TAOGLAS



Datasheet

MA284 4 in 1 Adhesive Mount

Part No:
MA284.LBIC.001

Description:

MA284 Adhesive Mount 4in1 Combination

GNSS, 2* LTE MIMO & Wi-Fi Low Profile Antenna

Features:

GPS/ GLONASS/BeiDou/Galileo

4G MIMO with fallback to 3G/2G

Dual Band Wi-Fi (2.4 & 5.8GHz)

Robust PC/ABS, IP67 Rated Enclosure

1.8~5.5V/30dB LNA

Cables: 2m RG-174 & 2m Low Loss TGC-200

Connectors: SMA(M) & RP-SMA(M) for Wi-Fi

Cables & Connectors Fully Customizable

Dimensions: 151.8 * 59 * 13mm

RoHS & REACH Compliant

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Taiwan ISO 9001:2015 Certified

IATF16949

1. Introduction



The Taoglas **MA284** is one of the smallest 4-in-1 low profile, adhesive mount, combination antennas on the market. Comprising of GNSS, 2*Cellular MIMO and dual band Wi-Fi, this unique antenna delivers powerful 4G antenna technology, that includes backward compatibility to work at most worldwide 3G and 2G bands. The cellular antenna can also operate at some 5G bands. Coupled with GPS, GLONASS & BeiDou and 2.4/5.8GHz Wi-Fi, it is ideal for next generation, multiple wireless technology systems, such as vehicle telematics and applications that require highly sophisticated antennas for real-time streaming demanding high-speed video uplink and downlink into the cabin of the vehicle. These challenges are resolved by the highly efficient, high gain antennas, with high isolation, all of which is necessary to achieve the required signal to noise ratio and throughput.

The LTE & Wi-Fi antennas have an omnidirectional radiation pattern and the robust PC/ABS enclosure is fully IP67 waterproof and design for use in the harshest of environments. The GNSS antenna has been carefully designed to work equally well on both GPS/GALILEO and GLONASS bands, leading to higher location accuracy and stability of tracking in urban environments.

Typical Applications Include:

- Next Generation OEM Automotive Connectivity
- Multimedia, Navigation and Telematics Systems
- V2V, V2X and Fleet Management Applications
- Real-time HD Video Streaming
- Digital Signage and Remote Monitoring
- First Net Responder Routers

Cable length and connector types are fully customizable. Contact your regional Taoglas customer support team to request these services or additional support to integrate and test this antenna's performance in your device.

2. Specifications

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

Cellular Antenna										
Band		LTE700	GSM850	GSM900	5G Bands 74,75,76	DCS	PCS	UMTS1	LTE2600	5G Bands 42,43,48,78
Frequency (MHz)		698~803	824~894	880~960	1427-1518	1710~1880	1850~1990	1920~2170	2300~2690	3300-3800
Efficiency (%)										
MIMO1	0.3m	56.88	64.17	68.41	67.53	62.92	60.73	62.35	61.23	42.11
	1m	53.80	61.28	65.33	63.02	57.39	55.39	57.31	55.84	37.17
	2m	50.21	56.24	59.59	56.3	51.13	48.72	50.18	48.36	31.35
	3m	46.49	52.16	55.25	50.06	45.48	43.10	44.40	42.01	26.38
	5m	43.05	48.38	51.24	44.49	40.44	38.14	39.28	36.50	22.19
MIMO2	0.3m	65.41	53.23	49.54	43.20	74.95	76.59	79.35	75.16	60.02
	1m	61.77	50.84	47.31	40.32	68.35	69.85	72.93	68.55	52.87
	2m	57.64	46.66	43.15	36.02	60.88	61.42	63.88	59.35	44.8
	3m	53.46	43.27	40.02	32.03	54.16	54.35	56.50	51.56	37.72
	5m	49.59	40.12	37.12	28.47	48.16	48.09	49.98	44.80	31.74
Average Gain (dB)										
MIMO1	0.3m	-2.45	-1.93	-1.65	-1.71	-2.01	-2.17	-2.05	-2.13	-3.79
	1m	-2.69	-2.13	-1.85	-2.01	-2.41	-2.57	-2.42	-2.53	-4.33
	2m	-2.99	-2.50	-2.25	-2.49	-2.91	-3.12	-2.99	-3.16	-5.07
	3m	-3.33	-2.83	-2.58	-3.01	-3.42	-3.66	-3.53	-3.77	-5.82
	5m	-3.66	-3.15	-2.90	-3.52	-3.93	-4.19	-4.06	-4.38	-6.57
MIMO2	0.3m	-1.84	-2.74	-3.05	-3.66	-1.25	-1.16	-1.00	-1.24	-2.22
	1m	-2.09	-2.94	-3.25	-3.96	-1.65	-1.56	-1.37	-1.64	-2.77
	2m	-2.39	-3.31	-3.65	-4.45	-2.16	-2.12	-1.95	-2.27	-3.49
	3m	-2.72	-3.64	-3.98	-4.96	-2.66	-2.65	-2.48	-2.88	-4.24
	5m	-3.05	-3.97	-4.30	-5.48	-3.17	-3.18	-3.01	-3.49	-4.99
Peak Gain (dBi)										
MIMO1	0.3m	2.49	2.84	2.58	2.58	4.05	4.63	5.01	3.85	1.02
	1m	2.29	2.64	2.38	2.28	3.65	4.23	4.71	3.45	0.49
	2m	1.99	2.34	1.98	1.79	3.15	3.63	4.11	2.85	-0.25
	3m	1.61	1.94	1.68	1.29	2.55	3.13	3.51	2.25	-1
	5m	1.31	1.54	1.38	0.76	1.95	2.63	2.91	1.65	-1.75
MIMO2	0.3m	2.98	3.35	2.83	0.64	4.69	3.58	4.20	4.22	2.39
	1m	2.68	3.15	2.63	0.34	4.29	3.18	3.90	3.82	1.84
	2m	2.38	2.75	2.23	-0.15	3.79	2.58	3.30	3.22	1.12
	3m	2.08	2.45	1.93	-0.66	3.29	2.08	2.70	2.62	0.37
	5m	1.78	2.15	1.63	-1.17	2.79	1.58	2.10	2.02	-0.37
Impedance		50 Ω								
Polarization		Linear								

Wi-Fi Antenna (2.4GHz/5.8GHz)		
Frequency (MHz)	2400~2500	4900~5850
Efficiency (%)		
0.3m	56.61	64.55
1m	51.63	55.53
2m	47.11	47.78
3m	41.01	38.77
5m	31.11	25.47
Peak Gain (dBi)		
0.3m	2.12	4.10
1m	1.72	3.44
2m	1.12	2.53
3m	0.52	1.62
5m	-0.68	-0.21
Average Gain (dB)		
0.3m	-2.21	-0.87
1m	-2.61	-1.47
2m	-3.01	-2.07
3m	-3.61	-2.87
5m	-4.81	-4.67
Impedance	50 Ω	
Return loss	< -6 dB	
Polarization	Linear	

GNSS Antenna			
Frequency	BeiDou: 1561.098 ± 2.046MHz. GPS: 1575.42 ± 1.023MHz GLONASS: 1602 ± 5MHz		
Bandwidth	12.5 MHz min		
Return Loss	<-10 dB		
Return loss (GPS L1 GLONASS L1)	< -10 dB		
Passive Gain at Zenith (GPS L1 and GLONASS L1)	+2.3 dBi typ.		
Polarization	RHCP		
Impedance	50 Ω		
LNA Out-band Attenuation	fo = 1575.42MHz fo ± 50 MHz 8dB Min. fo ± 100 MHz 22dB Min. fo ± 150 MHz 26dB Min.		
Input Voltage	Min:1.8V	Typ. 3.0V	Max: 5.5V
Total Gain @ Zenith	25.3dBi	25.5dBi	25.3dBi
Current Consumption	5 mA	10 mA	23 mA
Noise Figure	3.0 dB	2.8 dB	3.0 dB
Mechanical			
Dimensions	151.8*59*13 mm		
Cable	LTE MIMO1/ MIMO2: 2000mm TGC200 WI-FI: 2000mm TGC200 GNSS: 2000mm RG174		
Connector	LTE: SMA Plug WI-FI: RP SMA Plug GNSS: SMA Plug		
Casing	PC+ABS		
Adhesive	3M 9448HK + CR4305		
Sealant	Rubber Stopper		
Weight	180 g (Not Including Cable And Package)		
Environmental			
Protection	IP67		
Temperature Range	-40°C to +85°C		
Thermal Shock	100 cycles -40°C to +85°C		
Humidity	Non-condensing 65°C 95% RH		
Cable Pull	RG174 - 4 Kg / TGC200 - 9Kg		

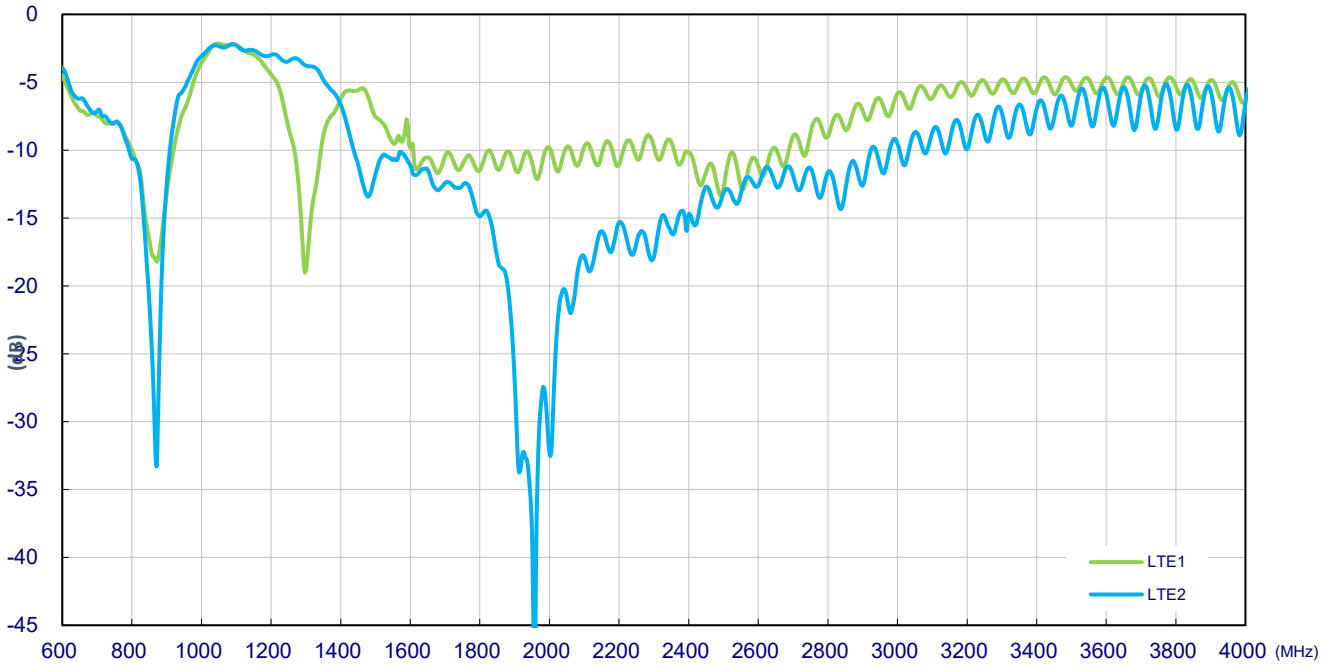
5G/4G Bands			
Band Number	5GNR / FR1 / LTE / LTE-Advanced / WCDMA / HSPA / HSPA+ / TD-SCDMA		
	Uplink	**Downlink**	**Covered**
1	UL: 1920 to 1980	DL: 2110 to 2170	✓
2	UL: 1850 to 1910	DL: 1930 to 1990	✓
3	UL: 1710 to 1785	DL: 1805 to 1880	✓
4	UL: 1710 to 1755	DL: 2110 to 2155	✓
5	UL: 824 to 849	DL: 869 to 894	✓
7	UL: 2500 to 2570	DL:2620 to 2690	✓
8	UL: 880 to 915	DL: 925 to 960	✓
9	UL: 1749.9 to 1784.9	DL: 1844.9 to 1879.9	✓
11	UL: 1427.9 to 1447.9	DL: 1475.9 to 1495.9	✓
12	UL: 699 to 716	DL: 729 to 746	✓
13	UL: 777 to 787	DL: 746 to 756	✓
14	UL: 788 to 798	DL: 758 to 768	✓
17	UL: 704 to 716	DL: 734 to 746 (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		✓
48	3550 to 3700		✓
66	UL: 1710-1780	DL: 2110-2200	✓
71	617 to 698		✗
74/75/76	1427 to 1518		✓
78	3300 to 3800		✓
79	4400 to 5000		✗
126	410 to 430		✗

