TAOGLAS

Datasheet

Guardian 5in1 Wall Mount Antenna

Part No:
MA950.W.A.LBICG.005.wm

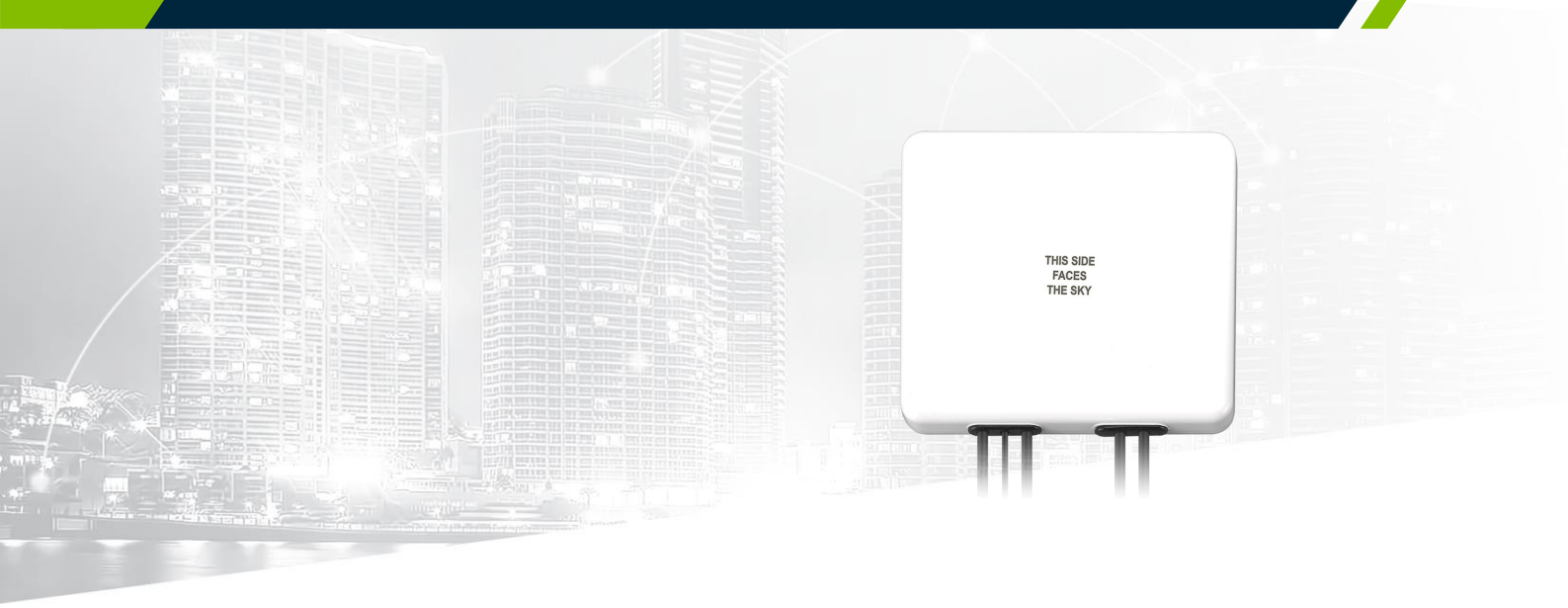
Description:

Guardian 5in1 Wall Mount Antenna, LTE*2+Wi-Fi*2+GNSS

Features:

Low-profile Housing
2* 4G/LTE MIMO 698-4000MHz
2* Wi-Fi MIMO 2.4GHz/5.8GHz
1* Active GPS-GLONASS-GALILEO-BeiDou Antenna
Worldwide 4G Bands including 3G and 2G
IP67 Waterproof Enclosure
Dims: 146*134*20mm
1M Low Loss TGC-200 and RG174 with SMA(M)/RP-SMA(M) connectors
Cables and Connectors Customizable
RoHS & REACH Compliant

1. Introduction



The MA950 Guardian is a next generation combination antenna. The first panel antenna worldwide designed for IoT Gateway and Router devices. It is a low profile 5in1 wall and adhesive mount antenna. This heavy-duty, fully IP67 waterproof external M2M antenna can be used by RF professionals in IoT Gateway and Routers, HD Video Streaming, Transportation and Remote Monitoring Applications.

This antenna delivers powerful MIMO antenna technology for worldwide 4G LTE bands at 698-4000MHz bands, dual-band 2.4/5.8GHz Wi-Fi, plus GPS-GLONASS-GALILEO-BeiDou for location accuracy. It enables designers to cover a wide range of technologies by installing a single antenna.

4G wireless applications 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. Taoglas also takes care to have high isolation among these antennas to prevent self-interference. Low loss cables used to keep efficiency high over long cable lengths. The GPS-GLONASS-GALILEO-BeiDou active antenna has been carefully designed for excellent performance across all GNSS bands, leading to higher location accuracy and stability of tracking in urban environments.

The housing is IP67 waterproof, and the adhesive mount version comes with wall mount bracket. The antenna can be mounted internally or externally on a vehicle. The MA950 comes with 1m, low loss TGC-200 coaxial cables for the LTE and Wi-Fi antennas, and RG174 coaxial cable for the GNSS antenna as standard. Customized cables and connector versions are also available. Contact your regional Taoglas customer support for more information on how to integrate the MA950 or sales support.

2. Specifications

GPS-GLONASS-GALILEO-BeiDou				
Center Frequency	GPS/GALILEO:1575.42±1.023MHz BeiDou:1561.098±2.046MHz GLONASS:1602±5MHz			
Passive Antenna Efficiency (without cable loss)	GPS/GALILEO: 48% GLONASS: 57% BeiDou: 63%			
Passive Antenna Average Gain (without cable loss)	GPS/GALILEO: -3.13dBi GLONASS: -2.39dBi BeiDou: -1.97dBi			
Passive Antenna Peak Gain (without cable loss)	GPS/GALILEO: 1.98dBi GLONASS: 3.01dBi BeiDou: 3dBi			
VSWR	3:1 Max			
Impedance	50Ω			
Axial Ratio	GPS/GALILEO:<14.02 GLONASS:<5.9 BeiDou:<9.7			
Polarization	RHCP			
Cable	1 meter RG174 standard, fully customizable			
Connector	SMA(M) standard, fully customizable			
LNA and Filter Electrical Properties				
Center Frequency	GPS/GALILEO:1575.42±1.023MHz GLONASS:1602±5MHz BeiDou: 1561.098±2.046MHz			
Output Impedance	50Ω			
VSWR	< 2:1			
Return Loss	10dB Min.			
LNA Gain, Current Draw, and Noise Figure@GPS	Voltage	LNA Gain(Typ)	Current Draw(mA) Typ	Noise Figure(Typ)
	Min 1.8V	28dB	7.9mA	1.13dB
	Typ 3.0V	30dB	9.0mA	1.13dB
	Max 5.5V	33dB	9.9mA	1.14dB
Total Specification (Through Antenna, SAW Filter, and LNA)				
Frequency	1561.098±2.046MHz	1575.42±1.023MHz	1602±5MHz	
Gain@3V	1561MHz:28±3dBi	1575.42MHz:28±3dBi	1602MHz:28±3dBi	
Output Impedance	50Ω			

4G/3G/2G LTE Antenna									
Frequency (MHz)		LTE700	GSM850	GSM900	DCS	PCS	UMTS1	LTE2600	LTE3500
		698~803	824~894	880~960	1710 ~1880	1850 ~1990	1920 ~2170	2490 ~2690	3300 ~3600
Efficiency (%)									
MIMO_1	Free space	50.82	55.85	41.29	66.47	70.19	71.51	49.20	50.92
	ABS	68.31	69.61	61.27	66.31	70.86	70.00	50.61	51.88
	Glass	67.99	67.37	62.94	66.89	71.80	69.58	51.00	52.83
	Metal	42.12	51.55	58.33	39.49	47.20	47.71	44.36	44.85
	Wall	67.97	70.42	66.80	63.91	64.94	63.35	50.37	51.49
MIMO_2	Free space	54.13	58.97	48.65	61.54	68.31	68.39	54.62	52.55
	ABS	71.74	66.05	58.58	63.18	69.29	69.23	53.95	54.95
	Glass	64.53	55.70	45.22	64.94	67.87	65.86	50.05	51.77
	Metal	55.62	63.13	56.59	32.14	40.89	43.97	54.22	52.90
	Wall	61.91	48.38	52.88	58.00	56.47	56.36	54.68	48.72
Average Gain (dBi)									
MIMO_1	Free space	-2.96	-2.62	-3.85	-1.78	-1.54	-1.46	-3.12	-2.96
	ABS	-1.68	-1.59	-2.13	-1.79	-1.50	-1.55	-3.00	-2.87
	Glass	-1.73	-1.73	-2.02	-1.75	-1.44	-1.58	-2.96	-2.79
	Metal	-3.94	-2.88	-2.37	-4.07	-3.27	-3.23	-3.57	-3.51
	Wall	-1.70	-1.53	-1.76	-1.95	-1.88	-1.99	-3.00	-2.89
MIMO_2	Free space	-2.72	-2.32	-3.17	-2.11	-1.66	-1.66	-2.65	-2.83
	ABS	-1.47	-1.81	-2.33	-2.00	-1.59	-1.60	-2.71	-2.63
	Glass	-1.93	-2.56	-3.46	-1.88	-1.68	-1.82	-3.04	-2.87
	Metal	-2.61	-2.00	-2.50	-4.95	-3.90	-3.59	-2.67	-2.77
	Wall	-2.09	-3.15	-2.79	-2.37	-2.48	-2.50	-2.63	-3.15
Peak Gain (dBi)									
MIMO_1	Free space	3.18	3.60	2.14	3.98	4.37	4.37	3.70	4.49
	ABS	4.65	4.00	3.45	5.24	6.05	6.05	4.69	3.18
	Glass	3.71	3.92	4.35	5.28	6.16	7.67	5.34	3.87
	Metal	5.09	3.10	4.73	4.50	4.96	5.69	6.02	4.96
	Wall	4.74	4.97	3.67	5.44	4.84	4.84	5.08	3.75
MIMO_2	Free space	5.83	3.66	2.57	3.78	4.01	4.01	3.87	3.97
	ABS	4.33	4.52	4.41	4.34	4.73	5.69	5.64	5.42
	Glass	3.02	3.14	1.36	4.99	5.89	6.02	6.18	4.42
	Metal	3.54	3.11	3.33	3.12	4.36	5.02	7.16	4.95
	Wall	3.21	1.77	2.15	5.49	5.49	7.20	6.10	4.74
Impedance		50Ω							
Polarization		Linear							
VSWR		< 3							
Cable		1 meter TGC-200 standard, fully customizable							
Connector		SMA(M) standard, fully customizable							

2.4GHz/5.8GHz Wi-Fi Antenna			
Frequency (MHz)		**2400~2500**	**4900~5850**
Efficiency (%)			
MIMO_1	Free space	57.73	48.06
	ABS	53.59	49.42
	Glass	53.98	47.16
	Metal	51.80	46.70
	Wall	61.02	46.29
MIMO_2	Free space	44.09	47.04
	ABS	46.34	46.79
	Glass	40.79	46.88
	Metal	45.58	45.59
	Wall	50.62	43.60
Average Gain (dBi)			
MIMO_1	Free space	-2.39	-3.25
	ABS	-2.71	-3.13
	Glass	-2.68	-3.36
	Metal	-2.86	-3.44
	Wall	-2.15	-3.42
MIMO_2	Free space	-3.57	-3.33
	ABS	-3.37	-3.36
	Glass	-3.91	-3.35
	Metal	-3.45	-3.52
	Wall	-2.96	-3.67
Peak Gain (dBi)			
MIMO_1	Free space	4.35	4.84
	ABS	5.34	5.18
	Glass	2.99	5.03
	Metal	5.22	5.98
	Wall	5.47	5.77
MIMO_2	Free space	2.94	5.70
	ABS	2.18	5.43
	Glass	3.75	7.07
	Metal	6.02	6.76
	Wall	3.23	5.97
Impedance		50Ω	
Polarization		Linear	
VSWR		< 3	
Cable		1 meter TGC-200 standard, fully customizable	
Connector		RP-SMA(M) standard, fully customizable	

MECHANICAL	
Antenna Dimensions	146*134*20mm
Casing	ASA
Weight (including cable)	640g
Ingress Protection Rating	IP67
ENVIRONMENTAL	
Operation Temperature	-40°C to 85°C
Storage Temperature	-40°C to 90°C
Humidity	Non-condensing 65°C 95% RH

2.1. LTE Bands Covered while on metal Ground Plane

LTE Bands				
Band Number	LTE / LTE-Advanced / WCDMA / HSPA / HSPA+ / TD-SCDMA			
	Uplink	Downlink	MIMO 1	MIMO 2
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 (LTE only)	✓	✓
18	UL: 815 to 830	DL: 860 to 875 (LTE only)	✓	✓
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 (LTE only)	✓	✓
24	UL:1625.5 to 1660.5	DL: 1525 to 1559 (LTE only)	✓	✗
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 (LTE only)	✓	✓
28	UL: 703 to 748	DL: 758 to 803 (LTE only)	✓	✓
29	UL: -	DL: 717 to 728 (LTE only)	✓	✓
30	UL: 2305 to 2315	DL: 2350 to 2360 (LTE only)	✓	✓
31	UL: 452.5 to 457.5	DL: 462.5 to 467.5 (LTE only)	✗	✗
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		✓	✓

*Covered bands represent greater than 20% efficiency

2.2. LTE Bands Covered in Free Space

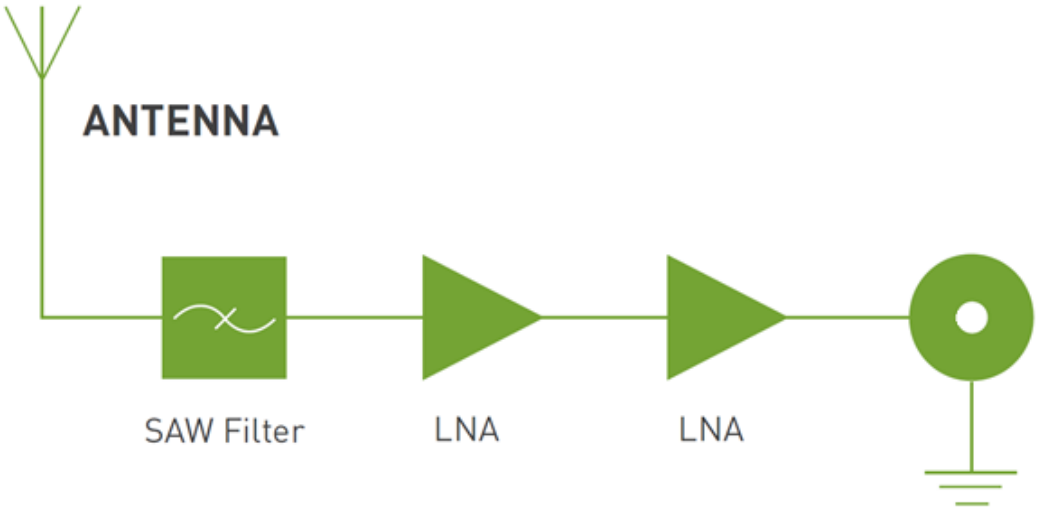
LTE Bands				
Band Number	LTE / LTE-Advanced / WCDMA / HSPA / HSPA+ / TD-SCDMA			
	Uplink	Downlink	MIMO 1	MIMO 2
1	UL: 1920 to 1980	DL: 2110 to 2170	✓	✓
2	UL: 1850 to 1910	DL: 1930 to 1990	✓	✓
3	UL: 1710 to 1785	DL: 1805 to 1880	✓	✓
4	UL: 1710 to 1755	DL: 2110 to 2155	✓	✓
5	UL: 824 to 849	DL: 869 to 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 (LTE only)	✓	✓
18	UL: 815 to 830	DL: 860 to 875 (LTE only)	✓	✓
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 (LTE only)	✓	✓
24	UL:1625.5 to 1660.5	DL: 1525 to 1559 (LTE only)	✓	✓
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 (LTE only)	✓	✓
28	UL: 703 to 748	DL: 758 to 803 (LTE only)	✓	✓
29	UL: -	DL: 717 to 728 (LTE only)	✓	✓
30	UL: 2305 to 2315	DL: 2350 to 2360 (LTE only)	✓	✓
31	UL: 452.5 to 457.5	DL: 462.5 to 467.5 (LTE only)	✗	✗
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		✓	✓

*Covered bands represent an efficiency greater than 20%

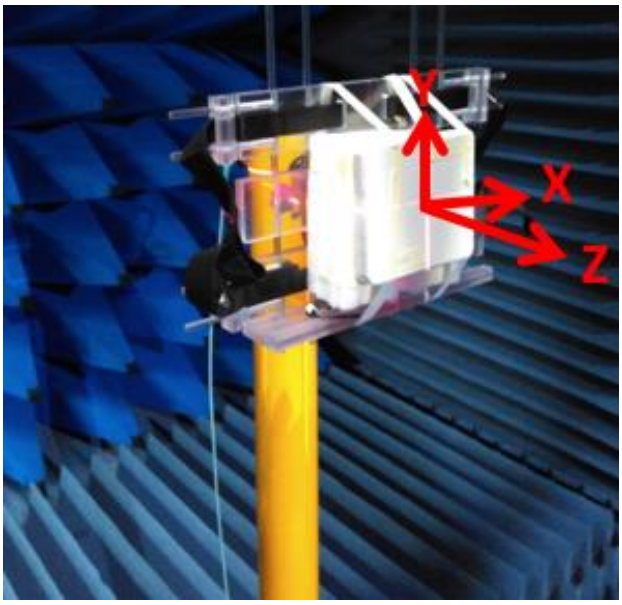
3. Antenna Characteristics

3.1 GPS-GLONASS-GALILEOBeiDou

3.1.1 Block Diagram (Active antenna)

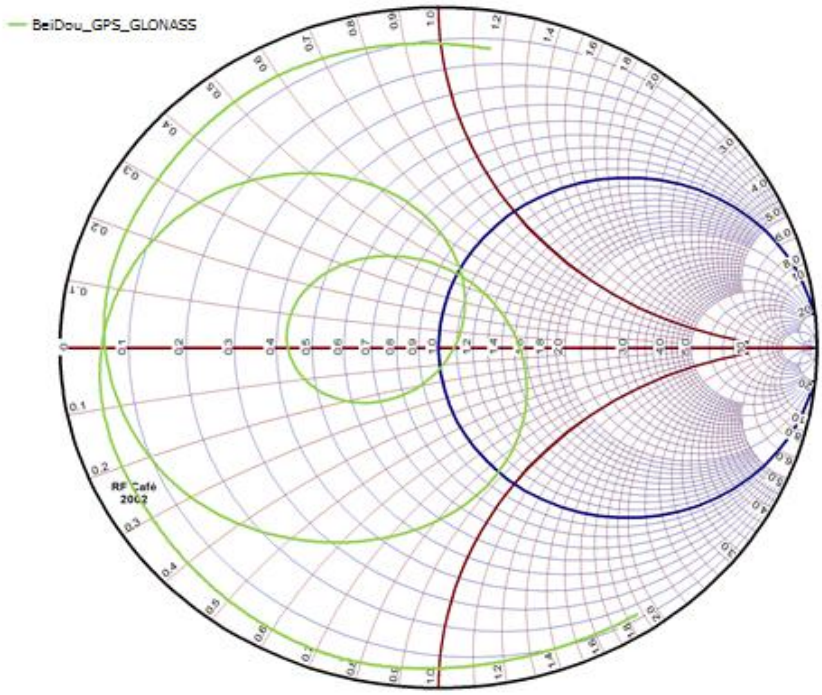


3.1.2 Test Setup

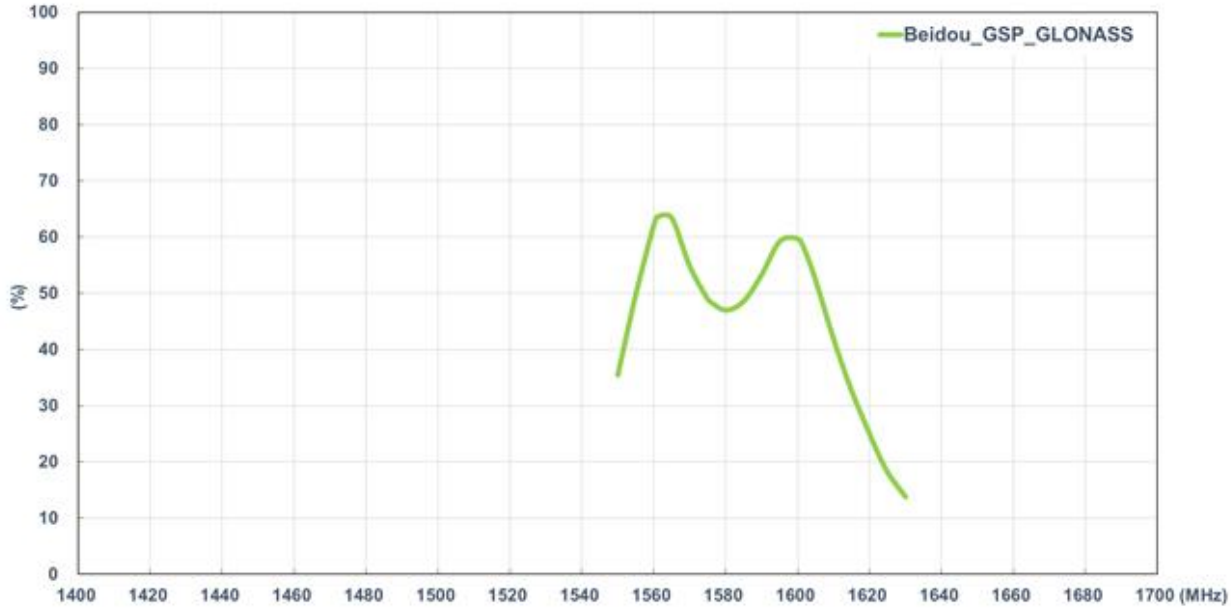


3.1.3 GPS-GLONASS-GALILEO-BeiDou Return Loss (Passive antenna)

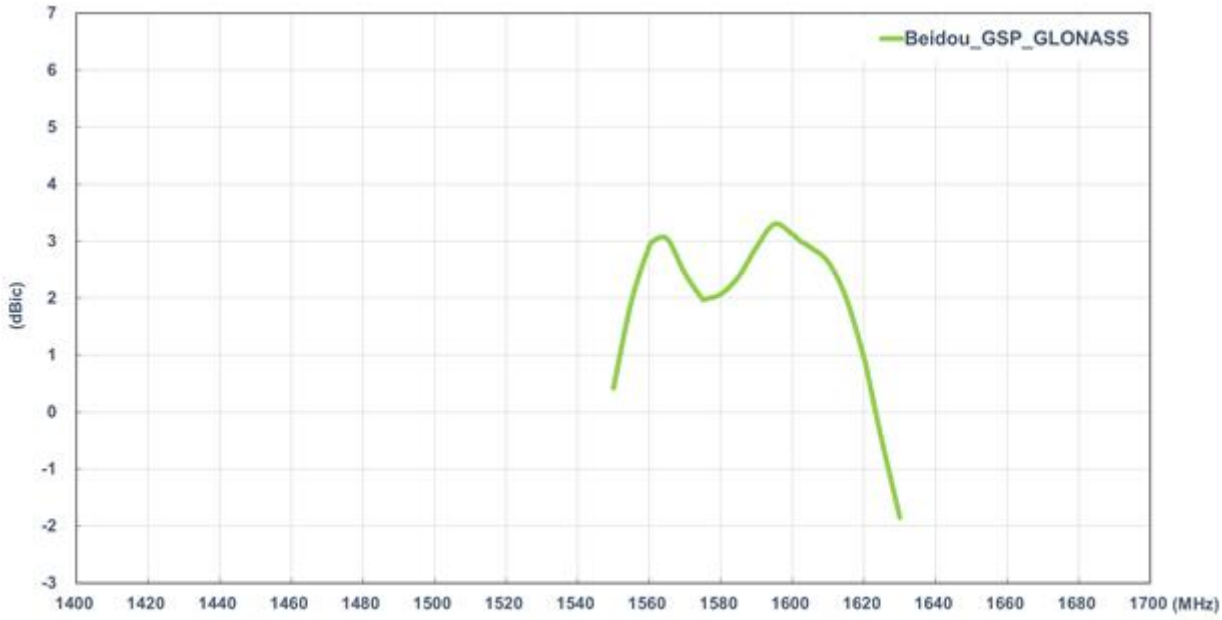
3.1.4 GPS-GLONASS-GALILEO-BeiDou Smith Chart (Passive antenna)



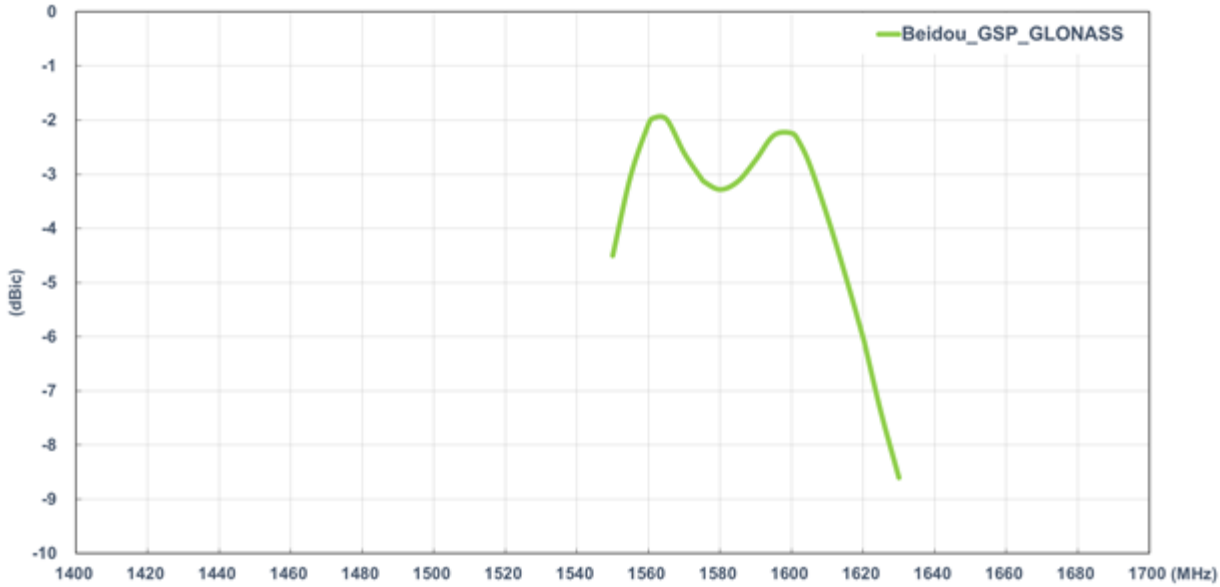
3.1.5 GPS-GLONASS-GALILEO-BeiDou Efficiency (Passive antenna)



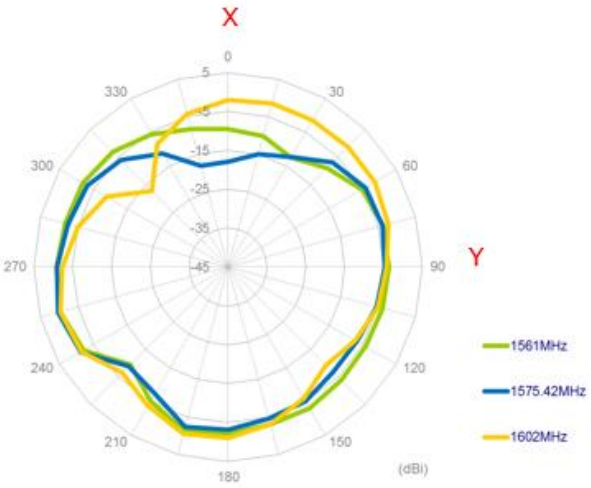
3.1.6 GLONASS-GALILEO-BeiDou Peak Gain (Passive antenna)

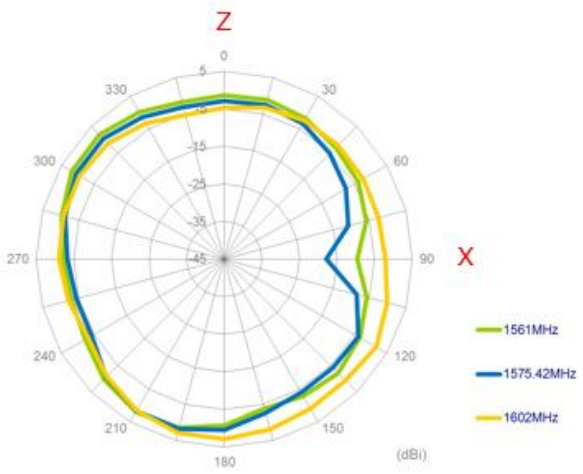


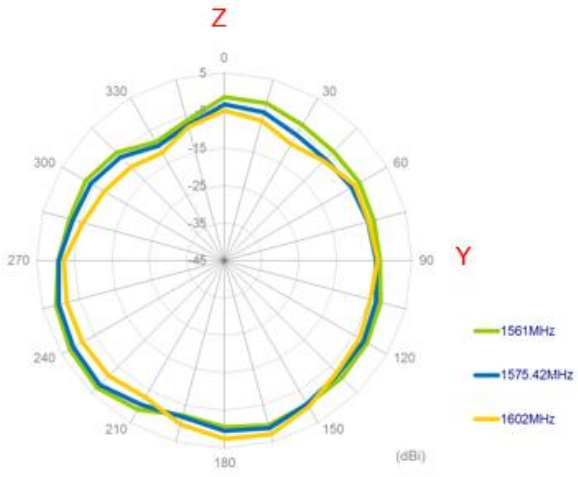
3.1.7 GPS-GLONASS-GAILEO-BeiDou Average Gain (Passive antenna)



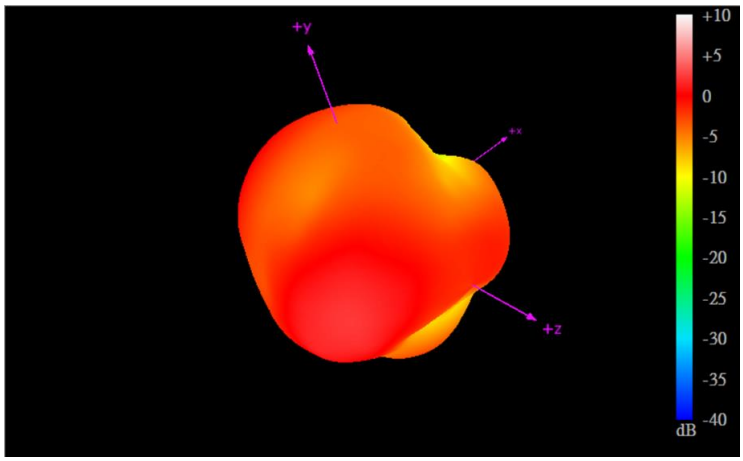
3.1.8 GLONASS-GALILEO-BeiDou Radiation Pattern (Passive antenna)



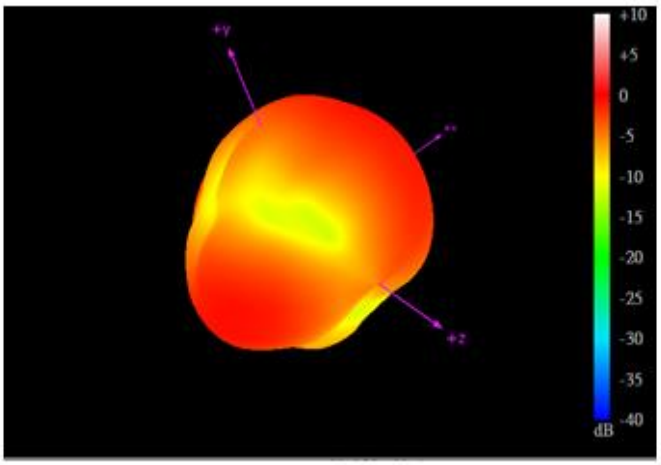




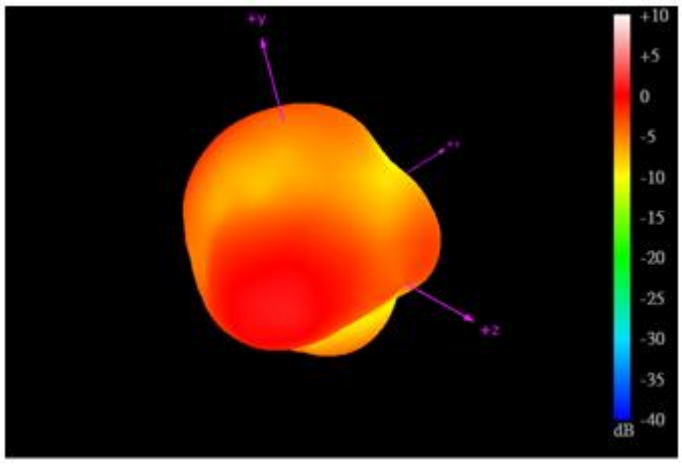
3.1.9 3D Radiation Pattern (Passive antenna)



1561MHz

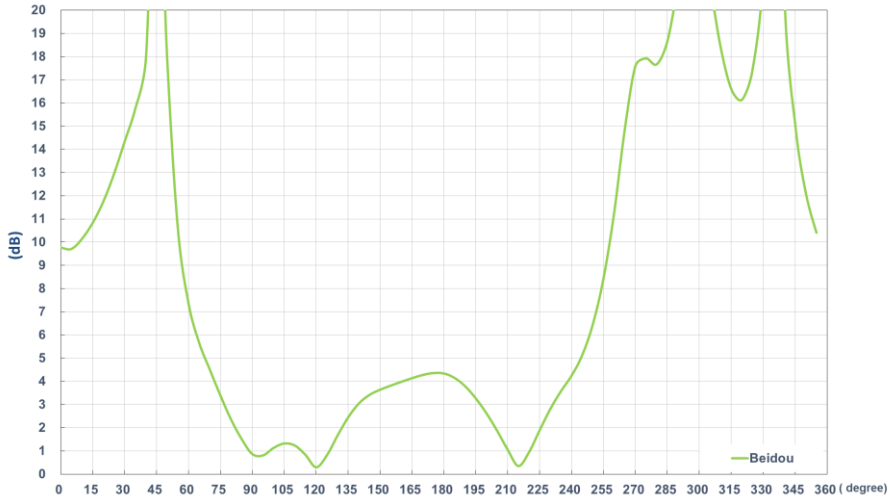


1575.42MHz

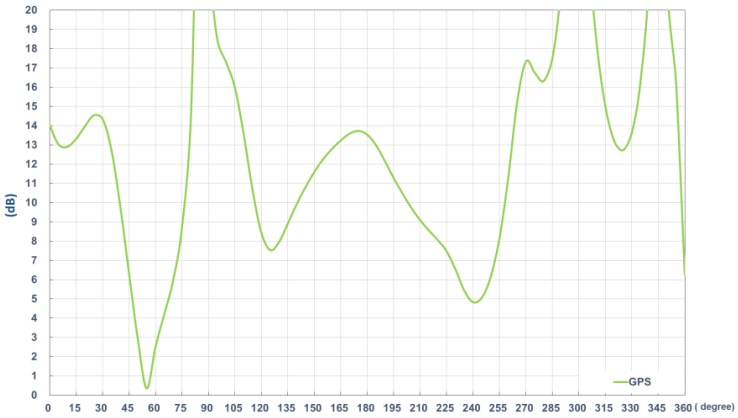


1602MHz

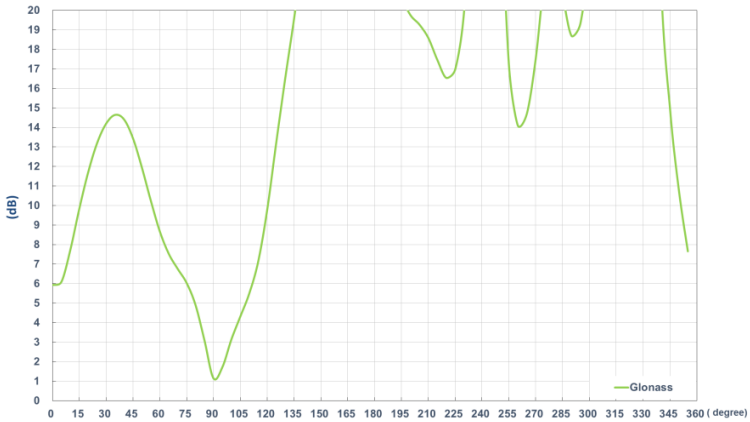
3.1.10 Axial Ratio (Passive antenna)



