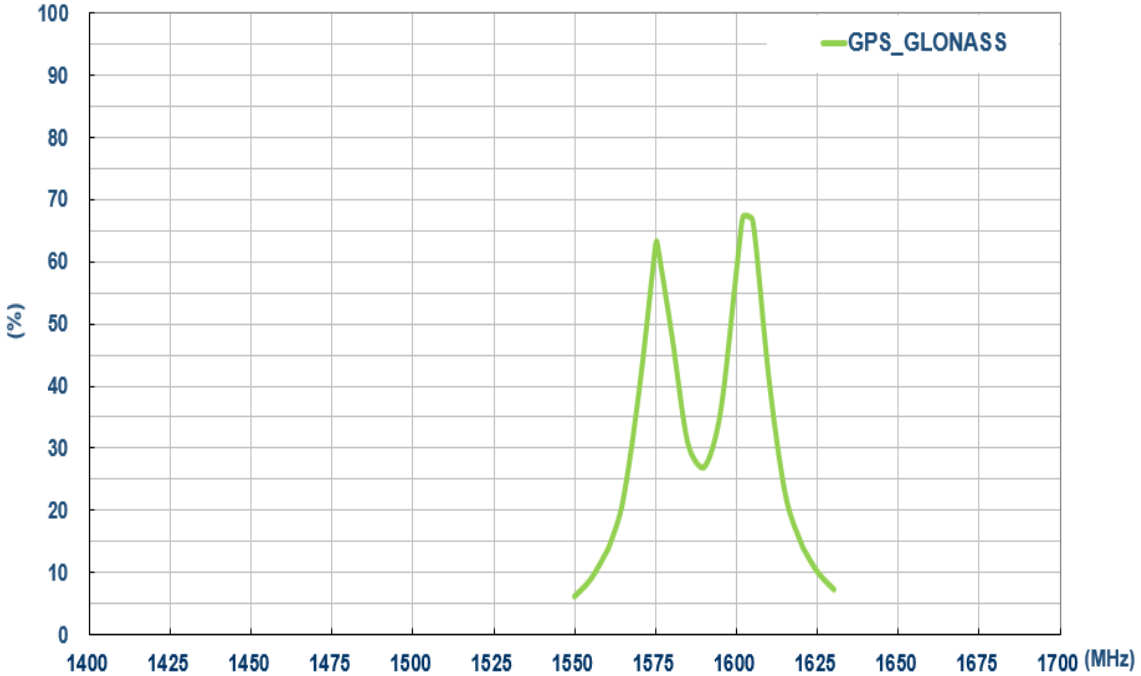
3. Antenna Characteristics

3.1 GPS-GLONASS Antenna

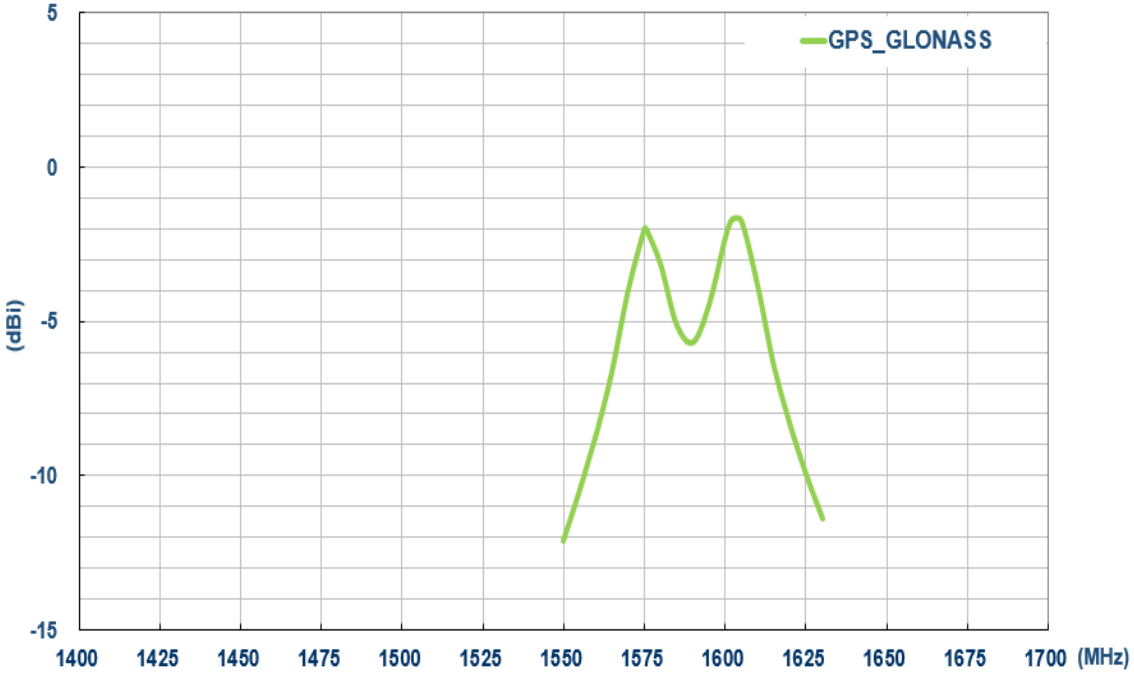
3.1.1 GPS-GLONASS Return Loss



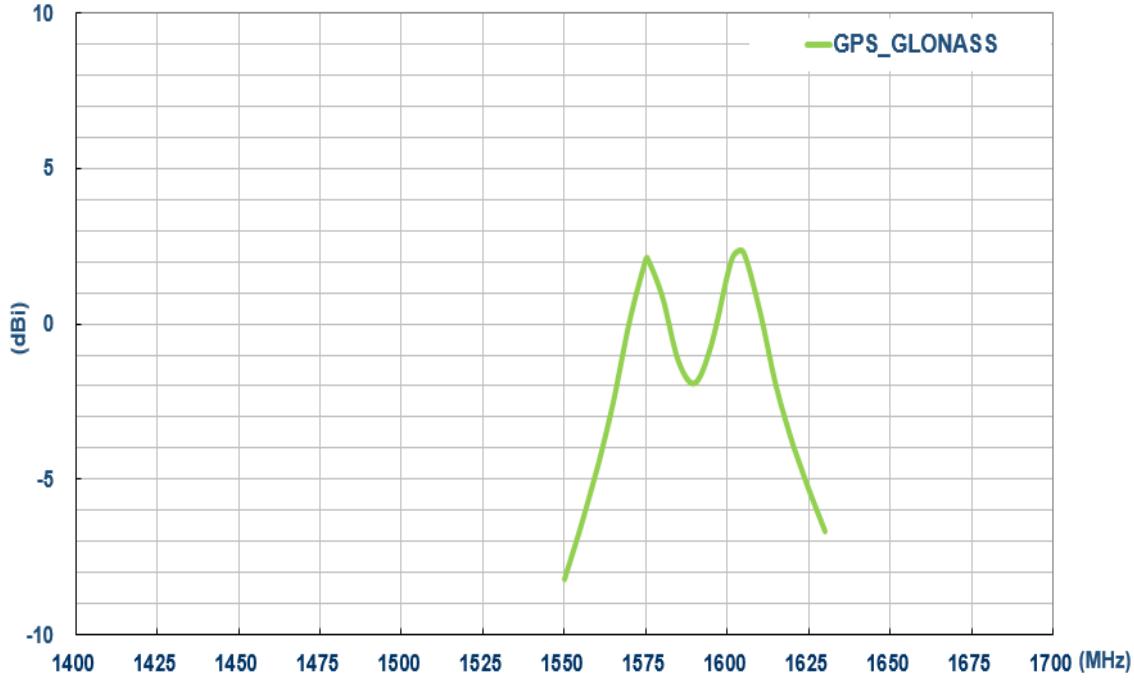
3.1.2 GPS-GLONASS Efficiency



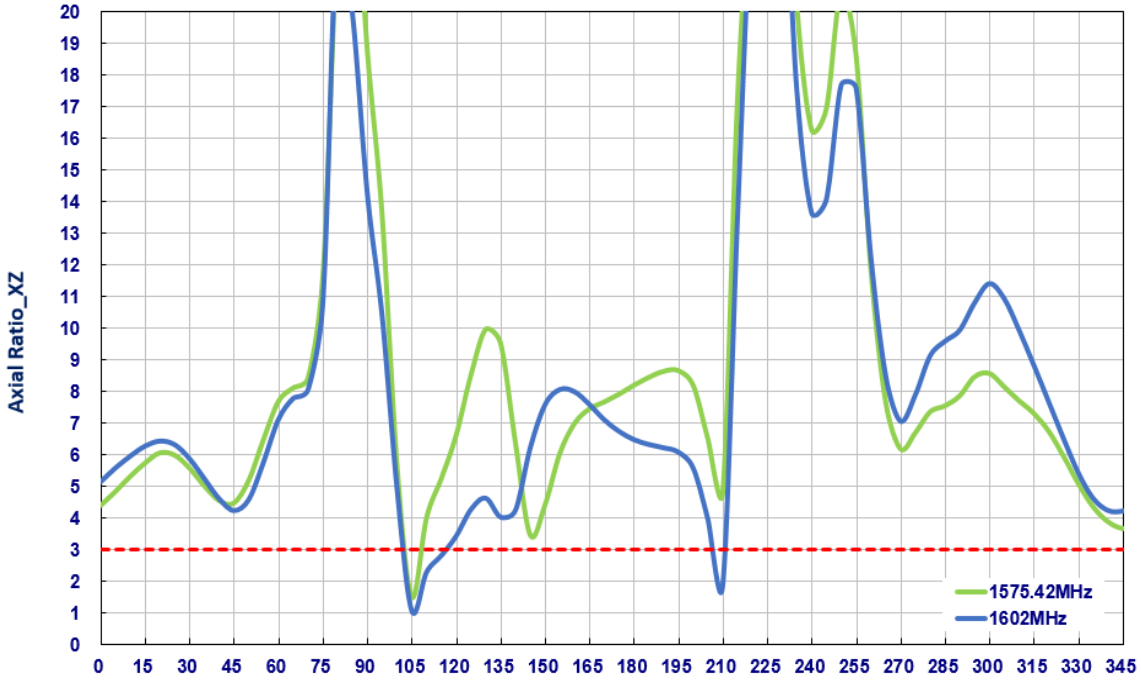
3.1.3 GPS-GLONASS Average Gain



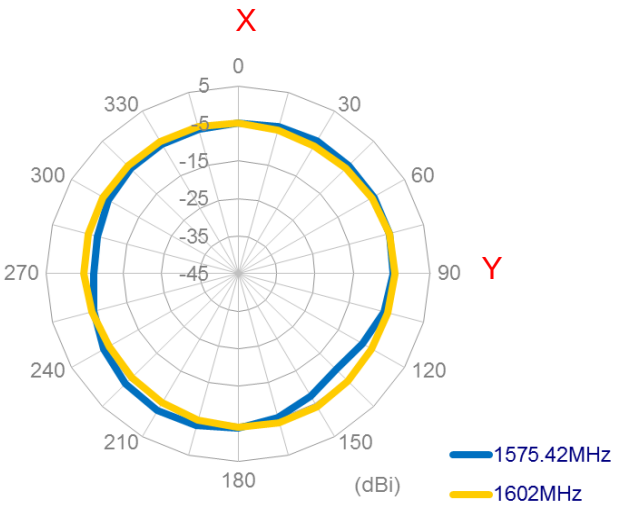
3.1.4 GPS-GLONASS Peak Gain

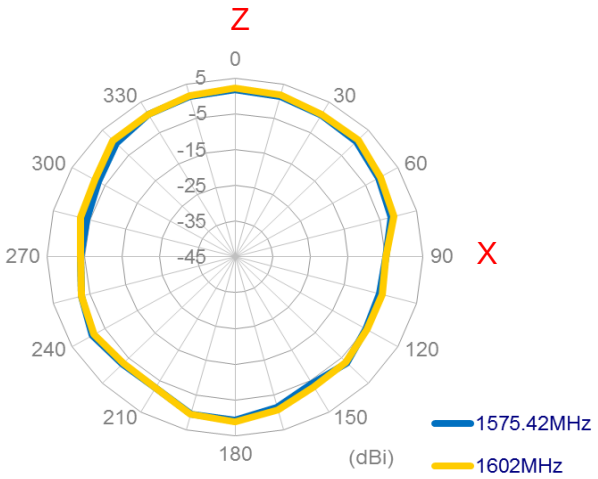


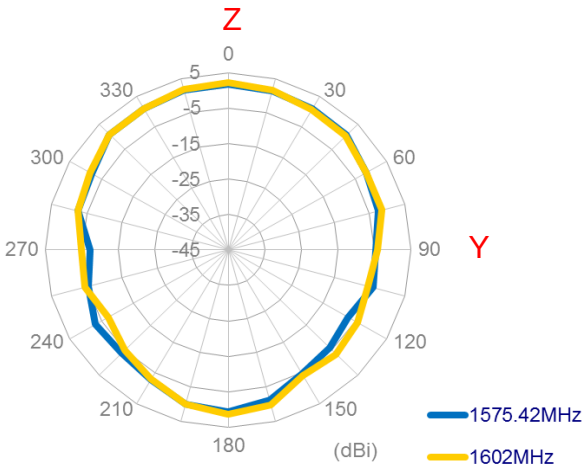
3.1.5 GPS-GLONASS Axial Ratio



3.1.6 GPS-GLONASS 2D Pattern

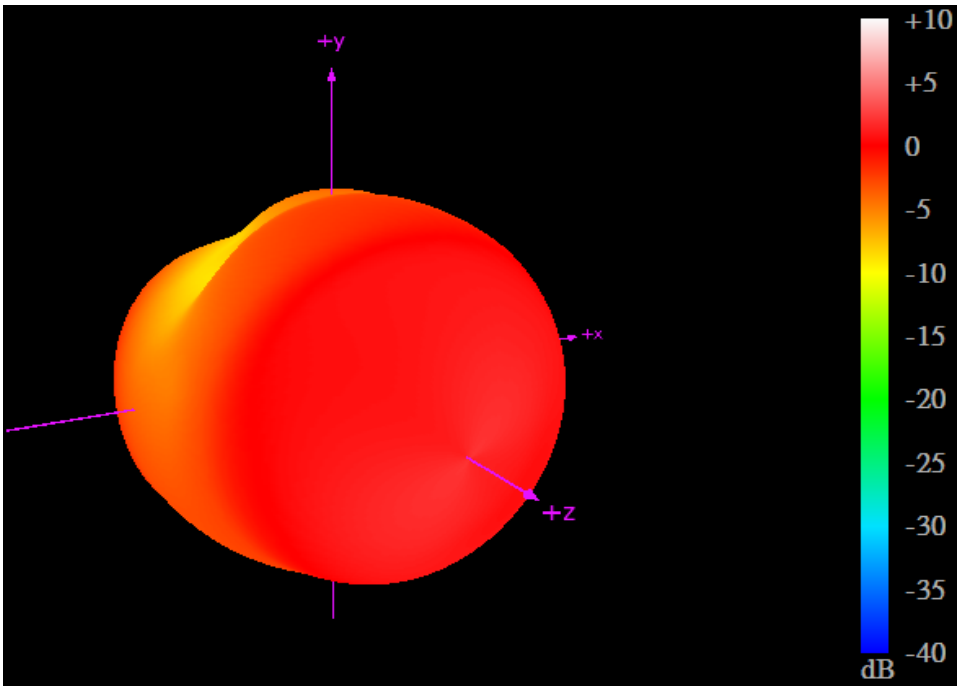




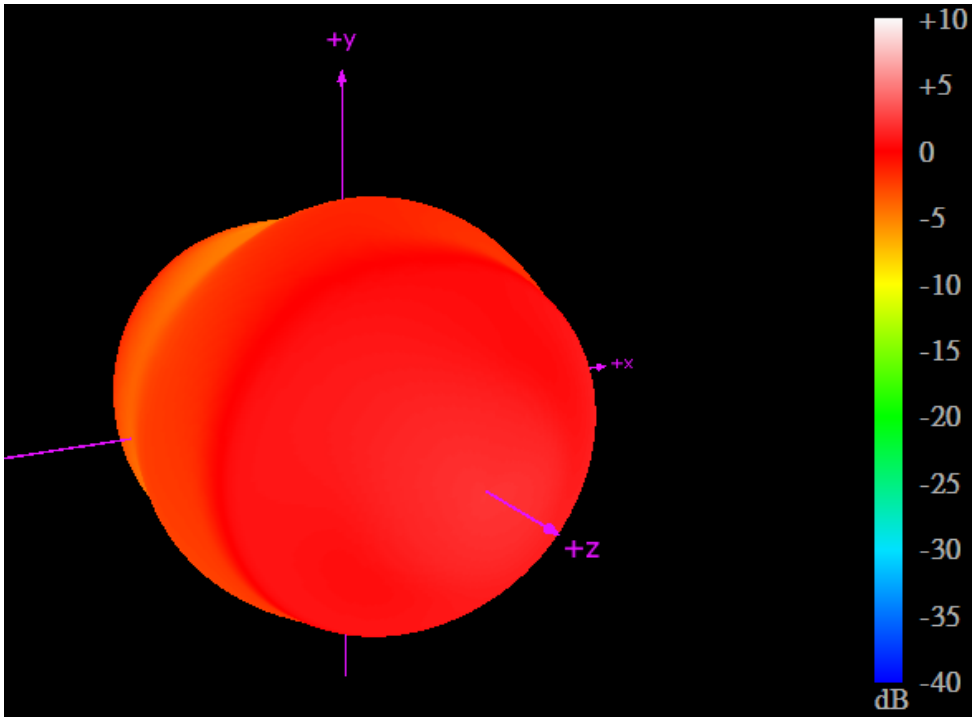


3.1.7 GPS-GLONASS 3D Pattern

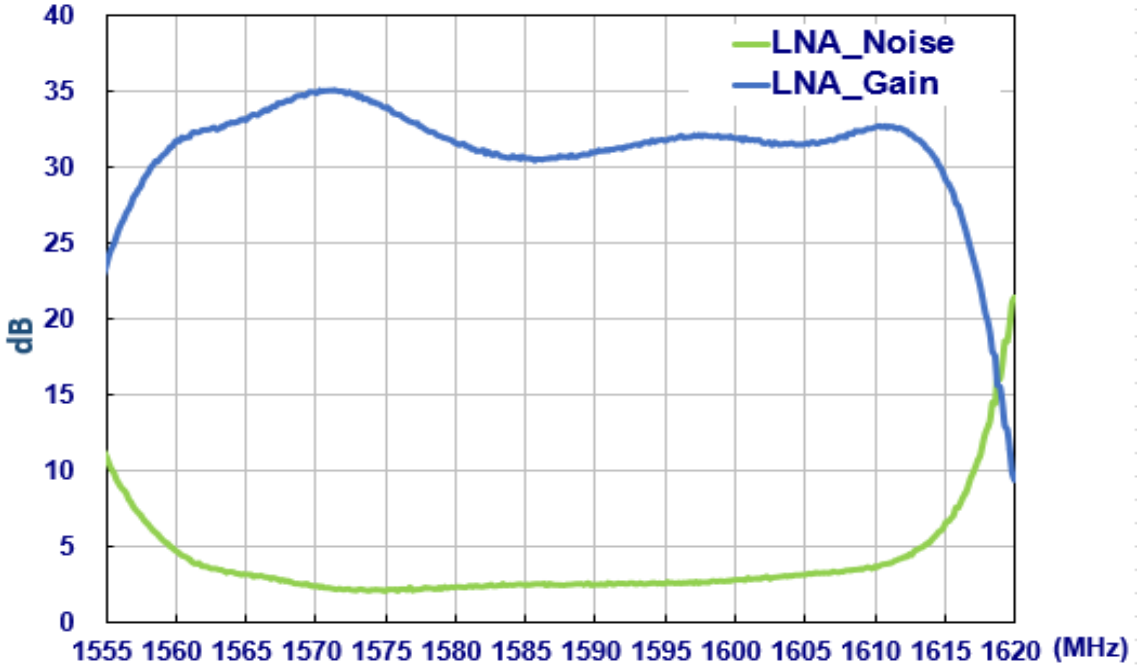
1575.42MHz



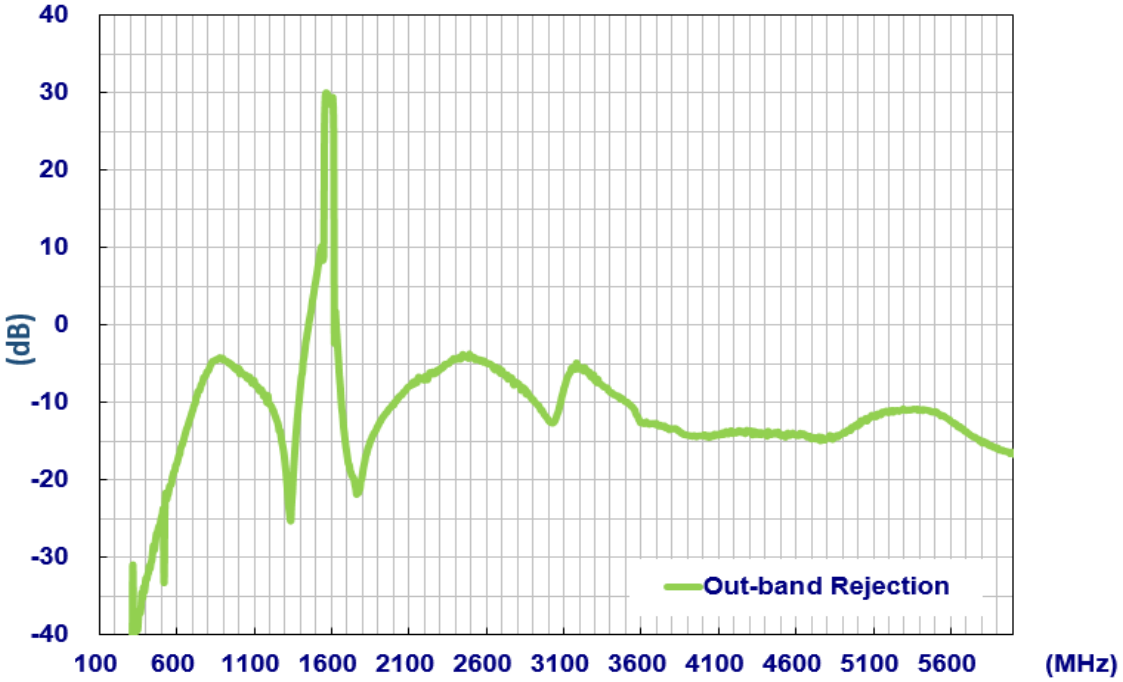
1602MHz



3.1.8 GPS-GLONASS LNA Noise Figure

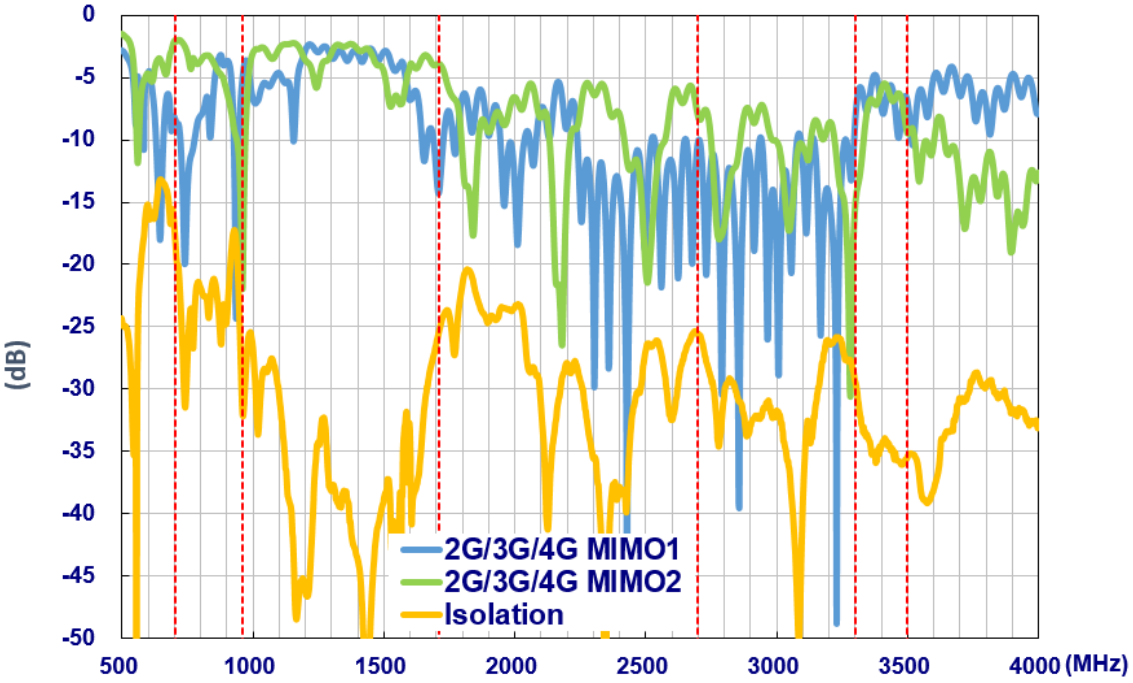


3.1.9 GPS-GLONASS Out-of-Band Rejection

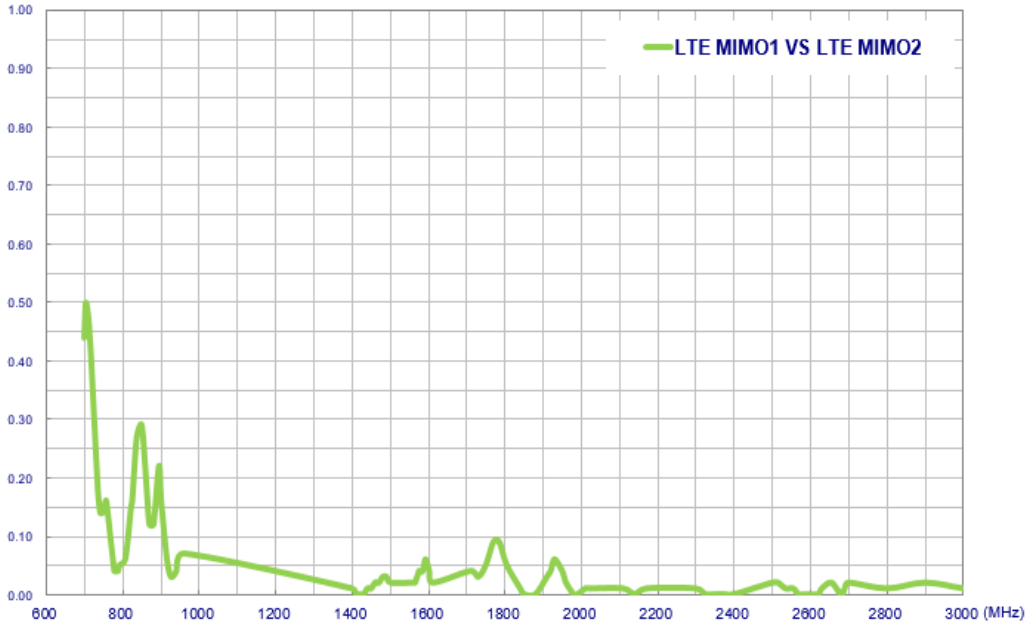


3.2 LTE MIMO Antenna

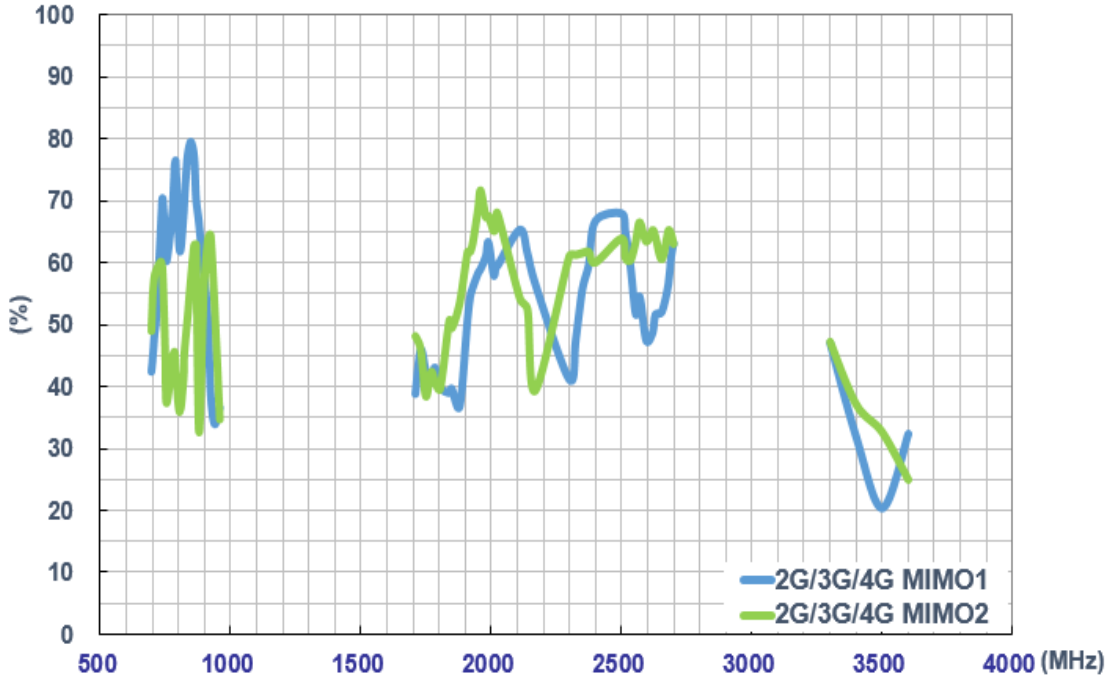
3.2.1 Return Loss