*Measured at 2m cable length

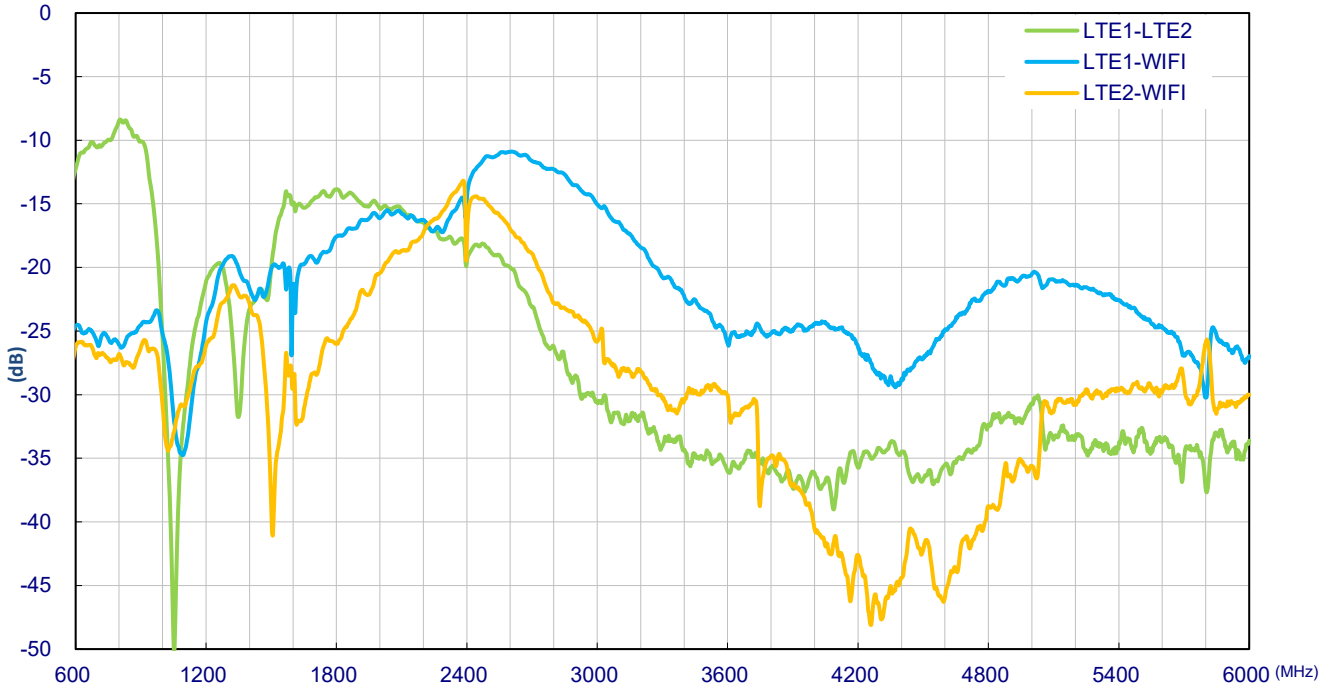
3. Antenna Characteristics

3.1 LTE MIMO 1& 2 Antennas

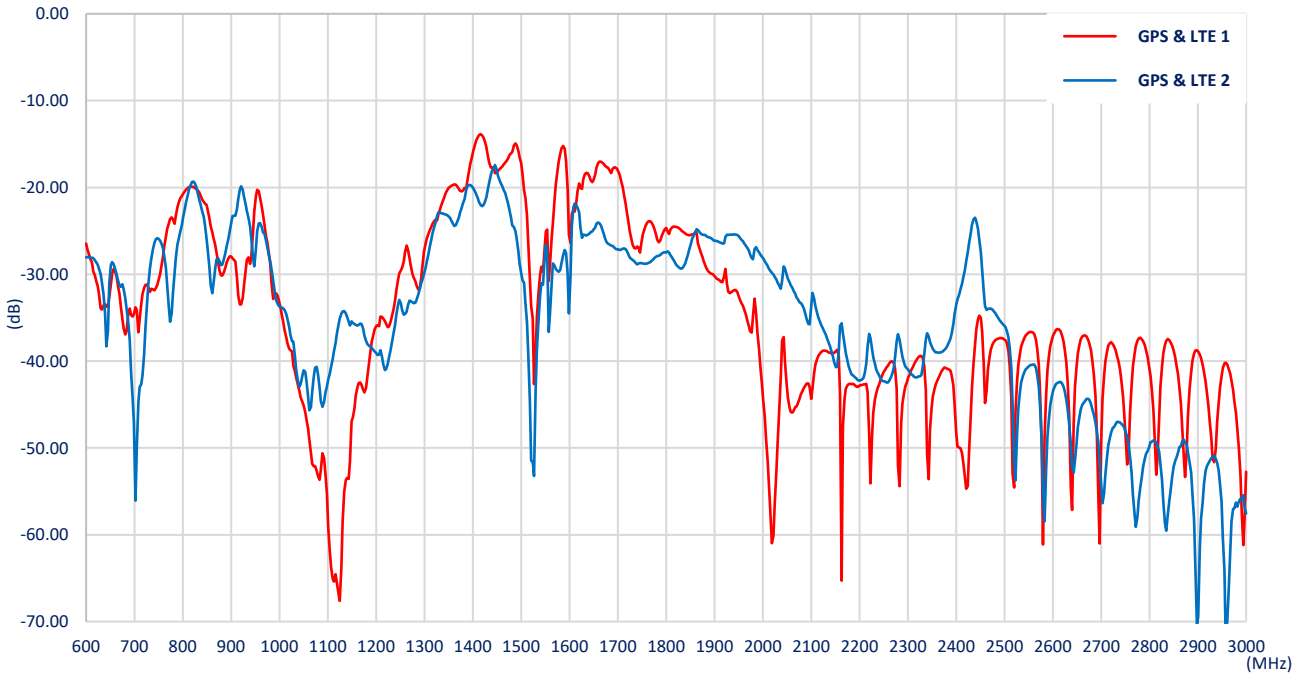
Return Loss



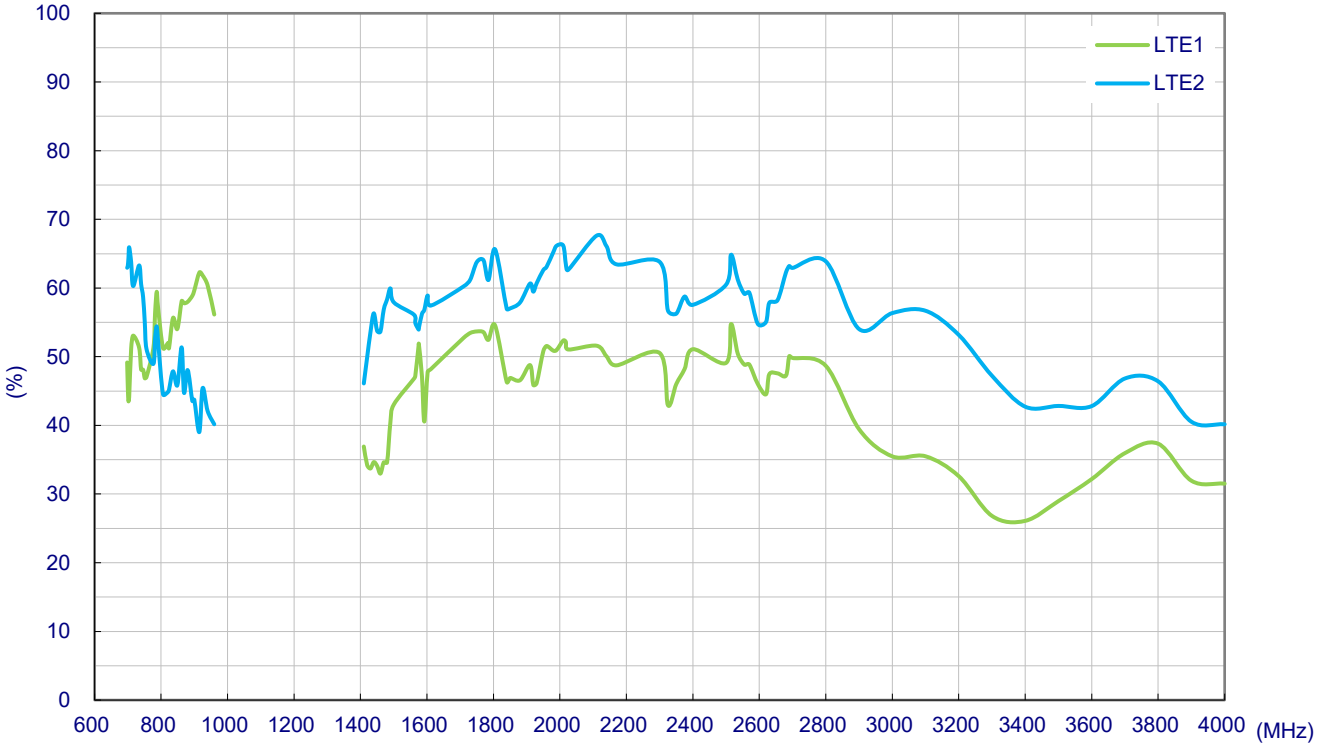
Isolation between LTE and Wi-Fi antenna



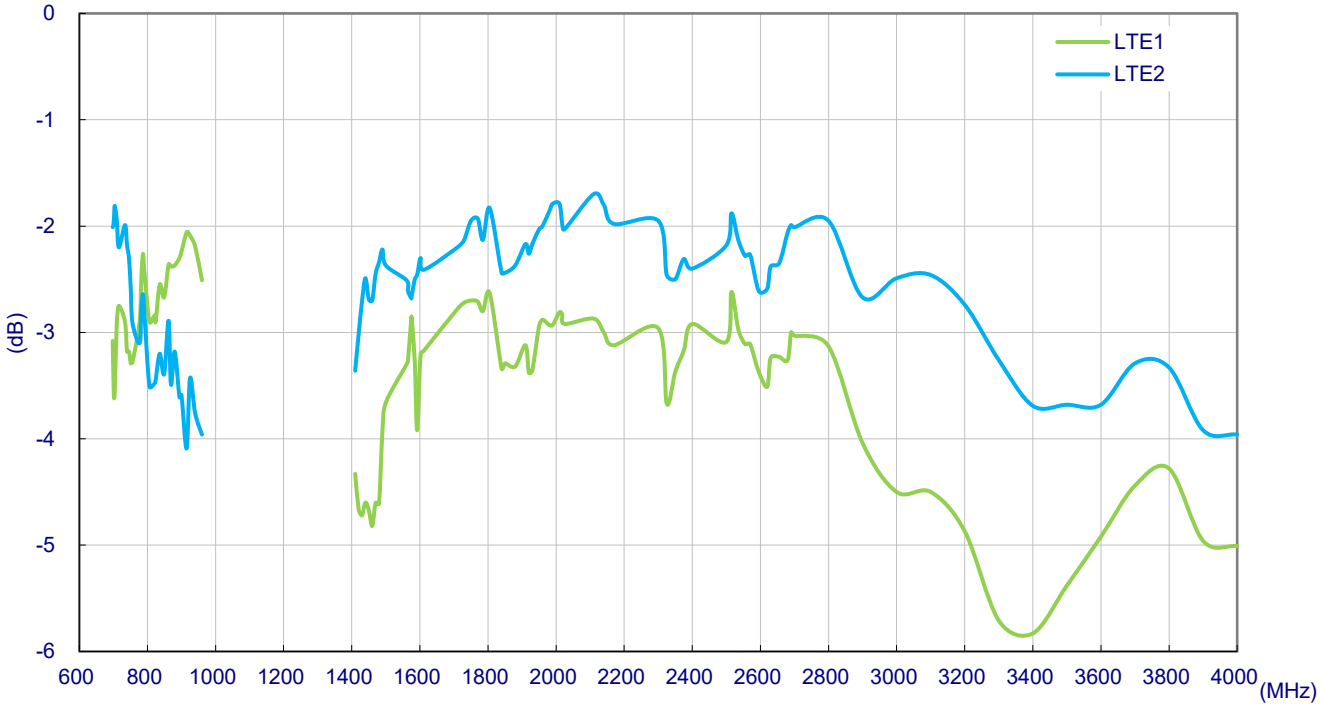
Isolation between LTE and GPS antenna



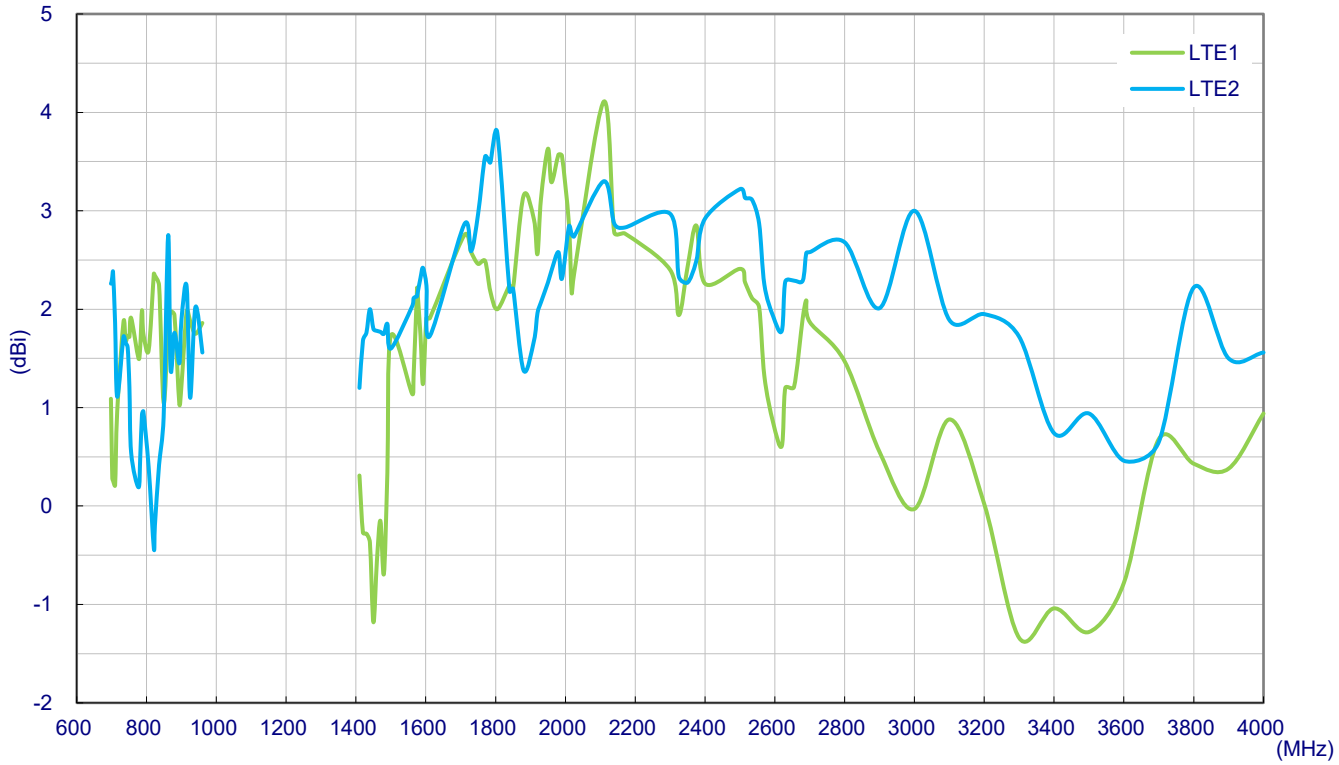
Efficiency



Average Gain

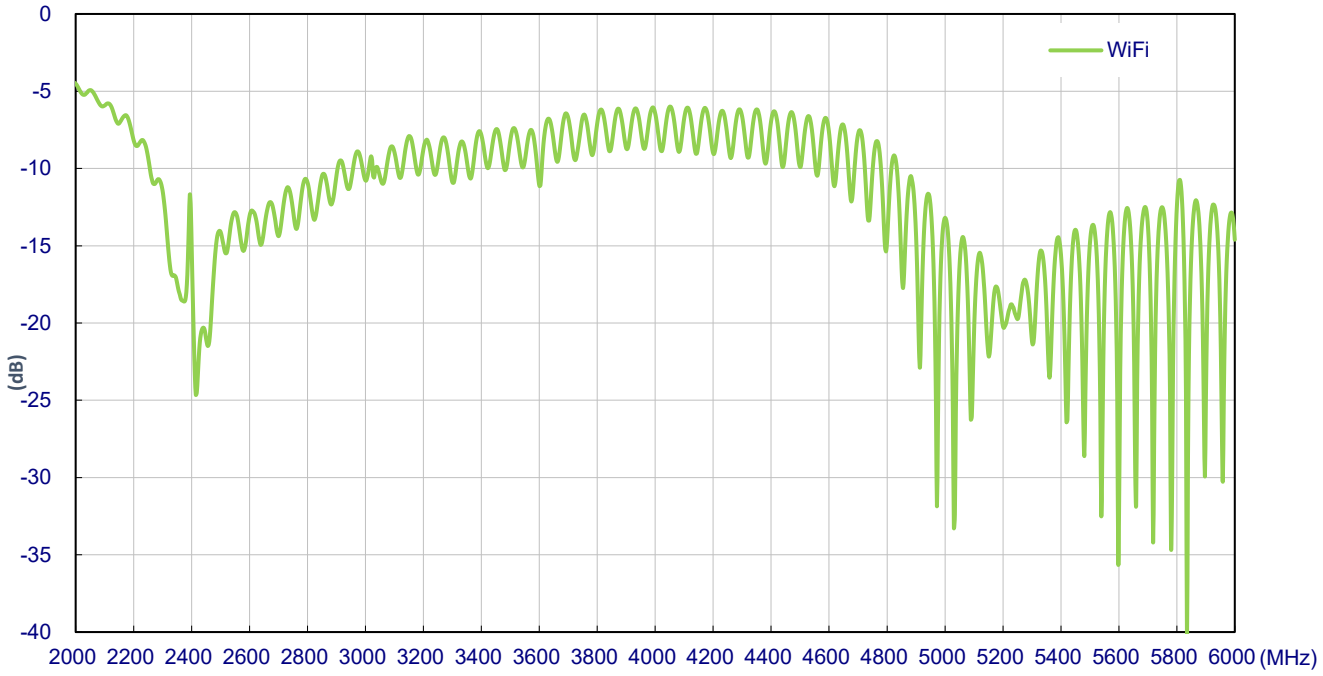


Peak Gain

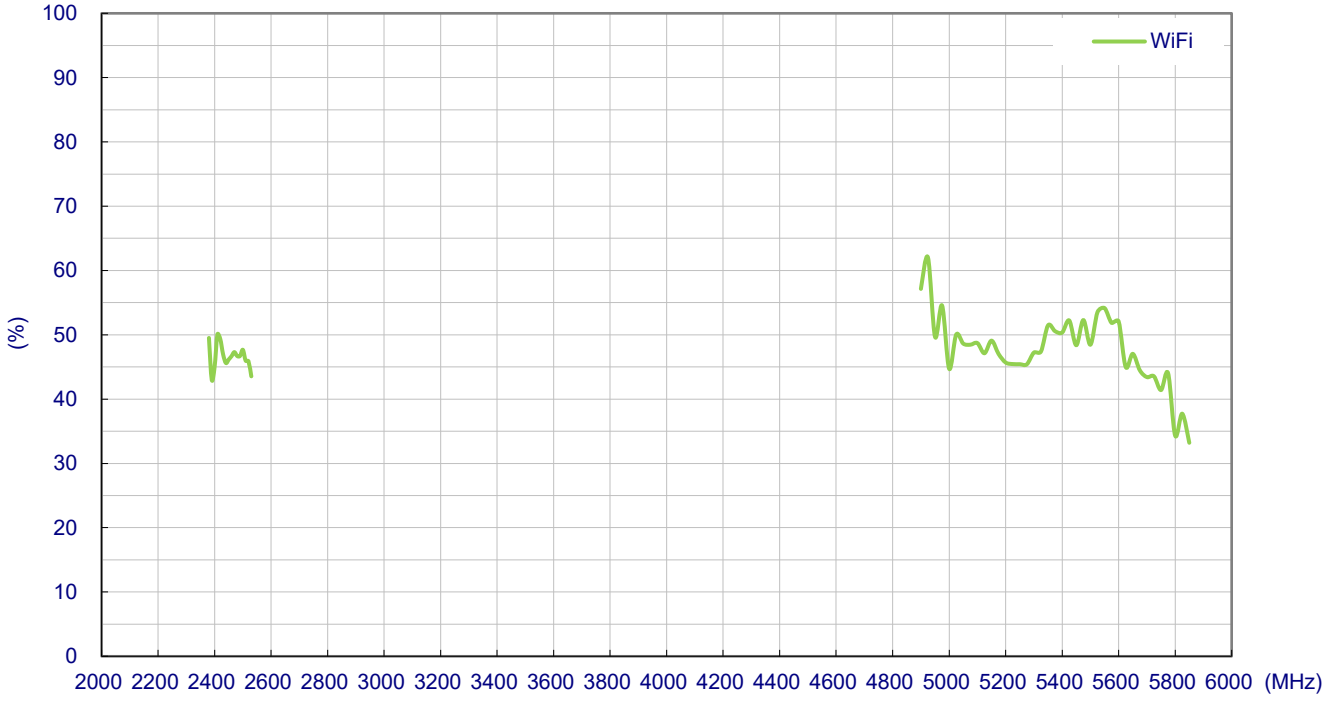


3.2 Wi-Fi Antenna

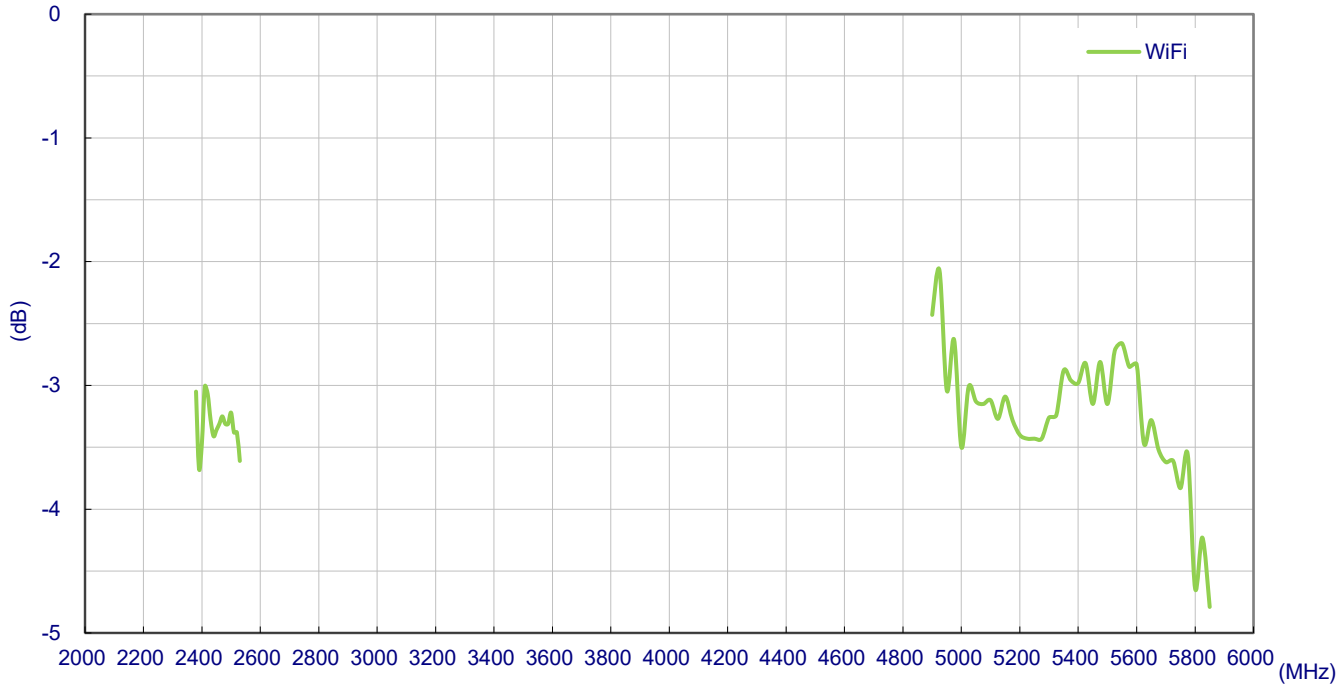
Return Loss



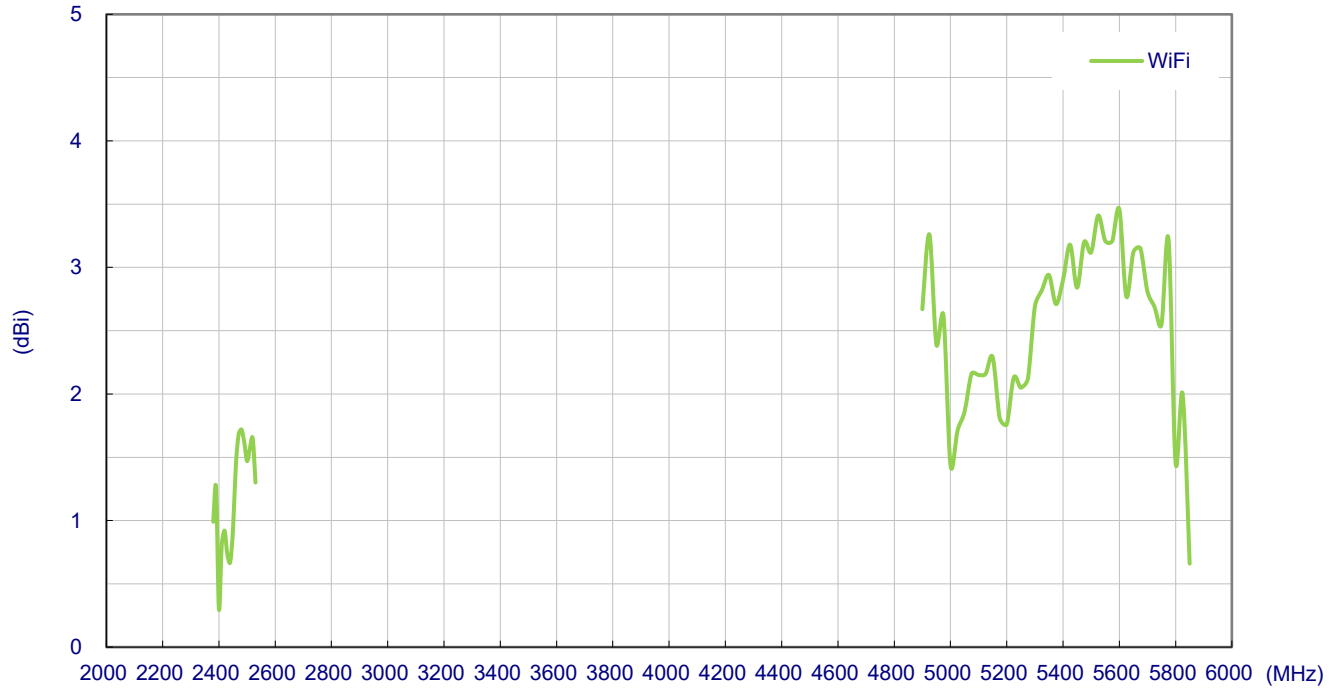
Efficiency



Average Gain

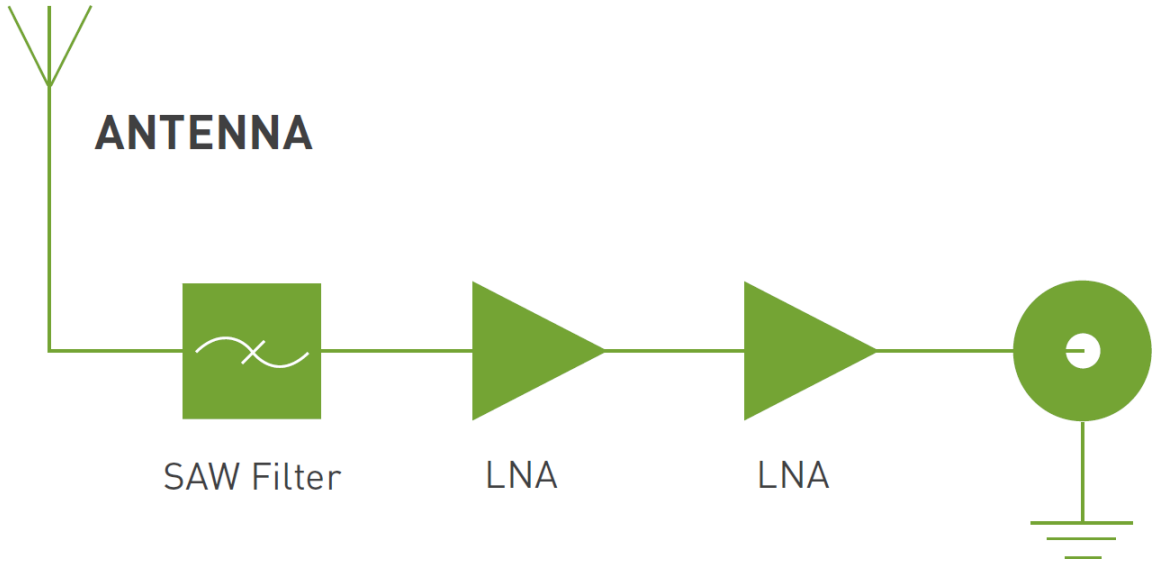


Peak Gain

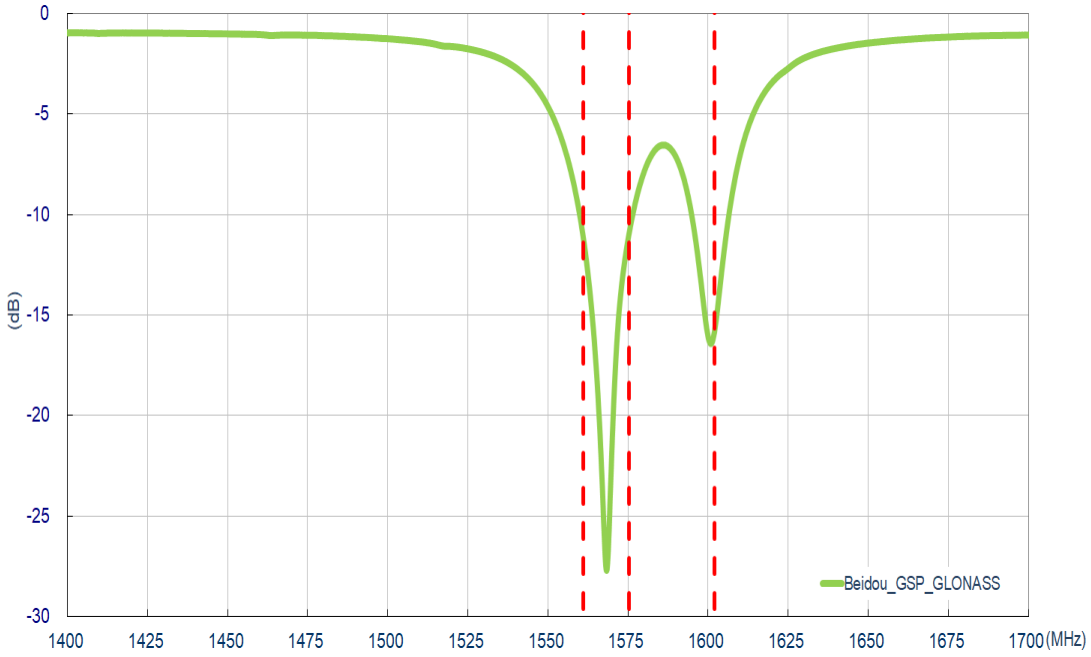


3.3 GNSS Antenna

