TAOGLAS

Datasheet

MA310.A.LB.003

Description:

Magnet Mount GPS/GLONASS-SMA(M) 4G LTE/Cellular-SMA(M) 3M CFD-200

Features:

1*LTE Antenna

1*Active GNSS Antenna - GPS L1 and GLONASS L1

Magnetic Mounting

Dimension: ø77mm x 23mm

IP67 Rated Enclosure

LTE: 3M TGC-200 Cable and SMA(M)ST Connector

GNSS: 3M RG-174 Cable and SMA(M)ST Connector

RoHS and REACH Compliant

1. Introduction

The MA310 antenna is a combination small form factor high performance GPS/GLONASS and Penta-band Cellular (GSM/GPRS/CDMA/ PCS/DCS/ WCDMA/UMTS) antenna to simplify AVL or Fleet management antenna systems worldwide.

It comes with magnetic mount as standard. An internal O-ring meets stringent IP-67 waterproof standards. With the strongest GPS/GLONASS and Cellular antenna design team in the industry and rigorous testing Taoglas offers guaranteed performance with your system and your environment.

The standard version comes with 3 metres RG174 cable and SMA(M) connectors for both GPS/GLONASS and TGC-200 for Cellular feeds. Cables and connectors are customizable upon requests.

Features

GPS/GLONASS

- High LNA Gain up to 31 dB
- Antenna Gain 28 ± 2 dB
- Miniaturized to 56.2 x 16.8 mm
- Low Noise Figure 2.8 dB typ. for GPS
- 3.2 dB typ. for GLONASS
- Ultra-Low Power Consumption 7~10mA typ. (at 3.3V DC)

Cellular

- Advanced penta-band cellular Antenna (GSM/GPRS/CDMA/ PCS/DCS/WCDMA/UMTS/HSPA)
- GSM850: 824~896MHz, GSM900: 880~960MHz,
- DCS: 1710~1880MHz, DCS: 1850~1990MHz
- UMTS/WCDMA/ HSPA: 1920~2170MHz

Other

- IP67 Water Resistant due to Internal O-Ring Structure
- Quality textured covert design.
- Low profile.
- ABS housing
- Optional cables and connectors
- ROHS Compliant