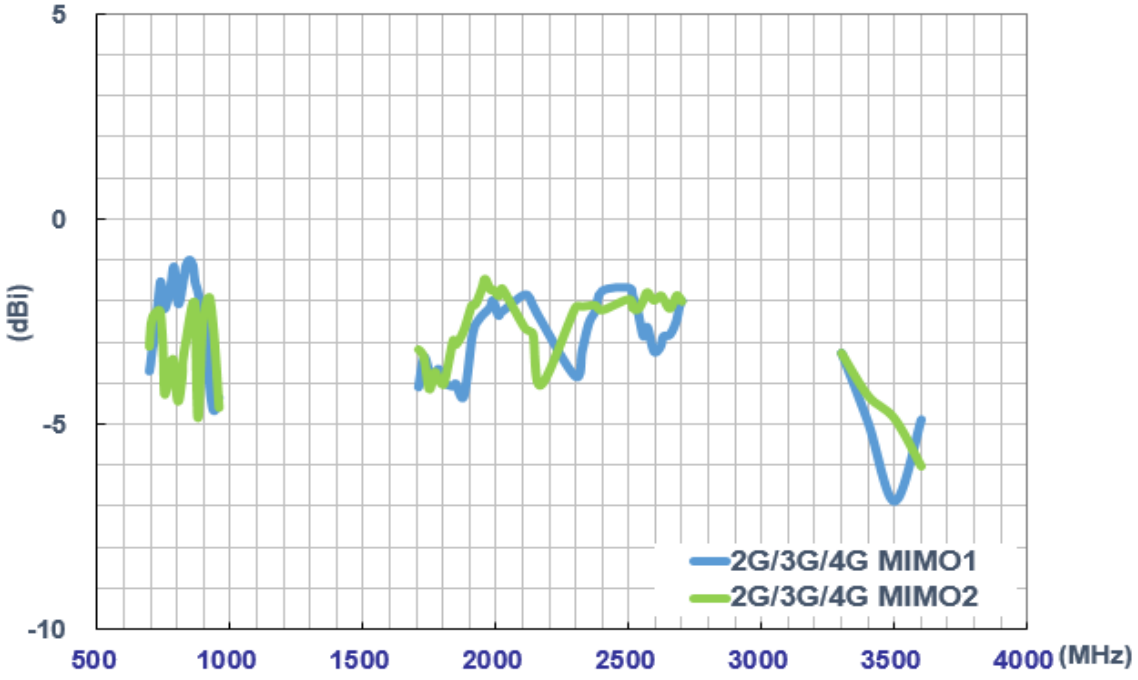
3.2.2 ECC



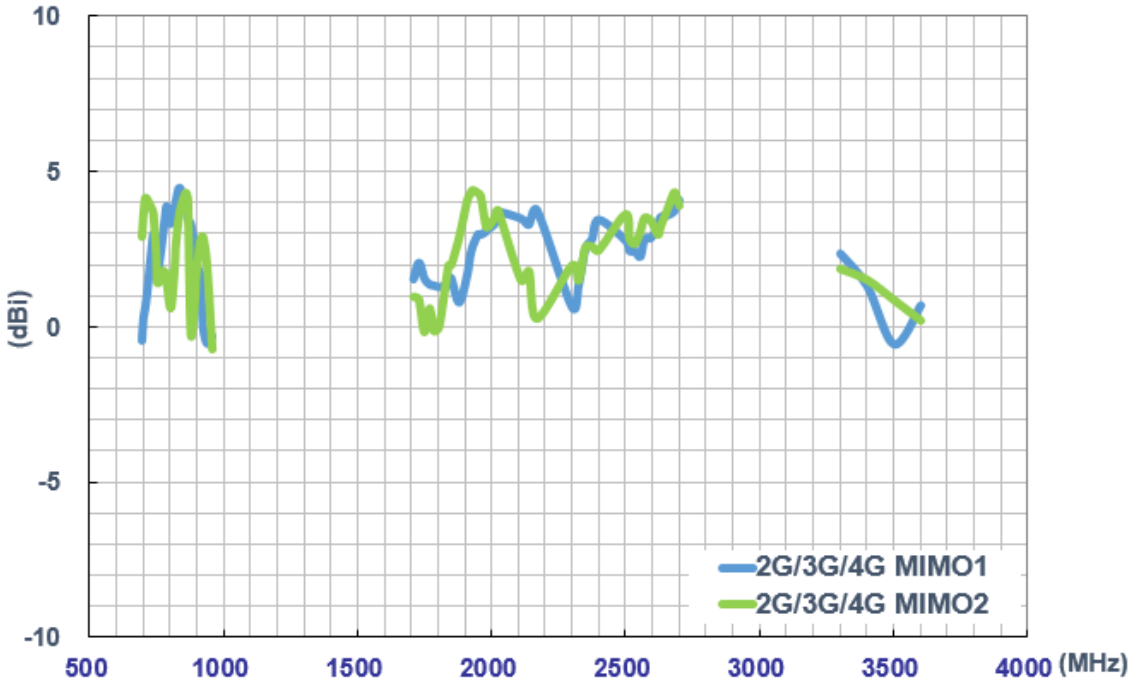
3.2.3 Efficiency



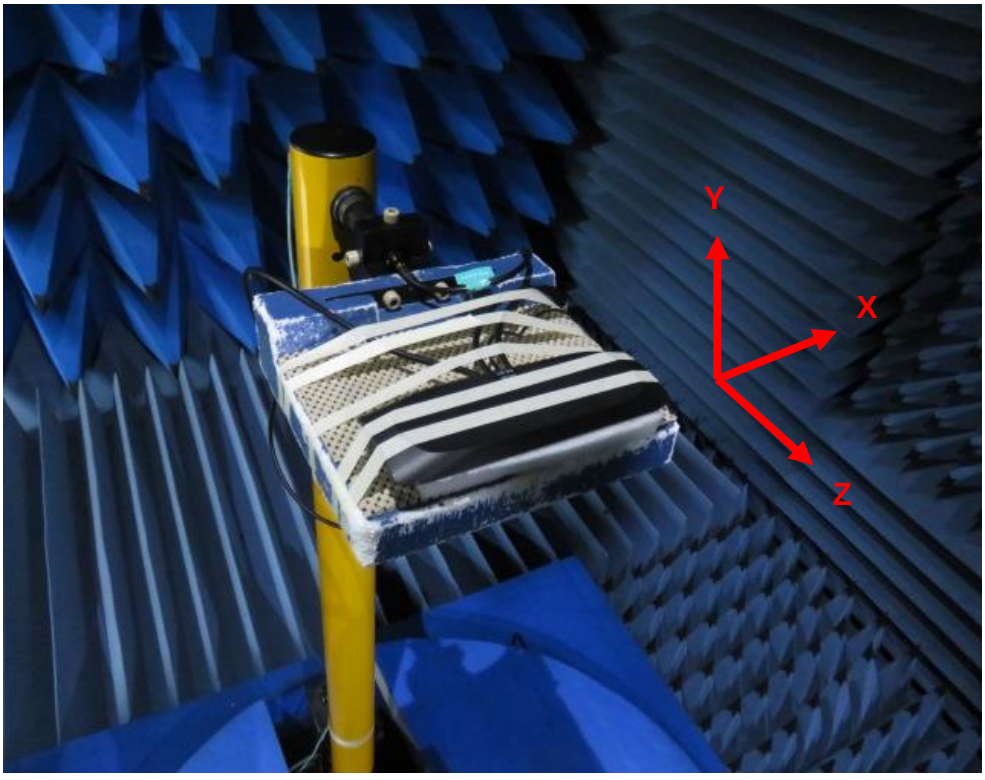
3.2.4 Average Gain



3.2.5 Peak Gain

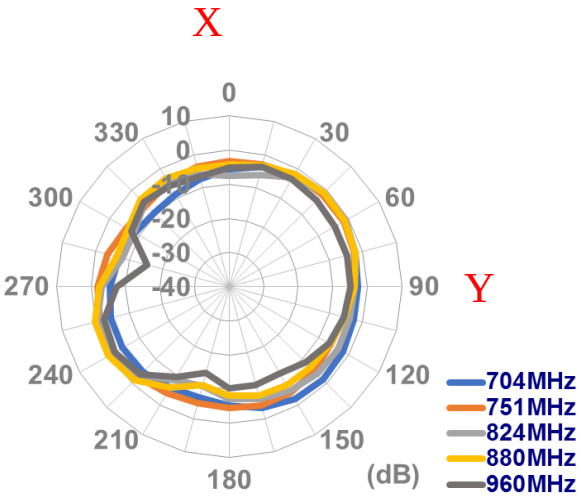


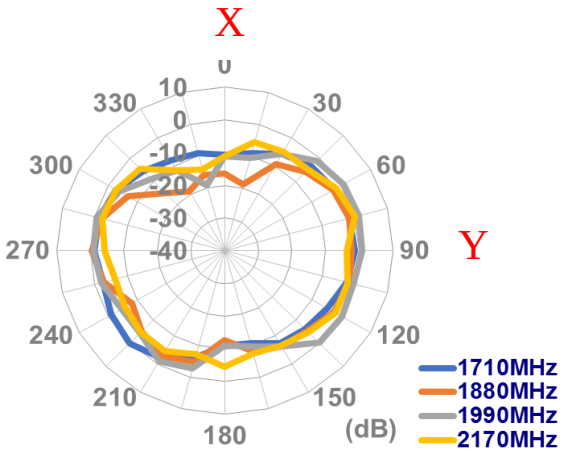
3.2.6 Test Setup for Antenna Radiation Pattern (ETS Anechoic chamber)

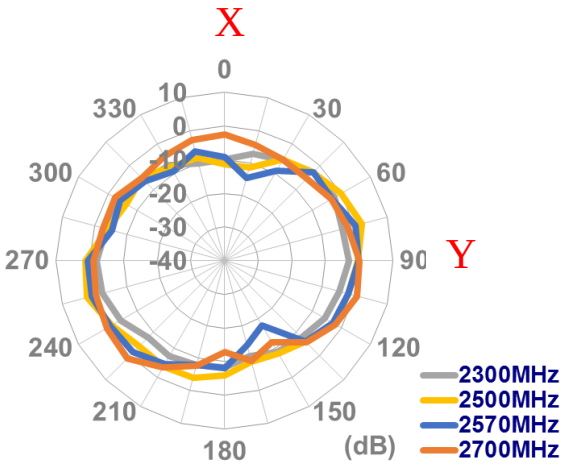


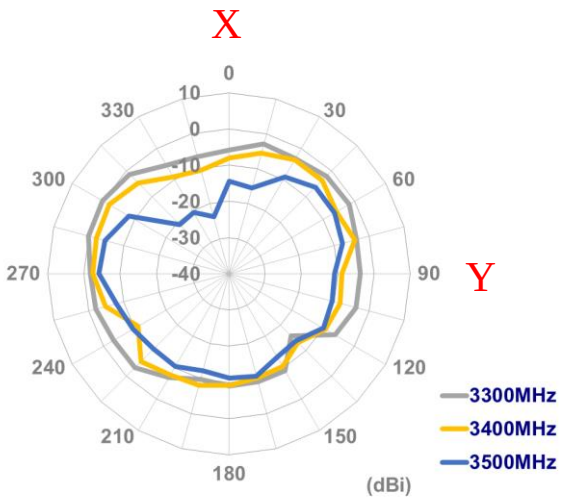
3.2.7 2D Radiation Pattern (MIMO1 with 2M cable length in free space)

XY Plane

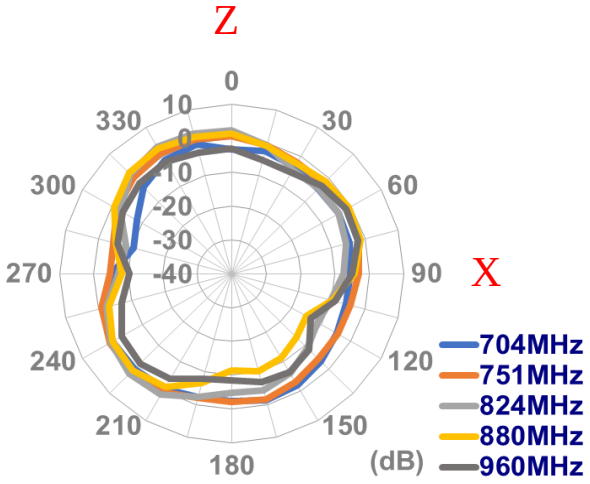


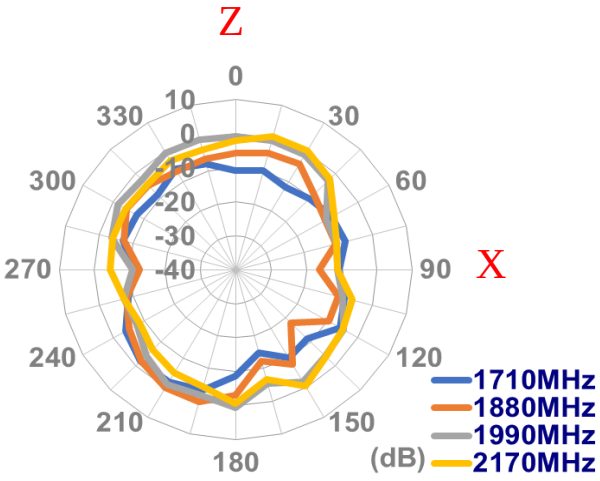


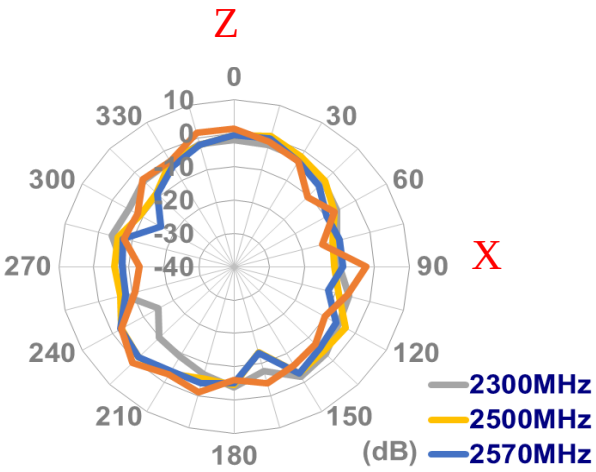


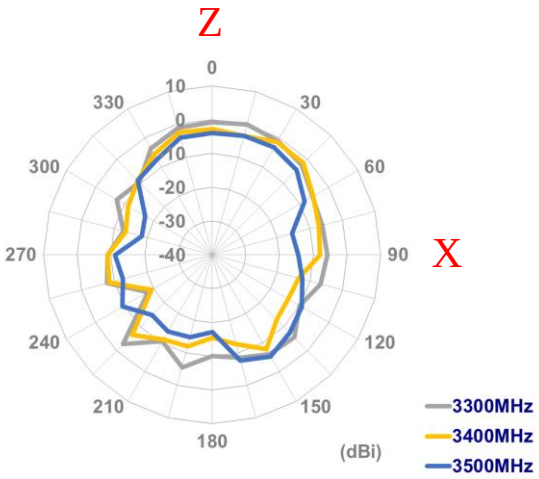

X
0
10
30
60
90
120
150
180
210
240
270
300
330
0
-10
-20
-30
-40
Y
(dBi)
3300MHz
3400MHz
3500MHz

XZ Plane

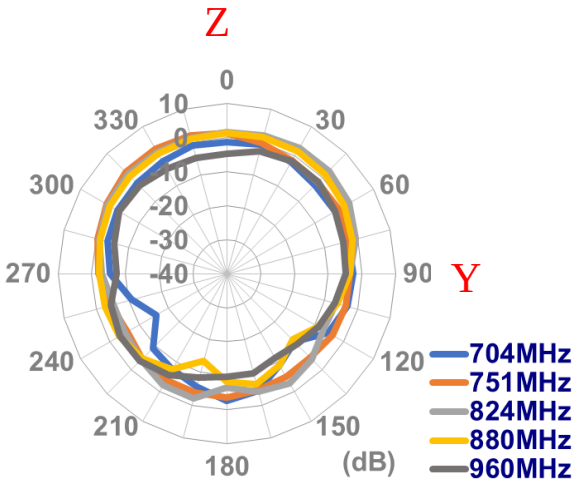

Z
0
10
30
60
90
120
150
180
210
240
270
300
330
0
-10
-20
-30
-40
X
(dB)
704MHz
751MHz
824MHz
880MHz
960MHz

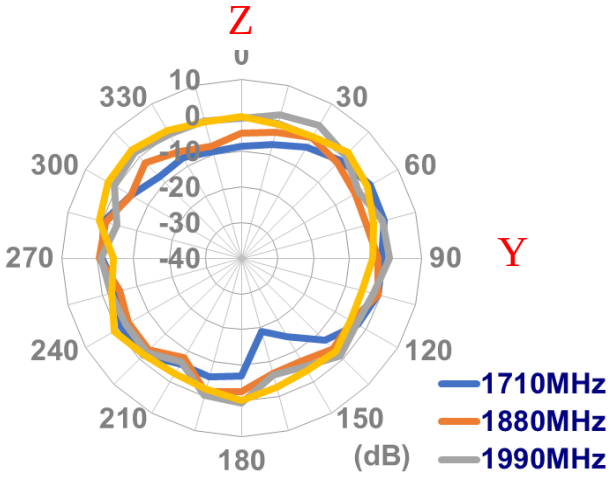

Z
0