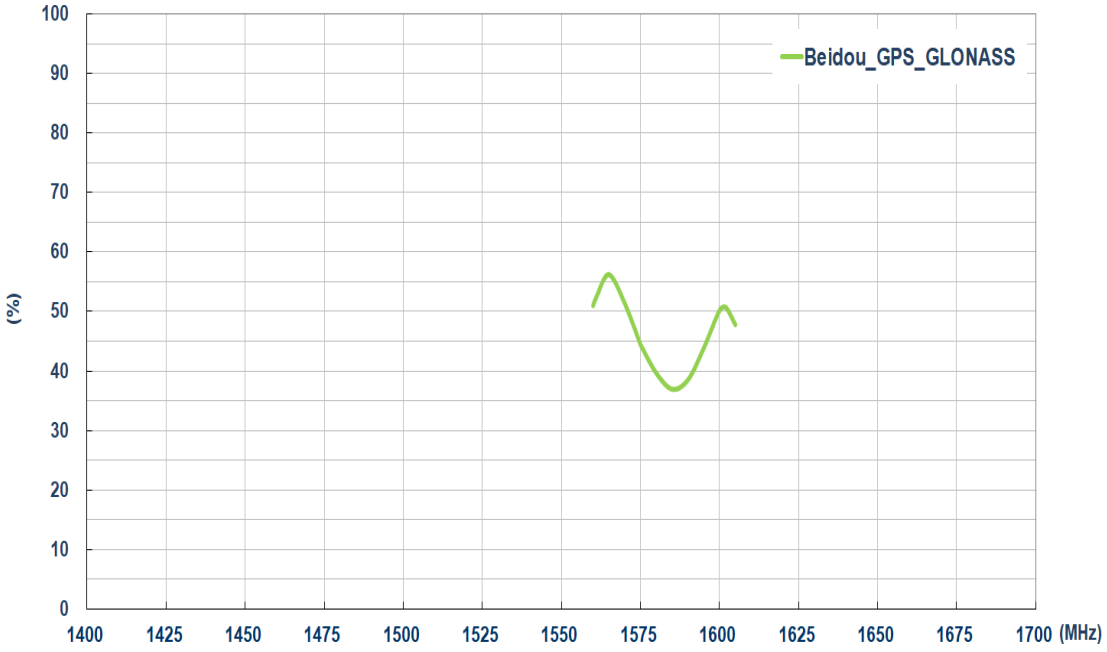
Block Diagram (Active antenna)



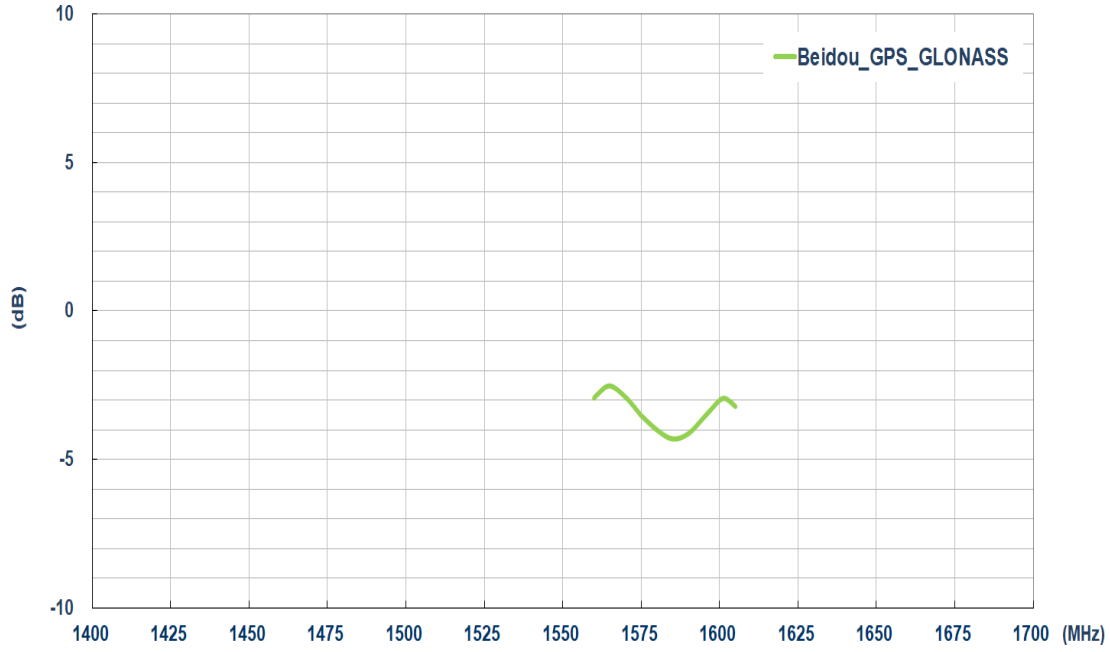
Return Loss



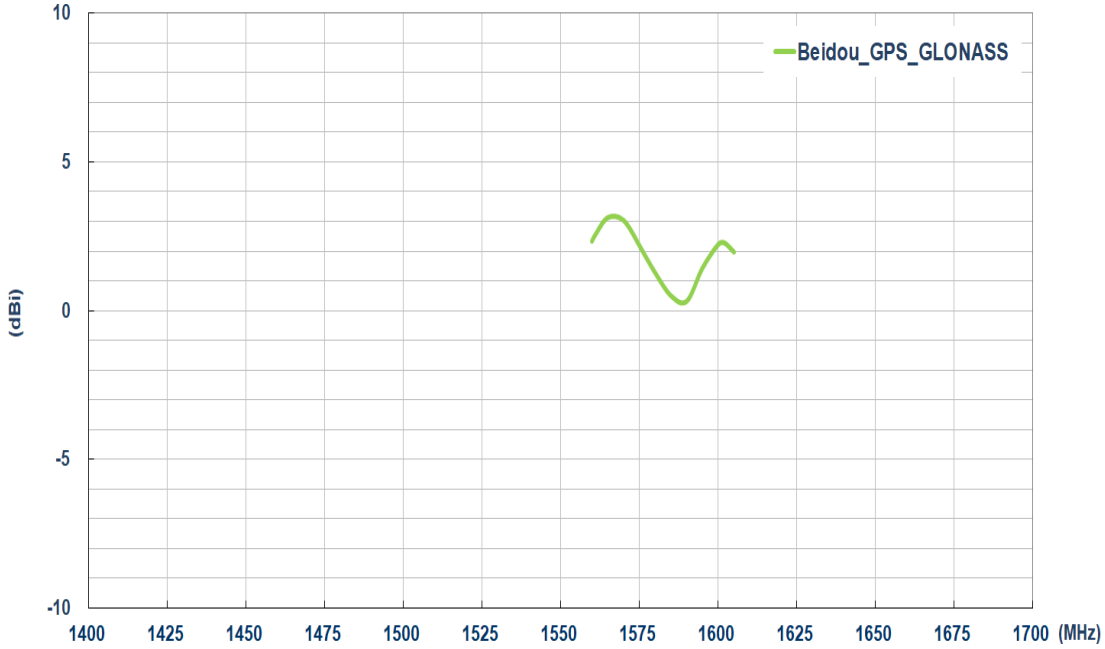
Efficiency



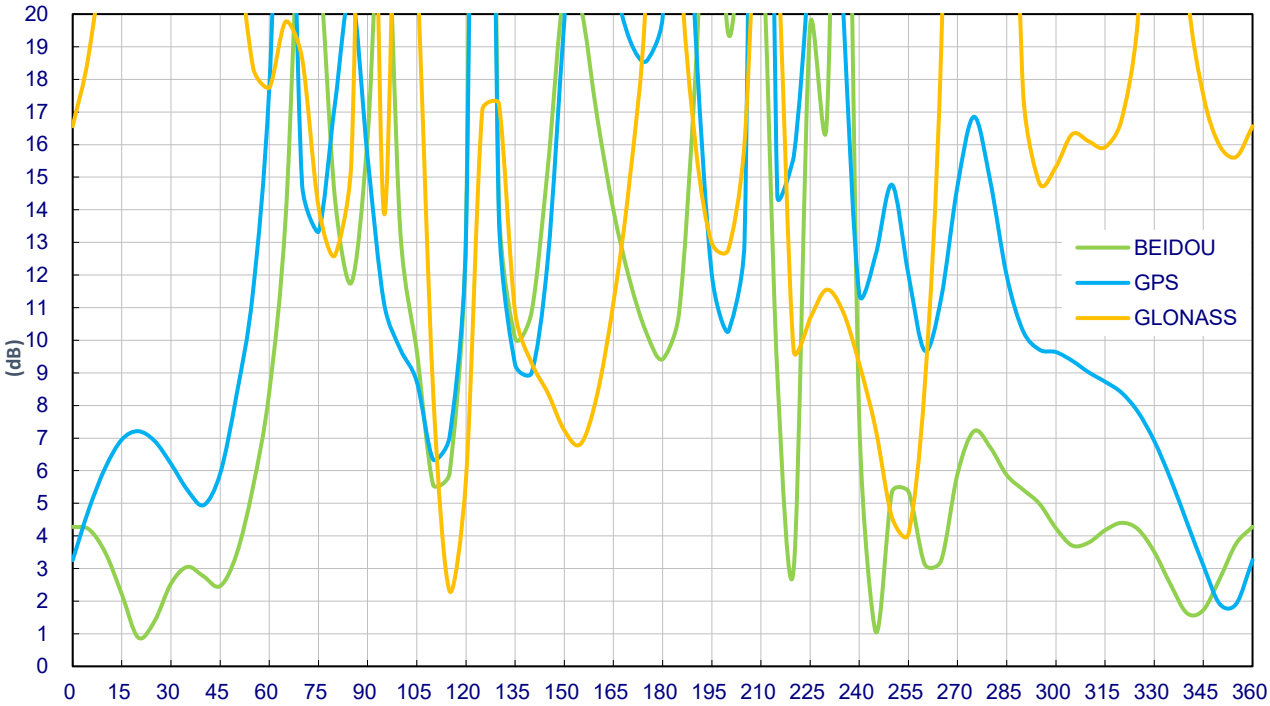
Average Gain



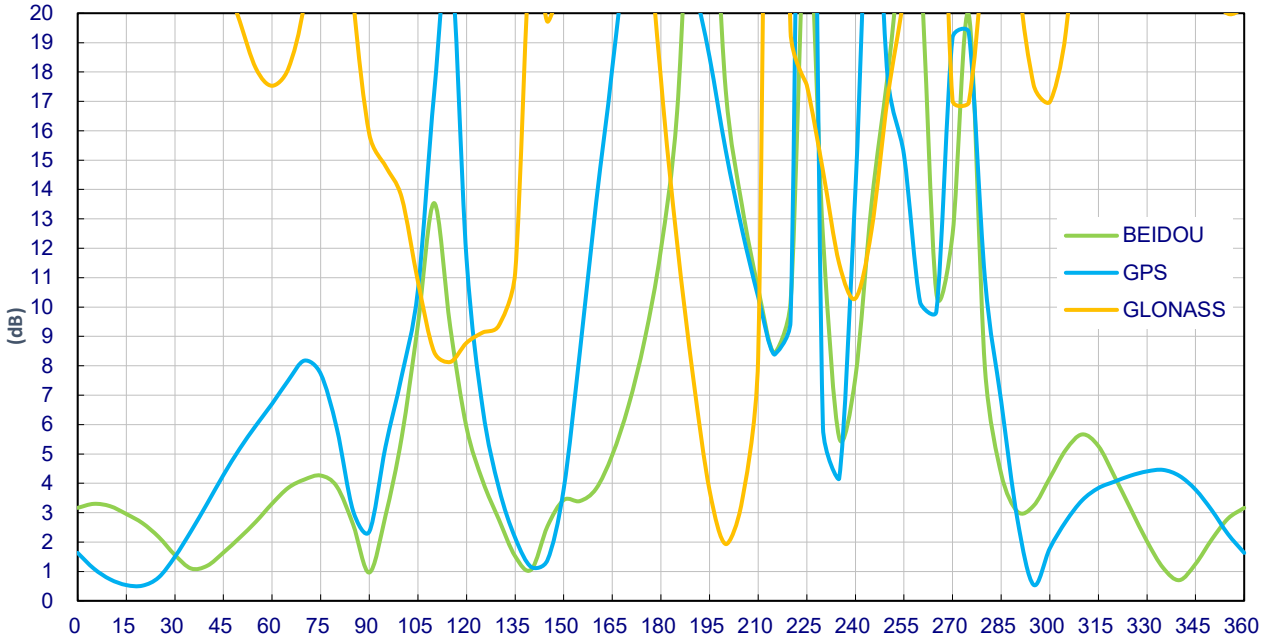
Peak Gain



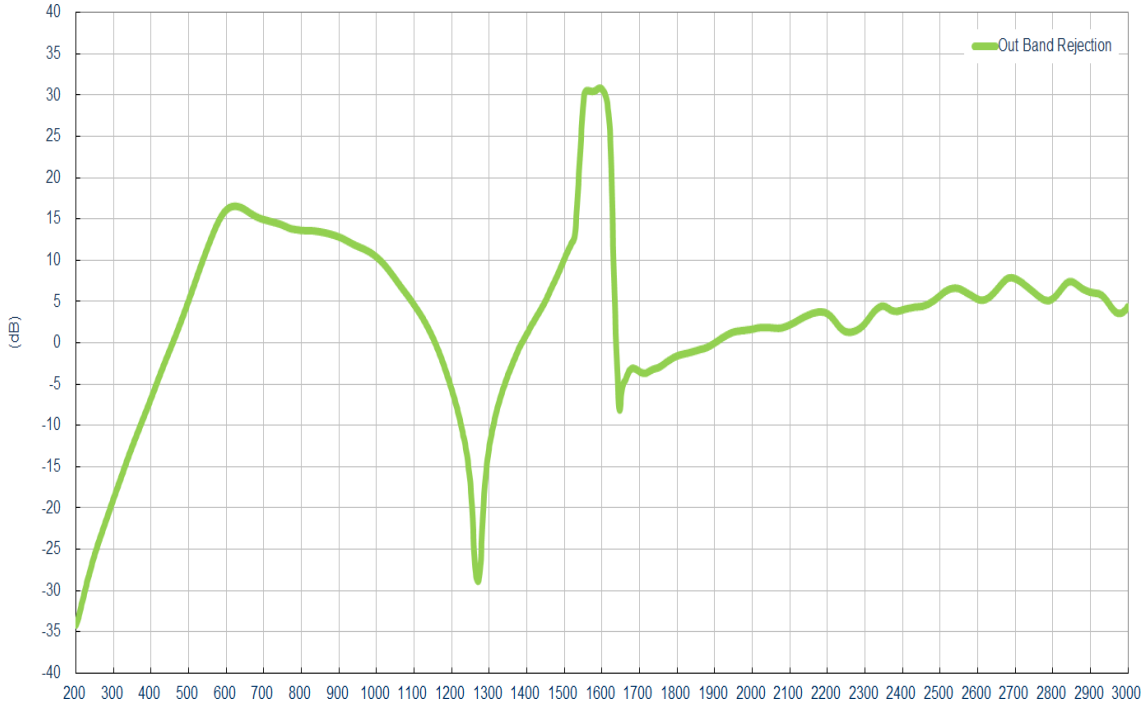
Axial Ratio - XZ



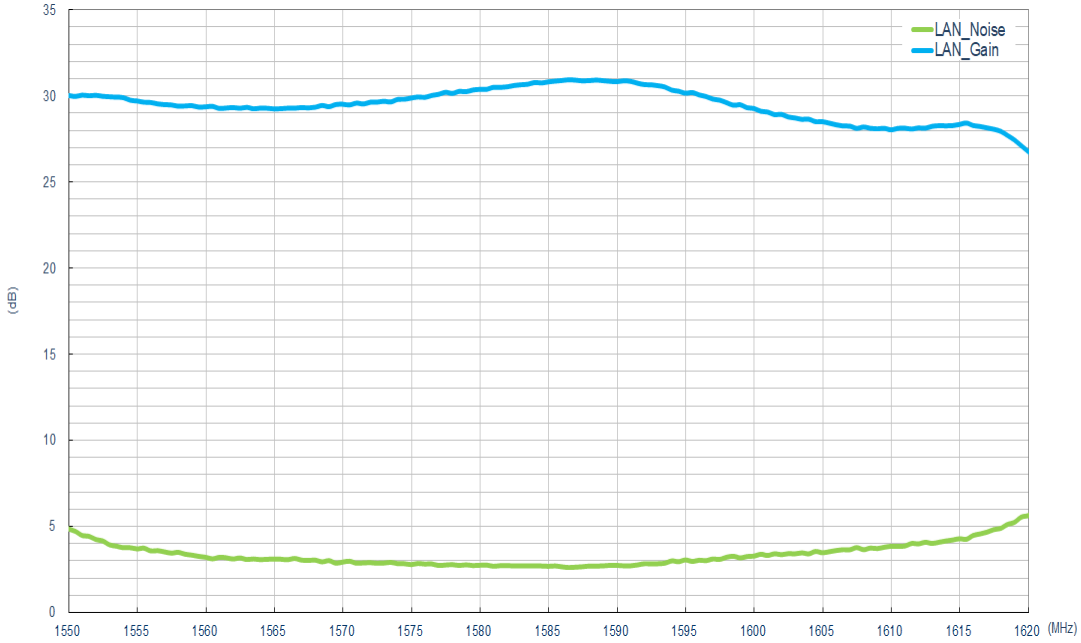
Axial Ratio - YZ



GNSS LNA Gain @3V



GNSS LNA Gain and Noise Figure @ 3V



LNA -1dB Compression Test

Parameter	Specification
Frequency	1574~1610 MHz
Outer Band Attenuation	1592±140 MHz 15dB min
Output Impedance	50Ω
Output VSWR	2.0 Max
Pout at 1dB Gain	Typ. -2dBm
Compression point	Min. -6dBm

The Compression point result for the LNA is when 3.3V of DC power applied.