1561MHZ

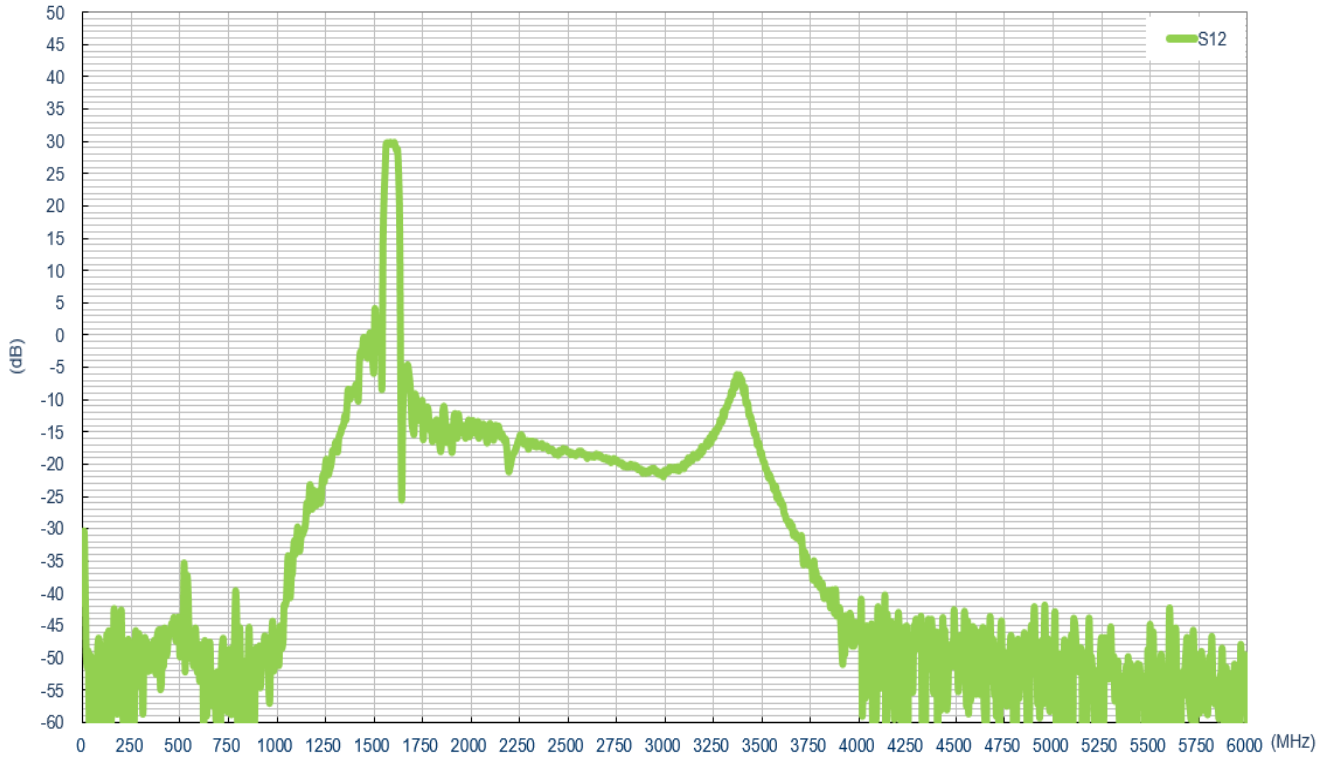


1575.42MHz

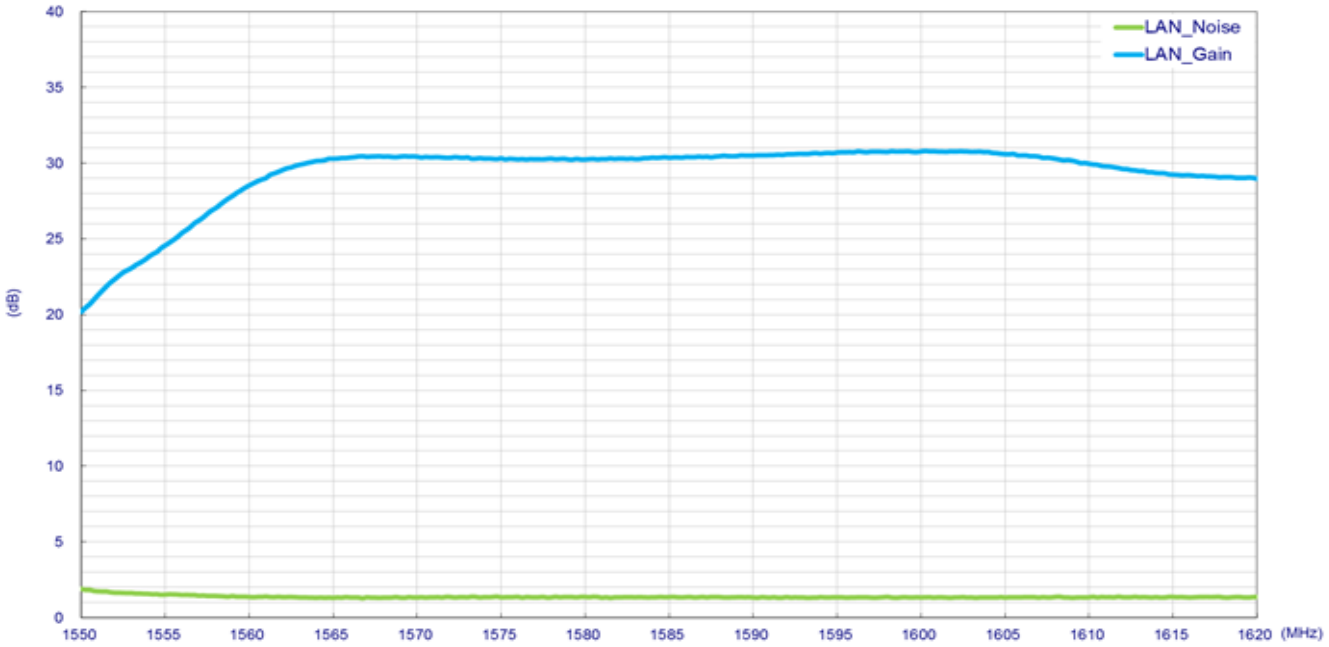


1602MHz

3.1.11 GPS-GLONASS-GALILEO-BeiDou LNA Gain and Noise Figure (Active antenna)



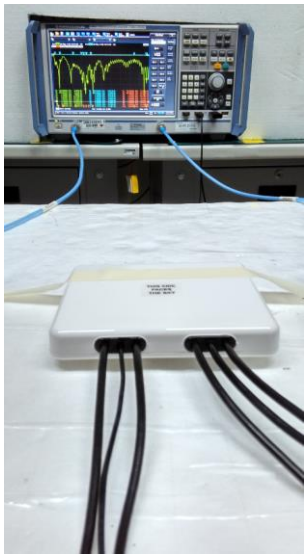
LNA Gain@3.0V



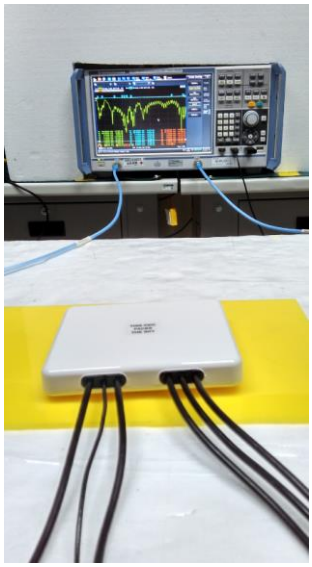
LNA Noise Figure @3.0V

3.2 LTE_MIMO/Wi-Fi_MIMO Antenna

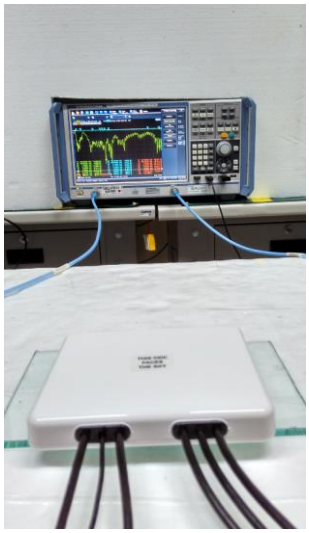
3.2.1 Test Setup



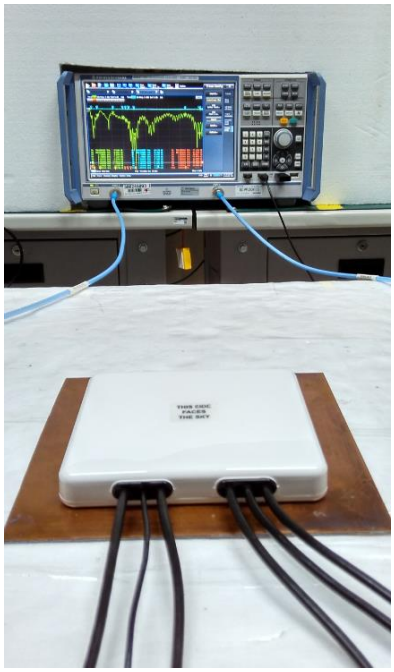
Free space



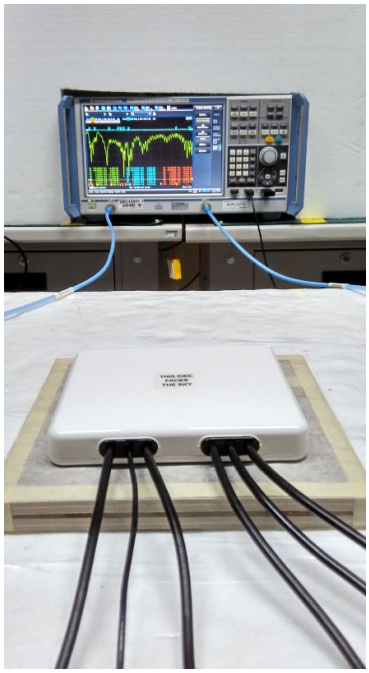
ABS



Glass



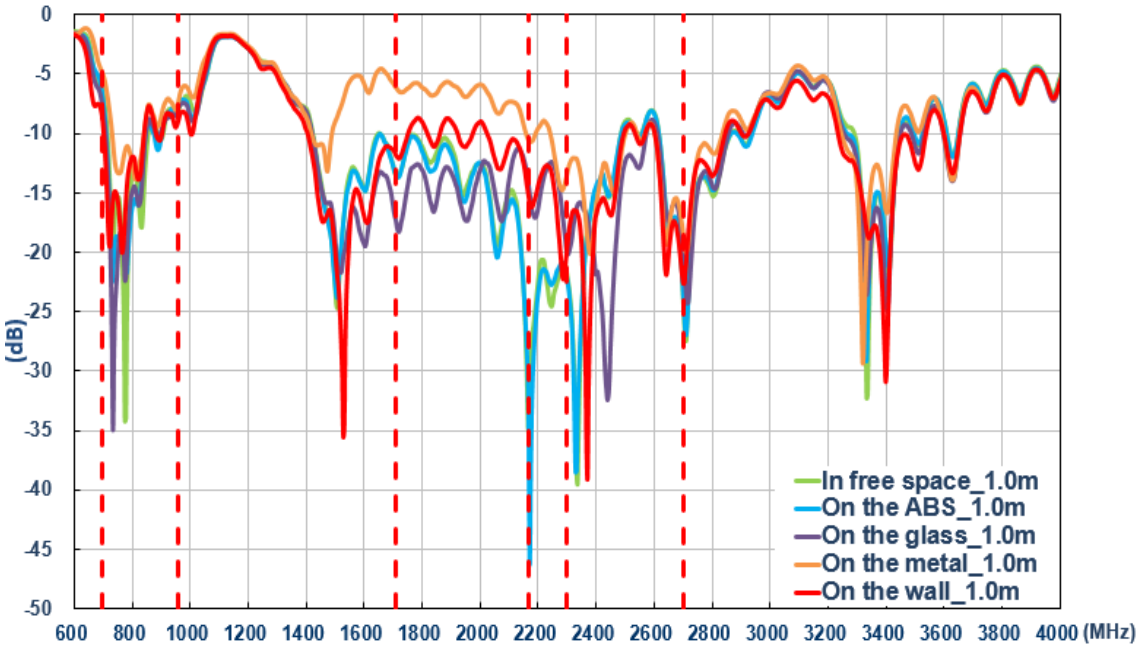
Metal



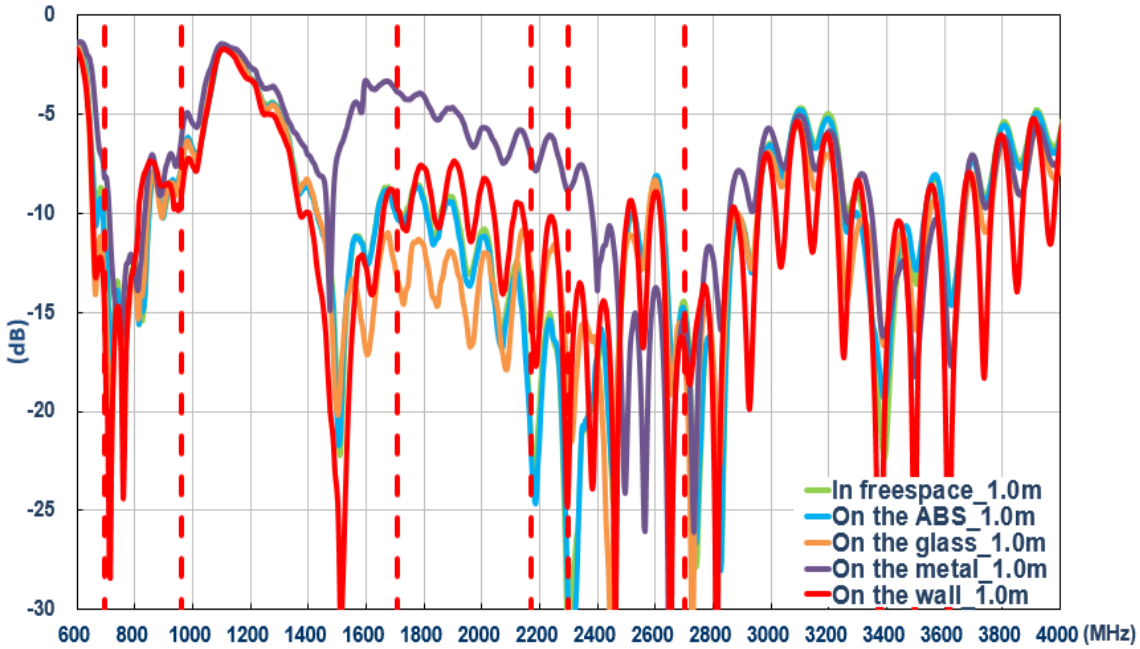
Wall

3.2.2 LTE_1 Antenna Return Loss

Performance in different environments with 1 meter cable length

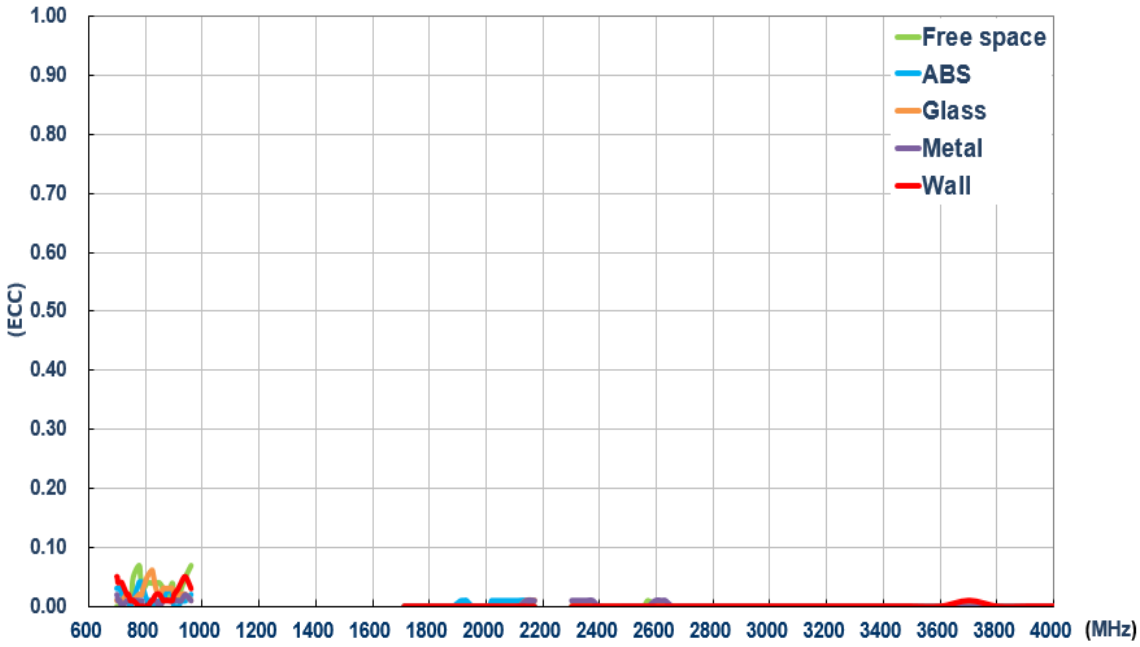


3.2.3 LTE_2 Antenna Return Loss

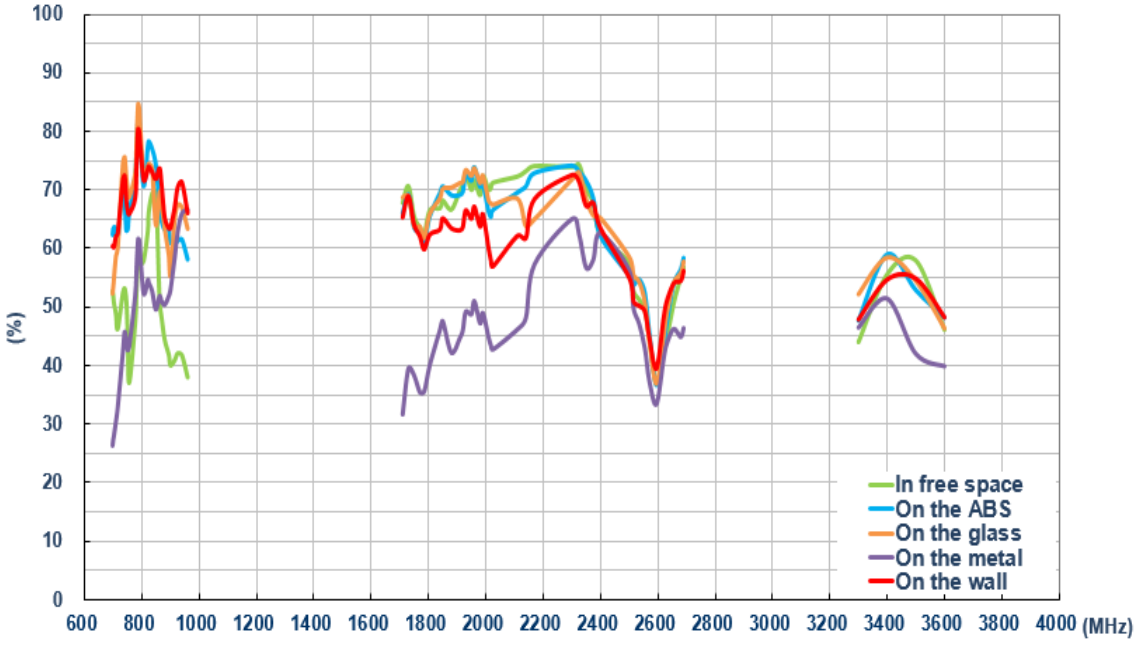


3.2.4 LTE Envelope Correlation Coefficient

Performance in different environments with 1 meter cable length

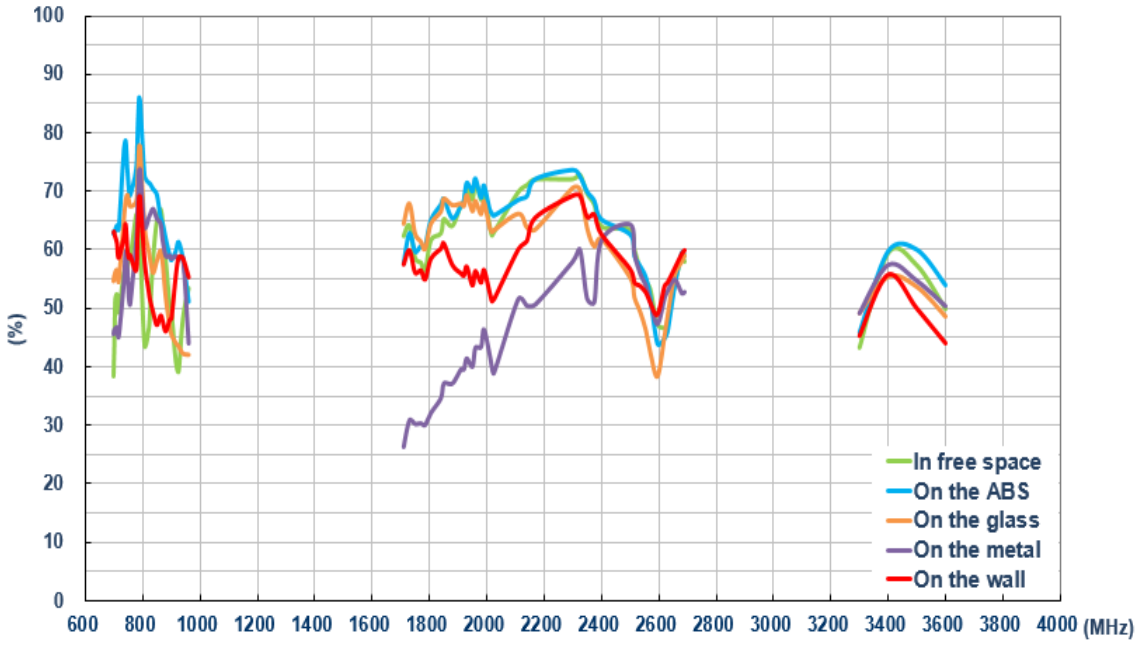


3.2.5 LTE_1 Antenna Efficiency

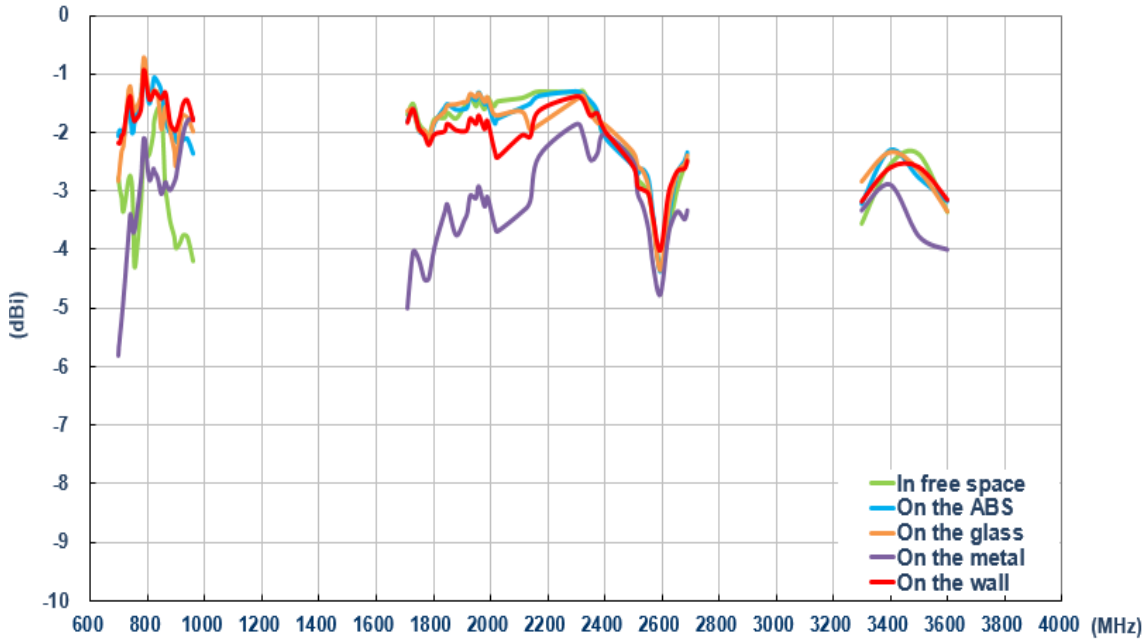


3.2.6 LTE_2 Antenna Efficiency

Performance in different environments with 1 meter cable length

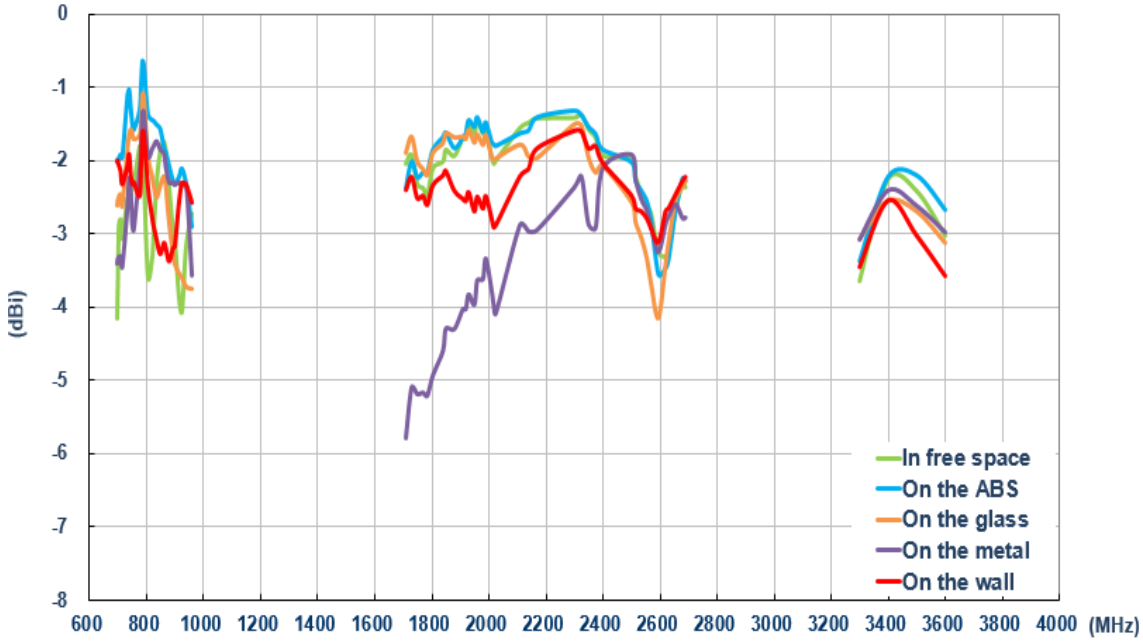


3.2.7 LTE_1 Antenna Average Gain

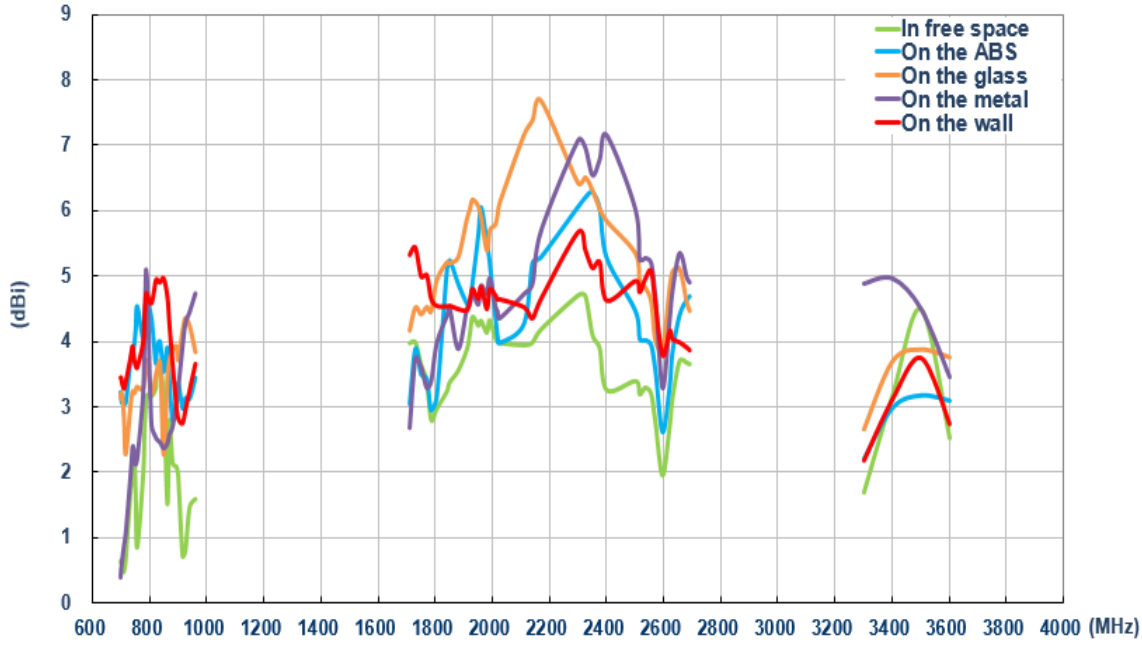


3.2.8 LTE_2 Antenna Average Gain

Performance in different environments with 1 meter cable length

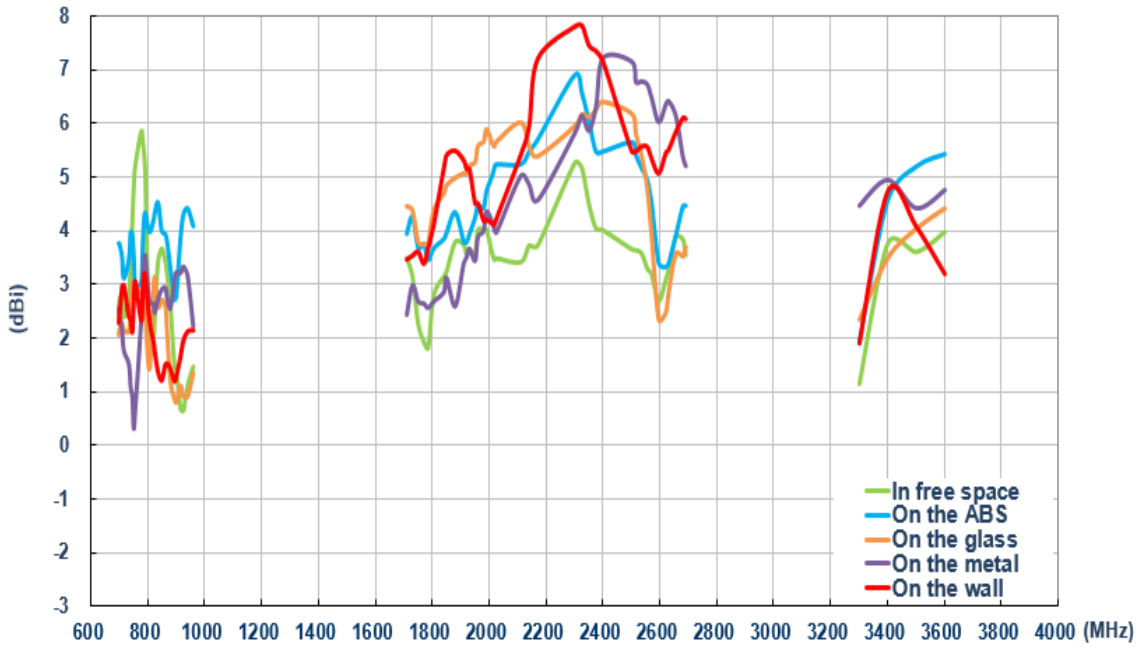


3.2.9 LTE_1 Antenna Peak Gain

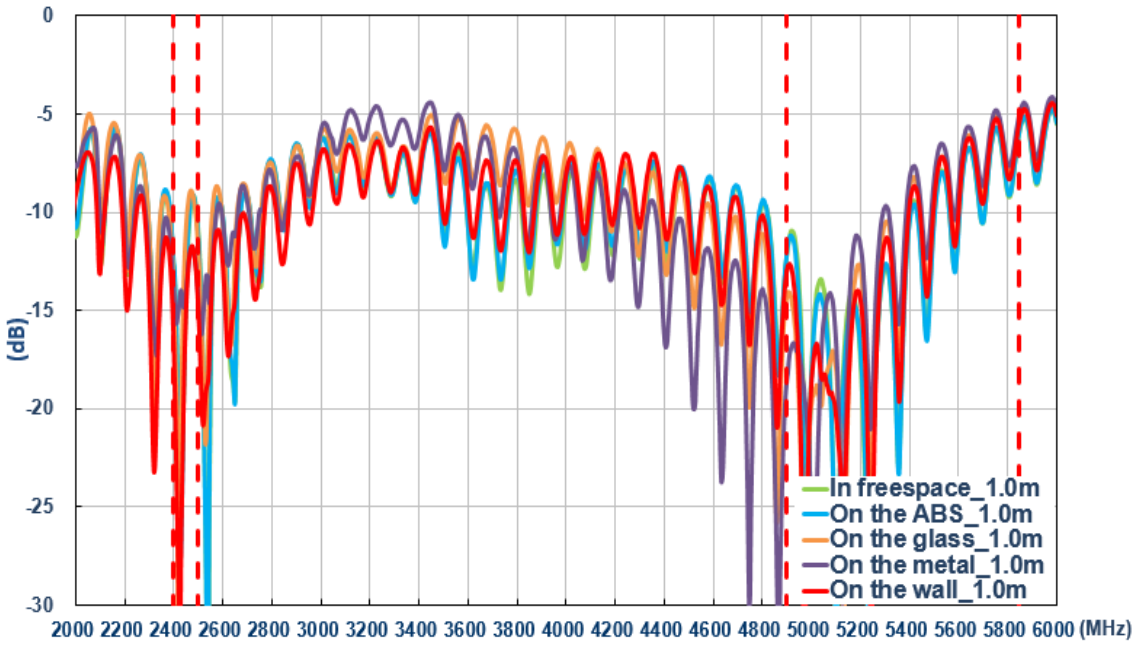


3.2.10 LTE_2 Antenna Peak Gain

Performance in different environments with 1 meter cable length

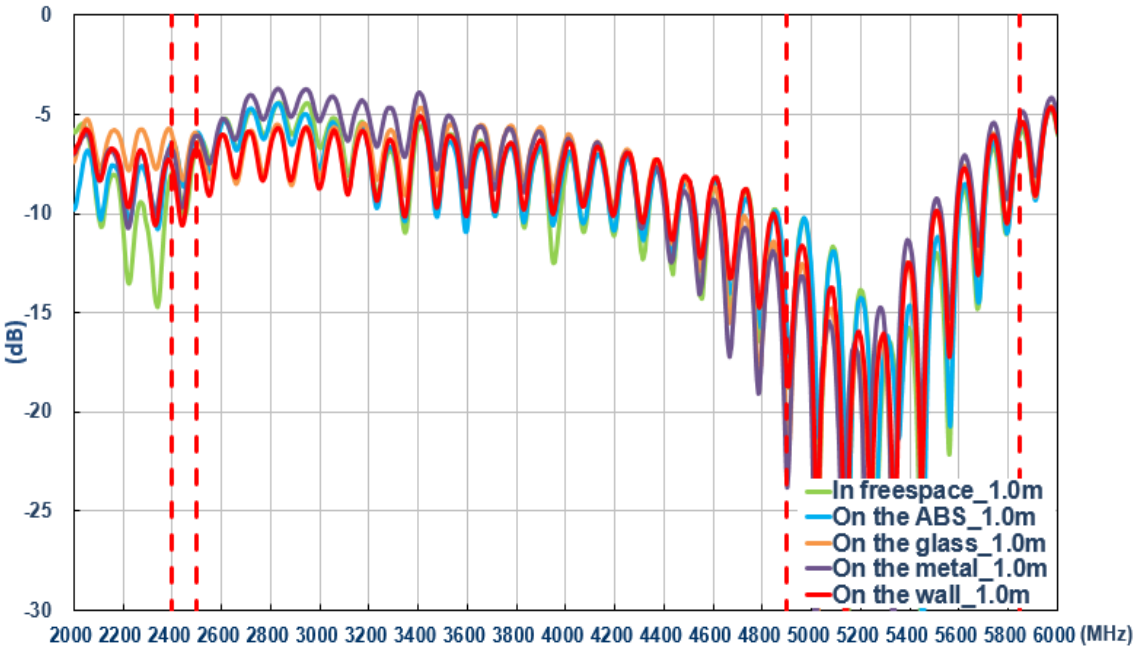


3.2.11 Wi-Fi_1 Antenna Return Loss

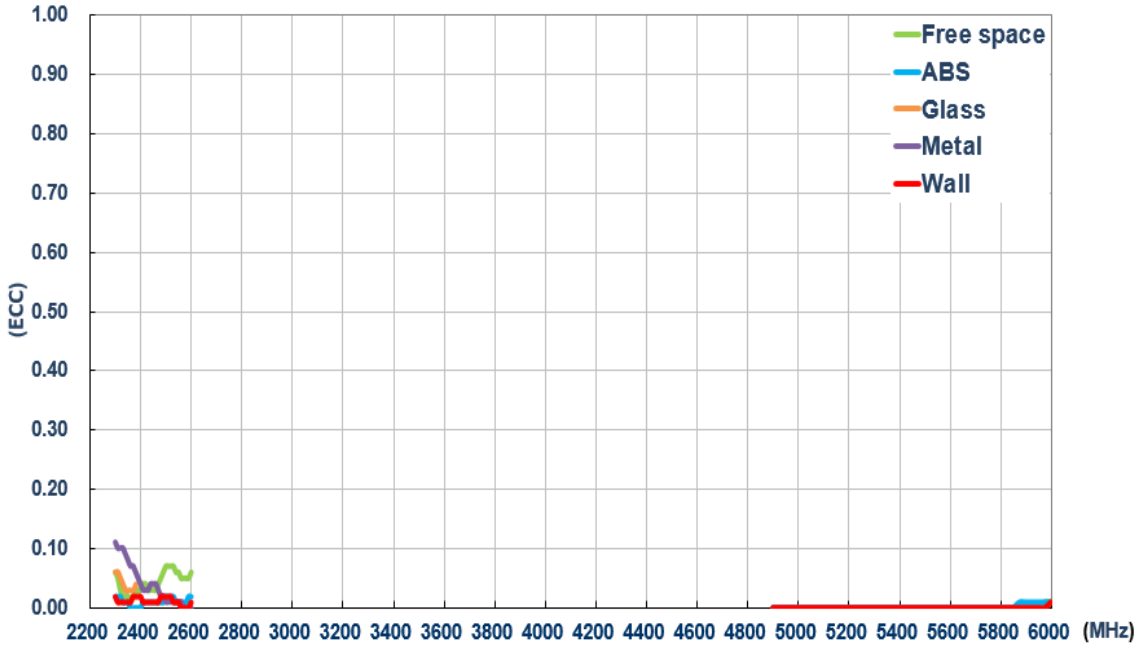


3.2.12 Wi-Fi_2 Antenna Return Loss

Performance in different environments with 1 meter cable length

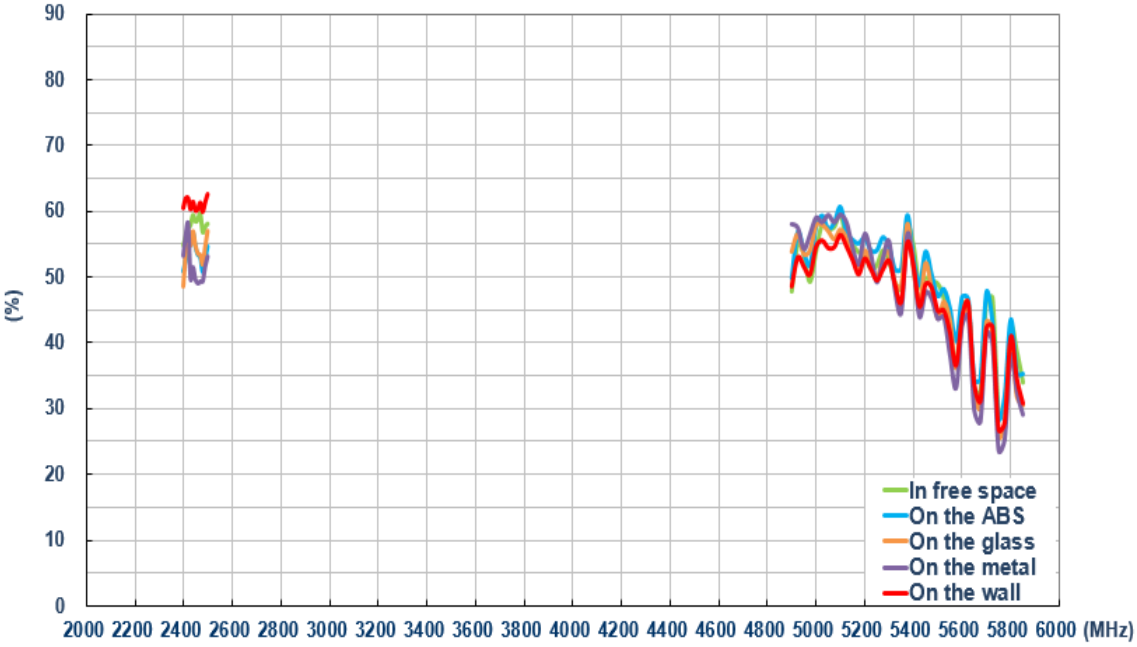


3.2.13 Wi-Fi Envelope Correlation Coefficient

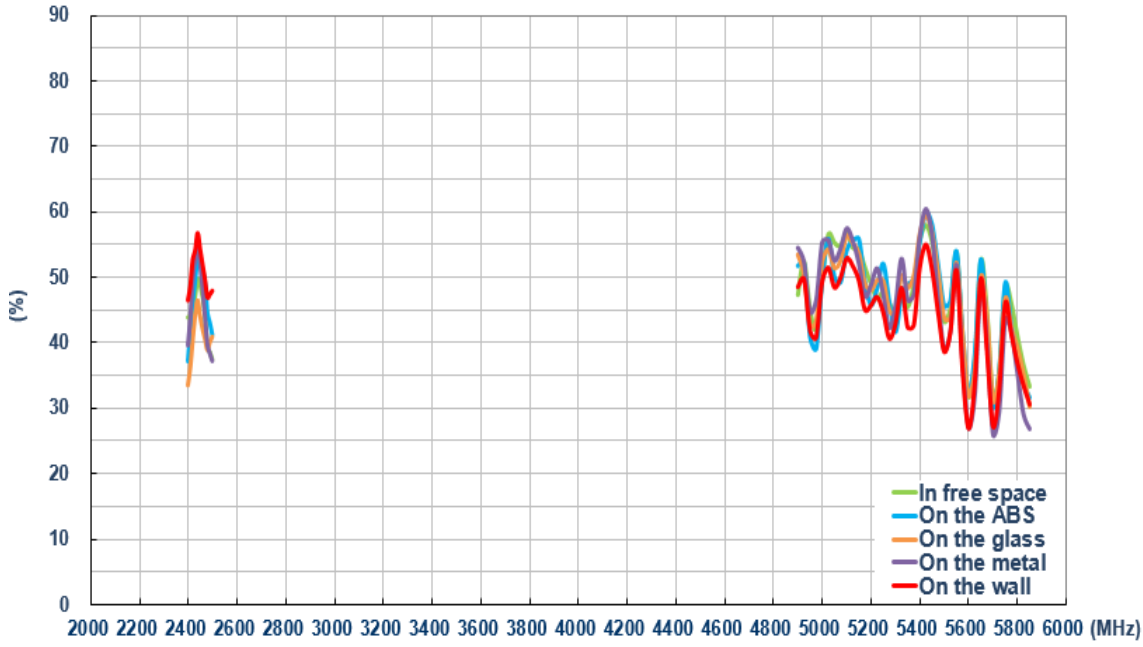


3.2.14 Wi-Fi_1 Antenna Efficiency

Performance in different environments with 1 meter cable length

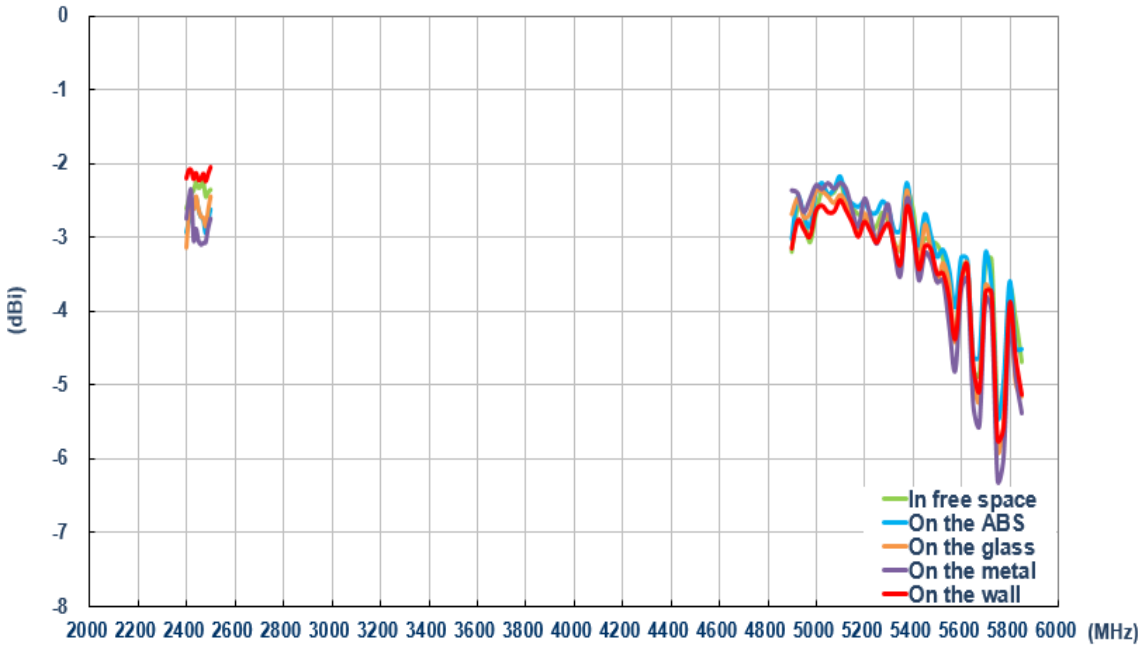


3.2.15 Wi-Fi_2 Antenna Efficiency

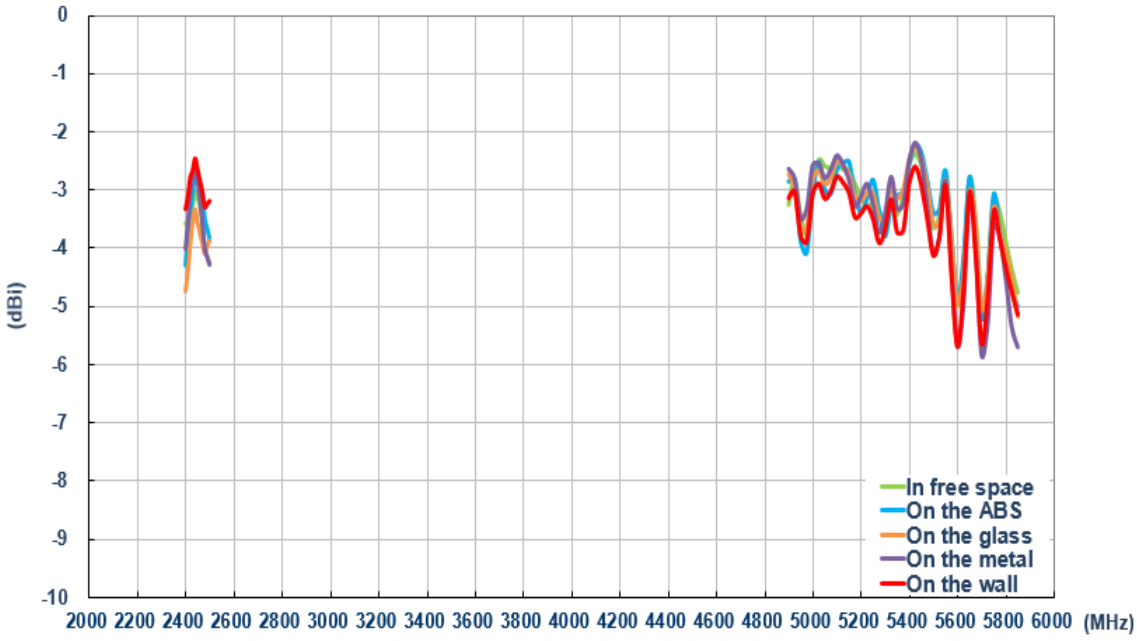


3.2.16 Wi-Fi_1 Antenna Average Gain

Performance in different environments with 1 meter cable length

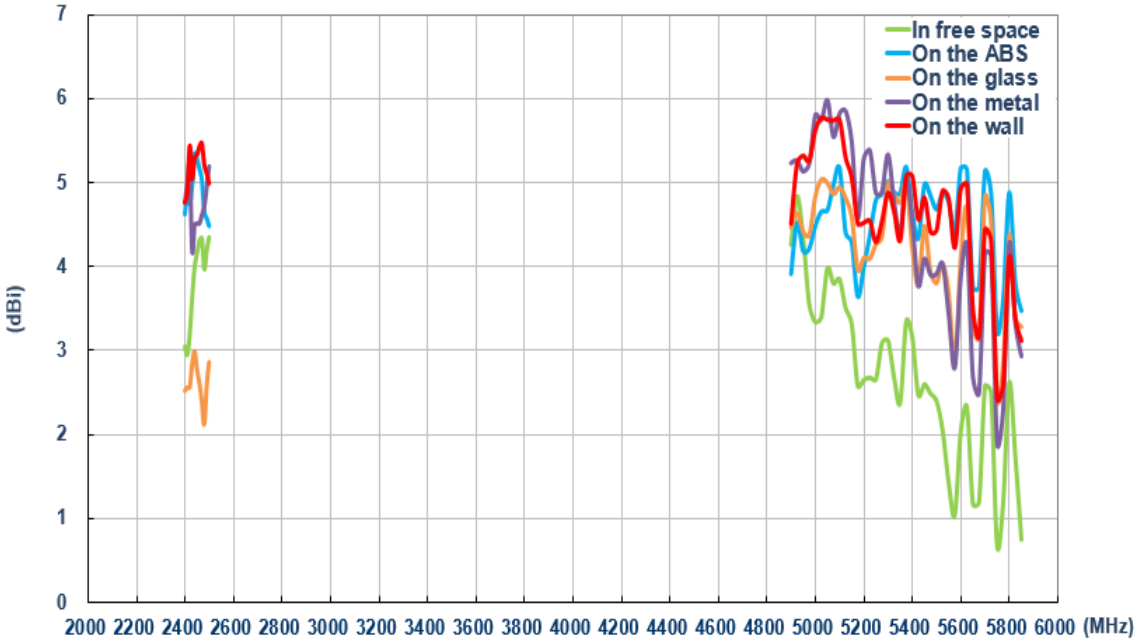


3.2.17 Wi-Fi_2 Antenna Average Gain

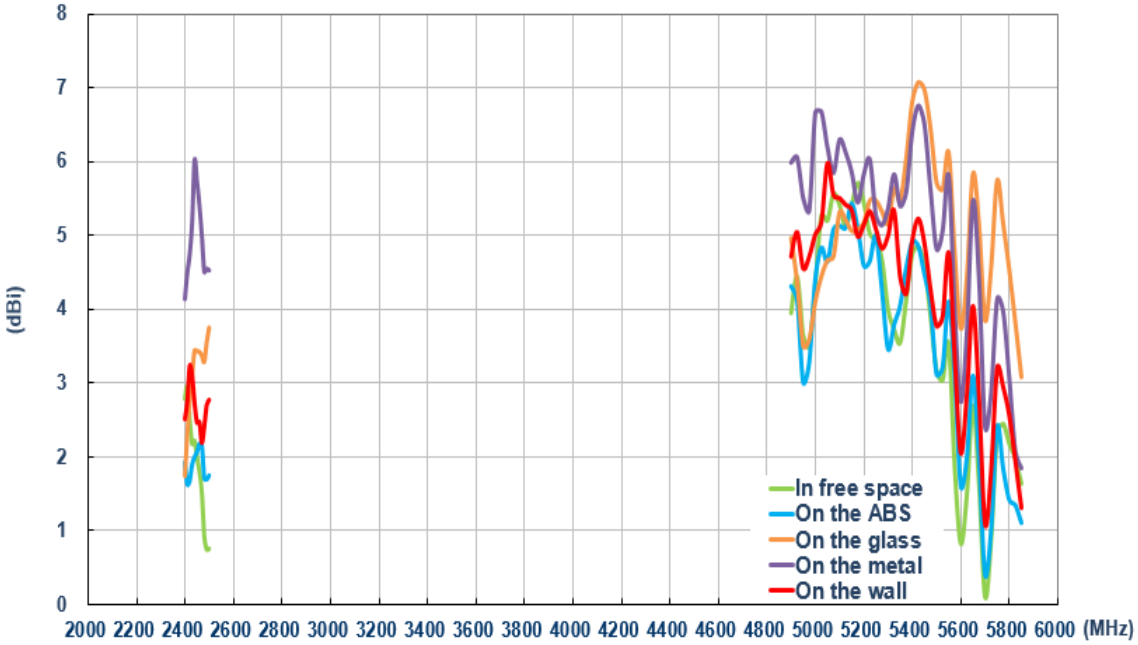


3.2.18 Wi-Fi_1 Antenna Peak Gain

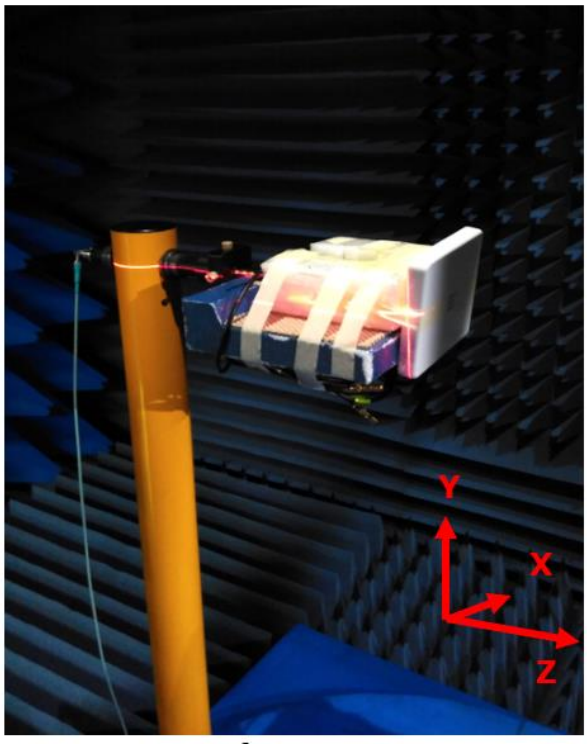
Performance in different environments with 1 meter cable length



3.2.19 Wi-Fi_2 Antenna Peak Gain



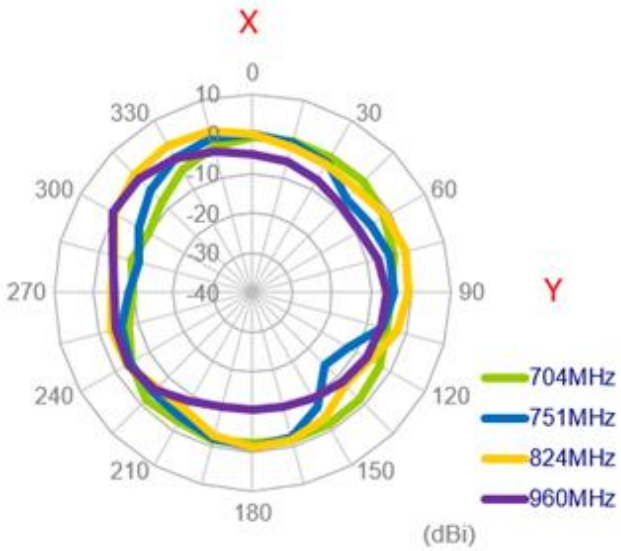
3.2.20 Test Setup for Antenna Radiation Pattern

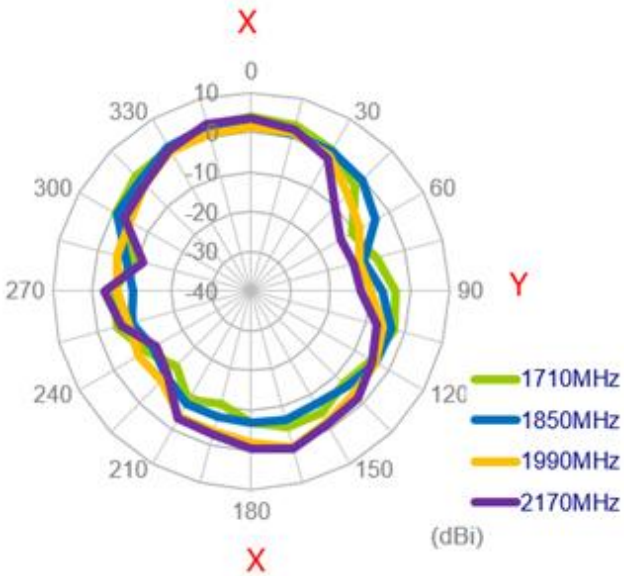


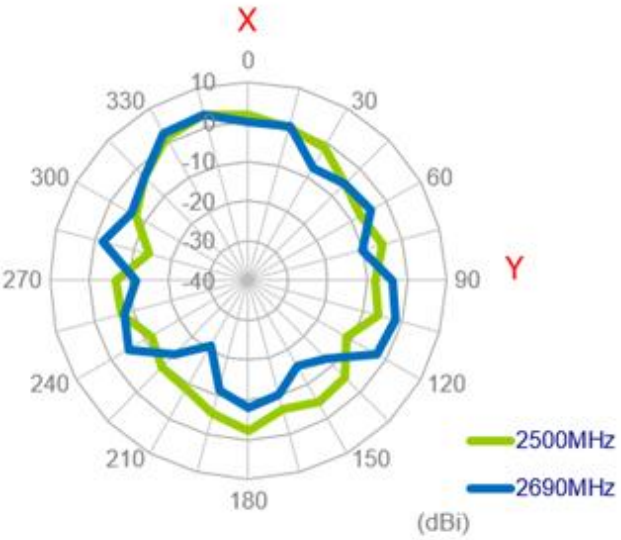
Free space

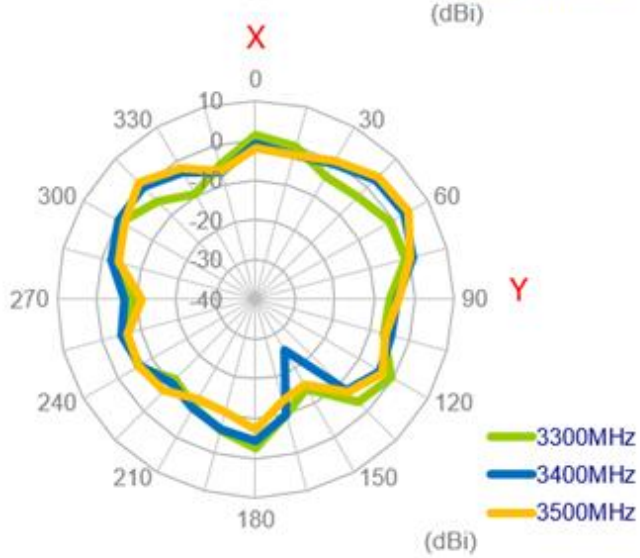
3.2.21 2D Radiation Patterns (LTE_MIMO1 with 1M cable length in free space)

XY Plane

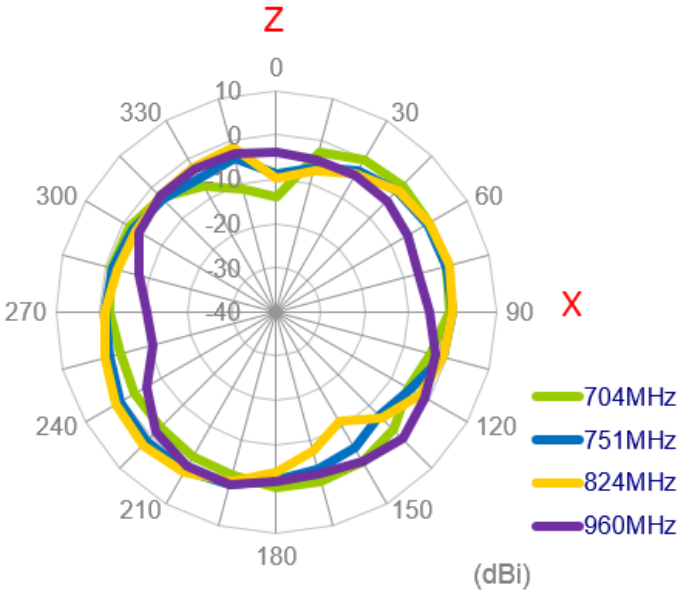


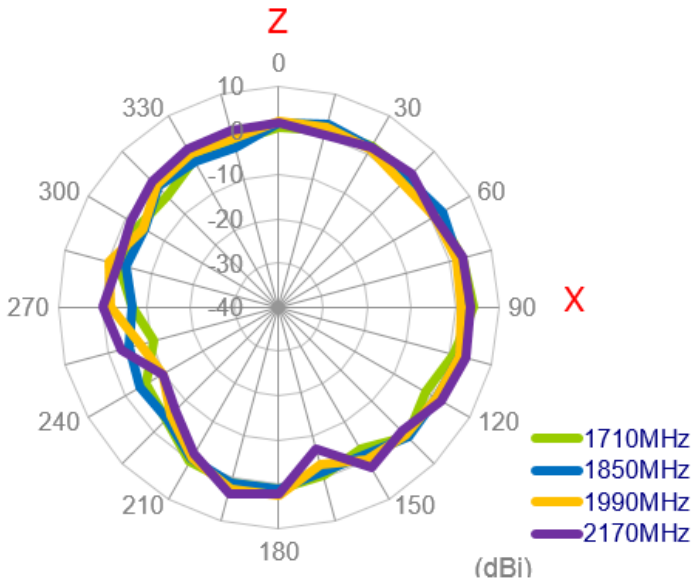






XZ Plane


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


Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
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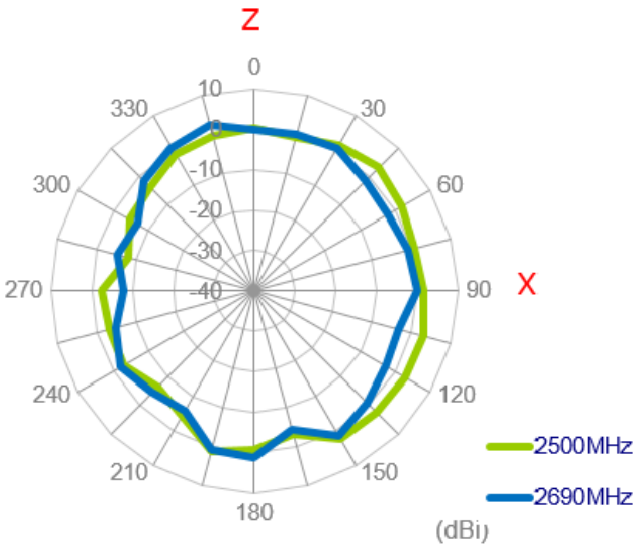
-40
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)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60
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120
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180
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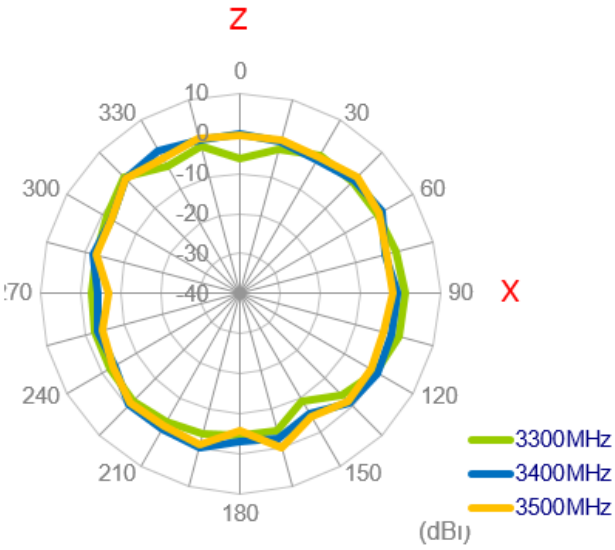
240
270
300
330
10
0
-10
-20
-30
-40
2500MHz
2690MHz
(dBi)


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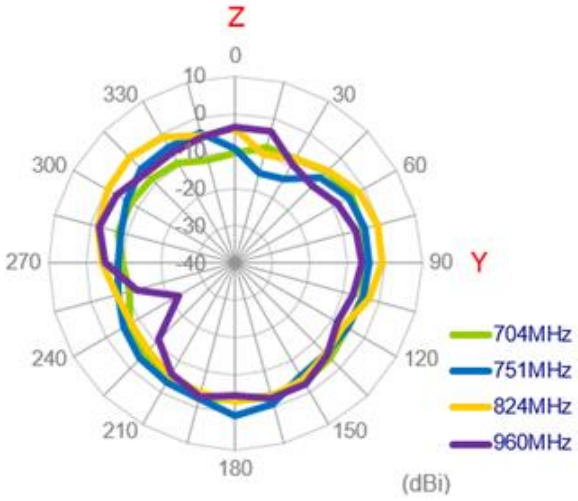
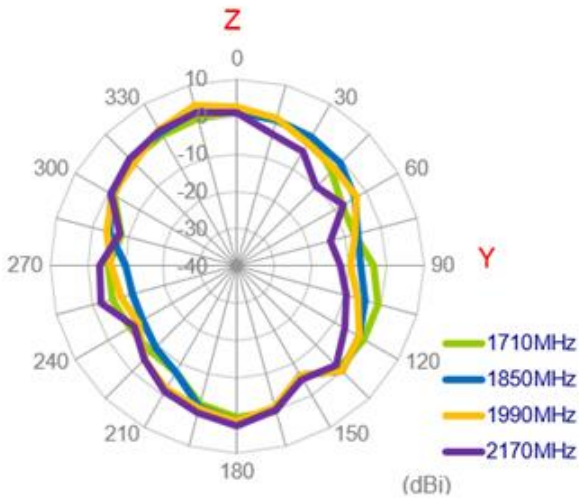
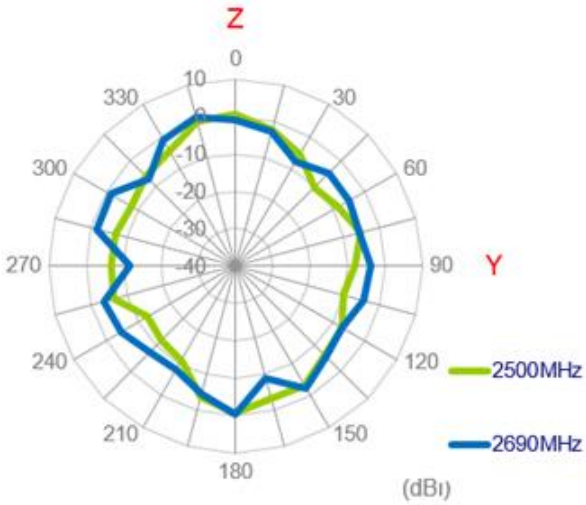
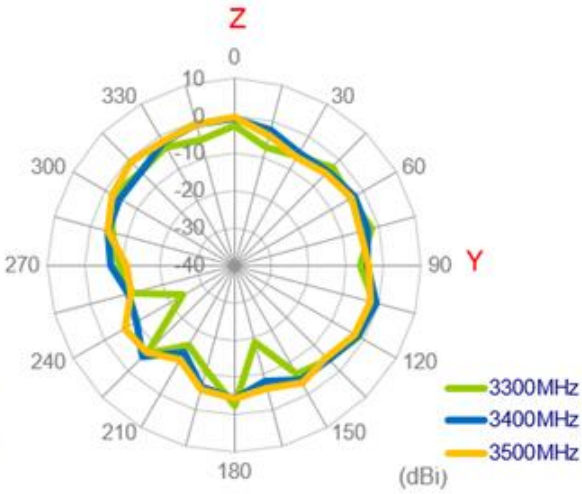
60
90
120
150
180
210
240
300
330
10
0
-10
-20
-30
-40
3300MHz
3400MHz
3500MHz
(dBi)

YZ Plane

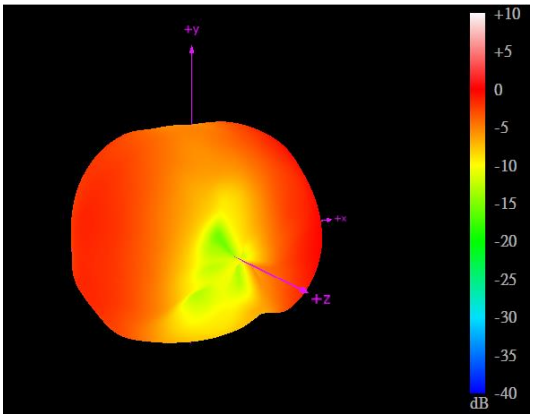

Z
Y
704MHz
751MHz
824MHz
960MHz
(dBi)


Z
Y
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)

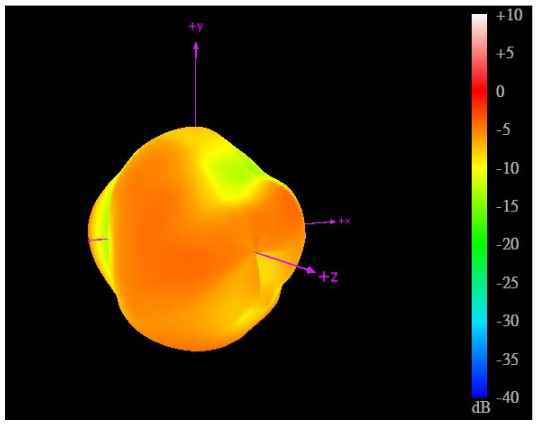

Z
Y
2500MHz
2690MHz
(dBi)


Z
Y
3300MHz
3400MHz
3500MHz
(dBi)

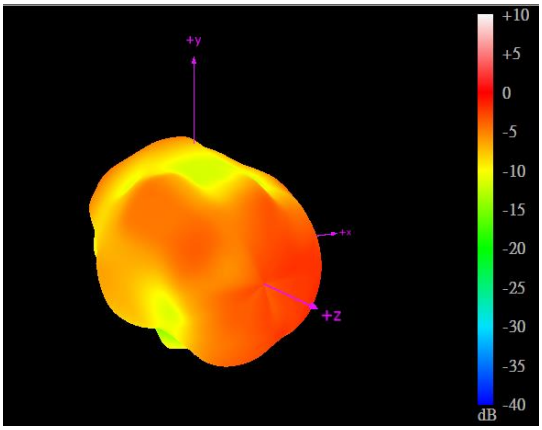
3.2.22 3D Radiation Patterns (LTE_MIMO1 with 1M cable length in free space)



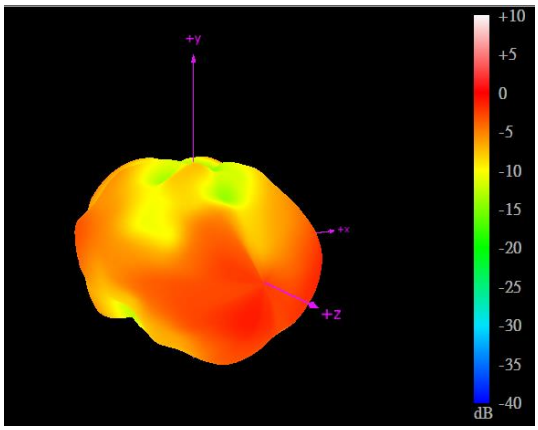
704MHz



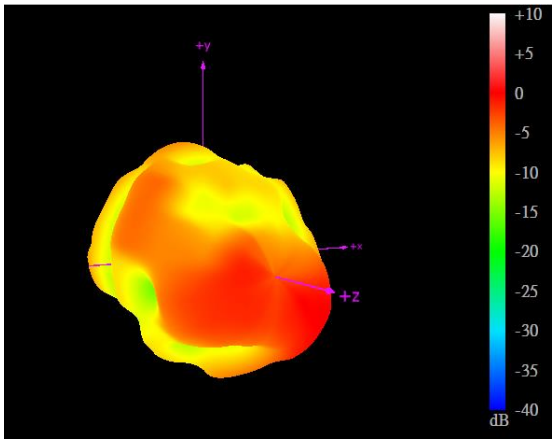
960MHz



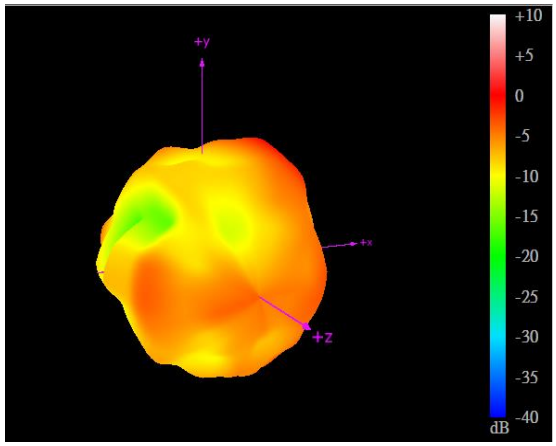
1710MHz



2170MHz



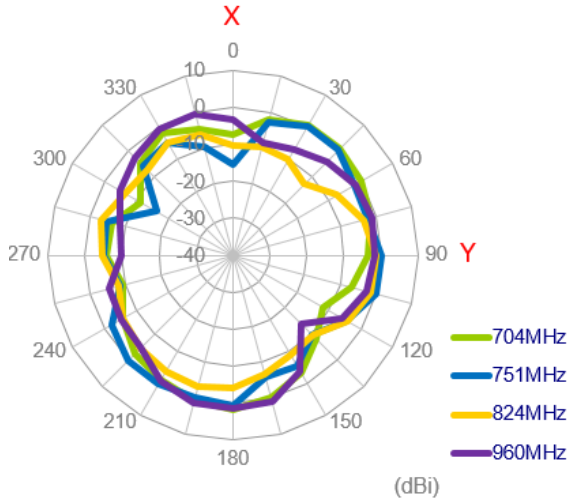
2690MHz

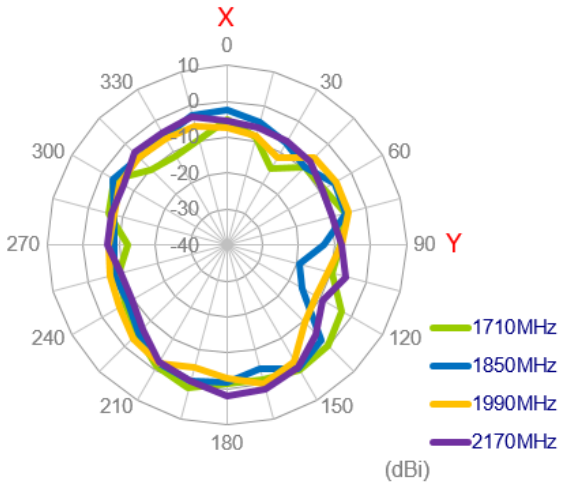


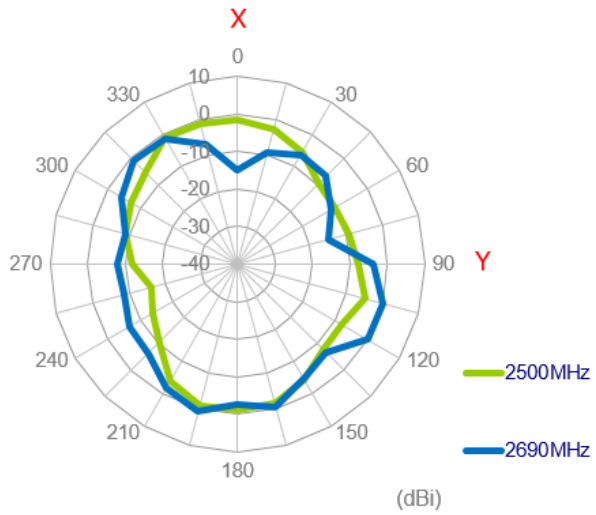
3500MHz

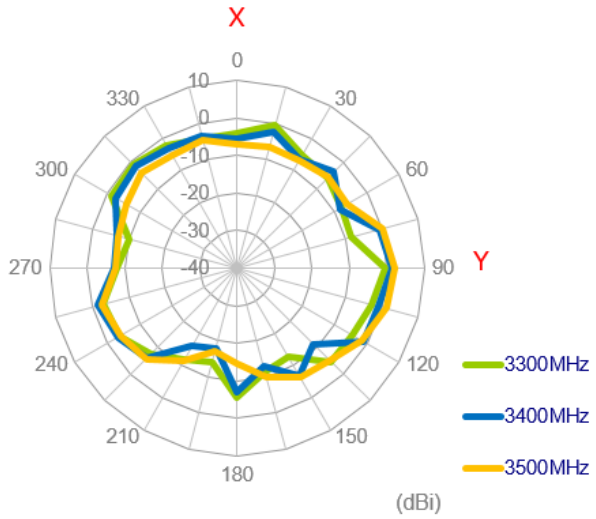
3.2.23 2D Radiation Patterns (LTE_MIMO2 with 1M cable length in free space)

XY Plane

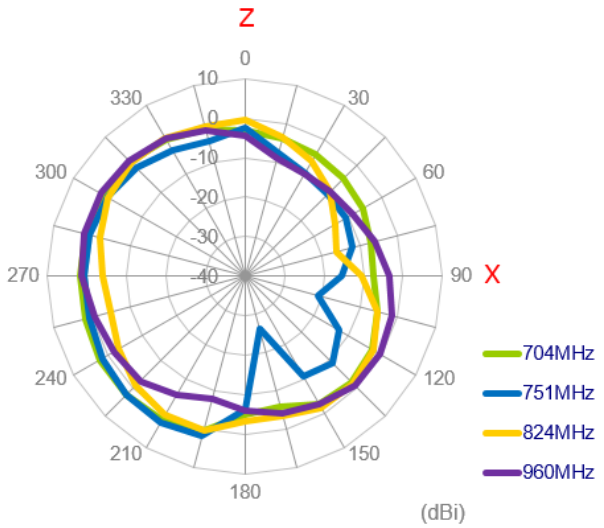








XZ Plane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X
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90
120
150
180
210
240
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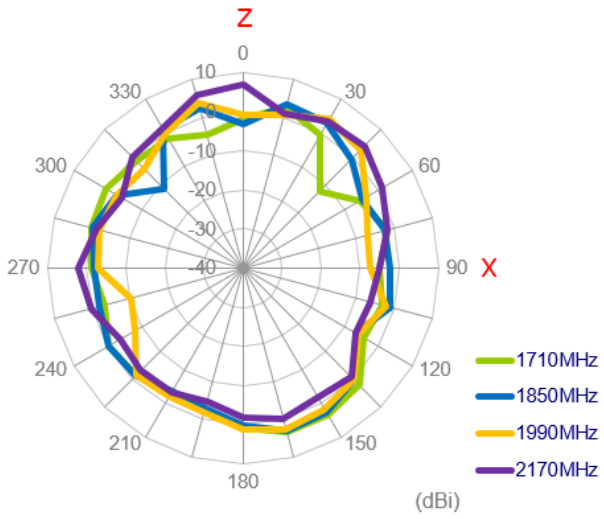
300
330
10
0
-10
-20
-30
-40
(dBi)
704MHz
751MHz
824MHz
960MHz


Z
X
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180
210
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270
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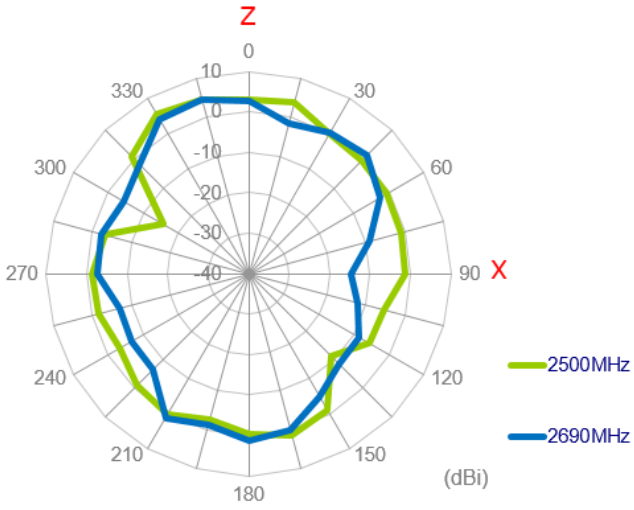
330
10
0
-10
-20
-30
-40
(dBi)
1710MHz
1850MHz
1990MHz
2170MHz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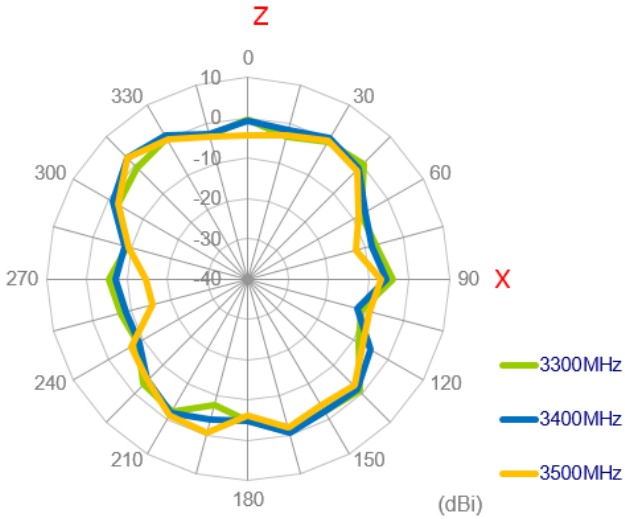
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
2500MHz
2690MHz


Z
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10
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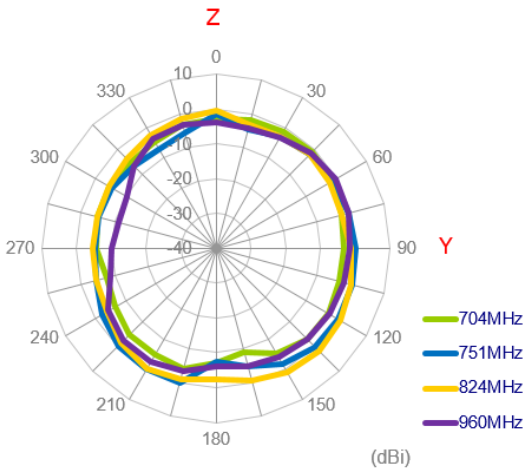
-10
-20
-30
-40
(dBi)
3300MHz
3400MHz
3500MHz

YZ Plane


Z
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330
10
0
-10
-20
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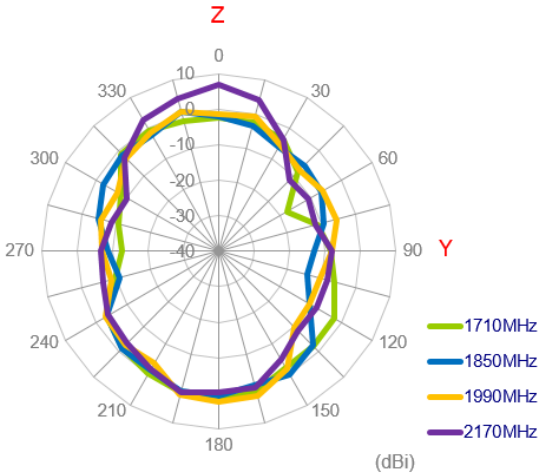
-40
704MHz
751MHz
824MHz
960MHz
(dBi)


Z
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270
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0
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-20
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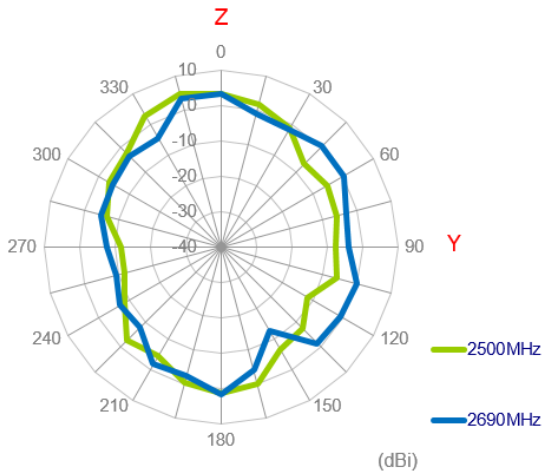
-40
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)


Z
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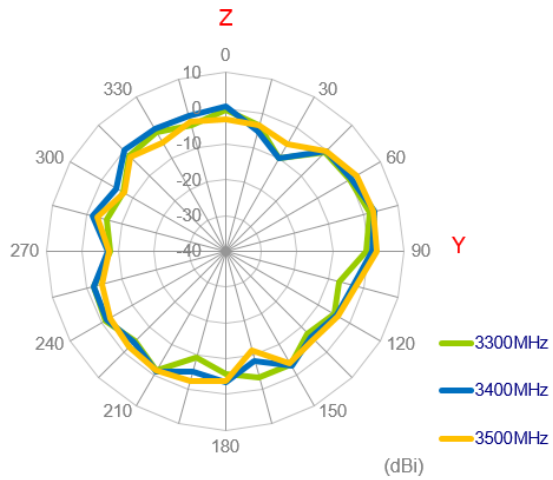
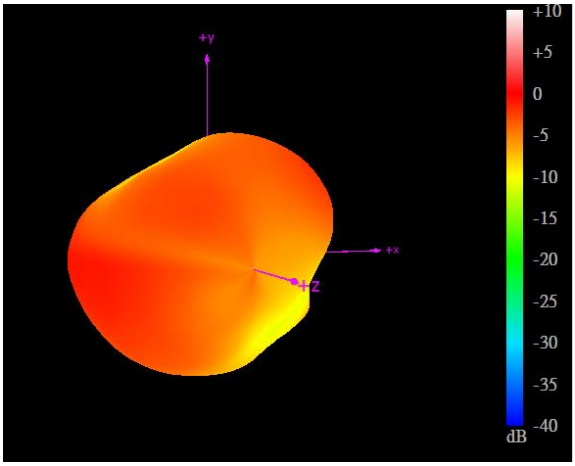
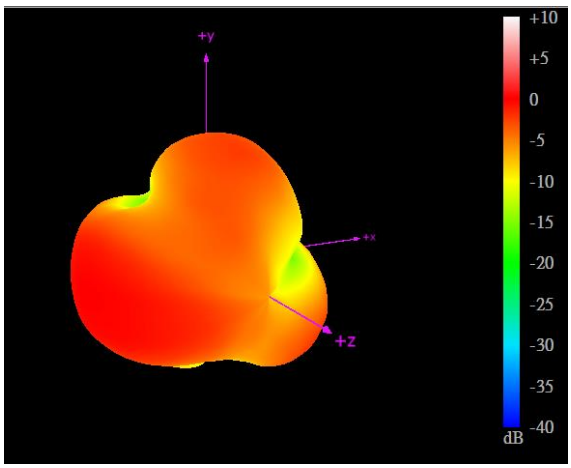
180
210
240
270
300
330
10
0
-10
-20
-30
-40
2500MHz
2690MHz
(dBi)


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

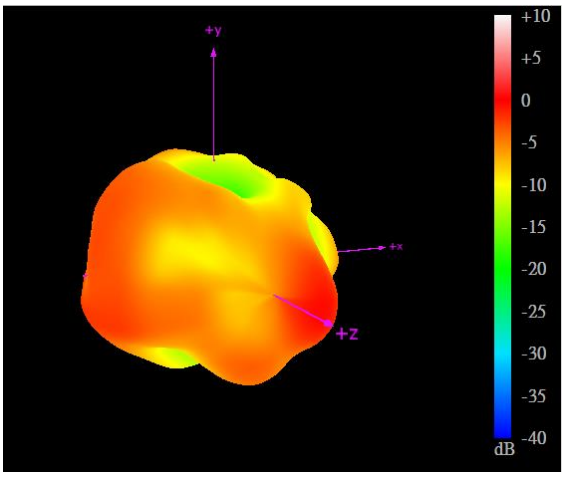
3.2.24 3D Radiation Patterns (LTE_MIMO2 with 1M cable length in free space)



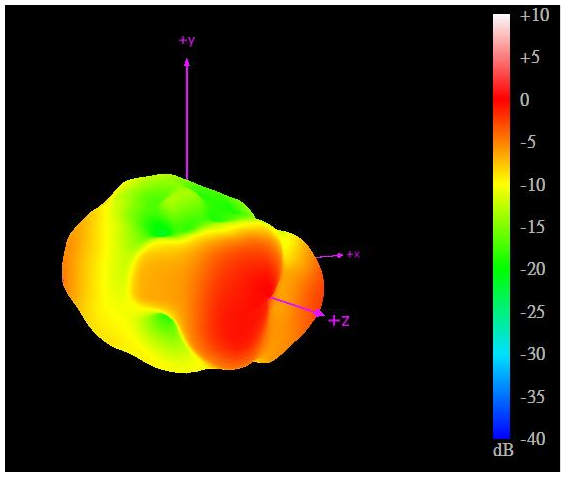
704MHz



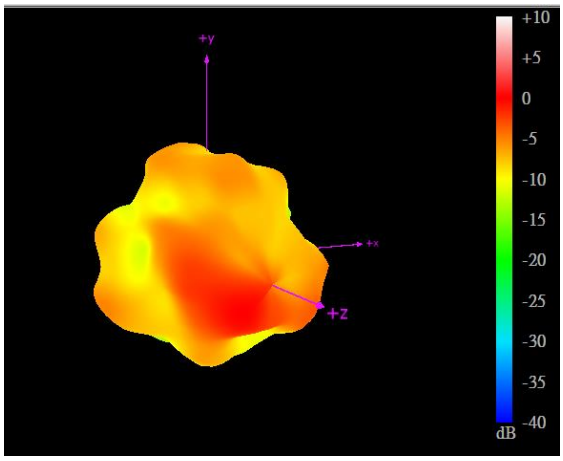
960MHz



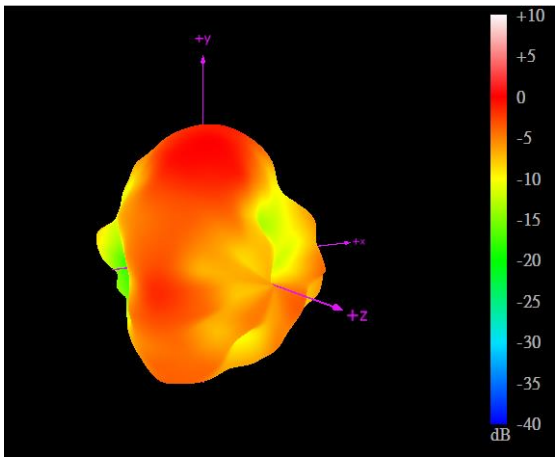
1710MHz



2170MHz



2690MHz

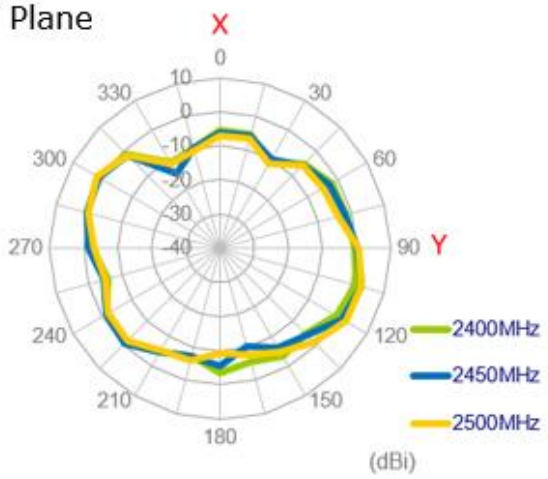


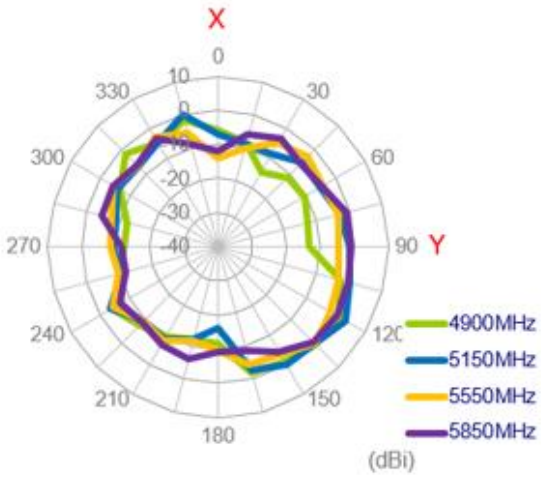
3500MHz

3.2.25 2D Radiation Patterns (LTE_MIMO1 with 1M cable length in free space)

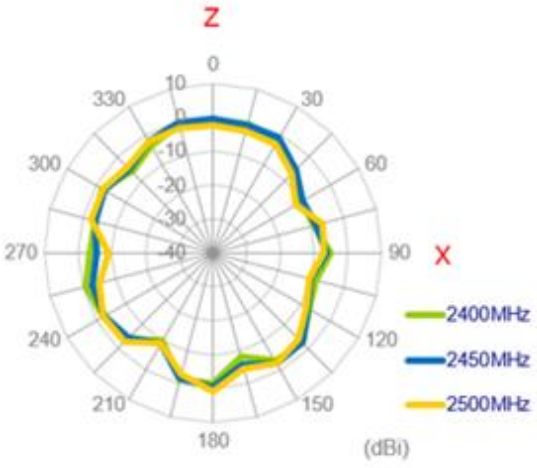
XY Plane

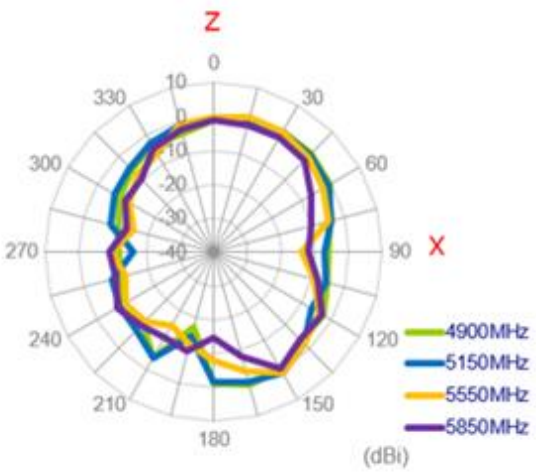
XY Plane





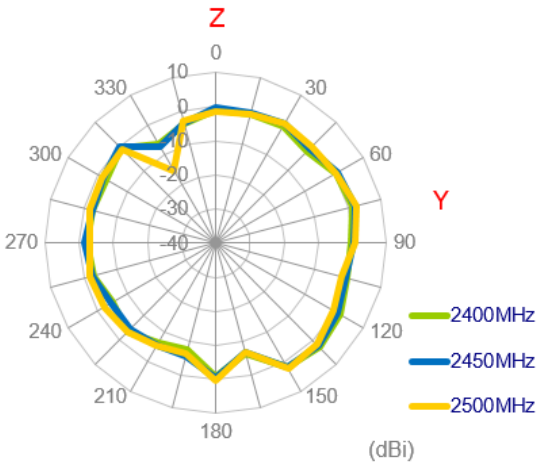
XZ Plane

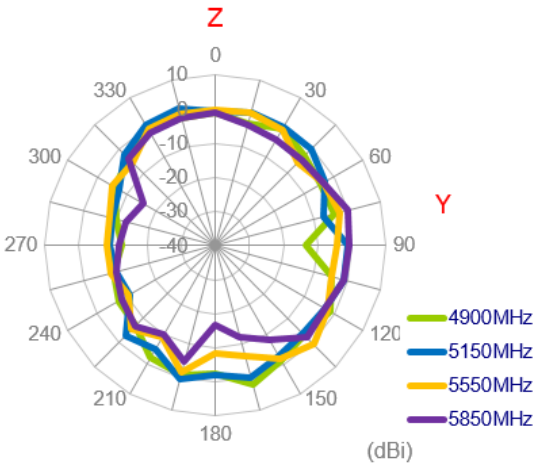




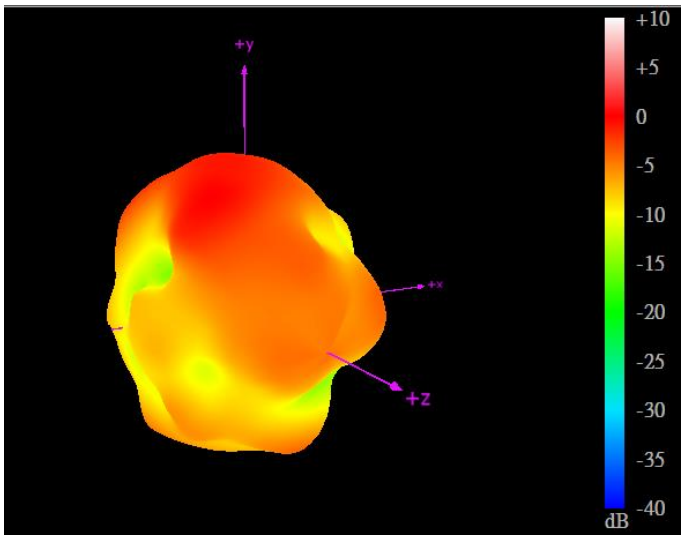
YZ Plane

YZ Plane

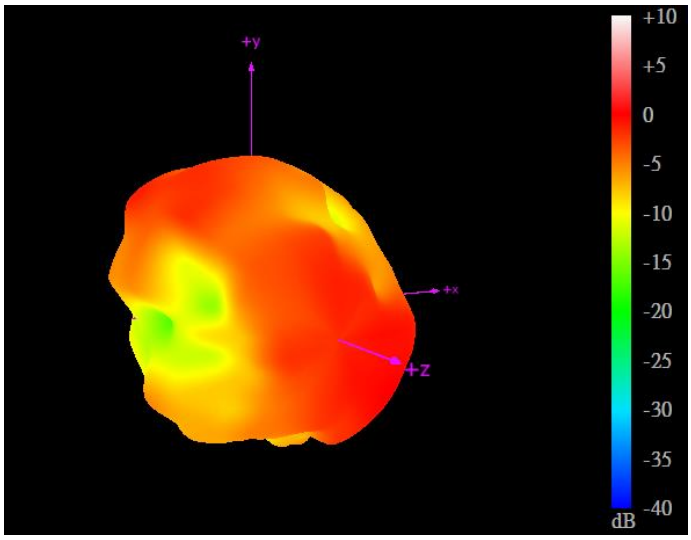




3.2.26 3D Radiation Patterns Pattern (Wi-Fi_MIMO1 with 1M cable length in free space)



2450MHz

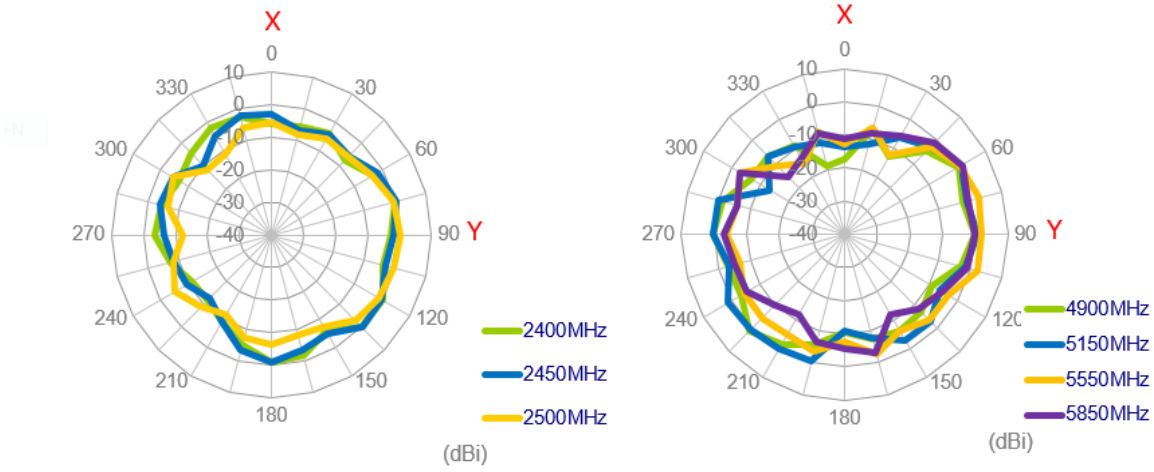


5550MHz

3.2.27 2D Radiation Patterns (Wi-Fi_MIMO2 with 3M cable length in free space)

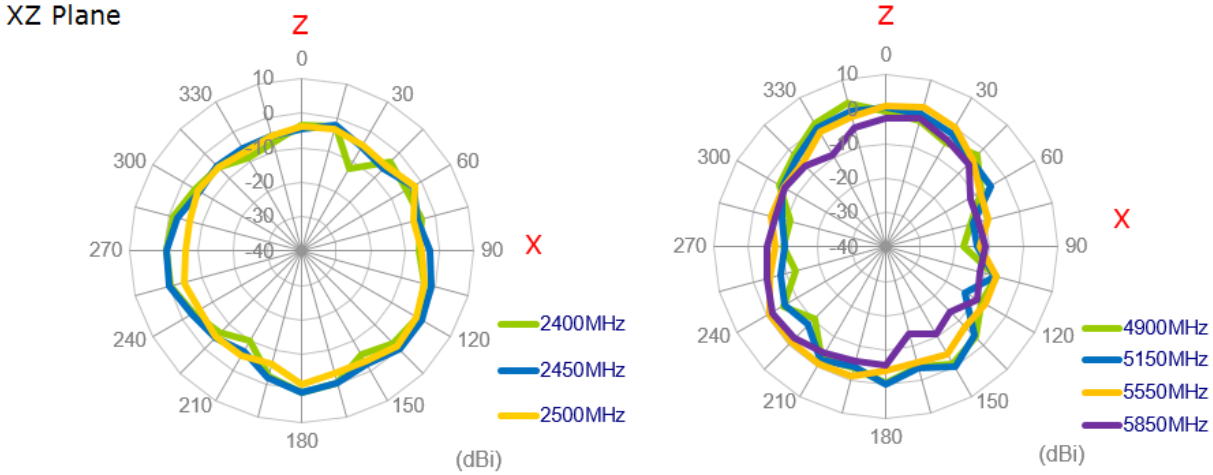
XY Plane

XY Plane



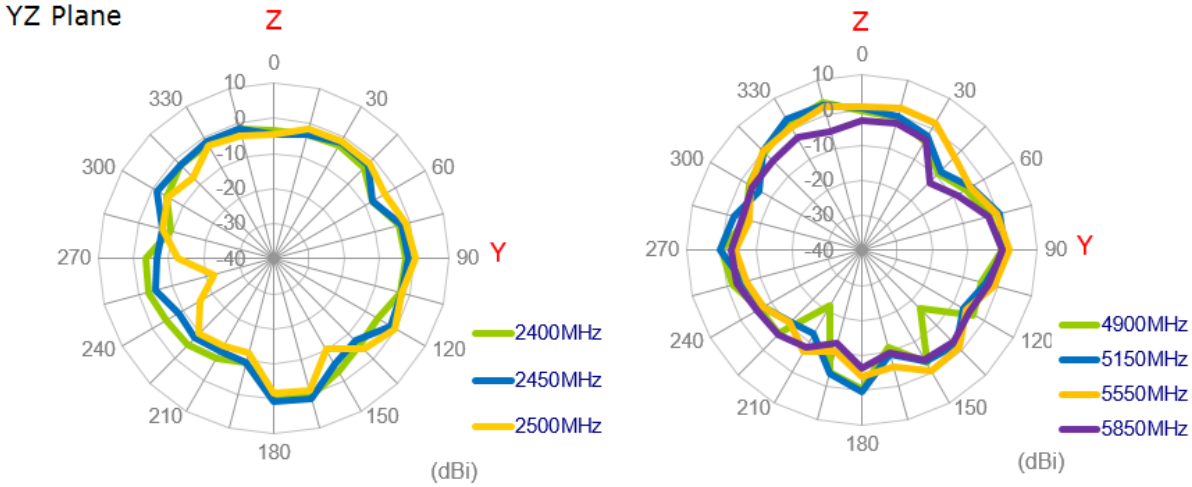
XZ Plane

XZ Plane

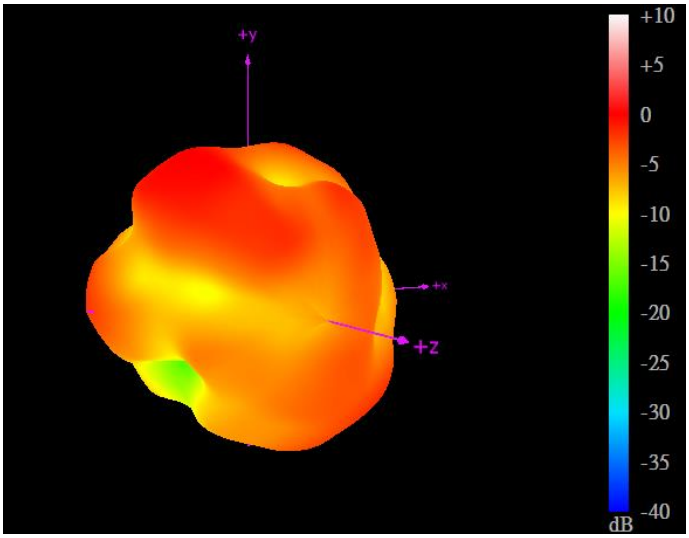


YZ Plane

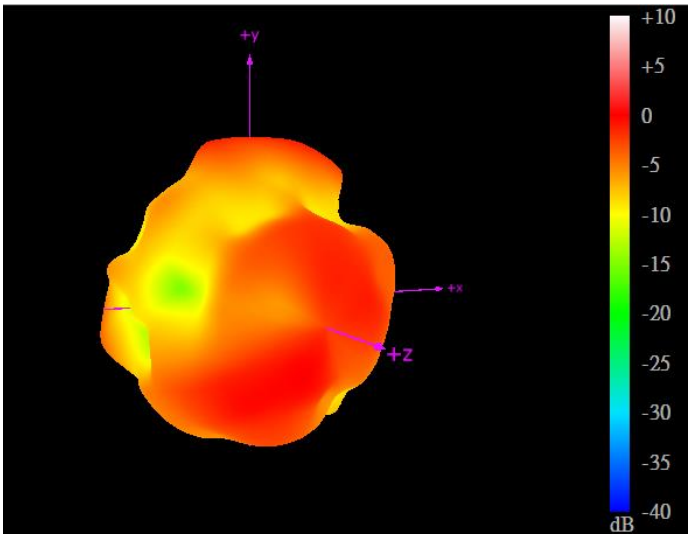
YZ Plane



3.2.28 3D Radiation Patterns Pattern (Wi-Fi_MIMO2 with 1M cable length in free space)

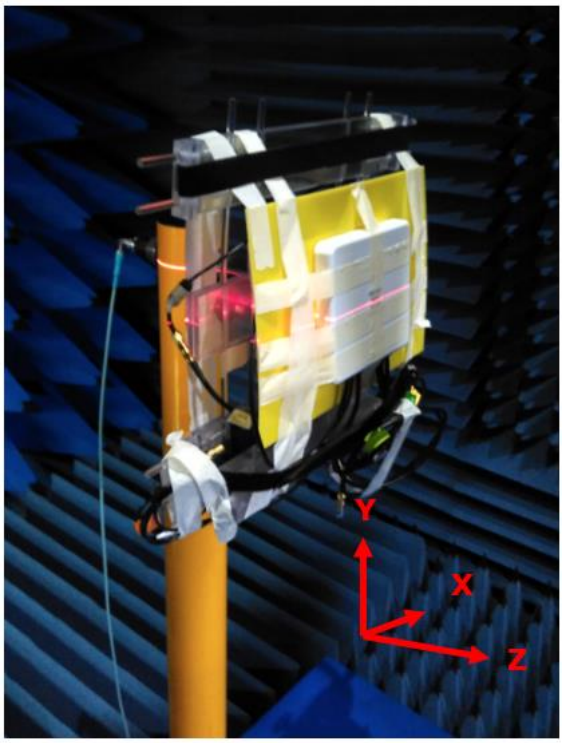


2450MHz



5550MHz

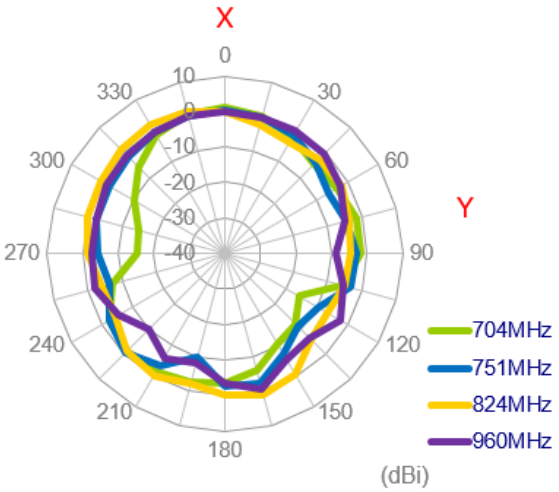
3.2.29 Test Setaup for Antenna Radiation Pattern

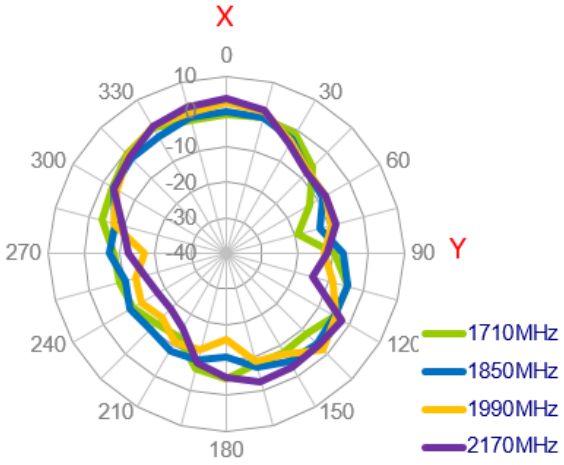


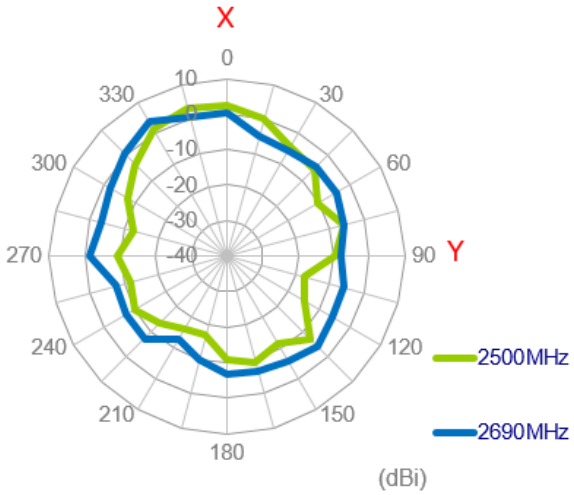
On the ABS

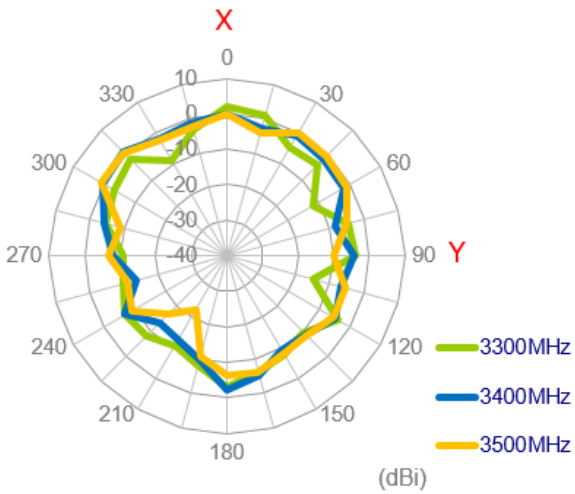
3.2.30 2D Radiation Patterns (LTE_MIMO1 with 1M cable length on ABS)