10
30
60
90
120
150
180
210
240
270
300
330
0
-10
-20
-30
-40
X
(dB)
1710MHz
1880MHz
1990MHz
2170MHz

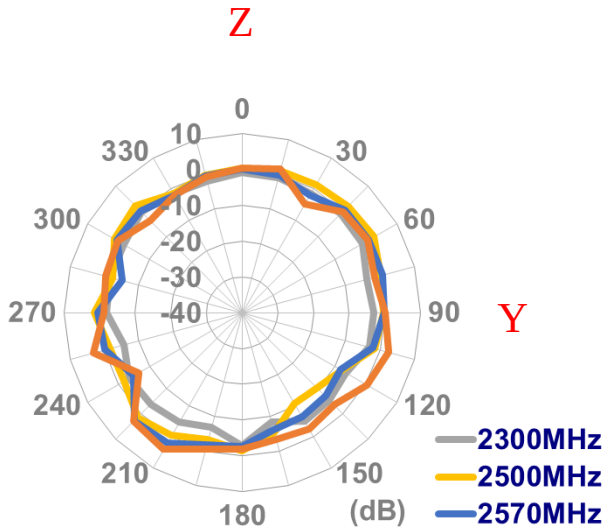

Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
X
(dB)
2300MHz
2500MHz
2570MHz

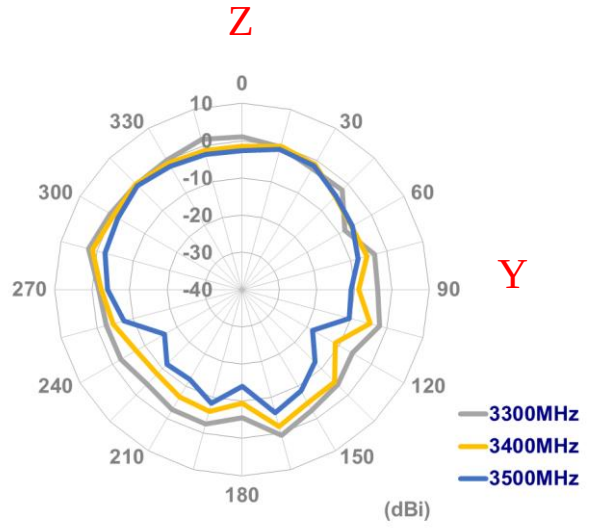

Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
X
(dBi)
3300MHz
3400MHz
3500MHz

YZ Plane


Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
Y
(dB)
704MHz
751MHz
824MHz
880MHz
960MHz

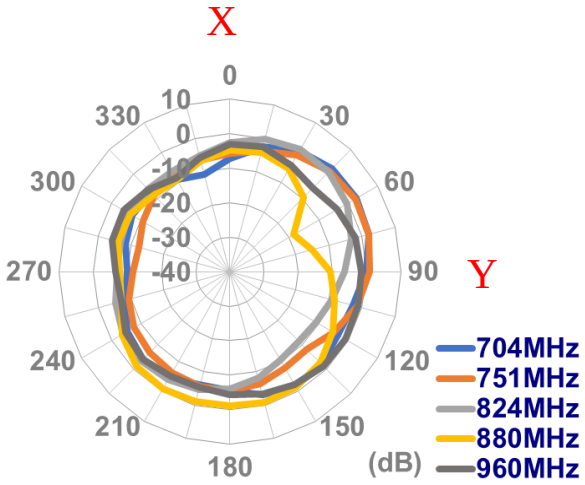

Z
0
10
30
330
0
60
300
-10
-20
-30
-40
270
90
Y
240
120
210
150
180
(dB)
1710MHz
1880MHz
1990MHz

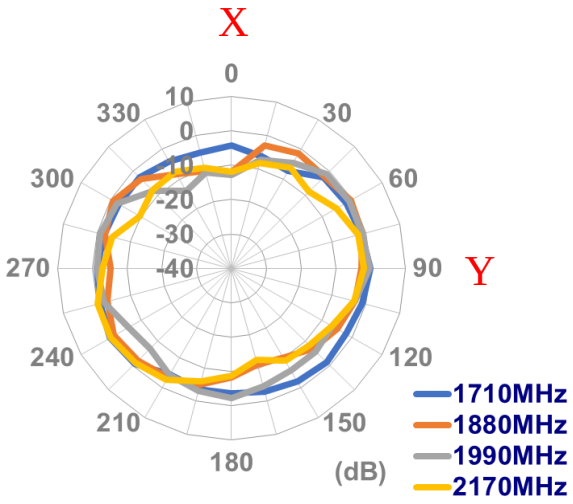

Z
0
10
30
330
0
60
300
-10
-20
-30
-40
270
90
Y
240
120
210
150
180
(dB)
2300MHz
2500MHz
2570MHz

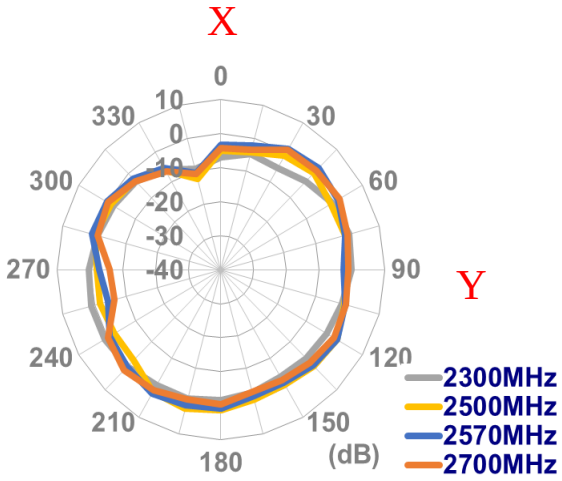

Z
0
10
30
330
0
60
300
-10
-20
-30
-40
270
90
Y
240
120
210
150
180
(dBi)
3300MHz
3400MHz
3500MHz

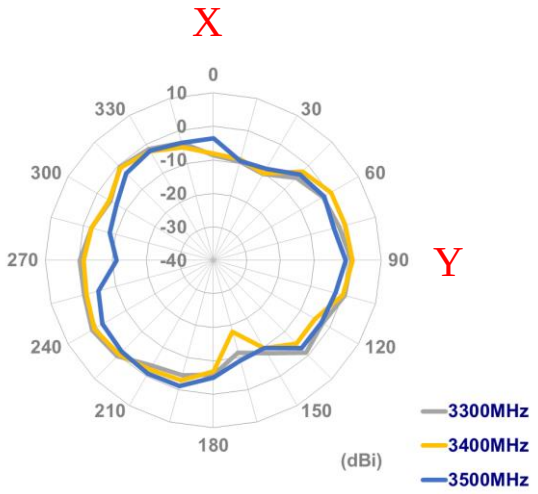
3.2.8 2D Radiation Pattern (MIMO2 with 2M cable length in free space)