2. Specifications

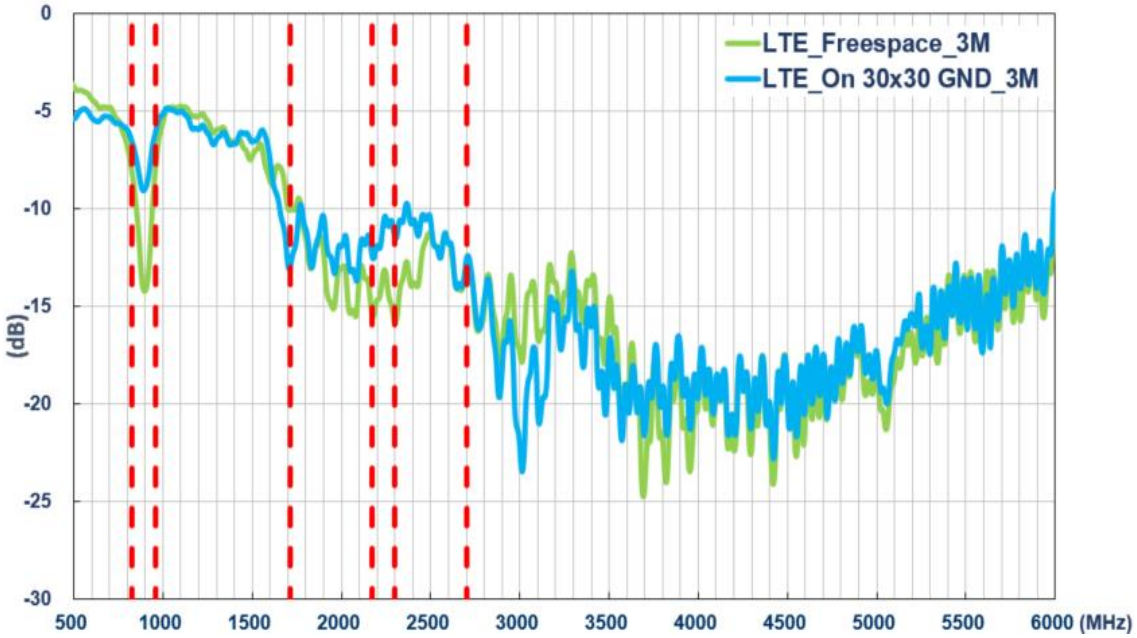
LTE Antenna								
Frequency (MHz)		LTE700	GSM850	GSM900	DCS	PCS	UMTS1	LTE2600
		698~824	824~894	880~960	1710~1880	1850~1990	1920~2170	2490~2690
Efficiency (%)								
Free Space	0.3M	24.98	63.74	66.67	50.46	60.06	58.44	40.03
	1M	23.74	60.87	63.66	46.01	54.76	53.84	36.51
	2M	22.15	55.72	58.06	41.00	48.41	47.18	31.73
	3M	20.44	51.81	54.05	36.44	42.61	41.71	27.66
On 30x30cm Ground Plane	0.3M	36.38	53.95	41.12	61.58	58.88	53.86	47.87
	1M	34.52	51.52	39.26	56.16	53.70	49.62	43.66
	2M	32.22	47.22	35.81	50.05	47.49	43.48	37.74
	3M	29.79	43.85	33.35	44.50	41.79	38.45	32.64
Average Gain (dB)								
Free Space	0.3M	-6.02	-1.96	-1.76	-2.97	-2.21	-2.33	-3.98
	1M	-6.25	-2.16	-1.96	-3.37	-2.62	-2.69	-4.38
	2M	-6.55	-2.54	-2.36	-3.87	-3.15	-3.26	-4.99
	3M	-6.89	-2.86	-2.67	-4.38	-3.71	-3.80	-5.58
On 30x30cm Ground Plane	0.3M	-4.39	-2.68	-3.86	-2.11	-2.30	-2.69	-3.20
	1M	-4.62	-2.88	-4.06	-2.51	-2.70	-3.04	-3.60
	2M	-4.92	-3.26	-4.46	-3.01	-3.23	-3.62	-4.23
	3M	-5.26	-3.58	-4.77	-3.52	-3.79	-4.15	-4.86
Peak Gain (dBi)								
Free Space	0.3M	-4.01	-1.14	-1.31	-2.33	-1.71	-1.71	-2.69
	1M	-4.21	-1.34	-1.51	-2.73	-2.11	-2.11	-3.09
	2M	-4.51	-1.74	-1.91	-3.23	-2.71	-2.71	-3.69
	3M	-4.91	-2.04	-2.21	-3.83	-3.21	-3.21	-4.19
On 30x30cm Ground Plane	0.3M	-3.13	-2.43	-2.81	-1.62	-2.10	-2.10	-2.76