XY Plane

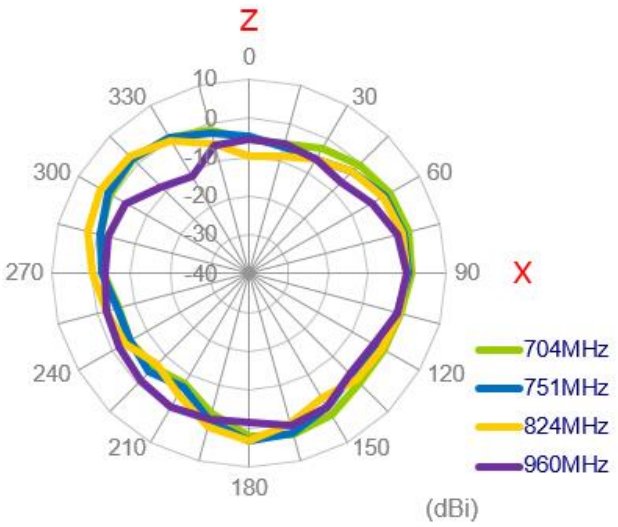


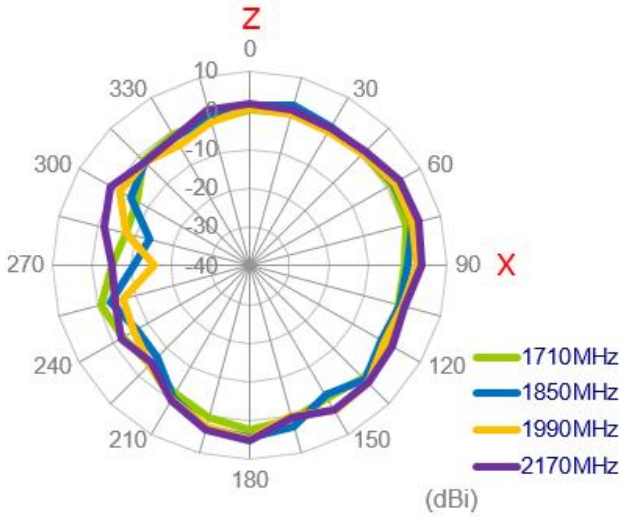


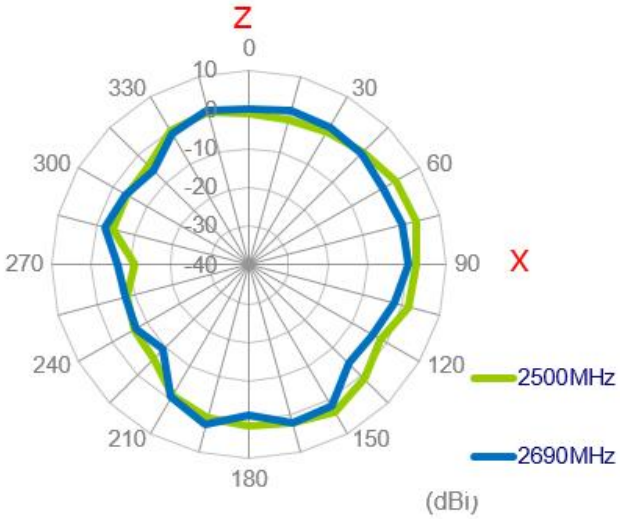


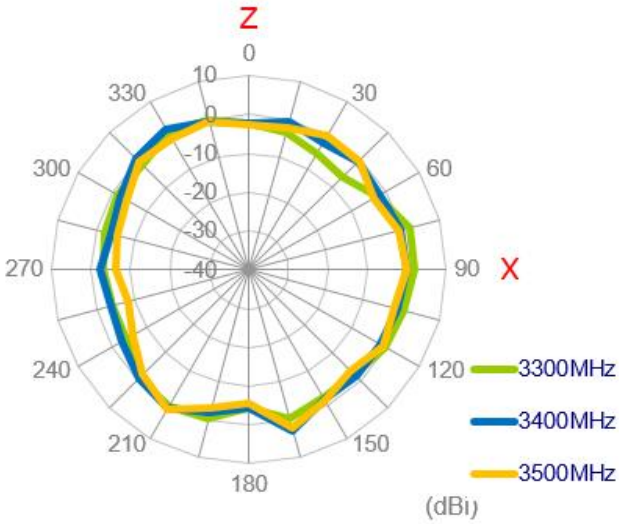


XZ Plane

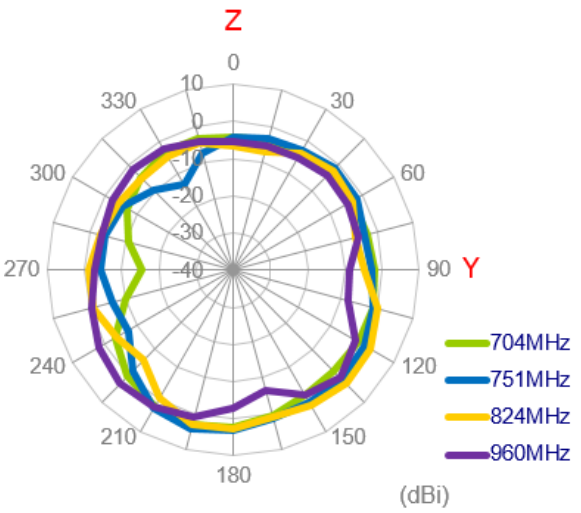

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
704MHz
751MHz
824MHz
960MHz
(dBi)

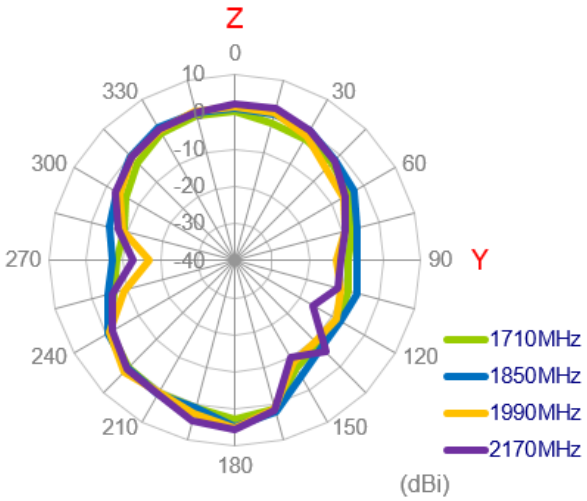

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)

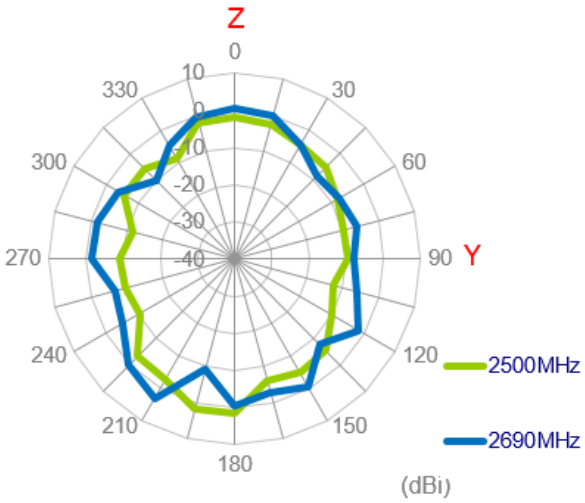

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
2500MHz
2690MHz
(dBi)

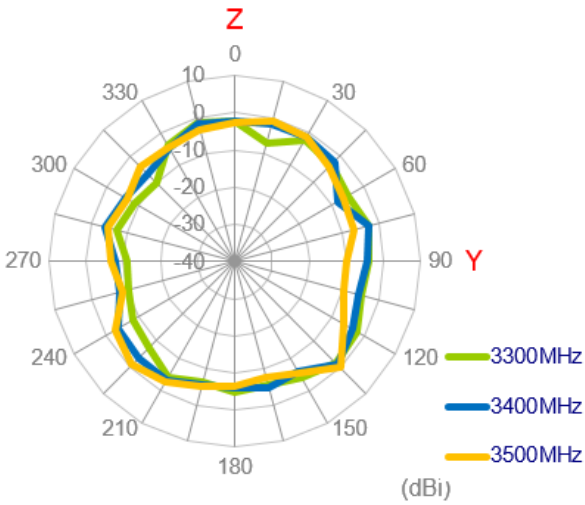

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
3300MHz
3400MHz
3500MHz
(dBi)

YZ Plane

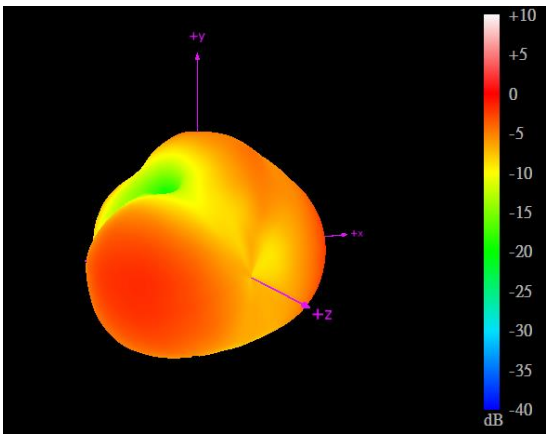

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
704MHz
751MHz
824MHz
960MHz
(dBi)


Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)

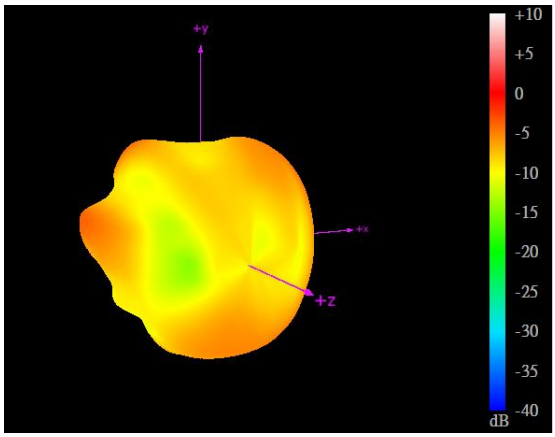

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
2500MHz
2690MHz
(dBi)


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

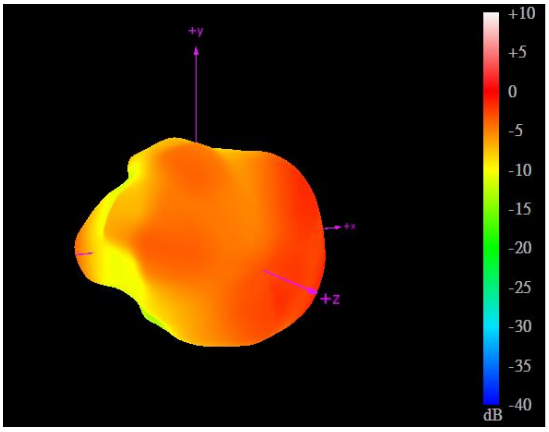
3.2.31 3D Radiation Patterns (LTE_MIMO1 with 1M cable length on ABS)



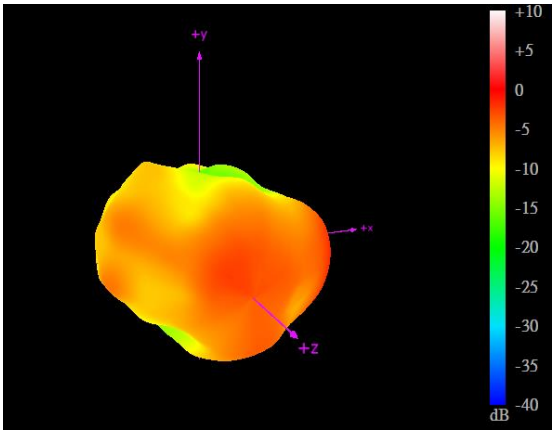
704MHz



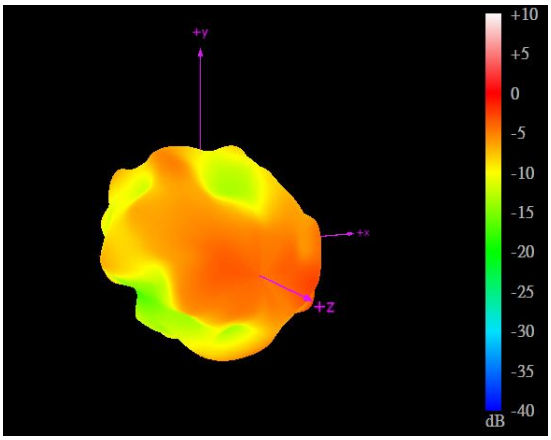
960MHz



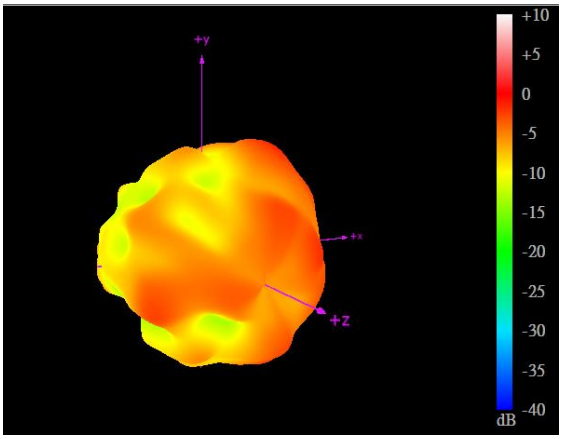
1710MHz



2170MHz



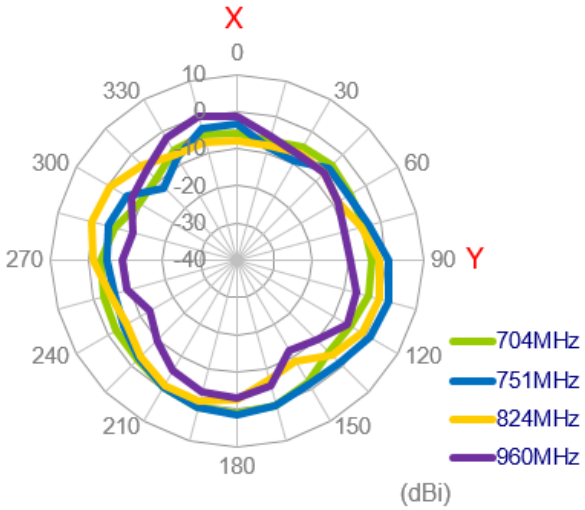
2690MHz

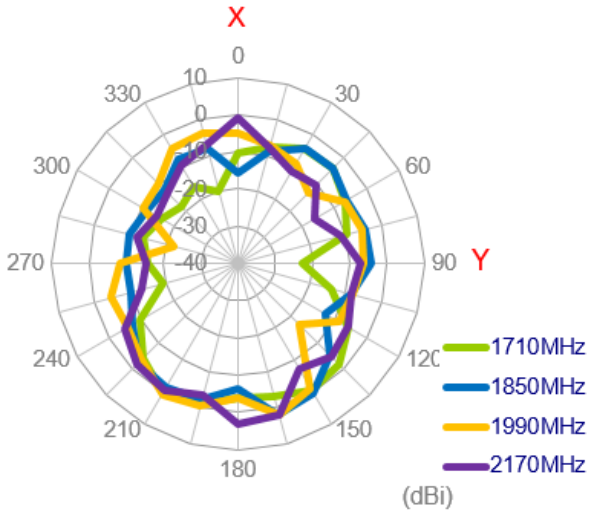


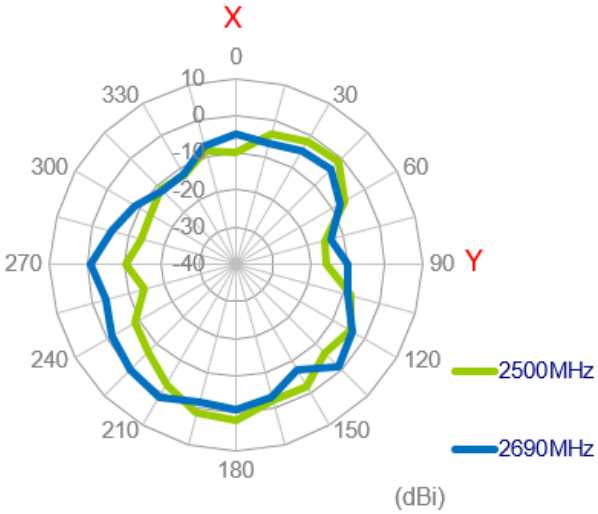
3500MHz

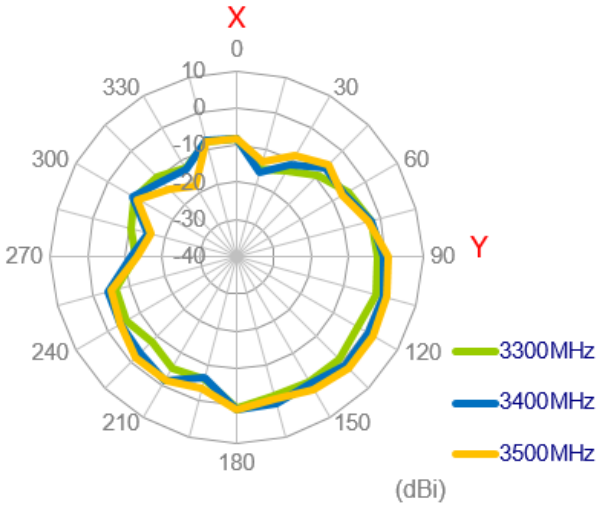
3.2.32 2D Radiation Patterns (LTE_MIMO2 with 1M cable length on ABS)

XY Plane

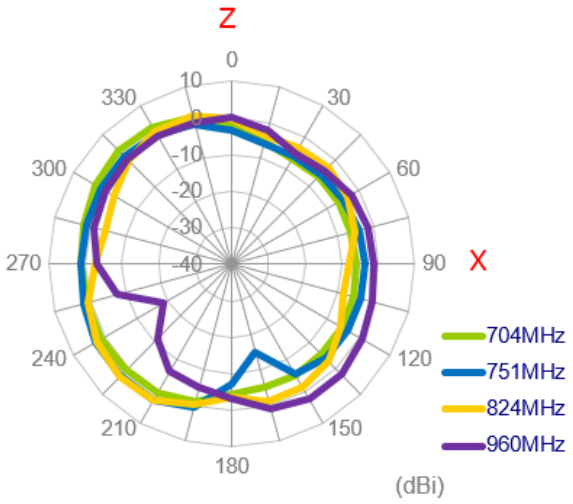


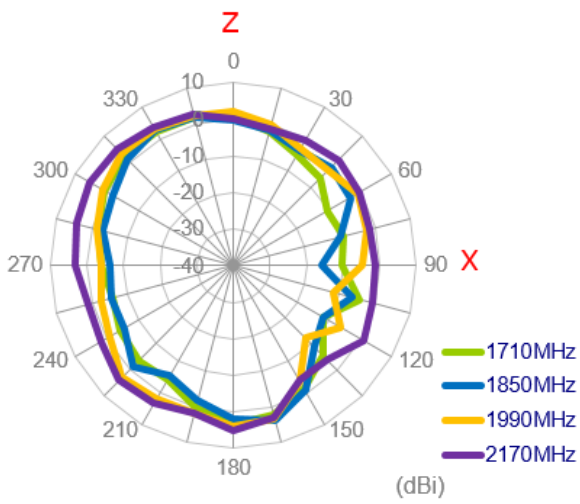


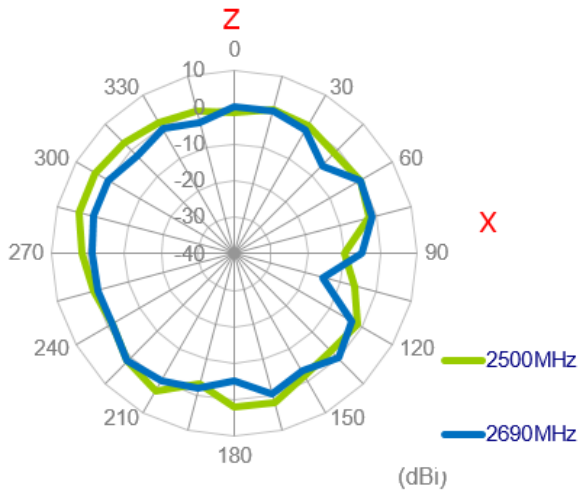


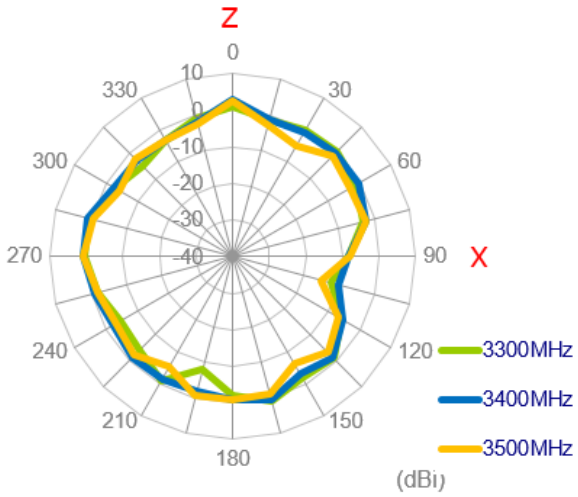


XZ Plane

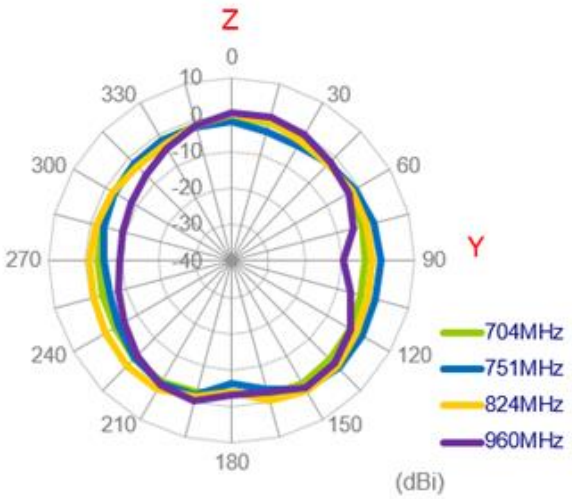

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
704MHz
751MHz
824MHz
960MHz
(dBi)

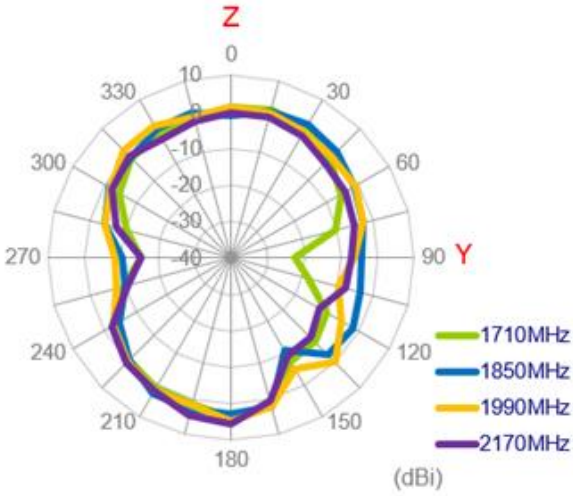

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)

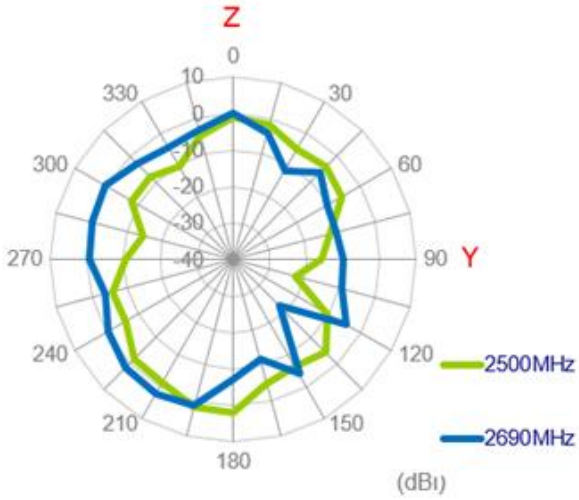

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
2500MHz
2690MHz
(dBi)

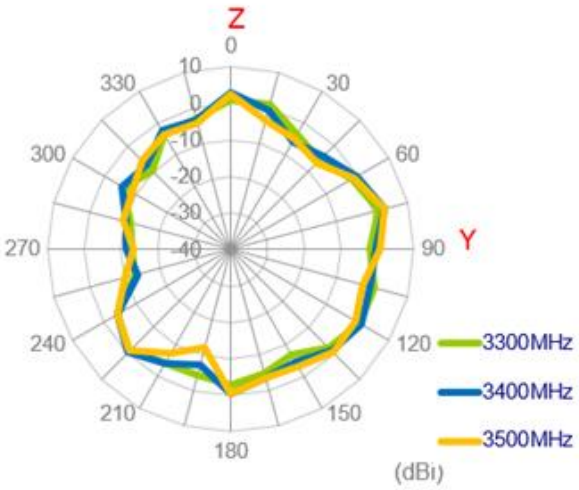

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
3300MHz
3400MHz
3500MHz
(dBi)

YZ Plane

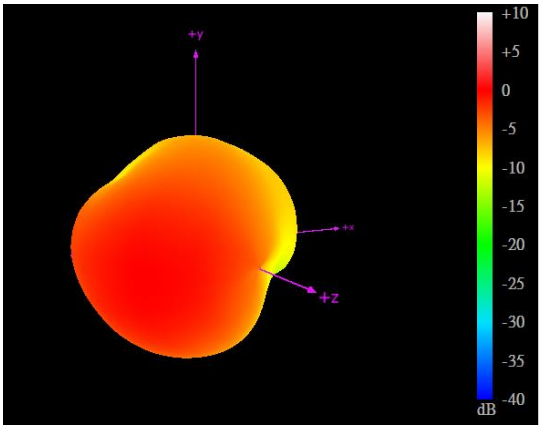

Z
Y
704MHz
751MHz
824MHz
960MHz
(dBi)


Z
Y
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)

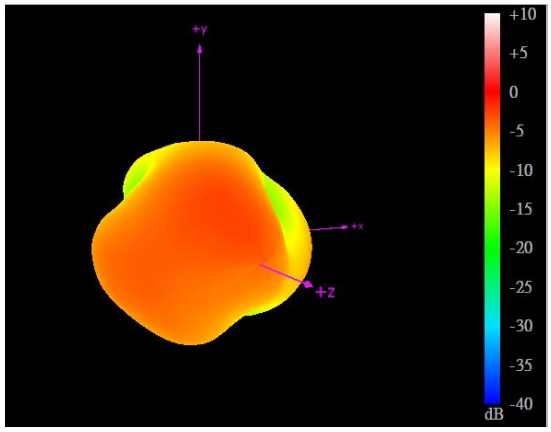

Z
Y
2500MHz
2690MHz
(dBi)


Z
Y
3300MHz
3400MHz
3500MHz
(dBi)

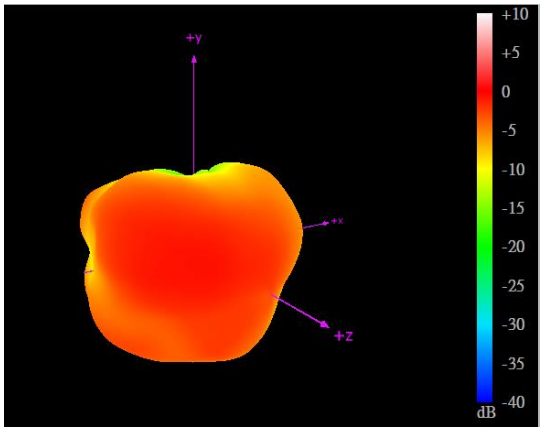
3.2.33 3D Radiation Patterns (LTE_MIMO2 with 1M cable length on ABS)



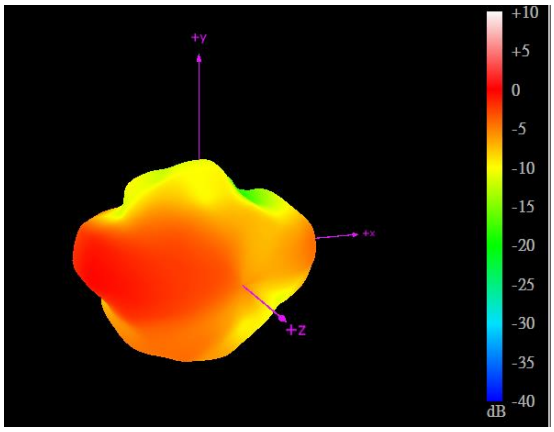
704MHz



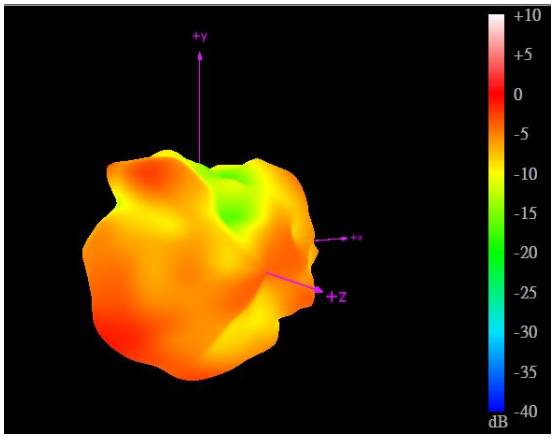
960MHz



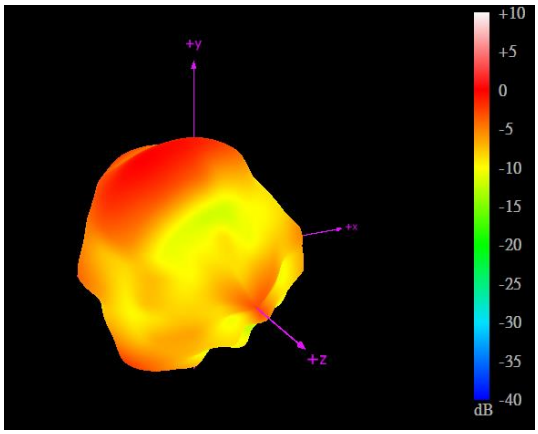
1710MHz



2170MHz



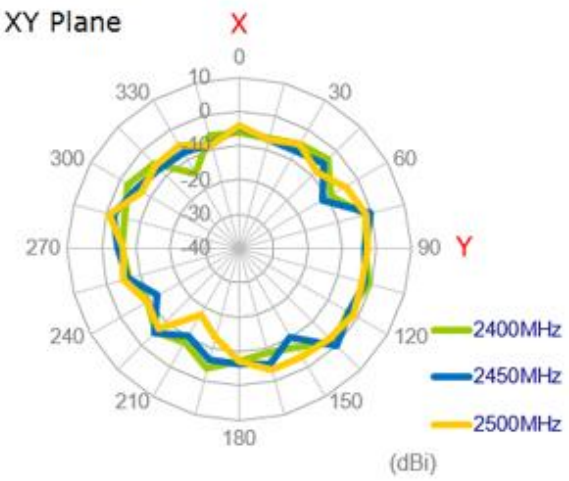
2690MHz

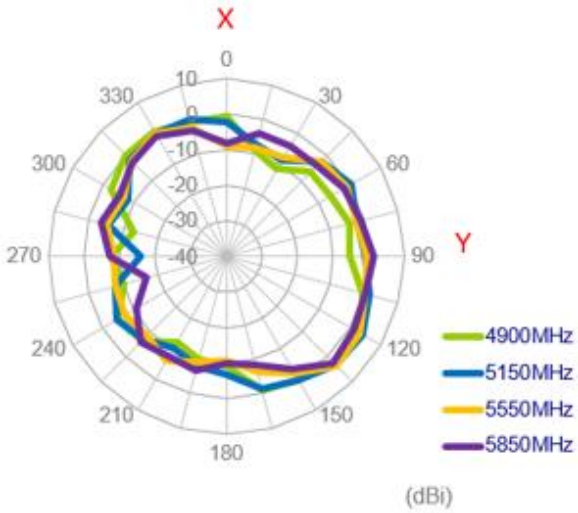


3500MHz

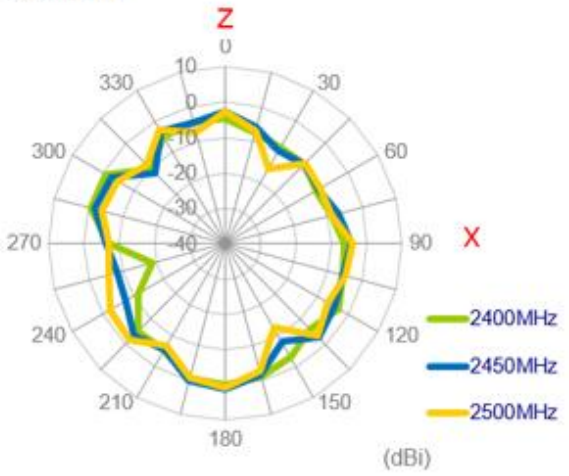
3.2.34 2D Radiation Patterns (Wi-Fi_MIMO1 with 1M cable length on ABS)

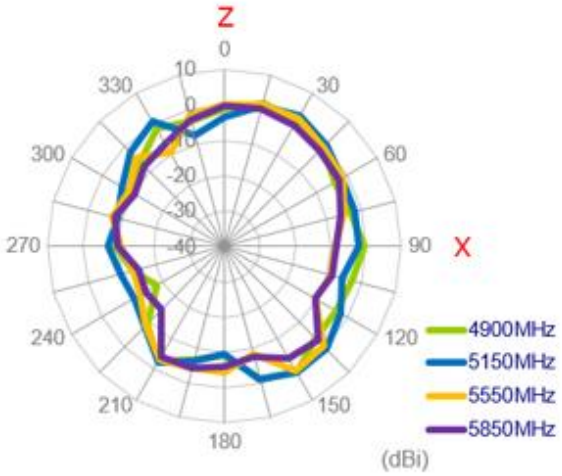
XY Plane



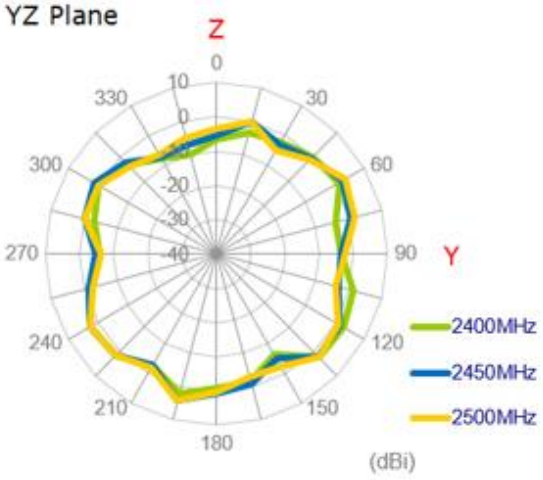


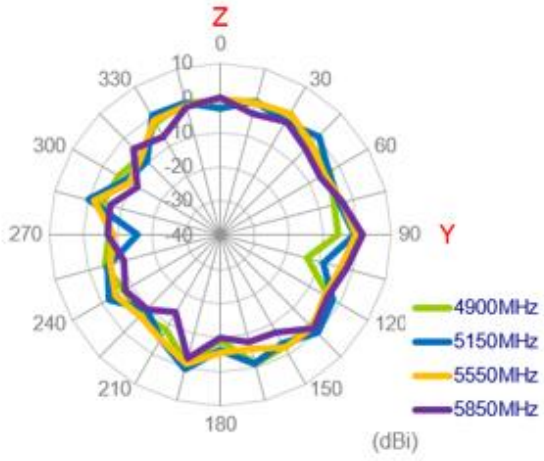
XZ Plane



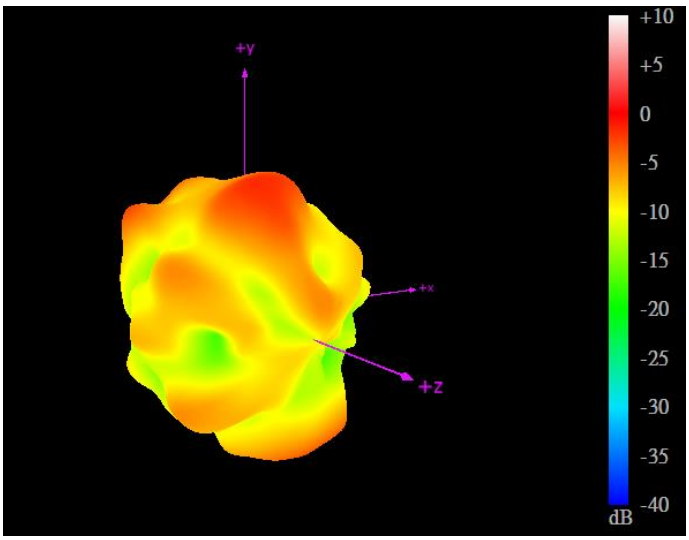


YZ Plane

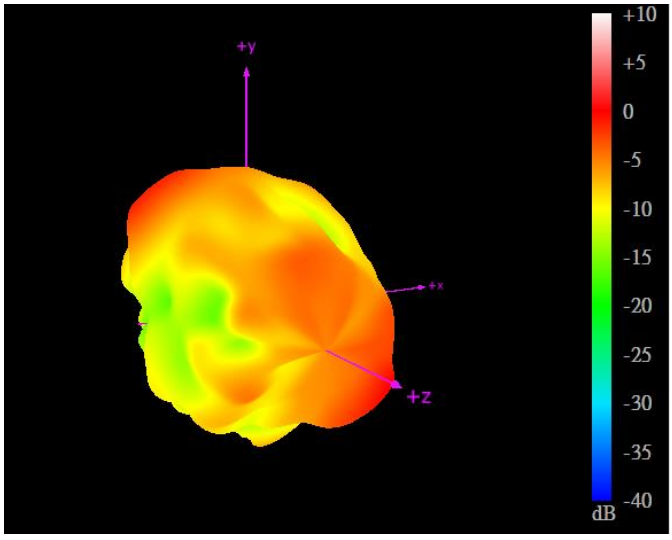




3.2.35 3D Radiation Patterns Pattern (Wi-Fi_MIMO1 with 1M cable length on ABS)



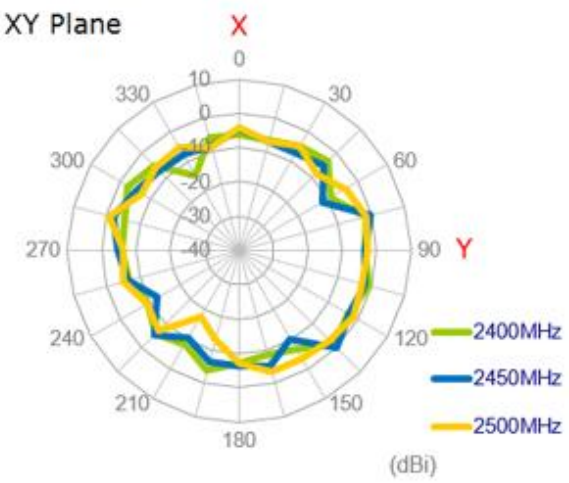
2450MHz

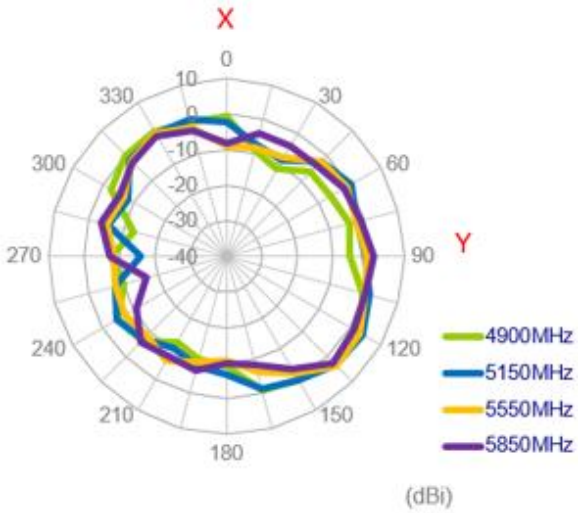


5550MHz

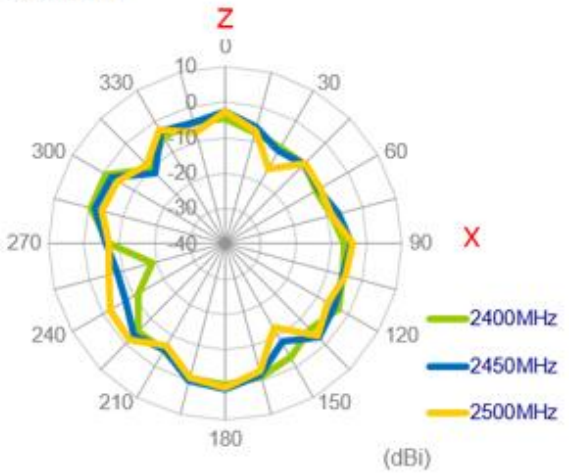
3.2.36 2D Radiation Patterns (LTE_MIMO1 with 1M cable length on ABS)

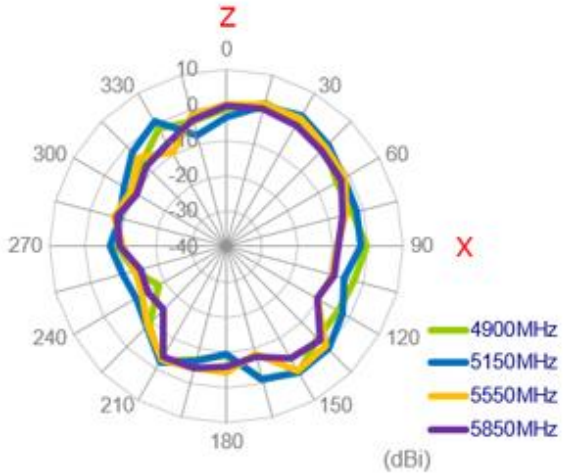
XY Plane



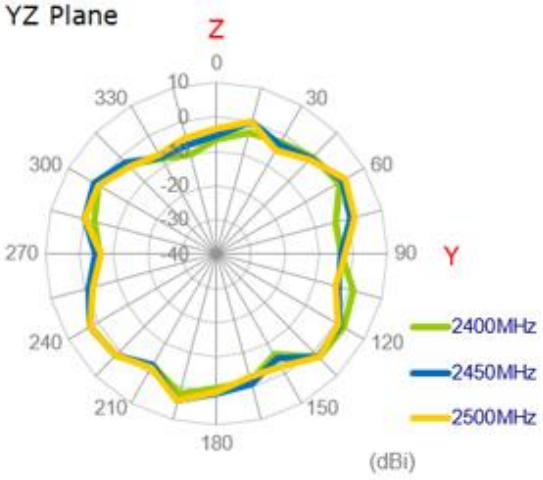


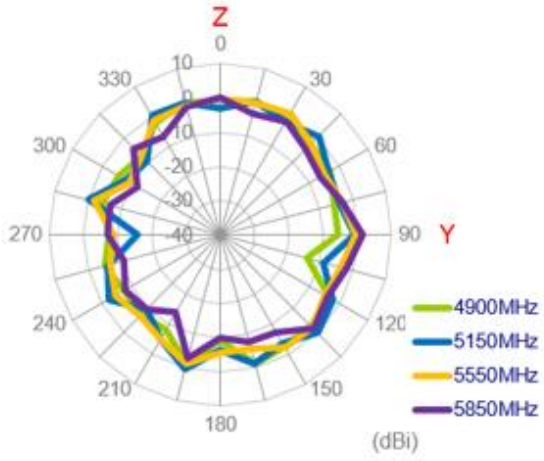
XZ Plane



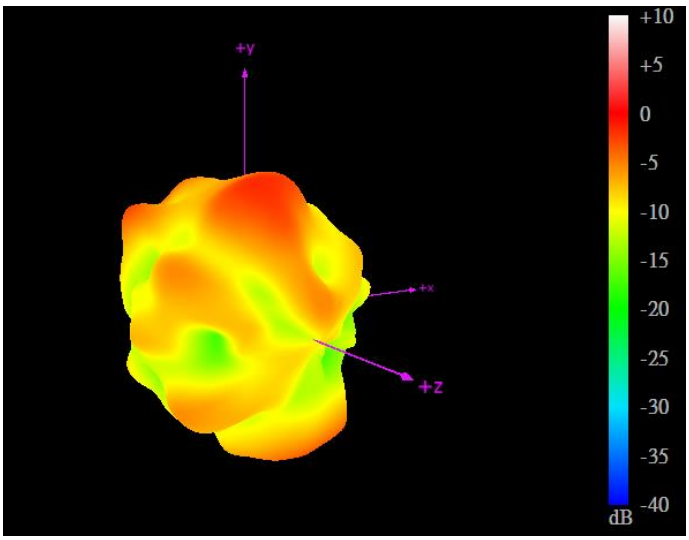


YZ Plane

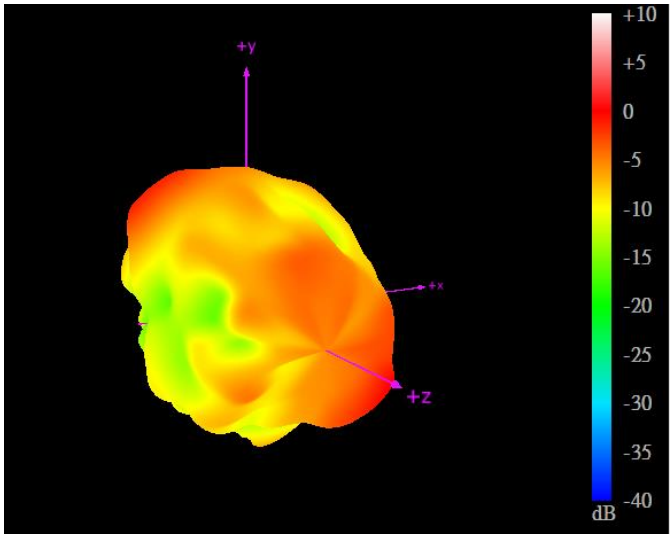




3.2.37 3D Radiation Patterns Pattern (Wi-Fi_MIMO2 with 1M cable length on ABS)

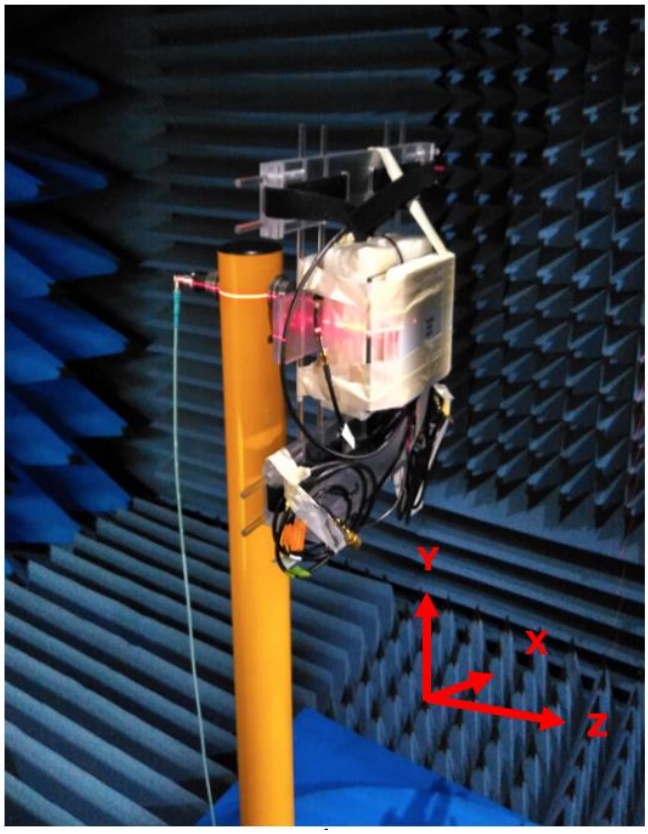


2450MHz



5550MHz

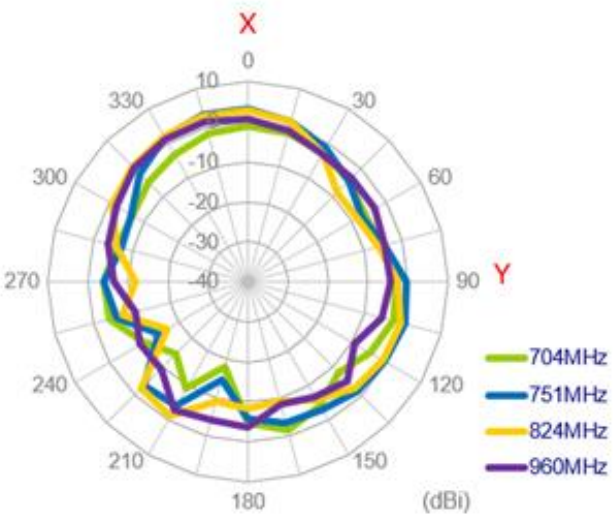
3.2.38 Test Setup for Antenna Radiation Pattern

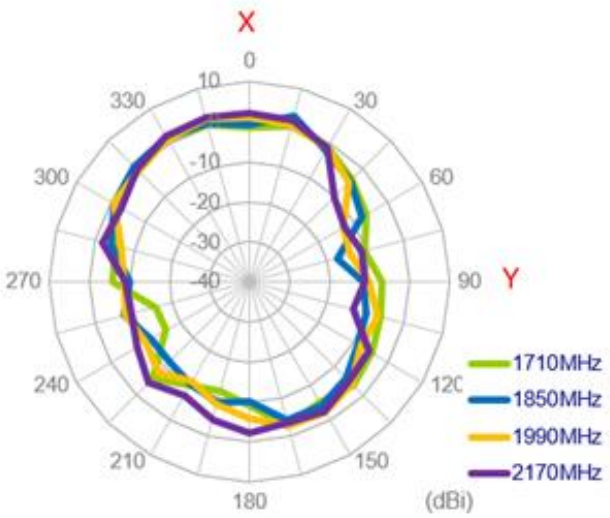


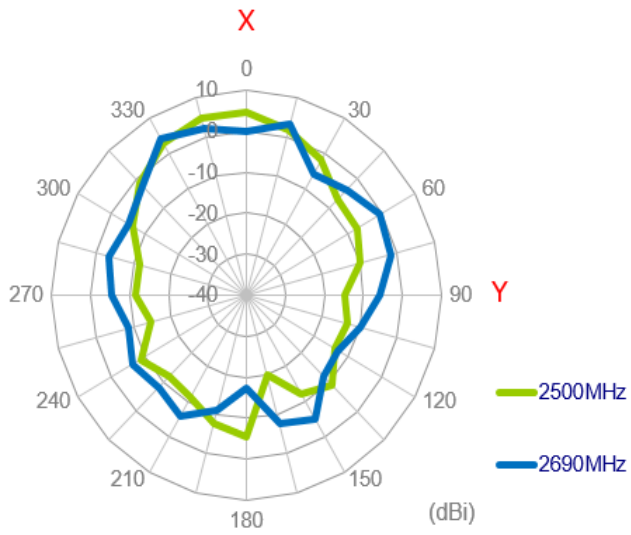
On glass

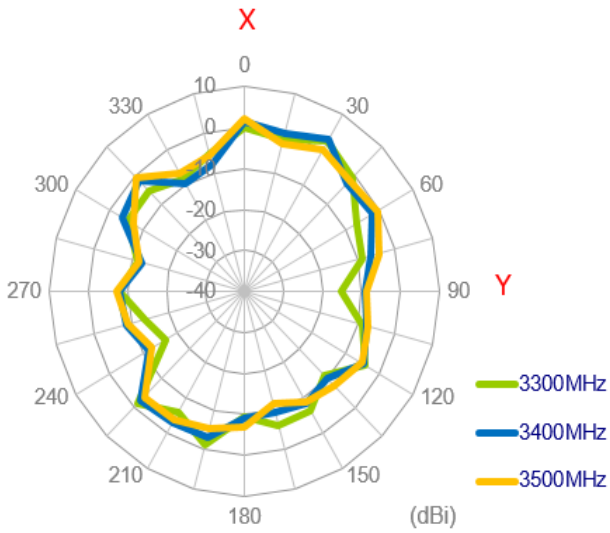
3.2.39 2D Radiation Patterns (LTE_MIMO1 with 1M cable length on glass)

XY Plane

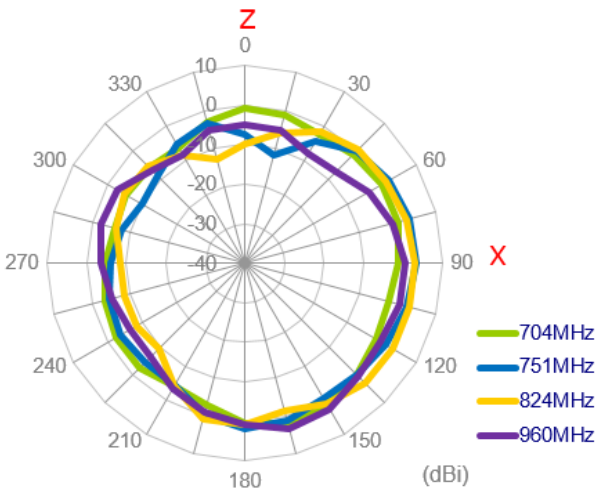


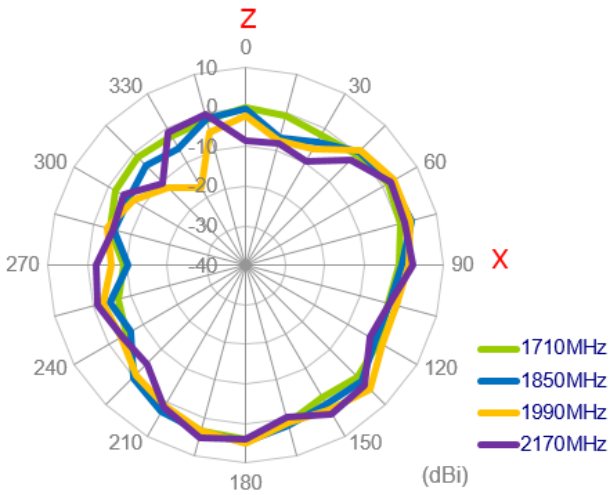


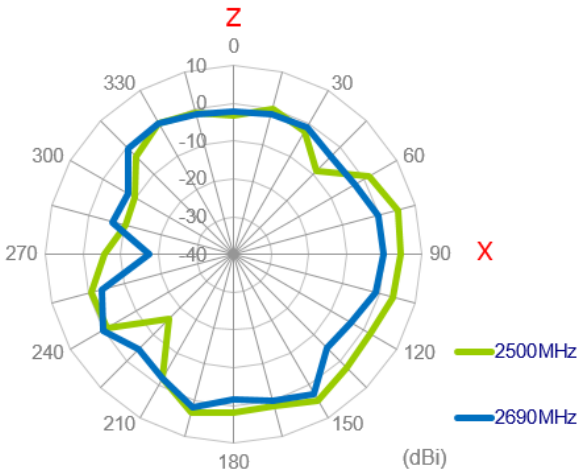


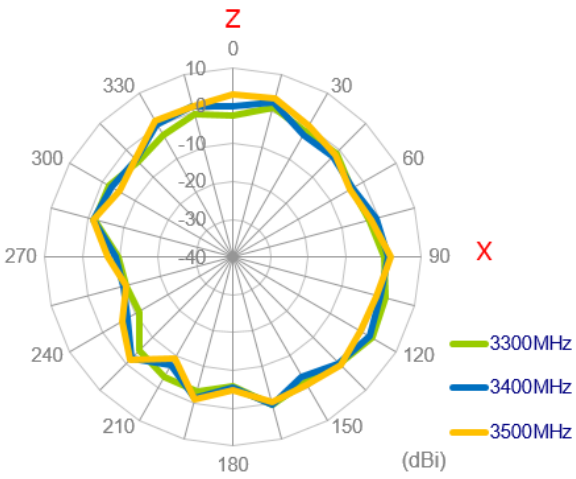


XZ Plane

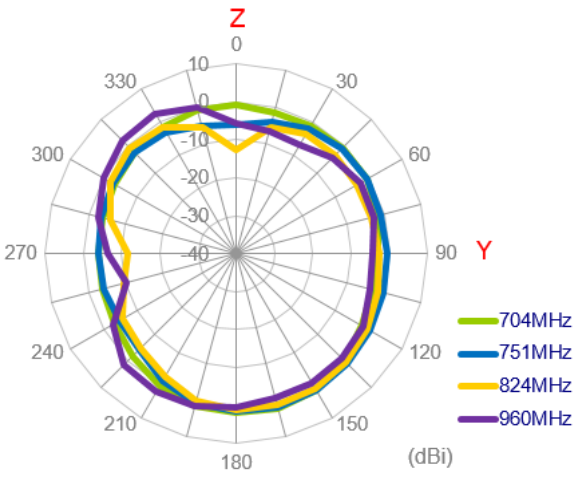

Z
X
704MHz
751MHz
824MHz
960MHz
(dBi)

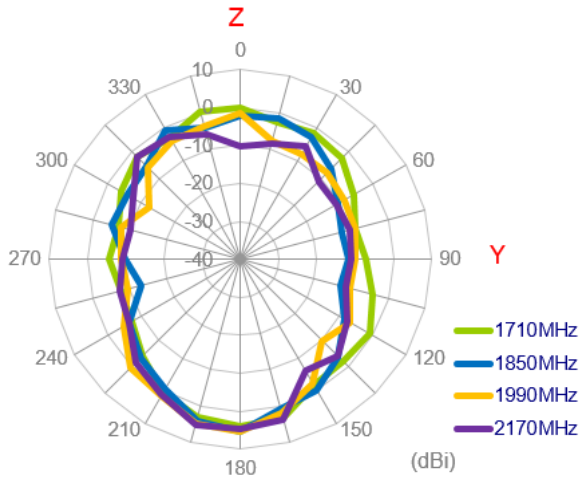

Z
X
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)

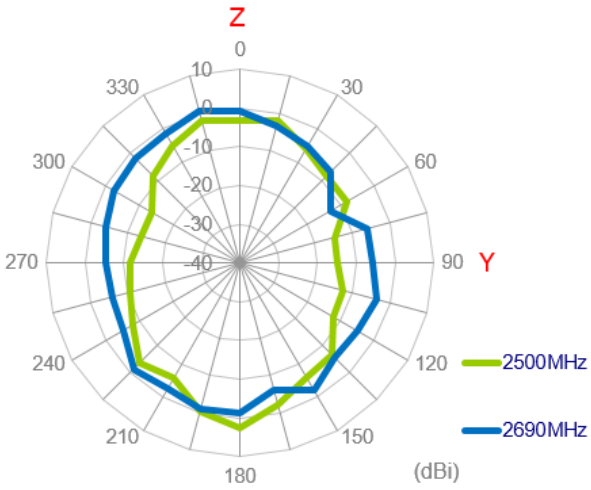

Z
X
2500MHz
2690MHz
(dBi)

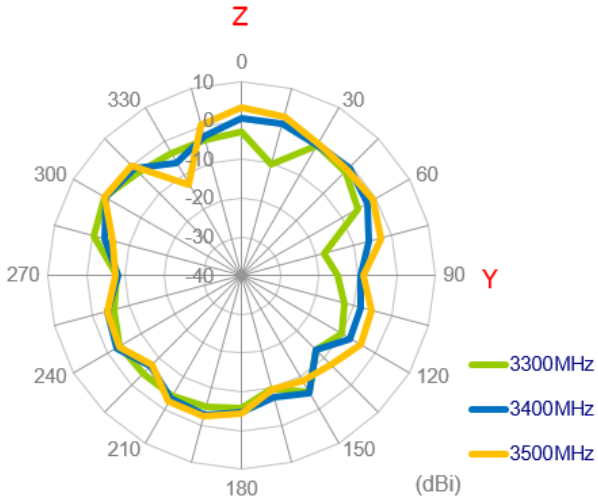

Z
X
3300MHz
3400MHz
3500MHz
(dBi)

YZ Plane

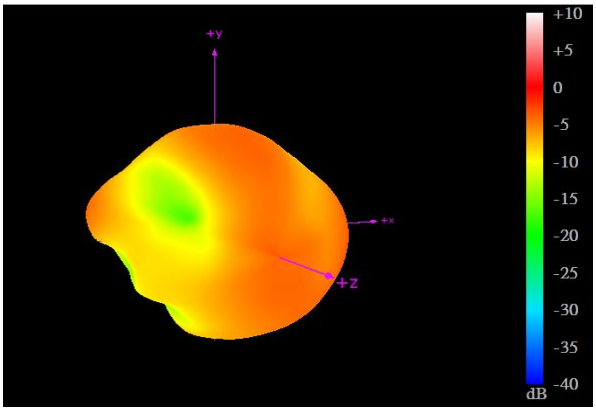

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
704MHz
751MHz
824MHz
960MHz
(dBi)


Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)

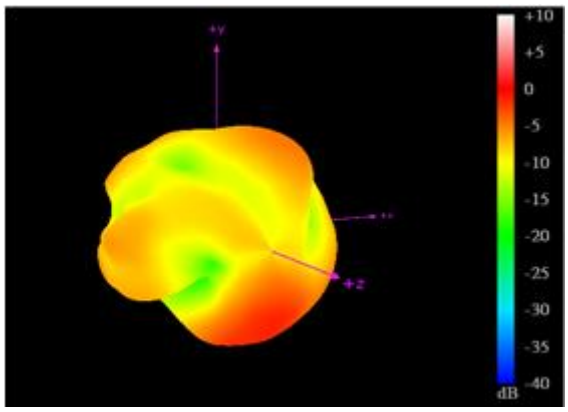

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
2500MHz
2690MHz
(dBi)


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

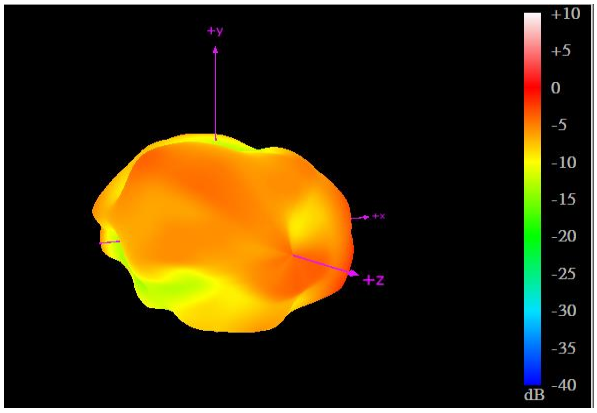
3.2.40 3D Radiation Patterns (LTE_MIMO1 with 1M cable length on grass)



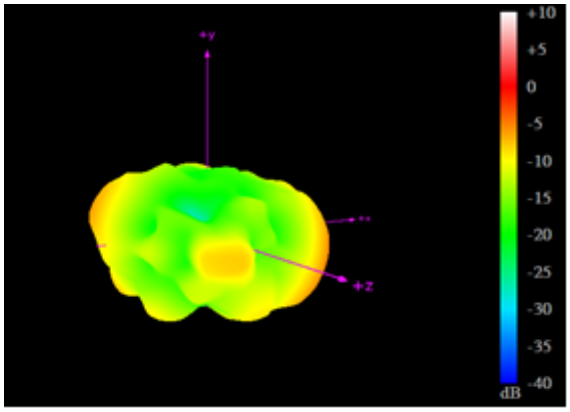
704MHz



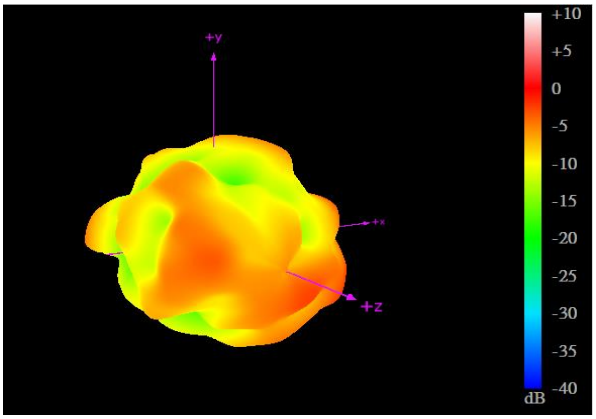
960MHz



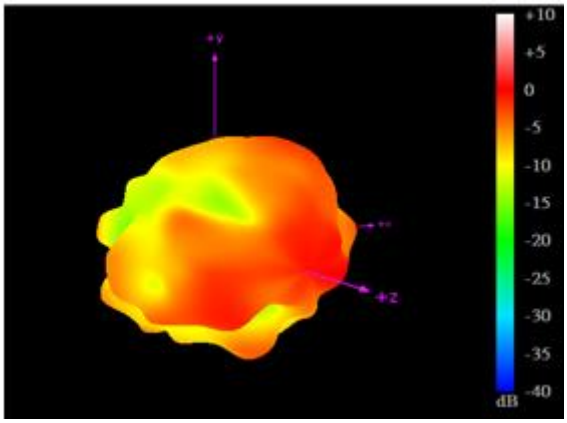
1710MHz



2170MHz



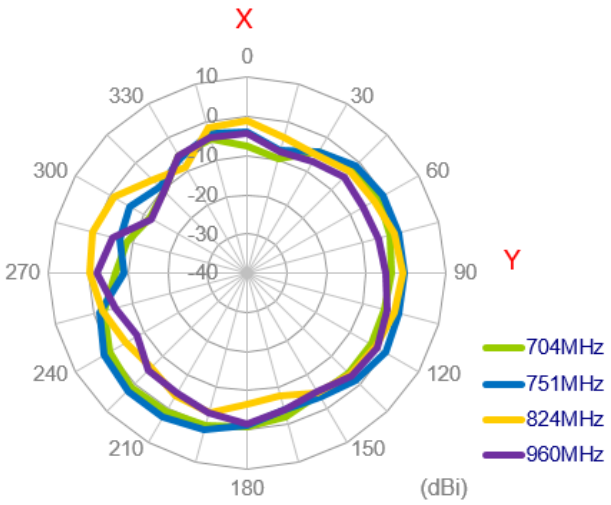
2690MHz

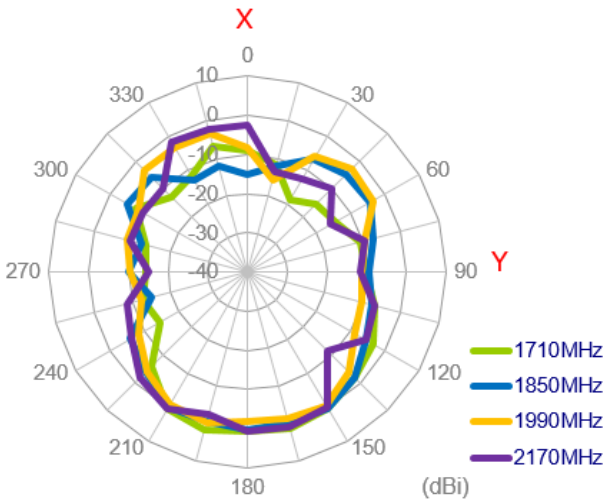


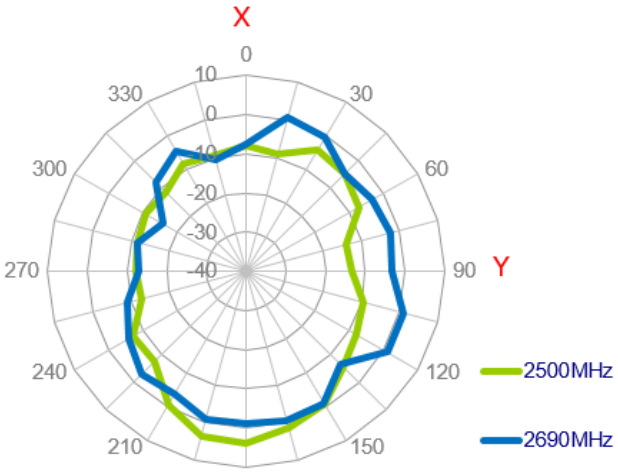
3500MHz

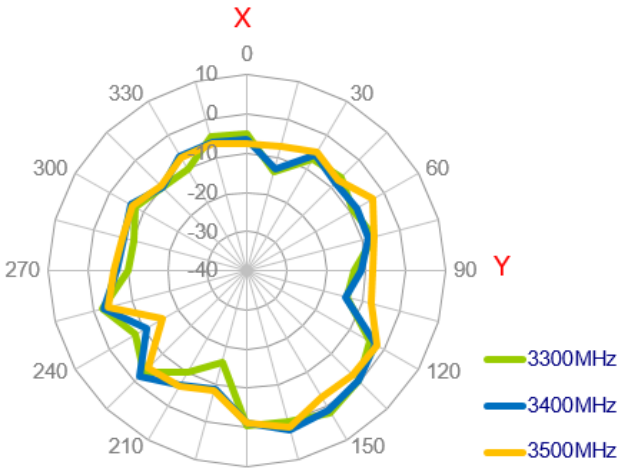
3.2.41 2D Radiation Patterns (LTE_MIMO2 with 1M cable length on glass)

XY Plane

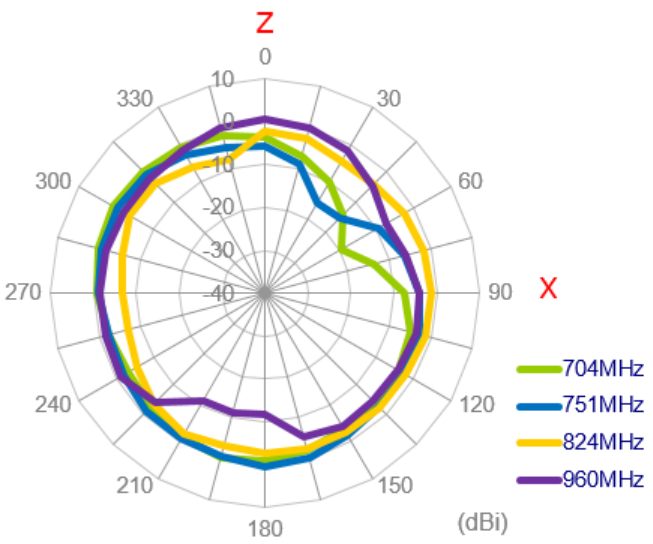


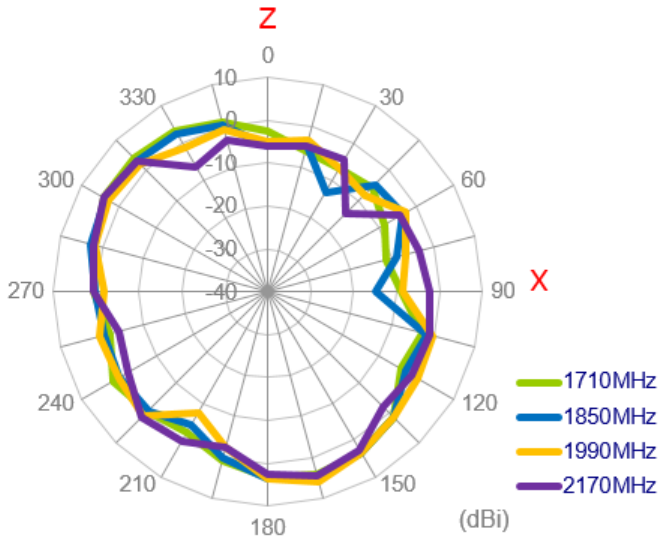


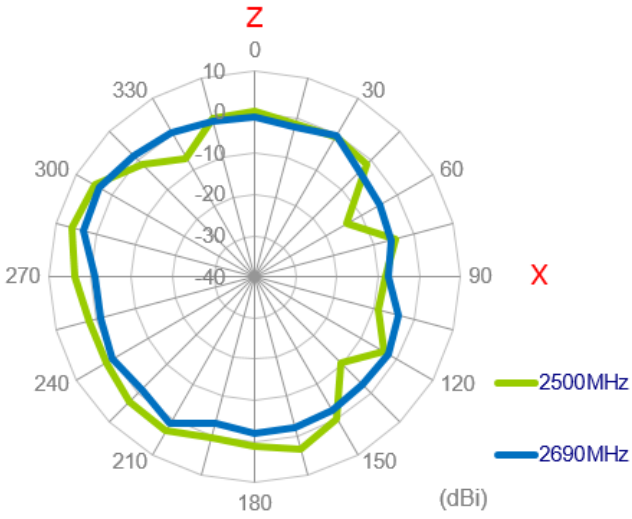


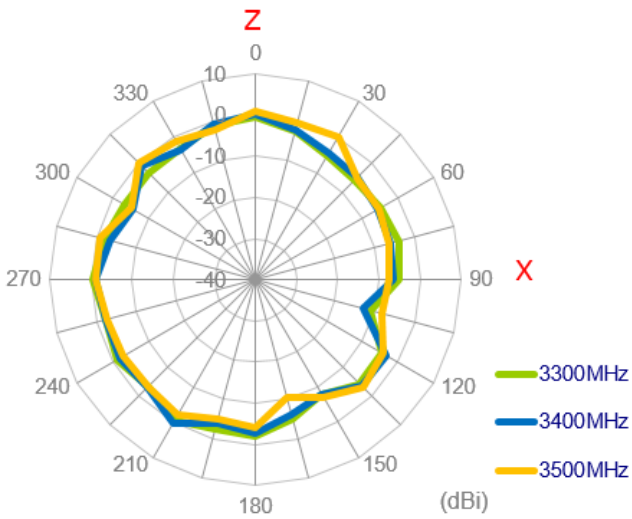


XZ Plane

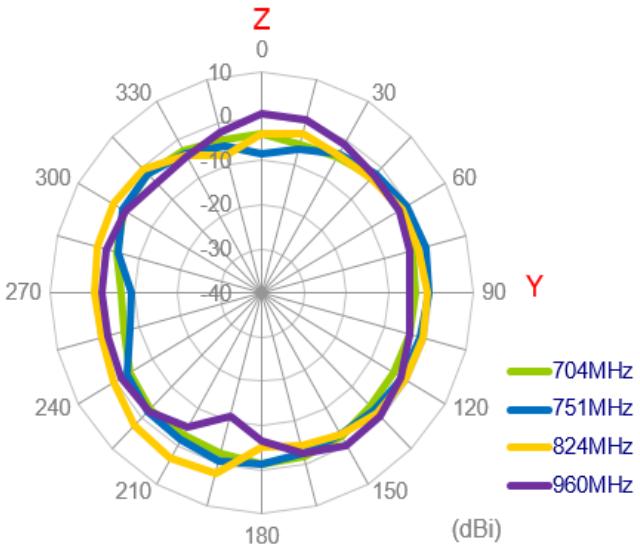

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
704MHz
751MHz
824MHz
960MHz

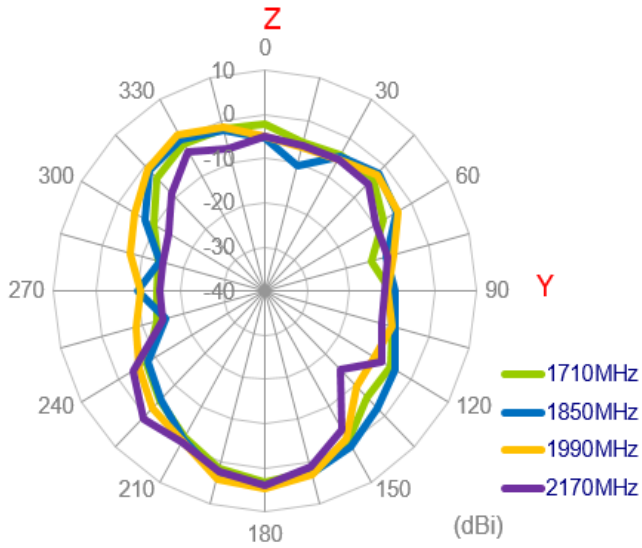

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
1710MHz
1850MHz
1990MHz
2170MHz