XY Plane

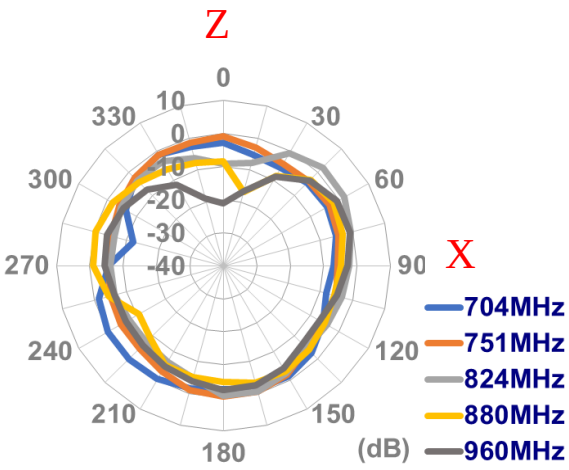


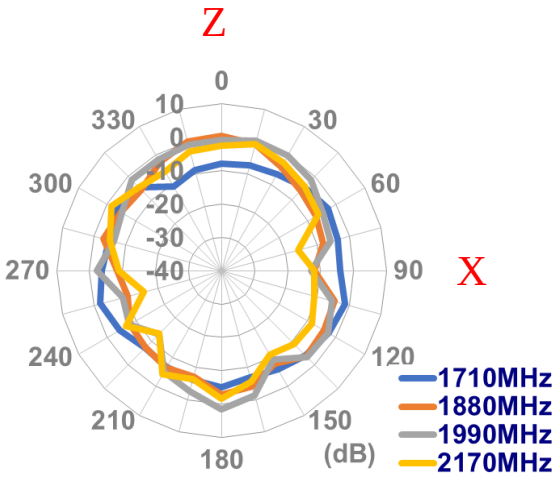


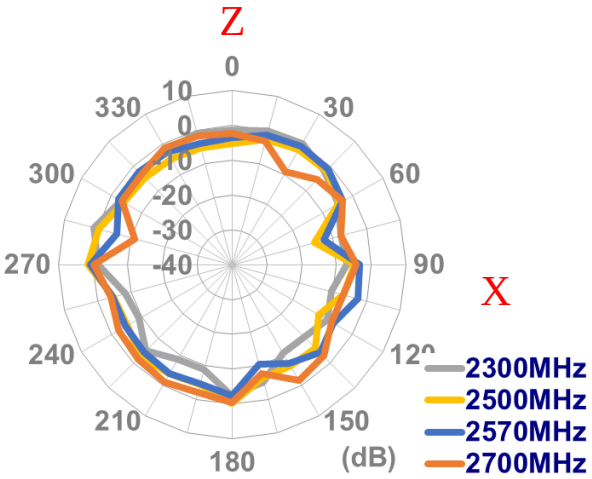


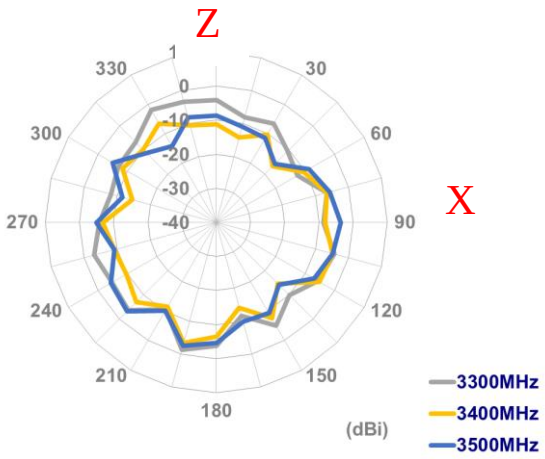

X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
Y
(dBi)
3300MHz
3400MHz
3500MHz

XZ Plane

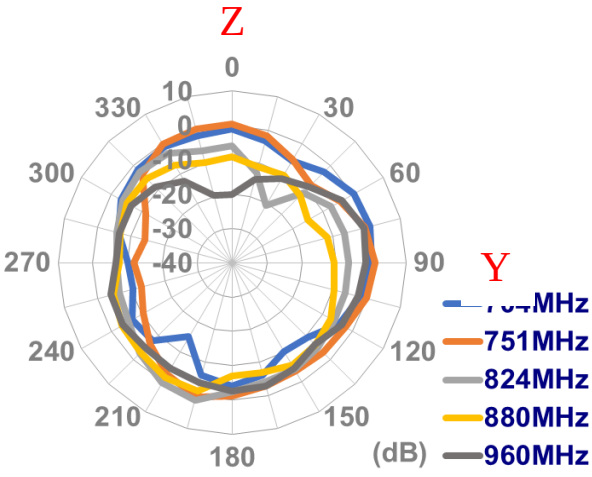

Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
X
(dB)
704MHz
751MHz
824MHz
880MHz
960MHz

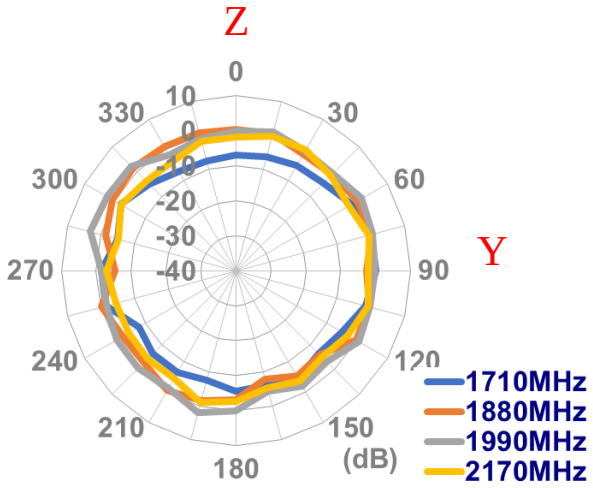

Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
X
(dB)
1710MHz
1880MHz
1990MHz
2170MHz

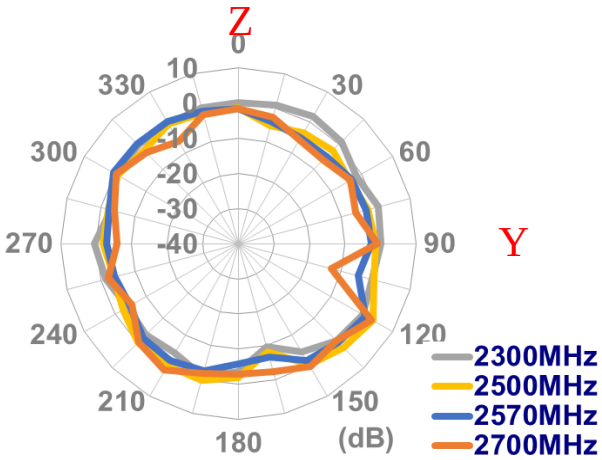

Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
X
(dB)
2300MHz
2500MHz
2570MHz
2700MHz

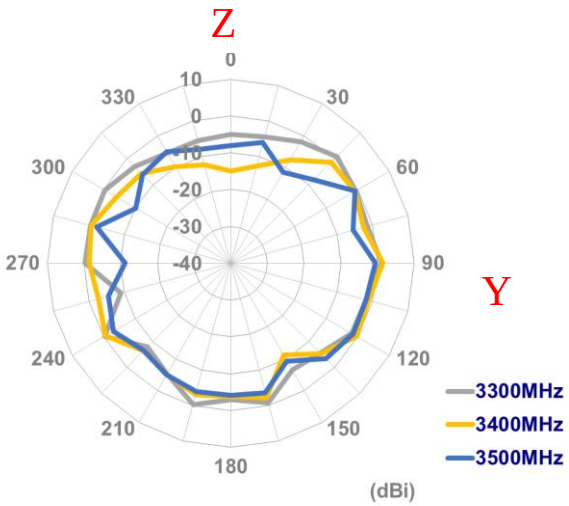

Z
1
0
30
60
90
120
150
180
210
240
270
300
330
-10
-20
-30
-40
X
(dBi)
3300MHz
3400MHz
3500MHz

YZ Plane


Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
Y
(dB)
751MHz
824MHz
880MHz
960MHz

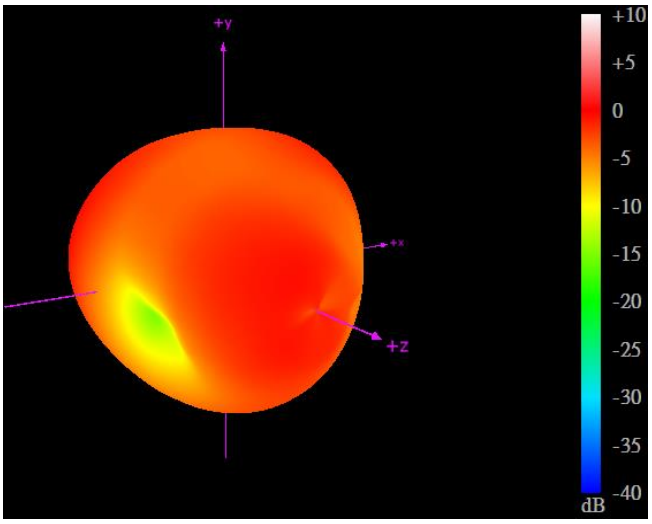

Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
Y
(dB)
1710MHz
1880MHz
1990MHz
2170MHz


Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
Y
(dB)
2300MHz
2500MHz
2570MHz
2700MHz

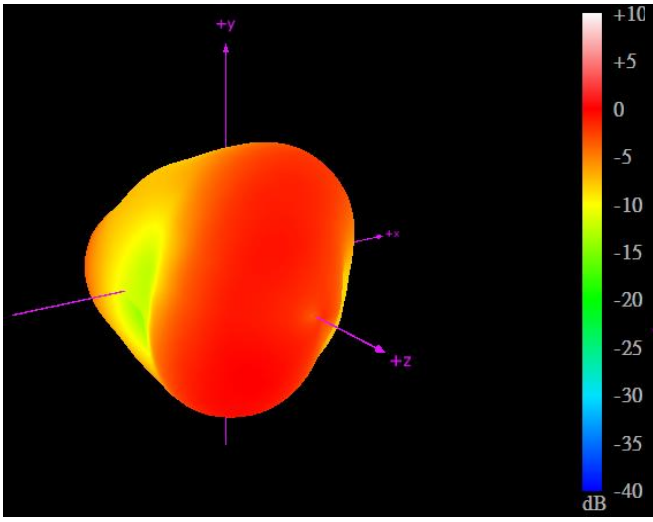

Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
Y
(dBi)
3300MHz
3400MHz
3500MHz

3.2.9 3D Radiation Pattern (MIMO1 with 2M cable length in free space)

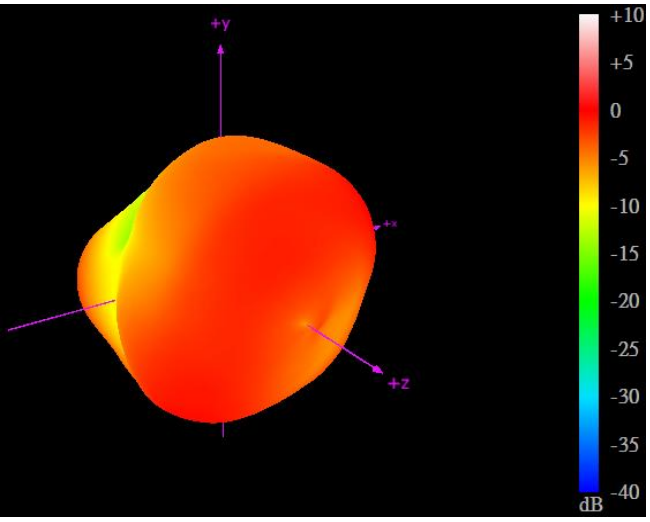
704 MHz



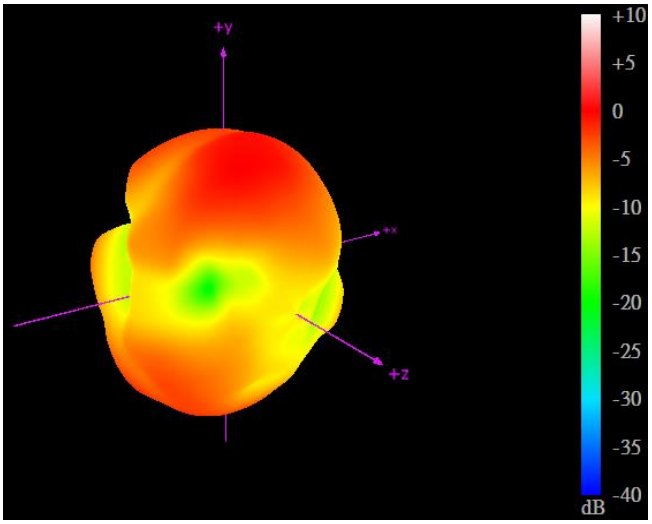
824 MHz



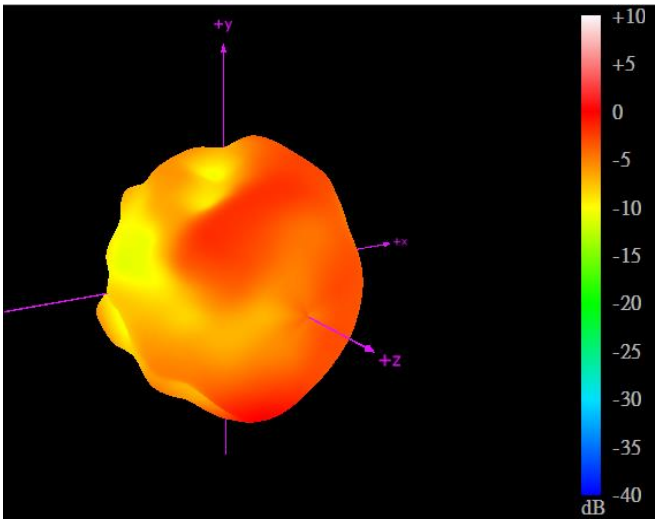
960 MHz



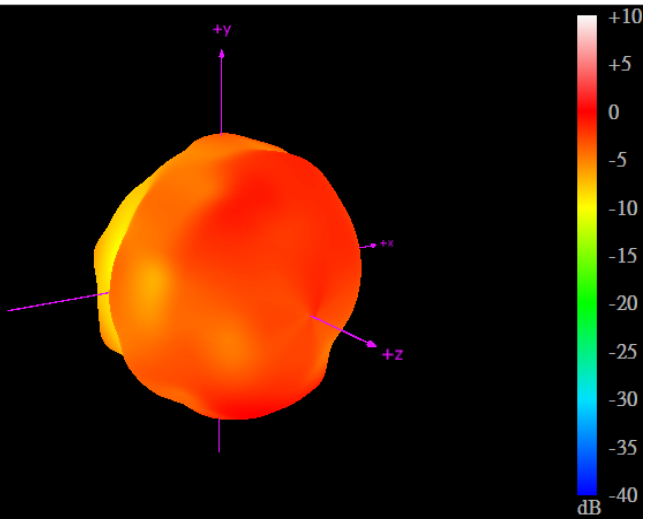
1710 MHz



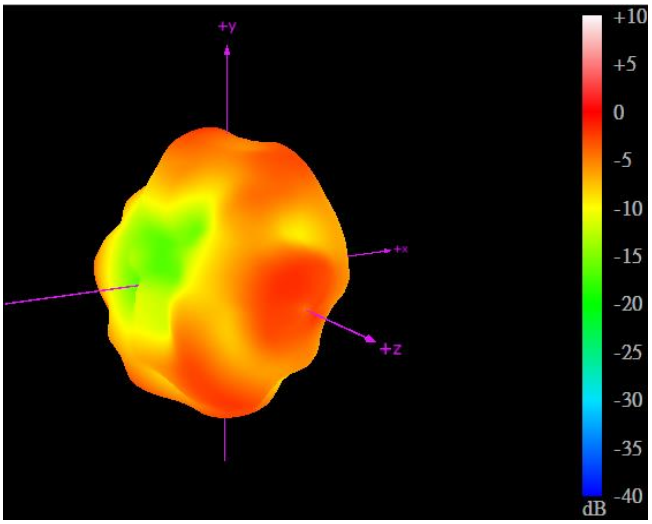
2170 MHz



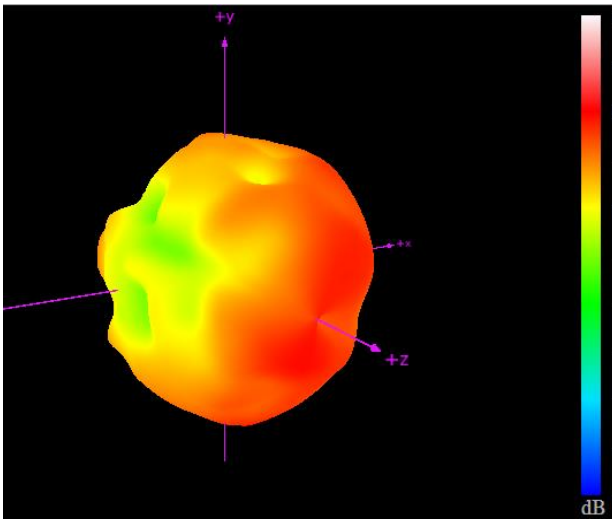
2300 MHz



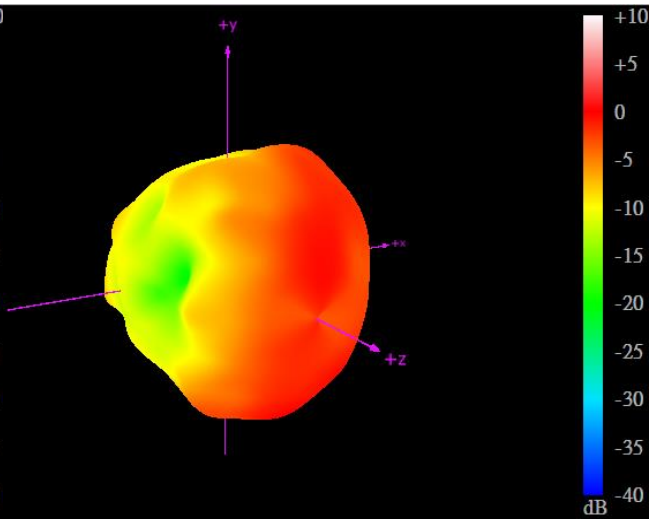
2700 MHz



3300MHz

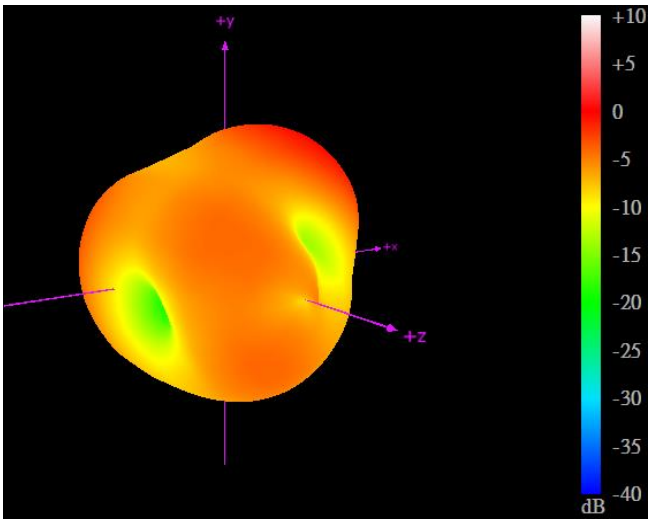


3500 MHz

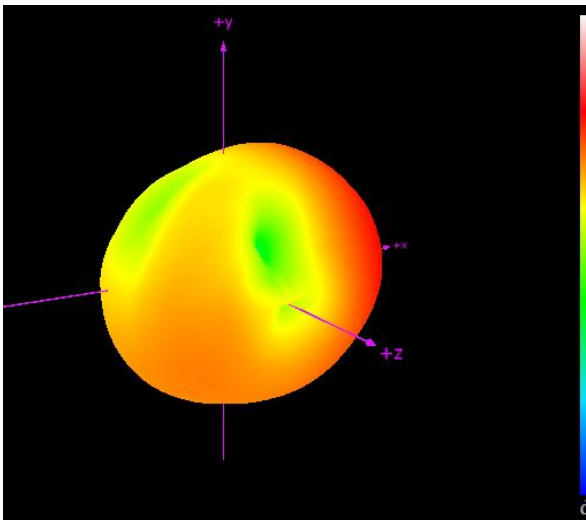


3.2.10 3D Radiation Pattern (MIMO2 with 2M cable length in free space)