	1M	-3.33	-2.63	-3.01	-2.02	-2.50	-2.50	-3.16
	2M	-3.63	-3.03	-3.41	-2.52	-3.10	-3.10	-3.86
	3M	-4.03	-3.33	-3.71	-3.02	-3.60	-3.60	-4.46
Impedance	50 Ω							
Return loss	< -3 dB							
Polarization	Vertical							

GNSS Electrical			
Frequency	GPS L1: 1575.42 MHz ± 1.023 MHz GLONASS L1: 1602 MHz ± 1.023 MHz		
Bandwidth - Return Loss <-10 dB	6 MHz min		
Return loss (GPS L1 GLONASS L1)	< -10 dB		
Passive Gain at Zenith (GPS L1 and GLONASS L1)	+1.0 dBic typ.		
Polarization	RHCP		
Impedance	50 Ω		
LNA Out-band Attenuation	fo = 1575.42MHz fo ± 30 MHz 5dB Min. fo ± 50 MHz 20dB Min. fo ± 100 MHz 25dB Min.		
Input Voltage	Min:1.8V	Typ. 3.0V	Max: 5.5V
Total Gain @ Zenith	25dBic	27dBic	29dBic
Current Consumption	6mA	12mA	30mA
Noise Figure	3.5dB	3.5dB	3.7dB
Mechanical			
Dimensions	Φ 77*23mm		
Cable	LTE: 3000mm TGC-200 GNSS: 3000mm RG-174		
Connector	LTE: SMA(M) GNSS: SMA(M)		
Casing	PC+ABS		
Adhesive	3M 9448HK + CR4305		
Sealant	Glue		
Weight	212g		
Environmental			
IP Rating	IP67		
Corrosion	5% NaCl for 96hrs - Nickel plated steel base and thread		
Temperature Range	-40°C to +85°C		
Thermal Shock	100 cycles -40°C to +85°C		
Humidity	Non-condensing 65°C 95% RH		
Shock (Drop Test)	1m drop on concrete 6 axes		
Cable Pull	8 Kgf		
Magnetic Pull Force (Vertical)	1.5 Kg (f/cm^2)		