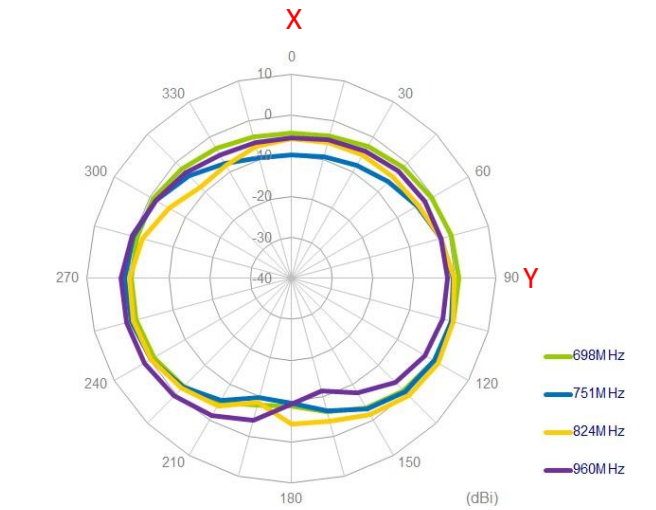
4. 2D Radiation Patterns

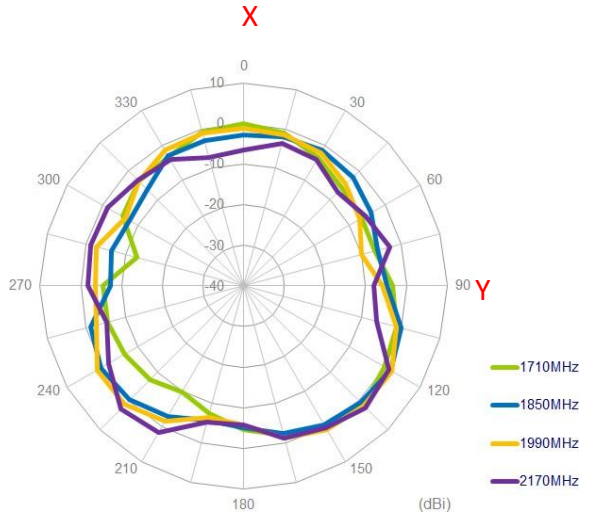
4.1 Test Setup – Free Space

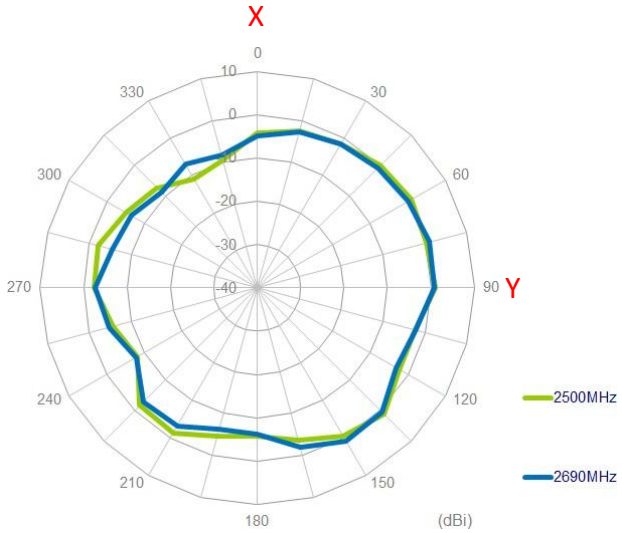


4.2 LTE MIMO1

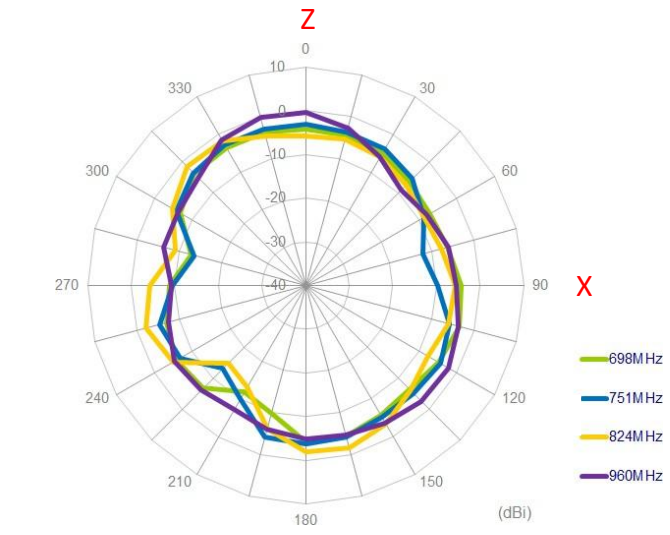
XY Plane

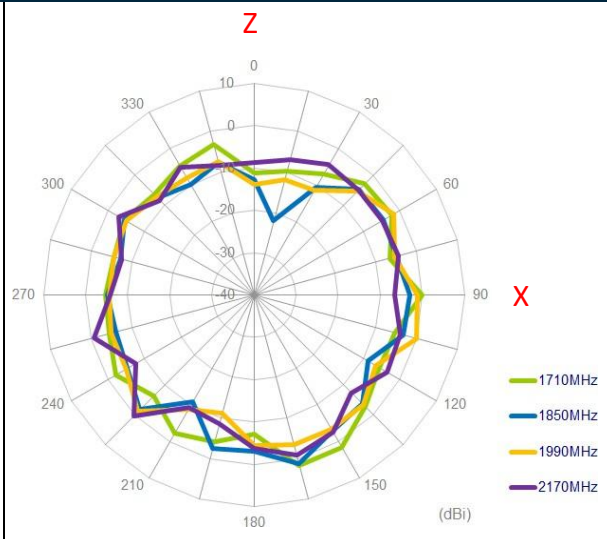


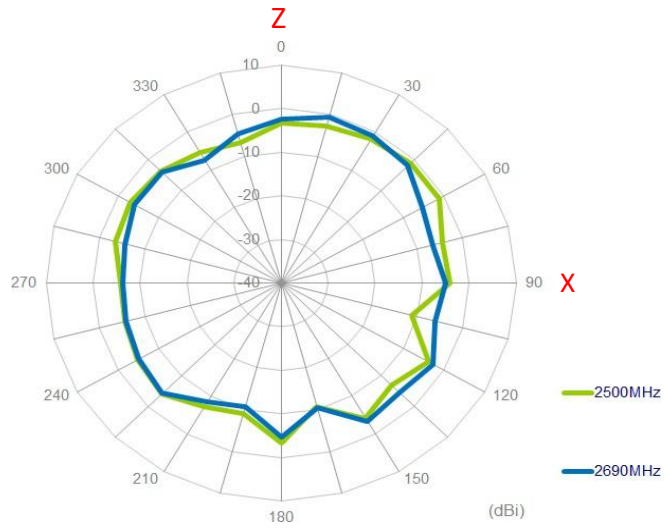




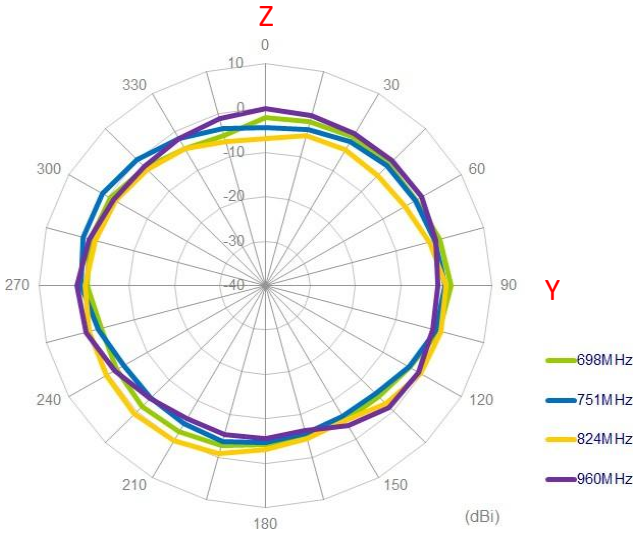
XZ Plane

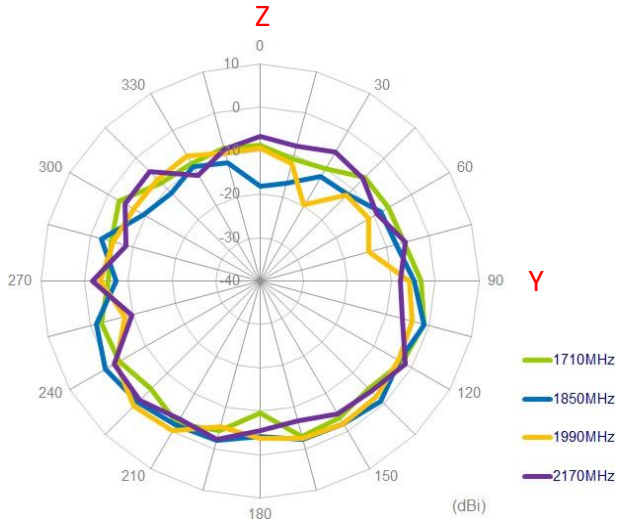

Z
X
0
30
60
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120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
698MHz
751MHz
824MHz
960MHz

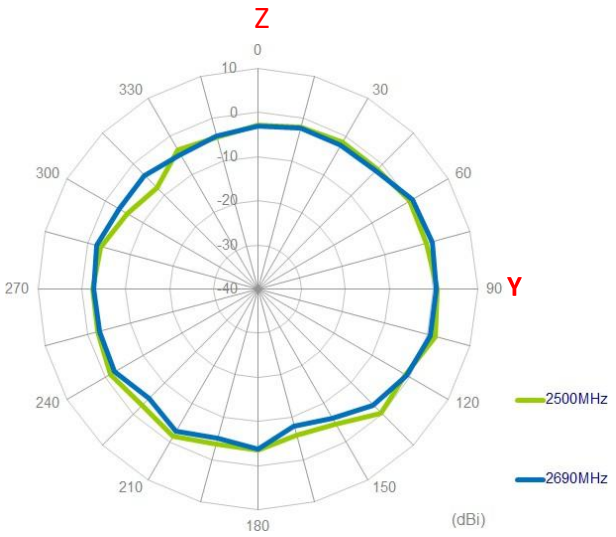

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
1710MHz
1850MHz
1990MHz
2170MHz


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

YZ Plane


Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
698MHz
751MHz
824MHz
960MHz

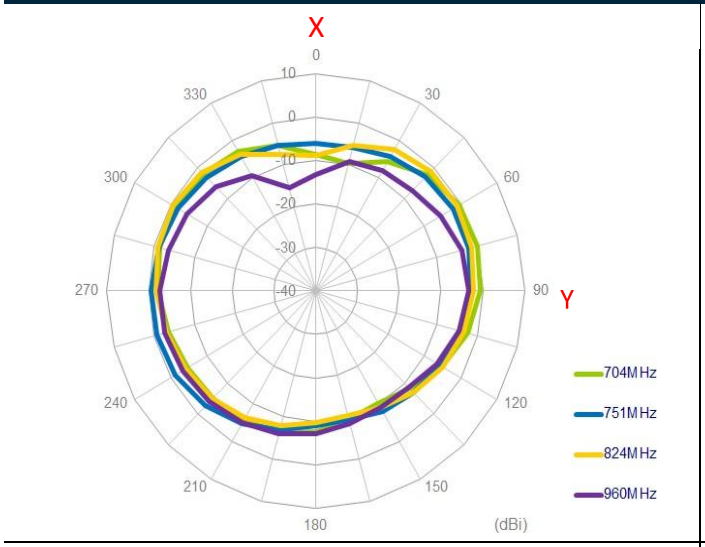

Z
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-10
-20
-30
-40
(dBi)
1710MHz
1850MHz
1990MHz
2170MHz

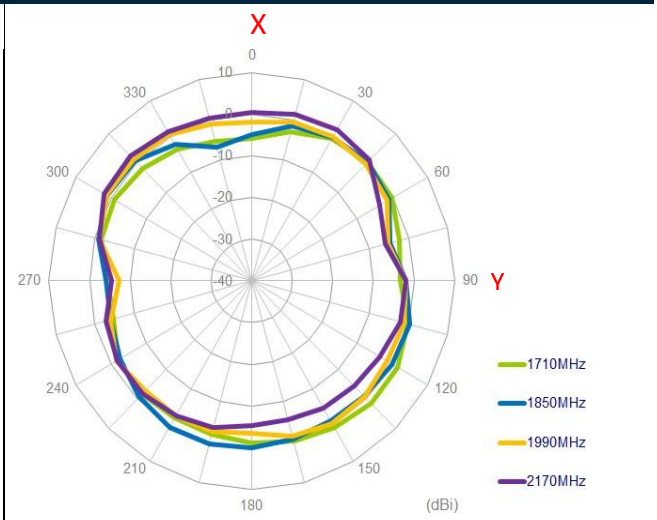

Z
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330
10
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-20
-30
-40
(dBi)
2500MHz
2690MHz

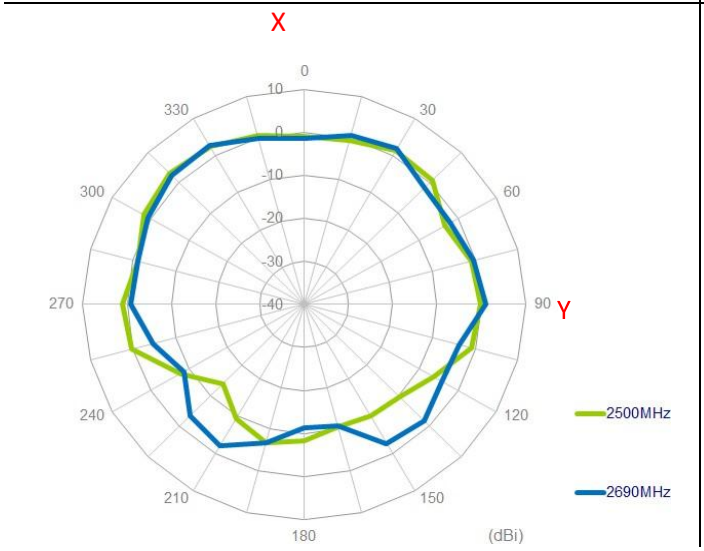
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4.3 LTE MIMO2

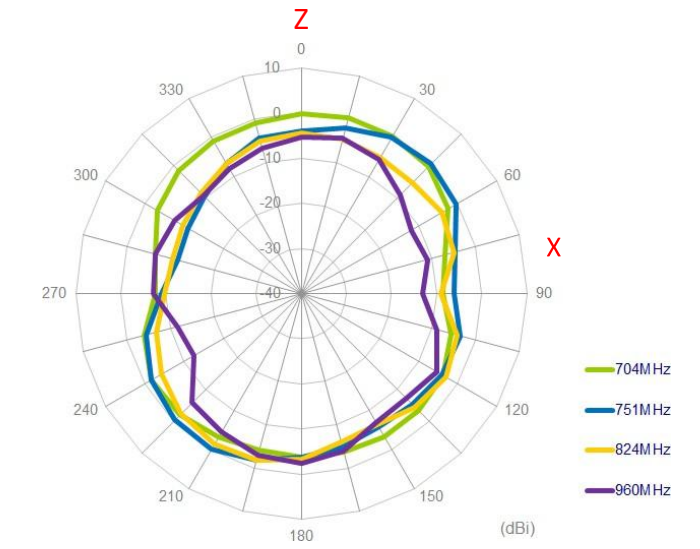
XY Plane

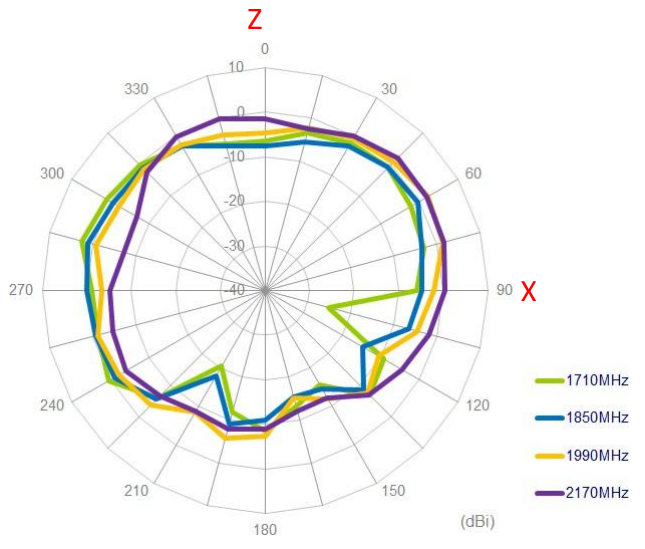


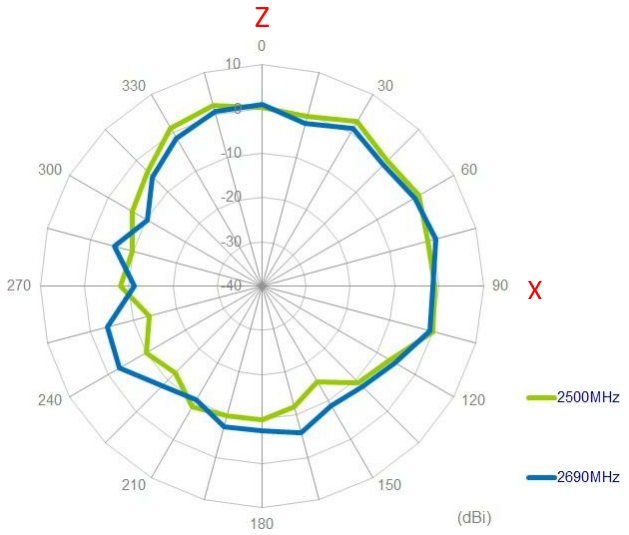




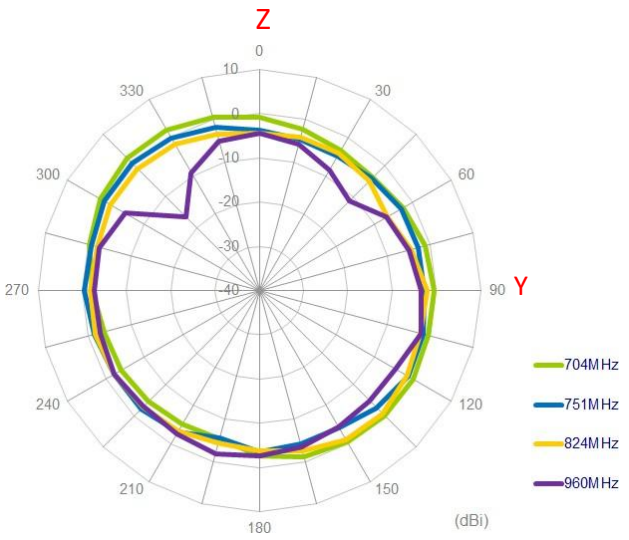
XZ Plane

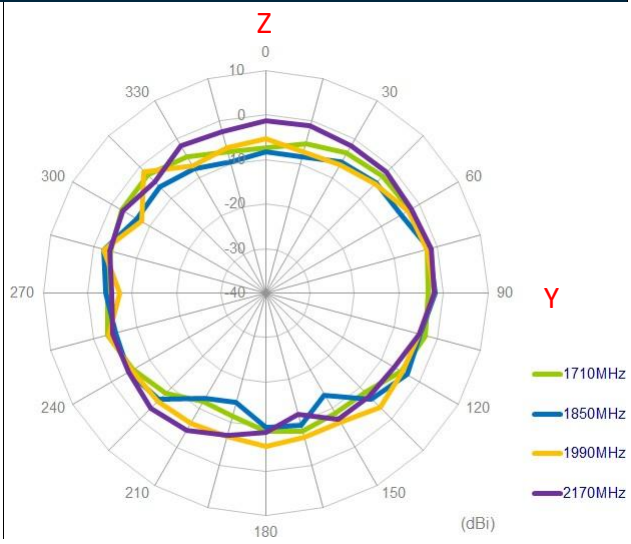

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330
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-10
-20
-30
-40
(dBi)
704MHz
751MHz
824MHz
960MHz