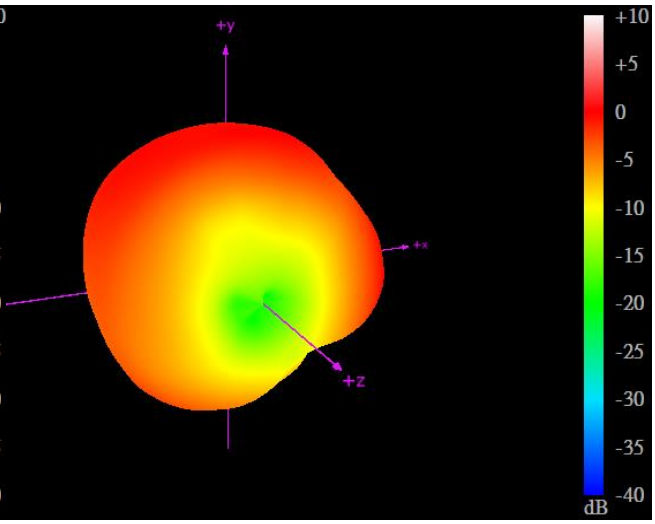
704 MHz



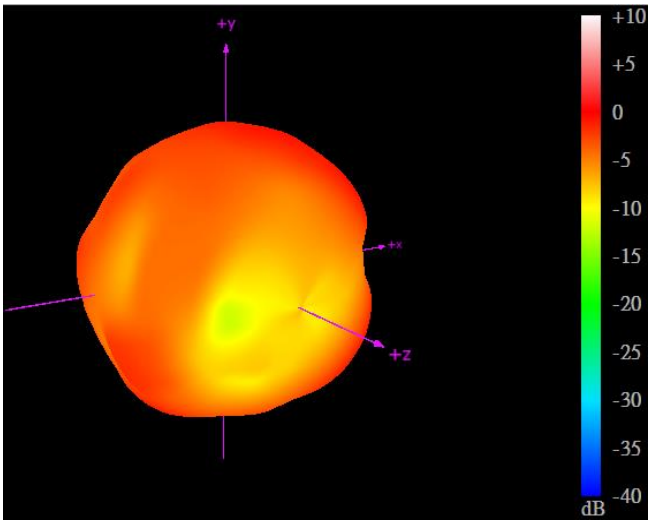
824 MHz



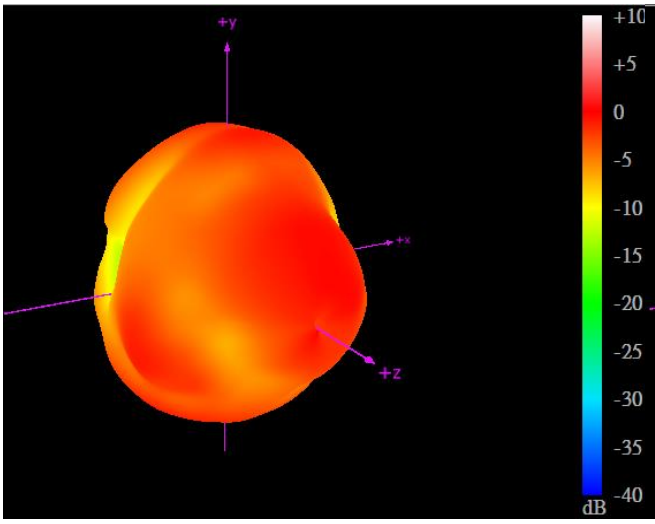
960 MHz



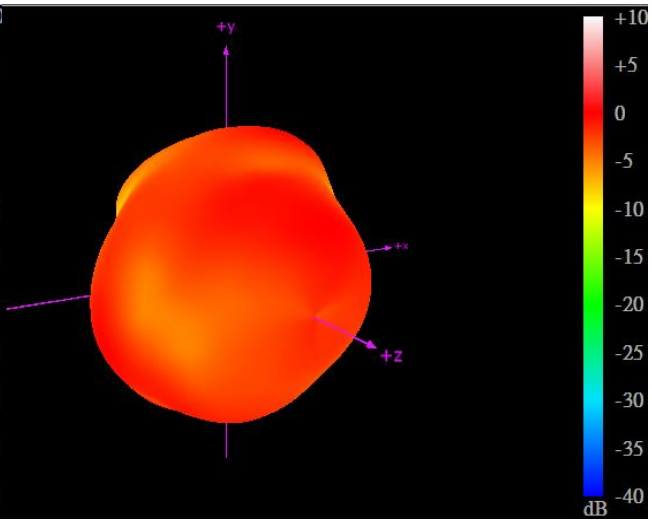
1710 MHz



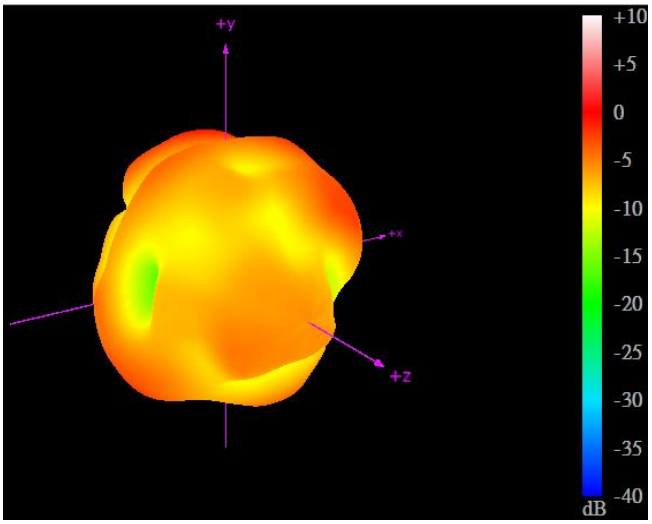
2170 MHz



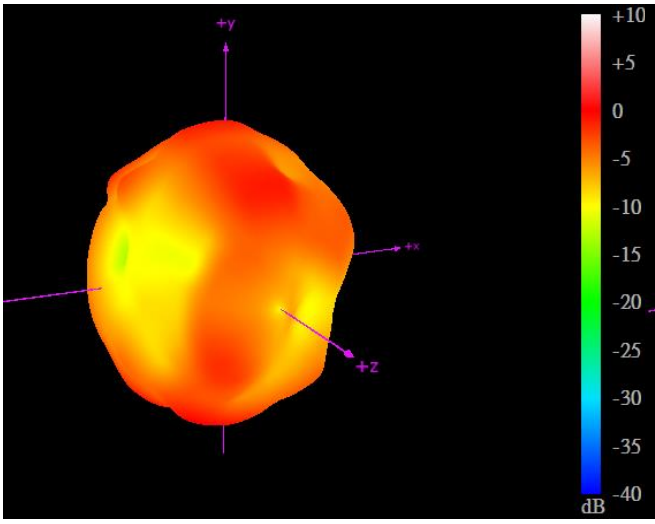
2300 MHz



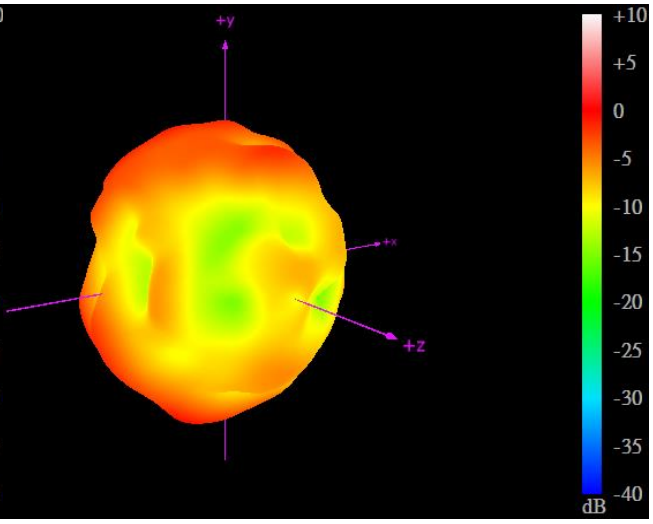
2700 MHz



3300MHz

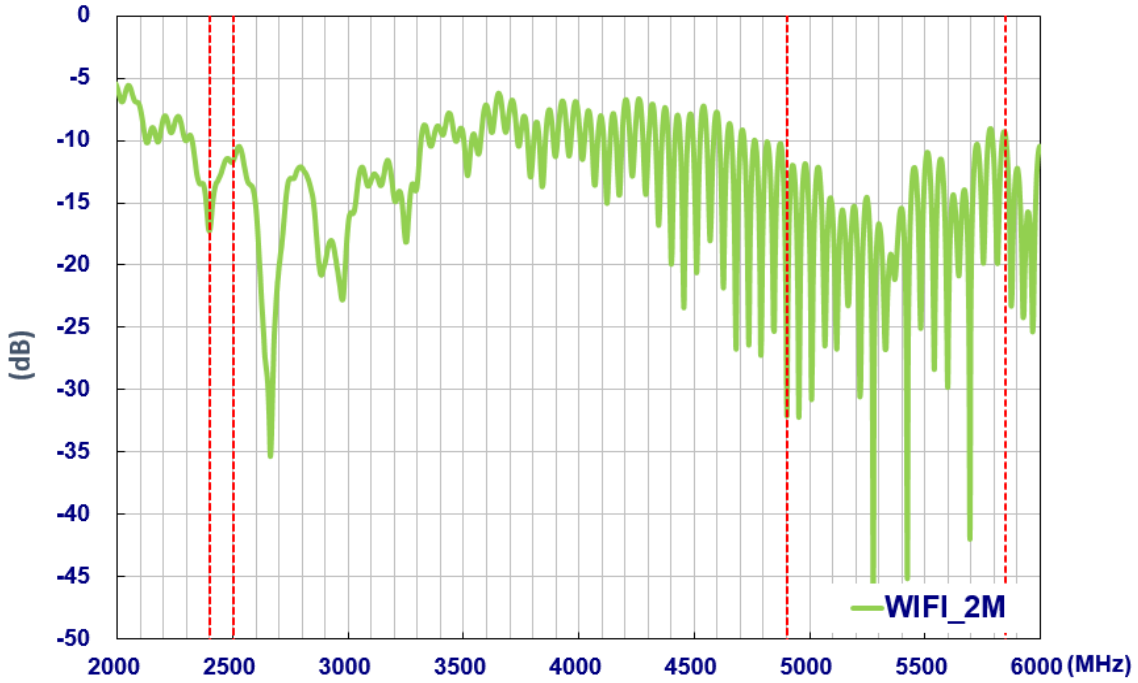


3500 MHz

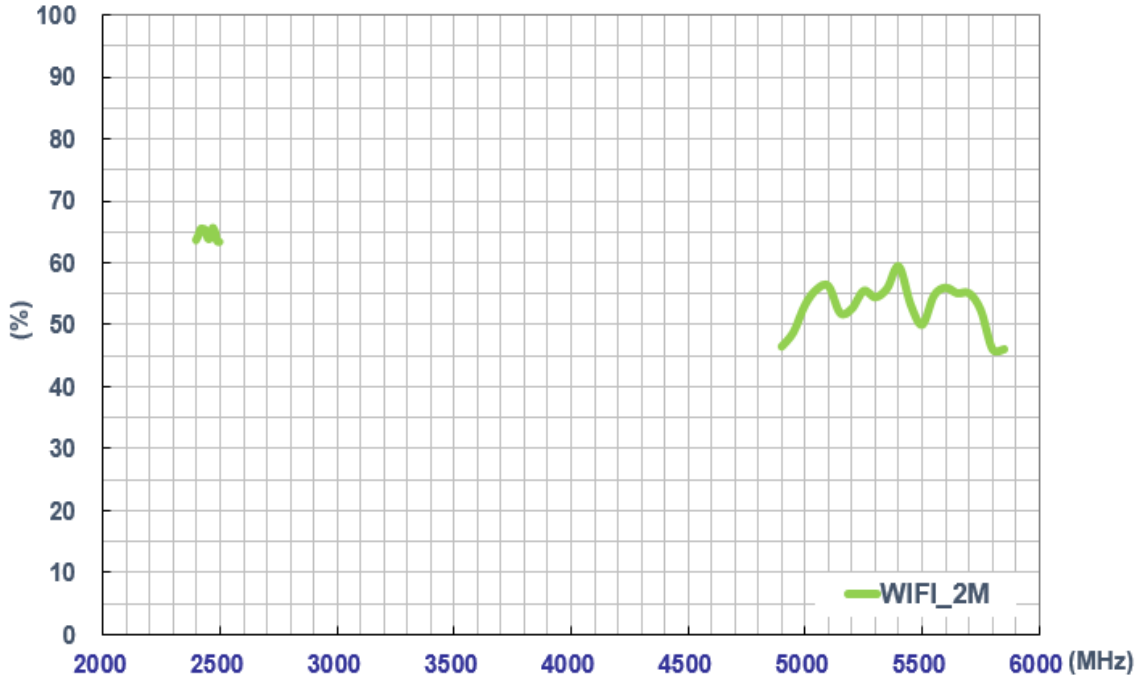


3.3 WIFI Antenna

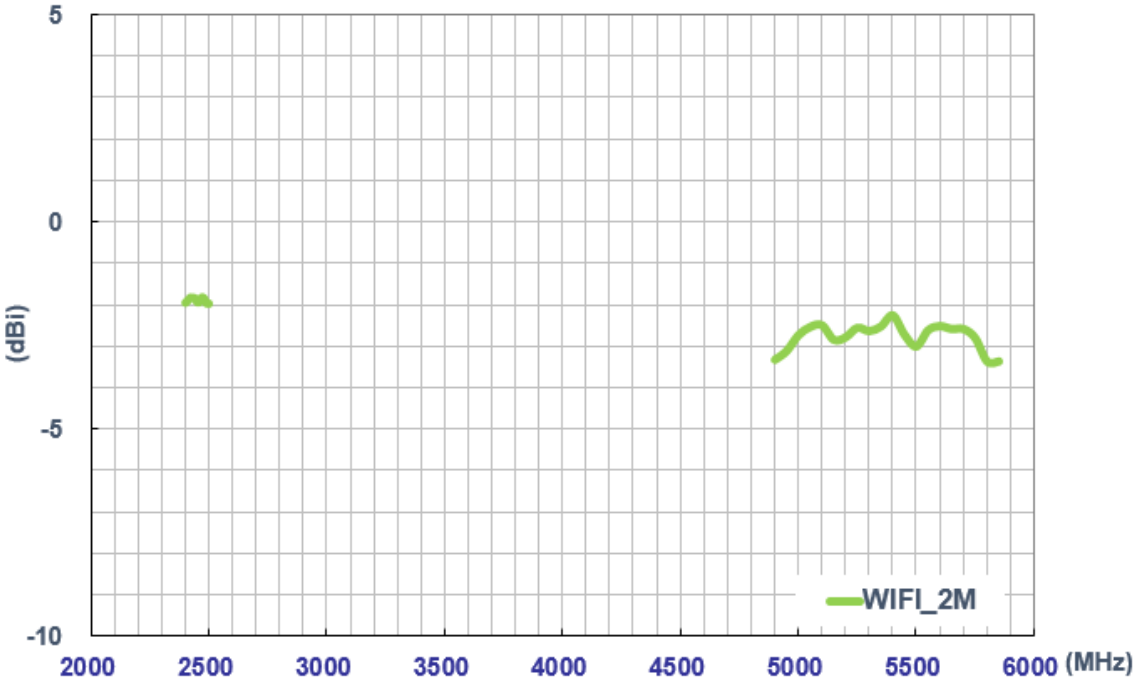
3.3.1 Return Loss



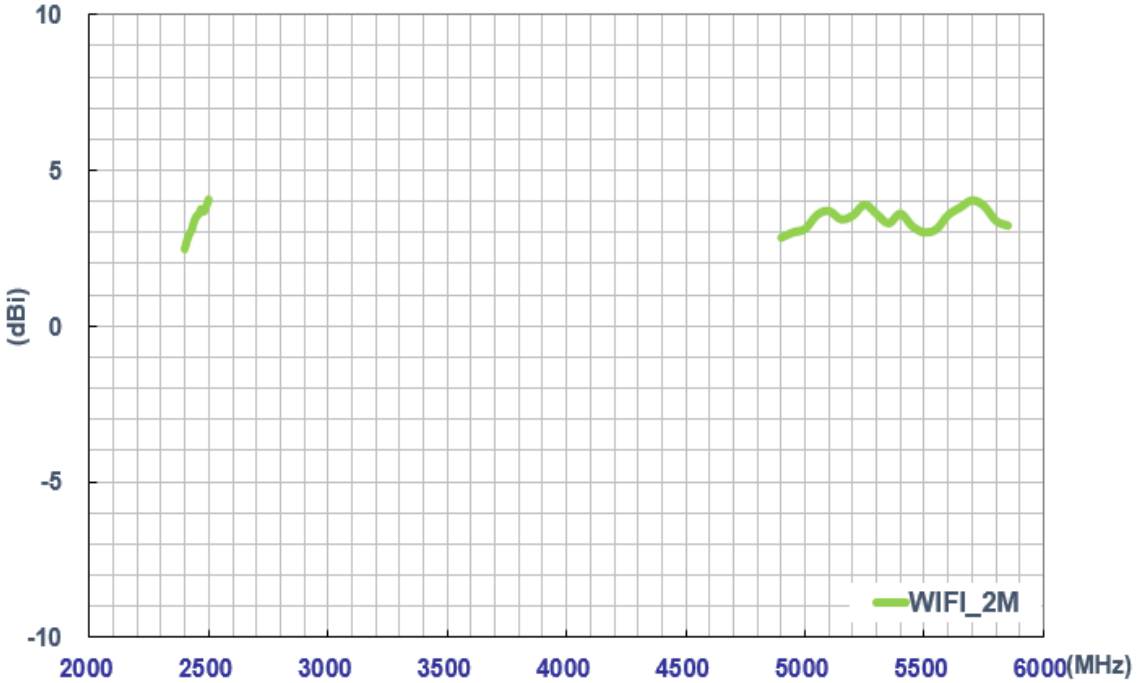
3.3.2 Efficiency



3.3.3 Average Gain

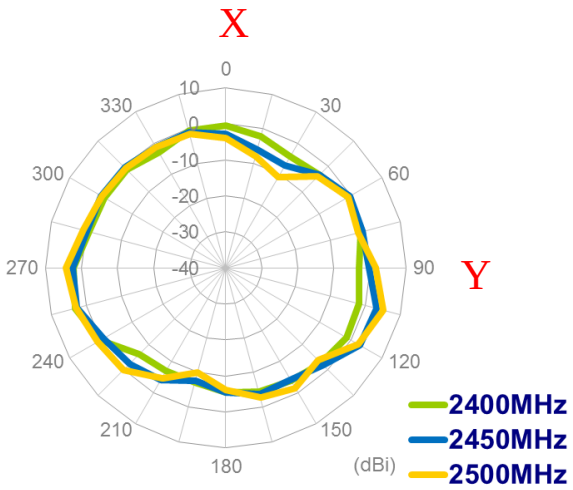


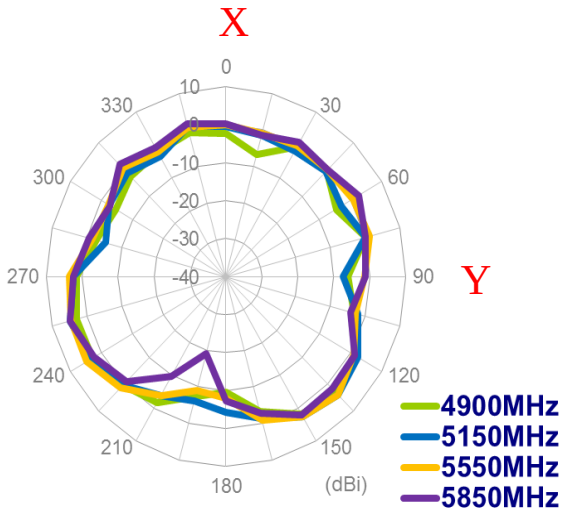
3.3.4 Peak Gain



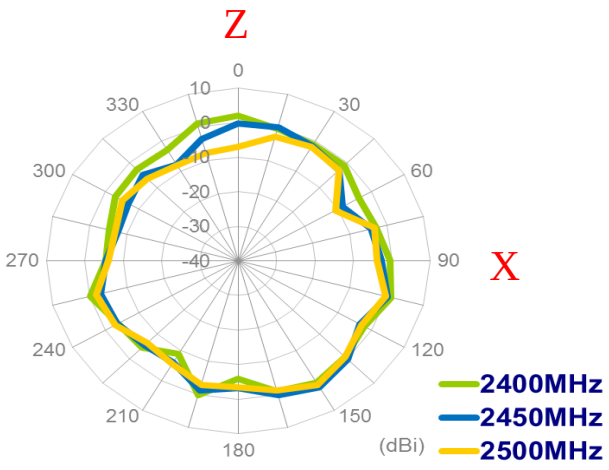
3.3.5 2D Radiation Pattern (WIFI with 2M cable length in free space)

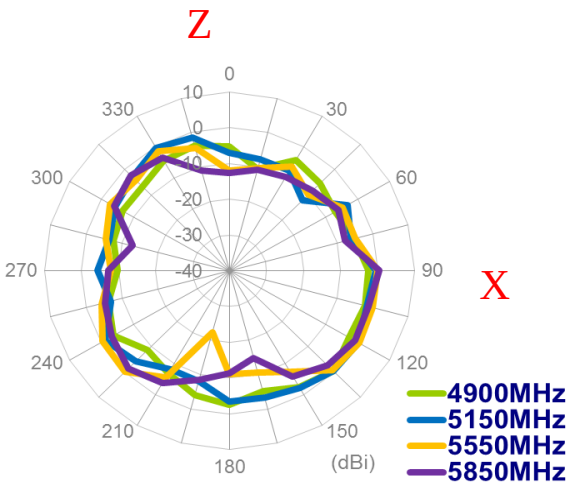
XY Plane



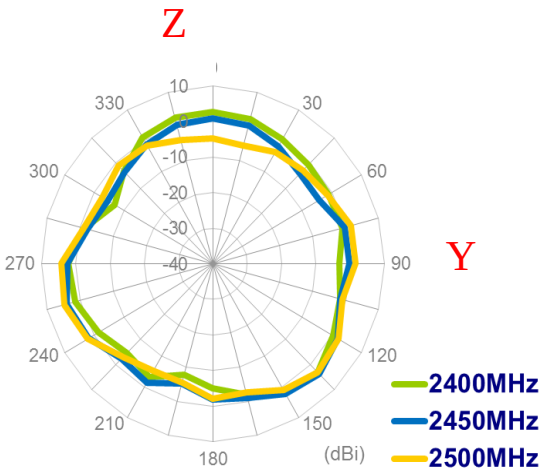


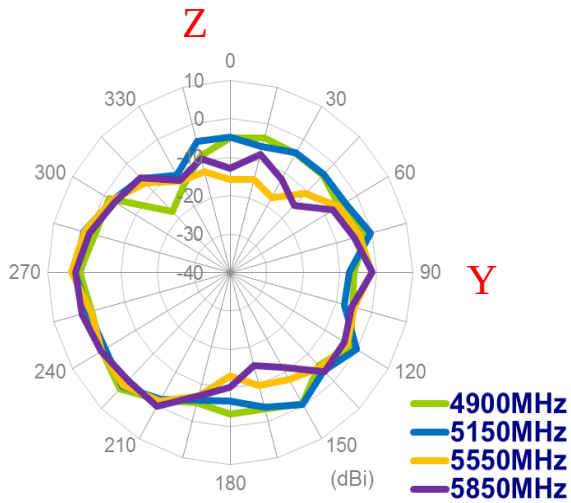
XZ Plane




Z
0
10
30
330
0
60
300
-10
-20
-30
270
-40
90
X
240
120
210
150
180
(dBi)
4900MHz
5150MHz
5550MHz
5850MHz

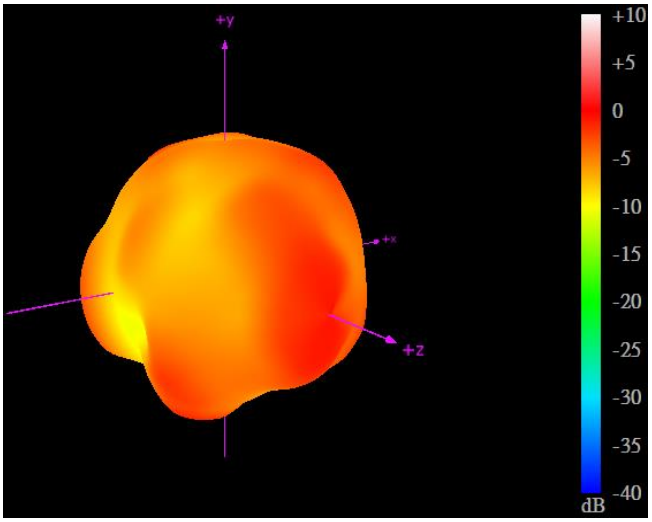