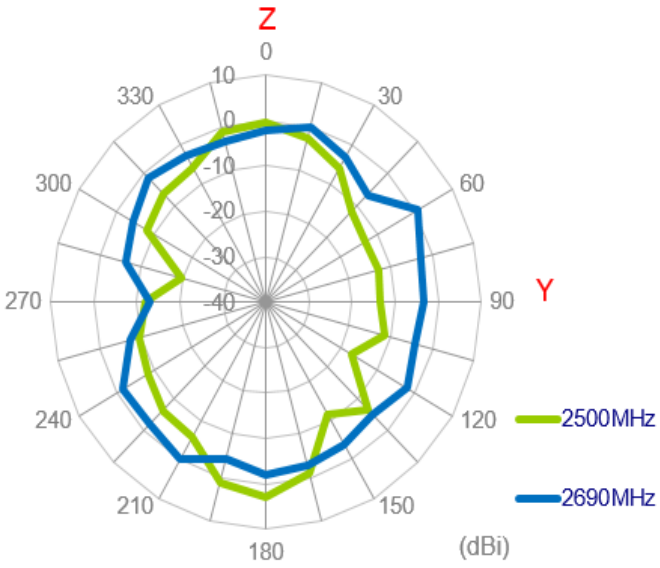

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
2500MHz
2690MHz

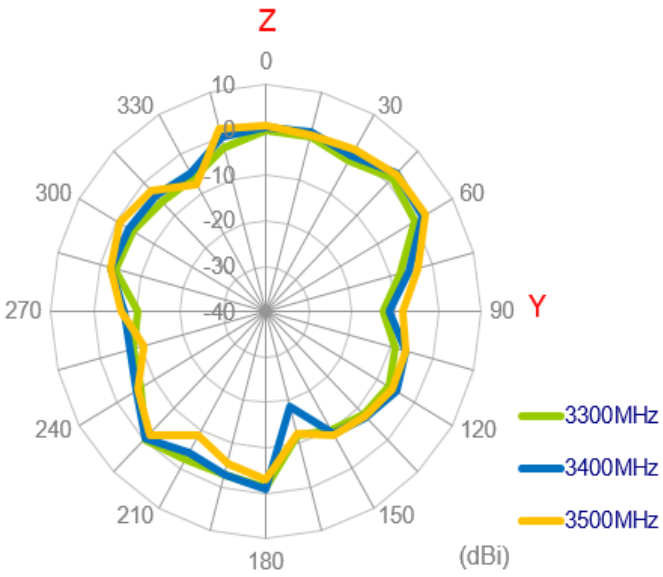

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
3300MHz
3400MHz
3500MHz

YZ Plane

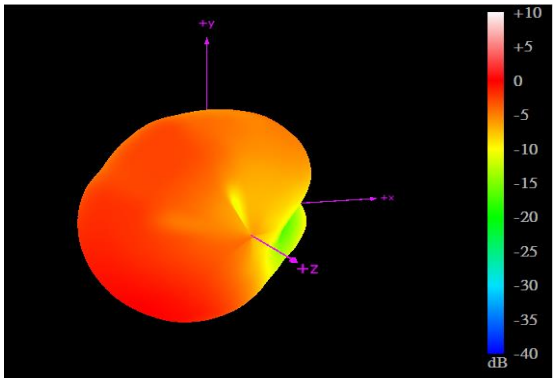

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
704MHz
751MHz
824MHz
960MHz
(dBi)


Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)

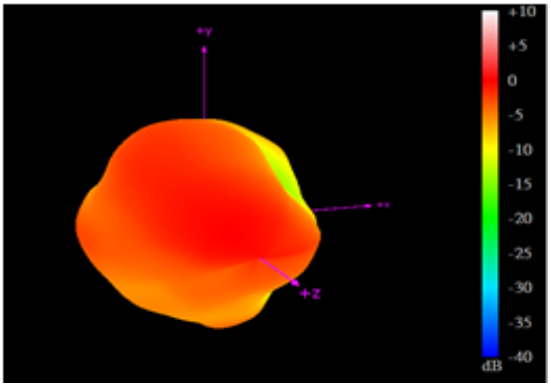

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
2500MHz
2690MHz
(dBi)


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

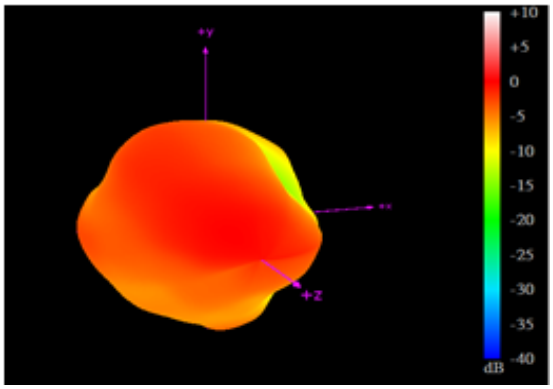
3.2.42 3D Radiation Patterns (LTE_MIMO2 with 1M cable length on grass)



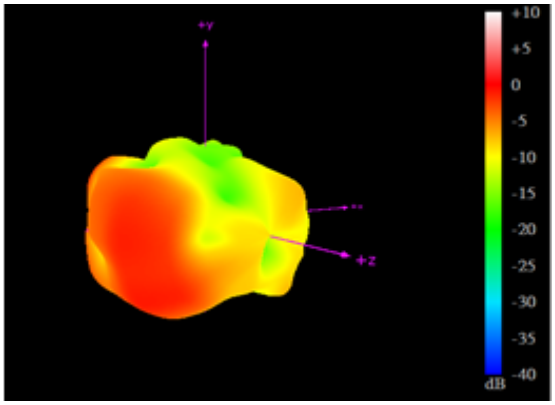
704MHz



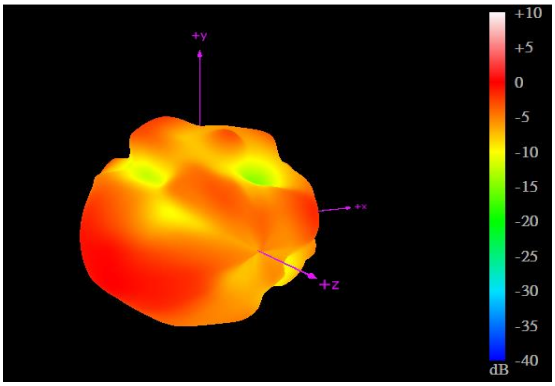
960MHz



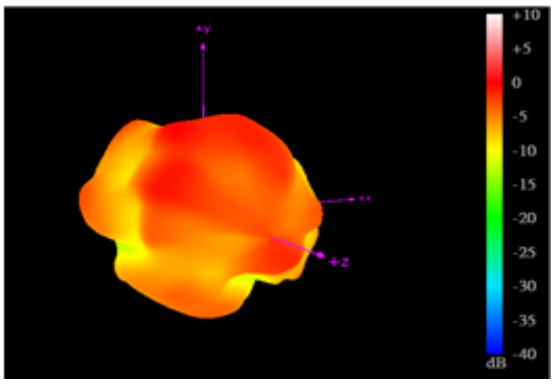
1710MHz



2170MHz



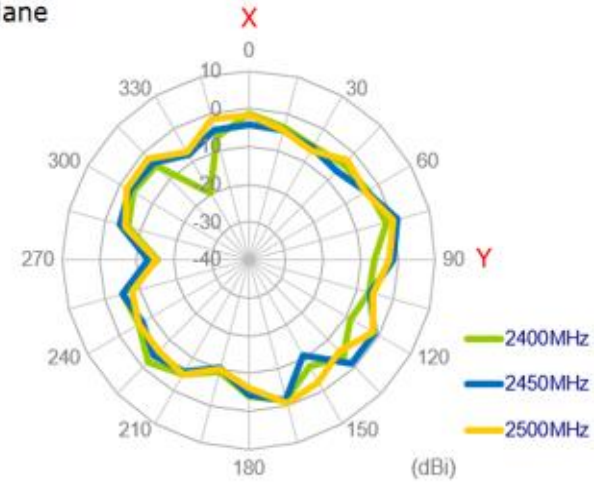
2690MHz

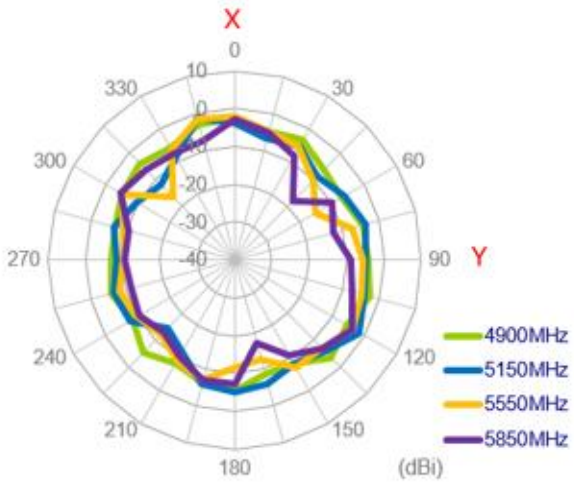


3500MHz

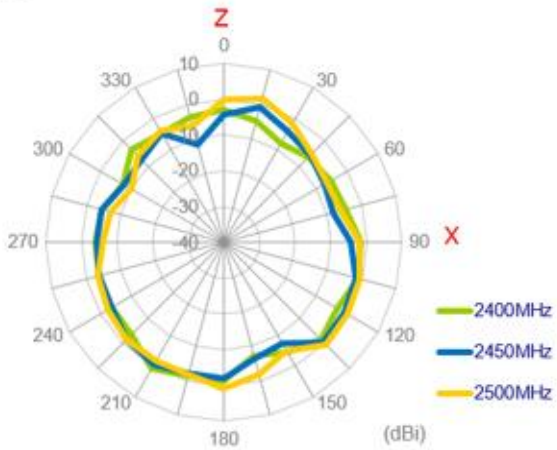
3.2.43 2D Radiation Patterns (Wi-Fi_MIMO1 with 1M cable length on glass)

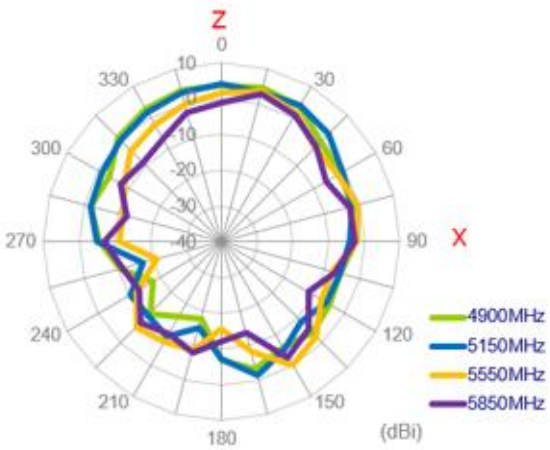
XY Plane



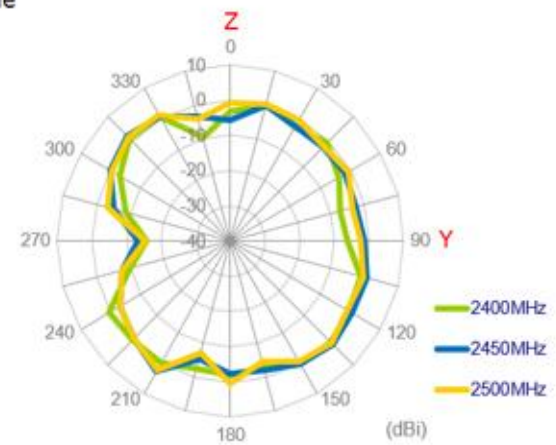


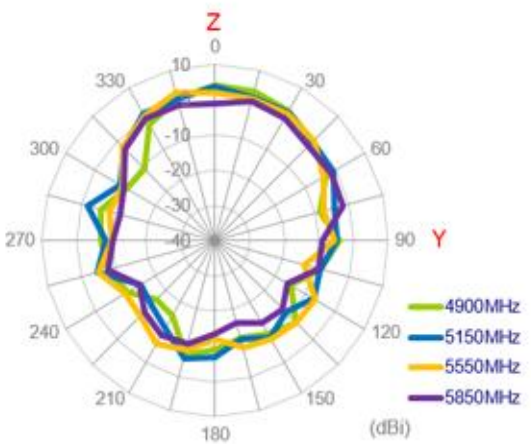
XZ Plane



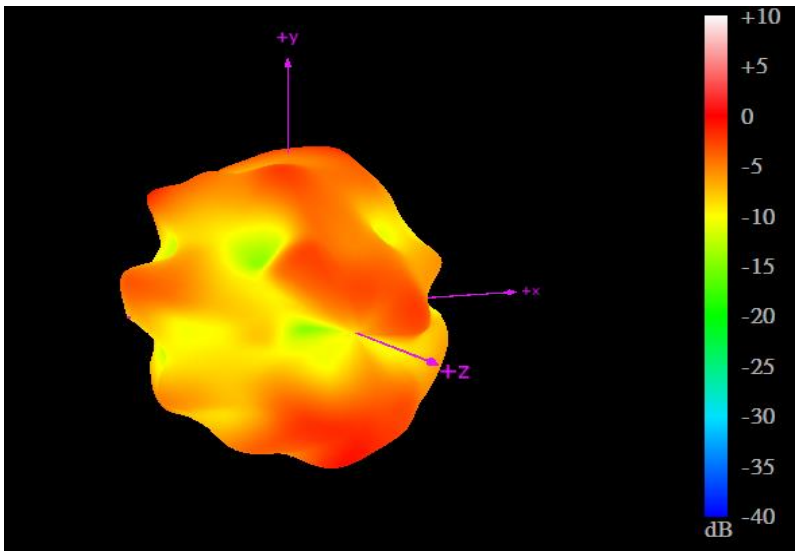


YZ Plane

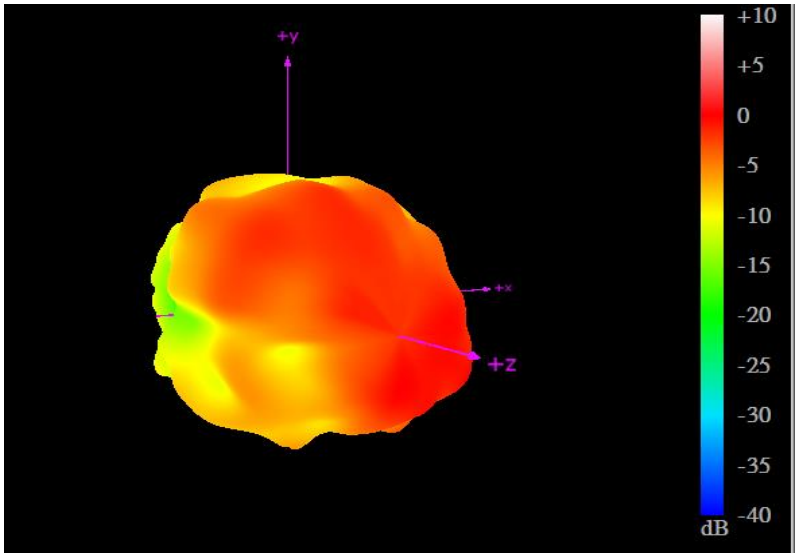




3.2.44 3D Radiation Patterns Pattern (Wi-Fi_MIMO1 with 1M cable length on glass)



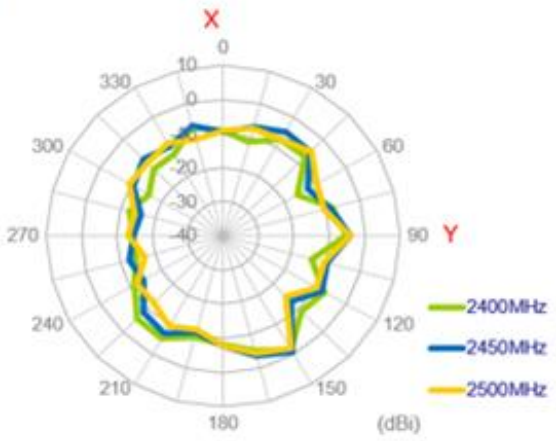
2450MHz

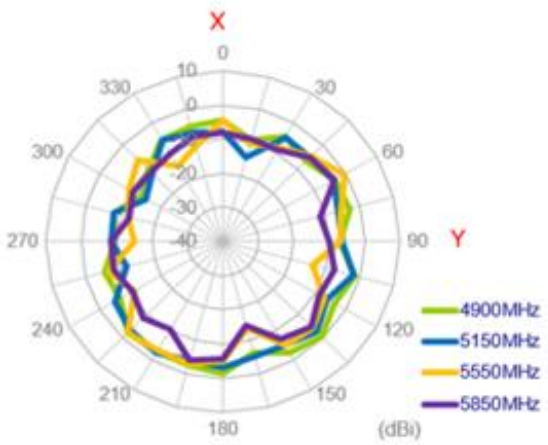


5550MHz

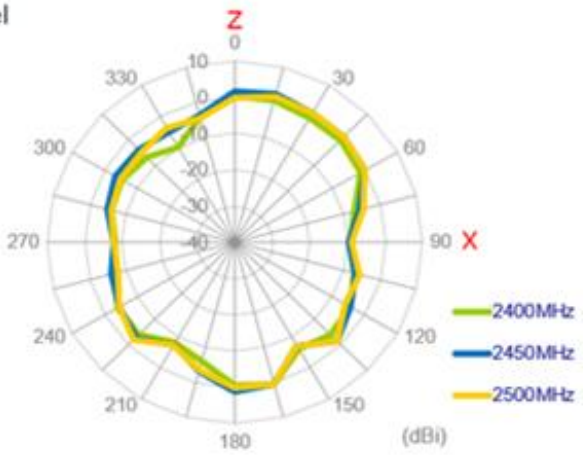
3.2.45 2D Radiation Patterns (Wi-Fi_MIMO2 with 3M cable length on glass)

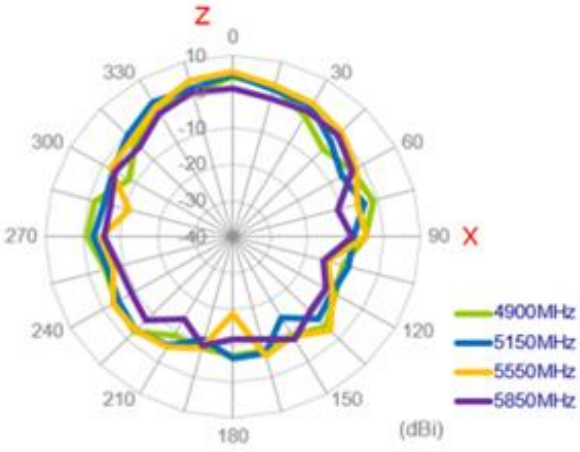
XY Plane



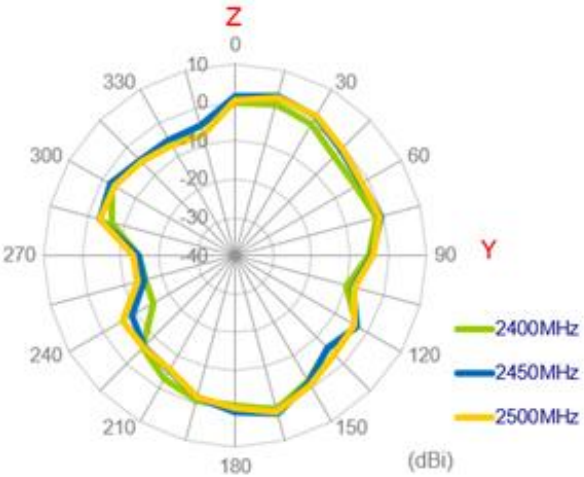


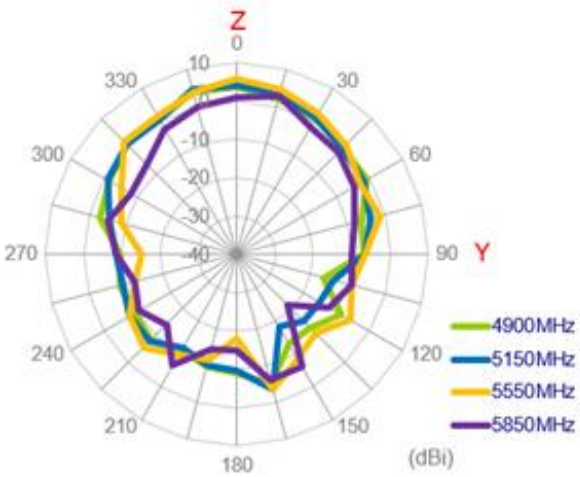
XZ Panel



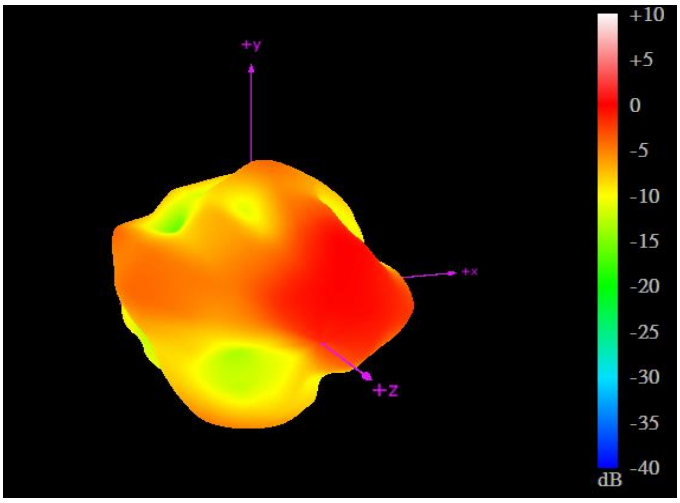


YZ Plane

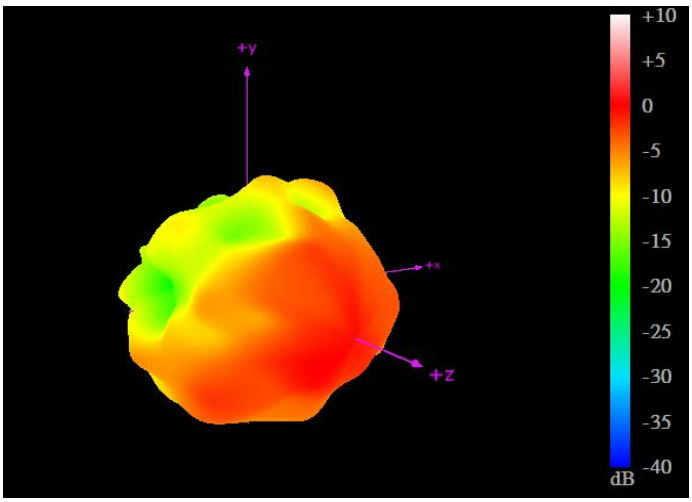




3.2.46 3D Radiation Patterns Pattern (Wi-Fi_MIMO2 with 1M cable length on glass)

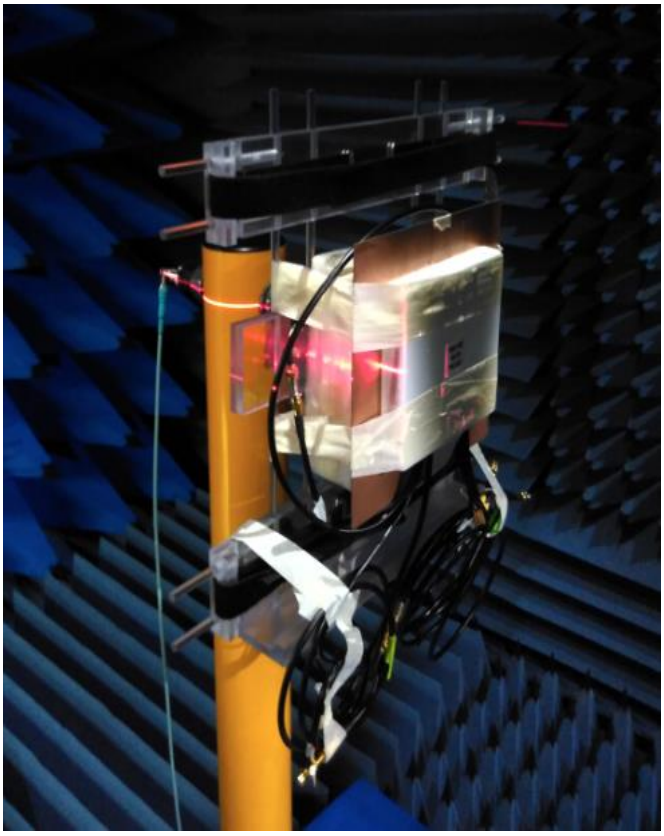


2450MHz



5550MHz

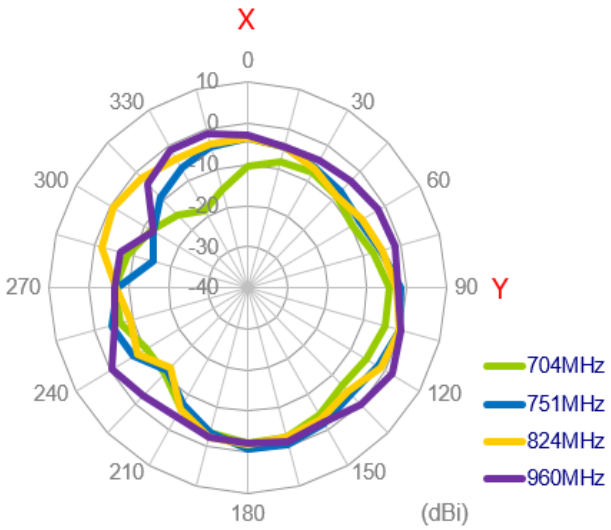
3.2.47 Test Setup for Antenna Radiation Pattern

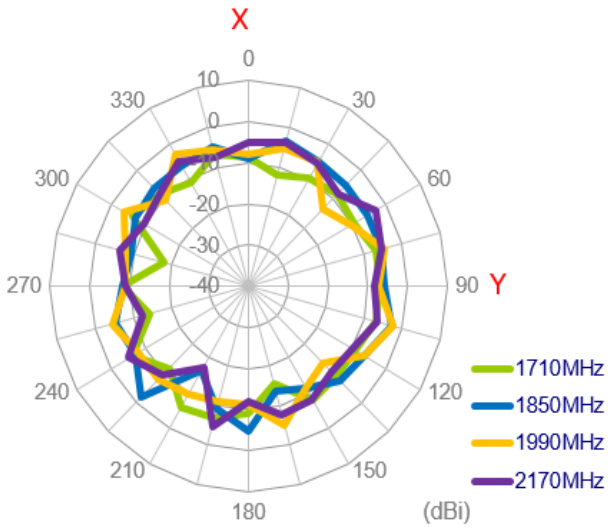


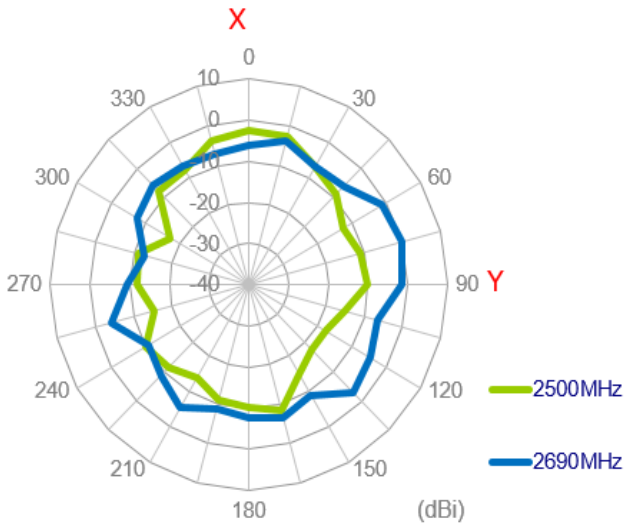
On metal

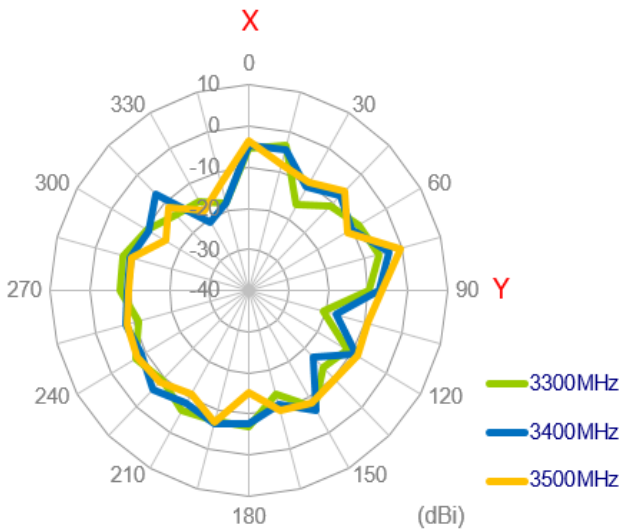
3.2.48 2D Radiation Patterns (LTE_MIMO1 with 1M cable length on metal)

XY Plane

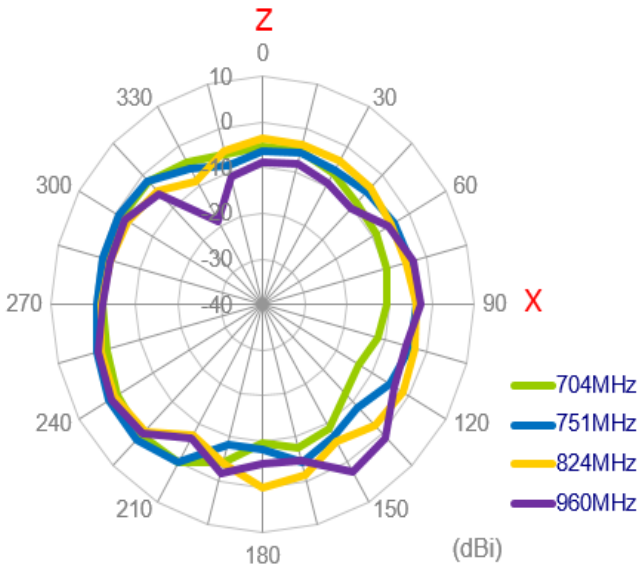


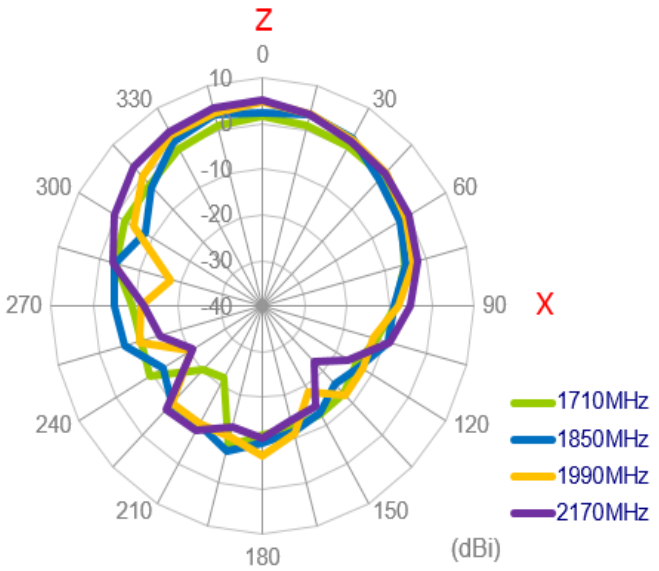


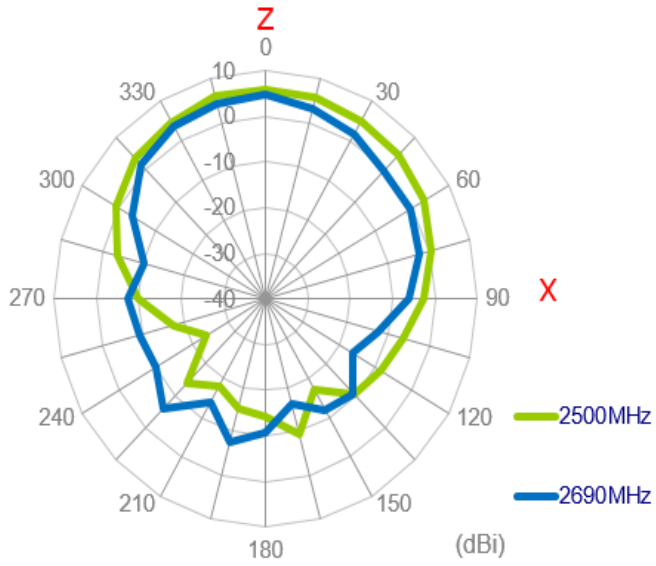


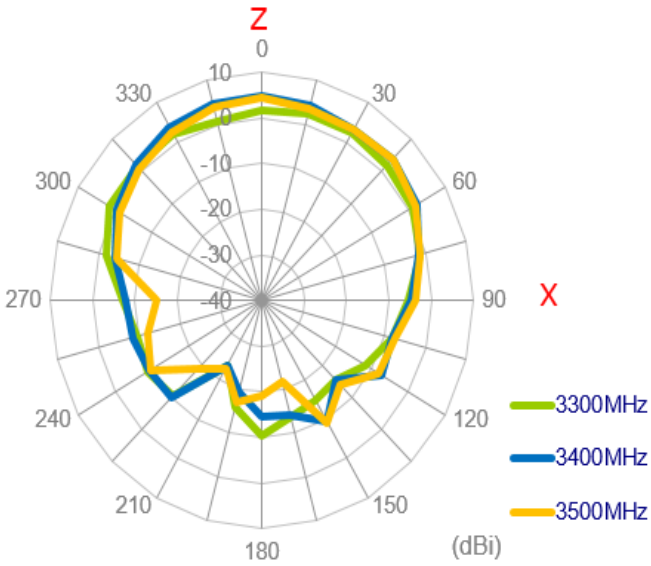


XZ Plane

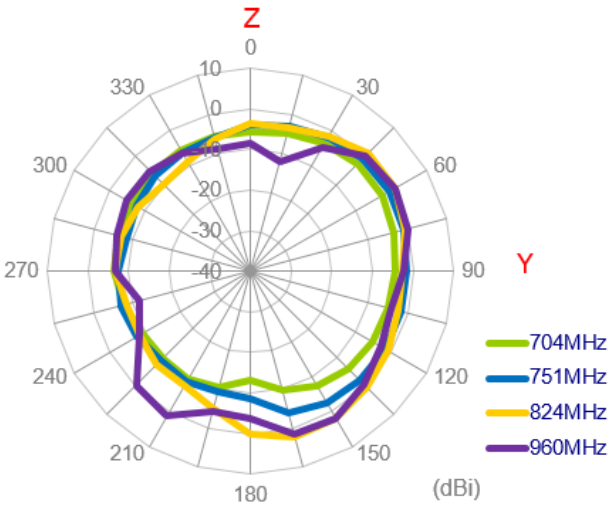

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
704MHz
751MHz
824MHz
960MHz

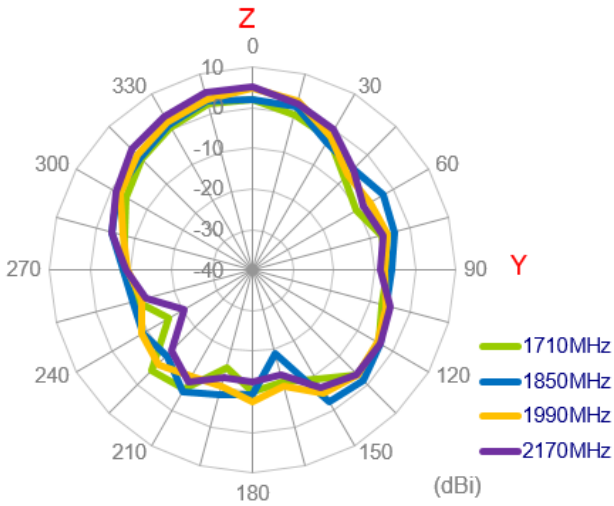

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
1710MHz
1850MHz
1990MHz
2170MHz

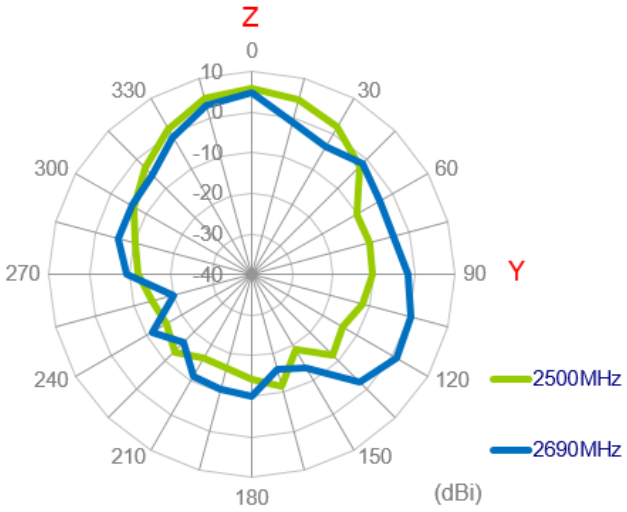

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
2500MHz
2690MHz

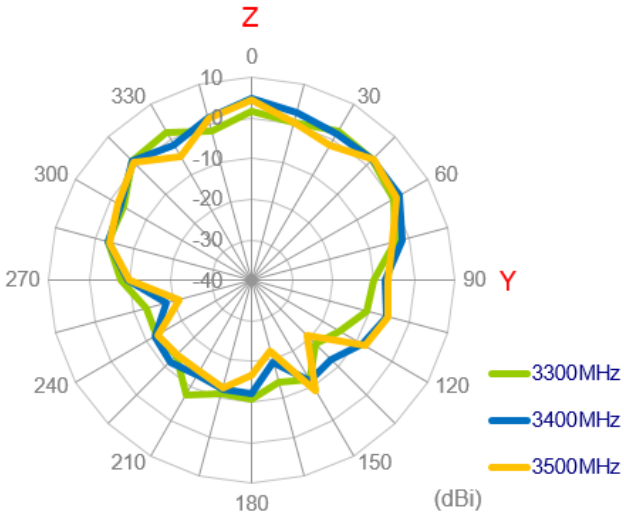

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
3300MHz
3400MHz
3500MHz

YZ Plane

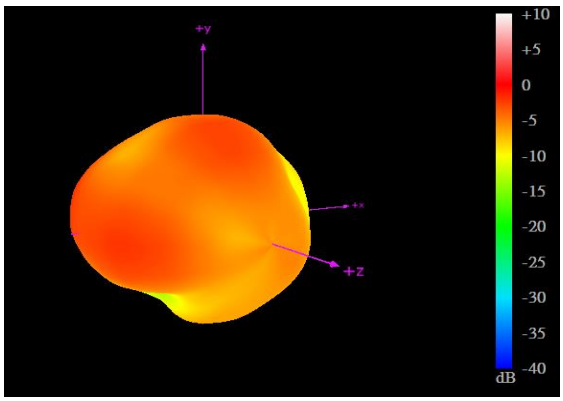

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
704MHz
751MHz
824MHz
960MHz


Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
1710MHz
1850MHz
1990MHz
2170MHz

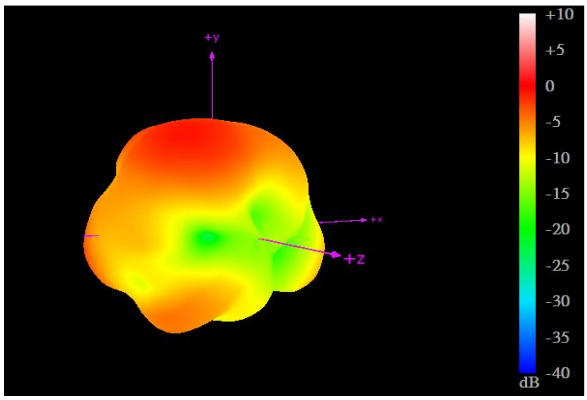

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
2500MHz
2690MHz


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

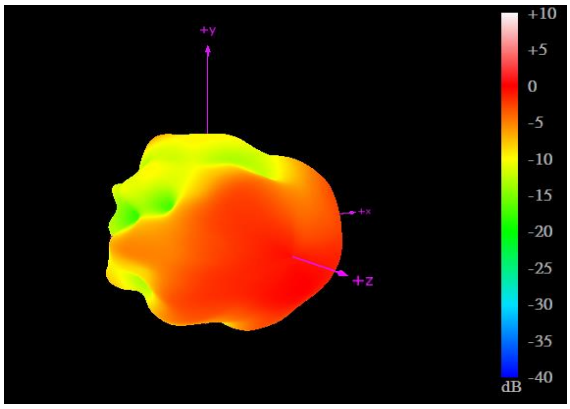
3.2.49 3D Radiation Patterns (LTE_MIMO2 with 1M cable length on metal)



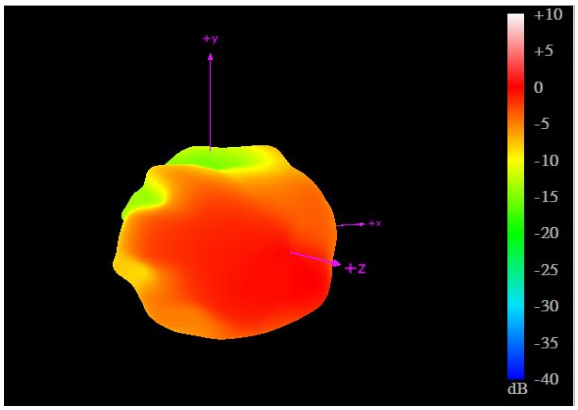
704MHz



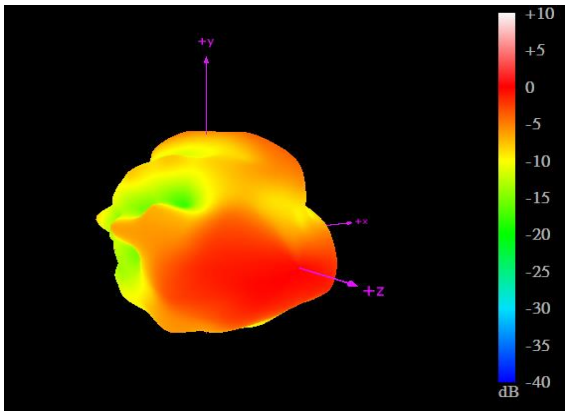
960MHz



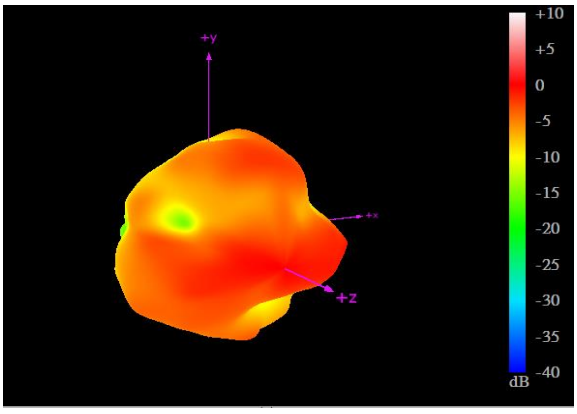
1710MHz



2170MHz



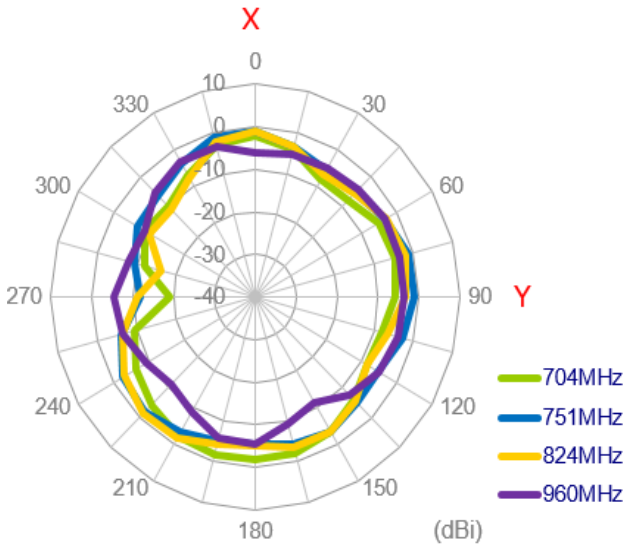
2690MHz

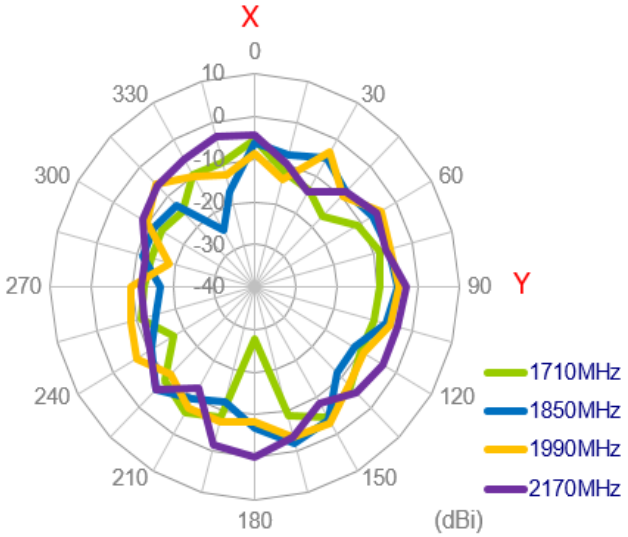


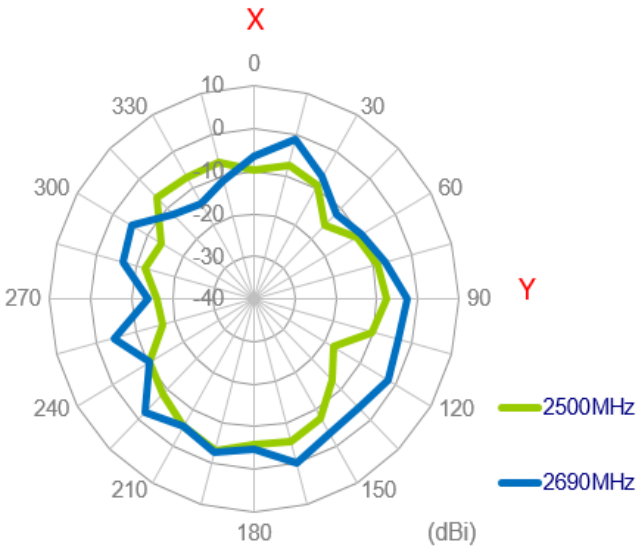
3500MHz

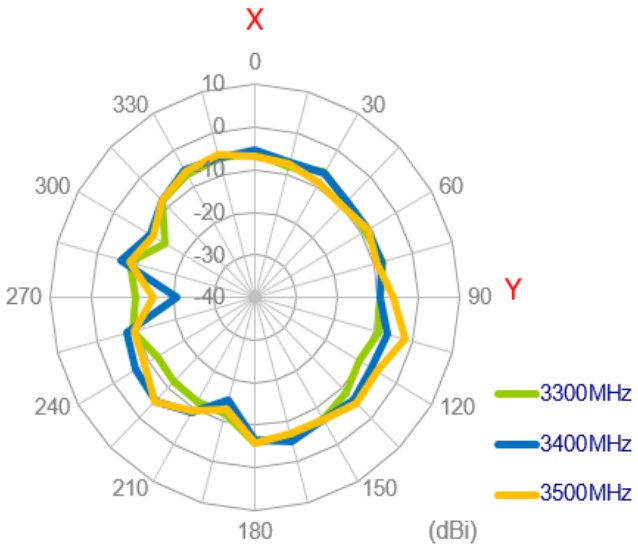
3.2.50 2D Radiation Patterns (LTE_MIMO2 with 1M cable length on metal)

XY Plane

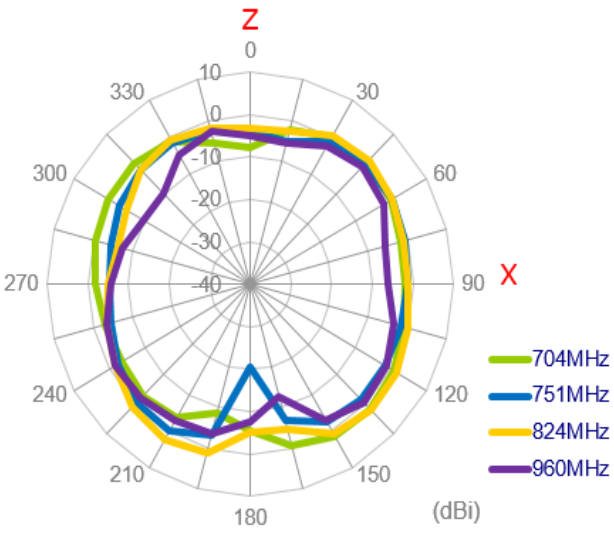


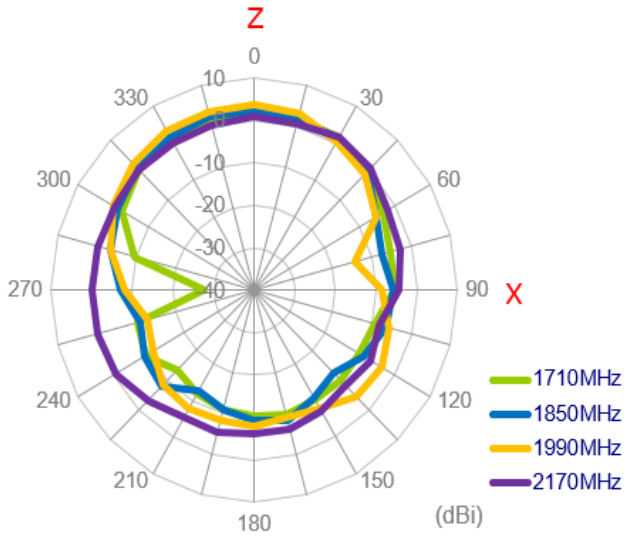


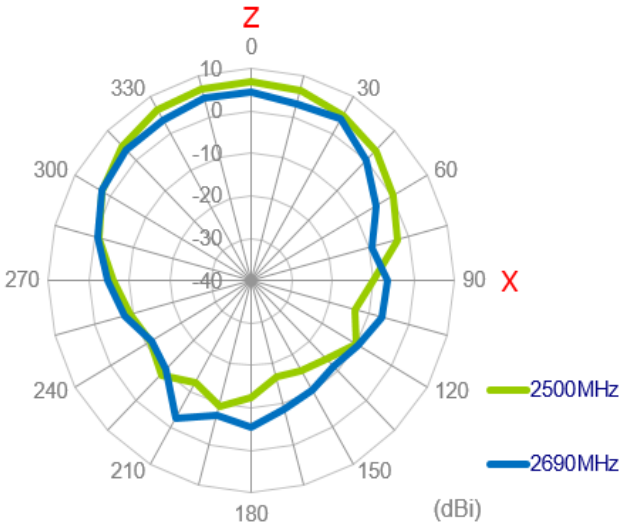


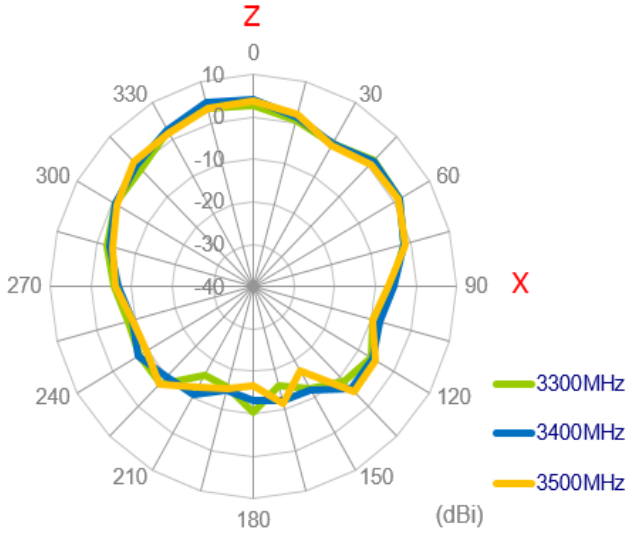


XZ Plane

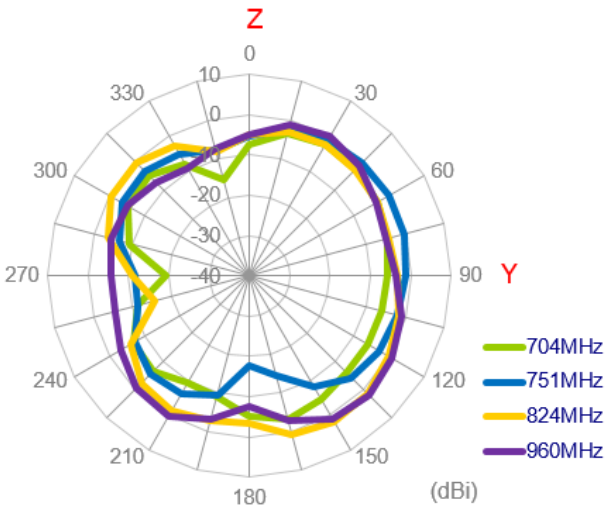

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
704MHz
751MHz
824MHz
960MHz
(dBi)

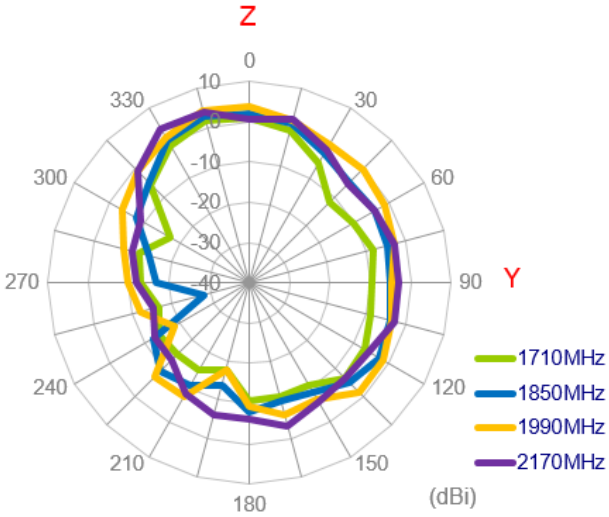

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)

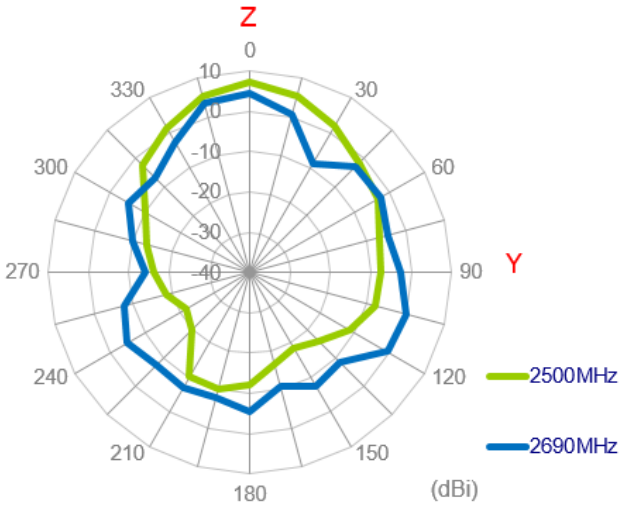

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
2500MHz
2690MHz
(dBi)

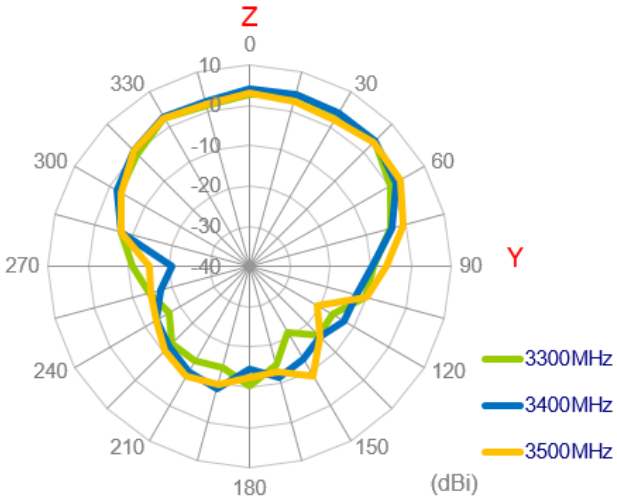

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
3300MHz
3400MHz
3500MHz
(dBi)

YZ Plane

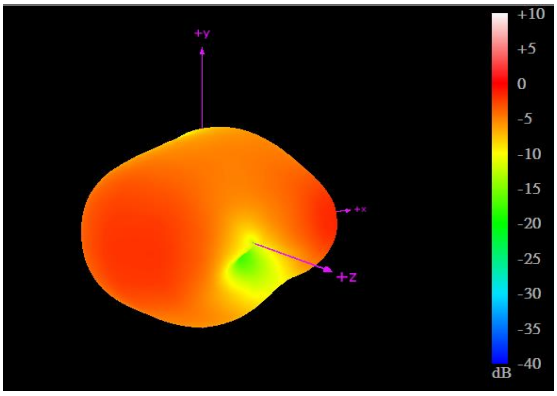

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
704MHz
751MHz
824MHz
960MHz


Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
1710MHz
1850MHz
1990MHz
2170MHz

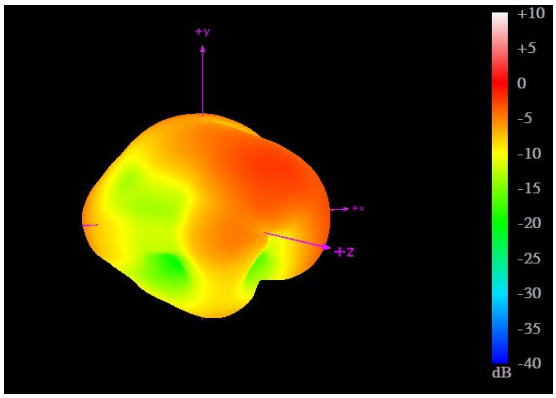

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
2500MHz
2690MHz


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

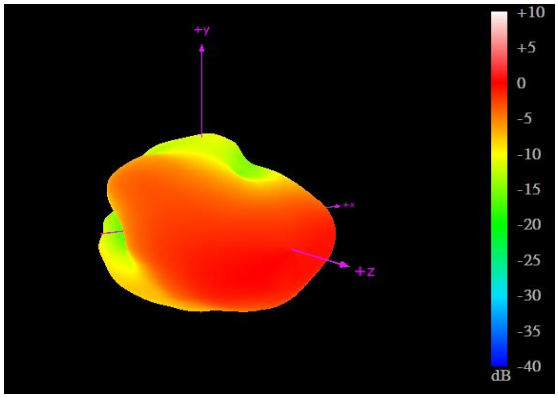
3.2.51 3D Radiation Patterns (LTE_MIMO2 with 1M cable length on metal)



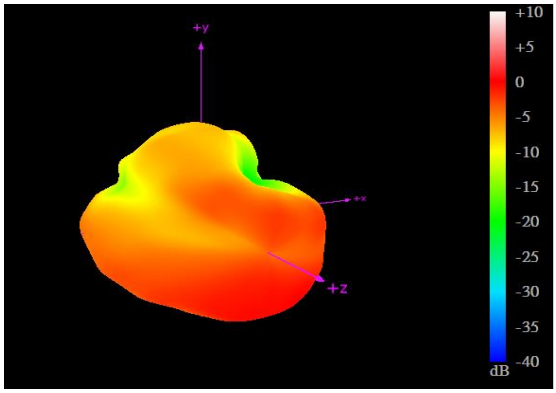
704MHz



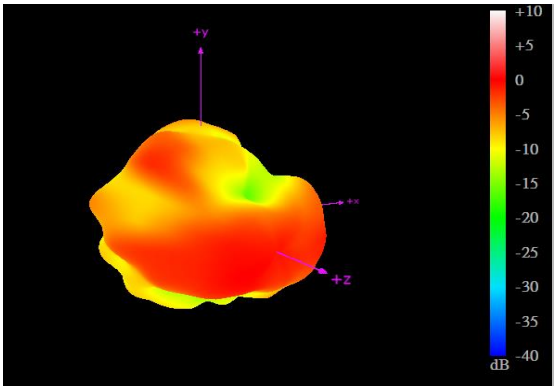
960MHz



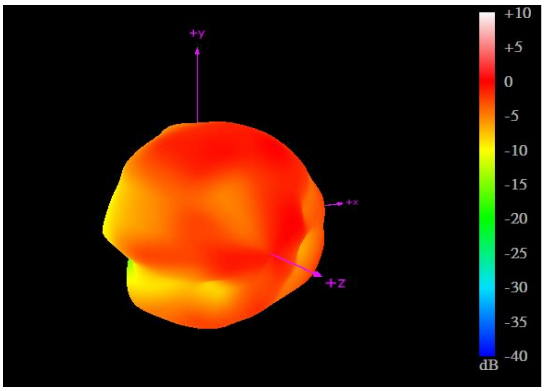
1710MHz



2170MHz



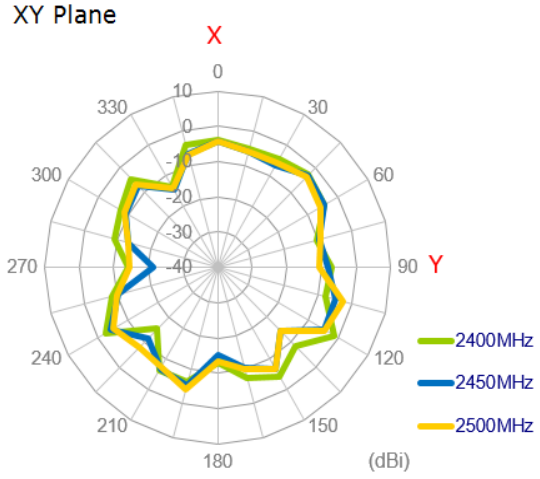
2690MHz

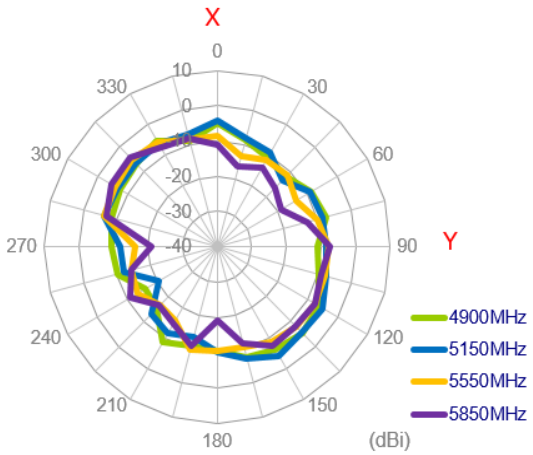


3500MHz

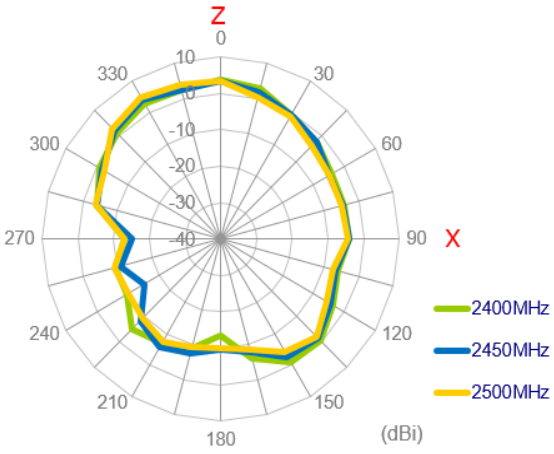
3.2.52 2D Radiation Patterns (LTE_MIMO2 with 1M cable length on metal)

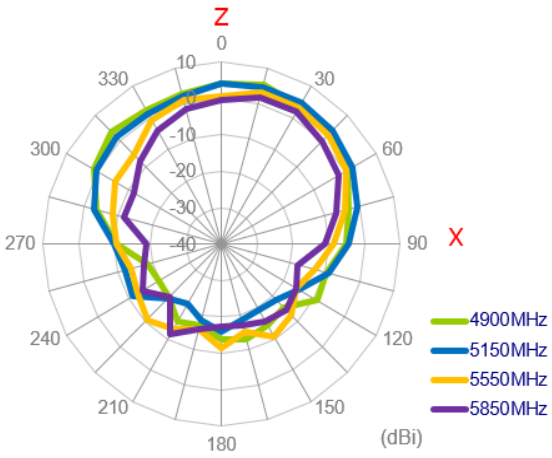
XY Plane



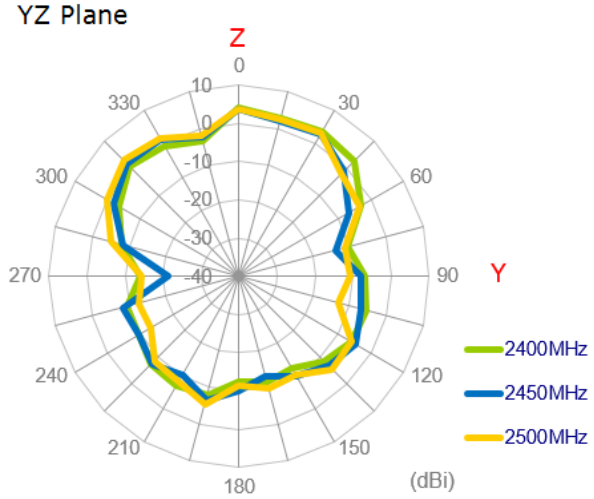


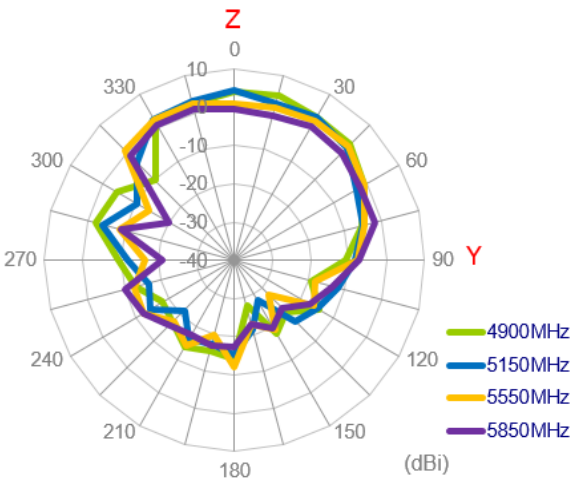
XZ Plane



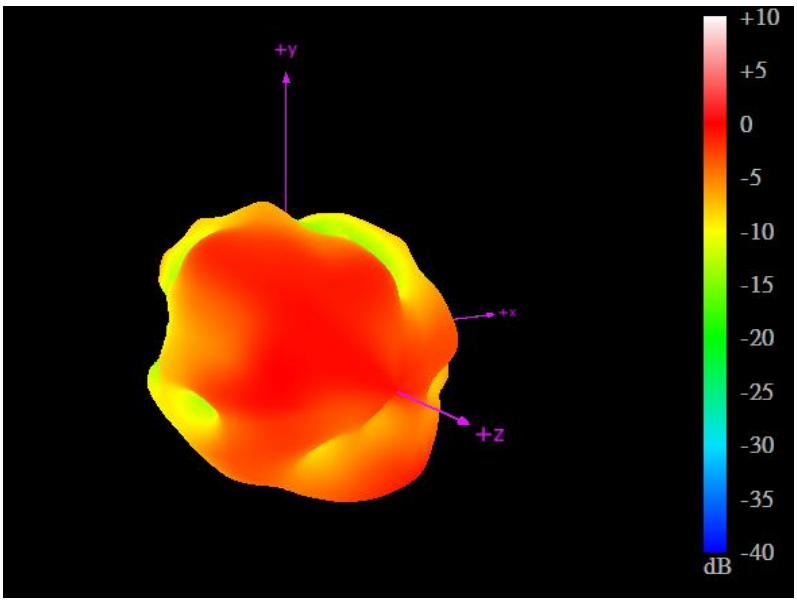


YZ Plane

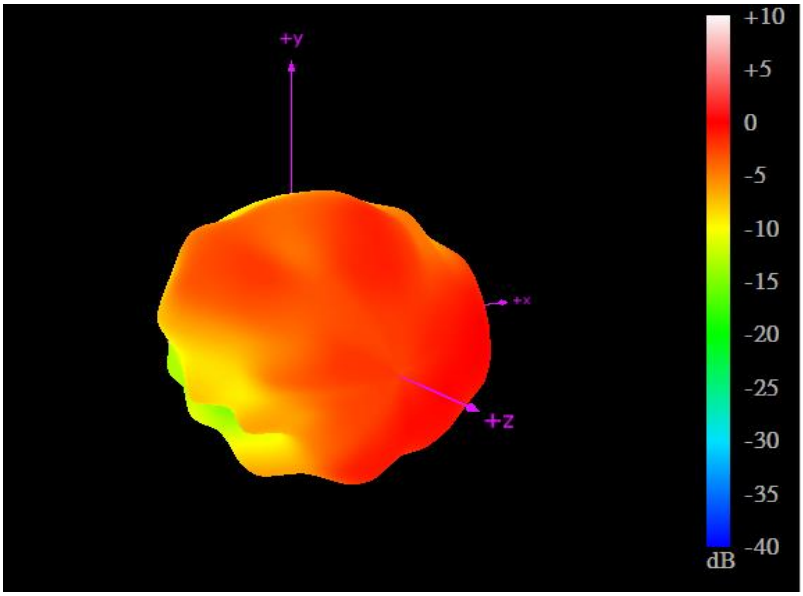




3.2.53 3D Radiation Patterns Pattern (Wi-Fi_MIMO2 with 1M cable length on glass)



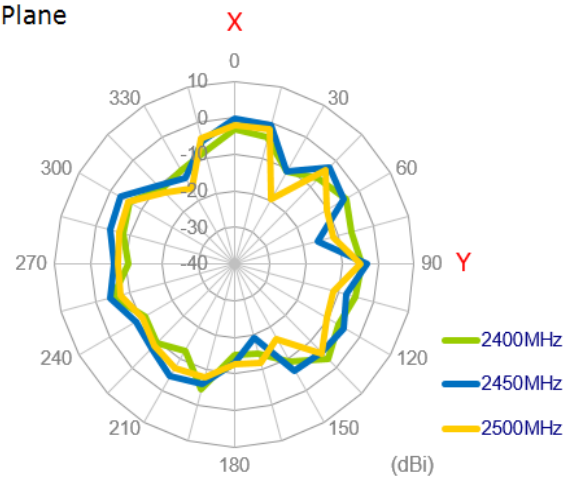
2450MHz

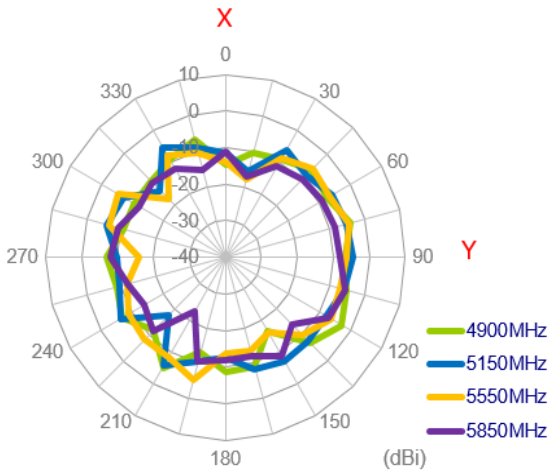


5550MHz

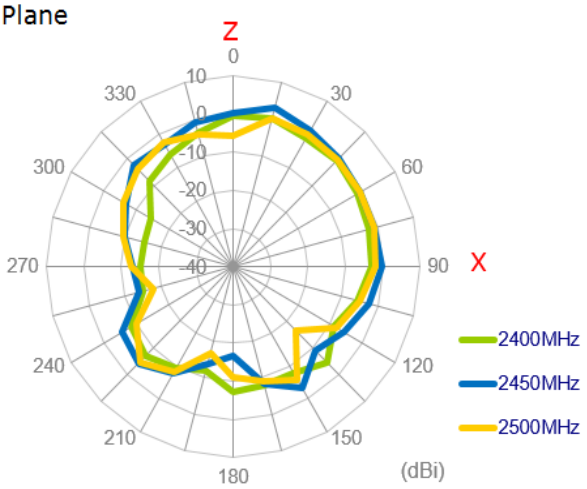
3.2.54 2D Radiation Patterns (LTE_MIMO1 with 1M cable length on metal)