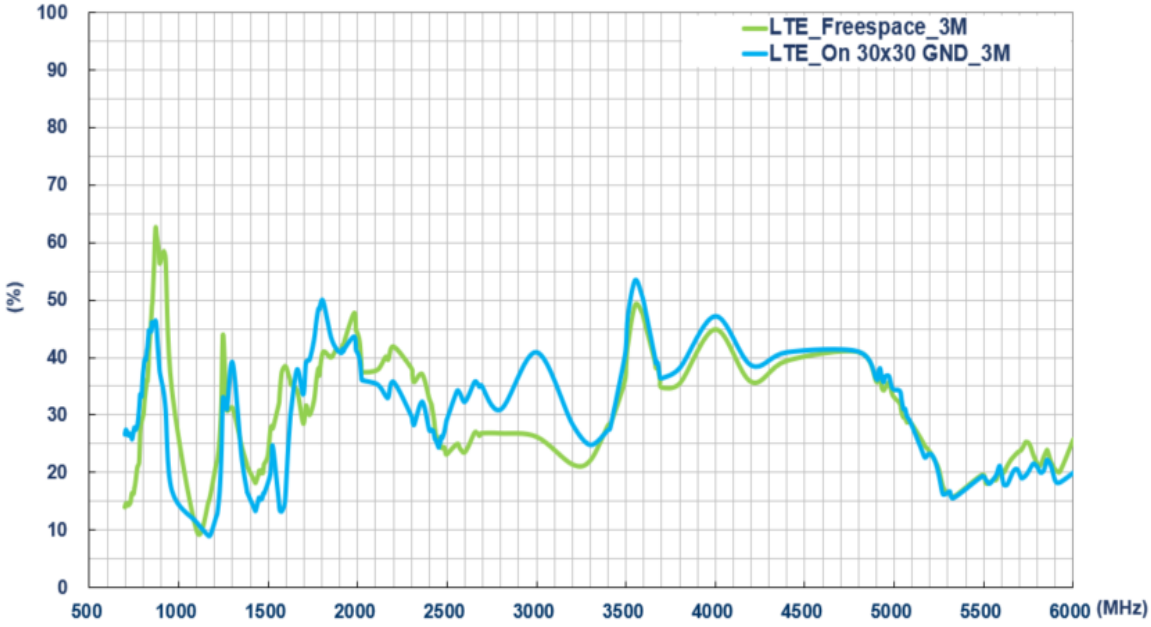
3. Antenna Characteristics

3.1 LTE Antennas

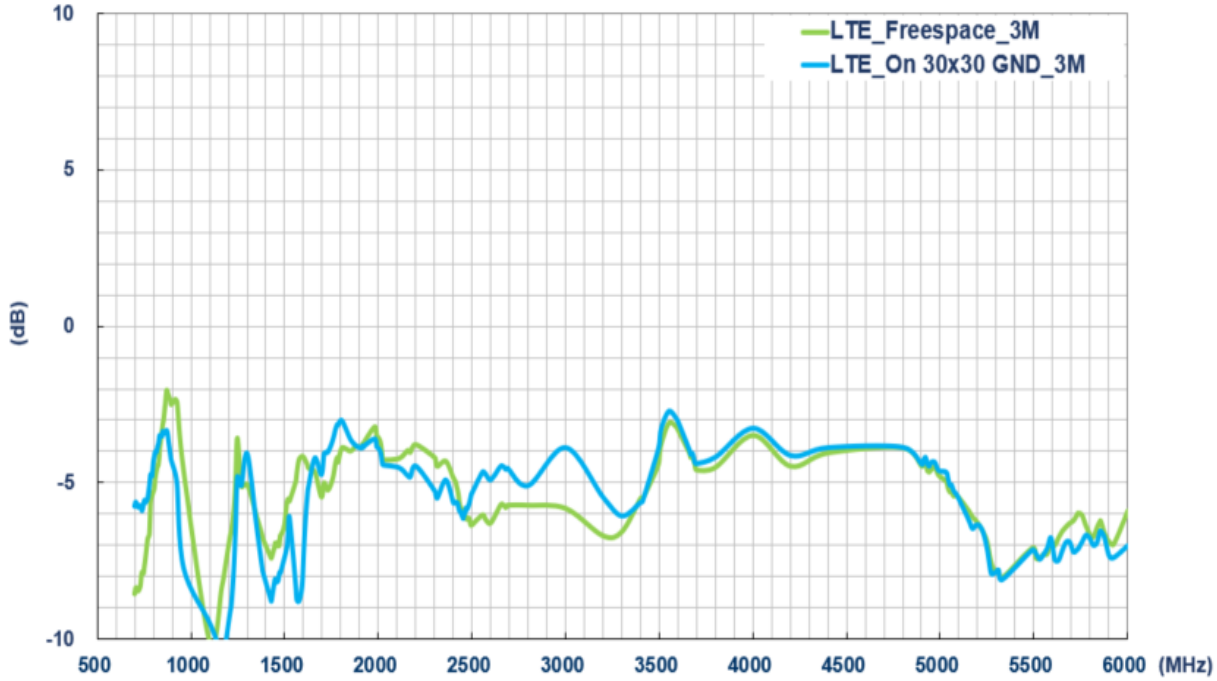
3.1.1. Return Loss – LTE