YZ Plane


Z
10
330
30
-10
300
60
-20
-30
270
-40
90
Y
240
120
210
150
180
(dBi)
2400MHz
2450MHz
2500MHz

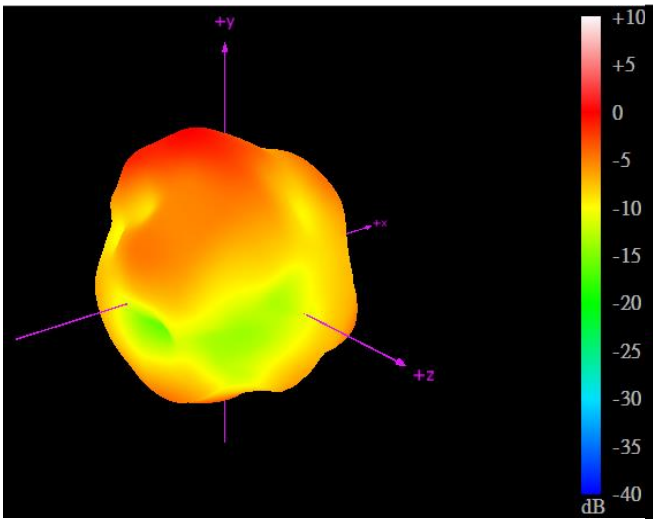

Z
0
10
330
30
0
300
60
-20
-30
270
-40
90
Y
240
120
210
150
180
(dBi)
4900MHz
5150MHz
5550MHz
5850MHz

3.3. 2D Radiation Pattern (WIFI with 2M cable length in free space)

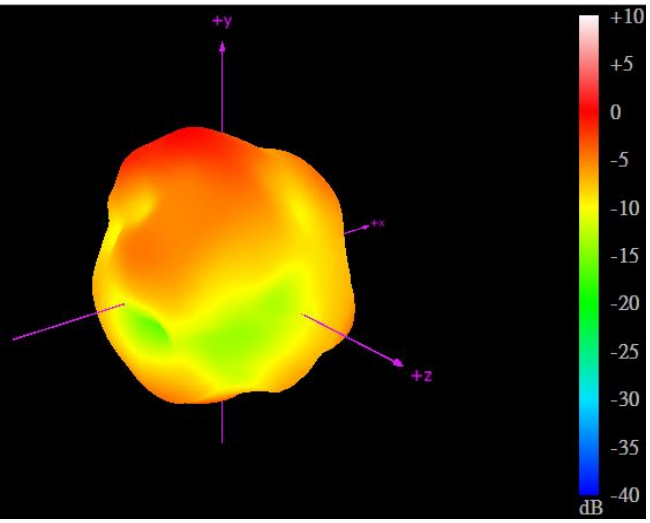
2400 MHz



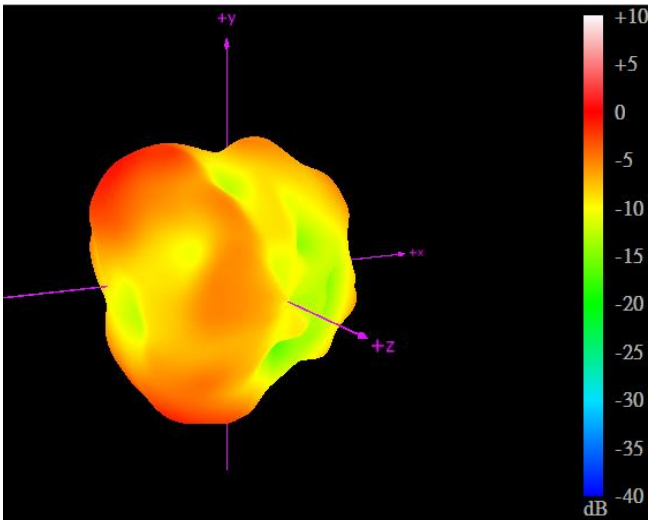
2500MHz



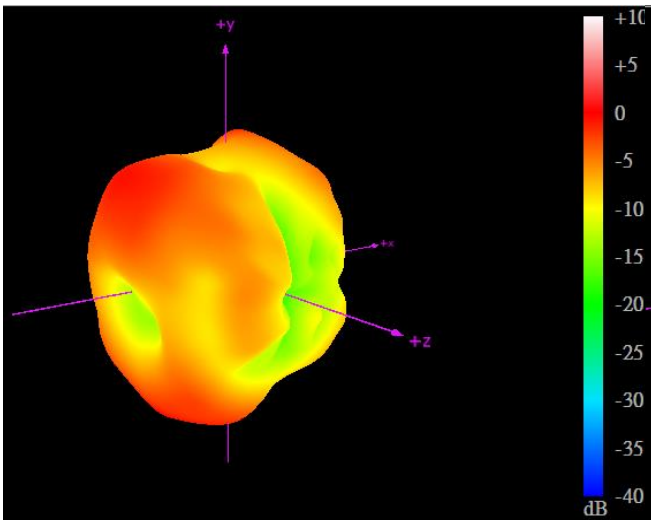
4900 MHz



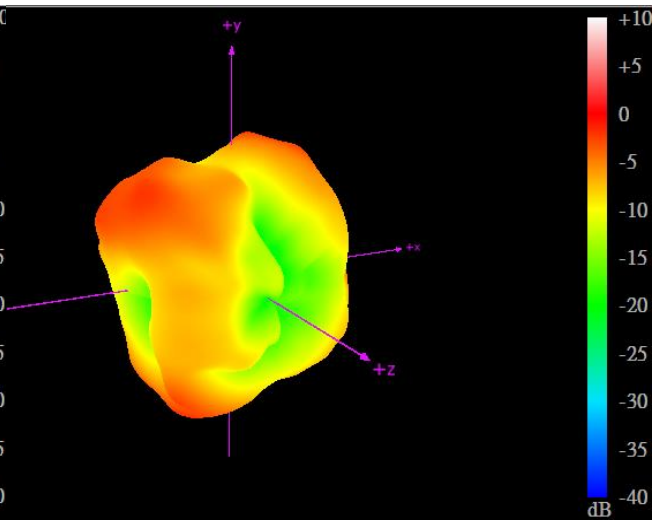
5150 MHz



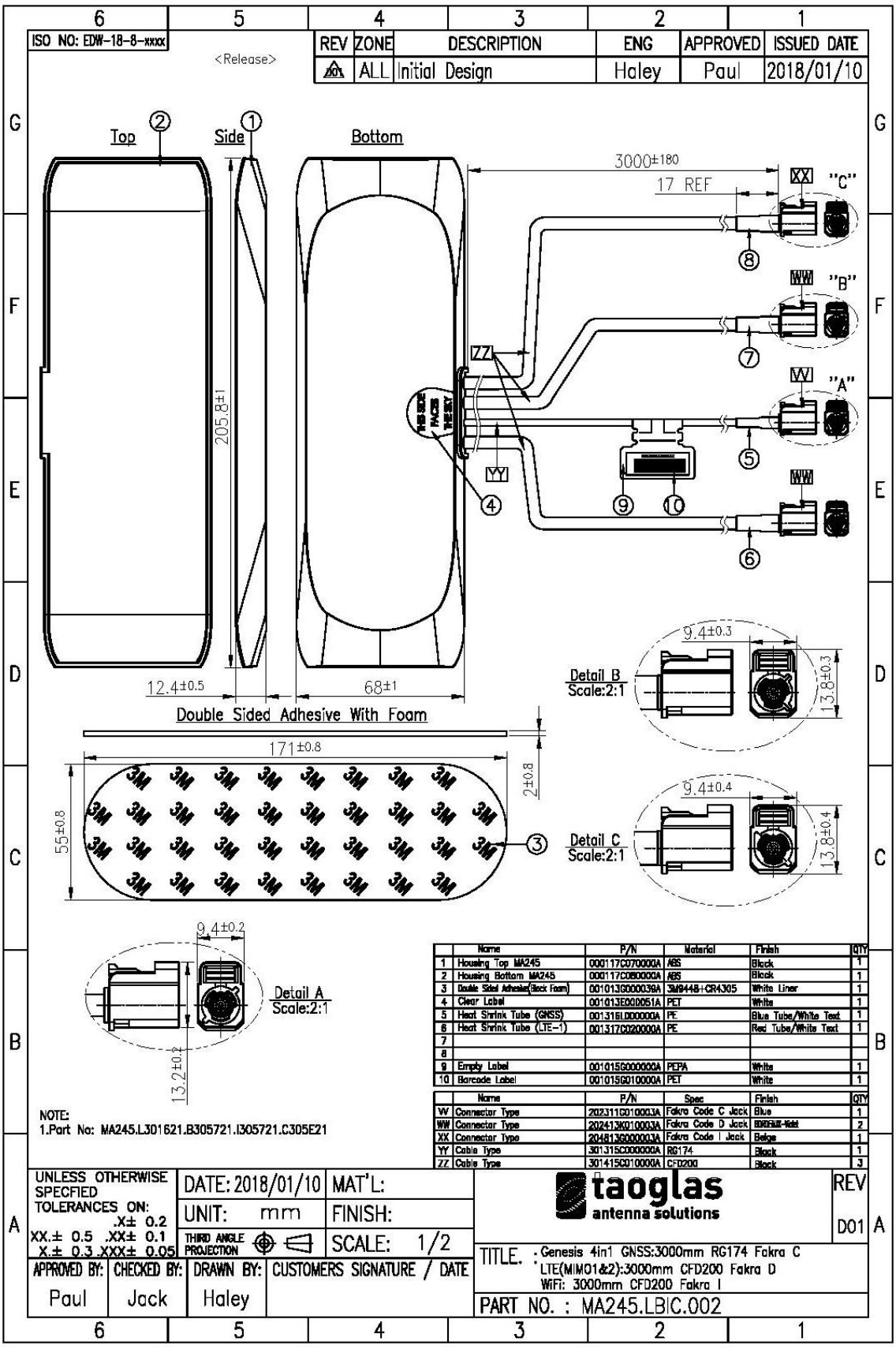
5550MHz



5850 MHz



4. Mechanical Drawing (Unit: mm)

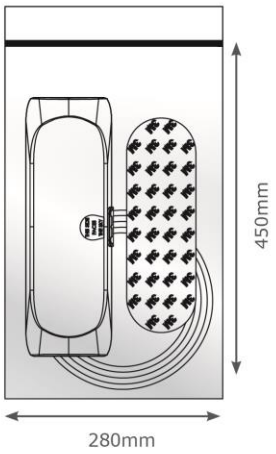


	Name	P/N	Material	Finish	QTY
1	Housing Top MA245	000117C070000A	ABS	Black	1
2	Housing Bottom MA245	000117C080000A	ABS	Black	1
3	Double Sided Adhesive(Black Foam)	001013G000039A	3M9448+GR4305	White Liner	1
4	Clear Label	001013E000051A	PET	White	1
5	Heat Shrink Tube (GNSS)	001316L000000A	PE	Blue Tube/White Text	1
6	Heat Shrink Tube (LTE-1)	001317C020000A	PE	Red Tube/White Text	1
7					
8					
9	Empty Label	001015G000000A	PEPA	White	1
10	Barcode Label	001015G010000A	PET	White	1