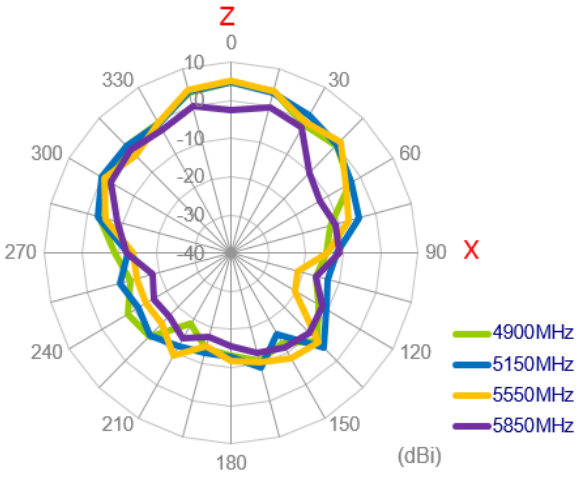
XY Plane



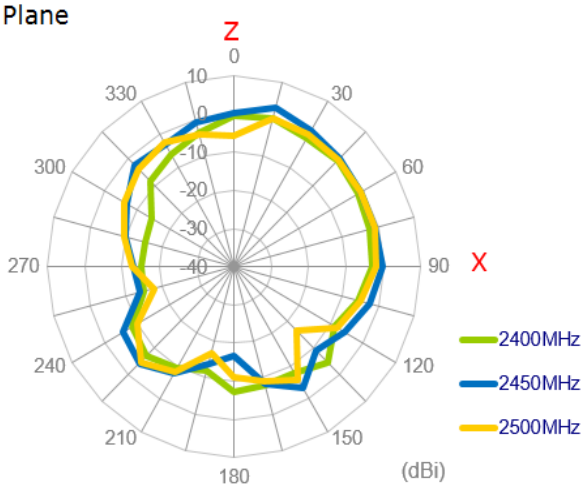


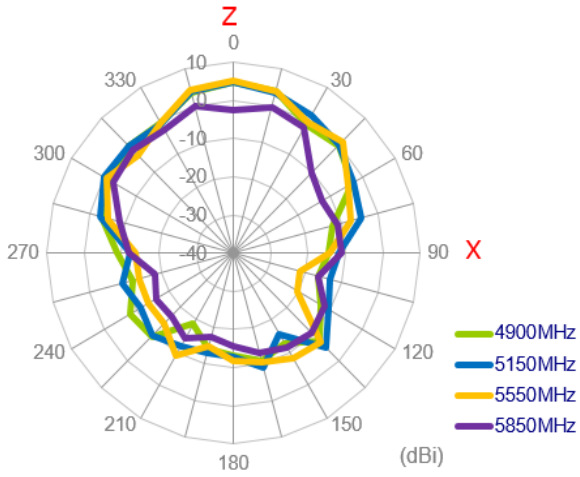
XZ Plane



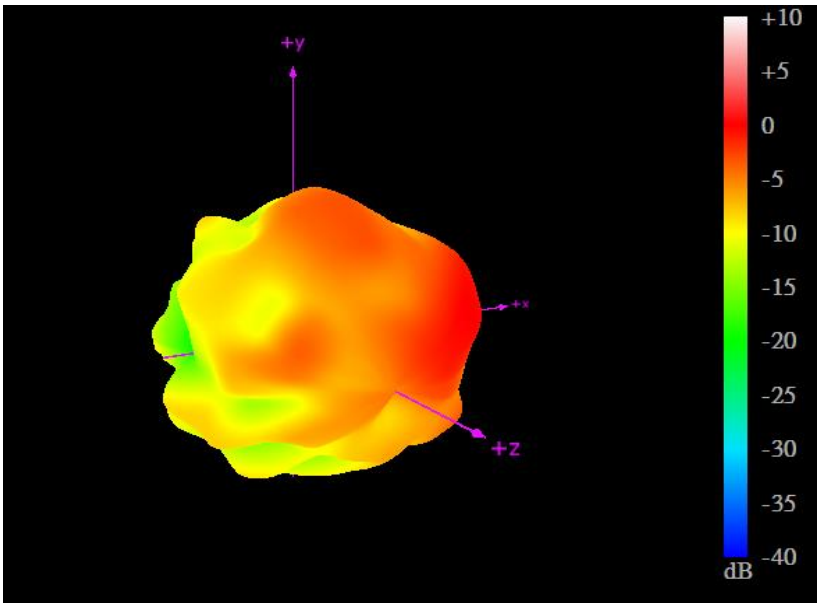


XZ Plane

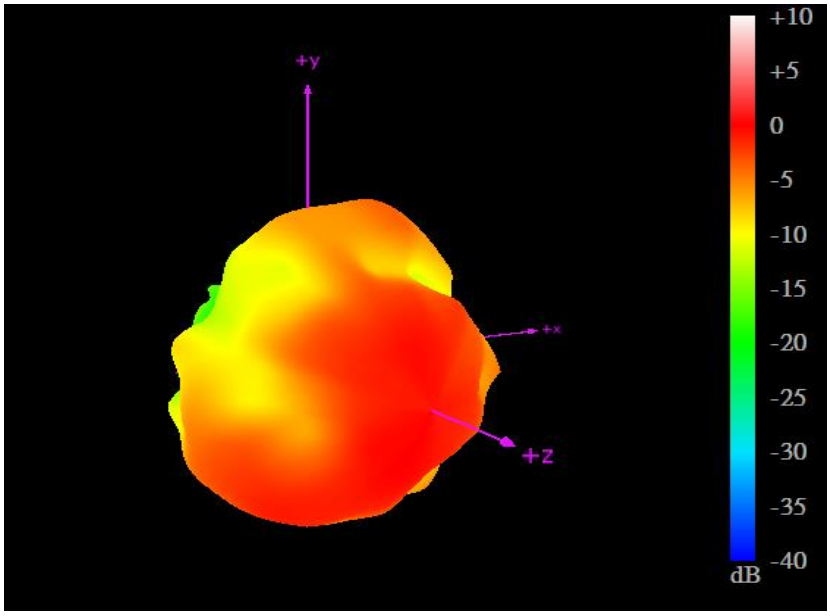




3.2.55 3D Radiation Patterns Pattern (Wi-Fi_MIMO2 with 1M cable length on metal)

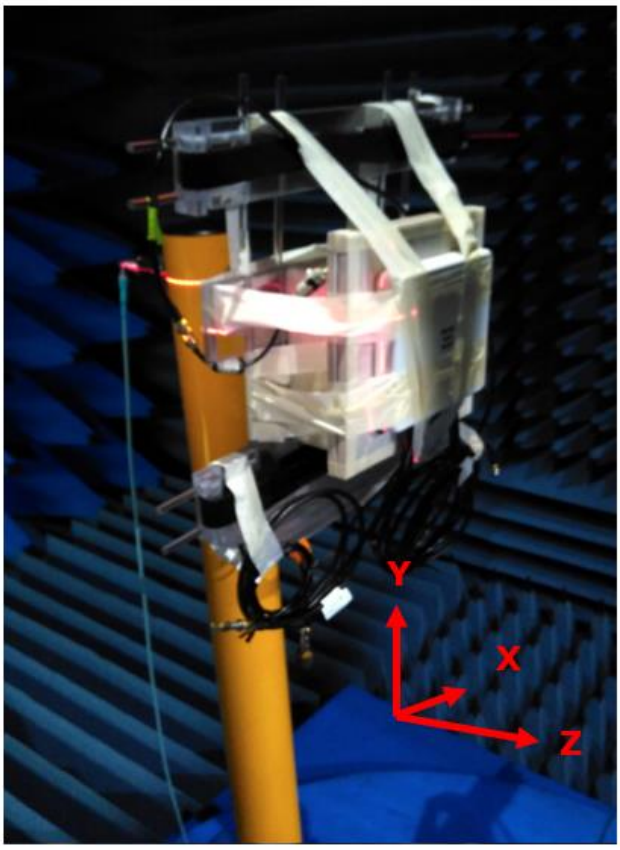


2450MHz



5550MHz

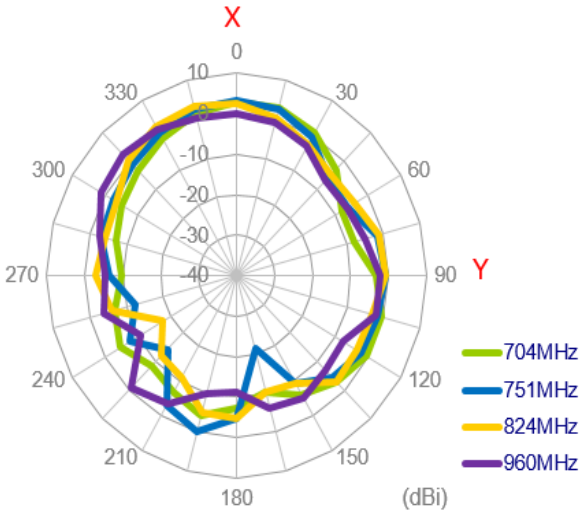
3.2.56 Test Setup for Antenna Radiation Pattern

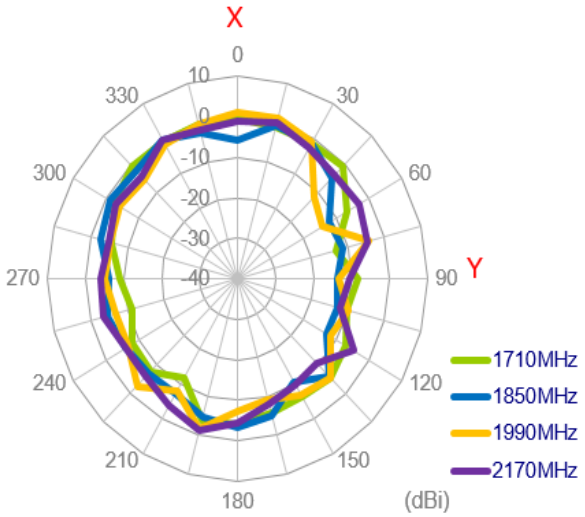


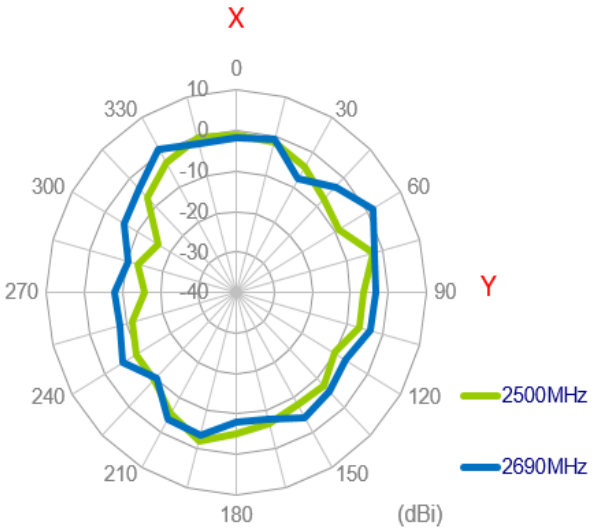
On the wall

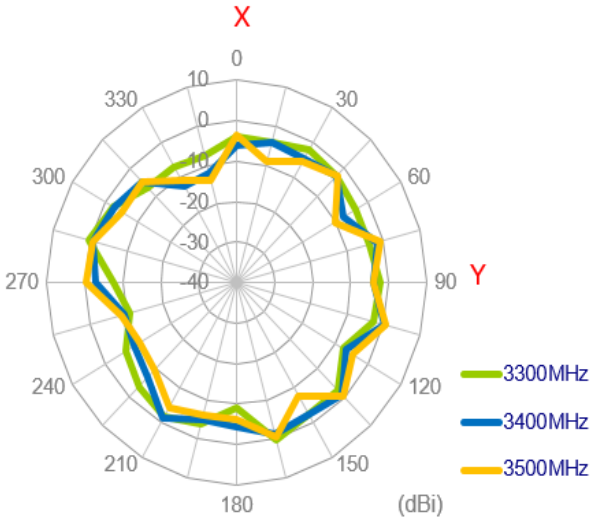
3.2.57 2D Radiation Patterns (LTE_MIMO1 with 1M cable length on the wall)

XY Plane

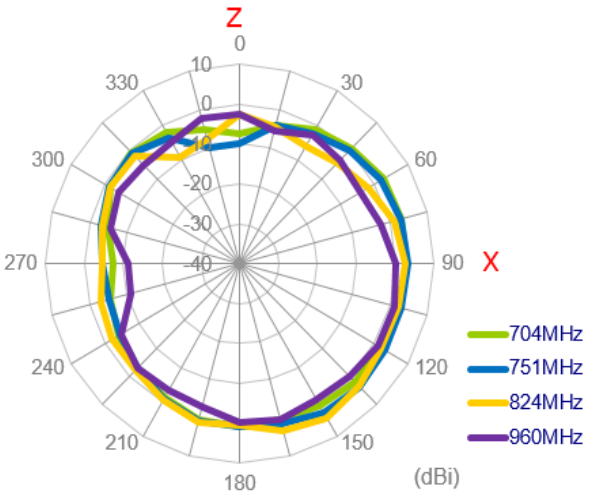


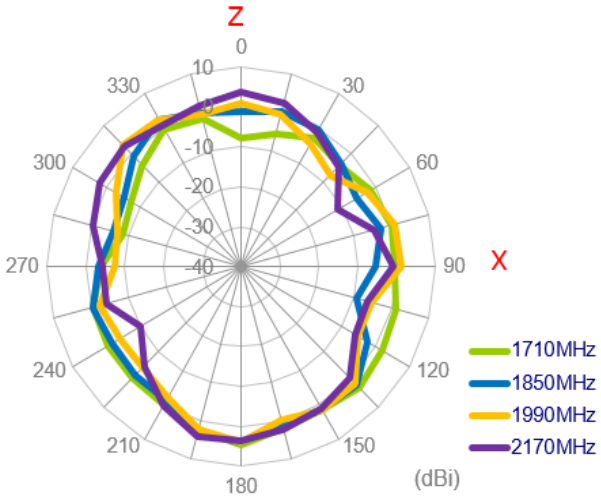


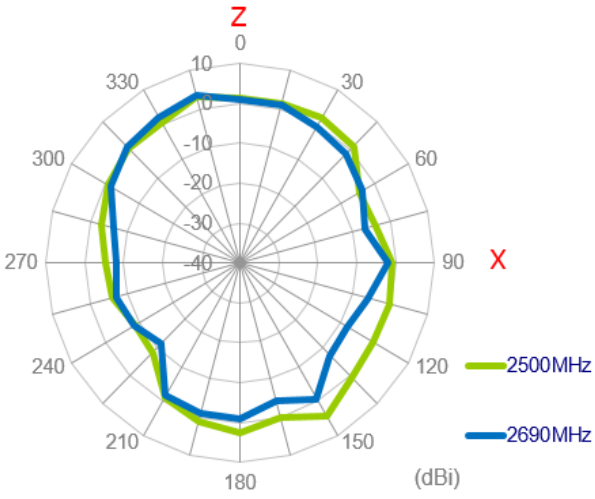


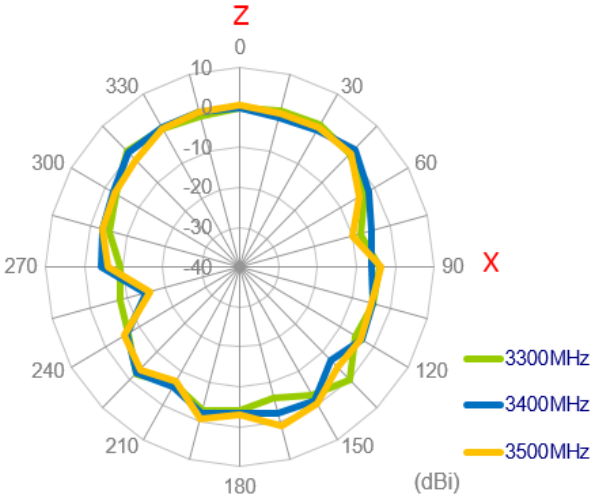


XZ Plane

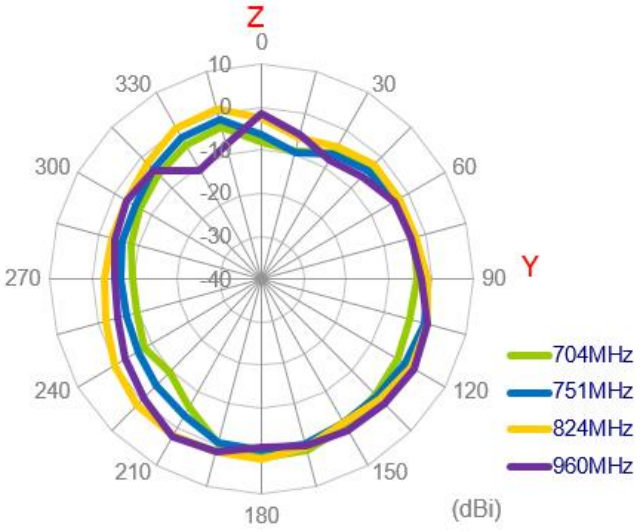

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
704MHz
751MHz
824MHz
960MHz
(dBi)

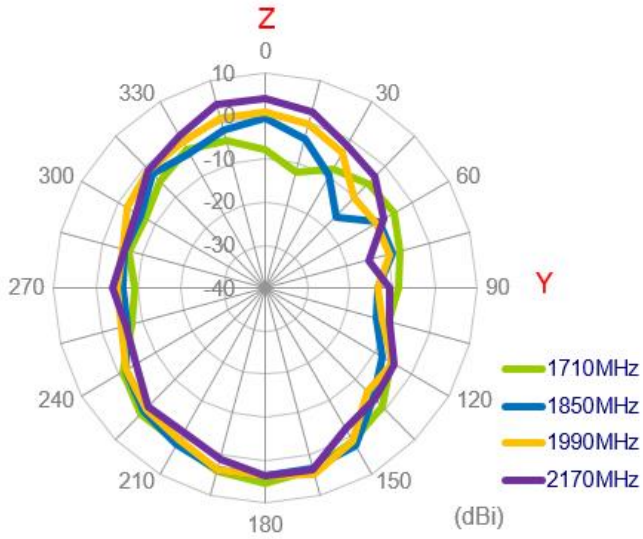

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)

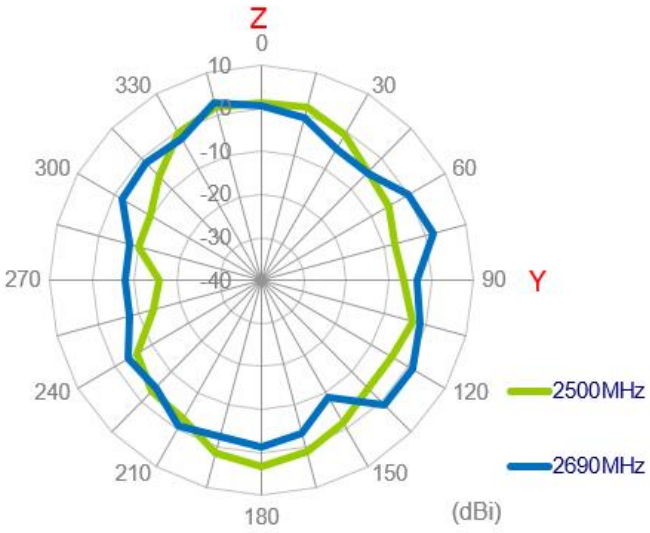

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
2500MHz
2690MHz
(dBi)

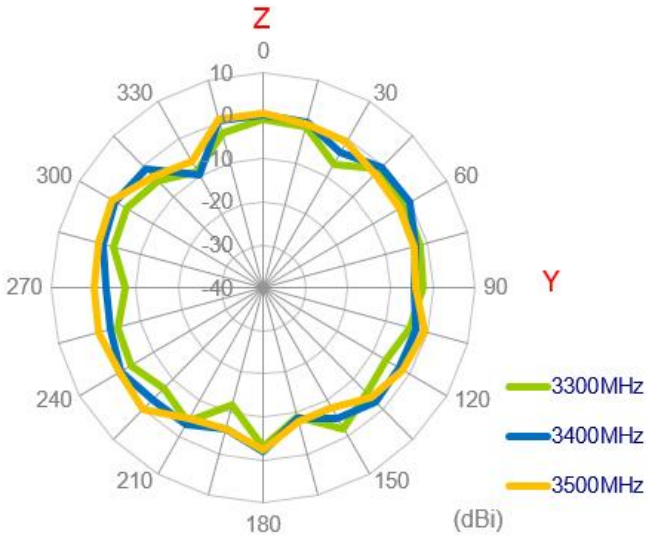

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
3300MHz
3400MHz
3500MHz
(dBi)

YZ Plane

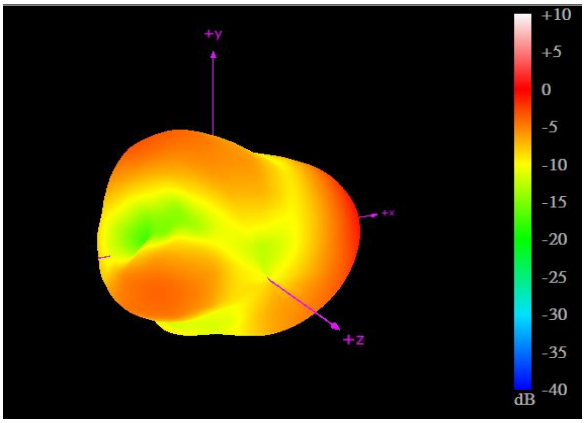

Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
Y
704MHz
751MHz
824MHz
960MHz
(dBi)


Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
Y
1710MHz
1850MHz
1990MHz
2170MHz
(dBi)

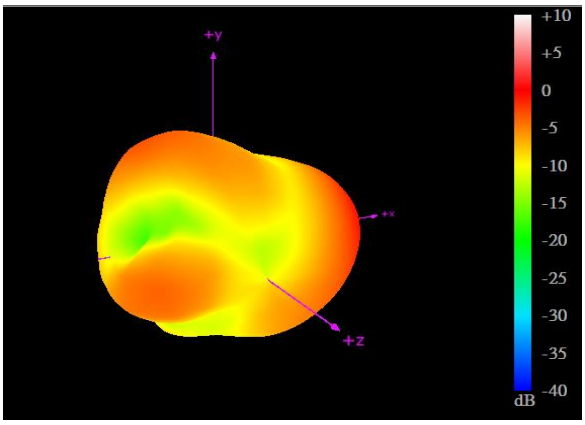

Z
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
Y
2500MHz
2690MHz
(dBi)


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

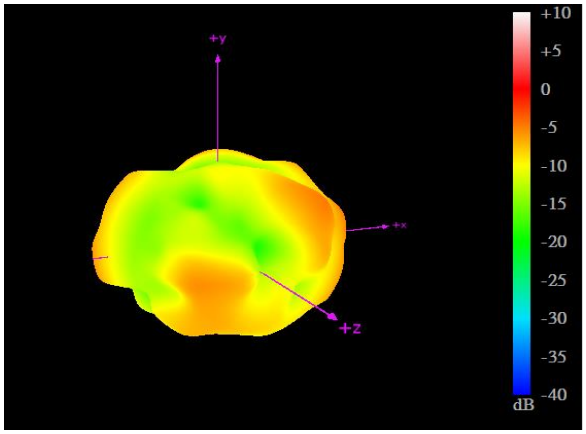
3.2.58 3D Radiation Patterns (LTE_MIMO1 with 1M cable length on the wall)



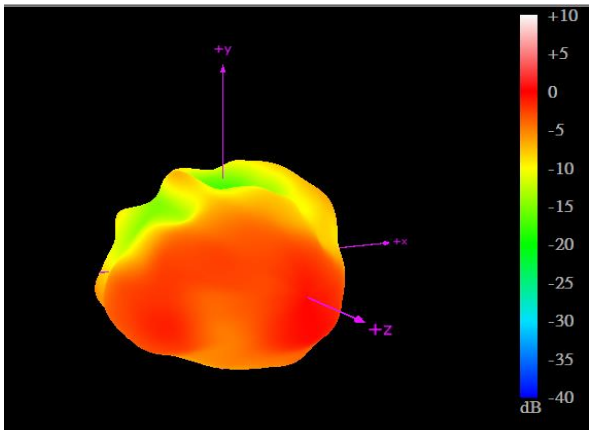
704MHz



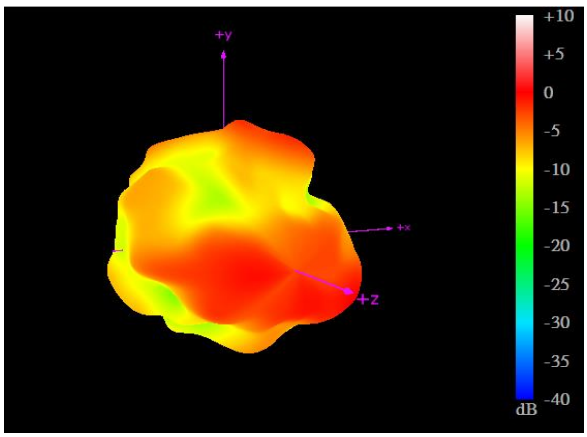
960MHz



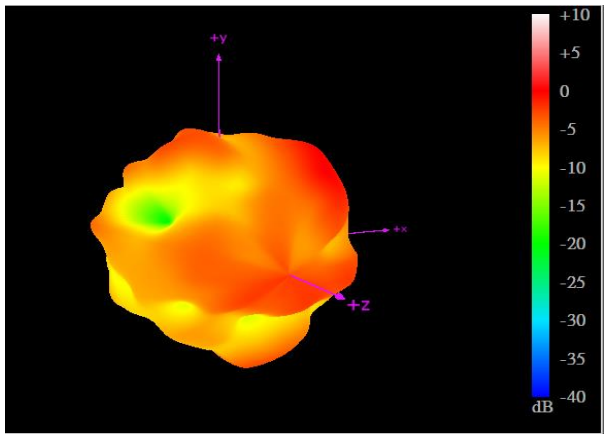
1710MHz



2170MHz



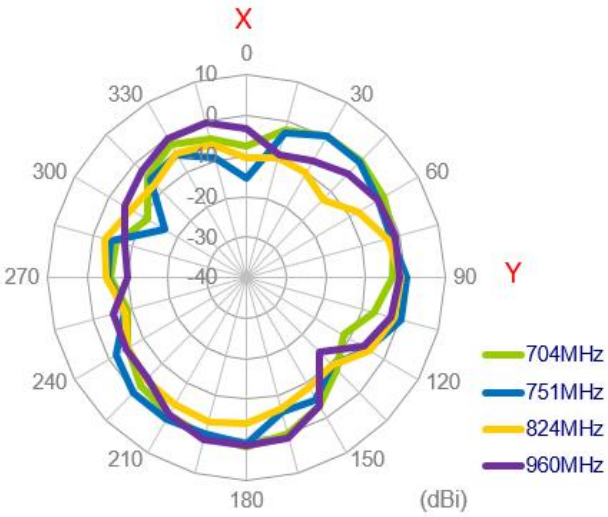
2690MHz

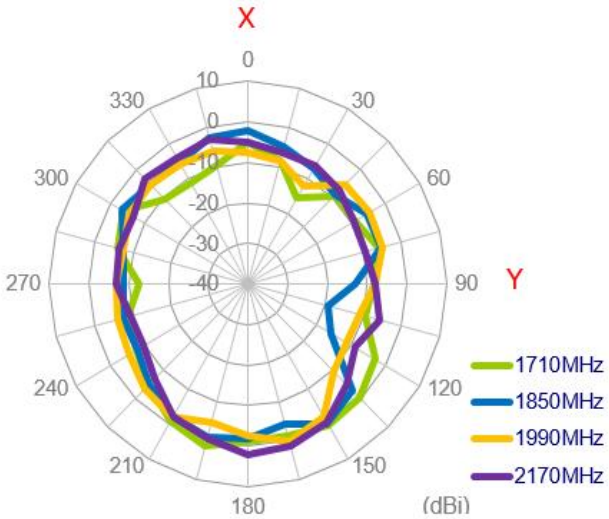


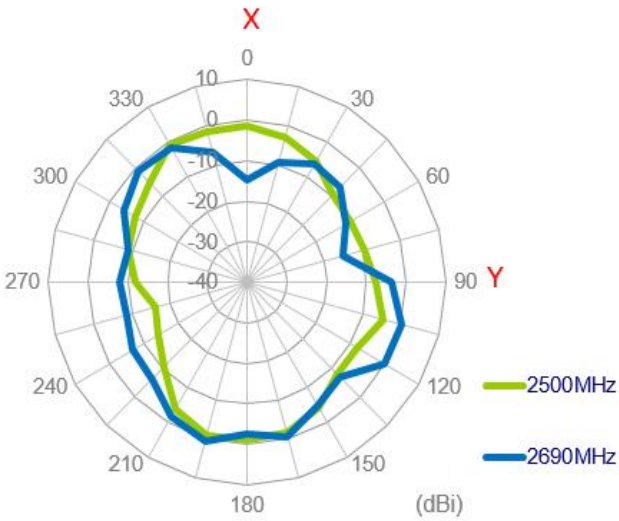
3500MHz

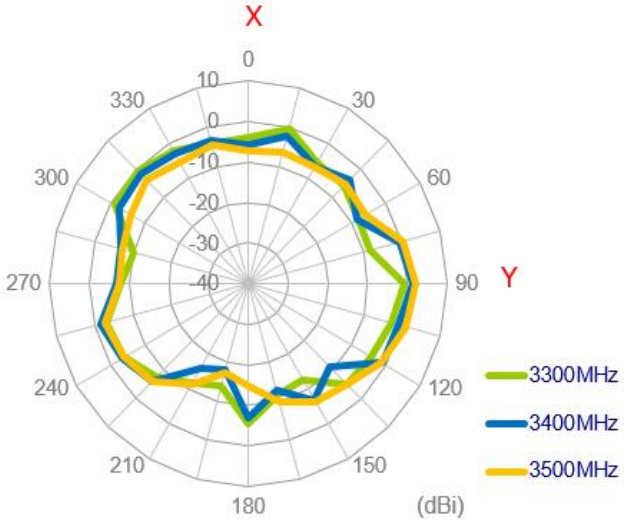
3.2.59 2D Radiation Patterns (LTE_MIMO1 with 1M cable length on the wall)

XY Plane

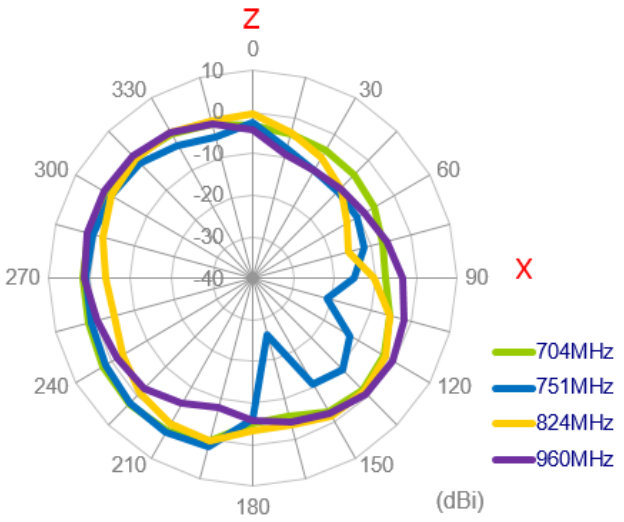


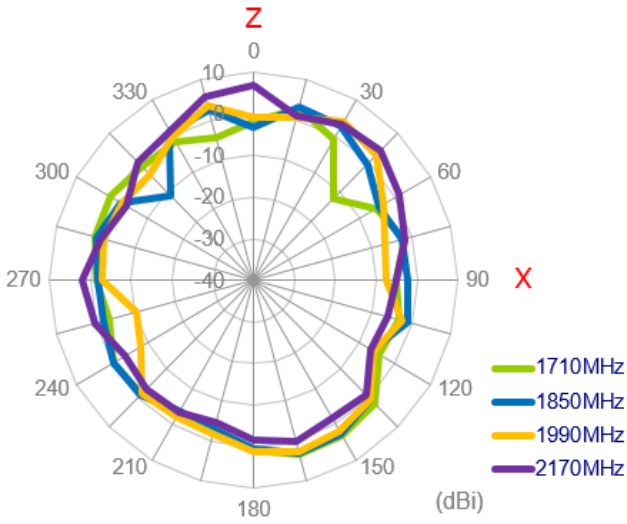


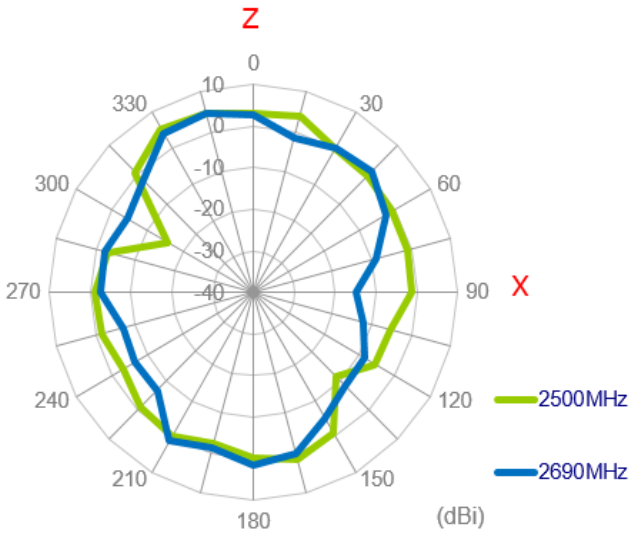


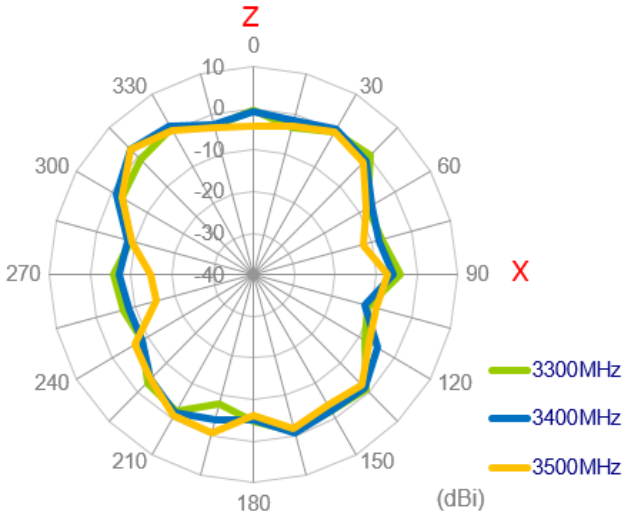


XZ Plane

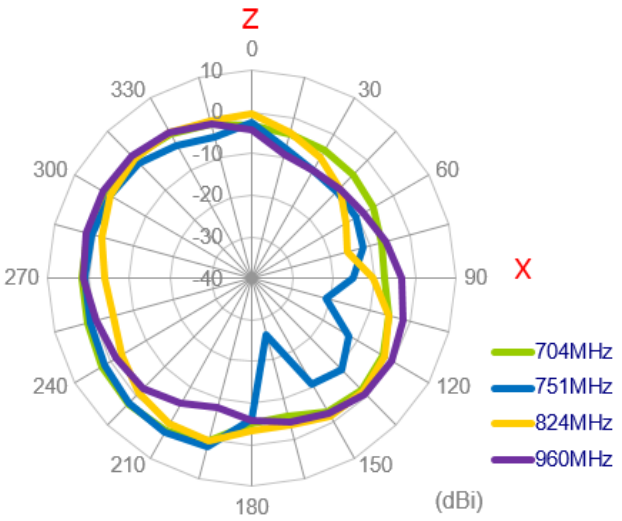

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
704MHz
751MHz
824MHz
960MHz

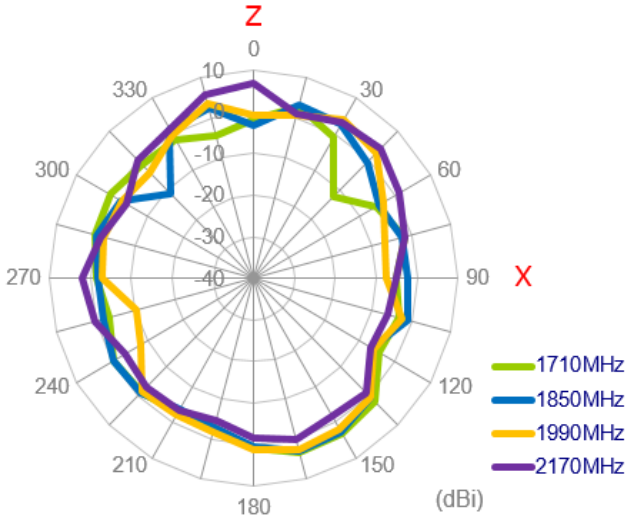

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
1710MHz
1850MHz
1990MHz
2170MHz

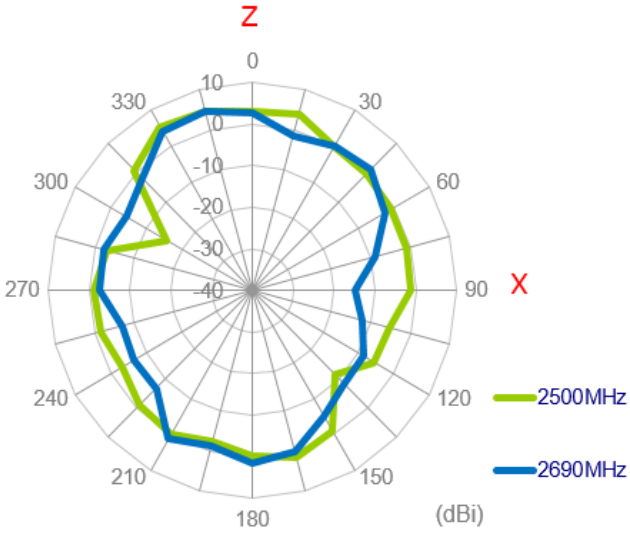

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
2500MHz
2690MHz

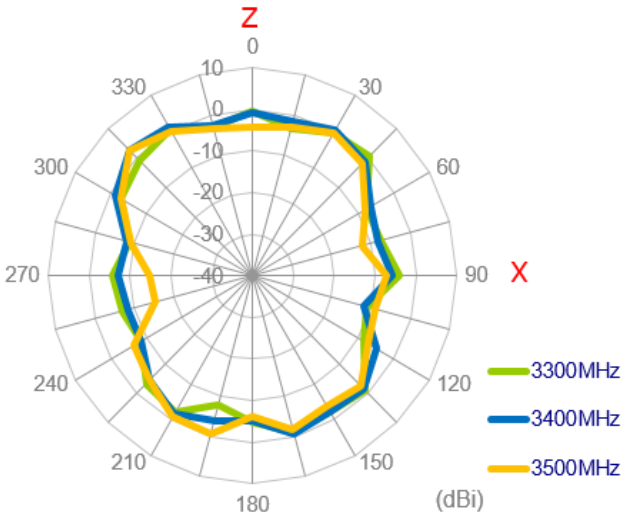

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
3300MHz
3400MHz
3500MHz

YZ Plane

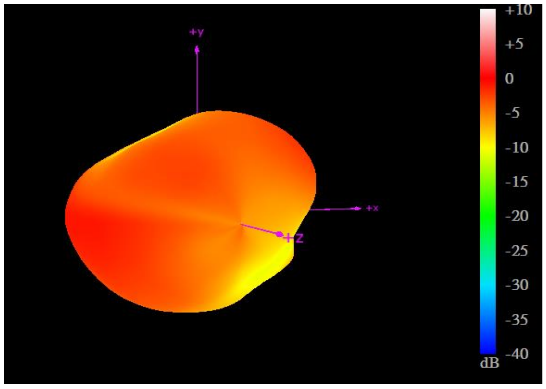

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
704MHz
751MHz
824MHz
960MHz


Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
1710MHz
1850MHz
1990MHz
2170MHz

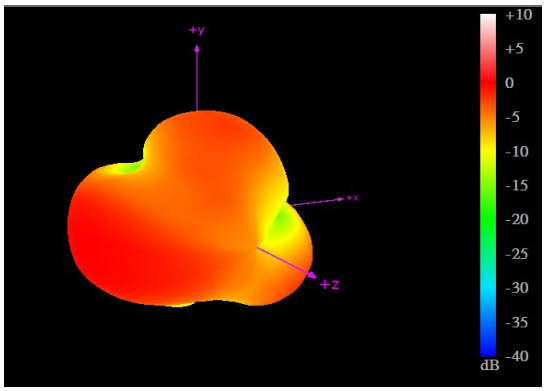

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
2500MHz
2690MHz


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

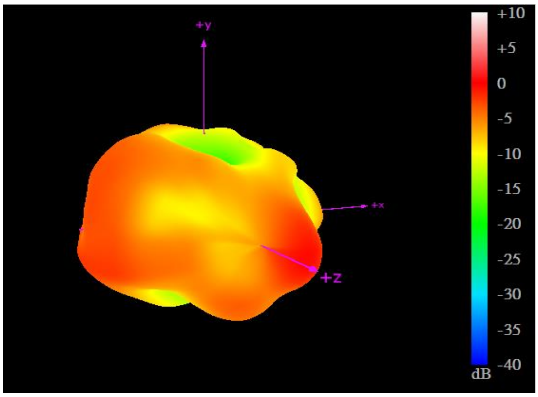
3.2.60 3D Radiation Patterns (LTE_MIMO1 with 1M cable length on the wall)



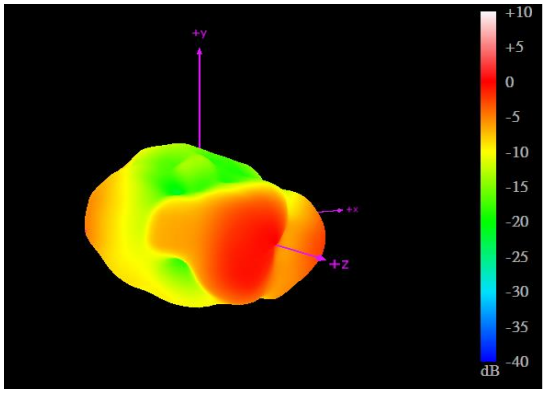
704MHz



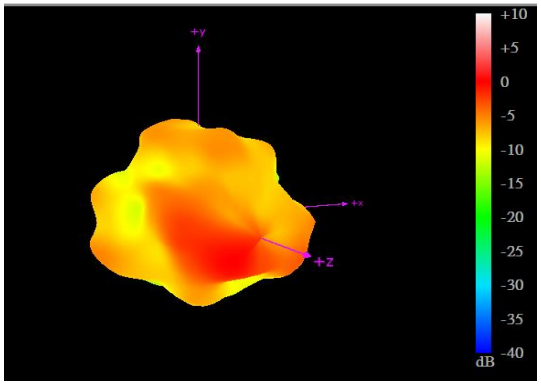
960MHz



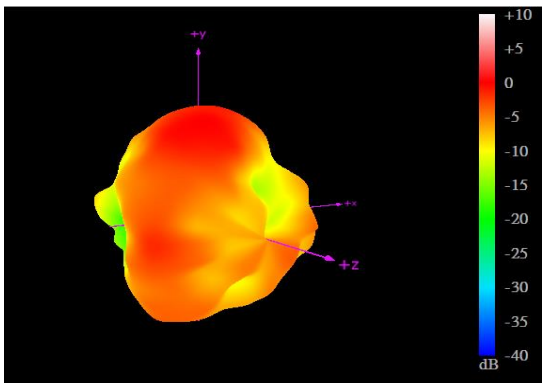
1710MHz



2170MHz



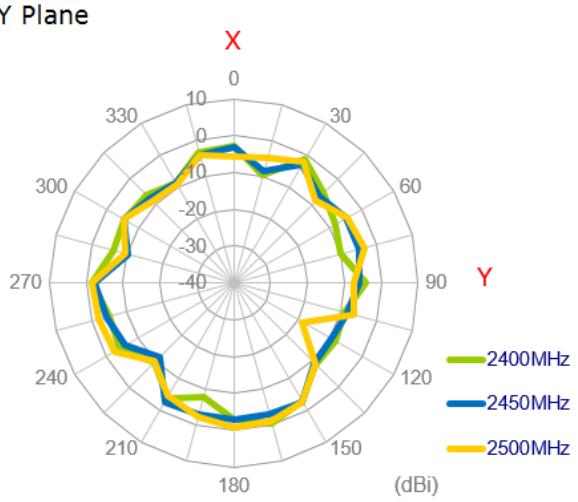
2690MHz

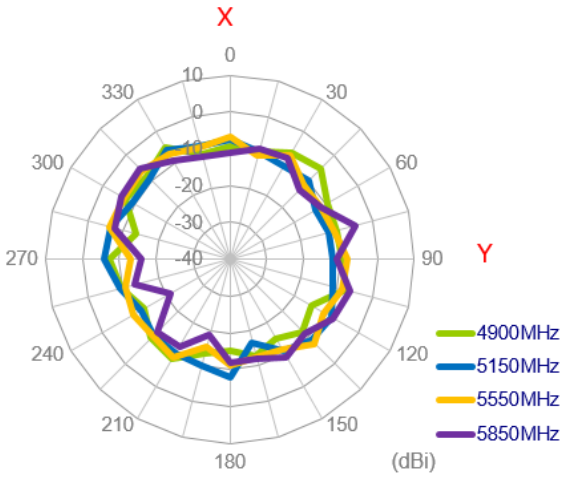


3500MHz

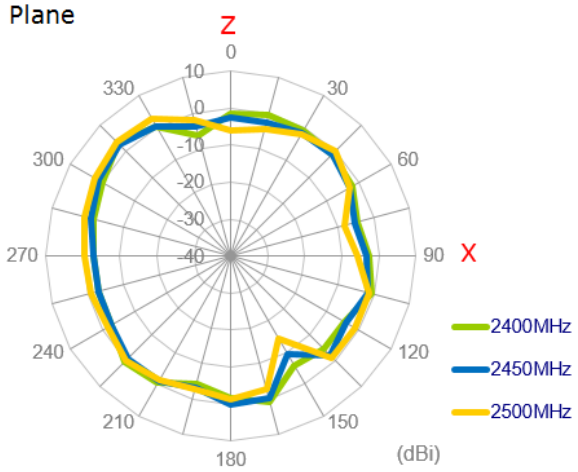
3.2.61 2D Radiation Patterns (Wi-Fi_MIMO1 with 1M cable length in free space)

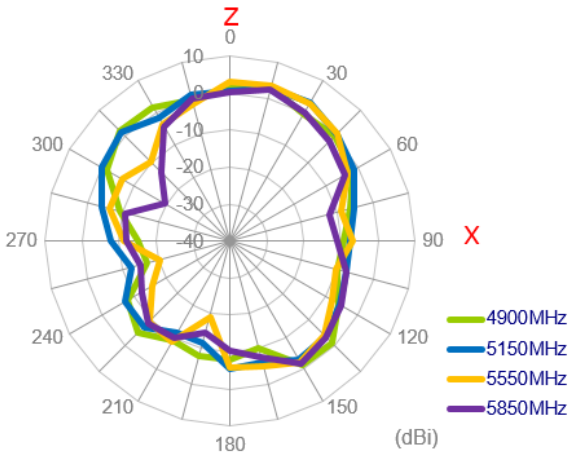
XY Plane



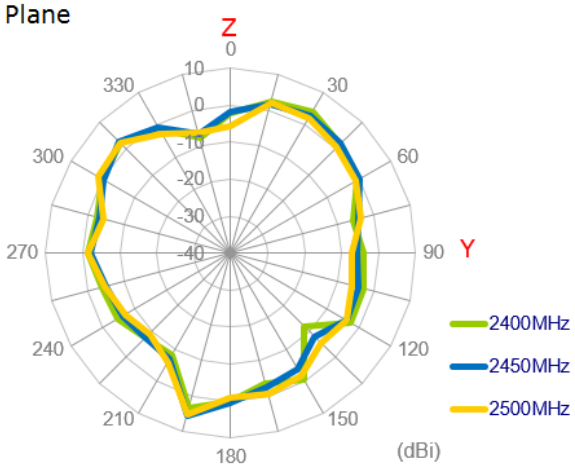


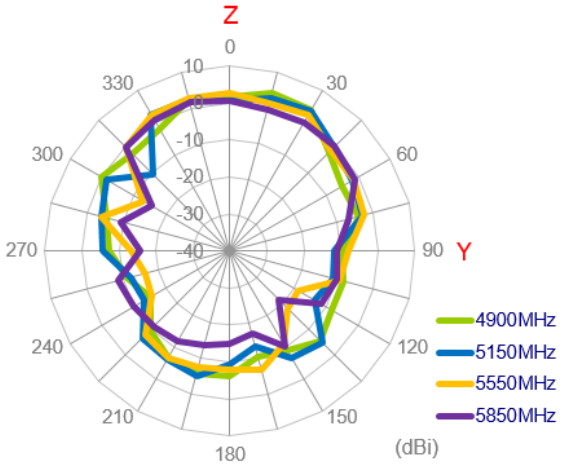
XZ Plane



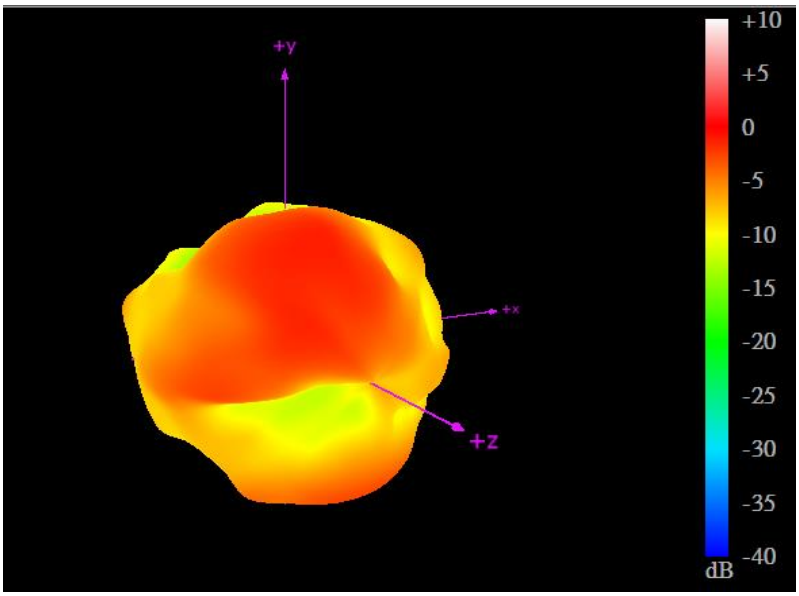


XY Plane

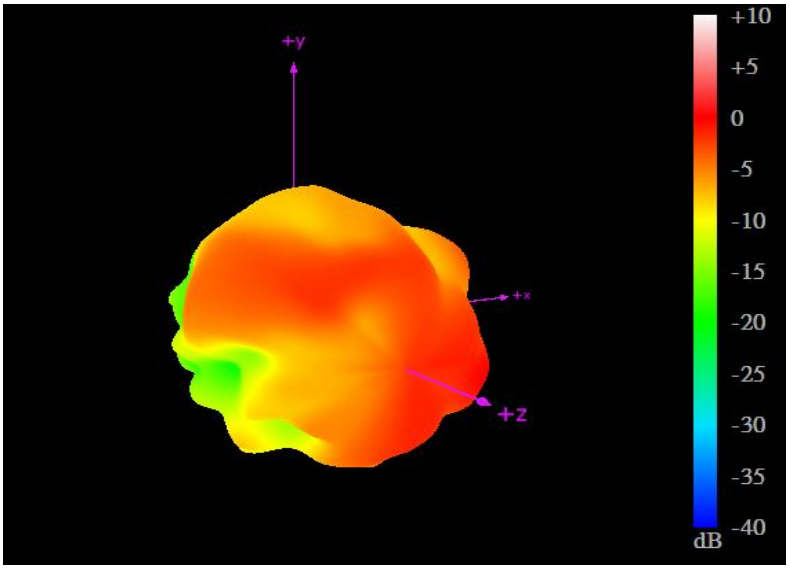




3.2.62 3D Radiation Patterns Pattern (Wi-Fi_MIMO2 with 1M cable length in free space)



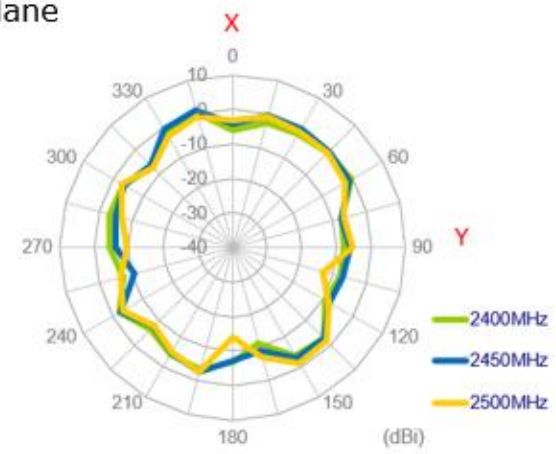
2450MHz

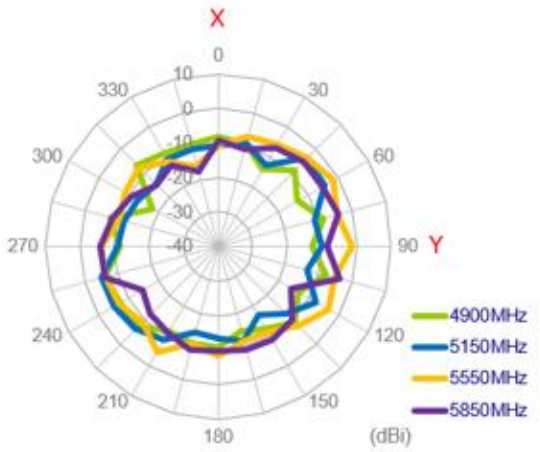


5550MHz

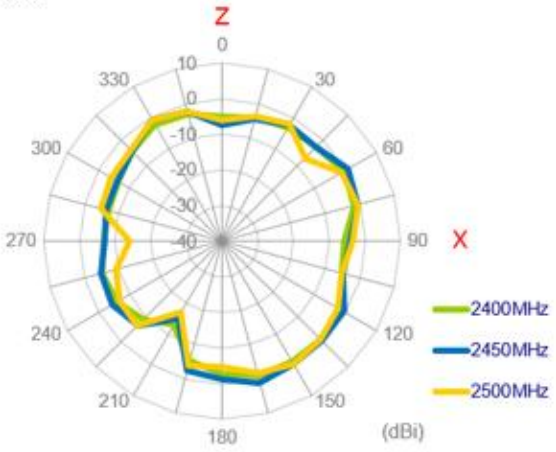
3.2.63 2D Radiation Patterns (Wi-Fi_MIMO2 with 2M cable length in free space)

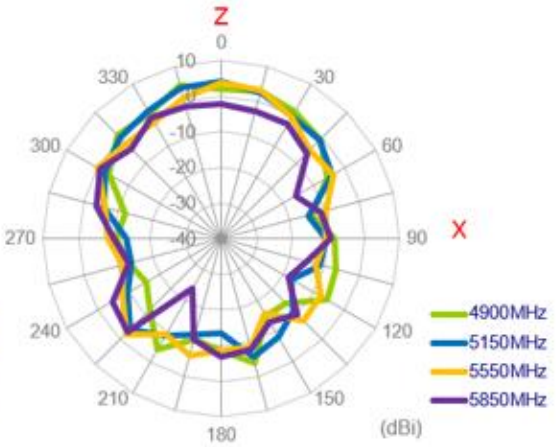
XY Plane



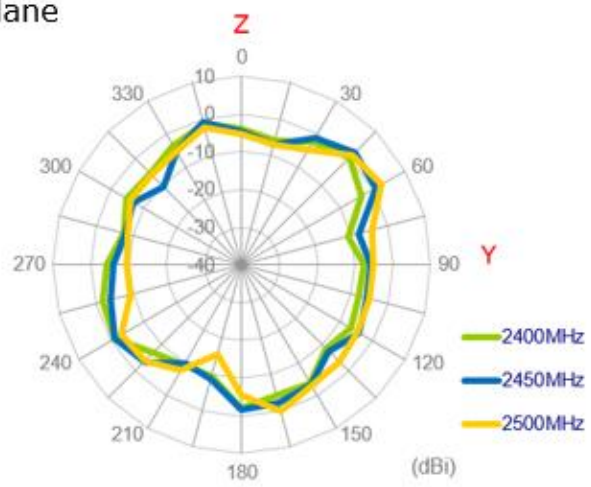


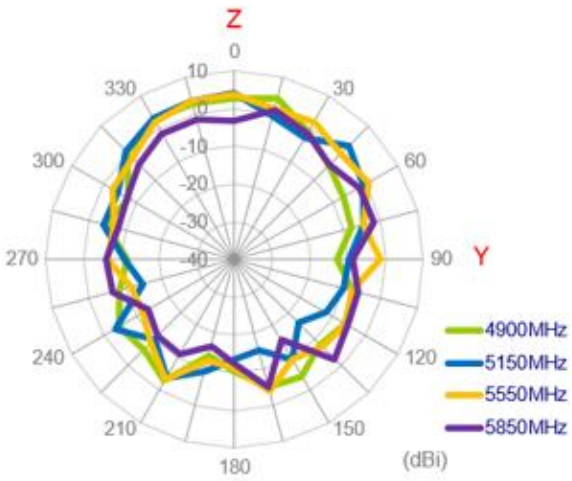
XZ Plane



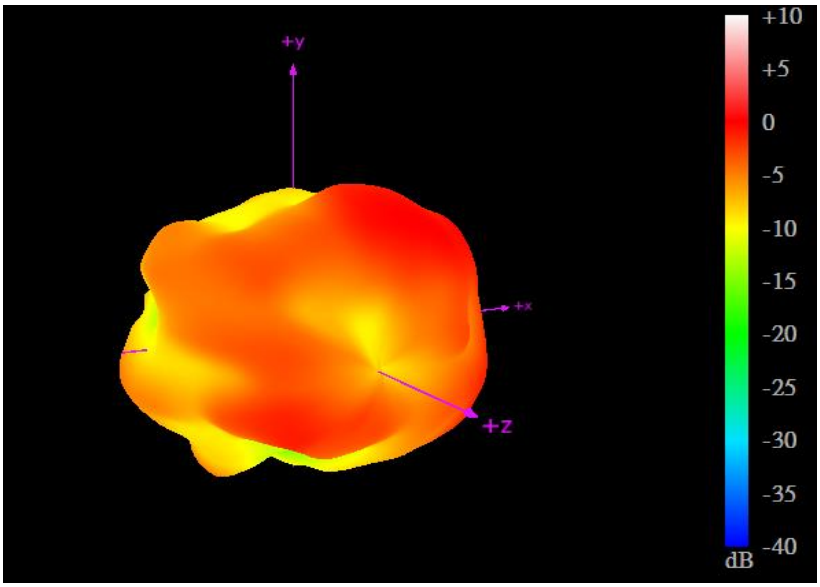


YZ Plane

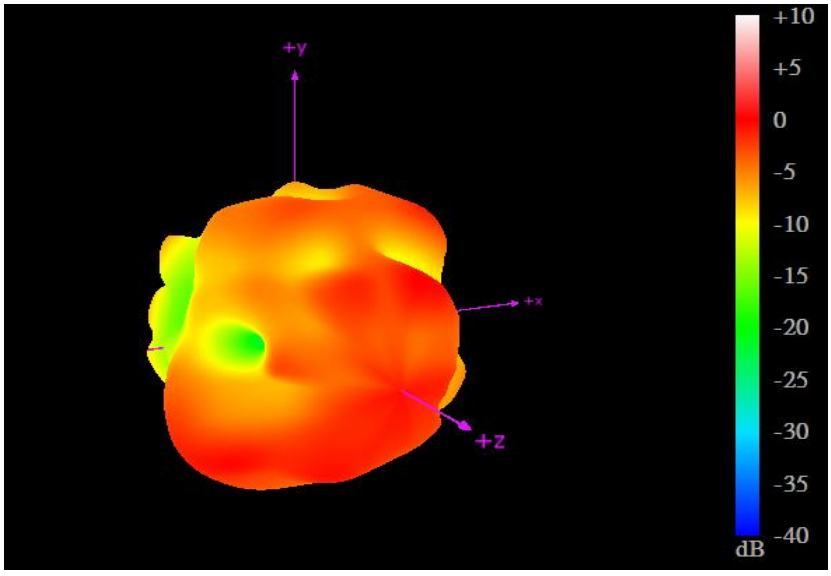




3.2.64 3D Radiation Patterns Pattern (Wi-Fi_MIMO2 with 1M cable length in free space)

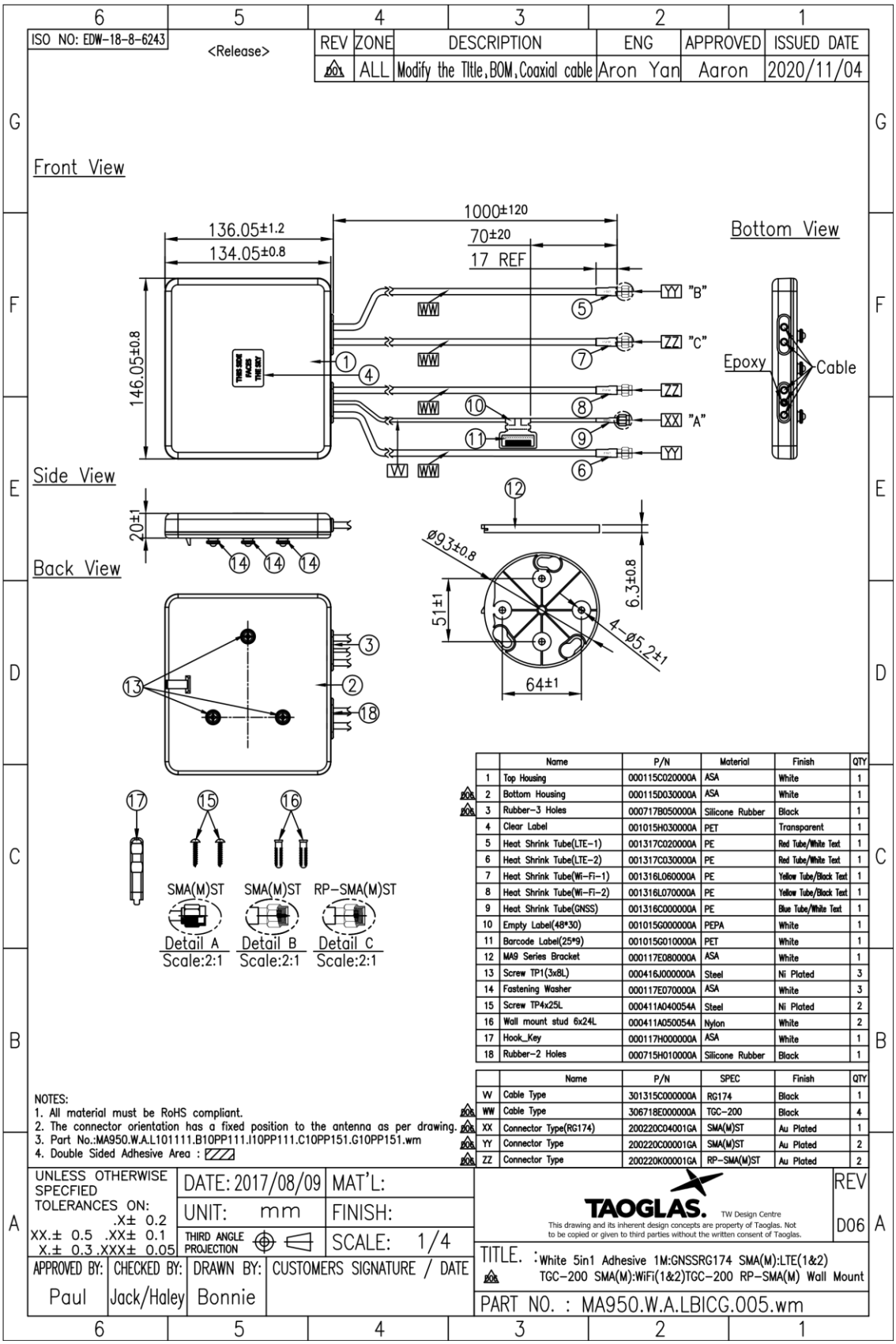


2450MHz



5550MHz

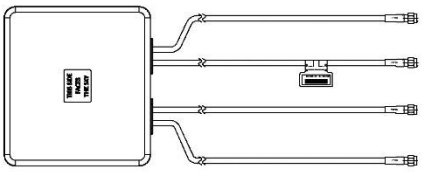
4. Mechanical Drawing (Units: mm)



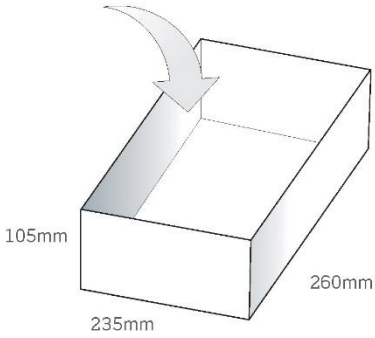
	Name	P/N	Material	Finish	QTY
1	Top Housing	000115C020000A	ASA	White	1
D01 2	Bottom Housing	000115D030000A	ASA	White	1
D01 3	Rubber-3 Holes	000717B050000A	Silicone Rubber	Black	1
4	Clear Label	001015H030000A	PET	Transparent	1
5	Heat Shrink Tube(LTE-1)	001317C020000A	PE	Red Tube/White Text	1
6	Heat Shrink Tube(LTE-2)	001317C030000A	PE	Red Tube/White Text	1
7	Heat Shrink Tube(Wi-Fi-1)	001316L060000A	PE	Yellow Tube/Black Text	1
8	Heat Shrink Tube(Wi-Fi-2)	001316L070000A	PE	Yellow Tube/Black Text	1
9	Heat Shrink Tube(GNSS)	001316C000000A	PE	Blue Tube/White Text	1
10	Empty Label(48*30)	001015G000000A	PEPA	White	1
11	Barcode Label(25*9)	001015G010000A	PET	White	1
12	MA9 Series Bracket	000117E080000A	ASA	White	1
13	Screw TP1(3x8L)	000416J000000A	Steel	Ni Plated	3
14	Fastening Washer	000117E070000A	ASA	White	3
15	Screw TP4x25L	000411A040054A	Steel	Ni Plated	2
16	Wall mount stud 6x24L	000411A050054A	Nylon	White	2
17	Hook_Key	000117H000000A	ASA	White	1
18	Rubber-2 Holes	000715H010000A	Silicone Rubber	Black	1

	Name	P/N	SPEC	Finish	QTY
VV	Cable Type	301315C000000A	RG174	Black	1
D01 WW	Cable Type	306718E000000A	TGC-200	Black	4
D01 XX	Connector Type(RG174)	200220C04001GA	SMA(M)ST	Au Plated	1
D01 YY	Connector Type	200220C00001GA	SMA(M)ST	Au Plated	2
D01 ZZ	Connector Type	200220K00001GA	RP-SMA(M)ST	Au Plated	2

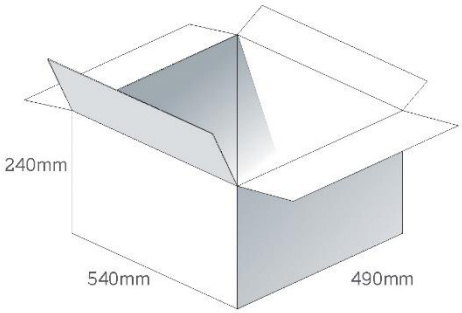
5. Packaging



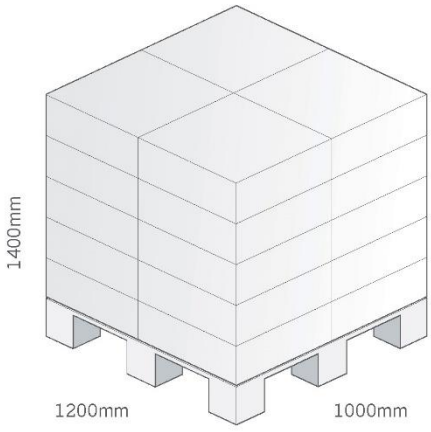
1 MA961.W.A.BICG.002.wm per small box
Box Dimensions - 260 x 235 x 105mm
Weight - 1000g



1 Outer Carton
Carton Dimensions - 540 x 490 x 240mm
8 pcs MA961.W.A.BICG.002.wm per carton
Weight - 9.01Kg



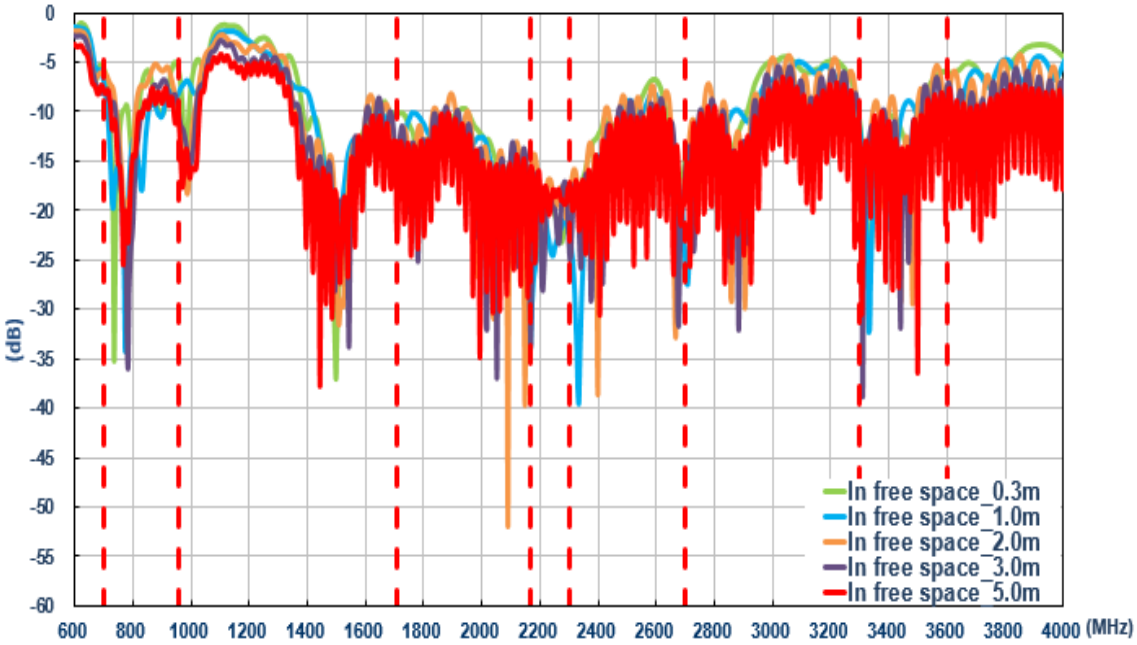
Pallet Dimensions 1200*1000*1400mm
20 Cartons per Pallet
4 Cartons per layer
5 Layers



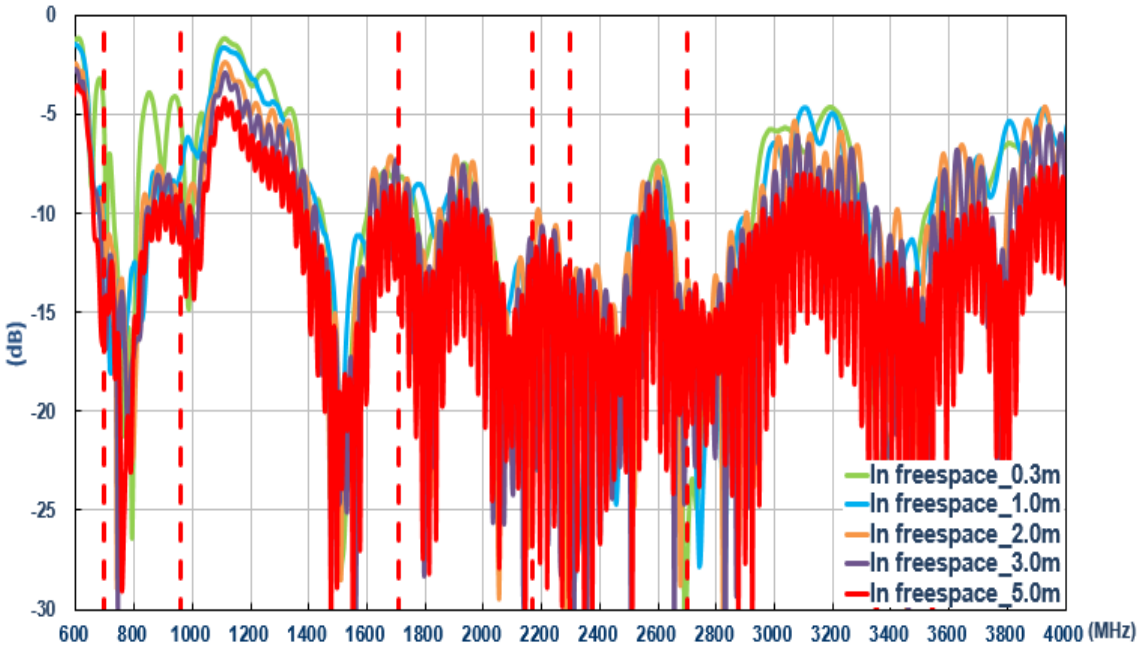
6. Application Note

6.1 In free space (LTE)

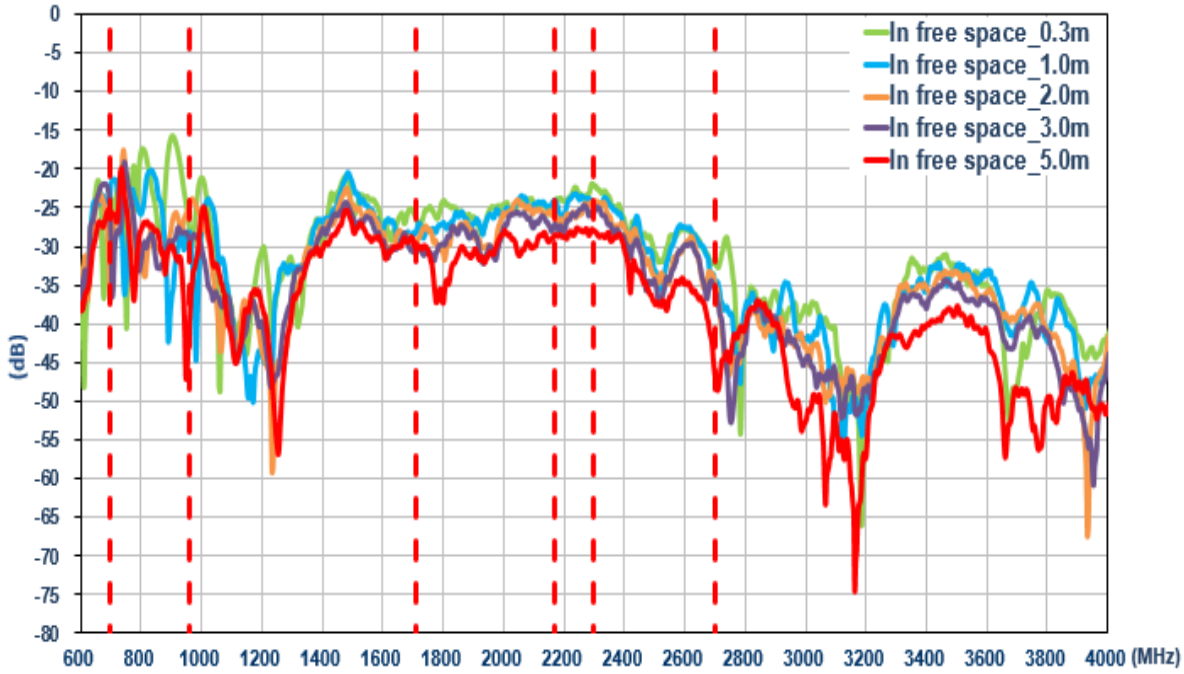
6.1.1 Return Loss (LTE MIMO 1)