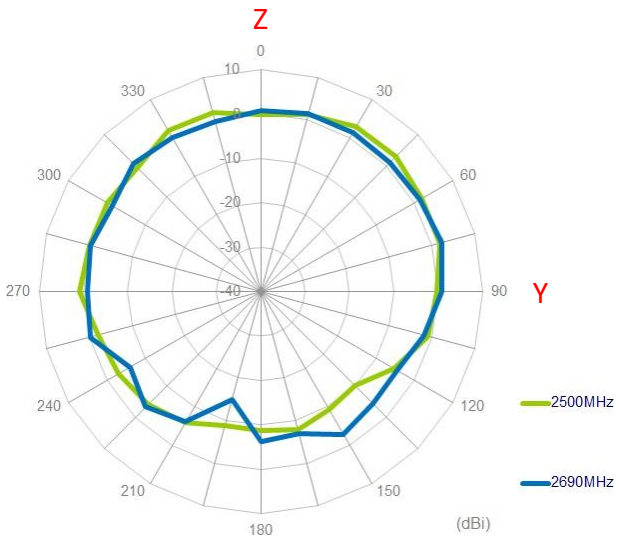

Z
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-20
-30
-40
(dBi)
1710MHz
1850MHz
1990MHz
2170MHz


Z
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330
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-10
-20
-30
-40
(dBi)
2500MHz
2690MHz

YZ Plane

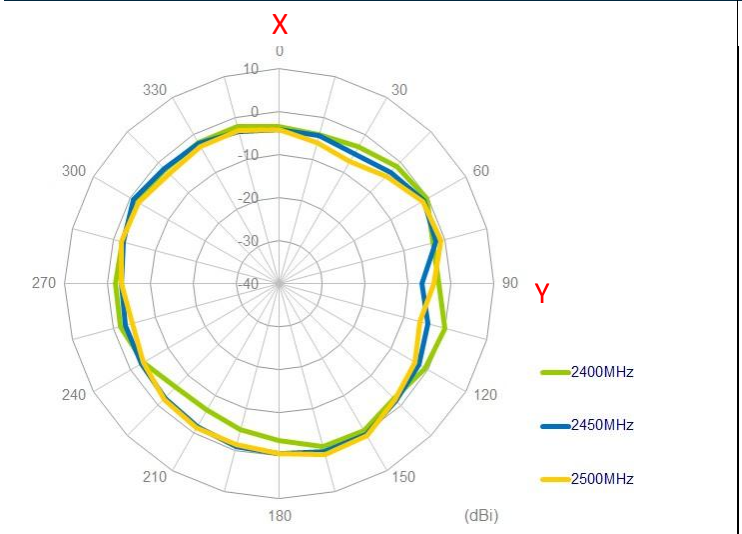

Z
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-40
(dBi)
704MHz
751MHz
824MHz
960MHz

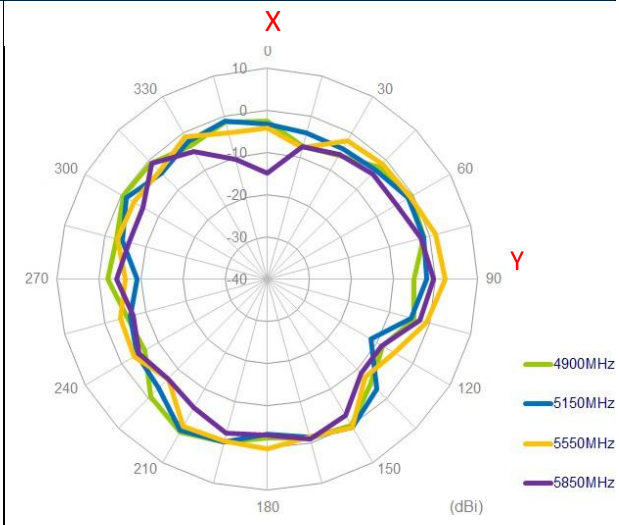

Z
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-20
-30
-40
(dBi)
1710MHz
1850MHz
1990MHz
2170MHz


Z
Y
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-30
-40
(dBi)
2500MHz
2690MHz