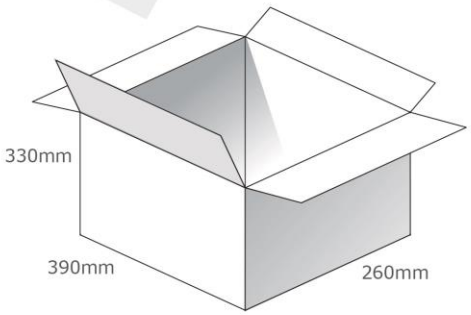
	Name	P/N	Spec	Finish	QTY
WW	Connector Type	202311C010003A	Fakra Code C Jack	Blue	1
WW	Connector Type	202413K010003A	Fakra Code D Jack	Blue	2
XX	Connector Type	204813G000003A	Fakra Code I Jack	Beige	1
YY	Cable Type	301315C000000A	RG174	Black	1
ZZ	Cable Type	301415C010000A	CFD200	Black	3

5. Packaging (Unit: mm)

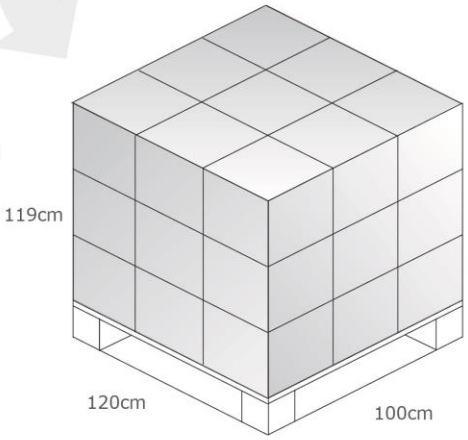
1pcs MA245.LBIC.002 per PE Bag
Bag Dimensions - 450 x 280mm
Weight - 430g



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

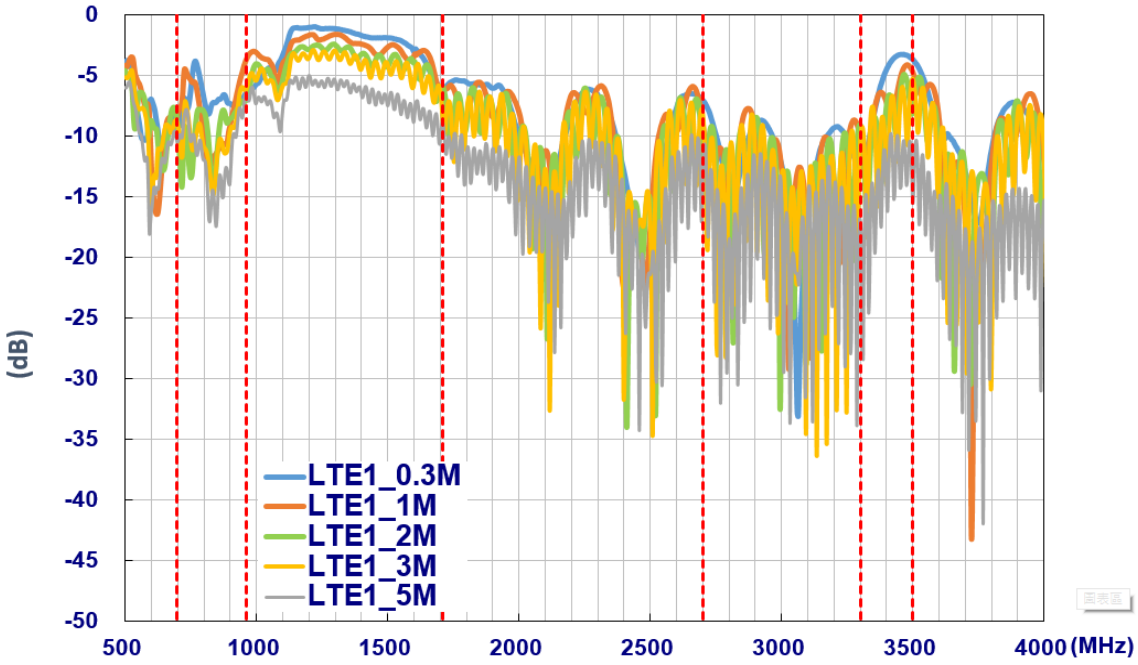


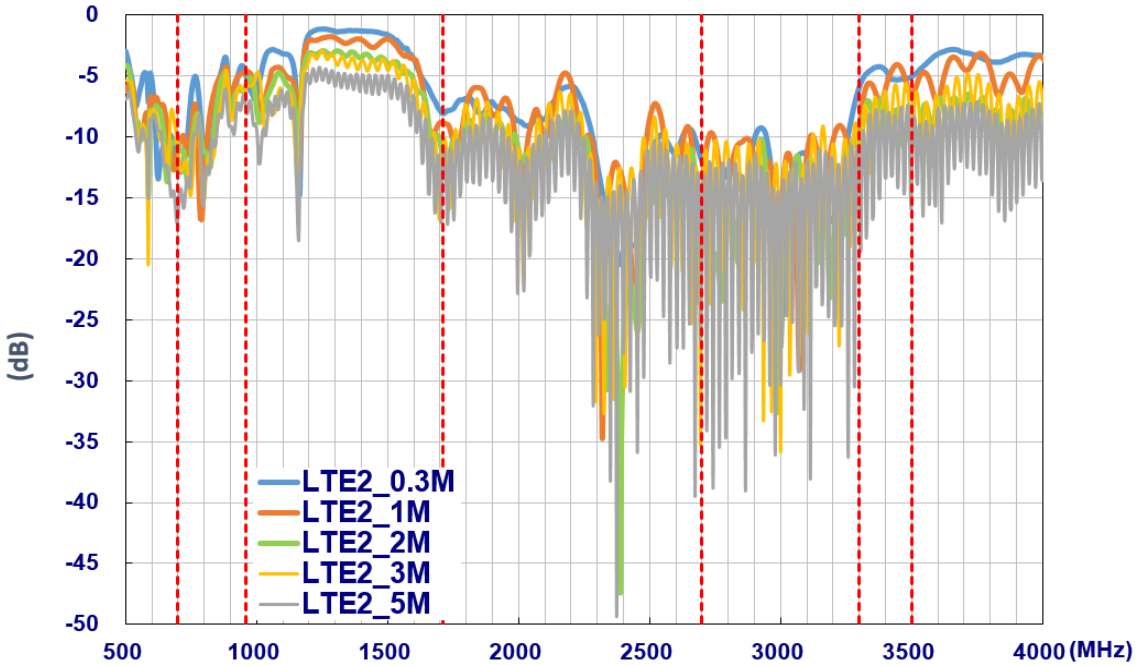
6. Application Note

The MA245 antenna measurement with difference cable length, the performance is shown as below.