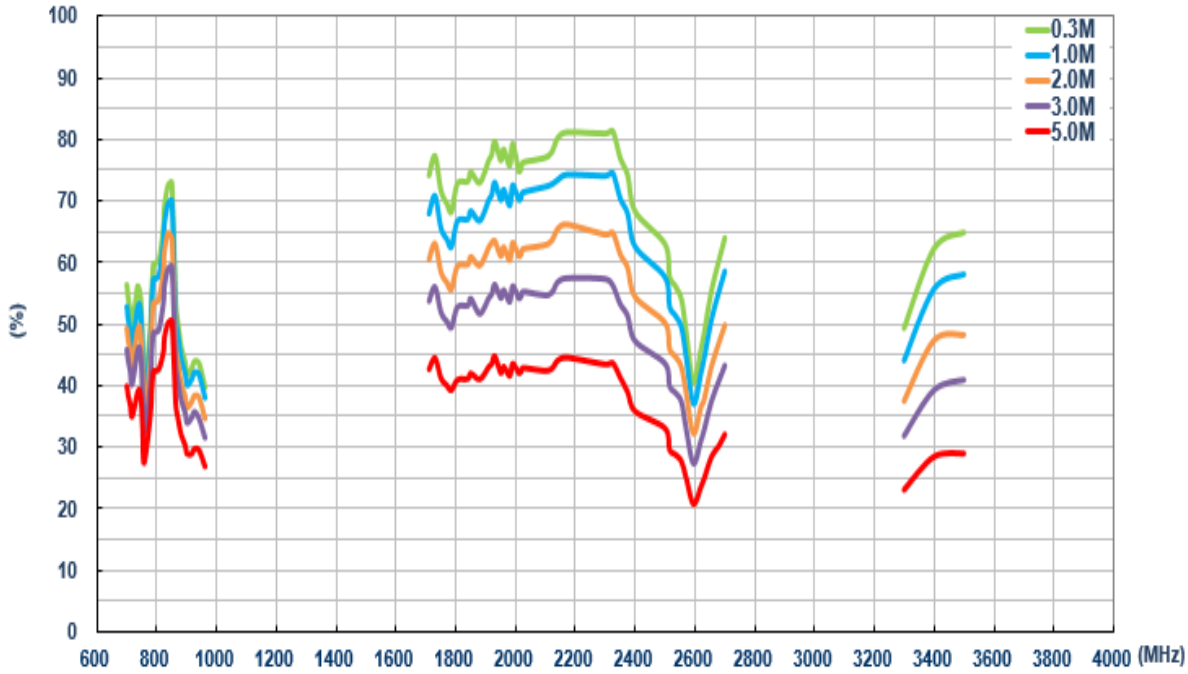
6.1.2 Return Loss (LTE MIMO 2)



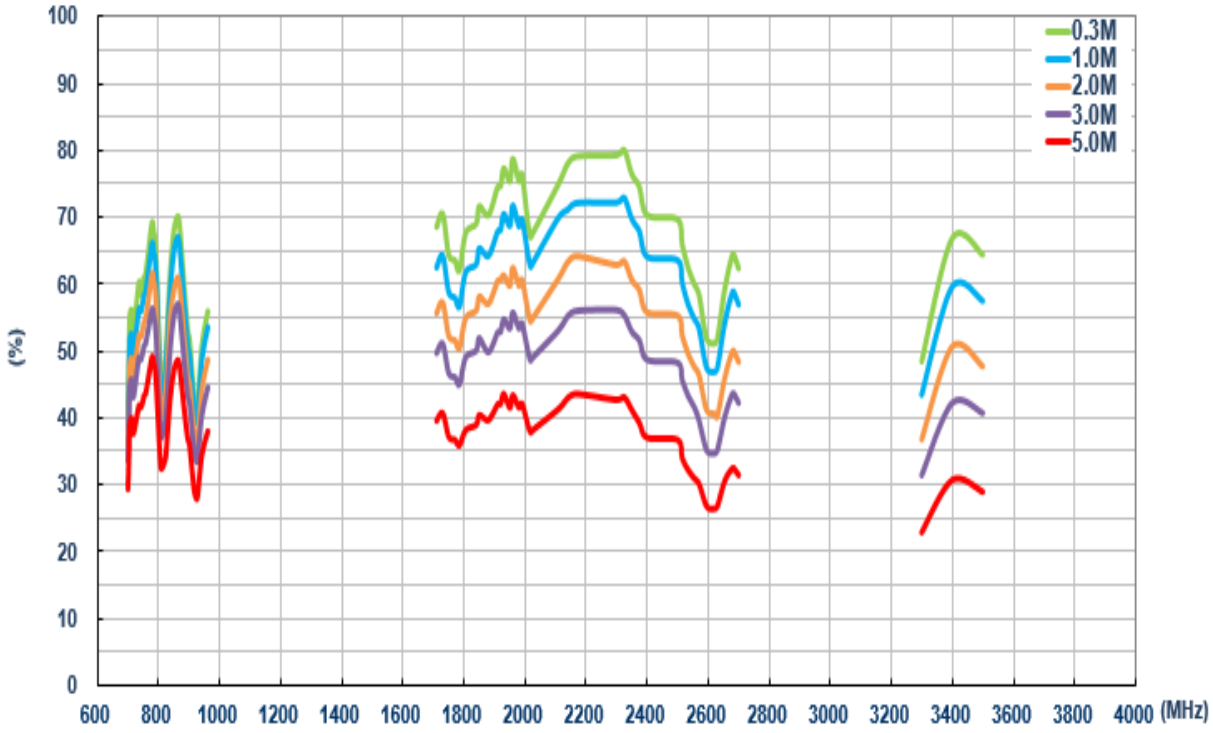
6.1.3 Isolation (LTE antenna)



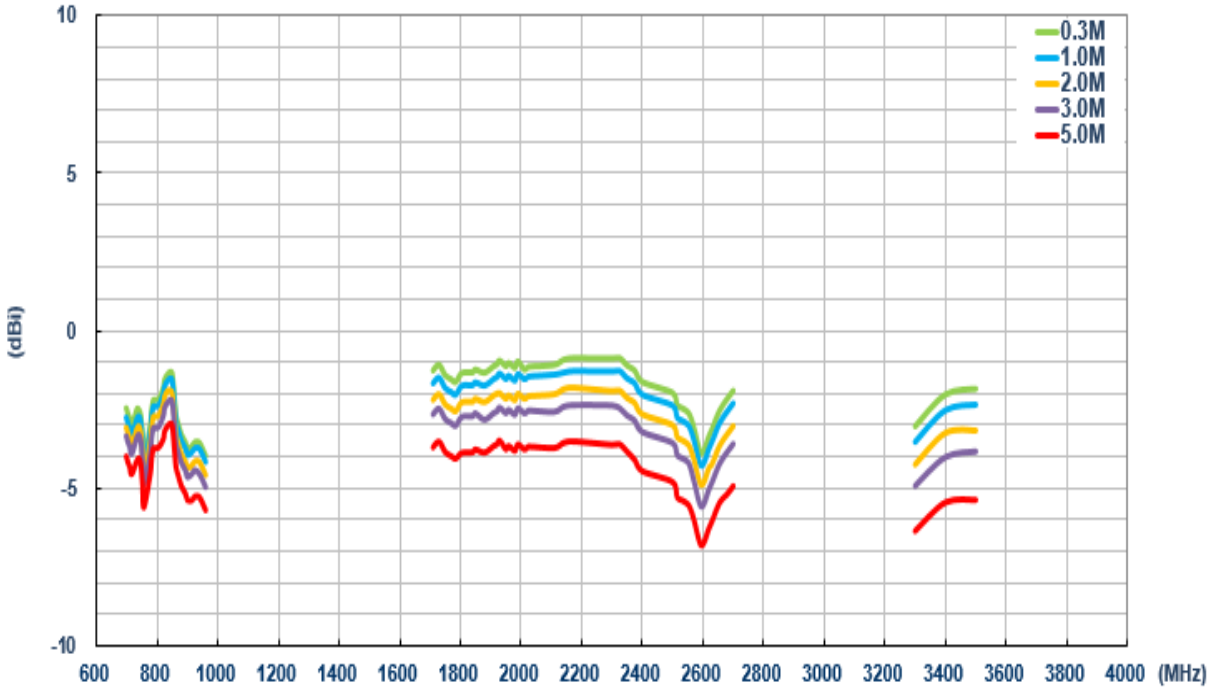
6.1.4 Return Loss (LTE MIMO 1)



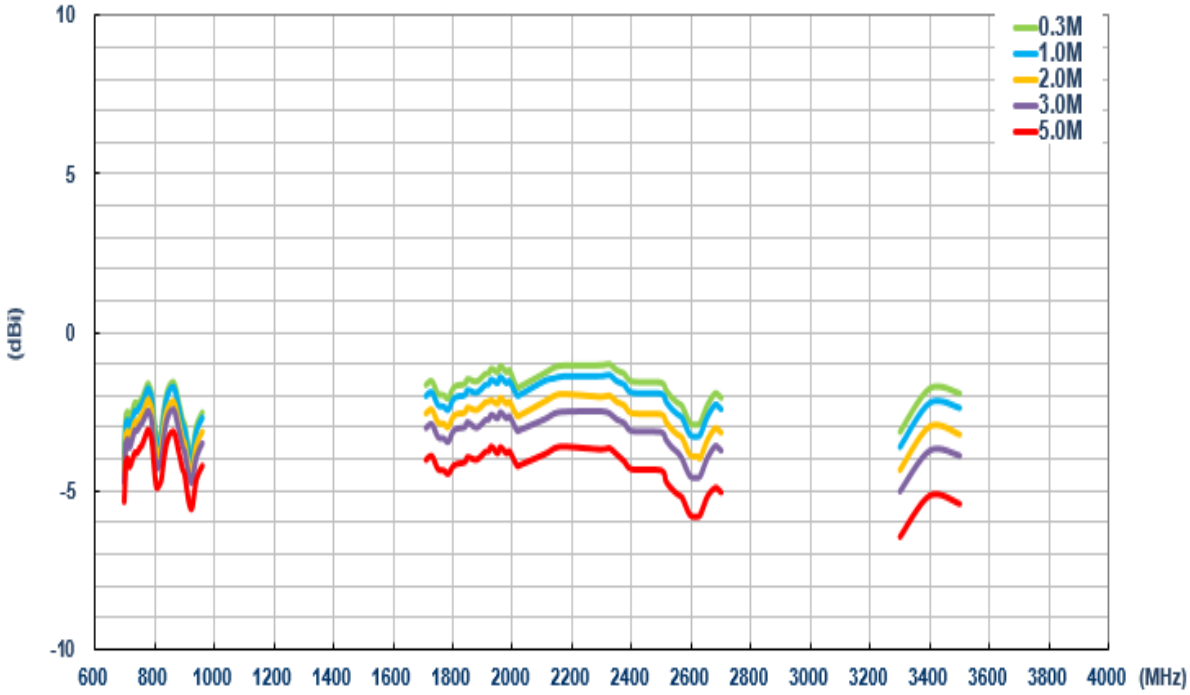
6.1.5 Efficiency (LTE MIMO 2)



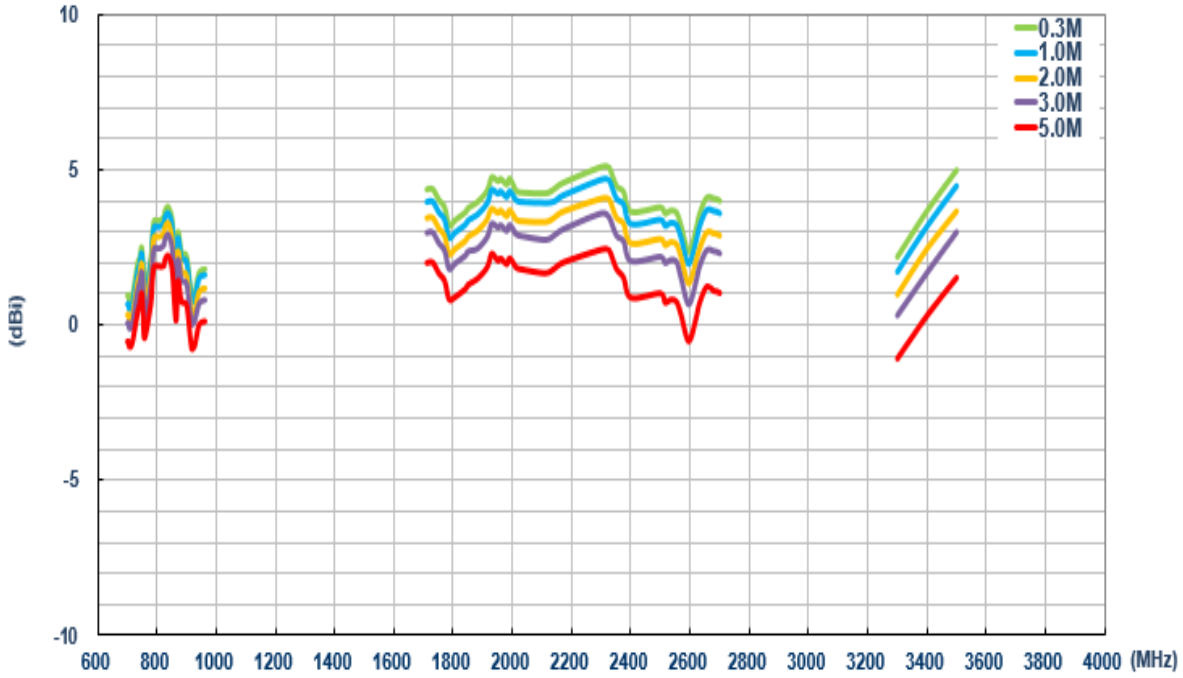
6.1.6 Average Gain (LTE MIMO 1)



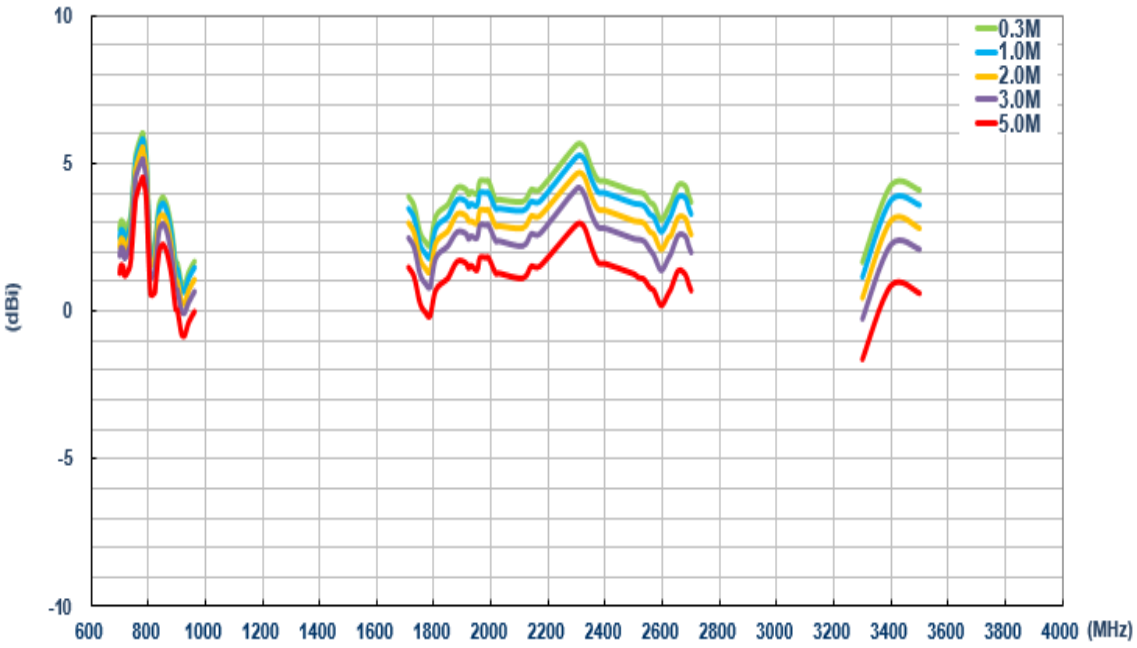
6.1.7 Average Gain (LTE MIMO 2)



6.1.8 Peak Gain (LTE MIMO 1)

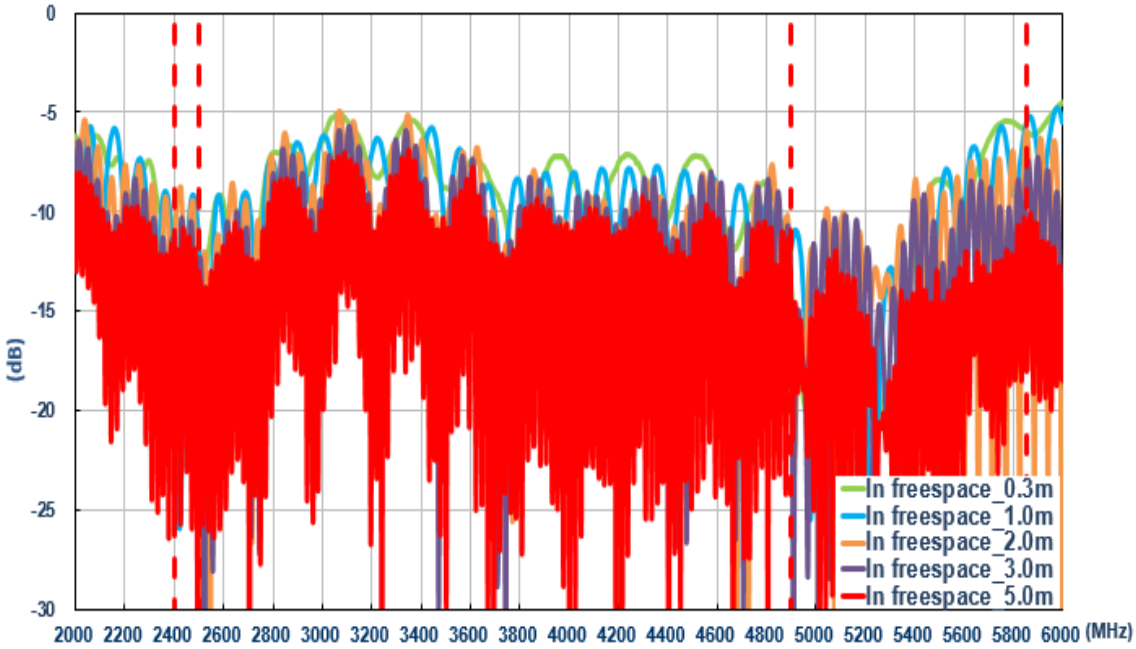


6.1.9 Peak Gain (LTE MIMO 2)

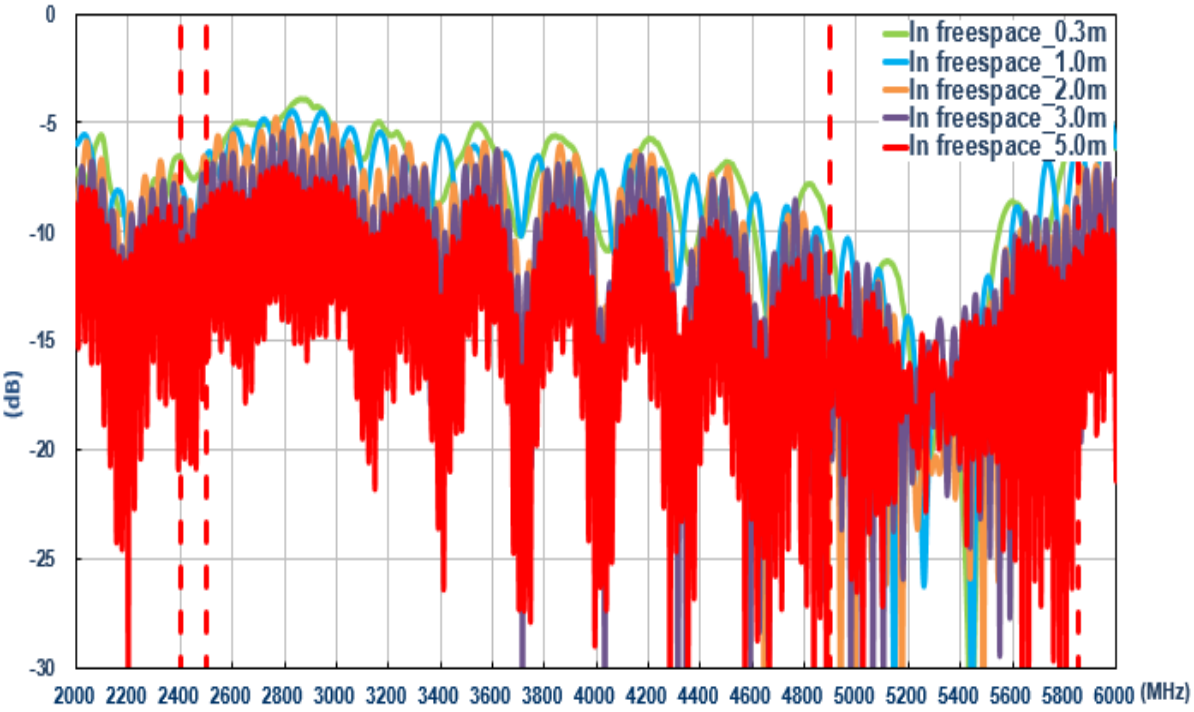


6.2 In free space (Wi-Fi)

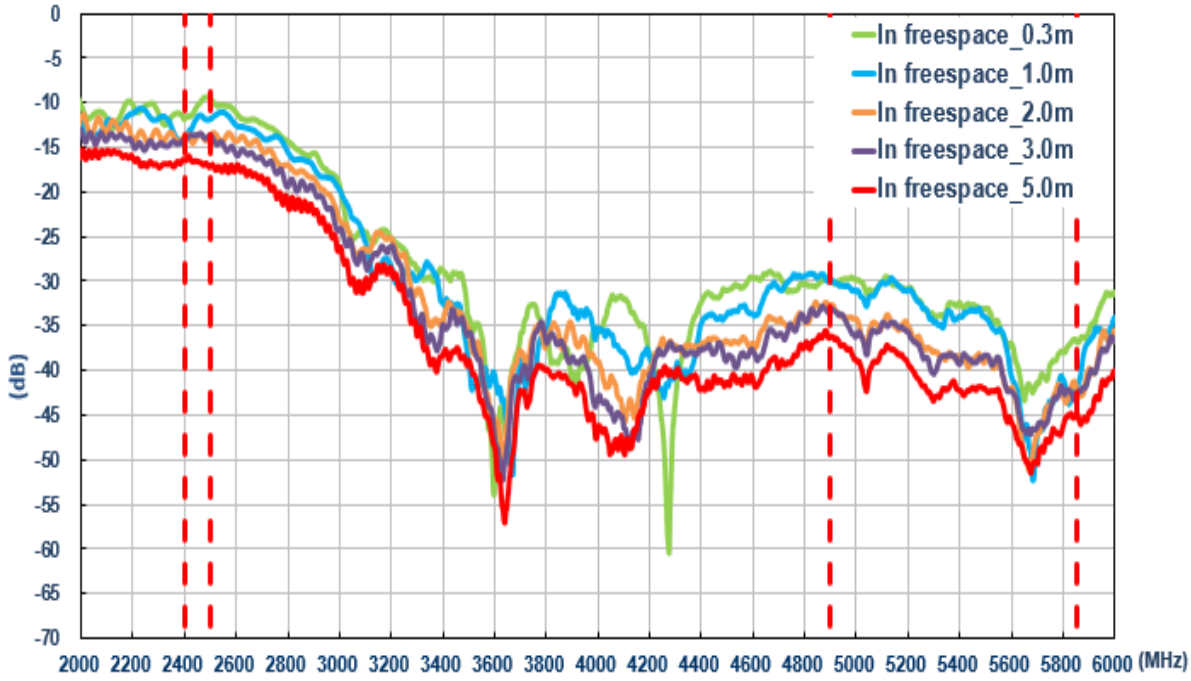
6.2.1 Return Loss (Wi-Fi MIMO 1)



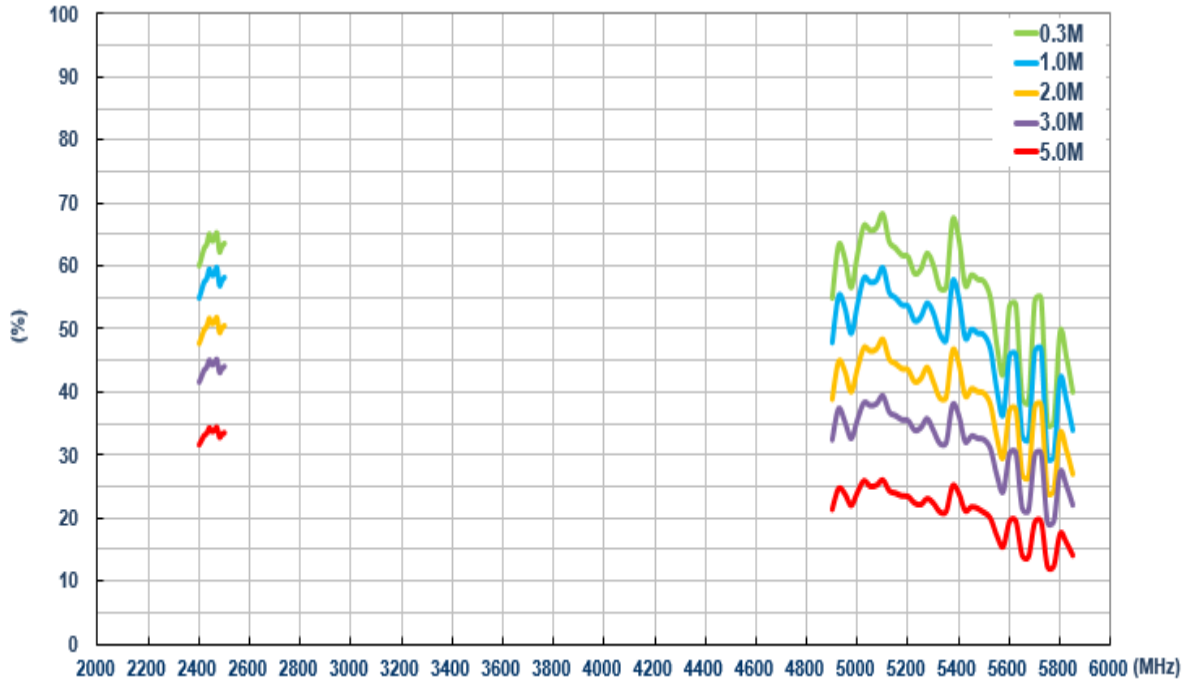
6.2.2 Return Loss (Wi-Fi MIMO 2)



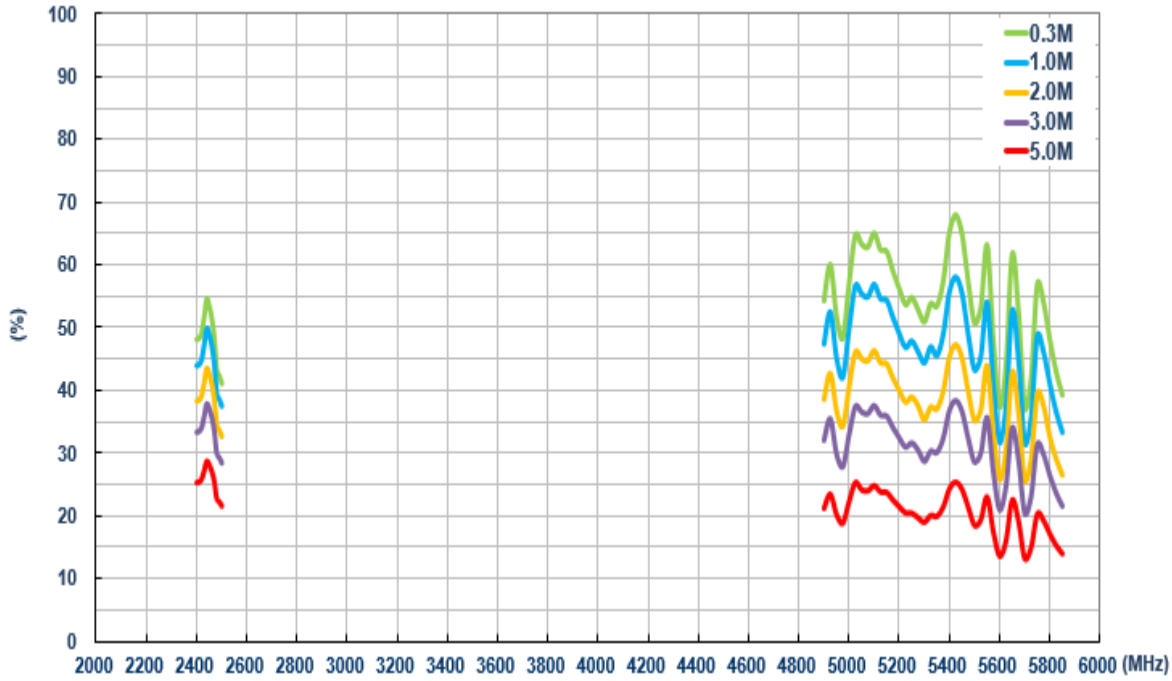
6.2.3 Isolation (Wi-Fi)



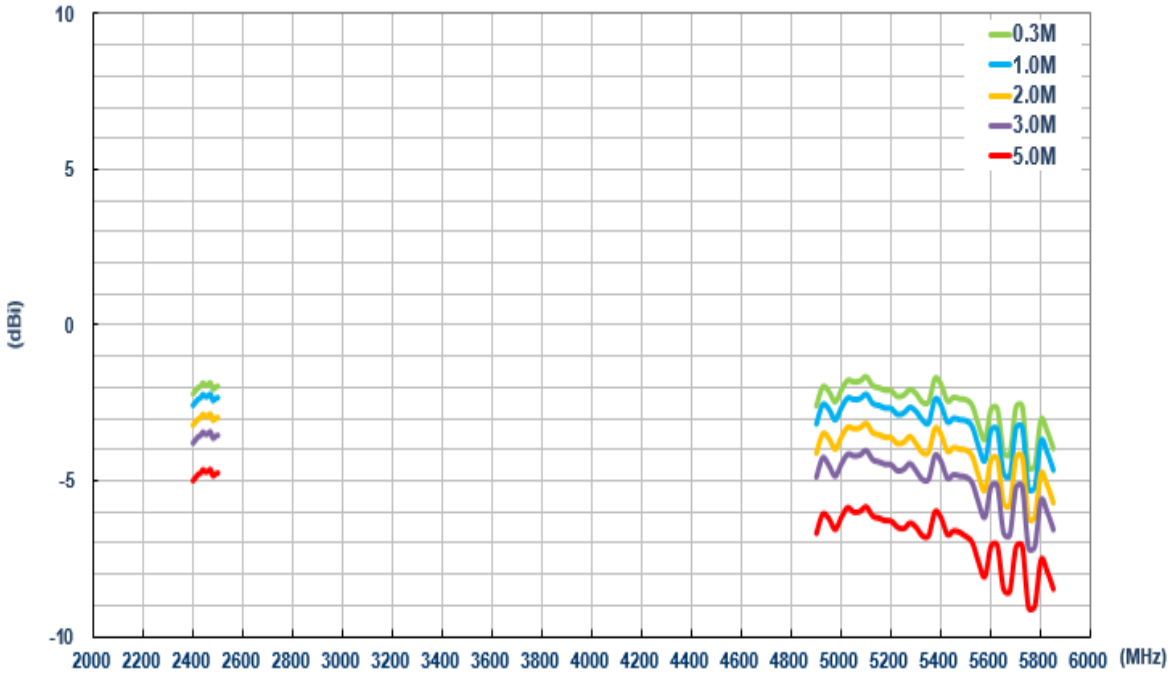
6.2.4 Efficiency (Wi-Fi MIMO 1)



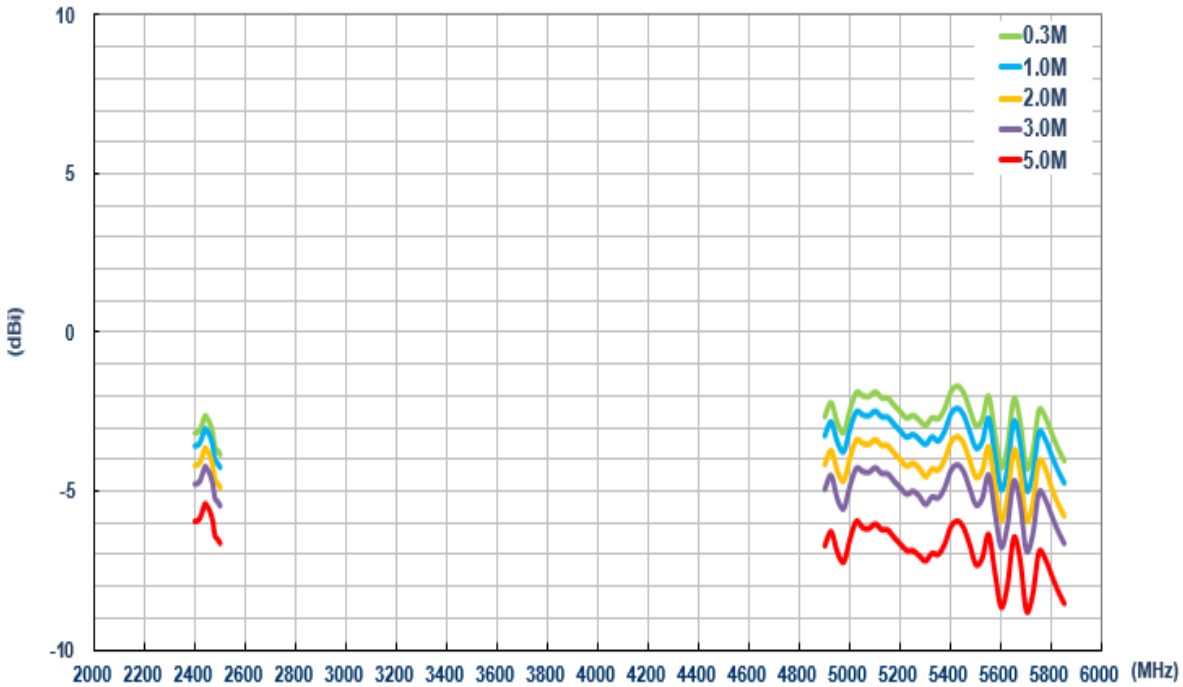
6.2.5 Efficiency (Wi-Fi MIMO 2)



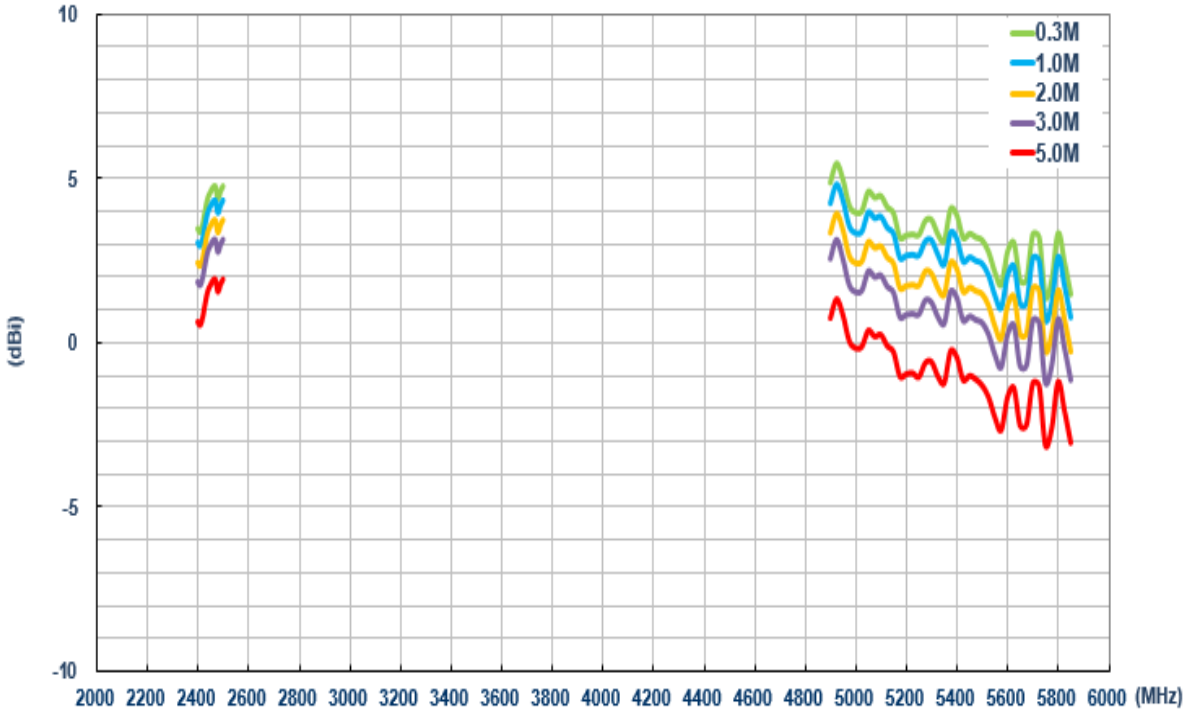
6.2.6 Average Gain (Wi-Fi MIMO 1)



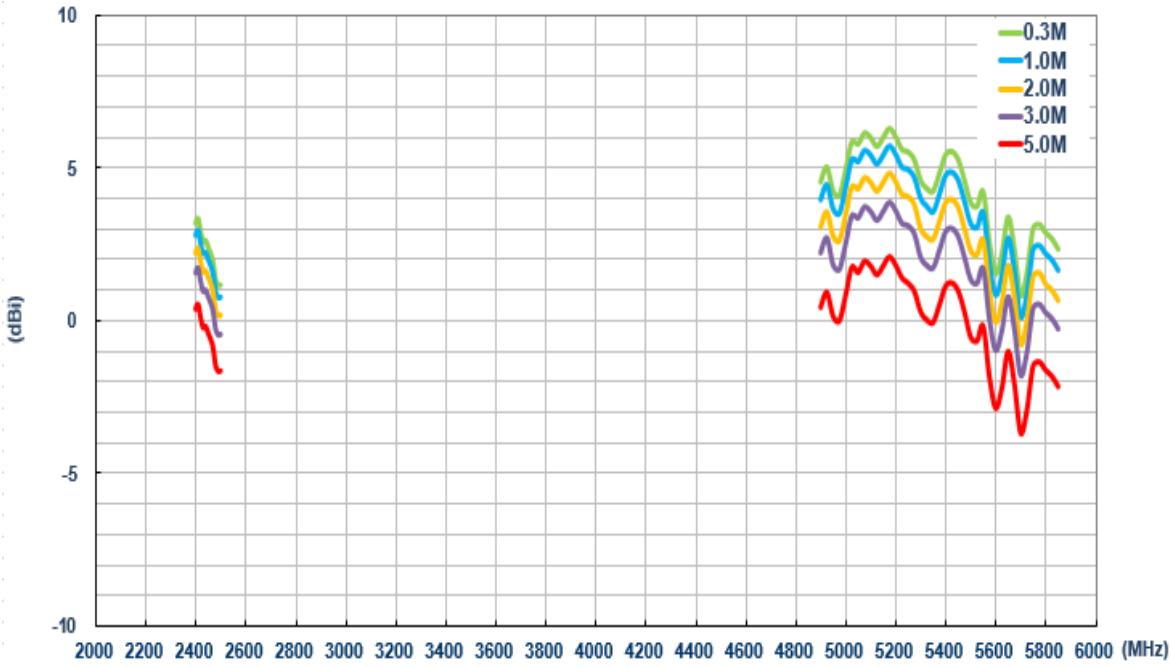
6.2.7 Average Gain (Wi-Fi MIMO 2)



6.2.8 Peak Gain (Wi-Fi MIMO 1)

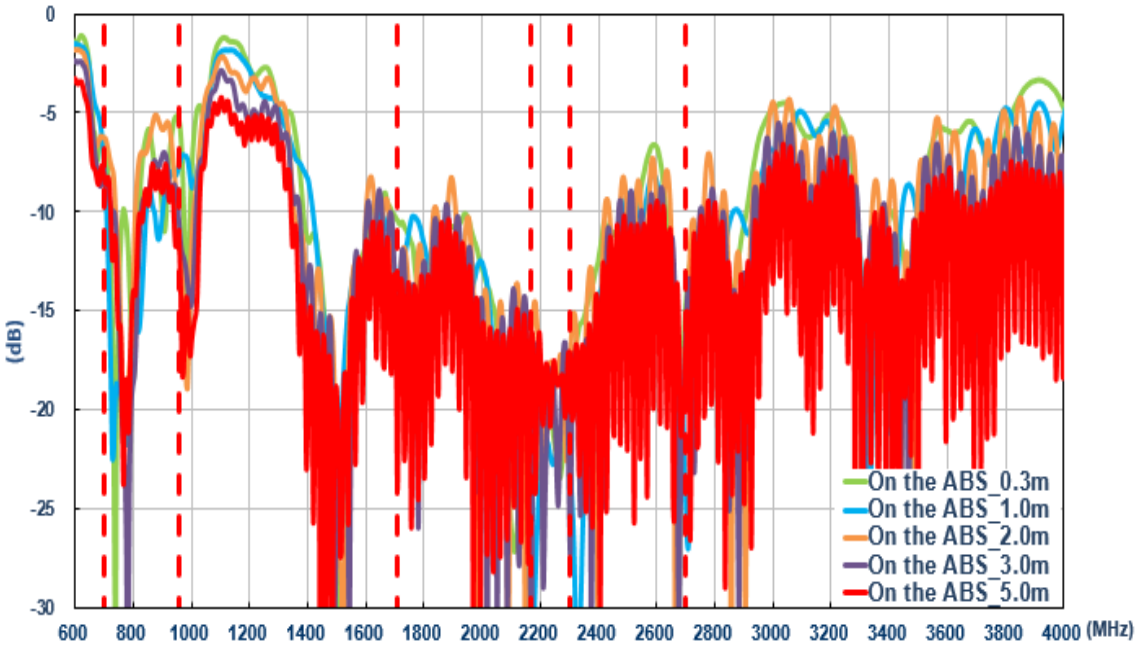


6.2.9 Peak Gain (Wi-Fi MIMO 2)

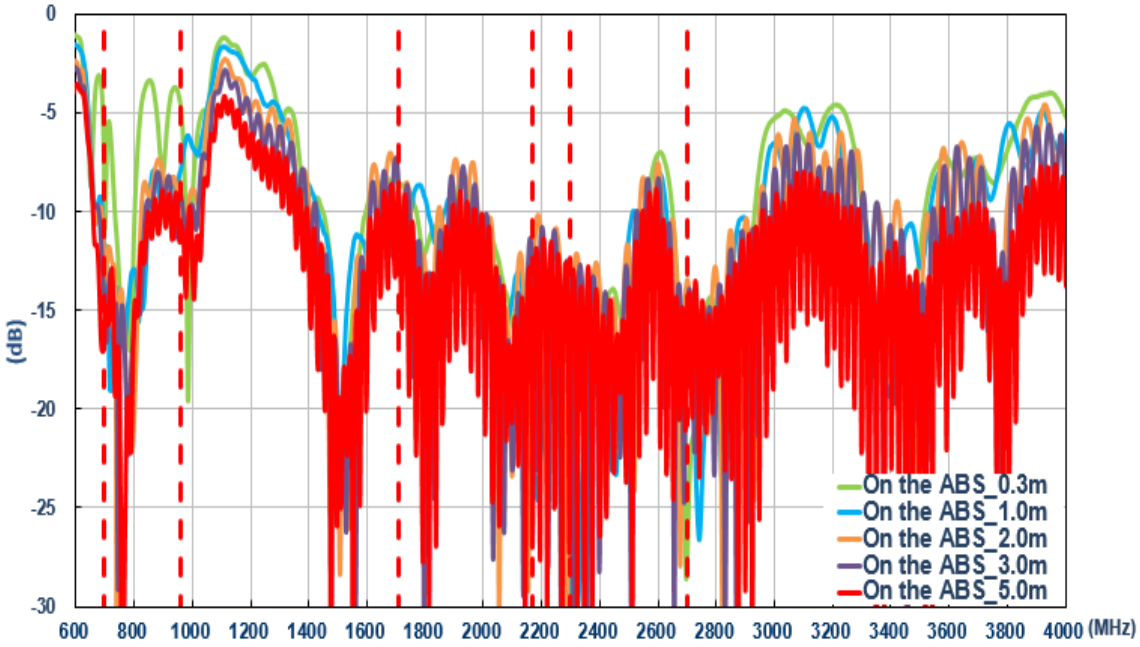


6.3 On the ABS (LTE)

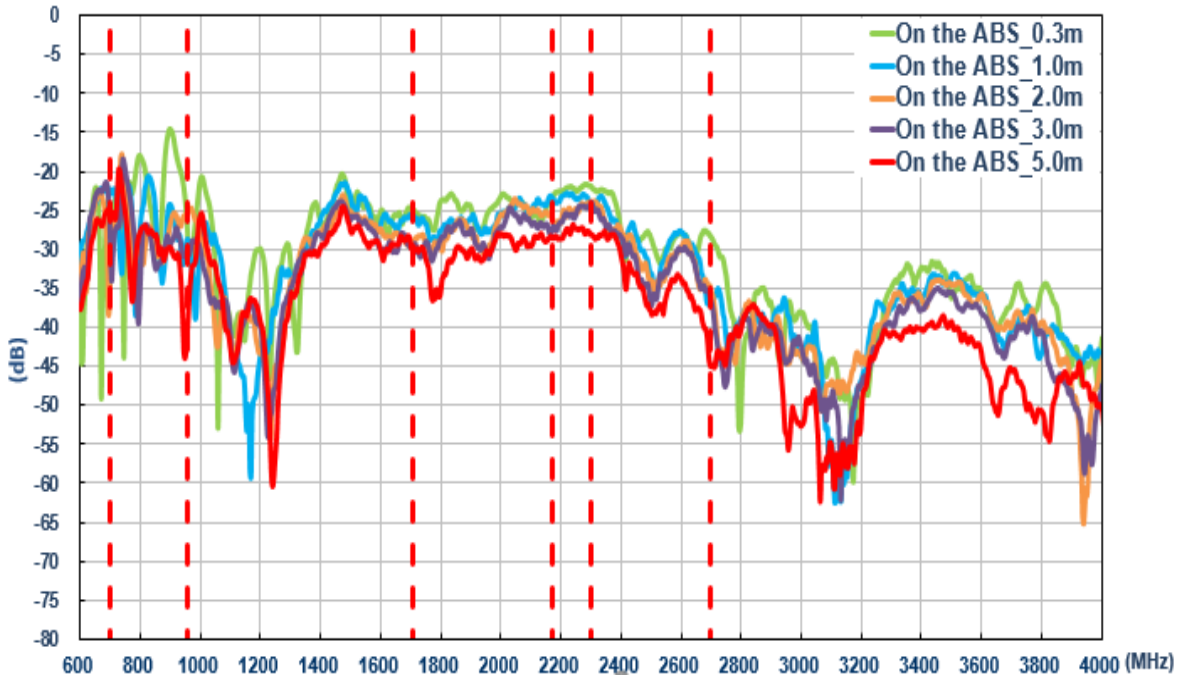
6.3.1 Return Loss (LTE MIMO 1)



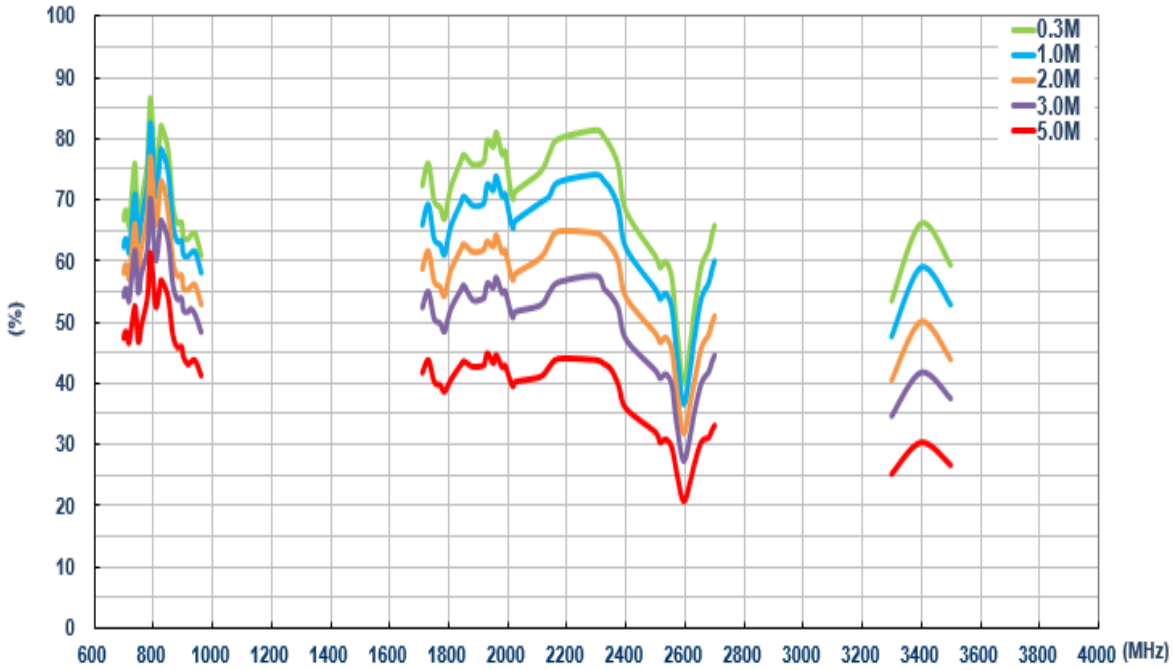
6.3.2 Return Loss (LTE MIMO 2)



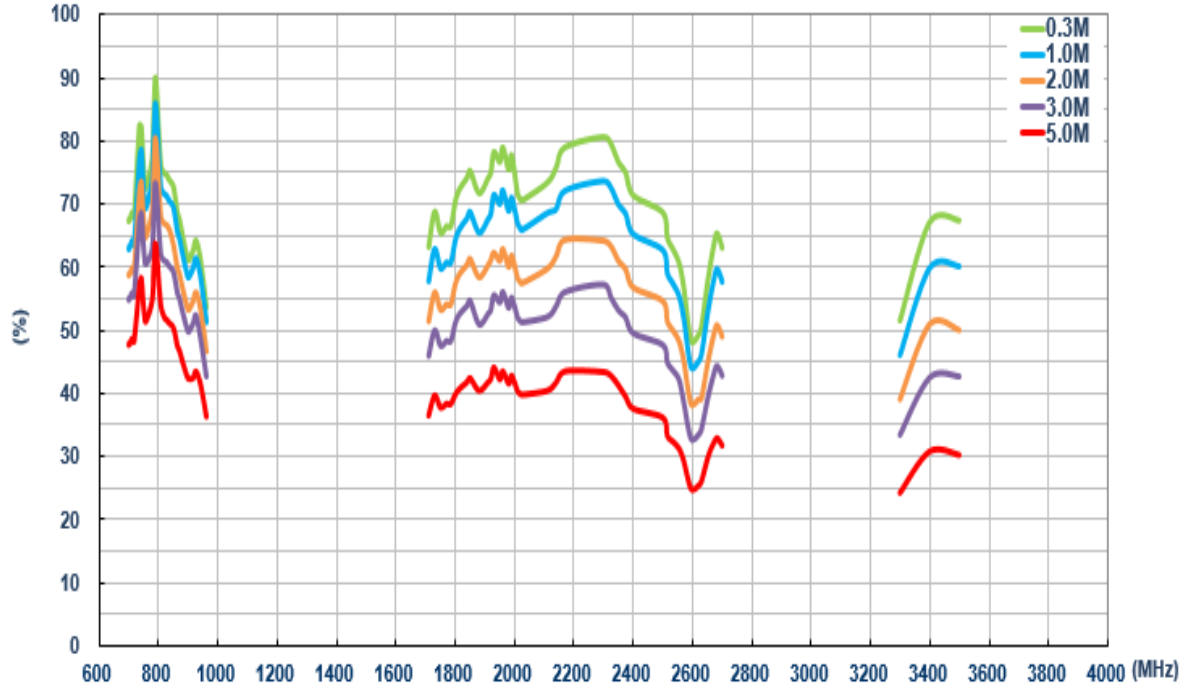
6.3.3 Isolation (LTE Antenna)



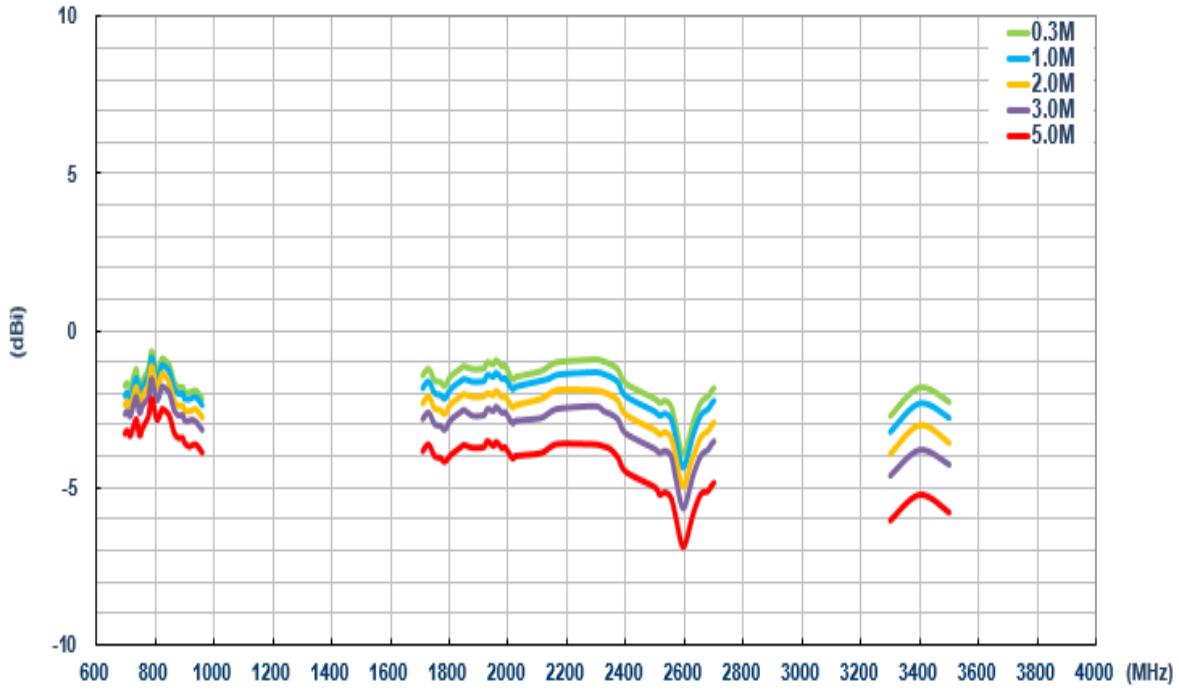
6.3.4 Efficiency (LTE MIMO 1)



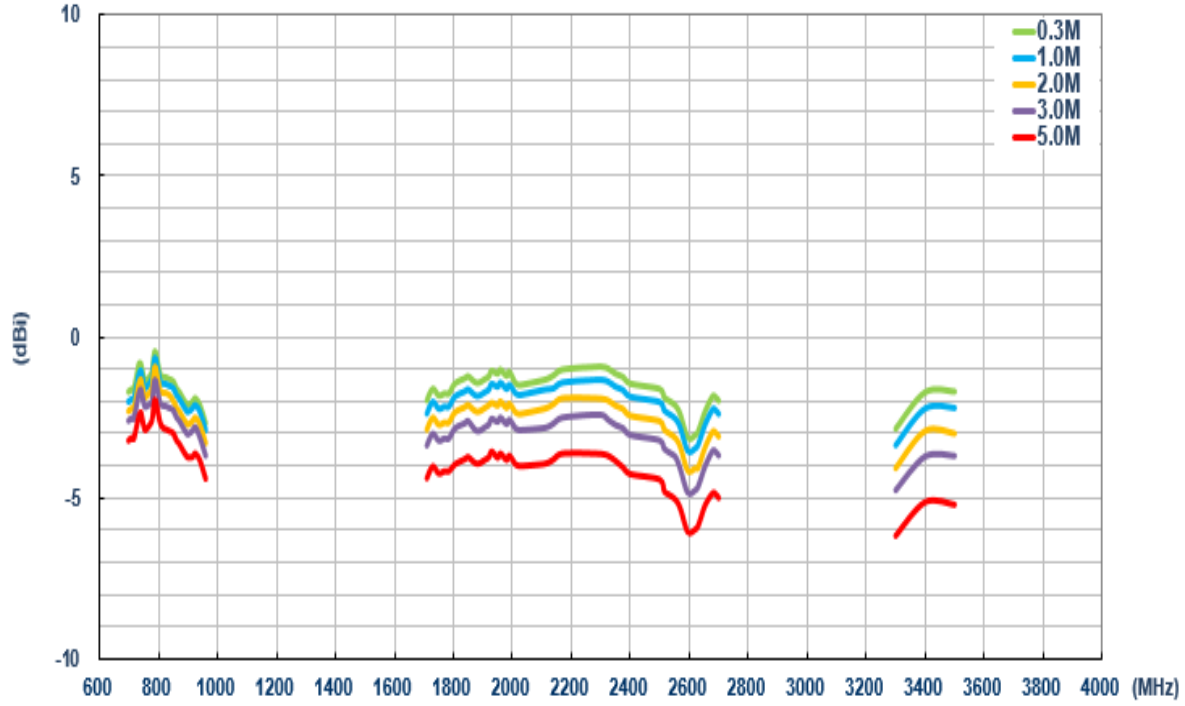
6.3.5 Efficiency (LTE MIMO 2)



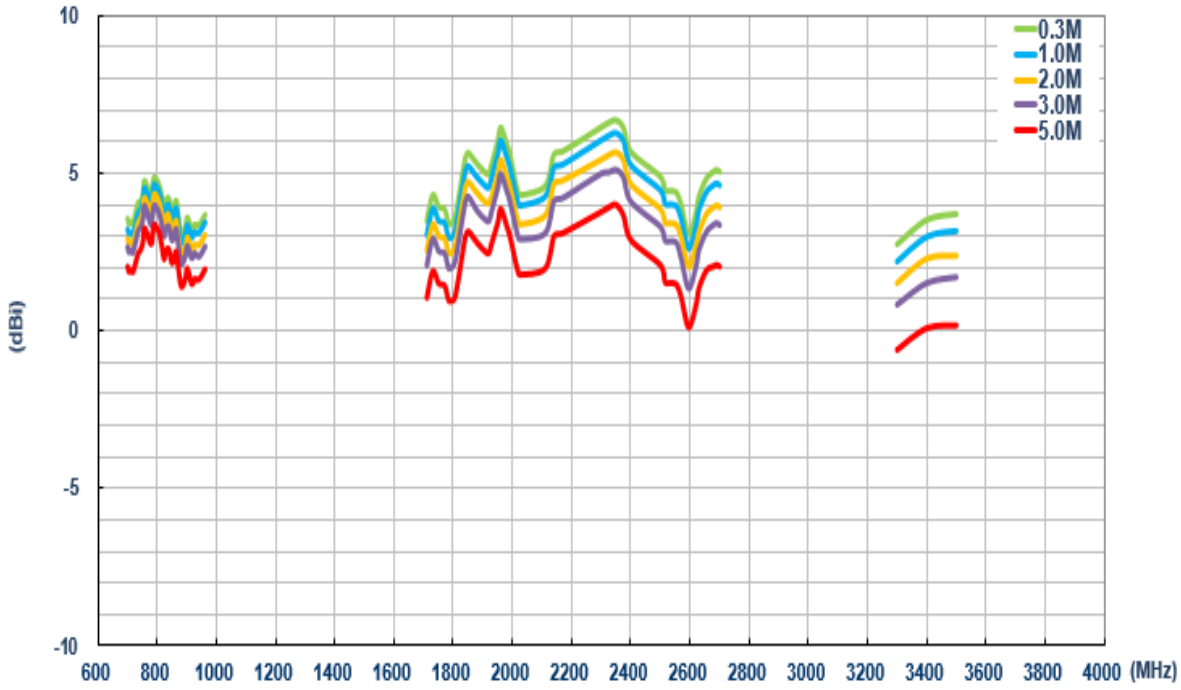
6.3.6 Average Gain (LTE MIMO 1)



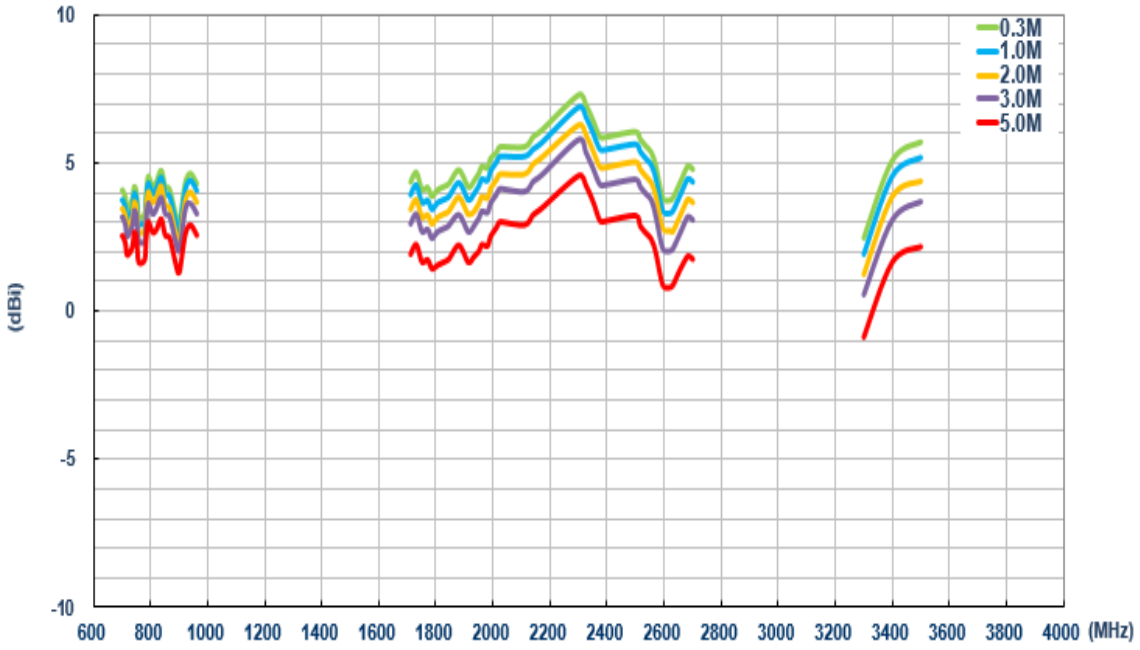
6.3.7 Average Gain (LTE MIMO 2)



6.3.8 Peak Gain (LTE MIMO 1)

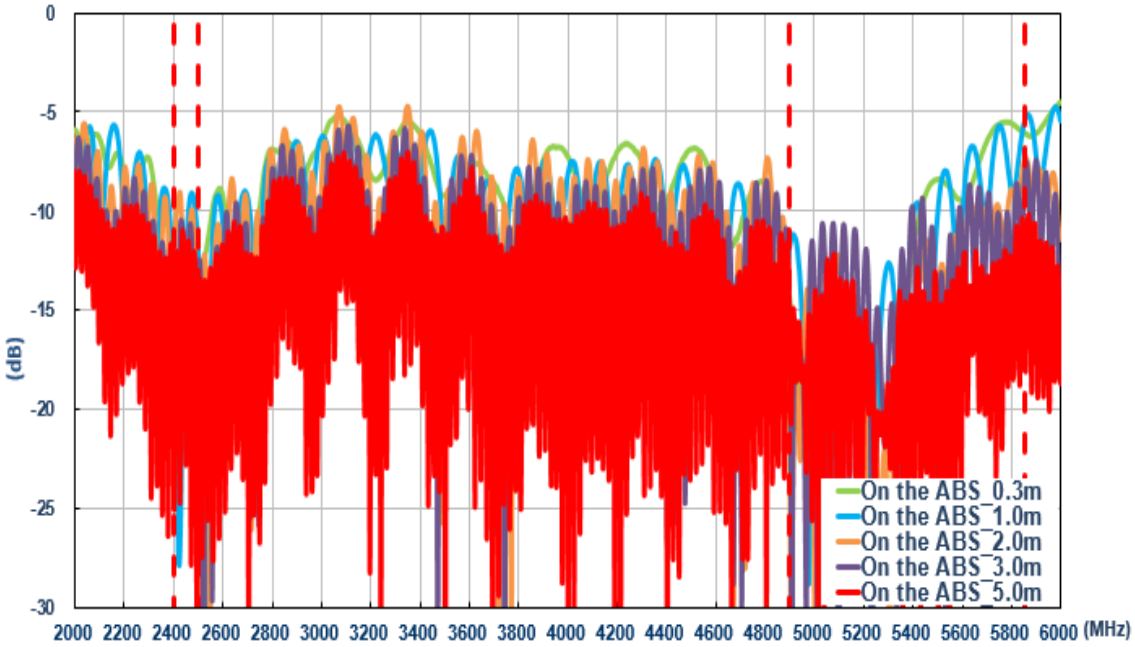


6.3.9 Peak Gain (LTE MIMO 2)

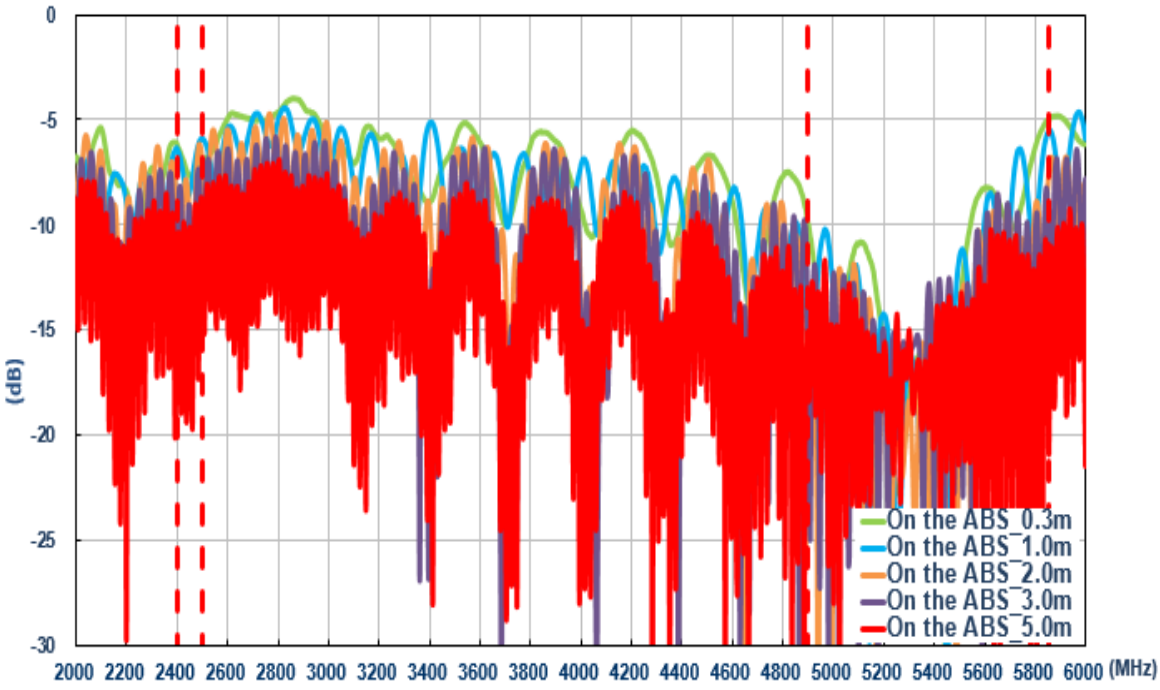


6.4 On ABS (Wi-Fi)

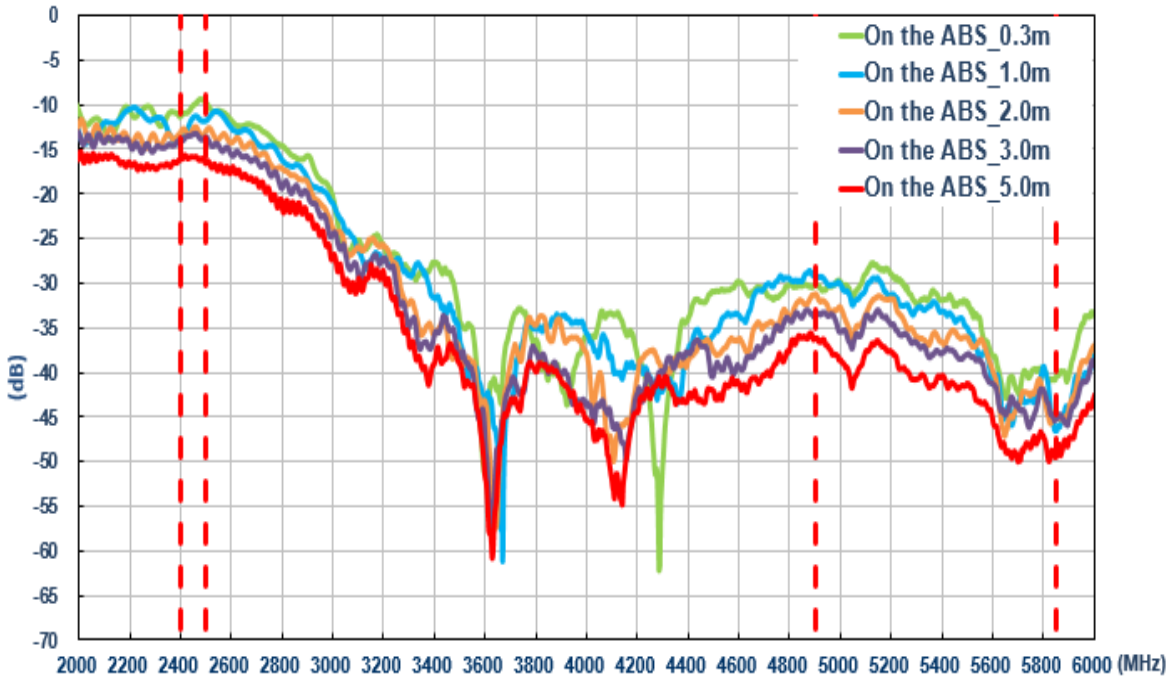
6.4.1 Return Loss (Wi-Fi MIMO 1)



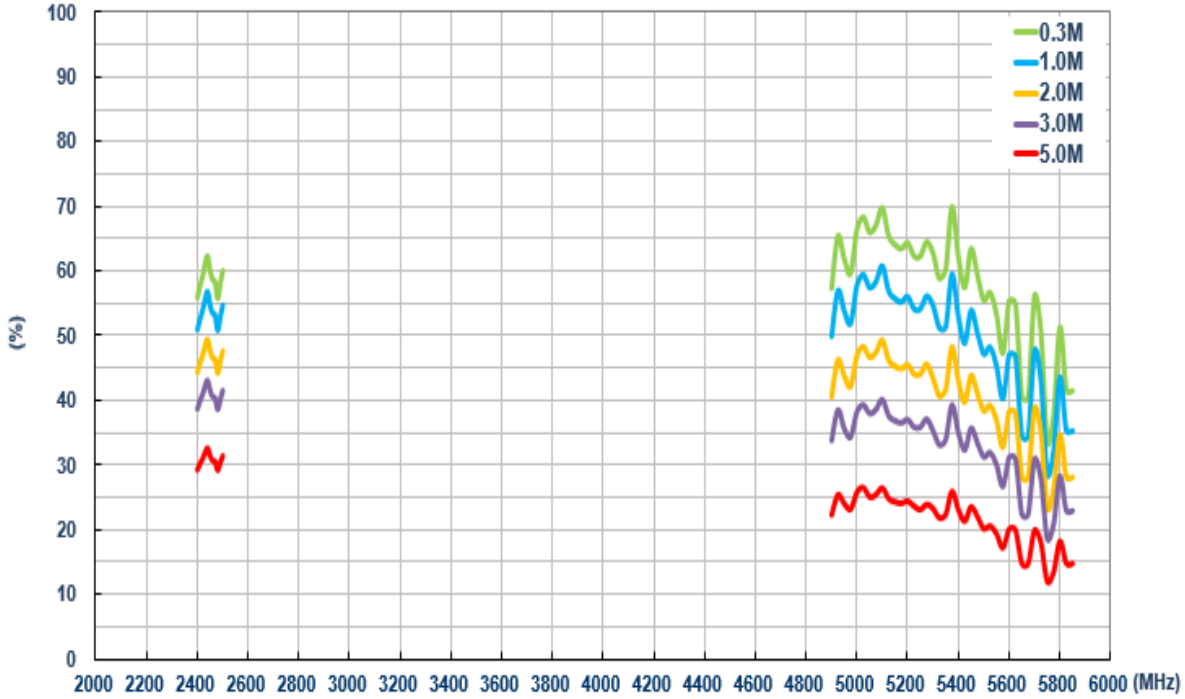
6.4.2 Return Loss (Wi-Fi MIMO 2)



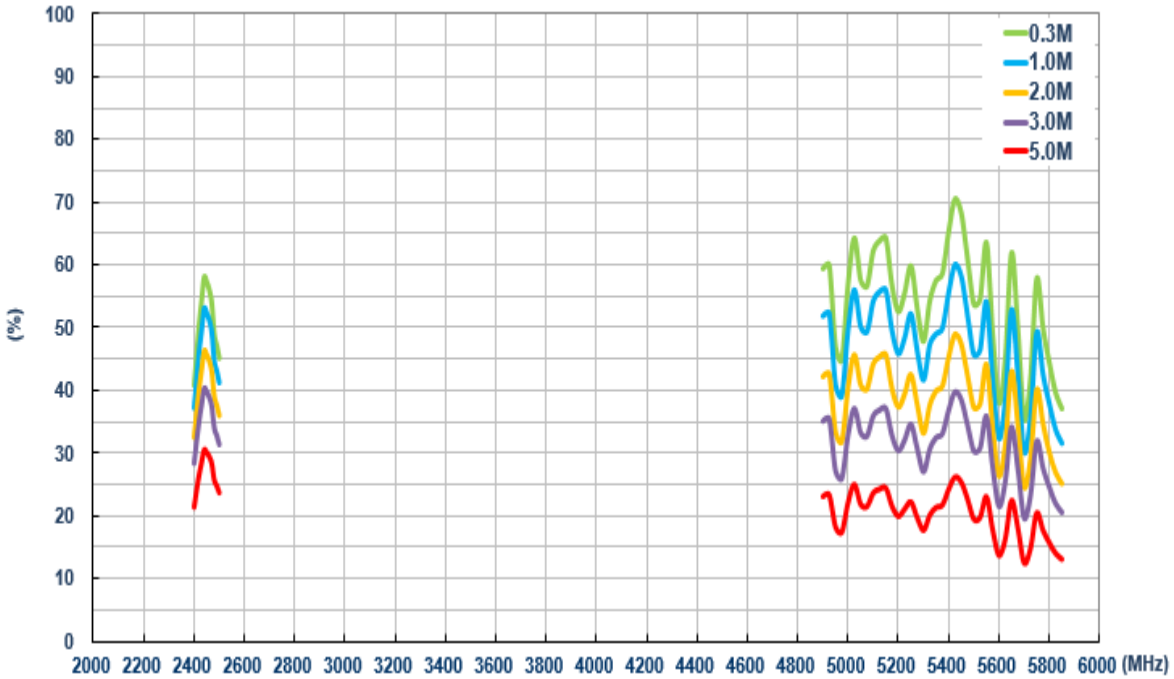
6.4.3 Isolation (Wi-Fi)