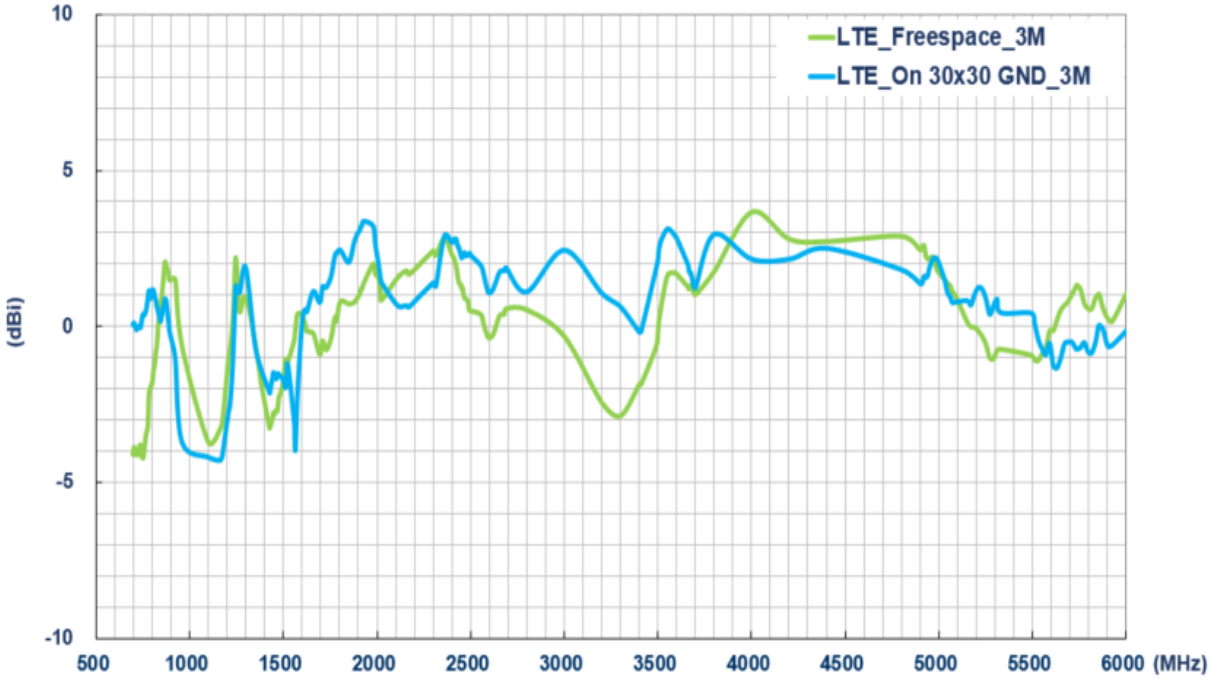
3.1.2. Efficiency – LTE



3.1.3. Average Gain – LTE

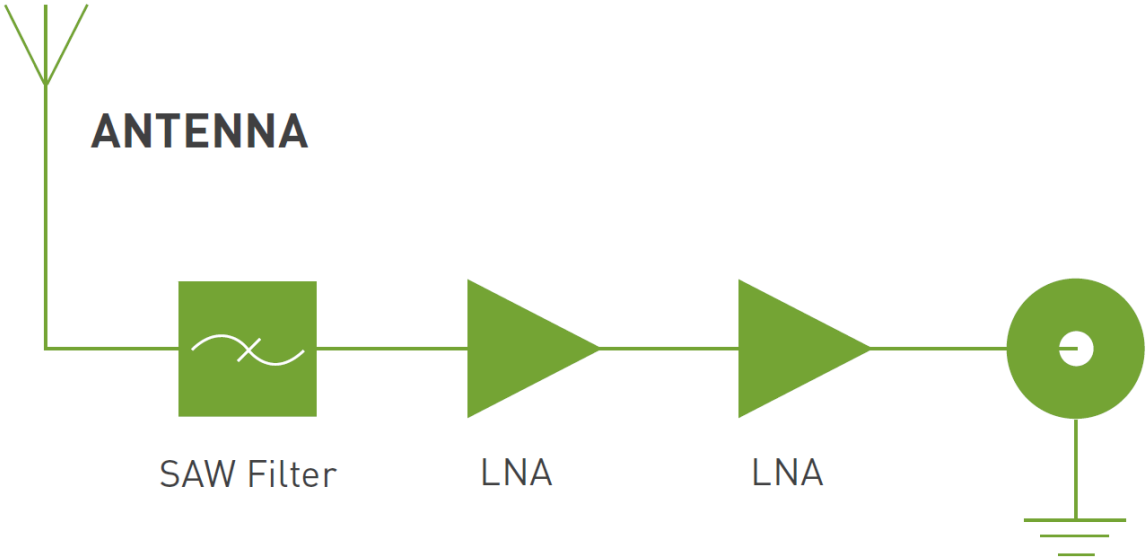


3.1.4. Peak Gain – LTE