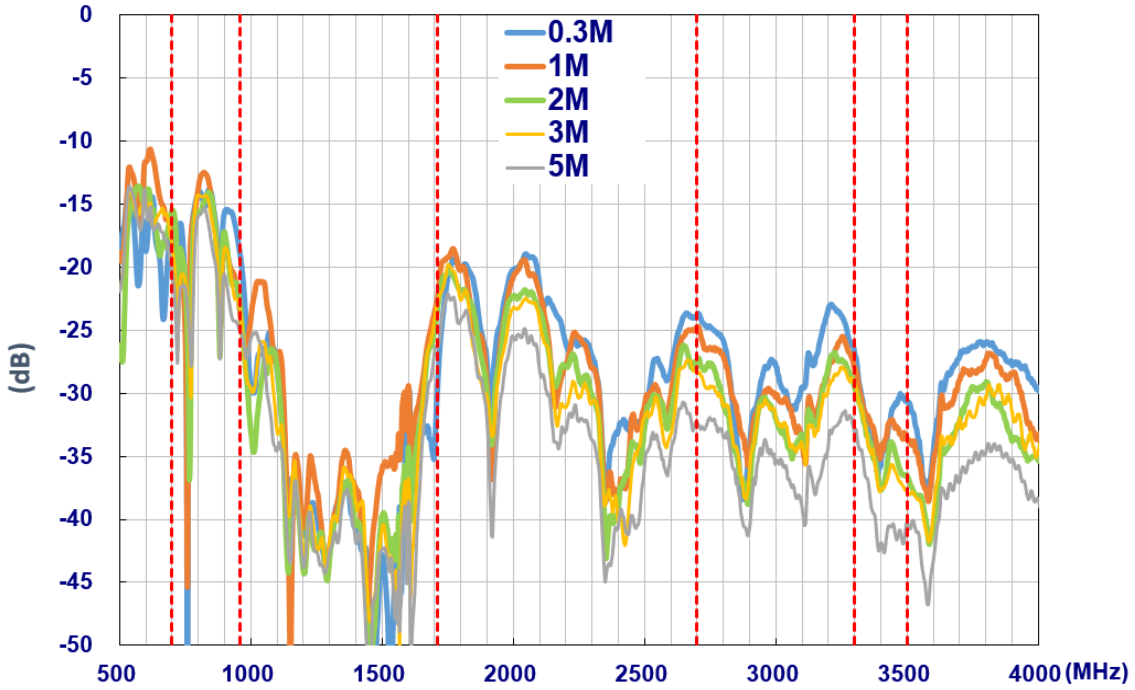
6.1 LTE Antenna

6.1.1 Return Loss

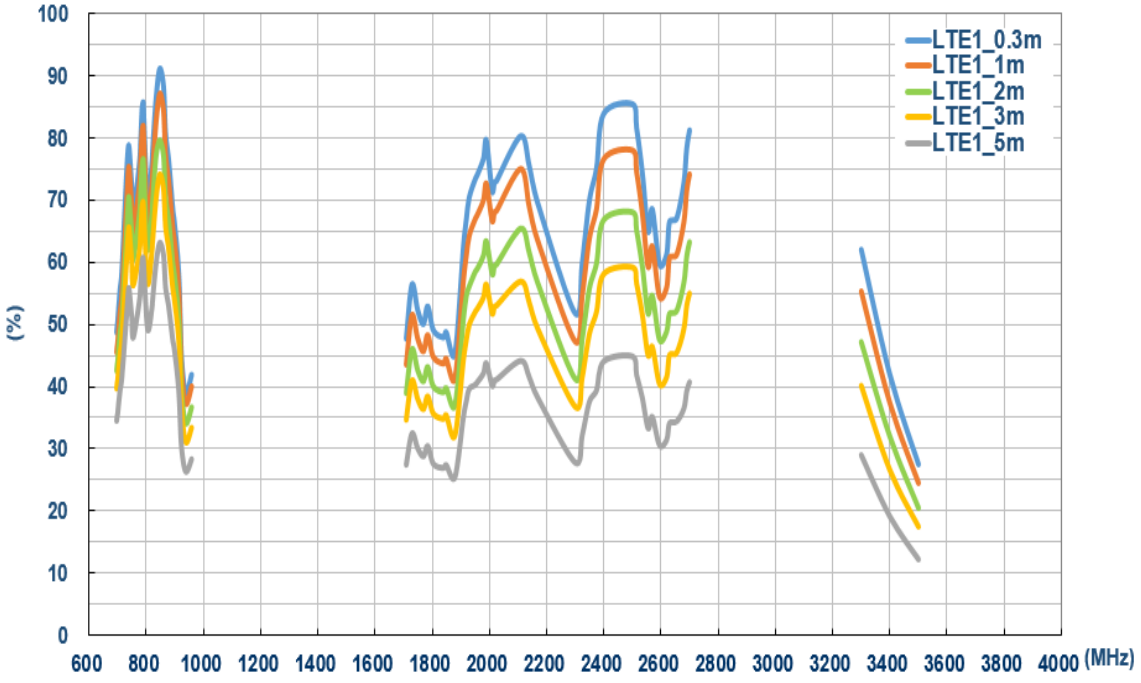


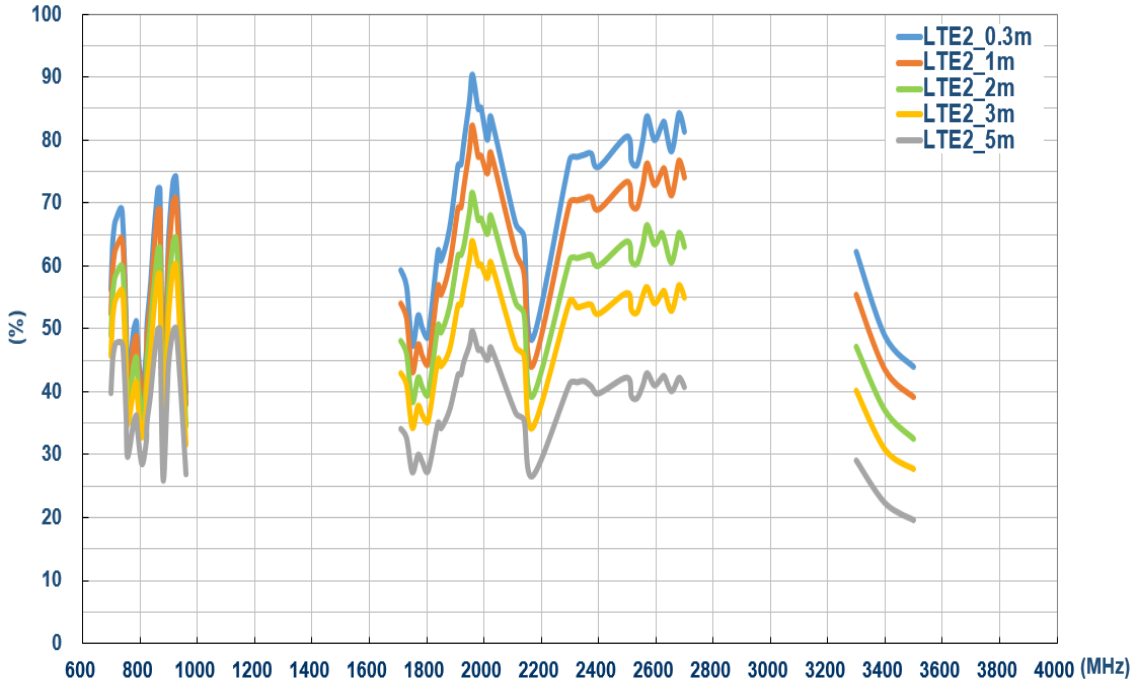


6.1.2 Isolation

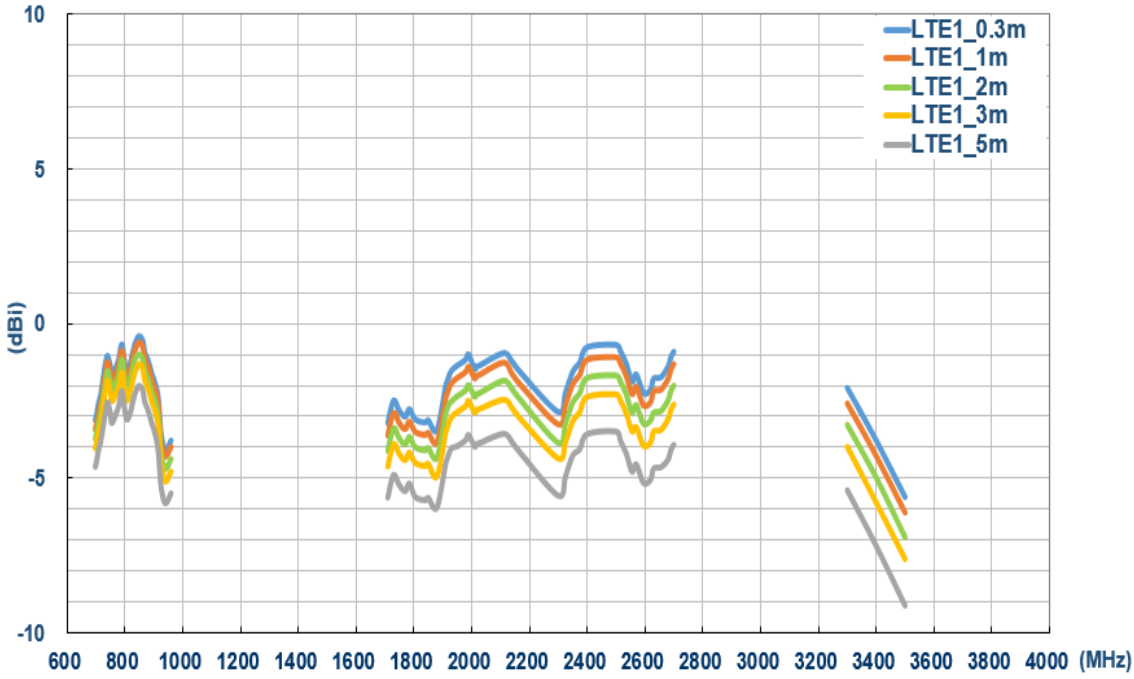


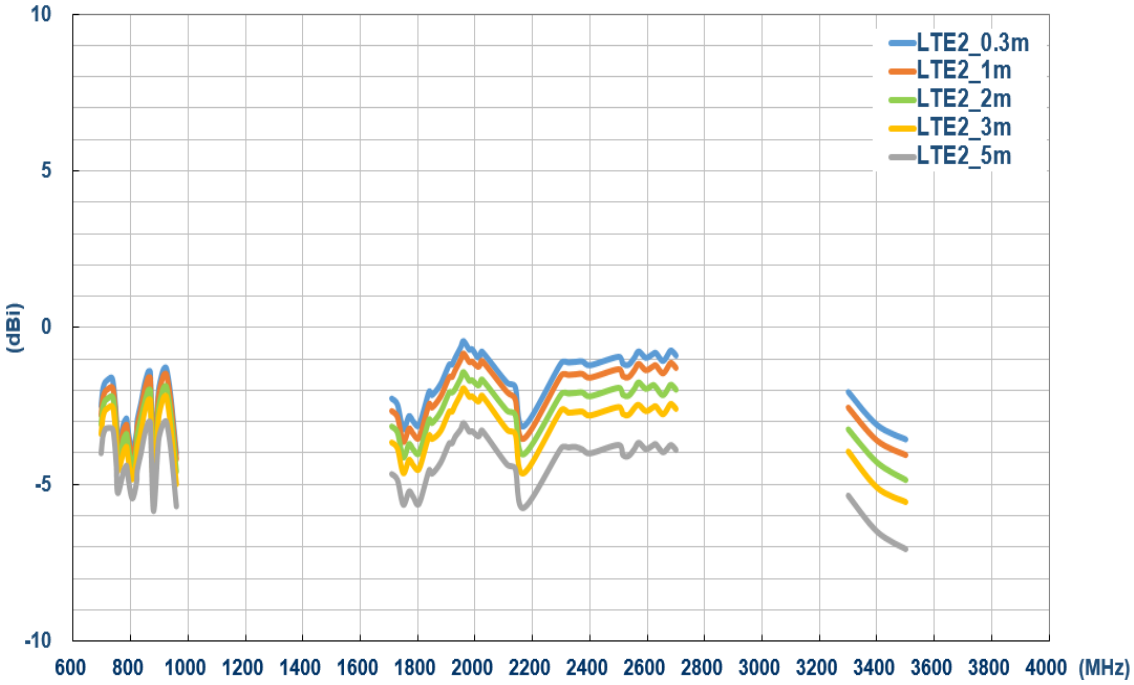
6.1.3 Efficiency



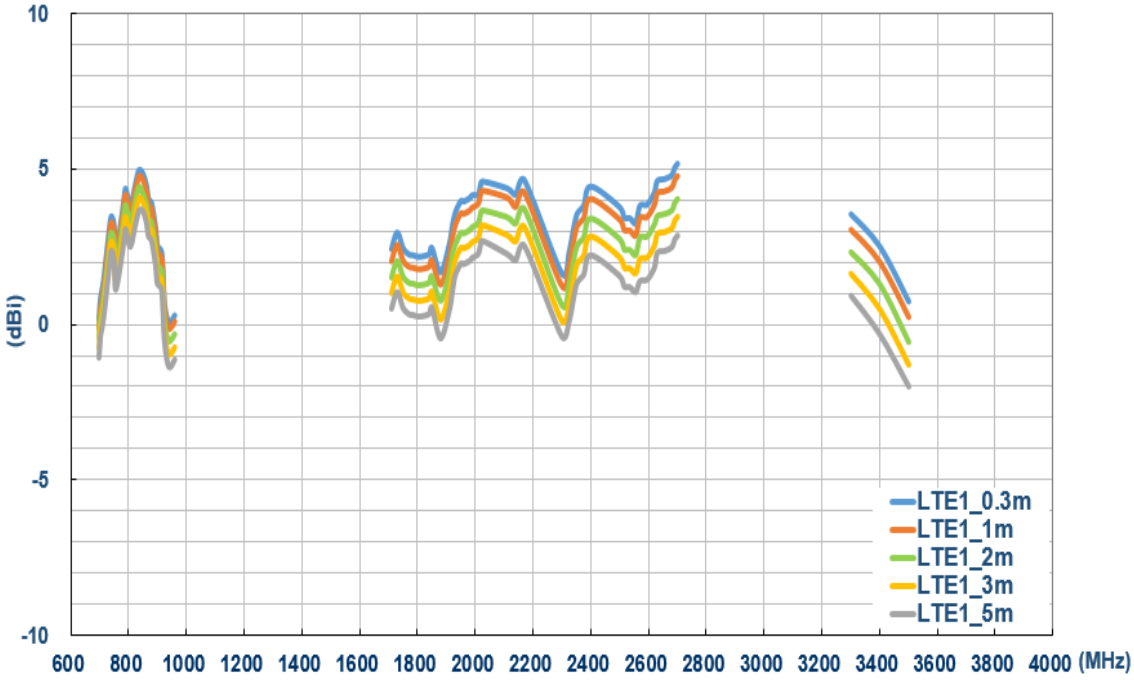


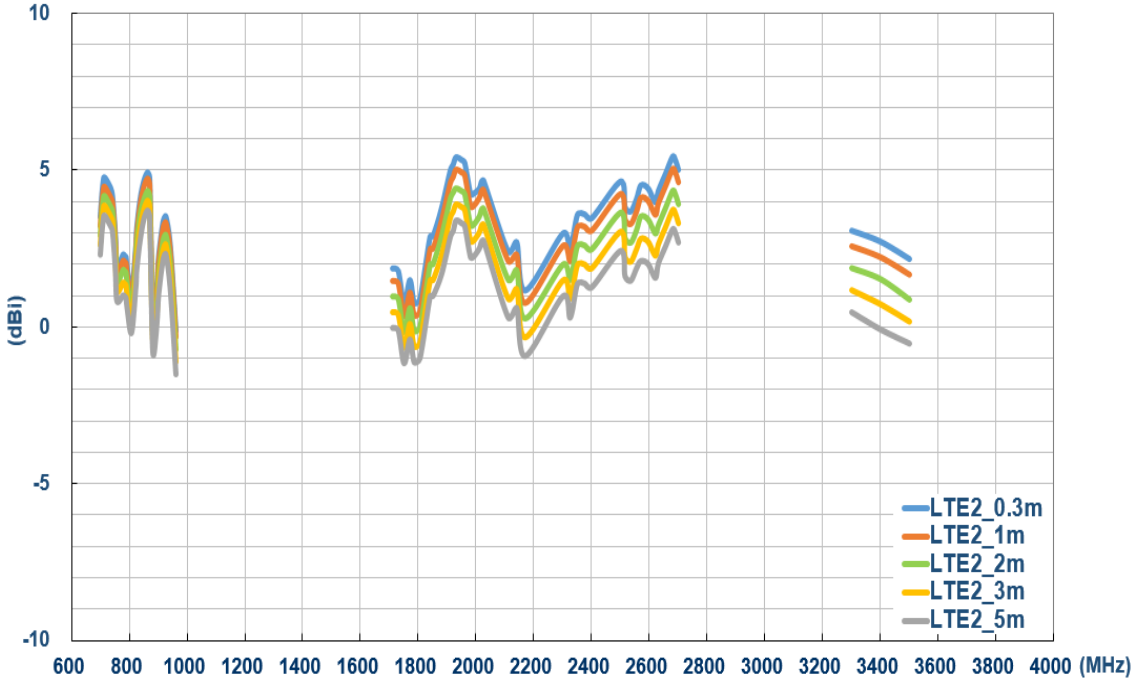
6.1.4 Average Gain





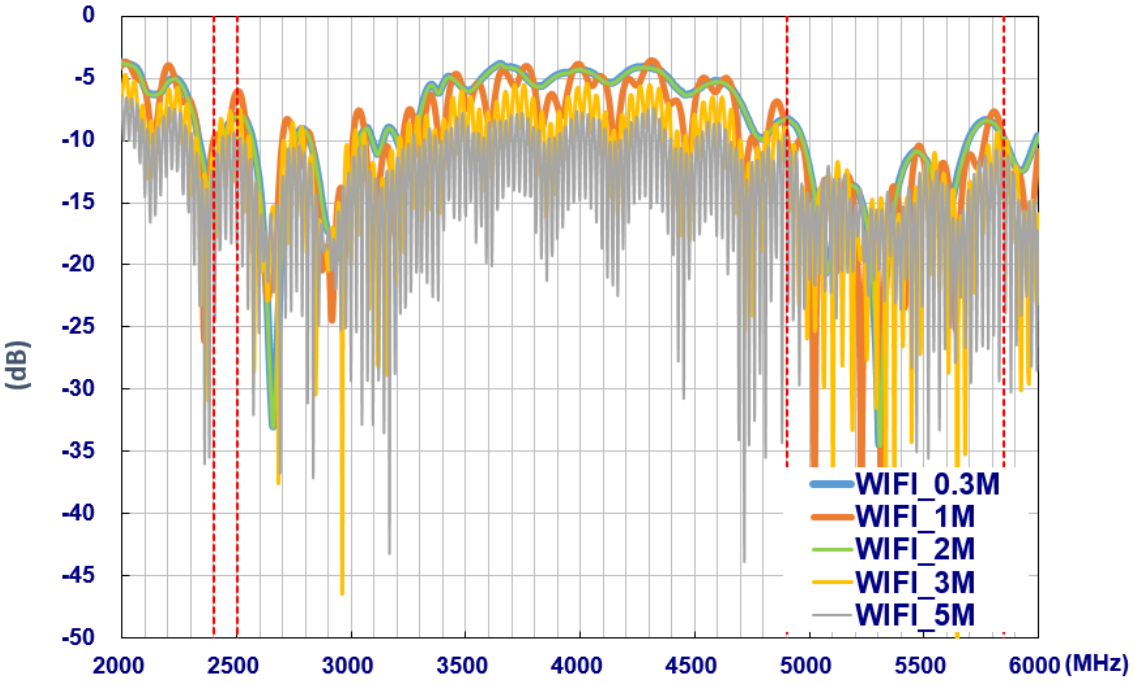
6.1.5 Peak Gain



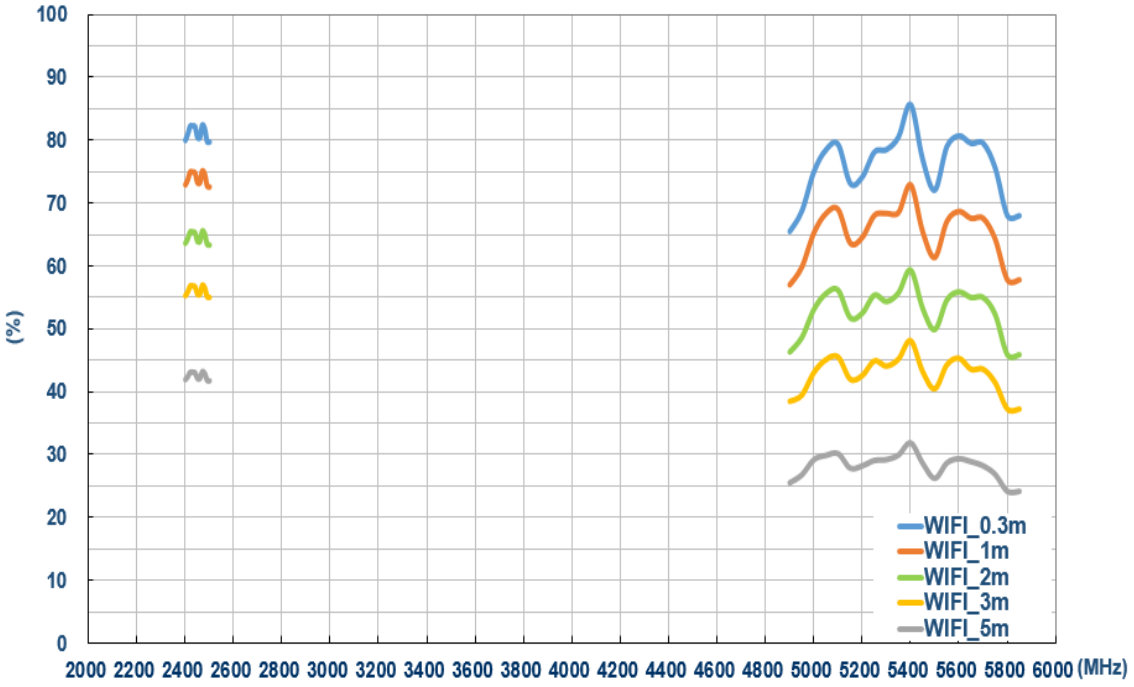

10
5
0
-5
-10
(dBi)
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000 (MHz)
LTE2_0.3m
LTE2_1m
LTE2_2m
LTE2_3m
LTE2_5m

6.2 WIFI Antenna

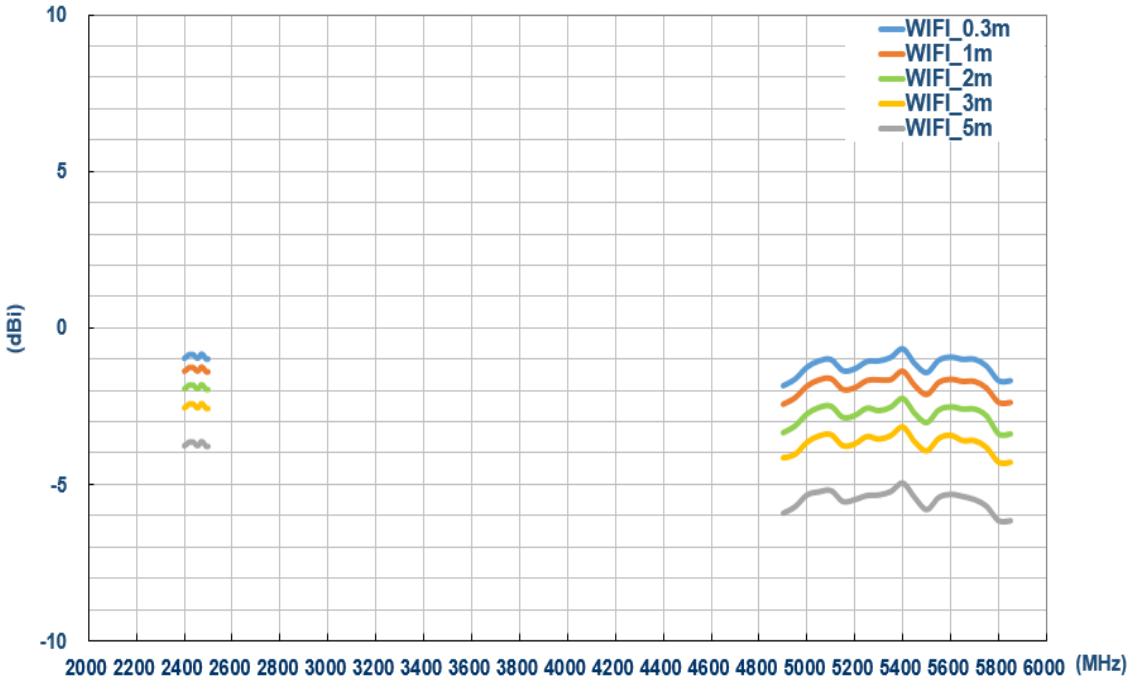
6.2.1 Return Loss



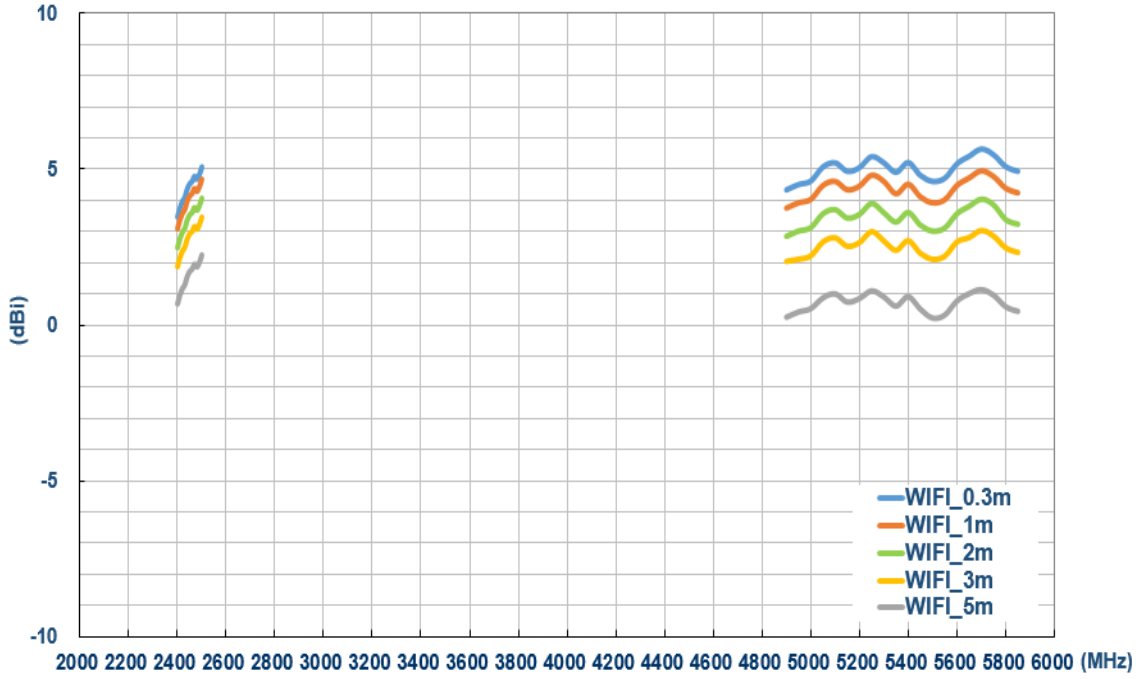
6.2.2 Efficiency



6.2.3 Average Gain



6.2.4 Peak Gain



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