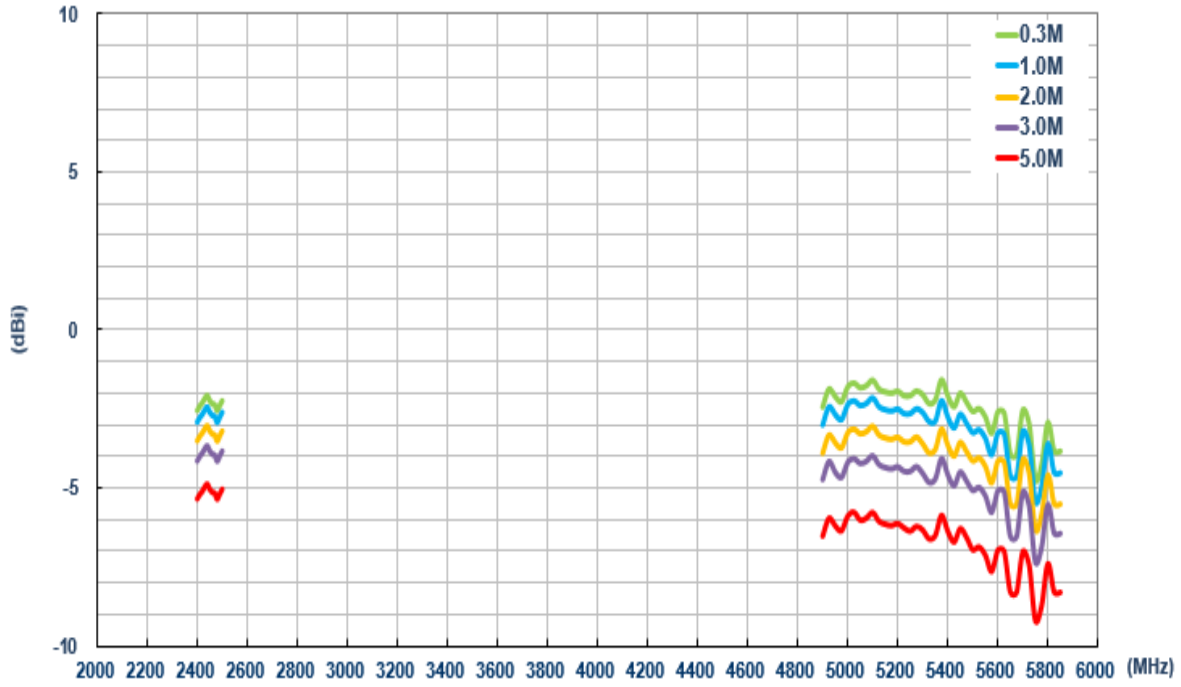
6.4.4 Return Loss (Wi-Fi MIMO 2)



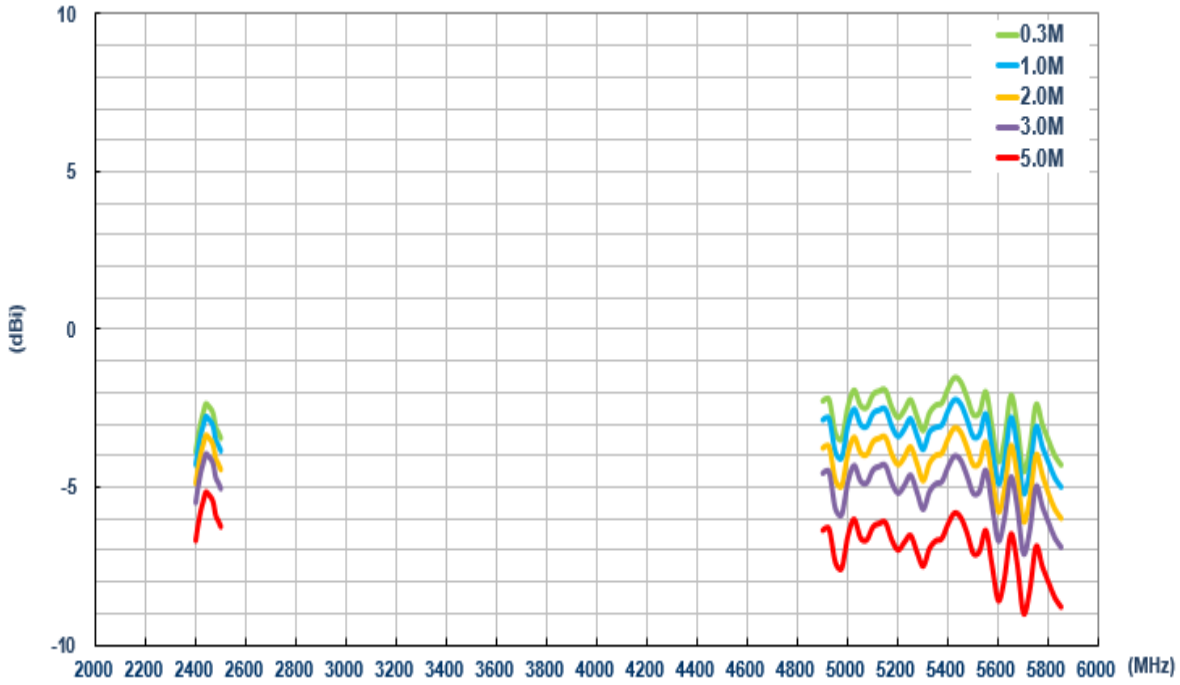
6.4.5 Isolation (Wi-Fi)



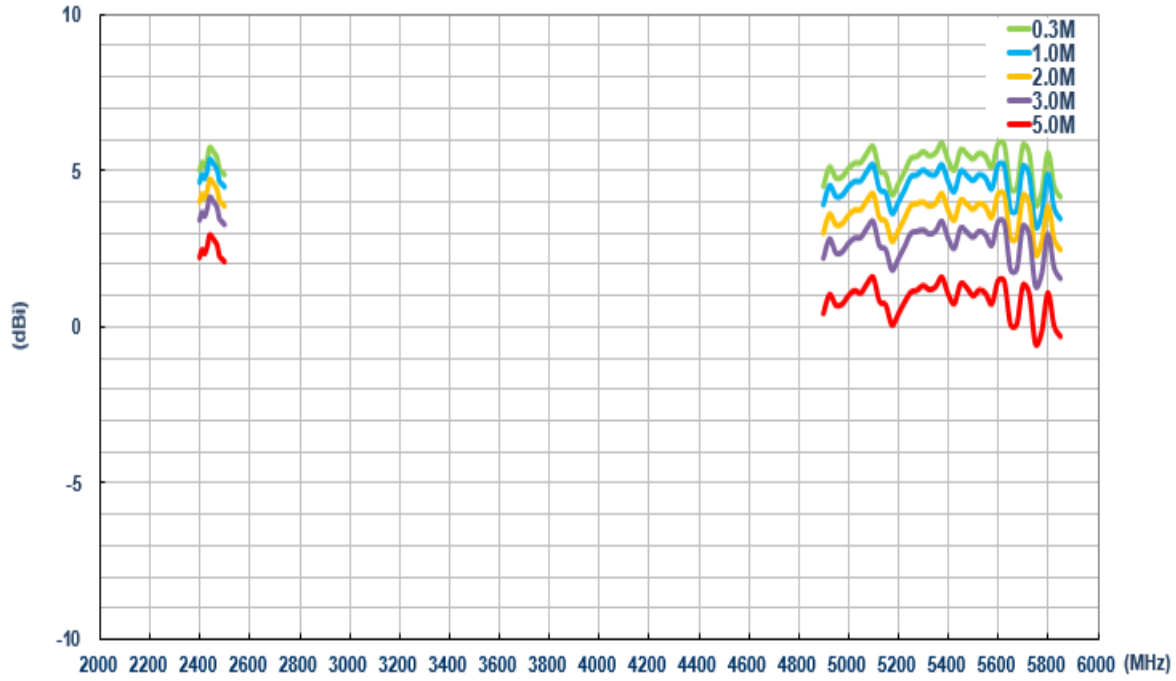
6.4.6 Average Gain (Wi-Fi MIMO 1)



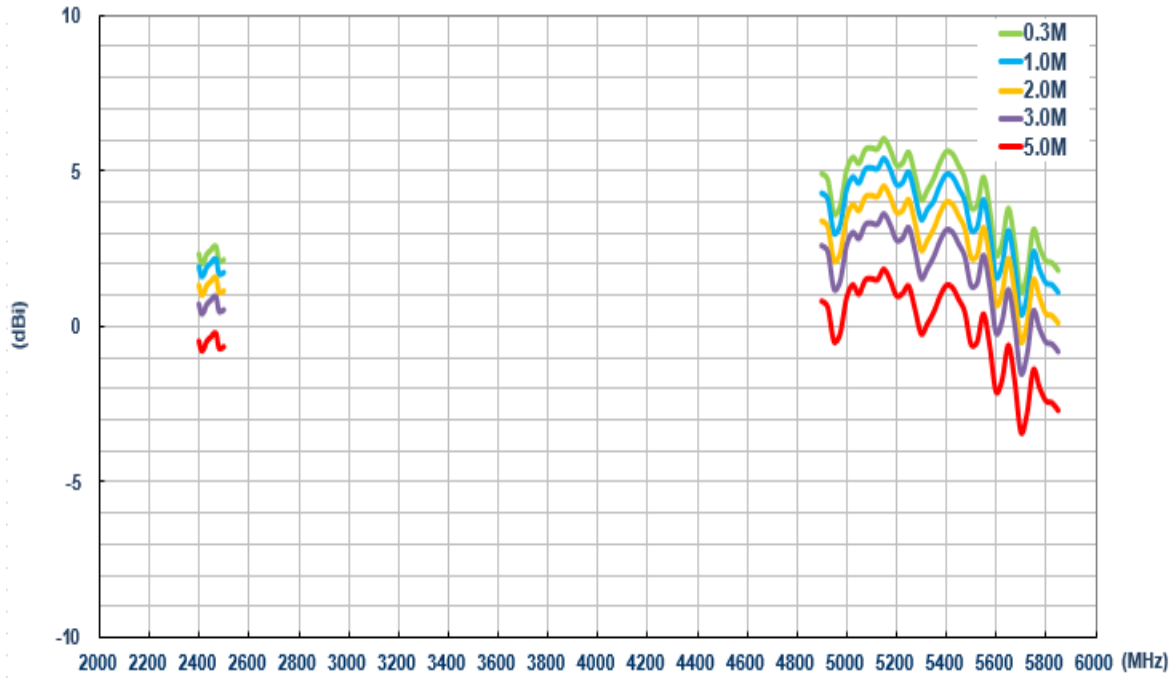
6.4.7 Average Gain (Wi-Fi MIMO 2)



6.4.8 Peak Gain (Wi-Fi MIMO 1)

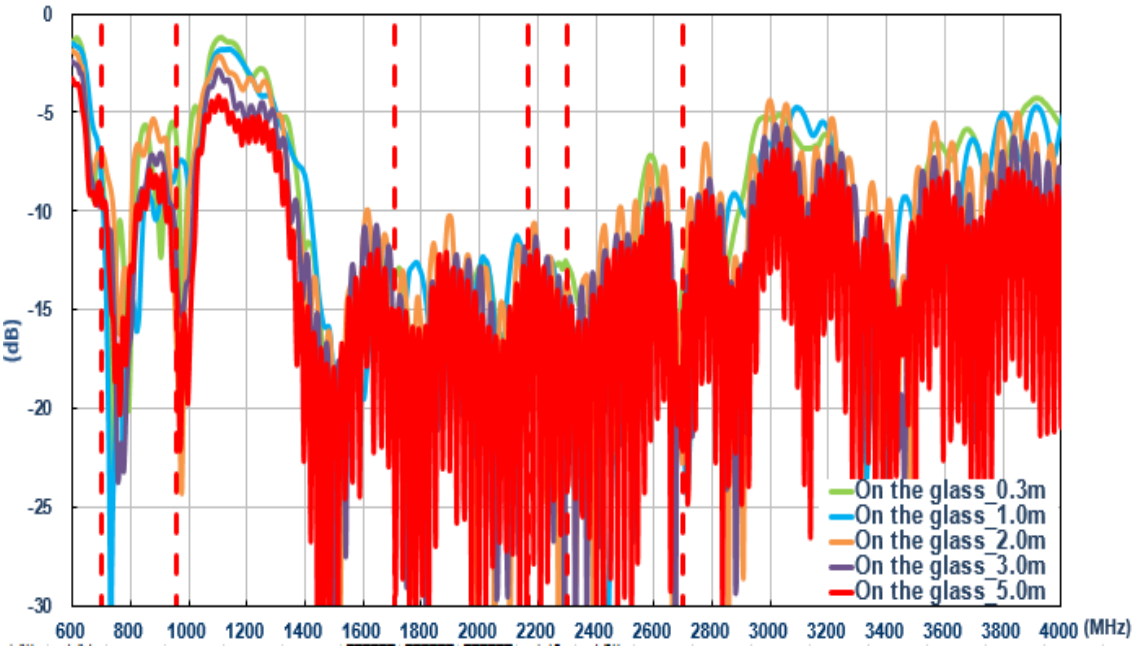


6.4.9 Peak Gain (Wi-Fi MIMO 2)

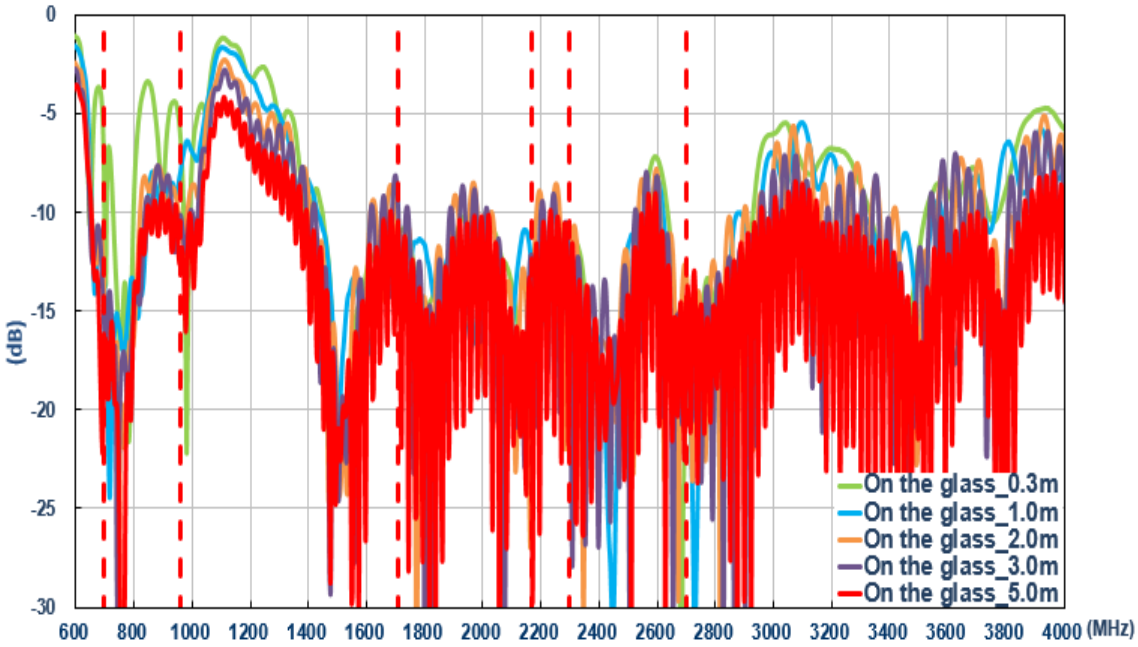


6.5. On glass

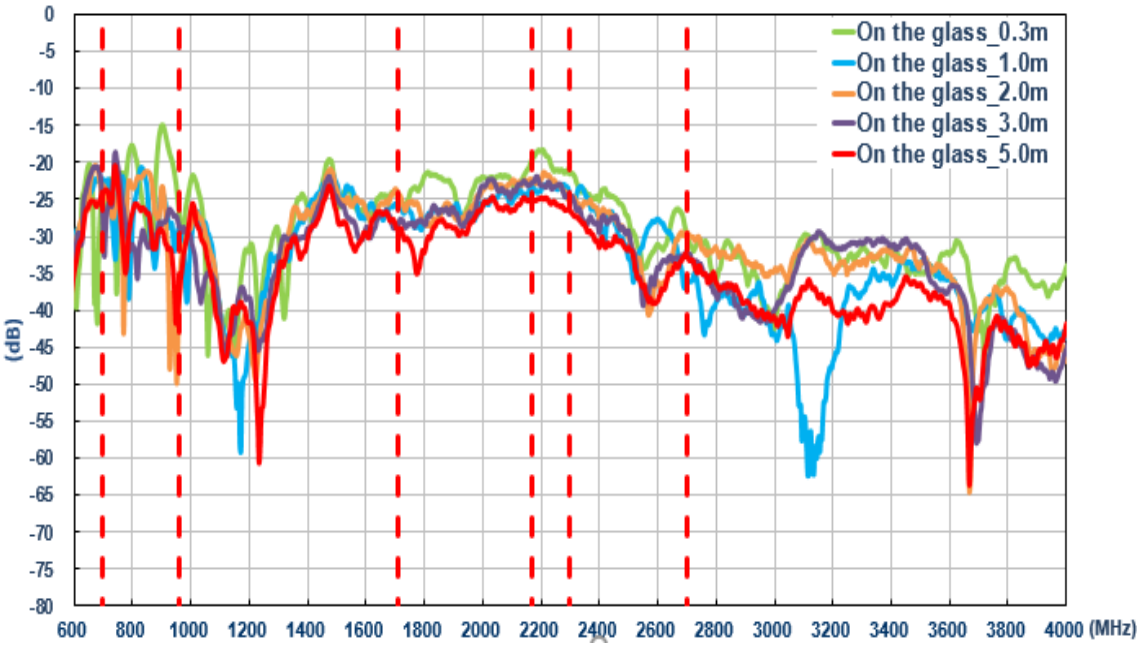
6.5.1 Return Loss (LTE_MIMO 1)



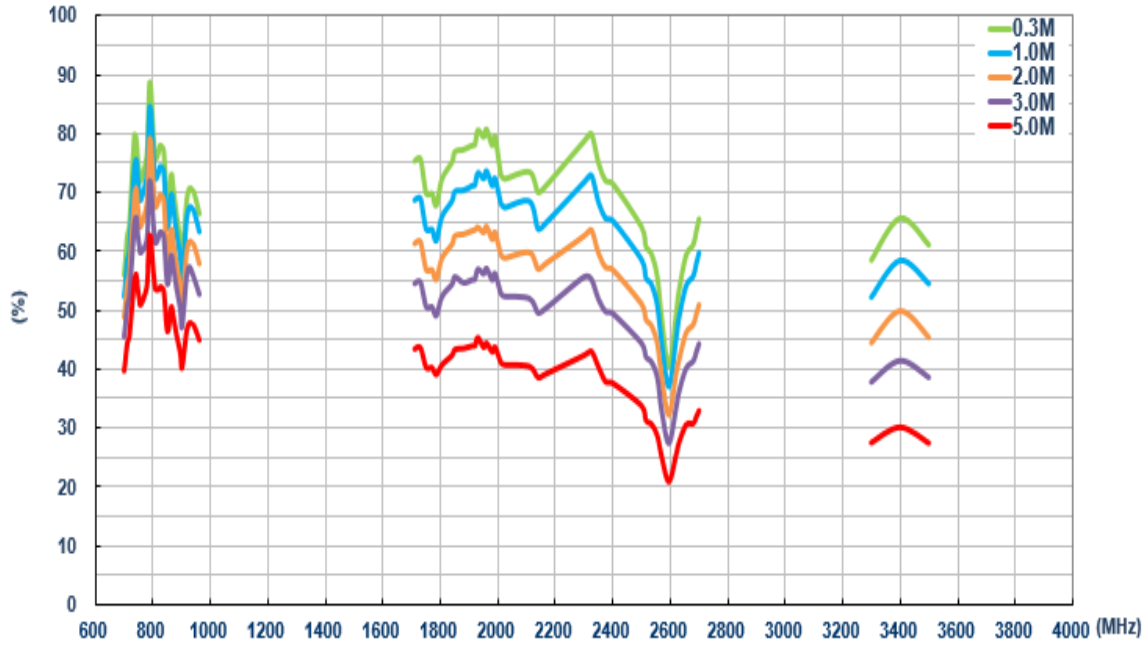
6.5.2 Return Loss (LTE_MIMO 2)



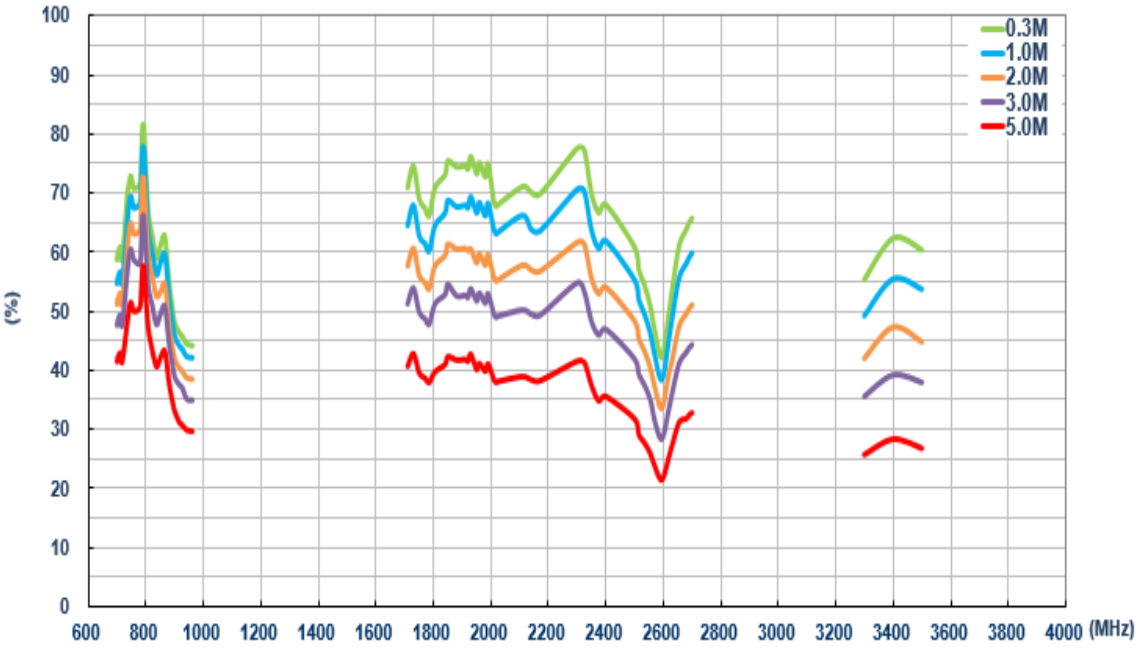
6.5.3 Isolation (LTE antenna)



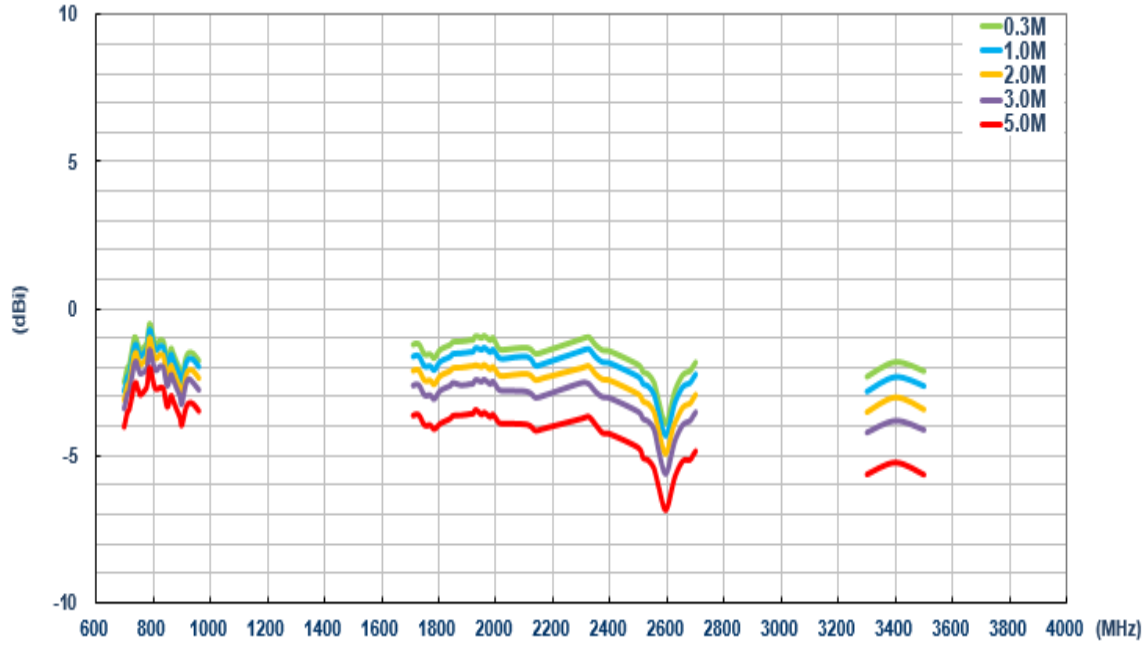
6.5.4 Efficiency (LTE MIMO 1)



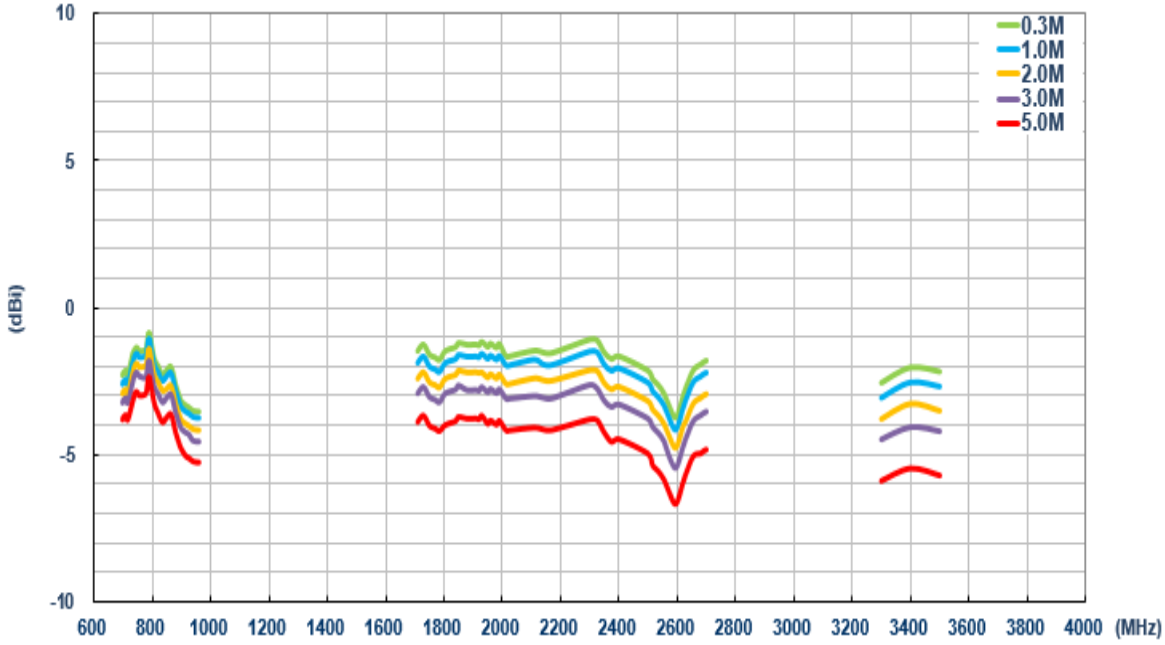
6.5.5 Efficiency (LTE MIMO 2)



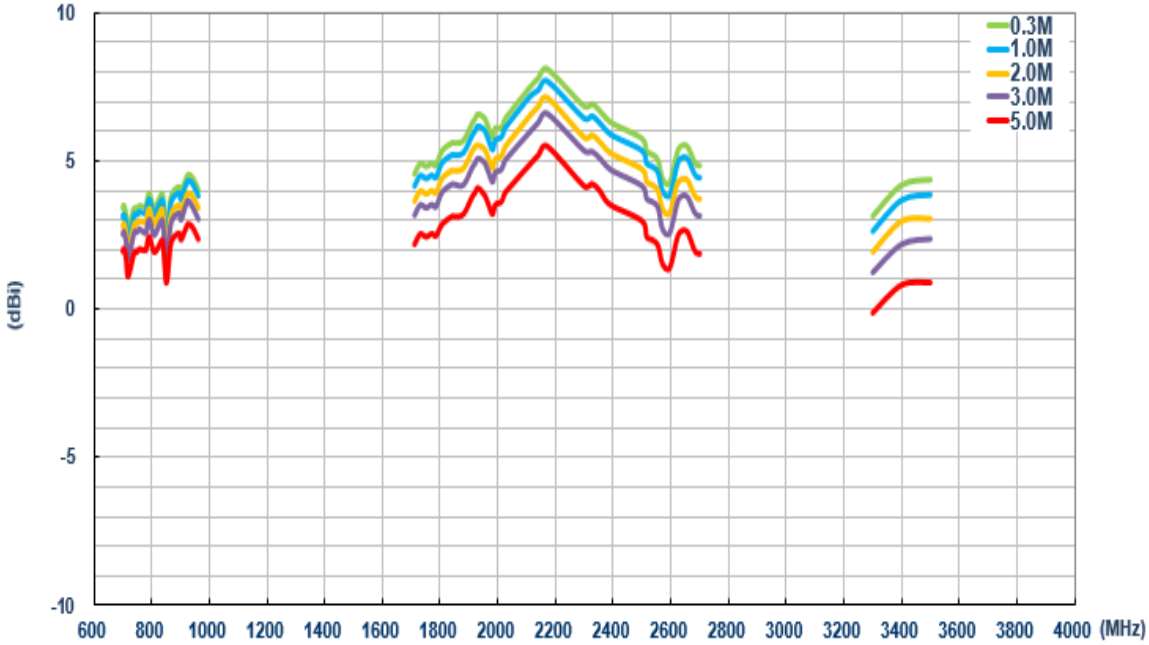
6.5.6 Average Gain (LTE MIMO 1)



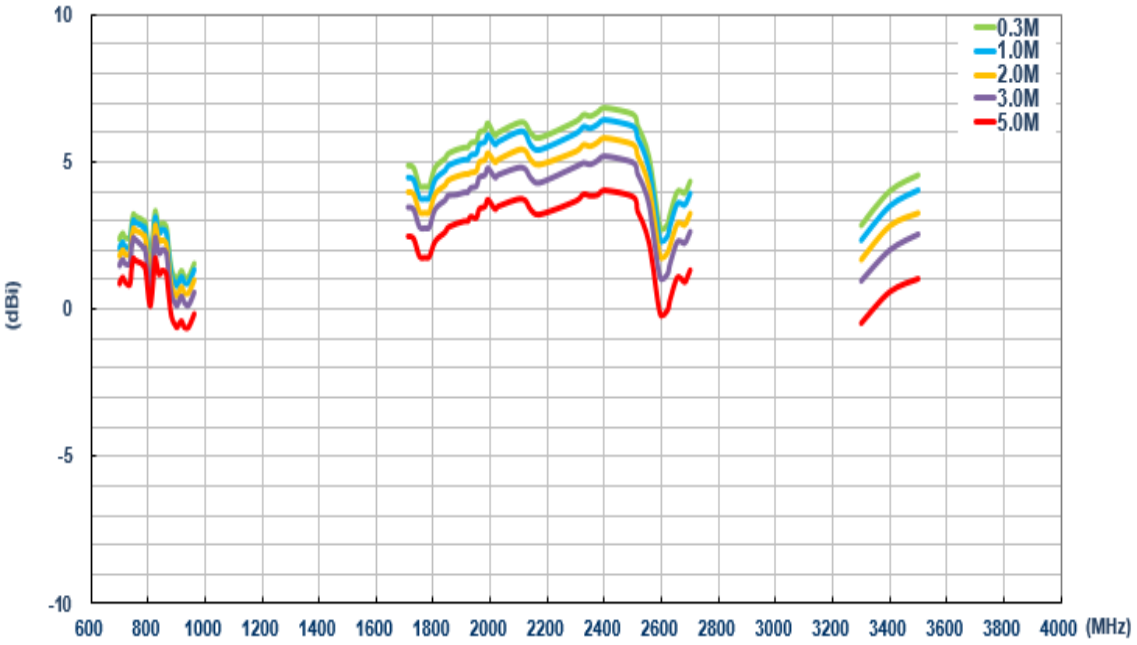
6.5.7 Average Gain (LTE MIMO 2)



6.5.8 Peak Gain (LTE MIMO 1)

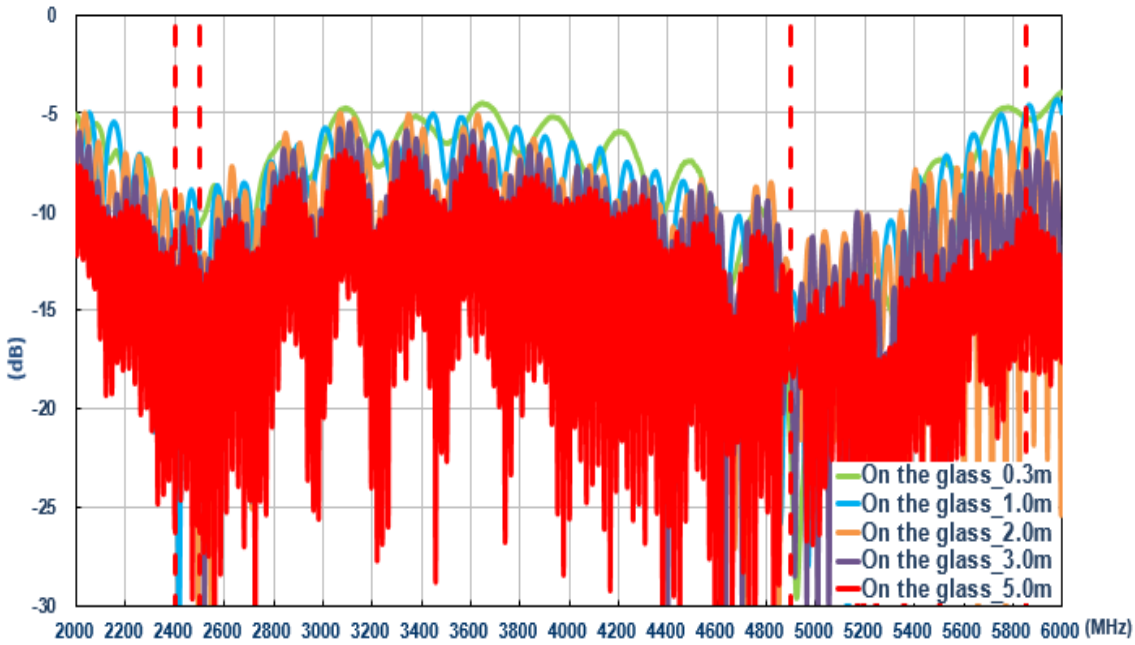


6.5.9 Peak Gain (LTE MIMO 2)

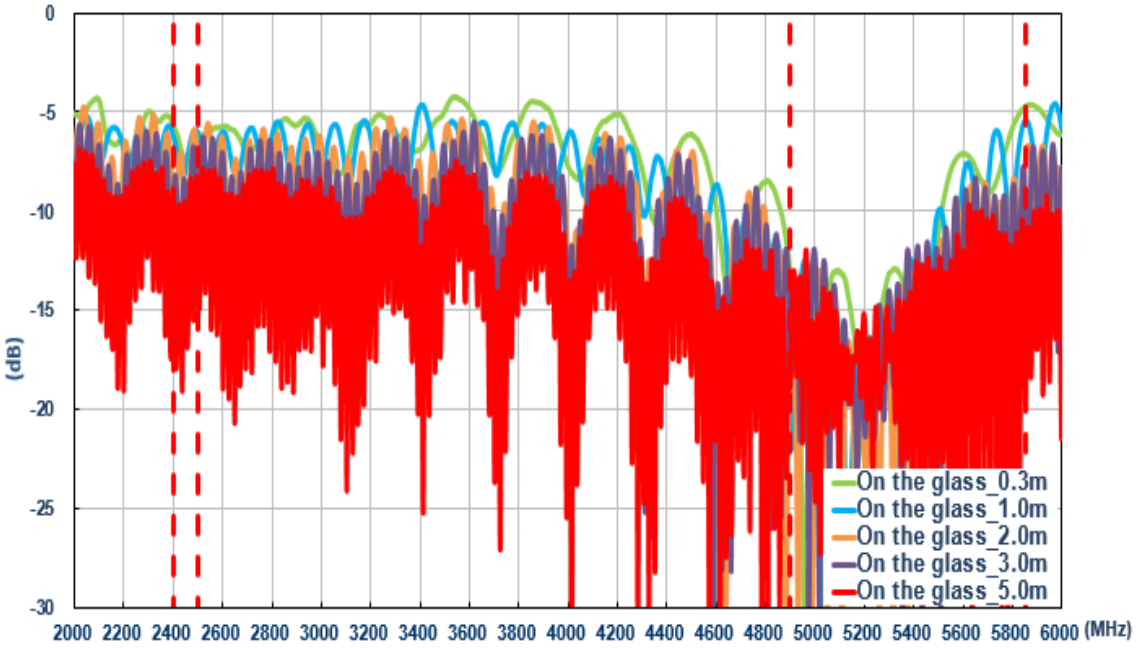


6.6. On glass (Wi-Fi)

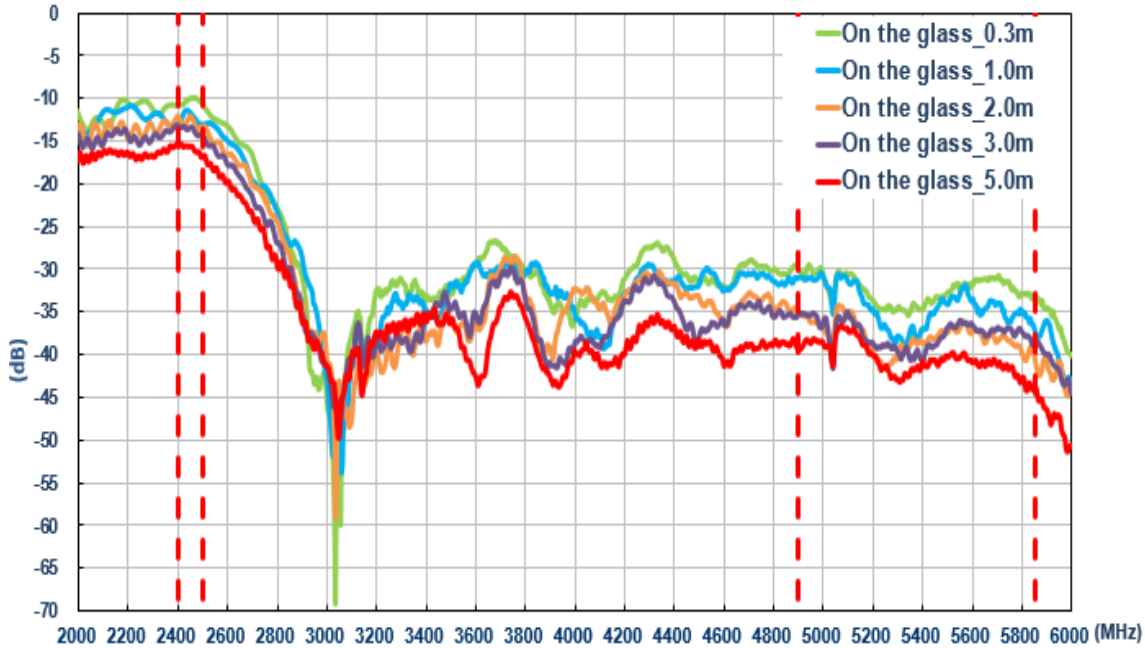
6.6.1 Return Loss (Wi-Fi MIMO 1)



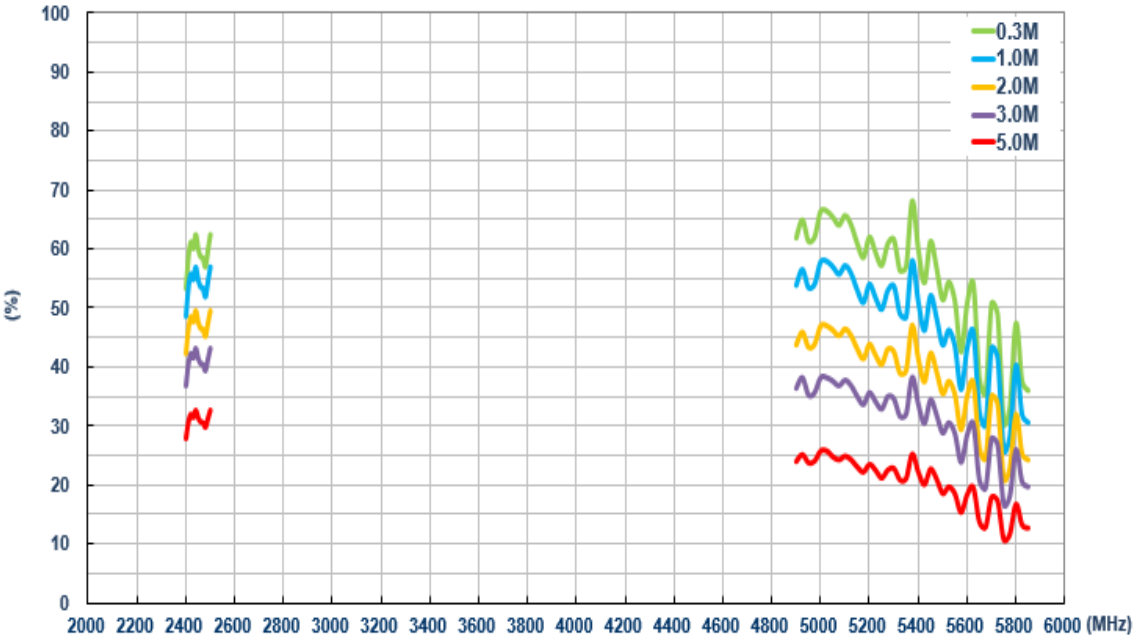
6.6.2 Return Loss (Wi-Fi MIMO 2)



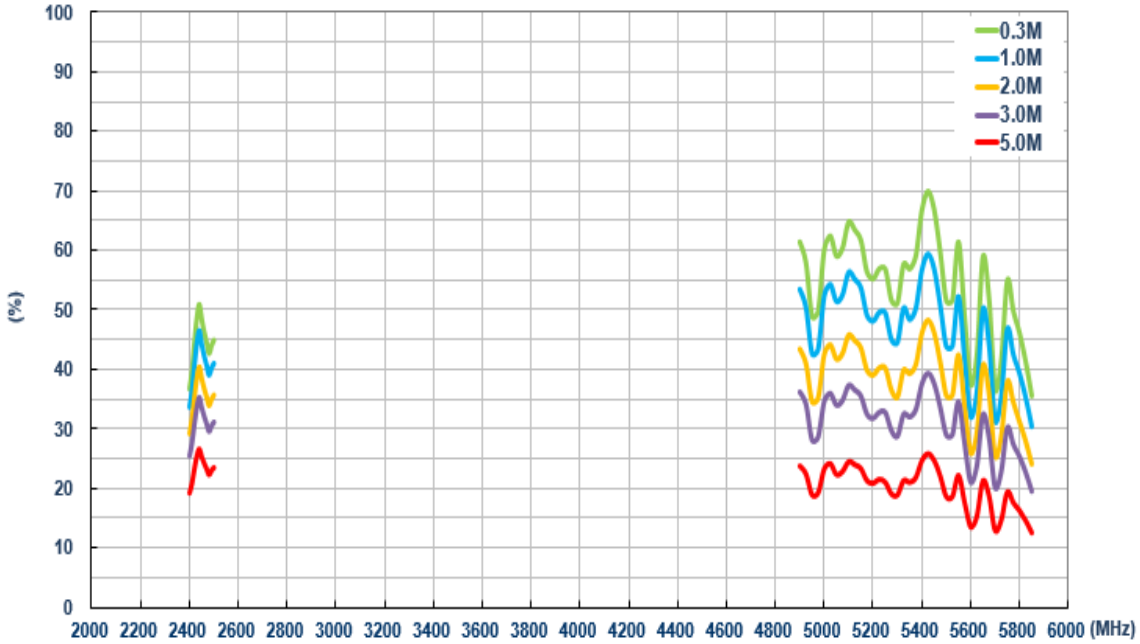
6.6.3 Isolation (Wi-Fi)



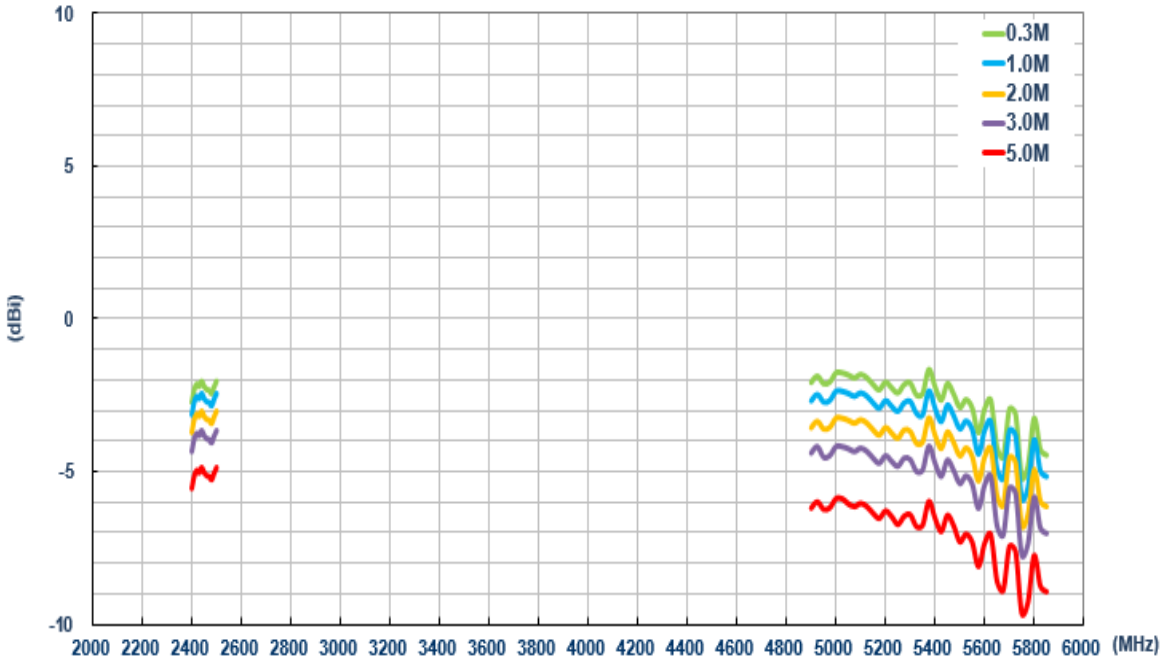
6.6.4 Efficiency (Wi-Fi MIMO 1)



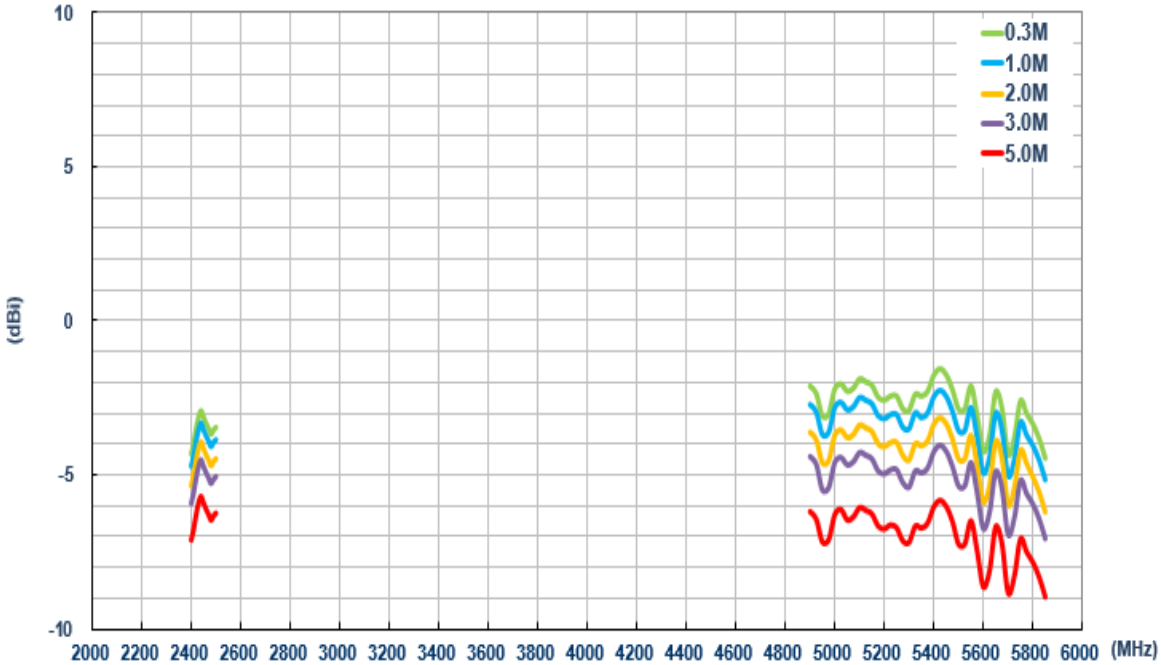
6.6.5 Efficiency (Wi-Fi MIMO 2)



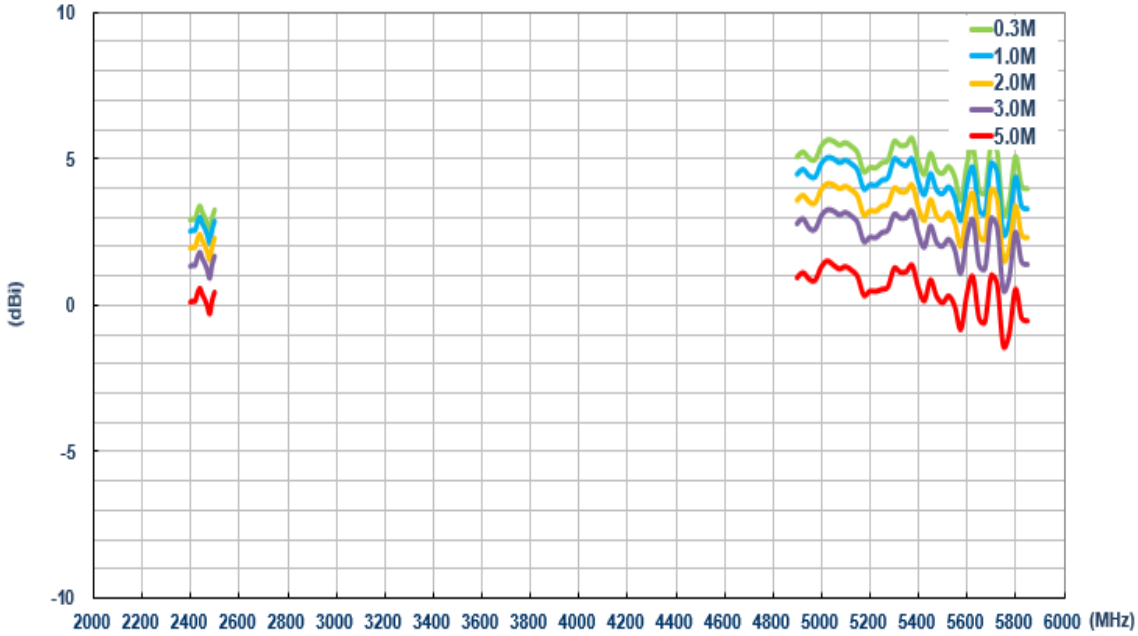
6.6.6 Average Gain (Wi-Fi MIMO 1)



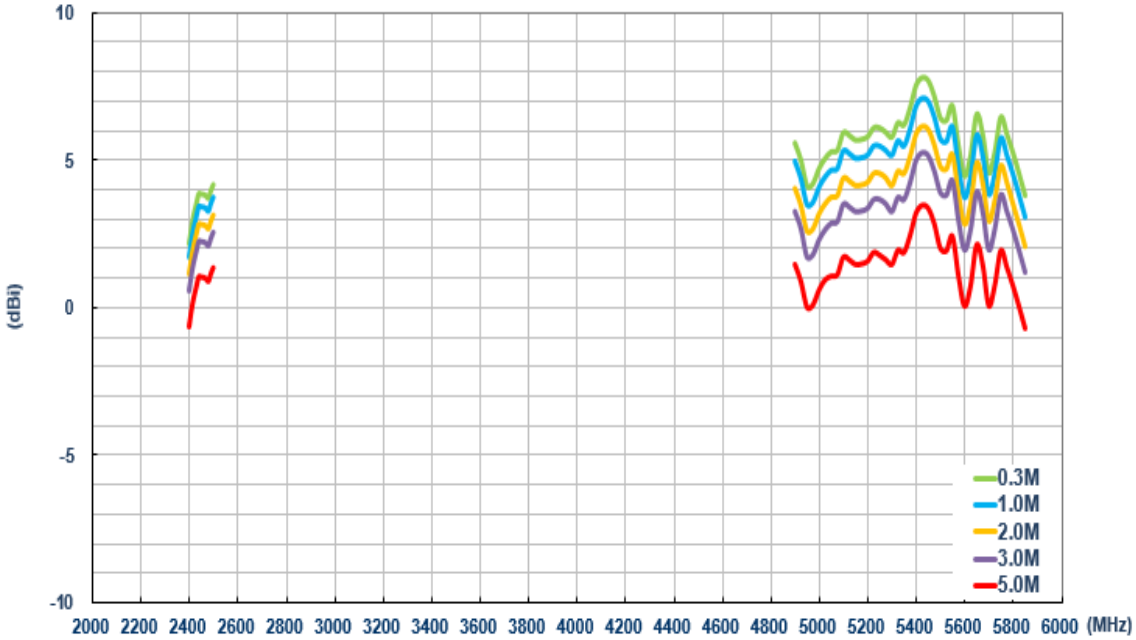
6.6.7 Average Gain (Wi-Fi MIMO 2)



6.6.8 Peak Gain (Wi-Fi MIMO 1)

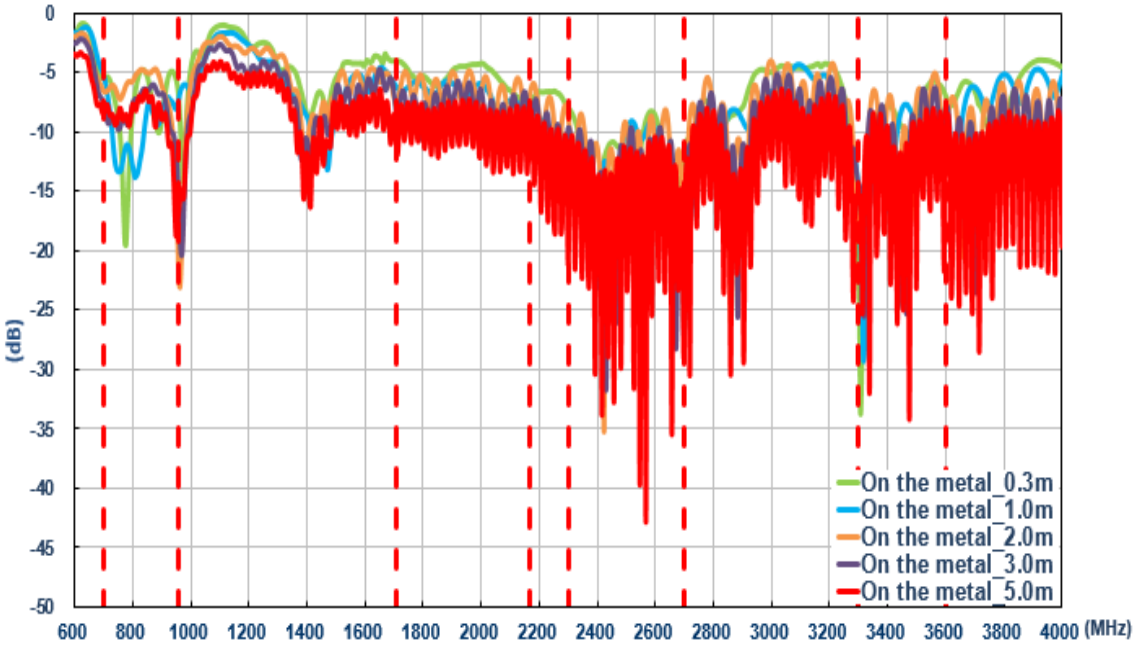


6.6.9 Peak Gain (Wi-Fi MIMO 2)

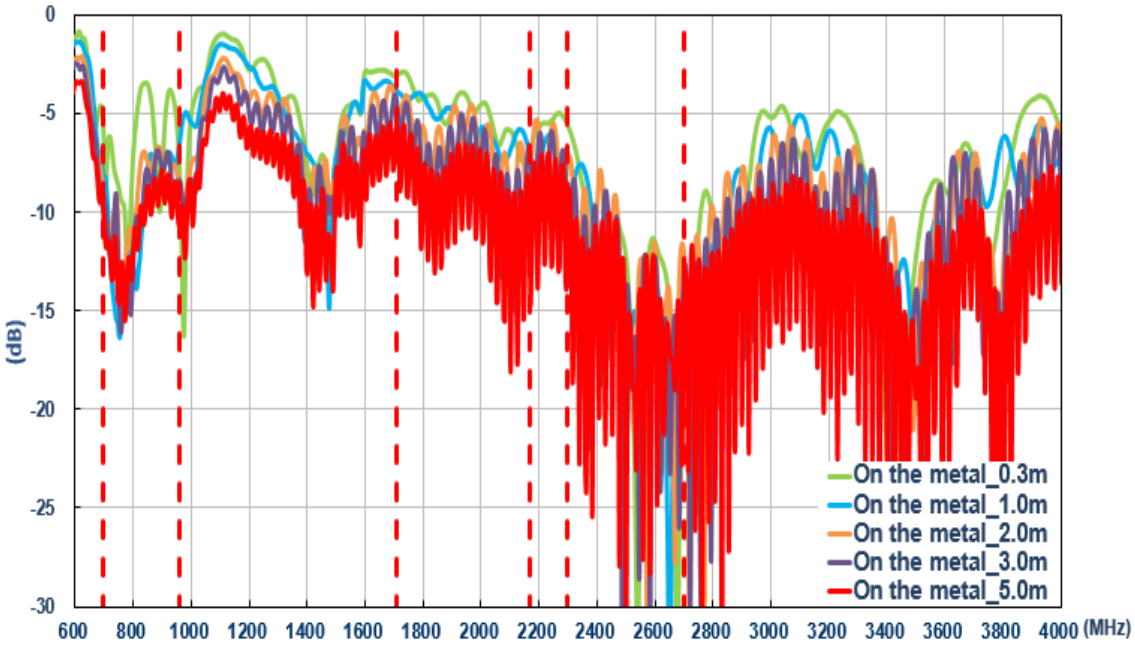


6.7. On metal (LTE)

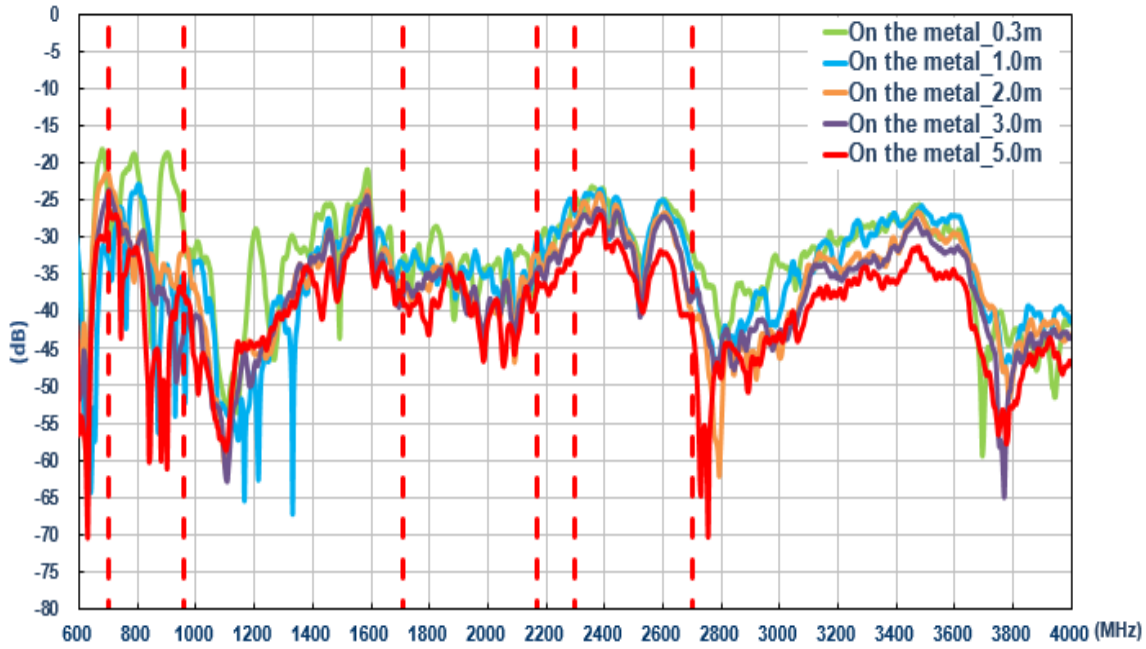
6.7.1 Return Loss (LTE MIMO 1)



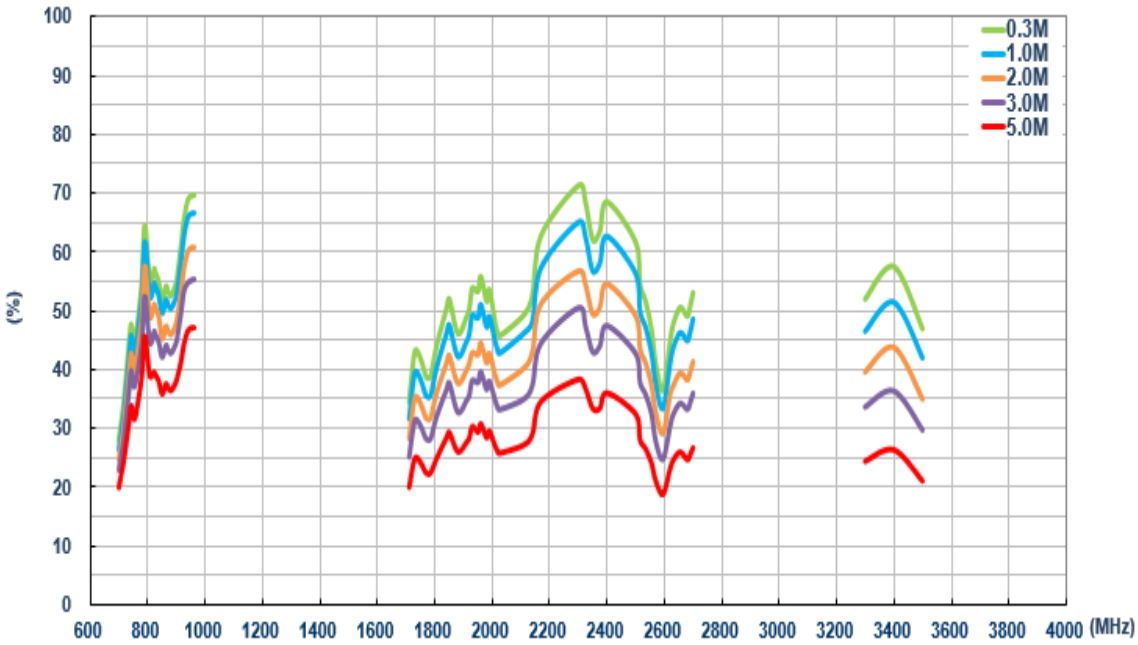
6.7.2 Return Loss (LTE MIMO 2)



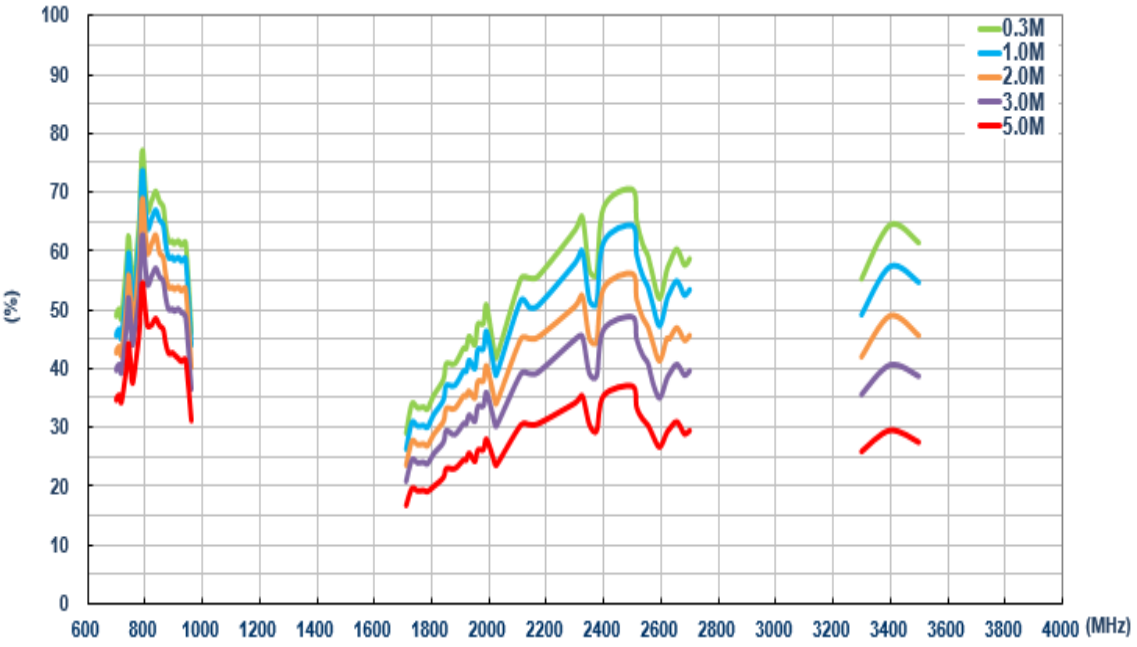
6.7.3 Isolation (LTE antenna)



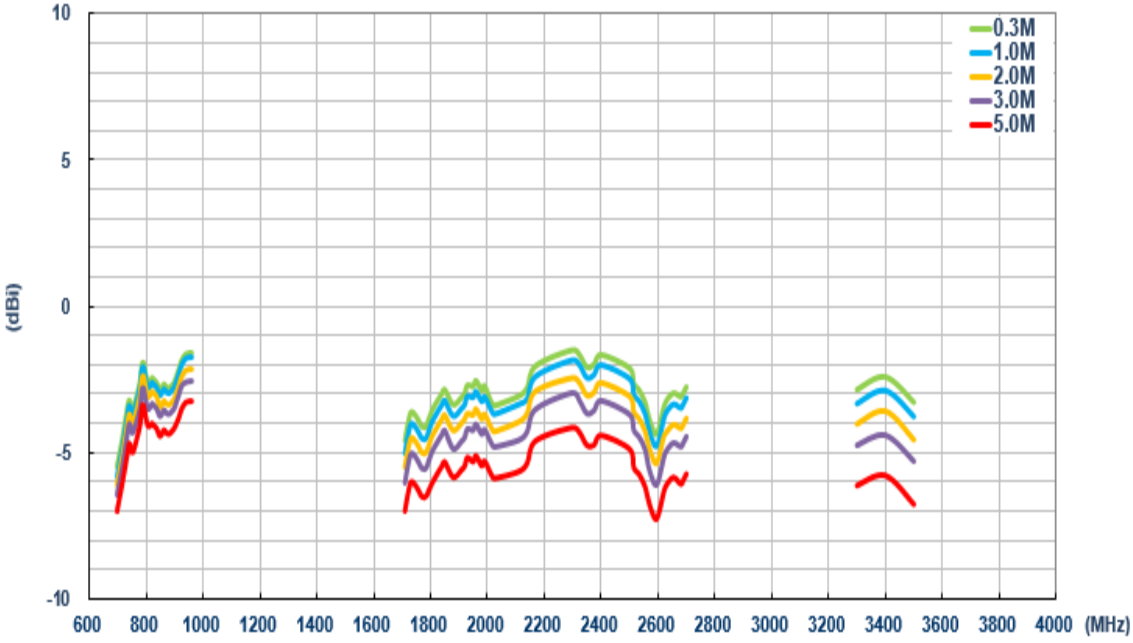
6.7.4 Efficiency (LTE MIMO 1)



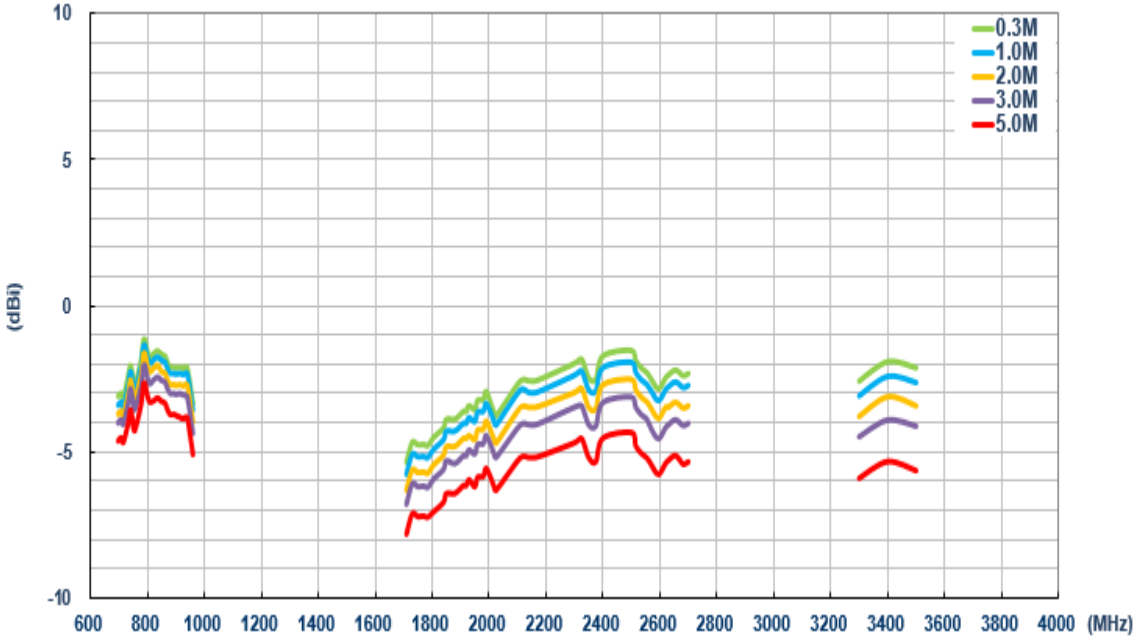
6.7.5 Efficiency (LTE MIMO 2)



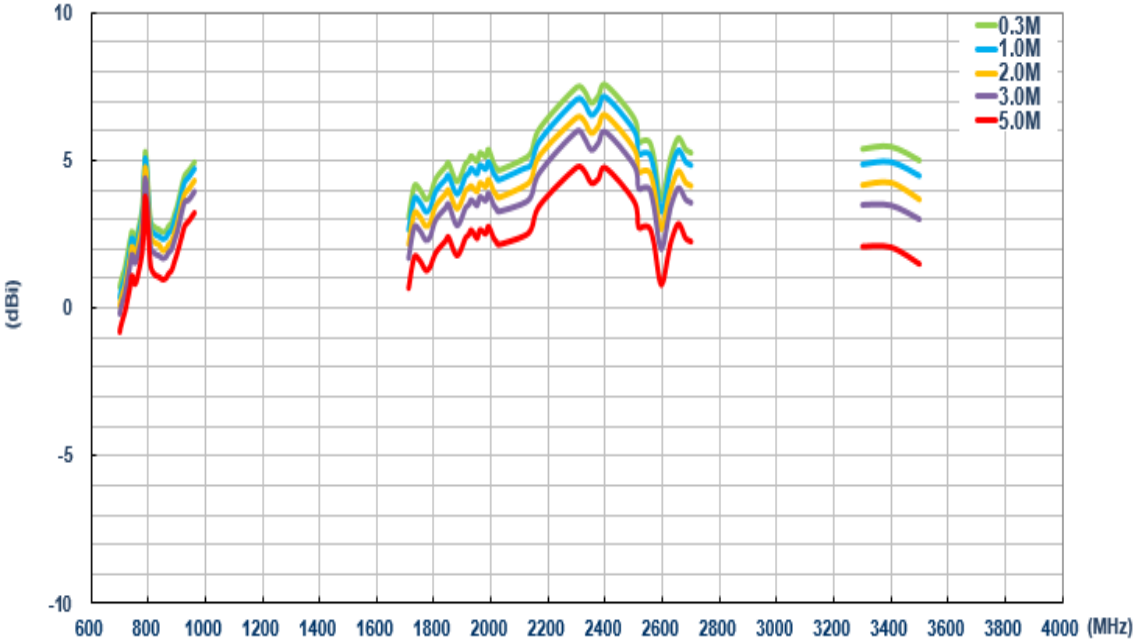
6.7.6 Average Gain (LTE MIMO 1)