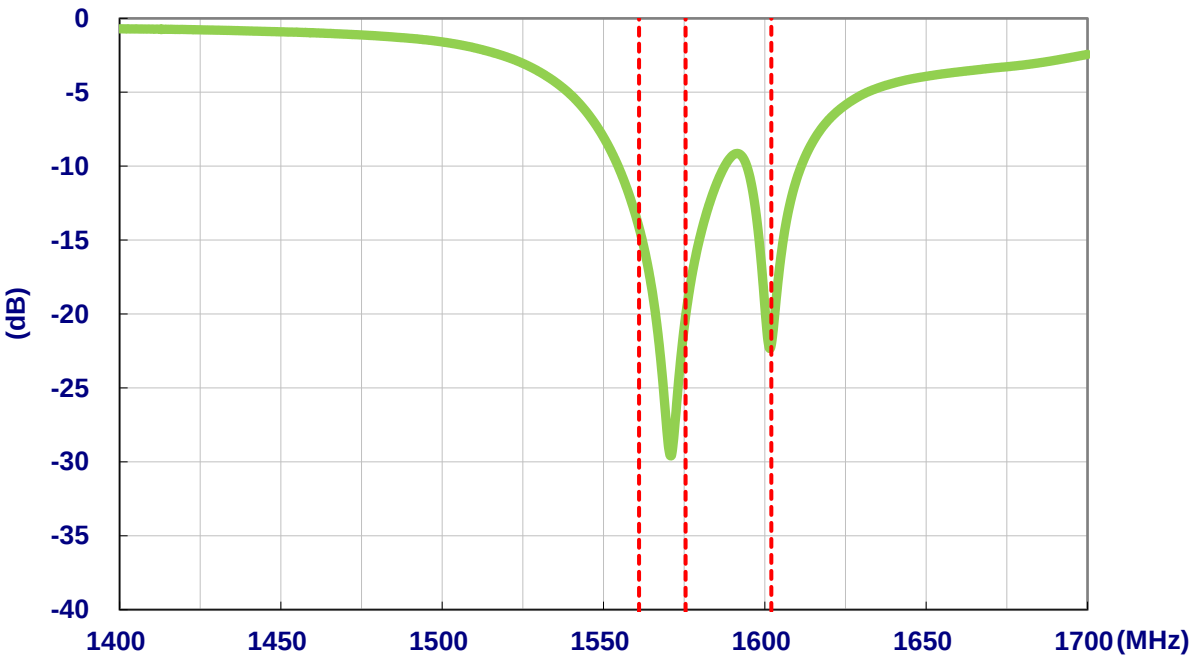


3.2 GNSS Antenna

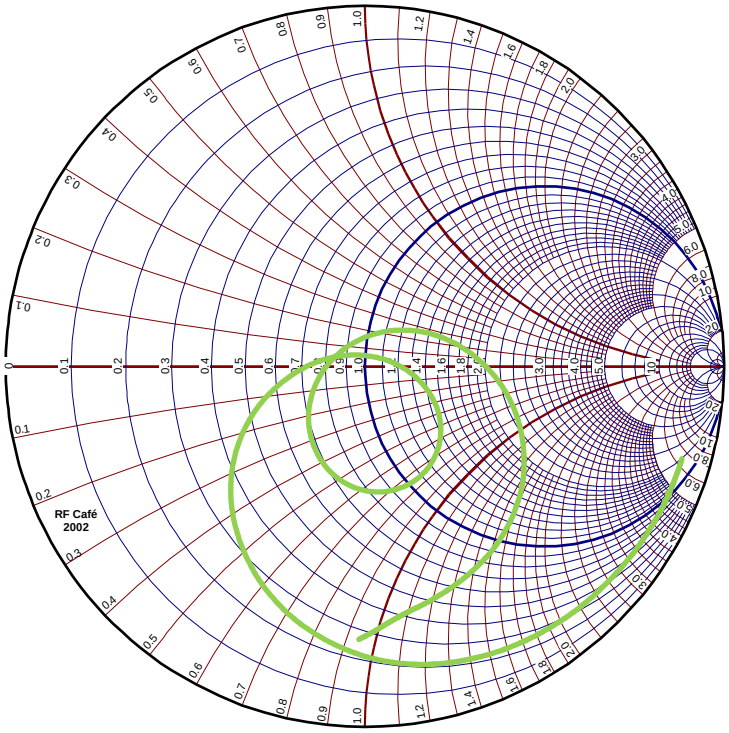
3.2.1. Block Diagram (Active antenna)