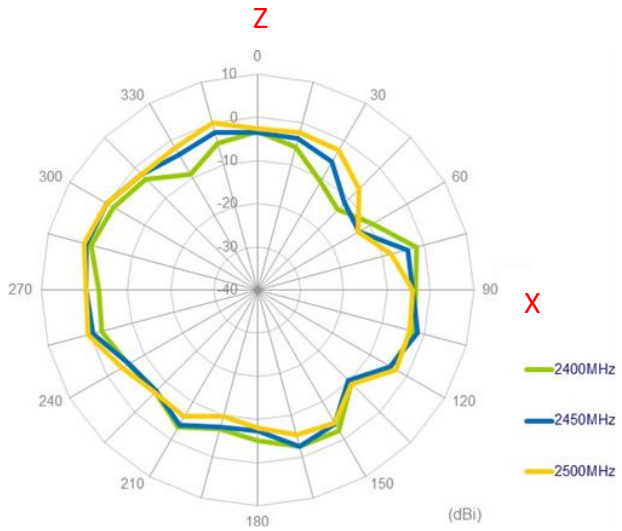
4.3 Wi-Fi

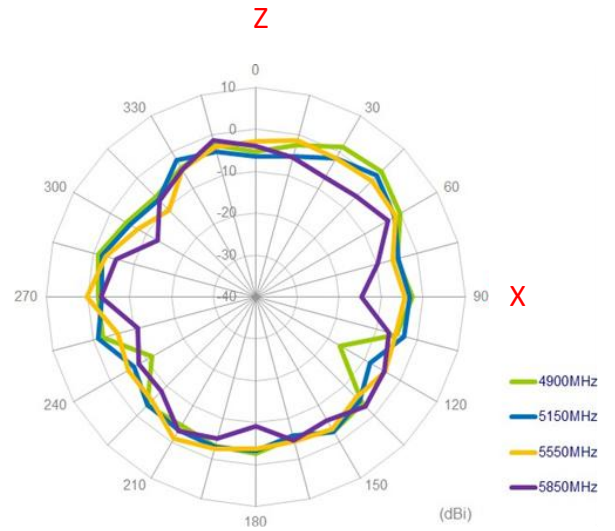
XY Plane



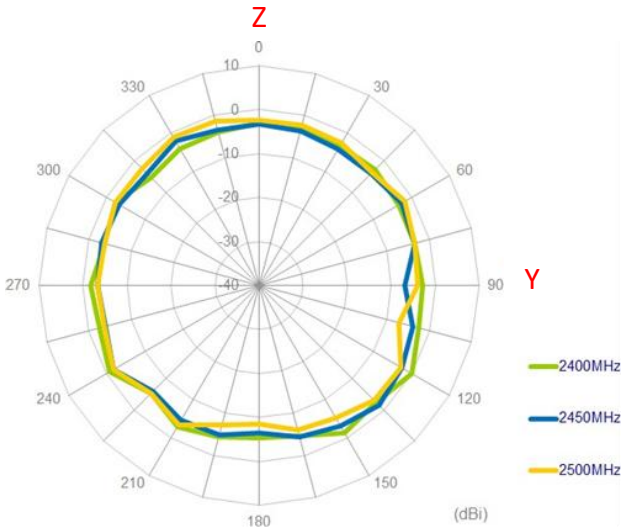


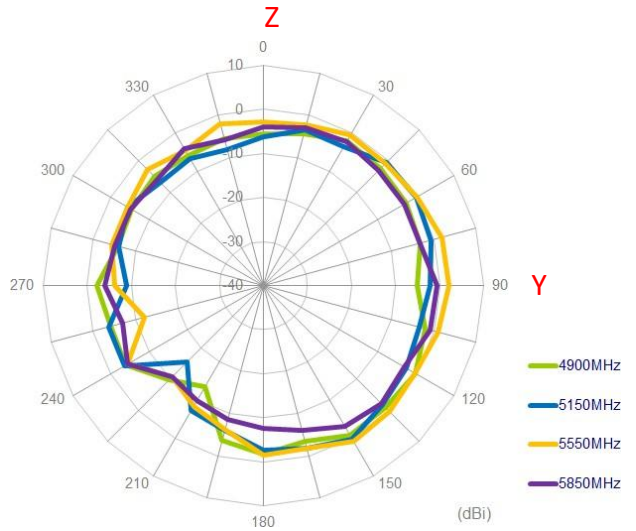
XZ Plane



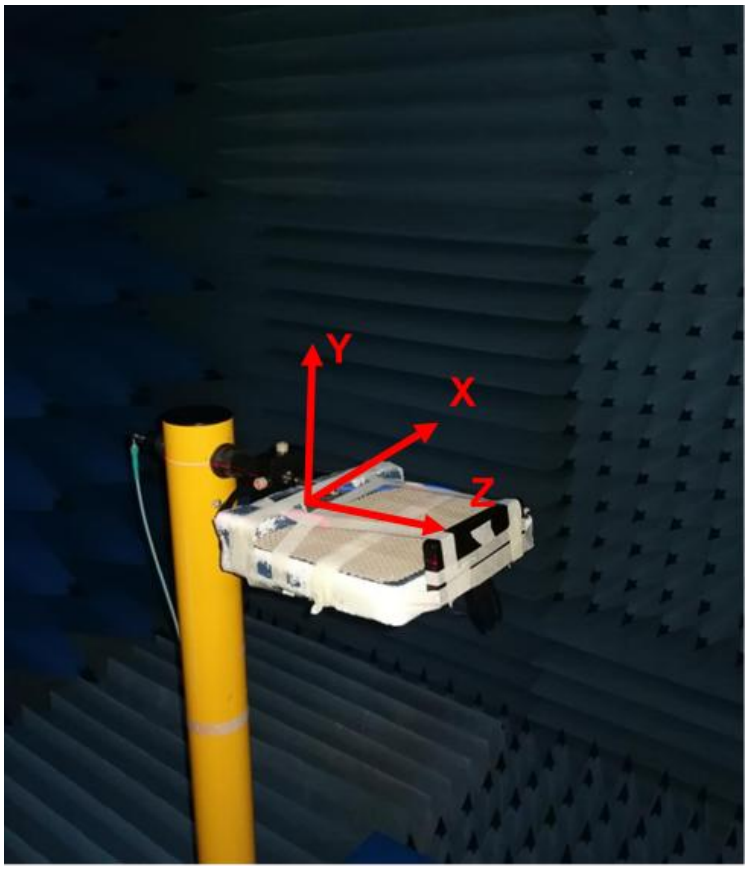


YZ Plane

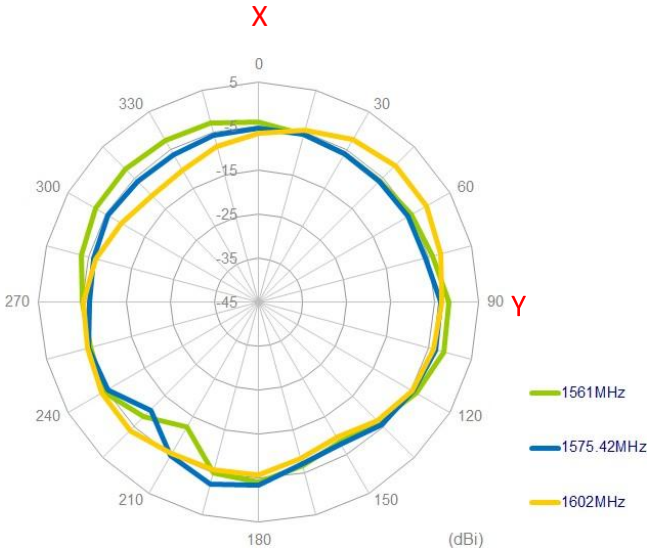




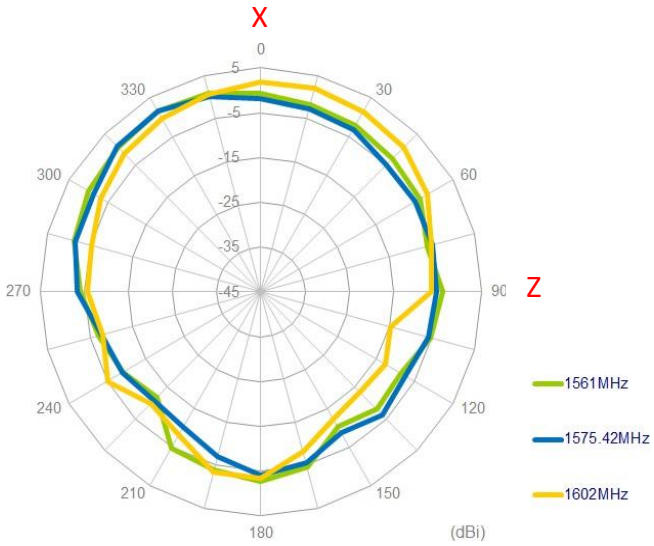
4.4 GNSS



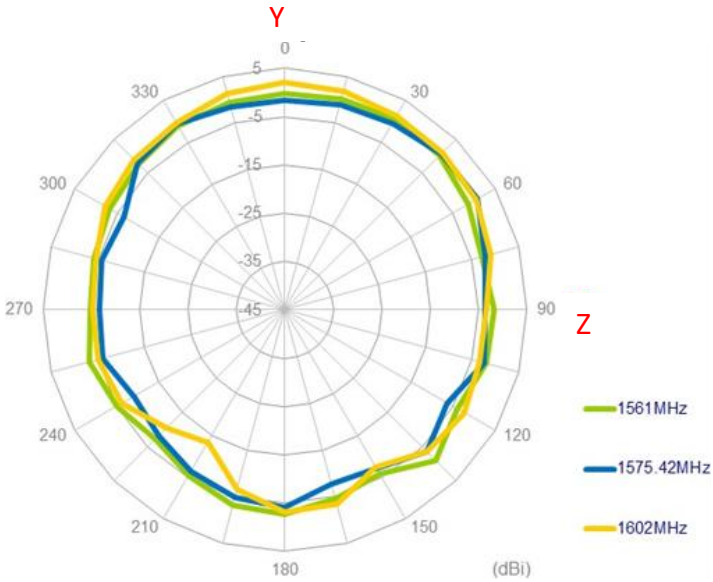
XY Plane



XZ Plane



YZ Plane

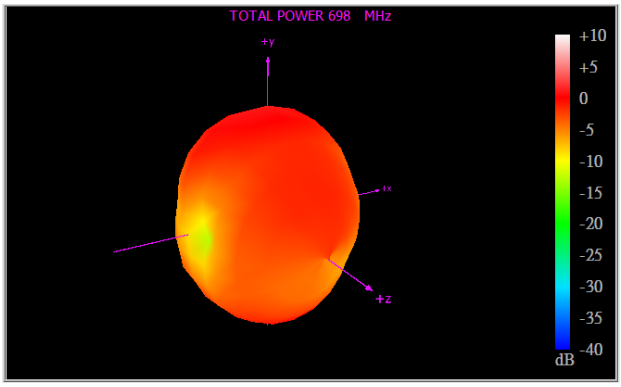


5. 3D Radiation Patterns

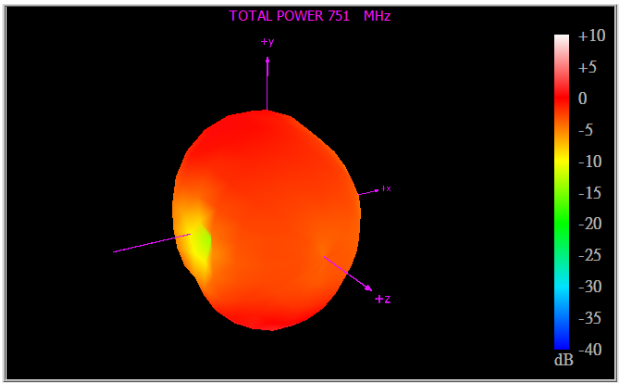
5.1 3D Radiation Patterns

LTE MIMO 1

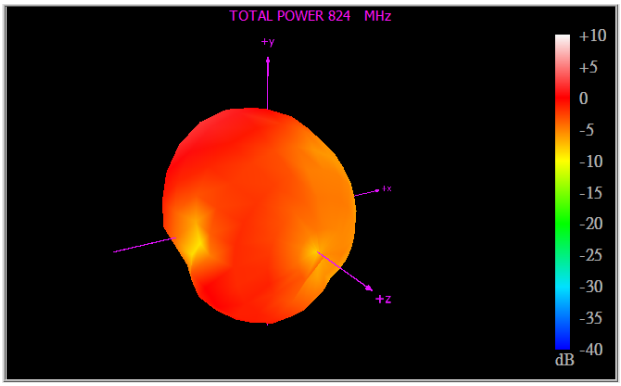
698 MHz



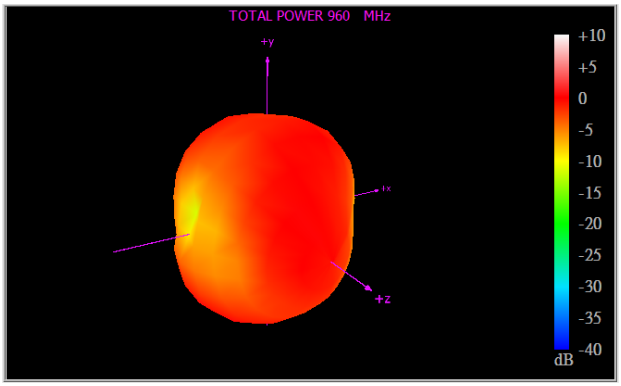
751 MHz



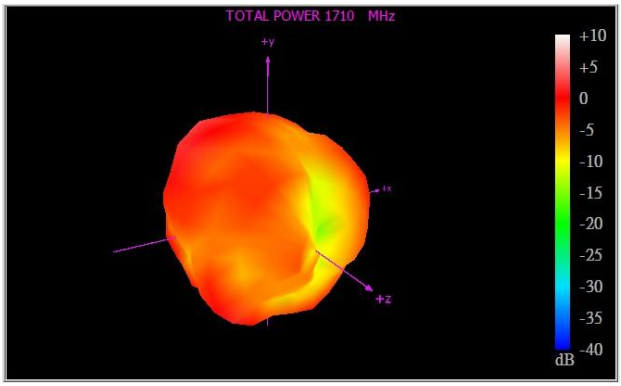
824 MHz



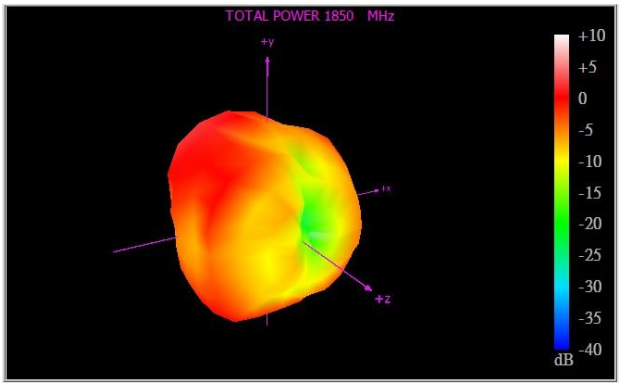
960 MHz



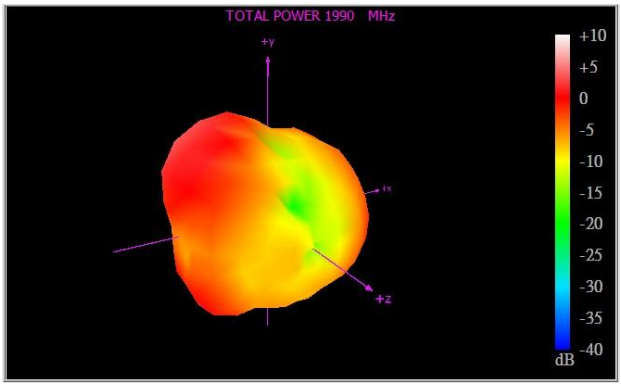
1710 MHz



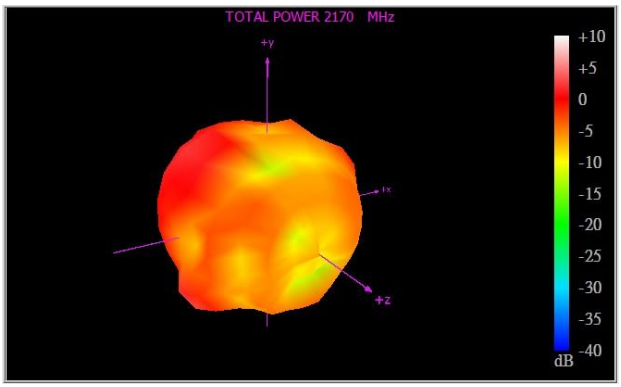
1850 MHz



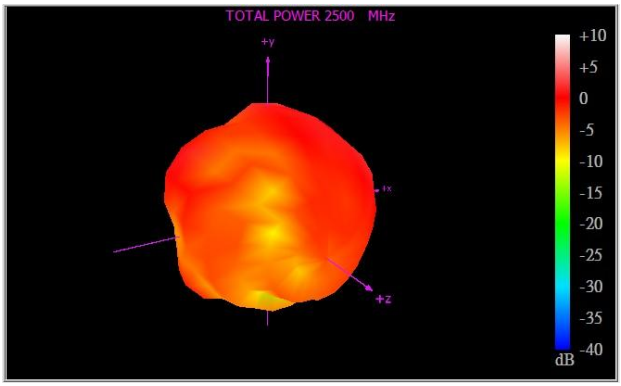
1990 MHz



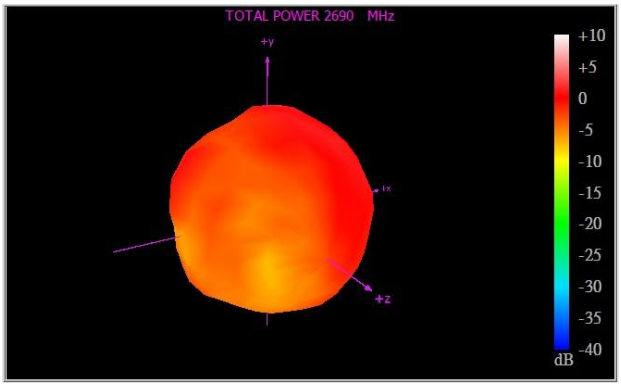
2170 MHz



2500 MHz

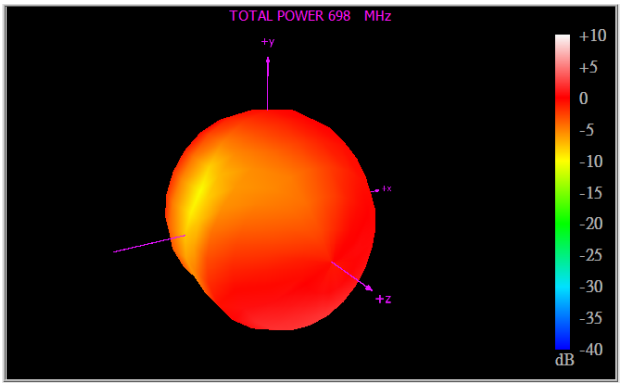


2690 MHz

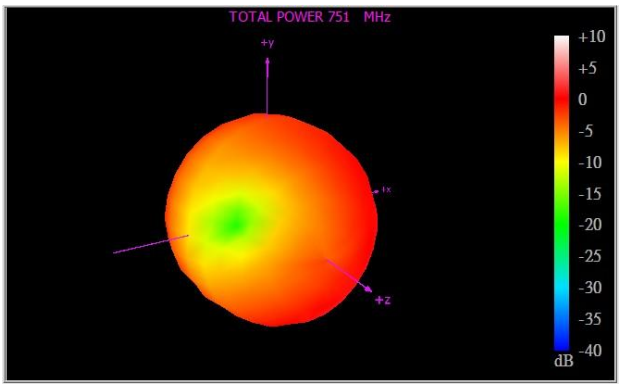


LTE MIMO 2

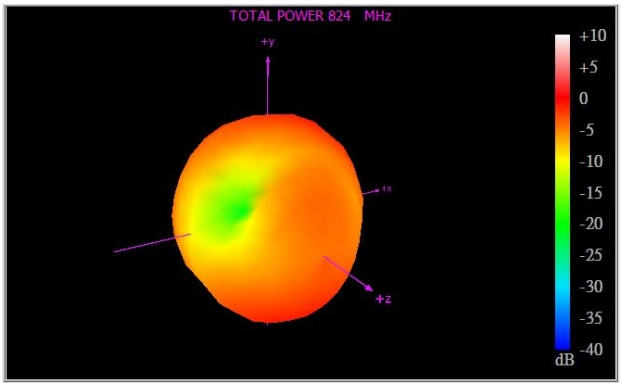
698 MHz



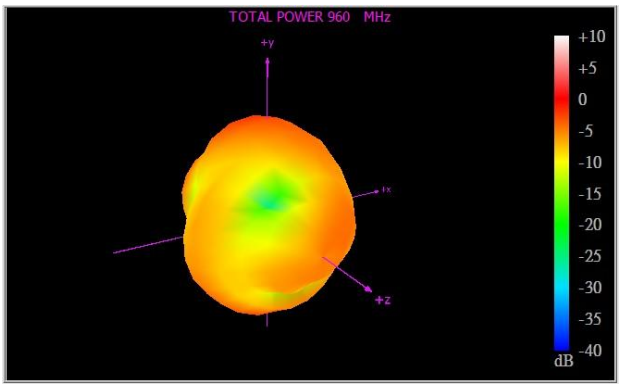
751 MHz



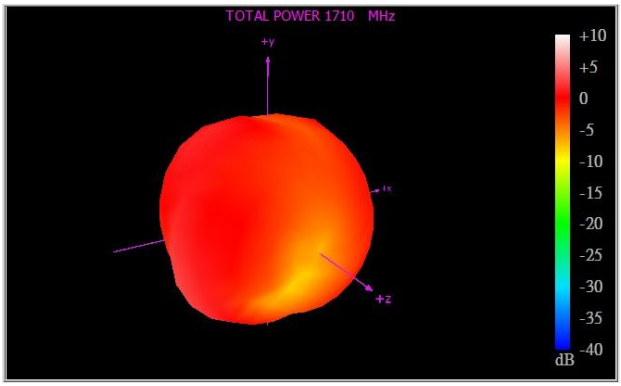
824 MHz



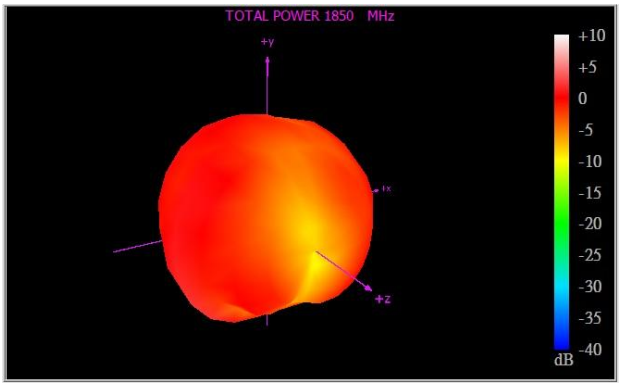
960 MHz



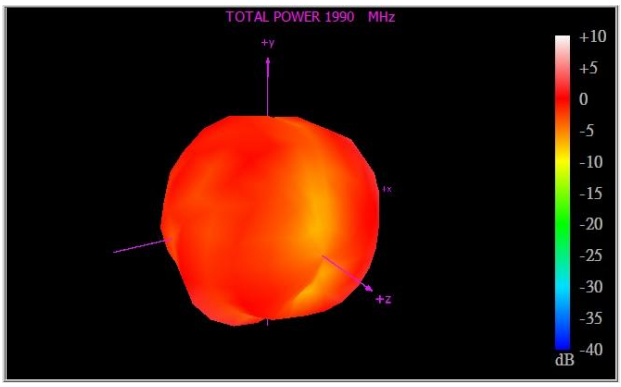
1710 MHz



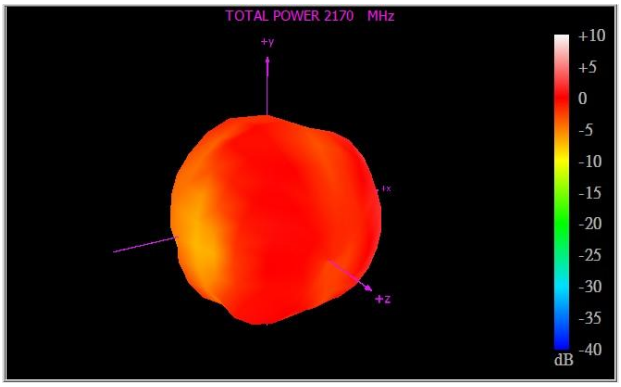
1850 MHz



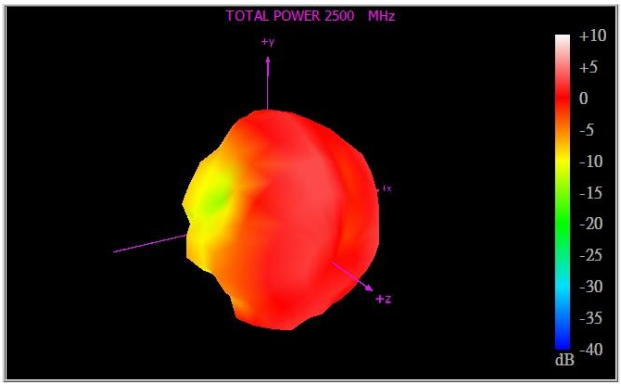
1990 MHz



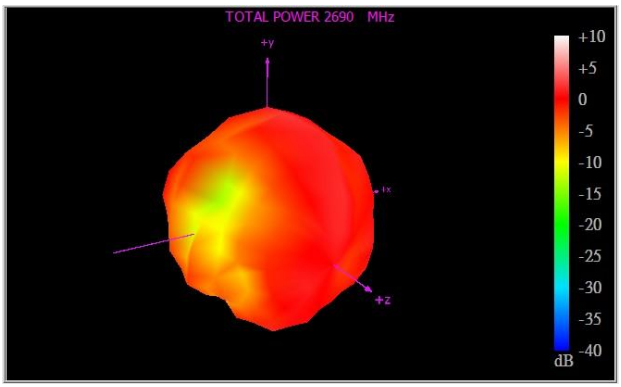
2170 MHz



2500 MHz

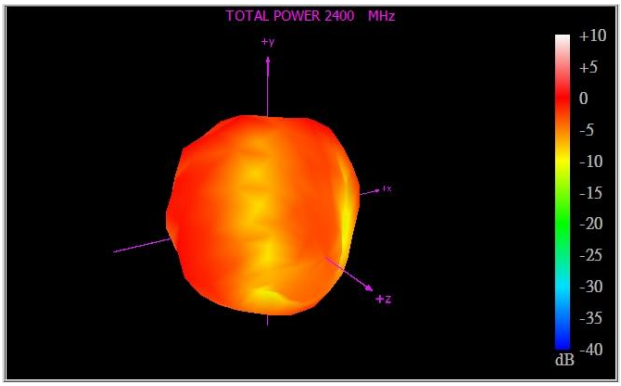


2690 MHz

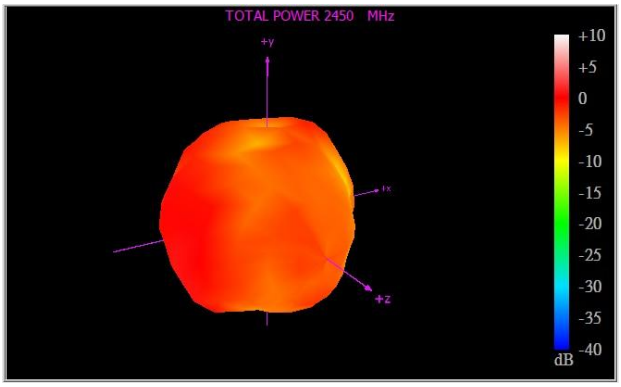


Wi-Fi

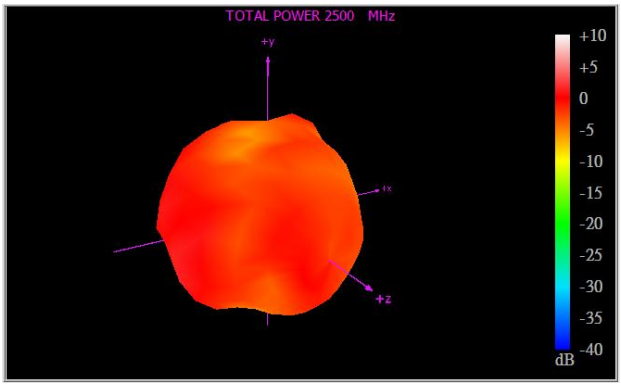
2400 MHz



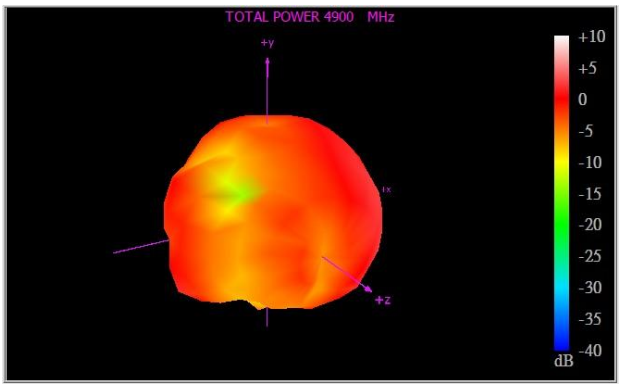
2450 MHz



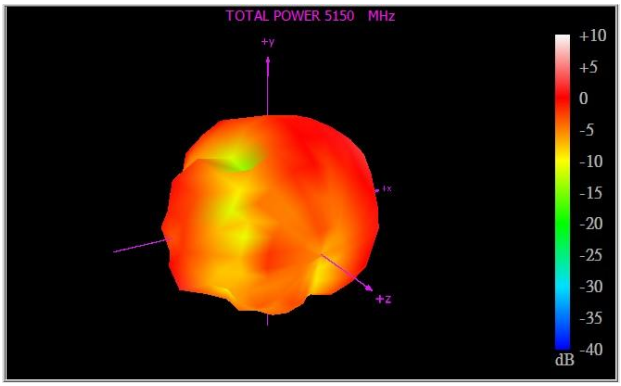
2500 MHz



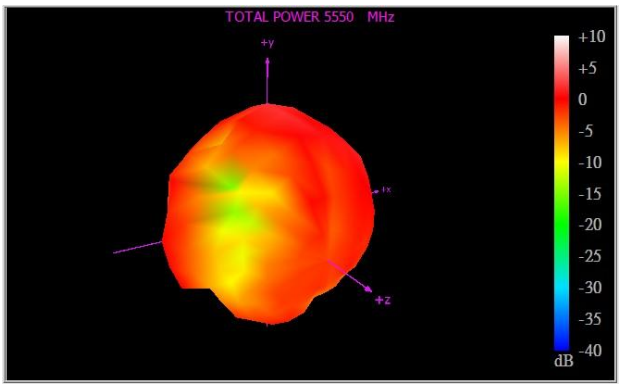
4900 MHz



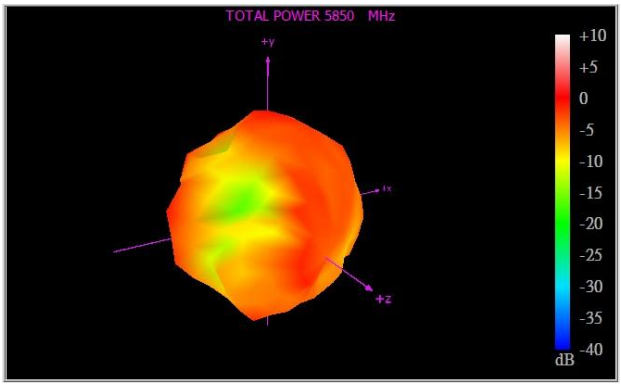
5150 MHz



5550 MHz

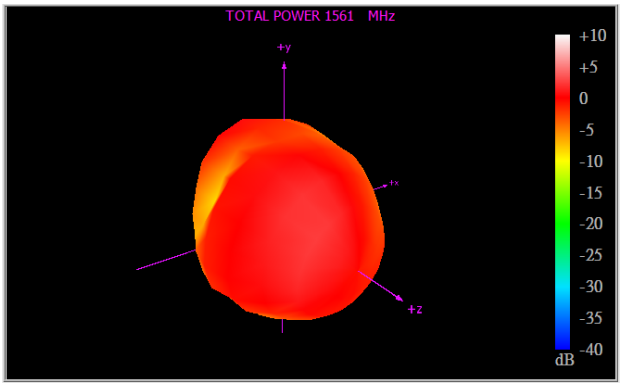


5850 MHz

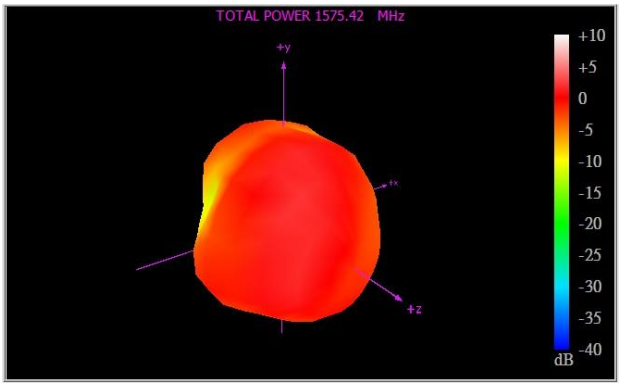


GNSS

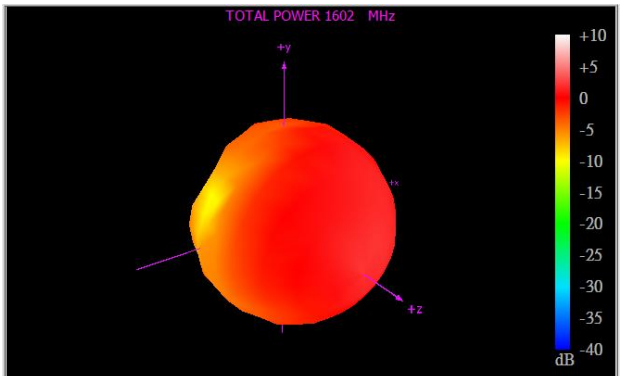
1561 MHz



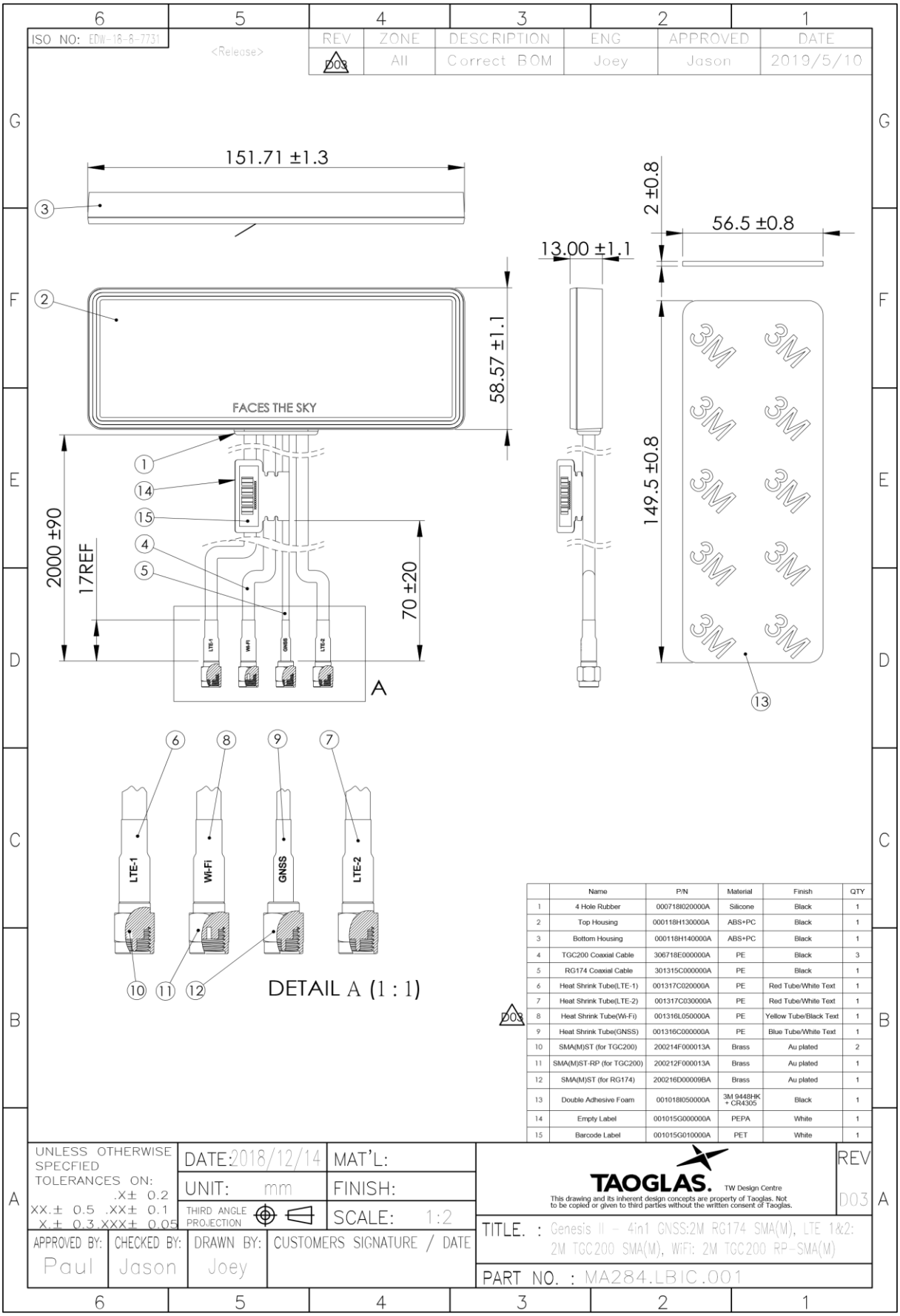
1575.42 MHz



1602 MHz



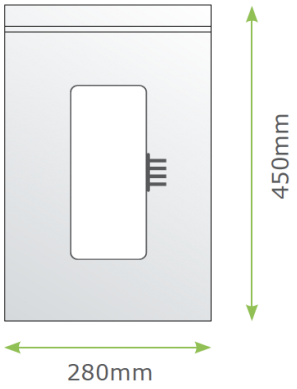
6. Mechanical Drawing (Units: mm)