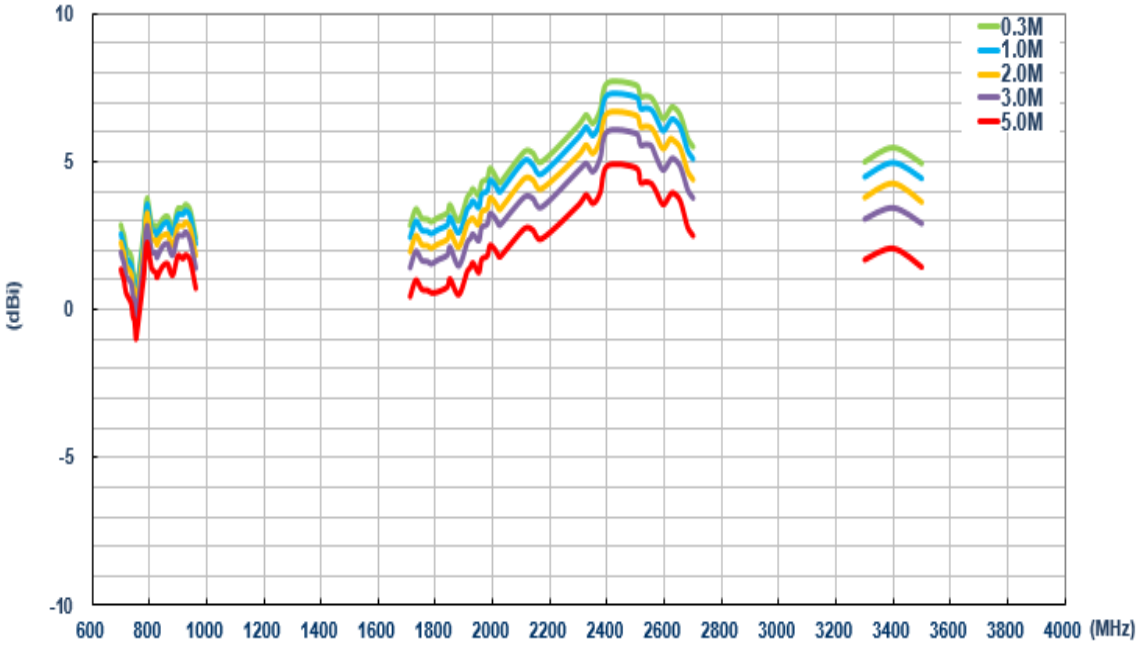
6.7.7 Average Gain (LTE MIMO 2)



6.7.8 Peak Gain (LTE MIMO 1)

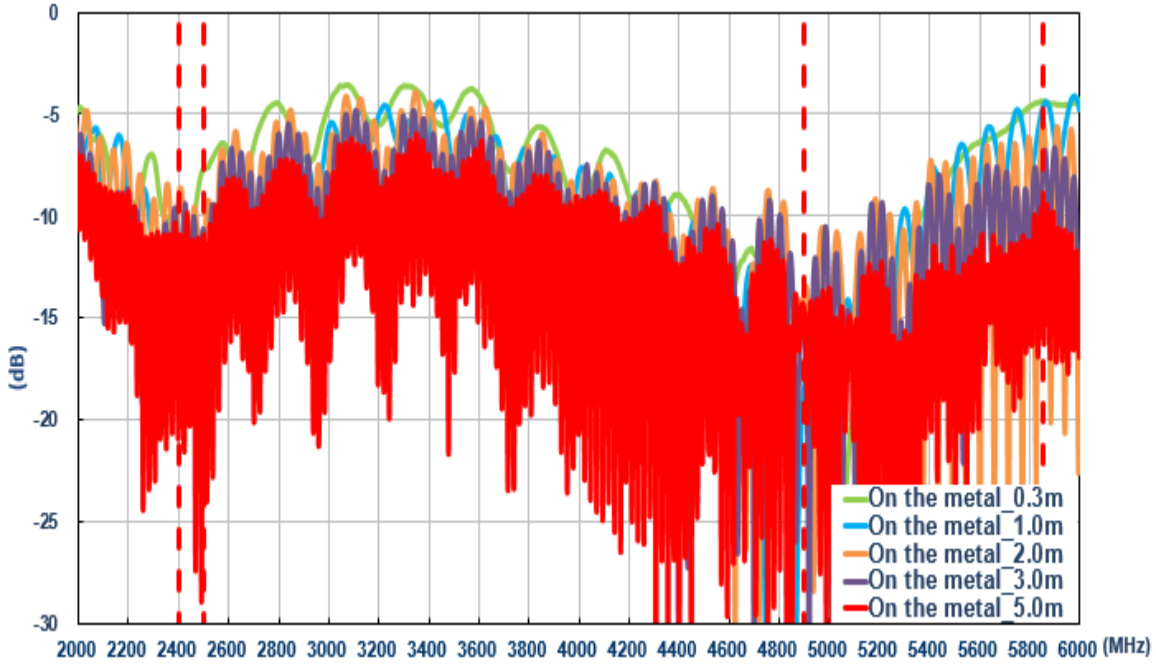


6.7.9 Peak Gain (LTE MIMO 2)

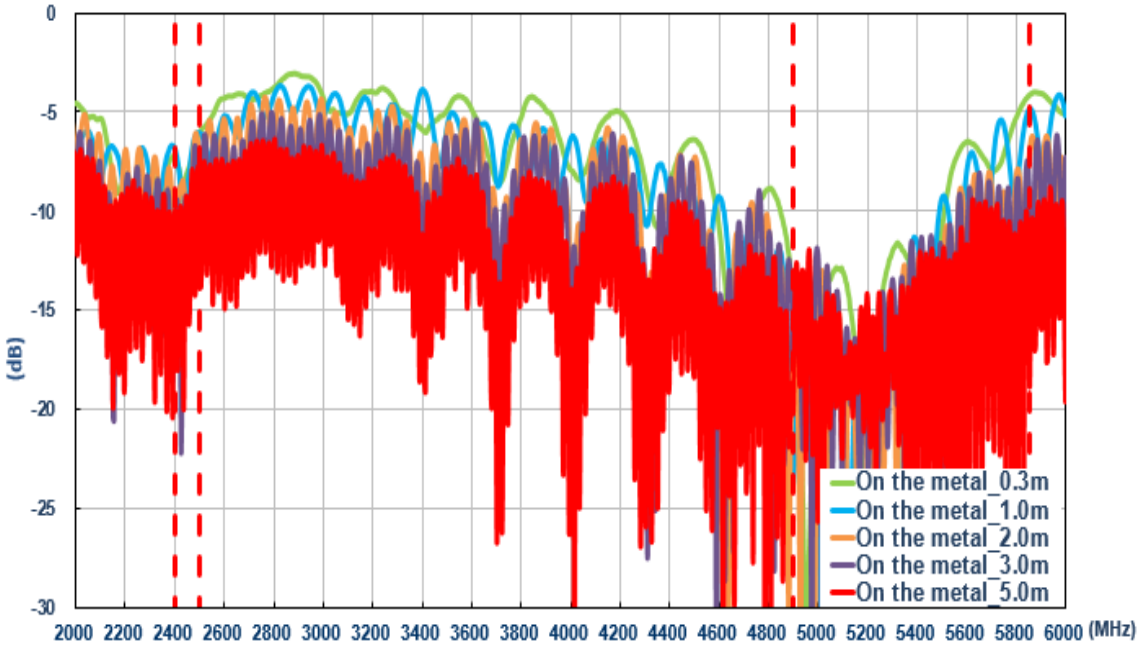


6.8. On metal (Wi-Fi)

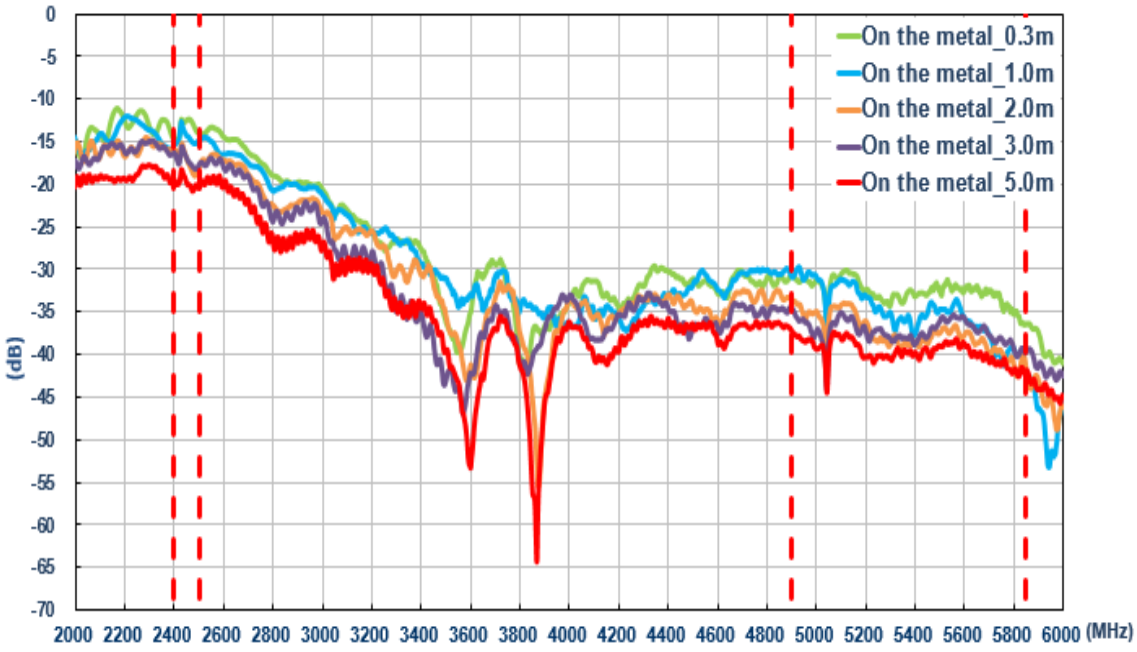
6.8.1 Return Loss (Wi-Fi MIMO 1)



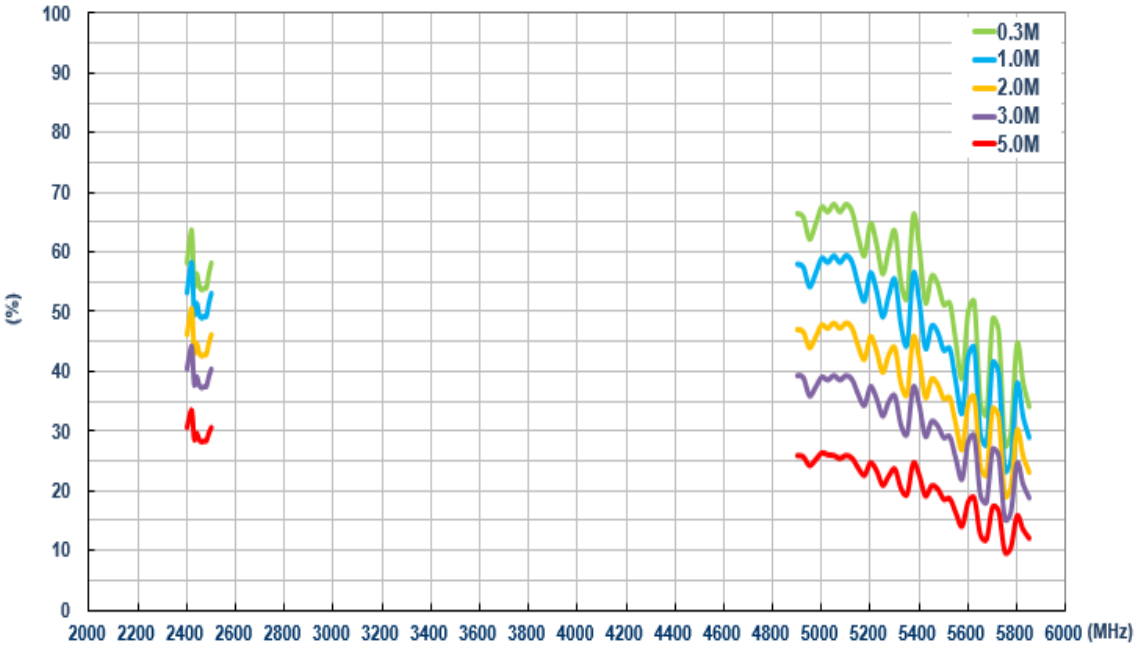
6.8.2 Return Loss (LTE MIMO 1)



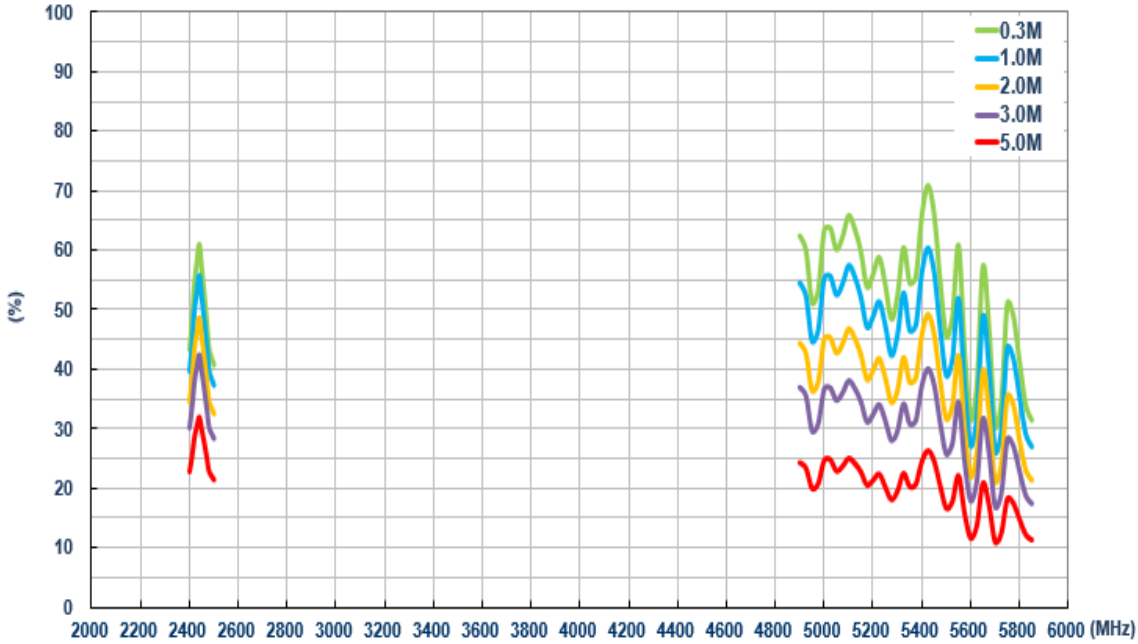
6.8.3 Isolation (Wi-Fi)



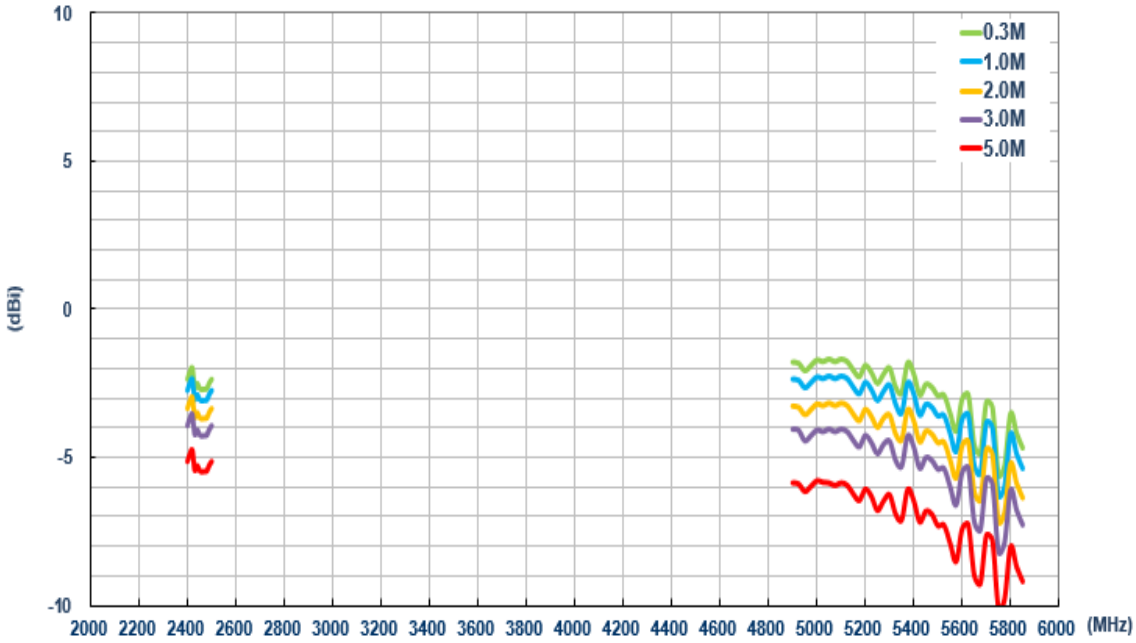
6.8.4 Efficiency (Wi-Fi MIMO 1)



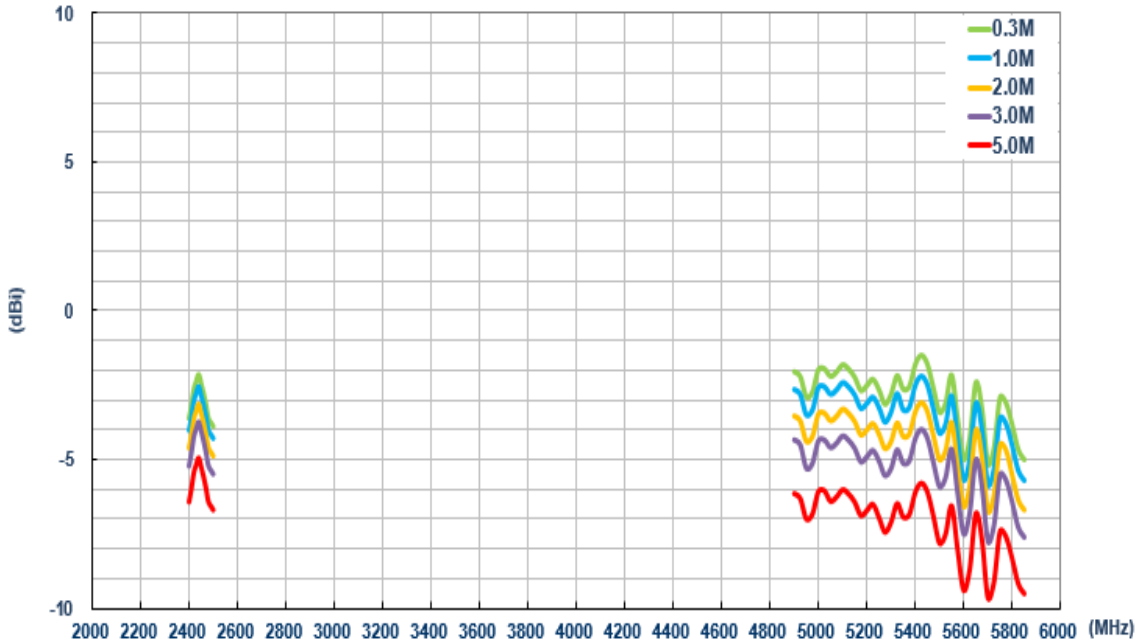
6.8.5 Efficiency (Wi-Fi MIMO 2)



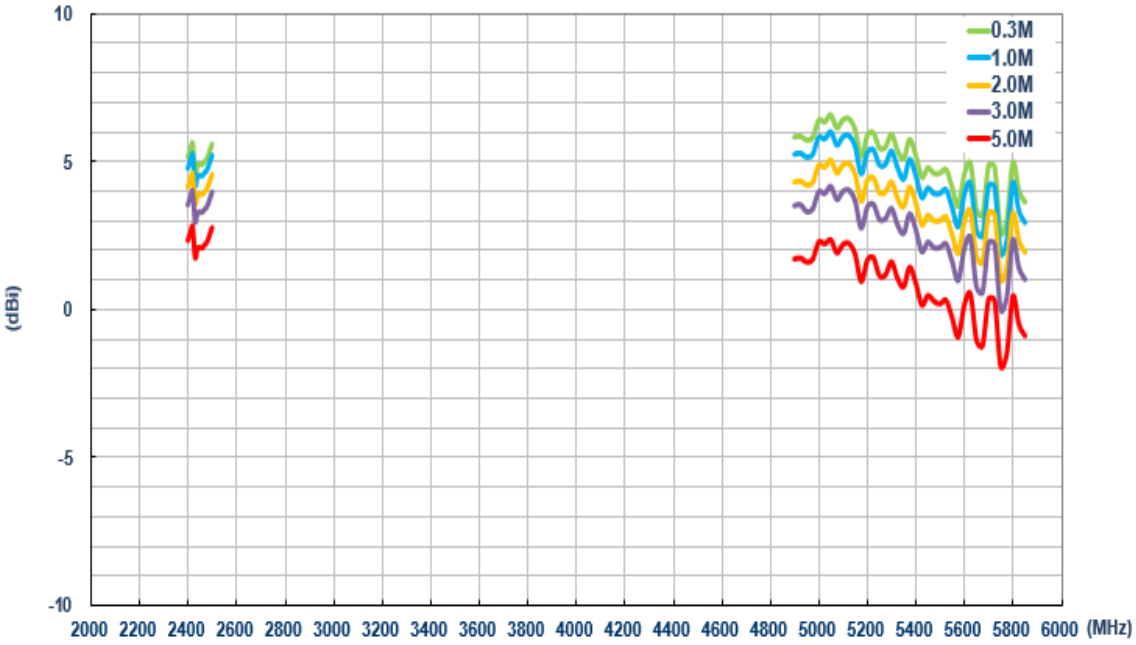
6.8.6 Average Gain (Wi-Fi MIMO 1)



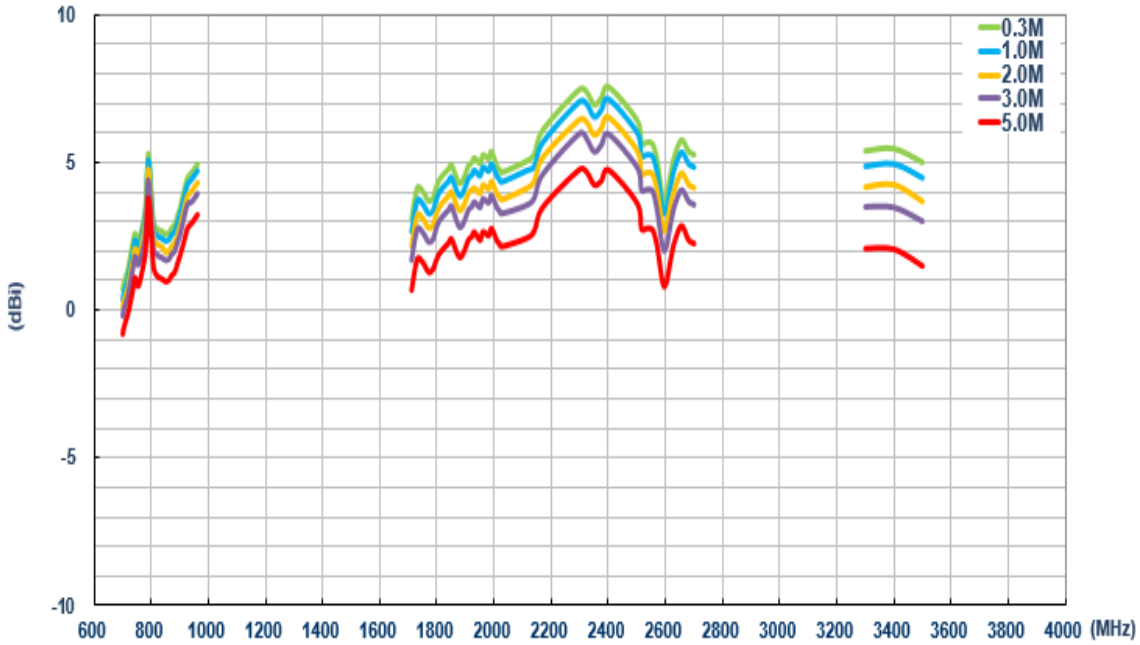
6.8.7 Average Gain (Wi-Fi MIMO 2)



6.8.8 Peak Gain (Wi-Fi MIMO 1)

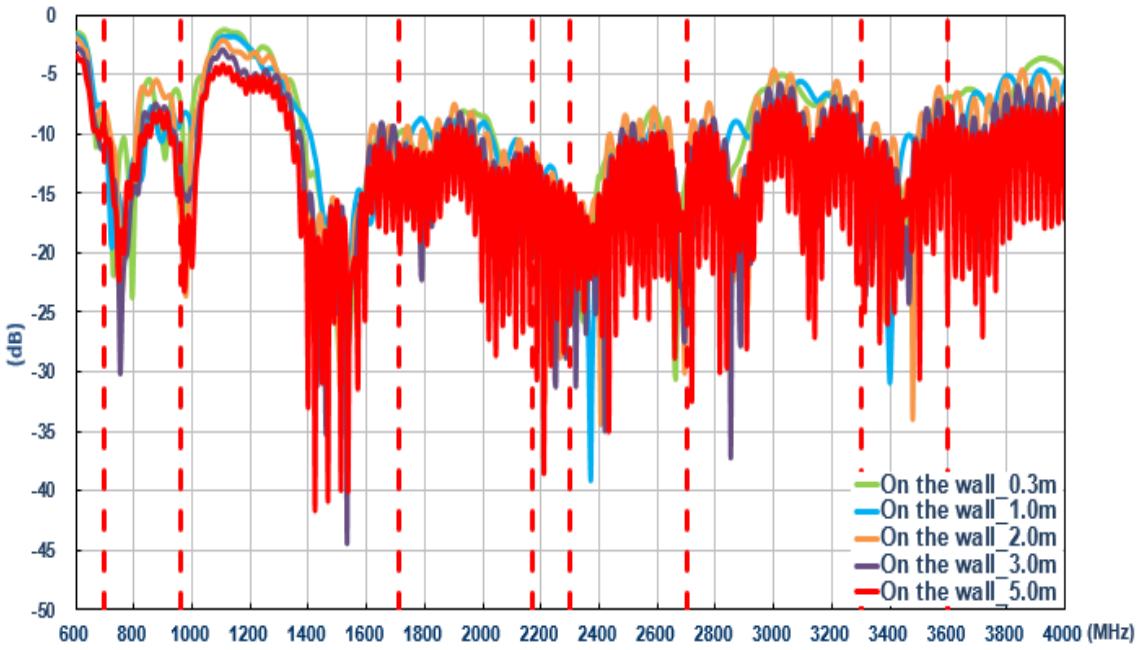


6.8.9 Peak Gain (Wi-Fi MIMO 2)

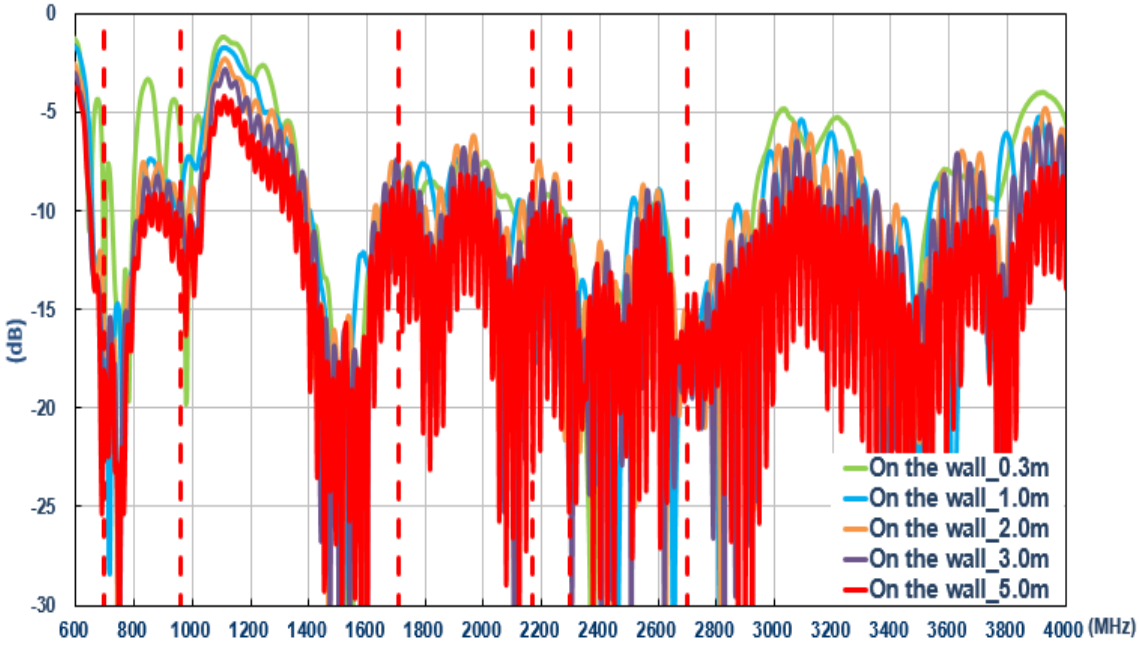


6.9. On the wall (LTE)

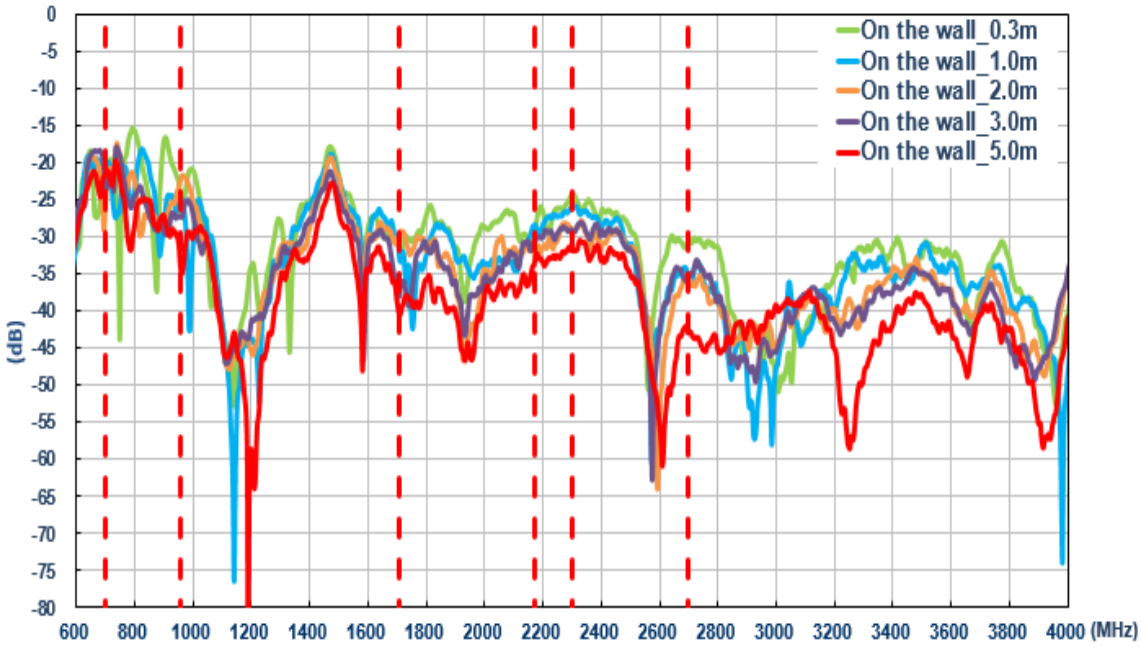
6.9.1 Return Loss (LTE MIMO 1)



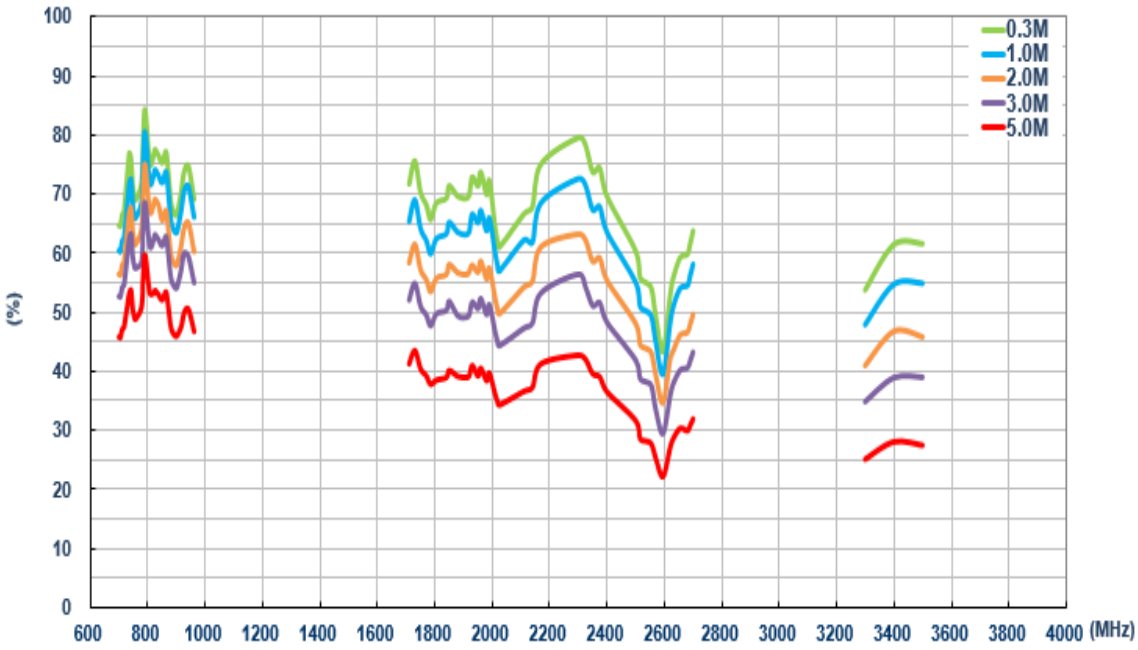
6.9.2 Return Loss (LTE MIMO 2)



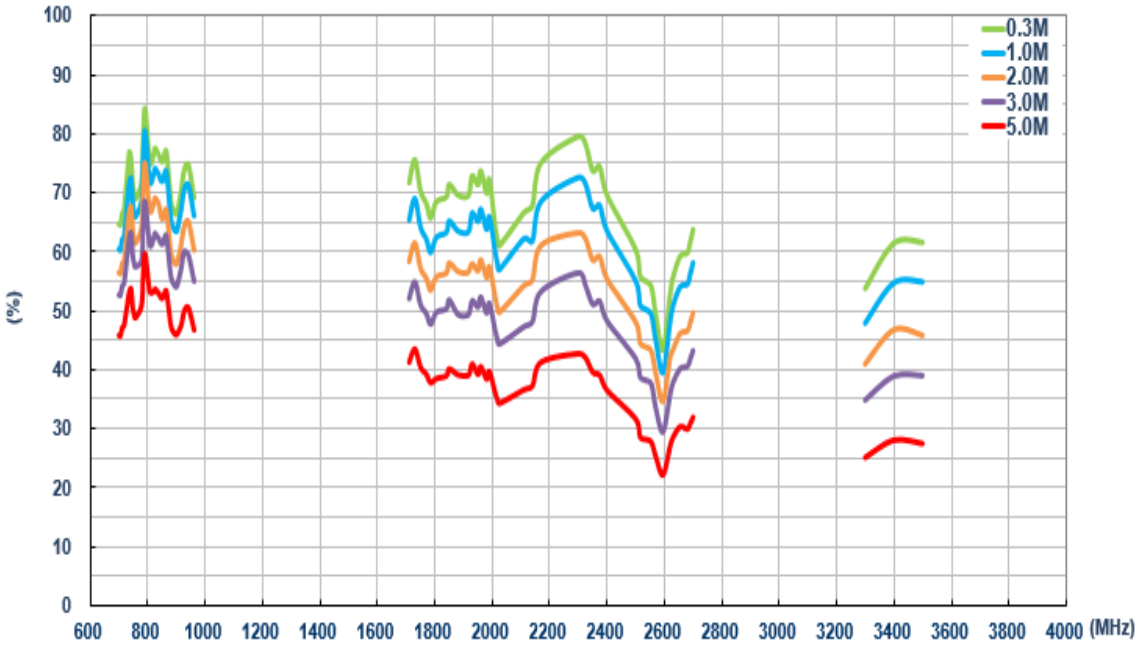
6.9.3 Isolation (LTE Antenna)



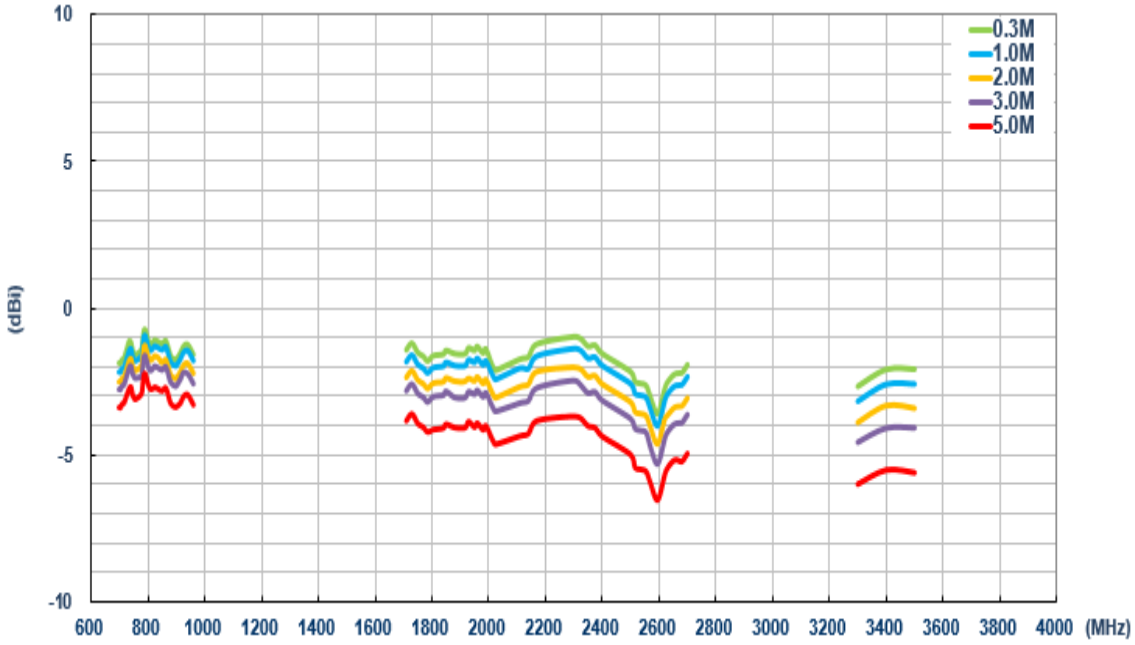
6.9.4 Efficiency (LTE MIMO 1)



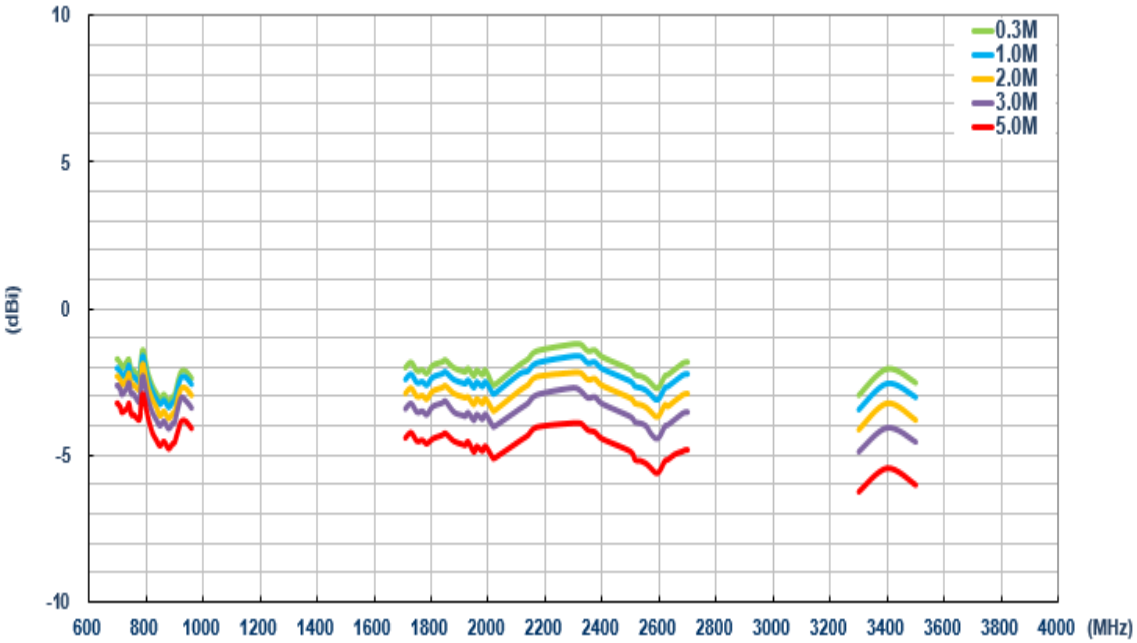
6.9.5 Efficiency (LTE MIMO 2)



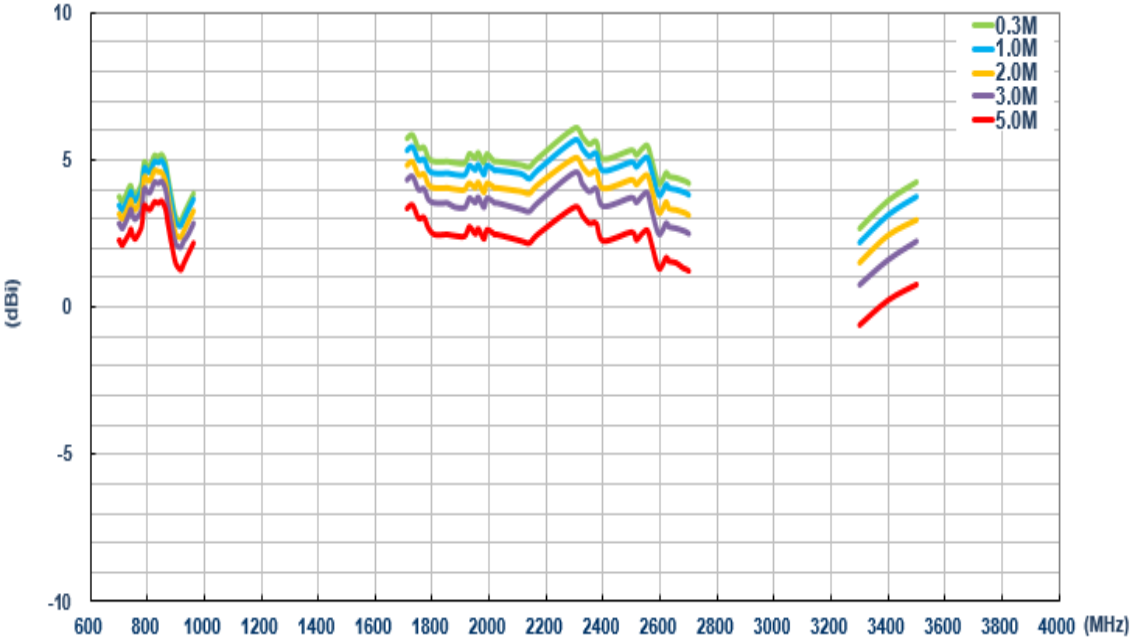
6.9.6 Average Gain (LTE MIMO 1)



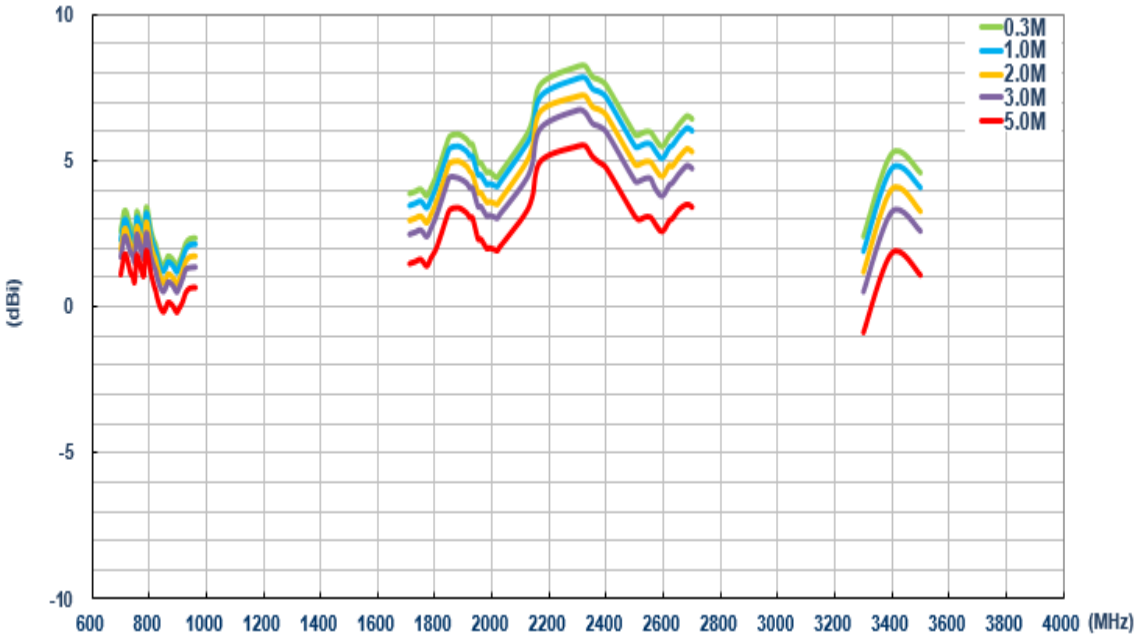
6.9.7 Average Gain (LTE MIMO 2)



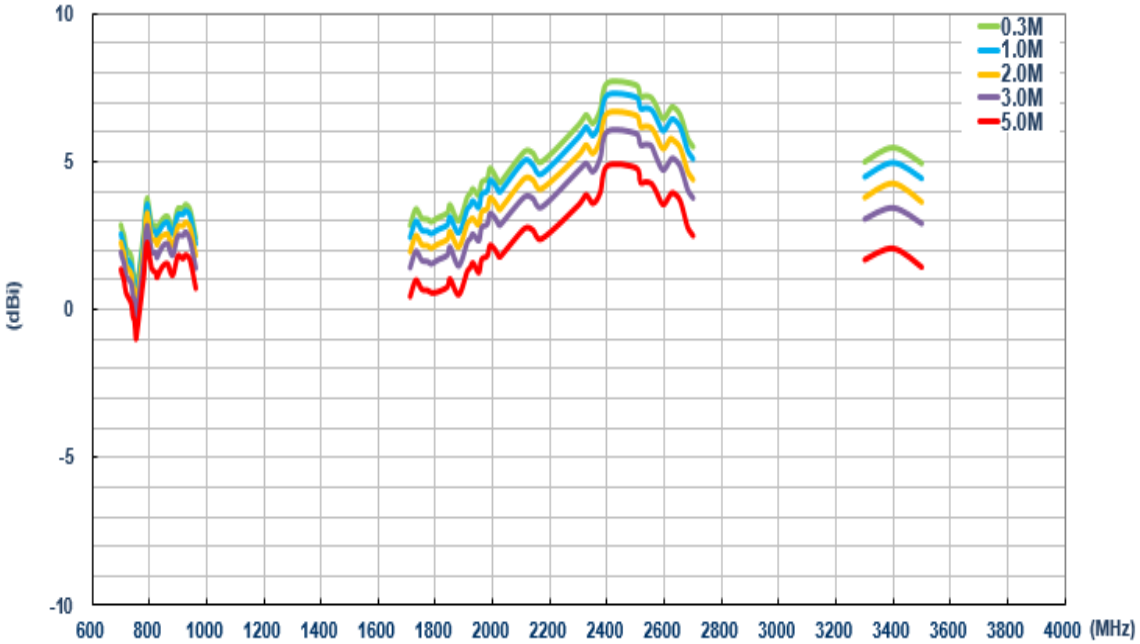
6.9.8 Peak Gain (LTE MIMO 1)



6.9.9 Peak Gain (LTE MIMO 2)

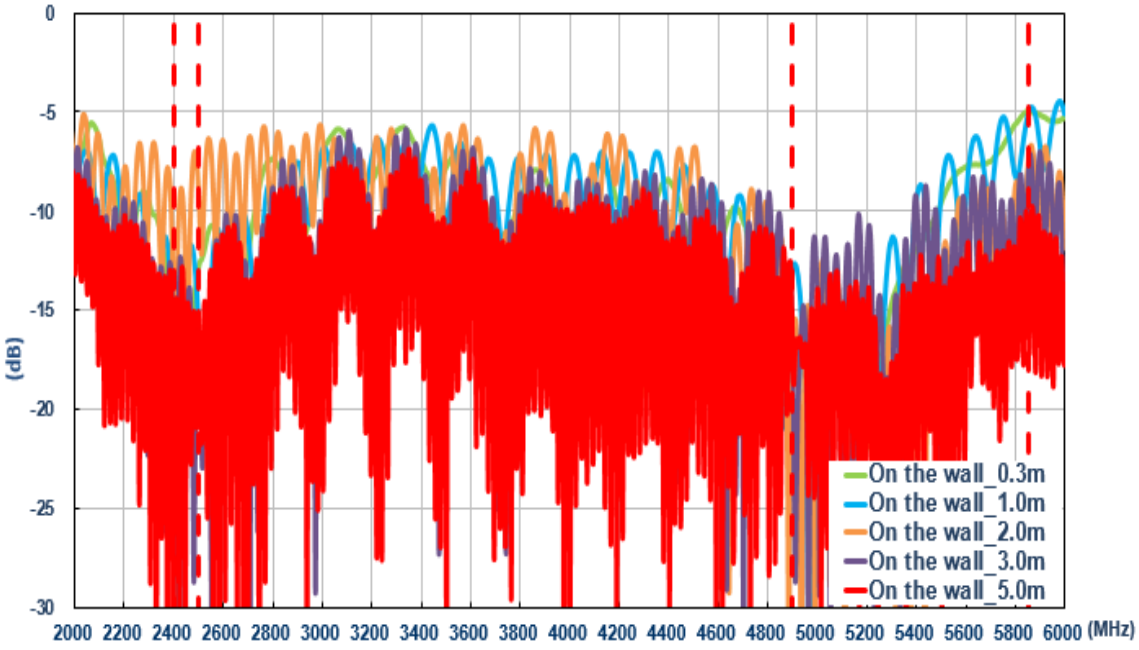


6.9.9 Peak Gain (LTE MIMO 2)

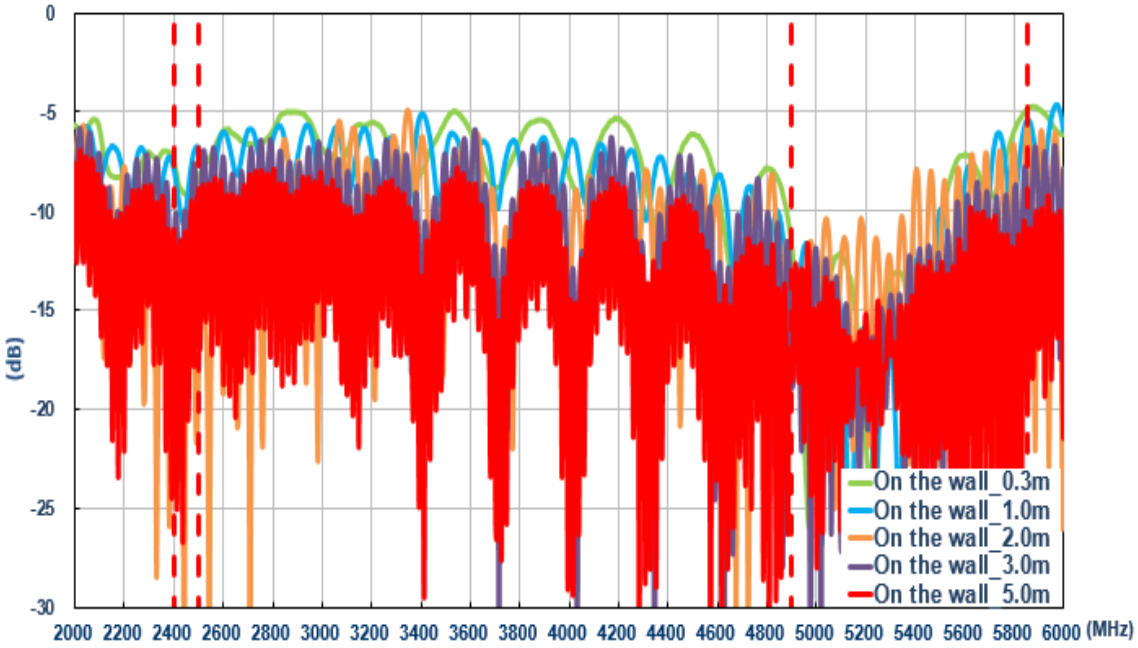


6.10. On wall (Wi-Fi)

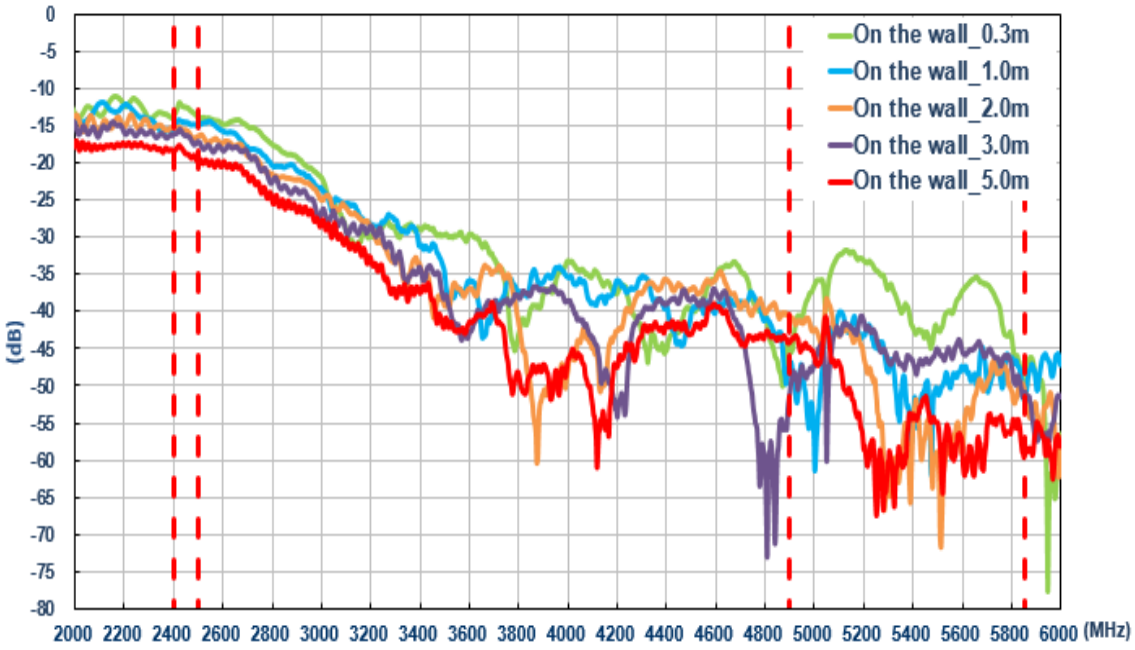
6.10.1 Return Loss (Wi-Fi MIMO 1)



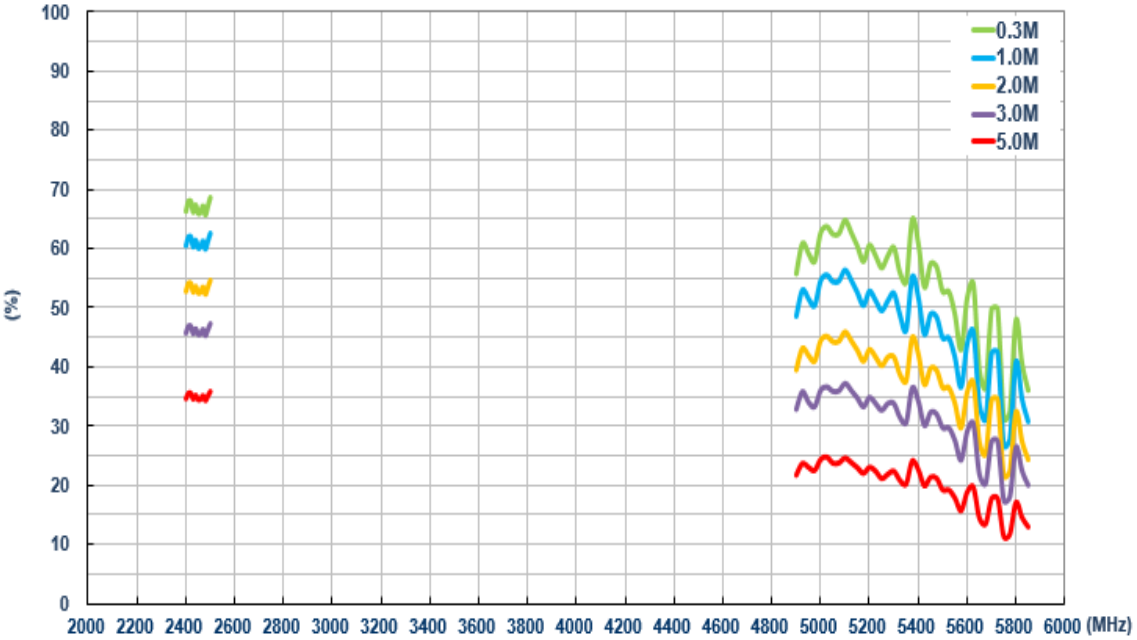
6.10.2 Return Loss (Wi-Fi MIMO 2)



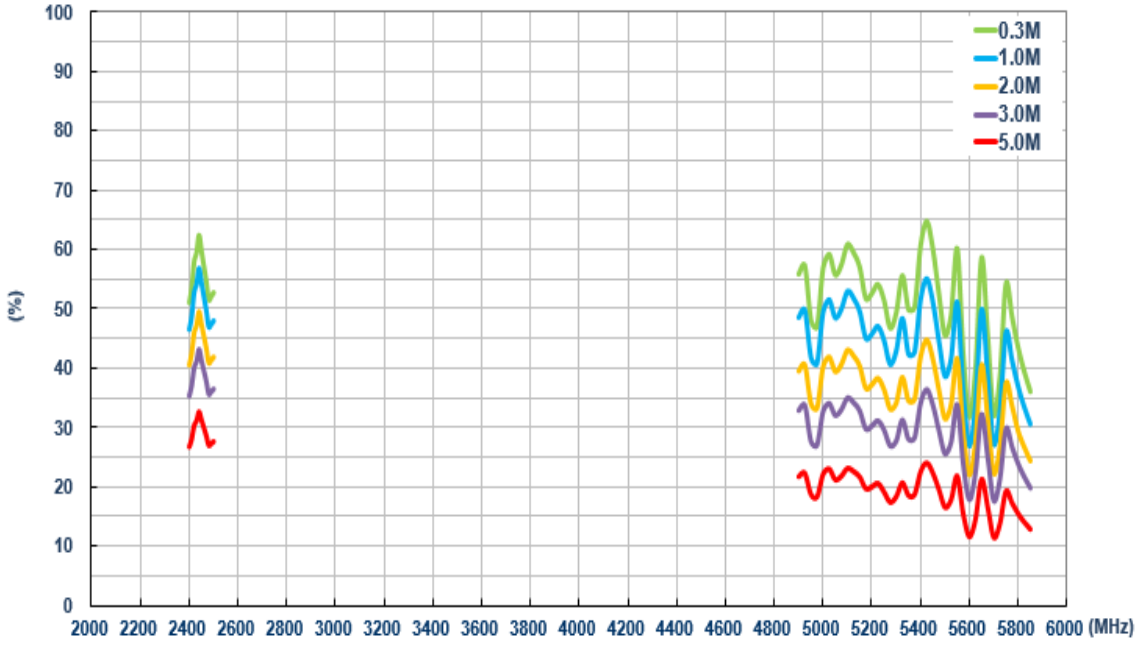
6.10.3 Isolation (Wi-Fi)



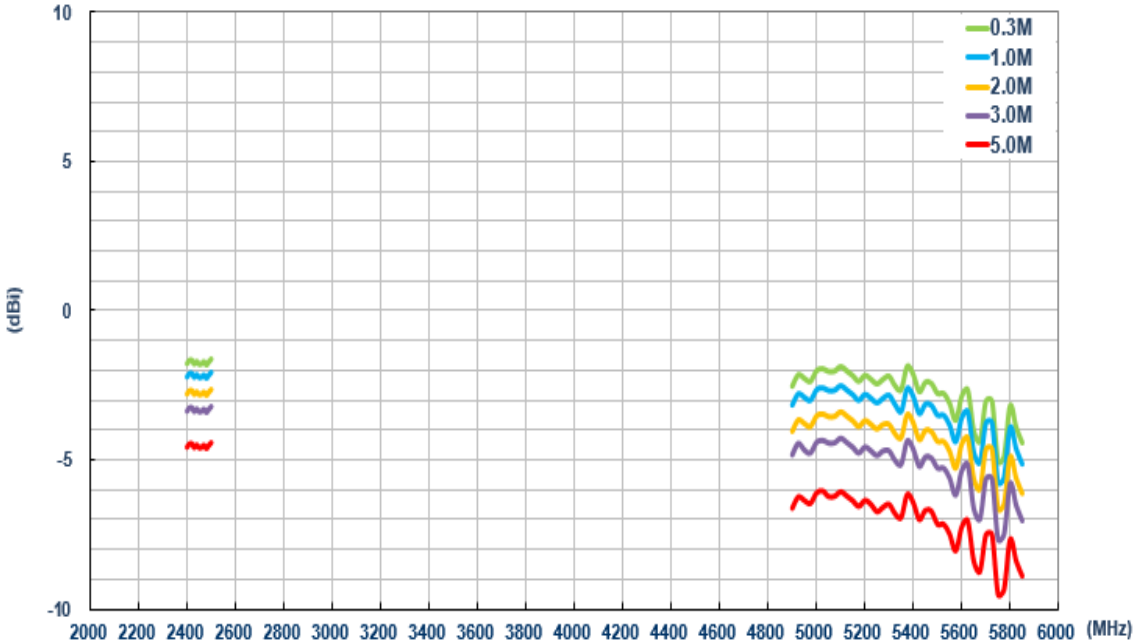
6.10.4 Efficiency (Wi-Fi MIMO 1)



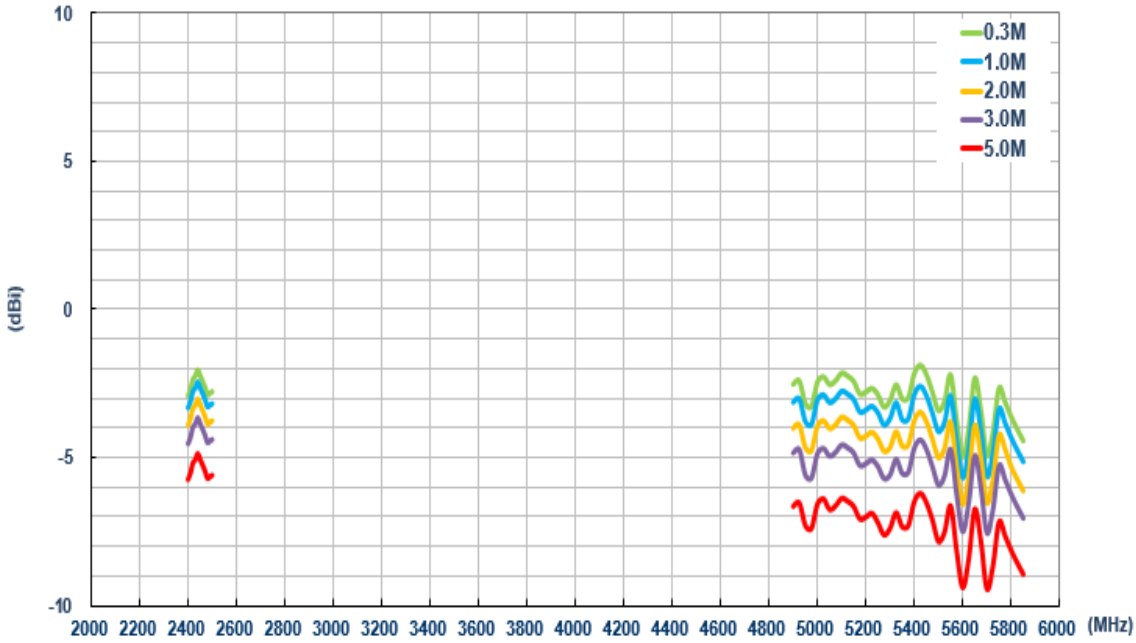
6.10.5 Efficiency (Wi-Fi MIMO 2)



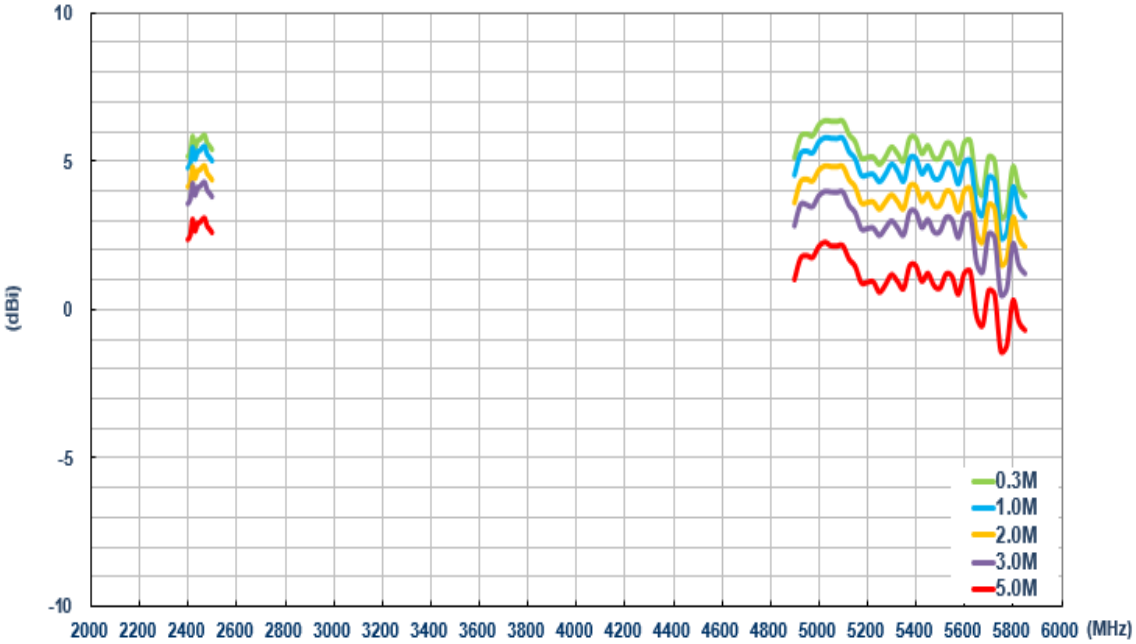
6.10.6 Average Gain (Wi-Fi MIMO 1)



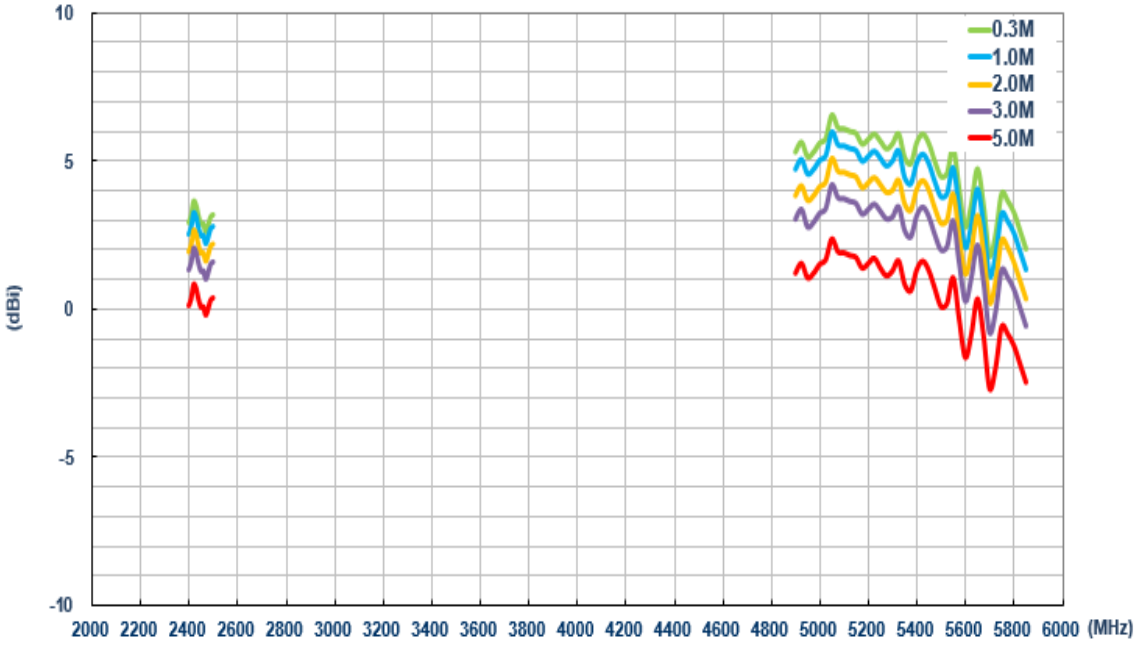
6.10.7 Average Gain (Wi-Fi MIMO 2)



6.10.8 Peak Gain (Wi-Fi MIMO 1)



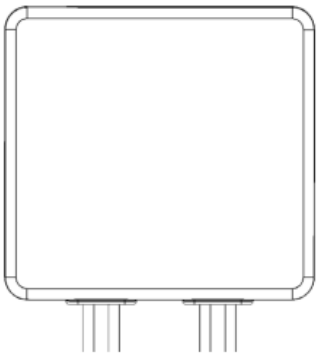
6.10.9 Peak Gain (Wi-Fi MIMO 2)



7. Installation Instructions

Introduction

Following these guidelines will help ensure that your Taoglas Guardian antenna is installed correctly. The Guardian is simply mounted via a wall mount bracket, details outlined below.



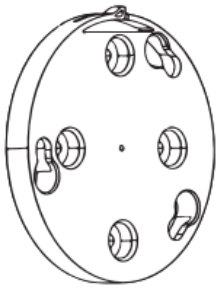
Electrical Safety
The Pantheon contain an active GPS/GNSS antenna.
Rated voltage: 3-5VDC Rated current: 20mA maximum
The supply to this device must be provided with overcurrent protection of 1A maximum.

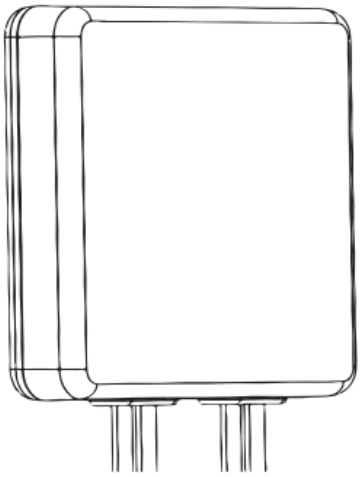
Power consumption@1.8V (mA) 8.7 mA
Power consumption@3.0V (mA) 9.0 mA
Power consumption@5.5V (mA) 11 mA

Installation Requirements

Antenna Components:

- Antenna Enclosure x 1
- Mounting Bracket x1
- Screws x2
- Rawl Plugs x2

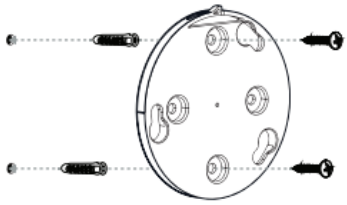




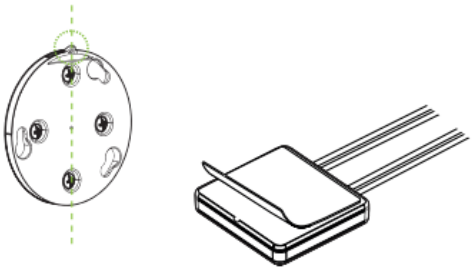
Tools Required:

Screwdriver, drill, M4 [Gauge 8])

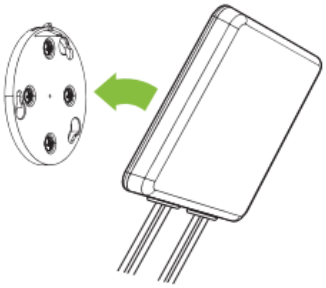
Wall Mount



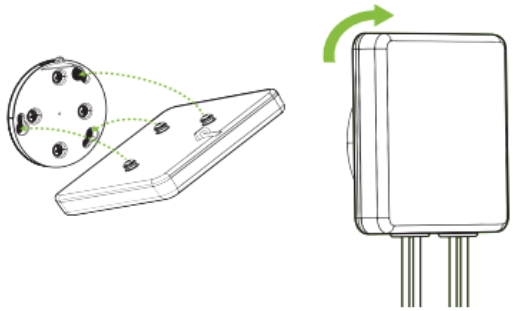
1. Using the mounting bracket as guide, mark the position of the wall screws to the desired location of the bracket. Drill holes for the wall mount studs (6mm [1/4”] diameter, min. 25mm [1”] depth) and secure the studs in place. Insert screws through the bracket holes and into the wall studs. Tighten the screw to secure the mounting bracket to the wall.



2. Connect the the back of the antenna to the brakcet via the 3 built-in mounting points on the rear of the antenna.
   Note: The locking mechanism is highlighted in green.



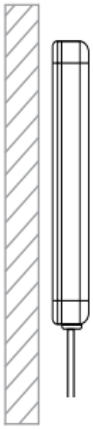
3. Press the antenna into the open area of the holes on the bracket via the mounting points.
   Note: The antenna and bracket should be mounted level on the horizontal plane.



4. Rotate the Antenna in to the bracket by turning slightly. The locking mechanism on the bracket and back of the antenna should be connected together at the point.

5. **Completed Installation of the .**

Note: The bracket should be flush with antenna.



Notices

Caution
To comply with FCC RF Exposure requirements in section 1.1310 of the FCC Rules, antennas used with this device must be installed to provide a separation distance of at least 20 cm from all persons to satisfy RF exposure compliance.

Warning
Do not Operate the transmitter when someone is within 20 cm of the antenna.
Do not operate the equipment in an explosive atmosphere.

European Waste Electronic Equipment Directive 2002/96/EC
Please ensure that your old Waste Electricals and Electronics are recycled do not throw them away into standard waste.

Waiver: This document represents information compiled by Taoglas to the best of our current knowledge. This is not intended to be used as a representation or warranty of fitness of the products described for any particular purpose. This document details guidelines for general information purposes only. When planning installations, always seek specialist advice and ensure that the products are always installed by a properly qualified installer in accordance with applicable regional laws and regulations.

Changelog for the datasheet

SPE-18-8-024 – MA950.W.A.LBICG.005.wm

Revision: C (Current Versions)	
Date:	2023-07-21
Notes:	Updated Installation Instructions
Author:	Cesar Sousa

Previous Revisions

Revision: B	
Date:	2022-07-11
Notes:	Updated Drawing
Author:	Cesar Sousa

Revision: A (Original First Release)	
Date:	2018-01-19
Notes:	Initial Datasheet Release
Author:	Author

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