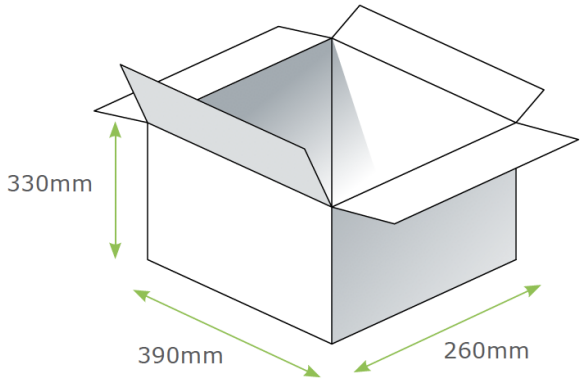
	Name	P/N	Material	Finish	QTY
1	4 Hole Rubber	000718I020000A	Silicone	Black	1
2	Top Housing	000118H130000A	ABS+PC	Black	1
3	Bottom Housing	000118H140000A	ABS+PC	Black	1
4	TGC200 Coaxial Cable	306718E000000A	PE	Black	3
5	RG174 Coaxial Cable	301315C000000A	PE	Black	1
6	Heat Shrink Tube(LTE-1)	001317C020000A	PE	Red Tube/White Text	1
7	Heat Shrink Tube(LTE-2)	001317C030000A	PE	Red Tube/White Text	1
8	Heat Shrink Tube(Wi-Fi)	001316L050000A	PE	Yellow Tube/Black Text	1
9	Heat Shrink Tube(GNSS)	001316C000000A	PE	Blue Tube/White Text	1
10	SMA(M)ST (for TGC200)	200214F000013A	Brass	Au plated	2
11	SMA(M)ST-RP (for TGC200)	200212F000013A	Brass	Au plated	1
12	SMA(M)ST (for RG174)	200216D00009BA	Brass	Au plated	1
13	Double Adhesive Foam	001018I050000A	3M 9448HK + CR4305	Black	1
14	Empty Label	001015G000000A	PEPA	White	1
15	Barcode Label	001015G010000A	PET	White	1

7. Packaging

1 pc MA284.LBIC.001 per PE Bag
Dimensions - 280*450mm
Weight - 352g



10 PE Bags per Small Carton
Carton Dimensions - 390*260*330mm
Weight - 3.5Kg

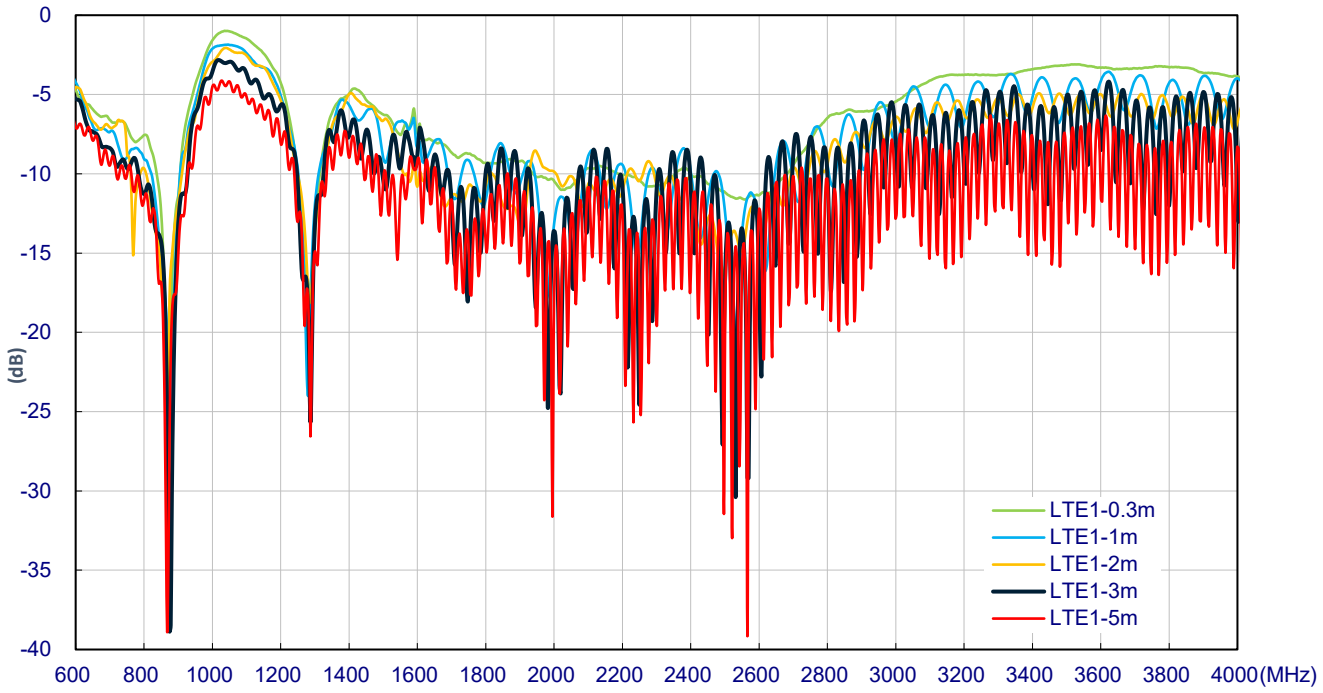


8. Application Notes

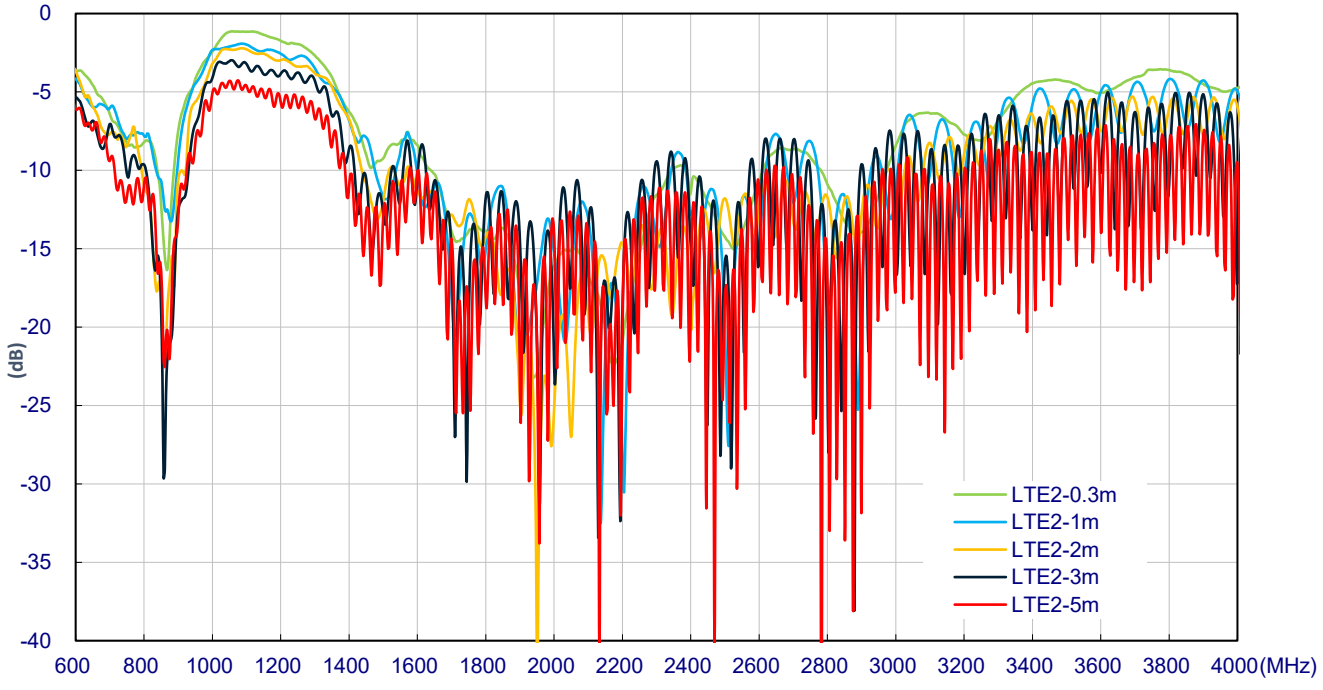
The MA284 antenna Performance with different cable lengths is shown below.

8.1 Return Loss

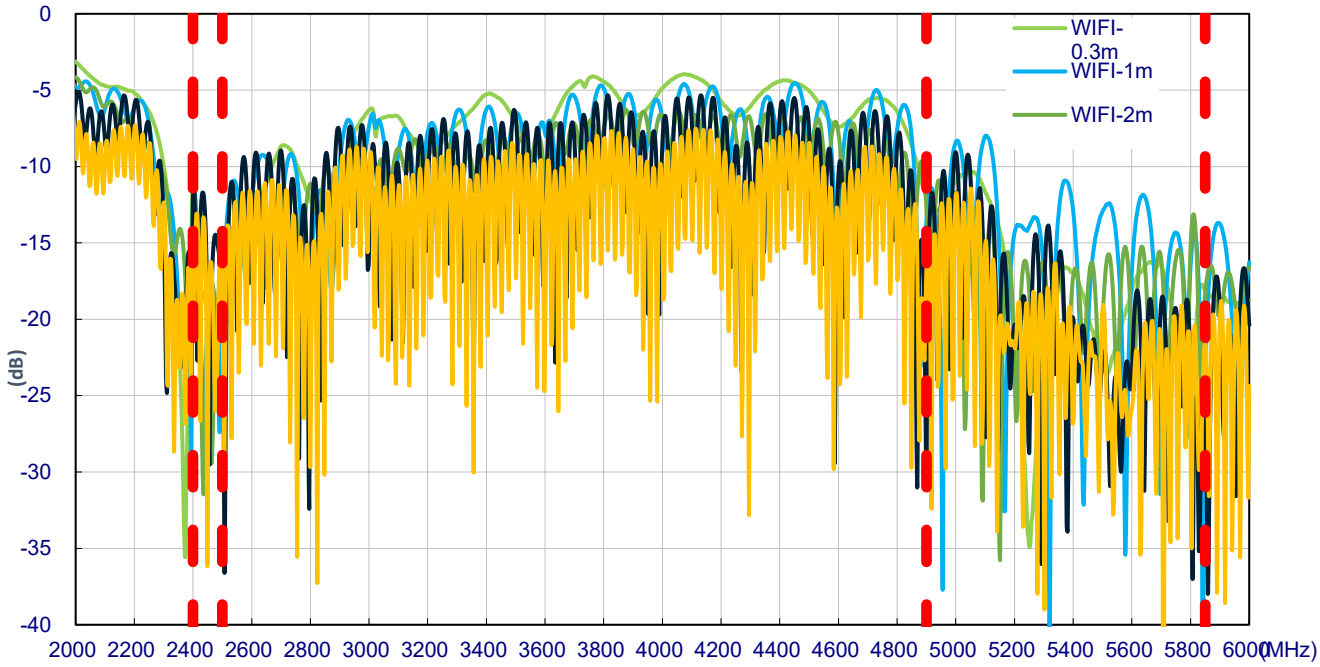
LTE MIMO 1



LTE MIMO 2

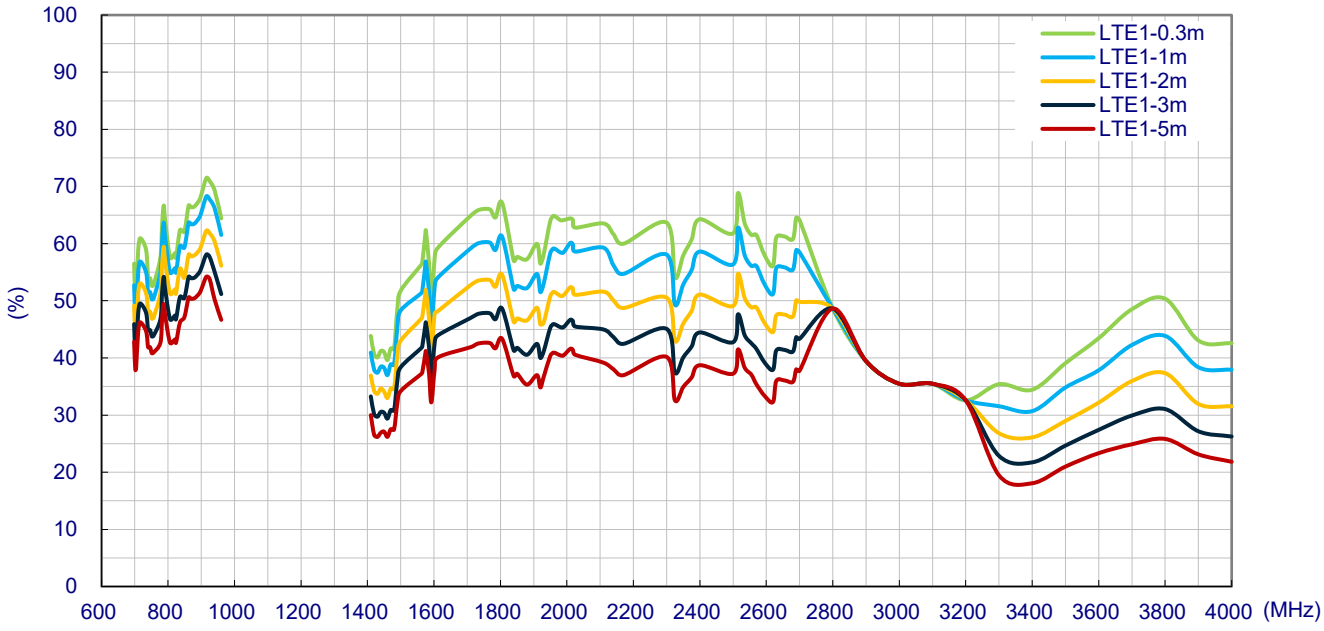


Wi-Fi

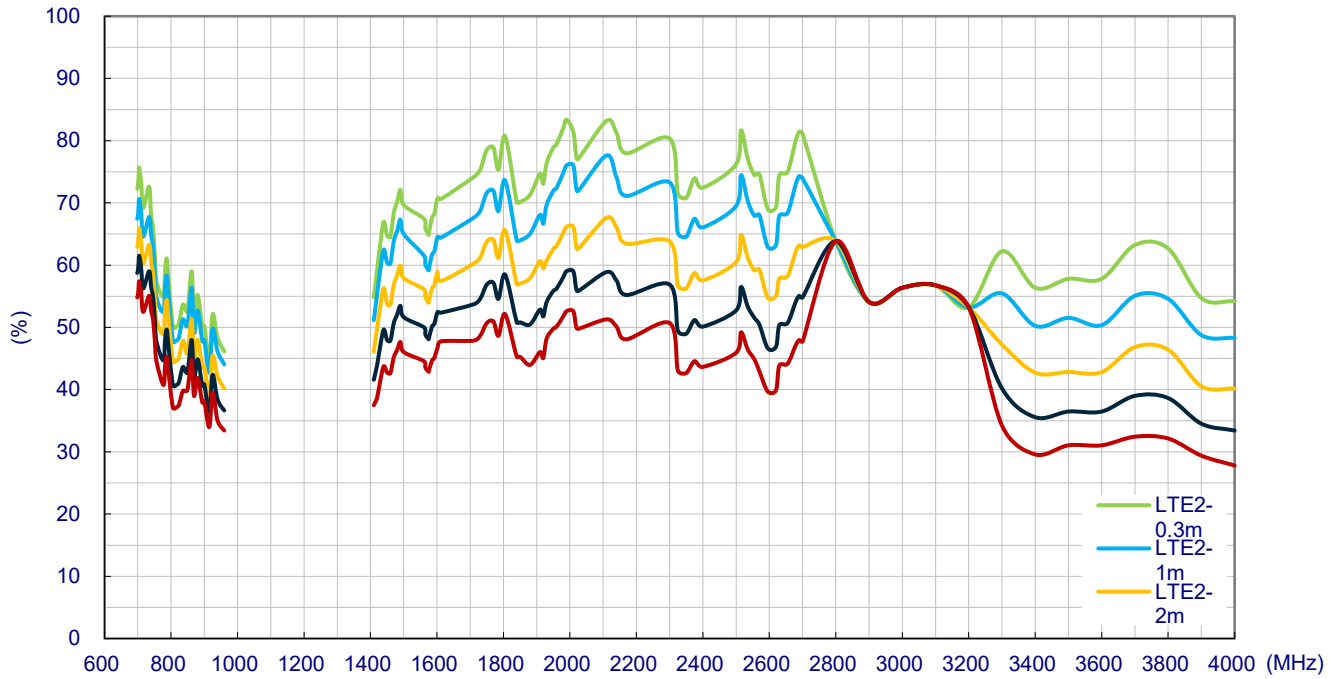


8.2 Efficiency

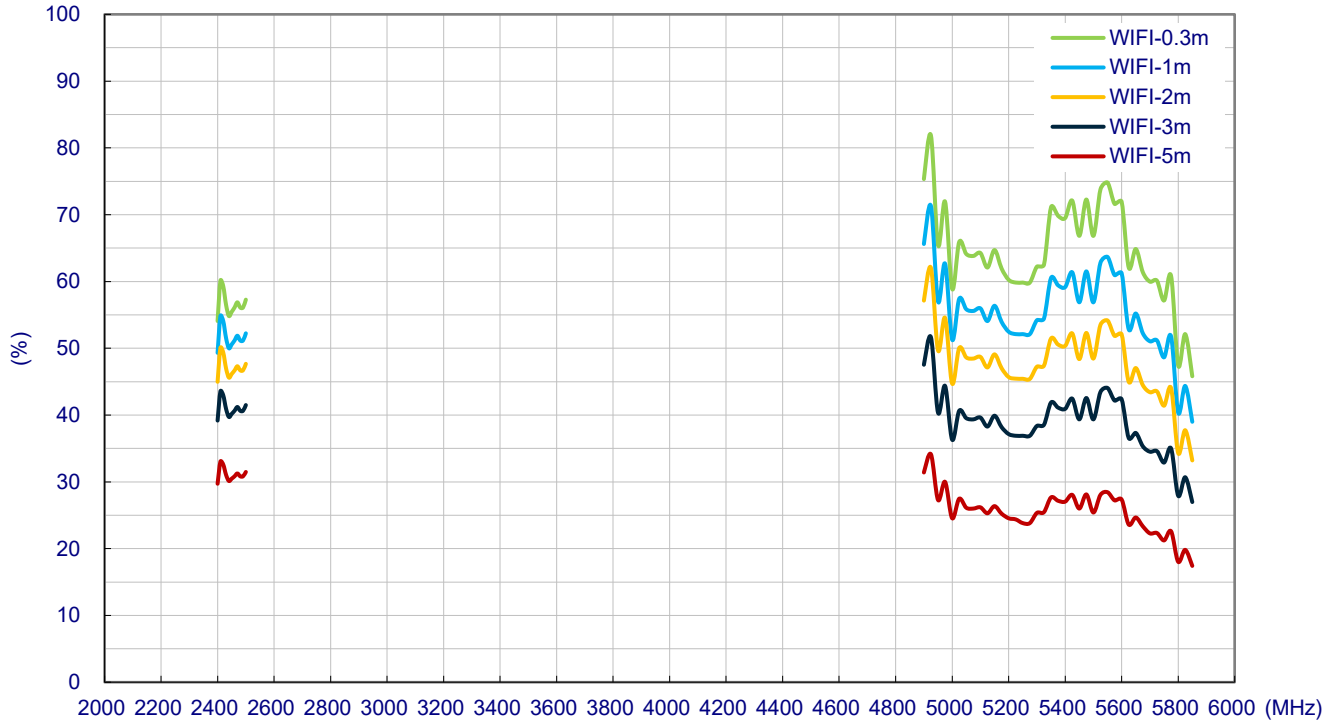
LTE MIMO 1



LTE MIMO 2

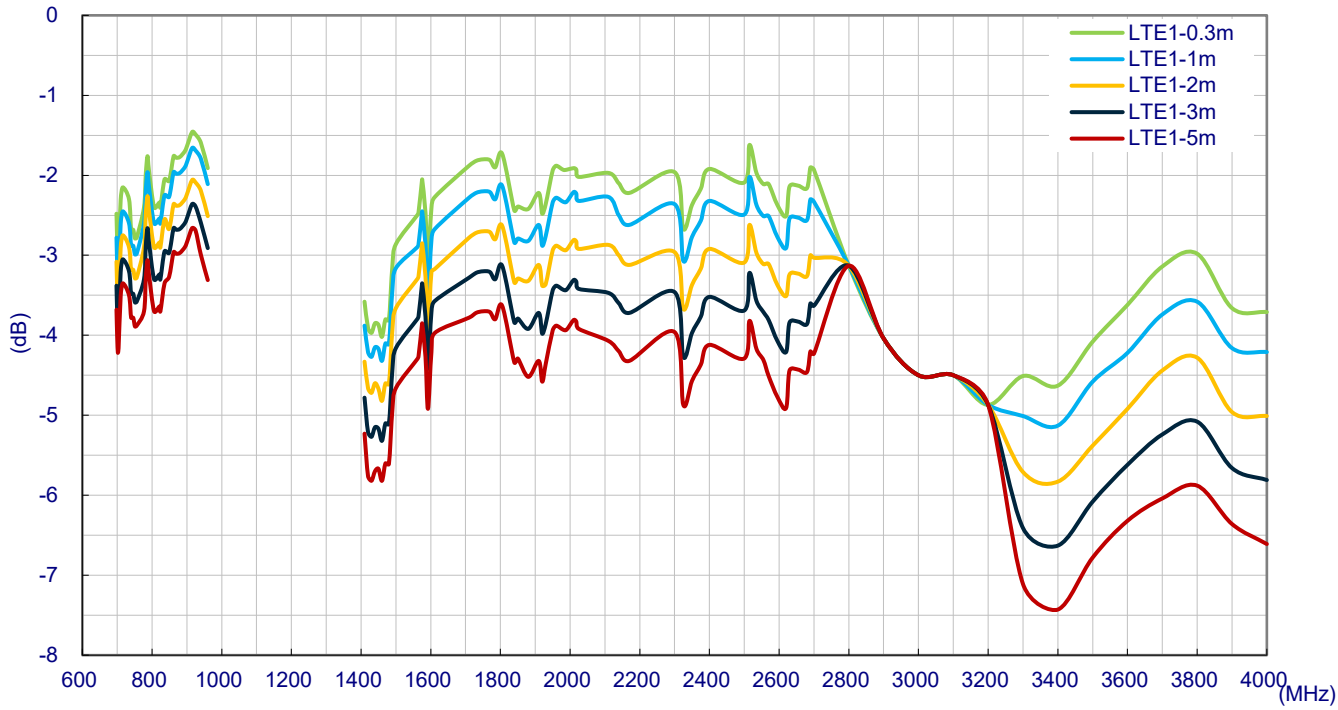


Wi-Fi

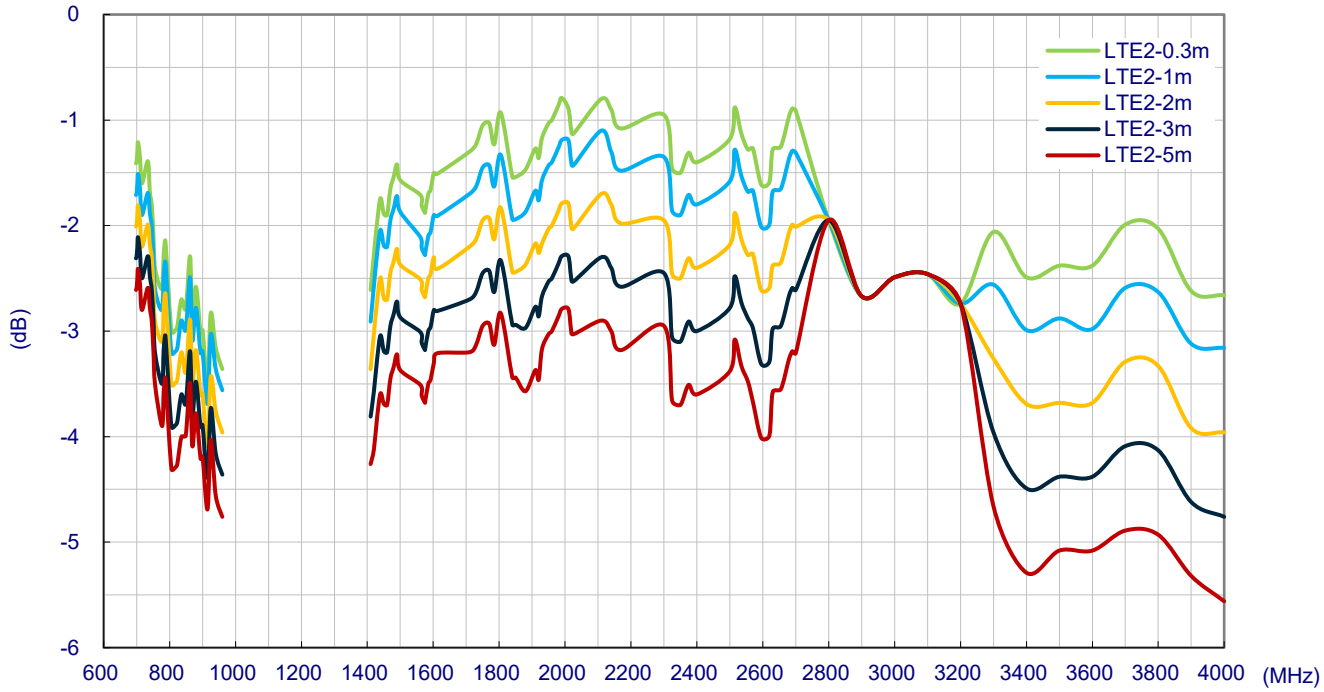


8.2 Average Gain

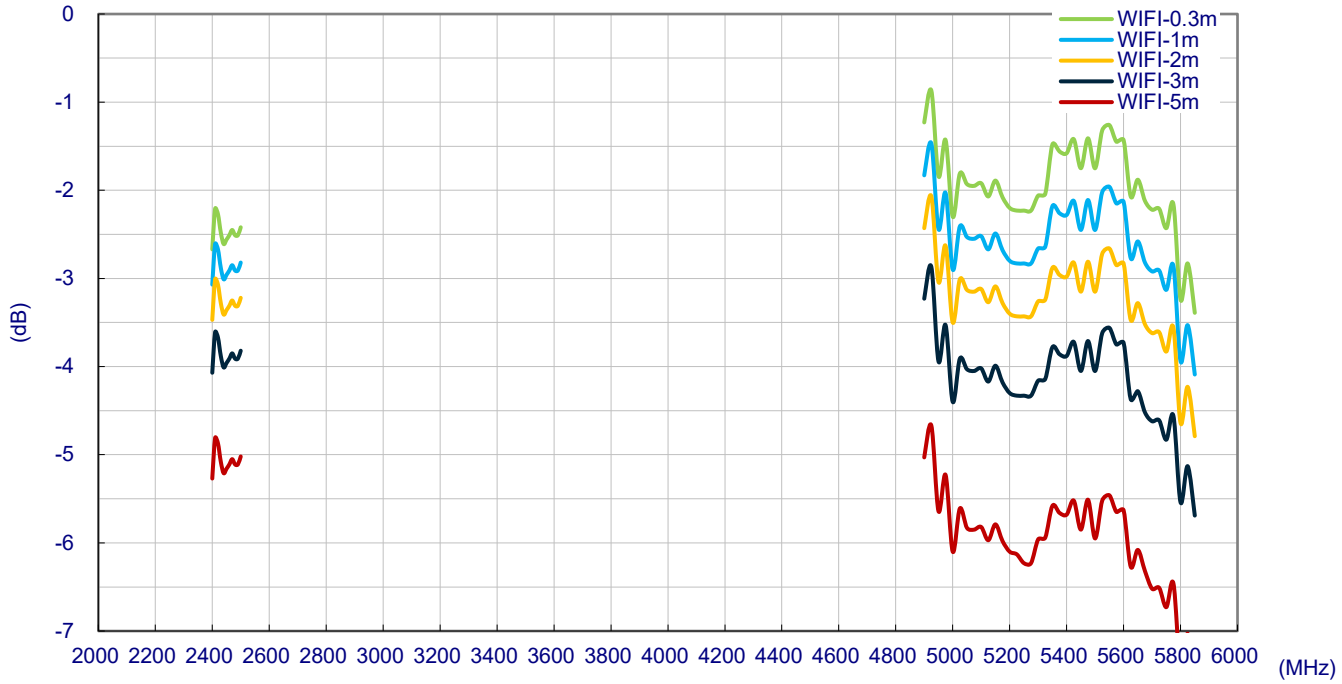
LTE MIMO 1



LTE MIMO 2

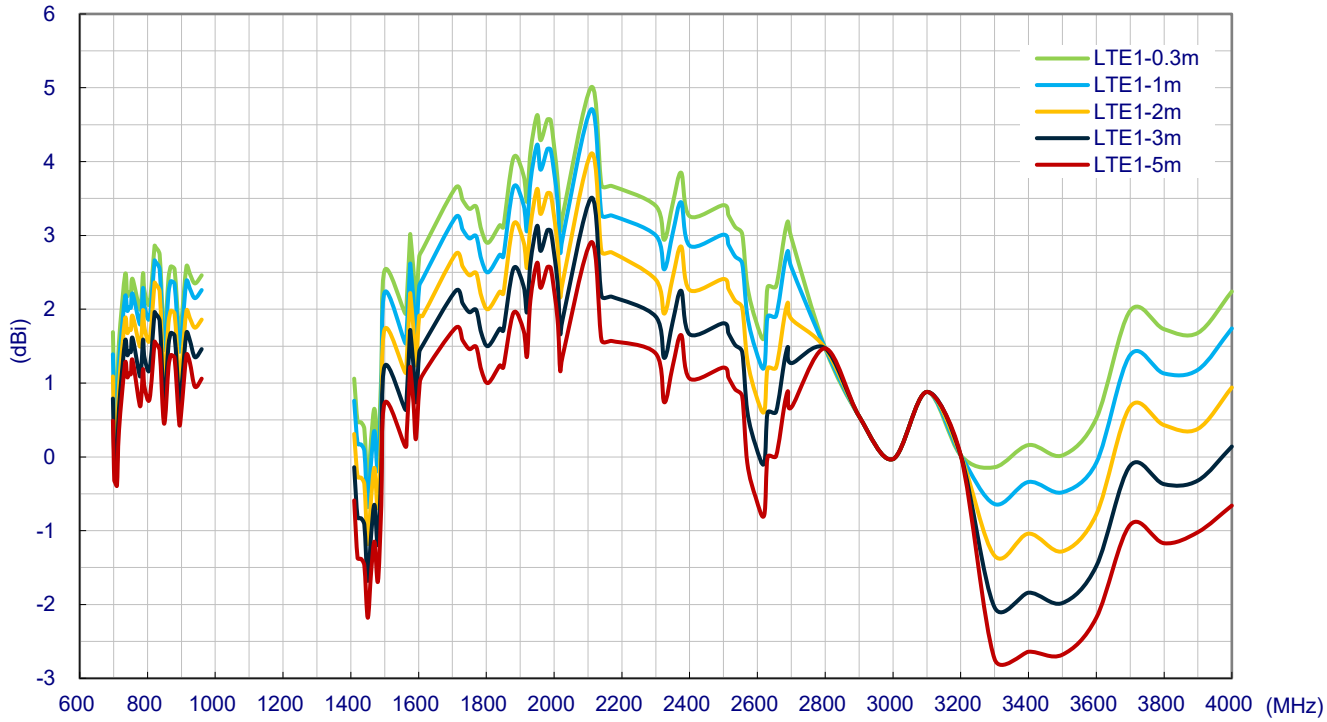


Wi-Fi

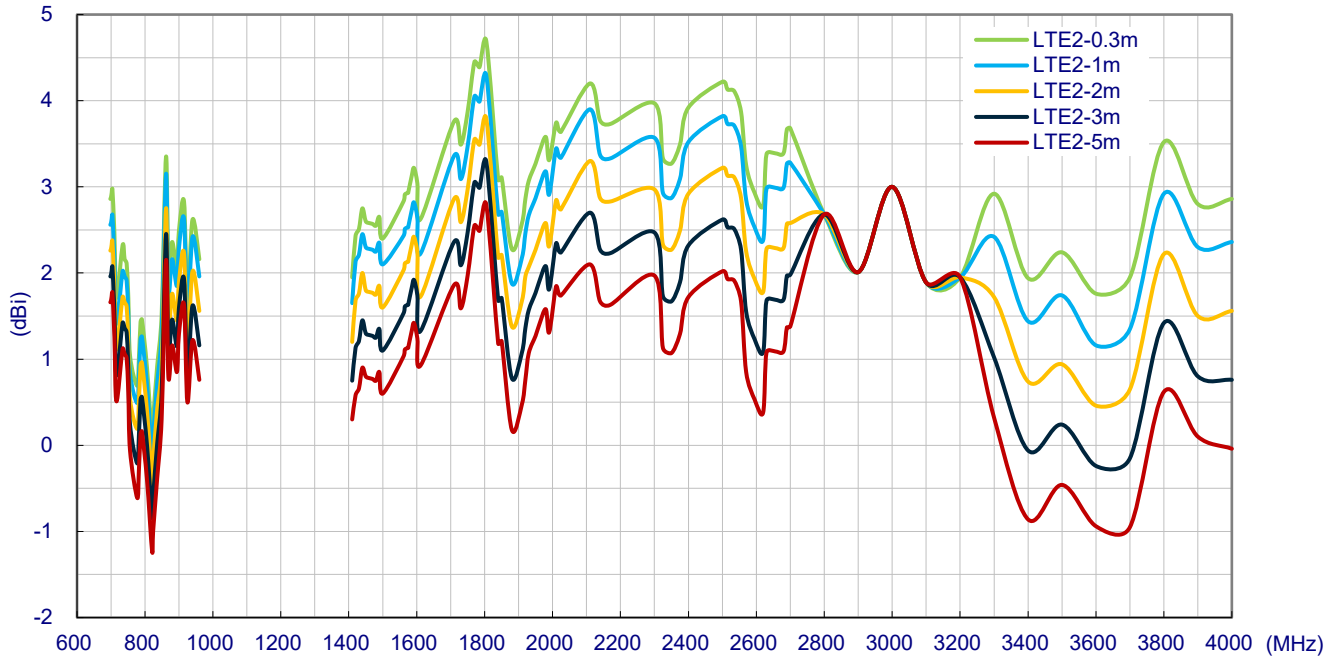


8.2 Peak Gain

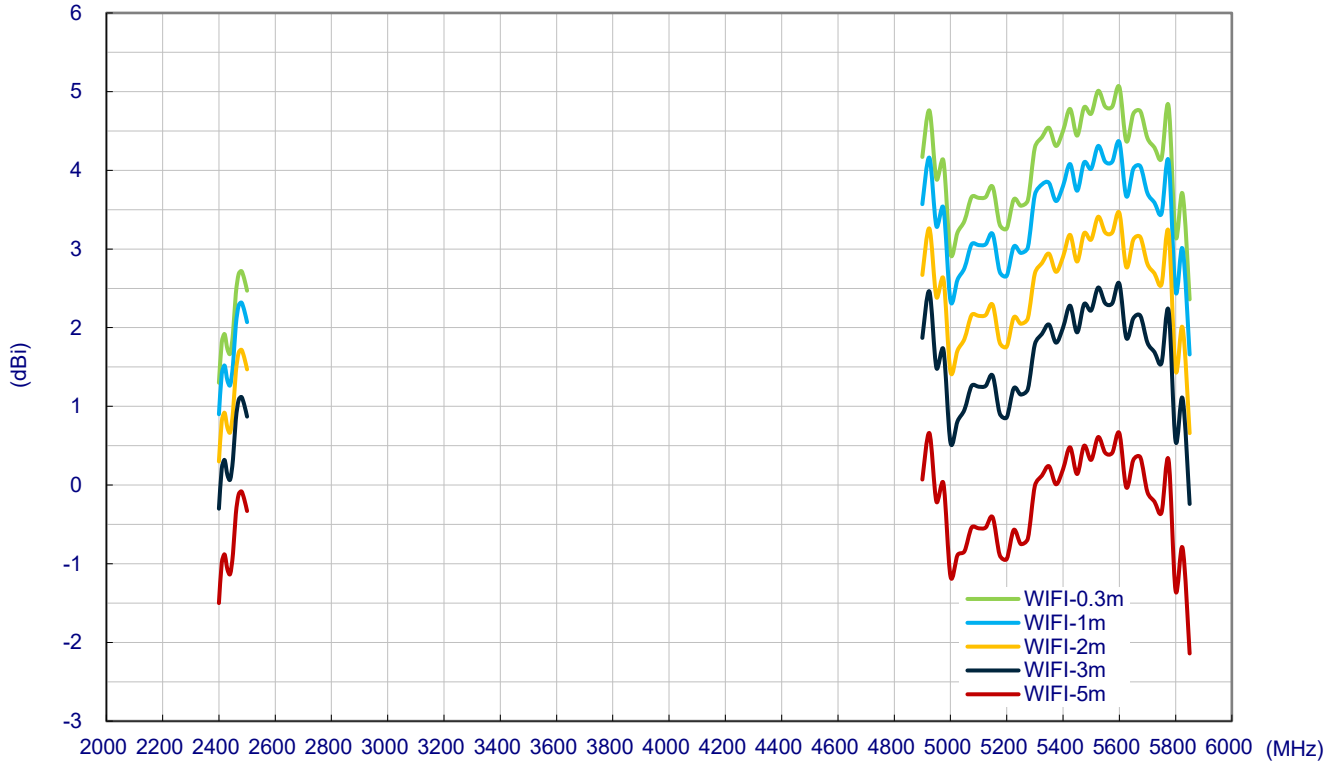
LTE MIMO 1



LTE MIMO 2



Wi-Fi



Changelog for the datasheet

SPE-19-8-009 – MA284.LBIC.001

Revision: C (Current Version)	
Date:	2026-06-12
Notes:	Removed section 9,10 and 11.
Author:	Gary West

Previous Revisions

Revision: B	
Date:	2020-02-12
Notes:	Updated to include some 5G bands
Author:	Jack Conroy

Revision: A (Original First Release)	
Date:	2019-01-28
Notes:	Initial Datasheet Release
Author:	Yu Kai Yeung

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