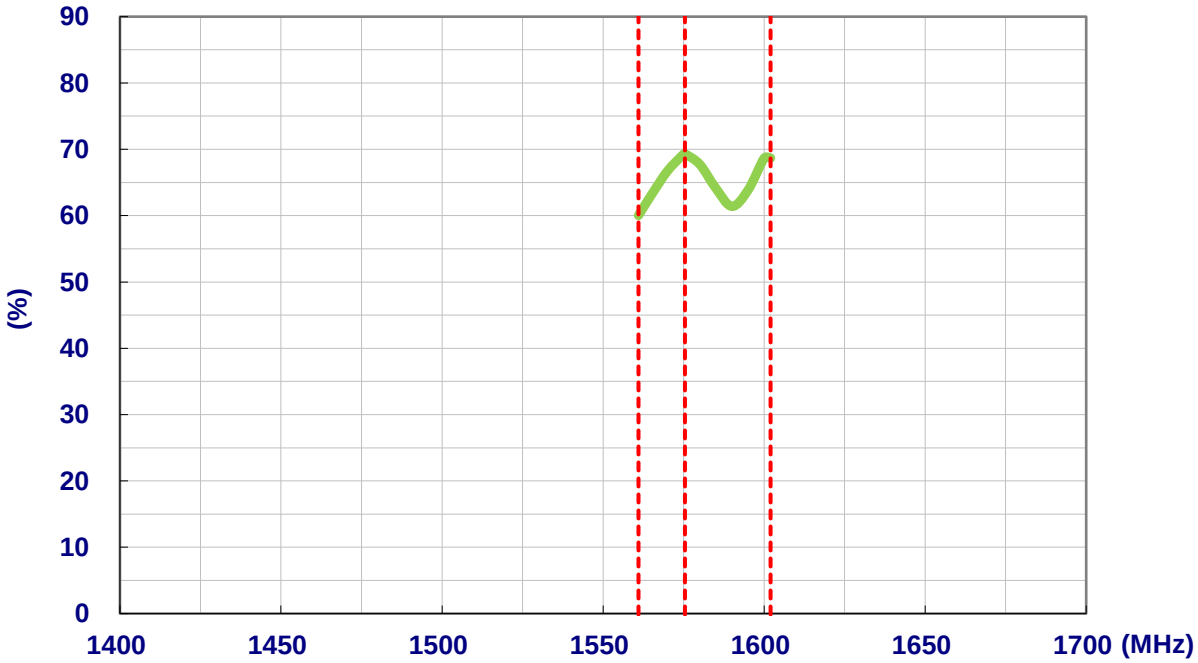
3.2.2. Return Loss – GNSS Antenna



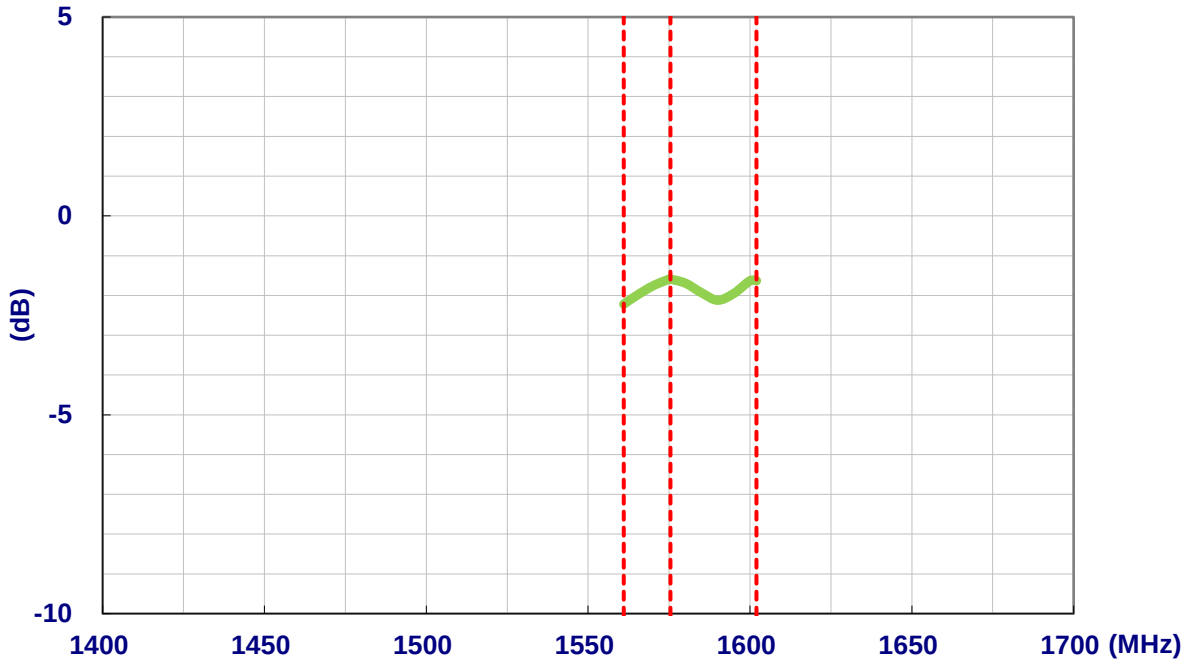
3.2.3. Impedance – GNSS Antenna



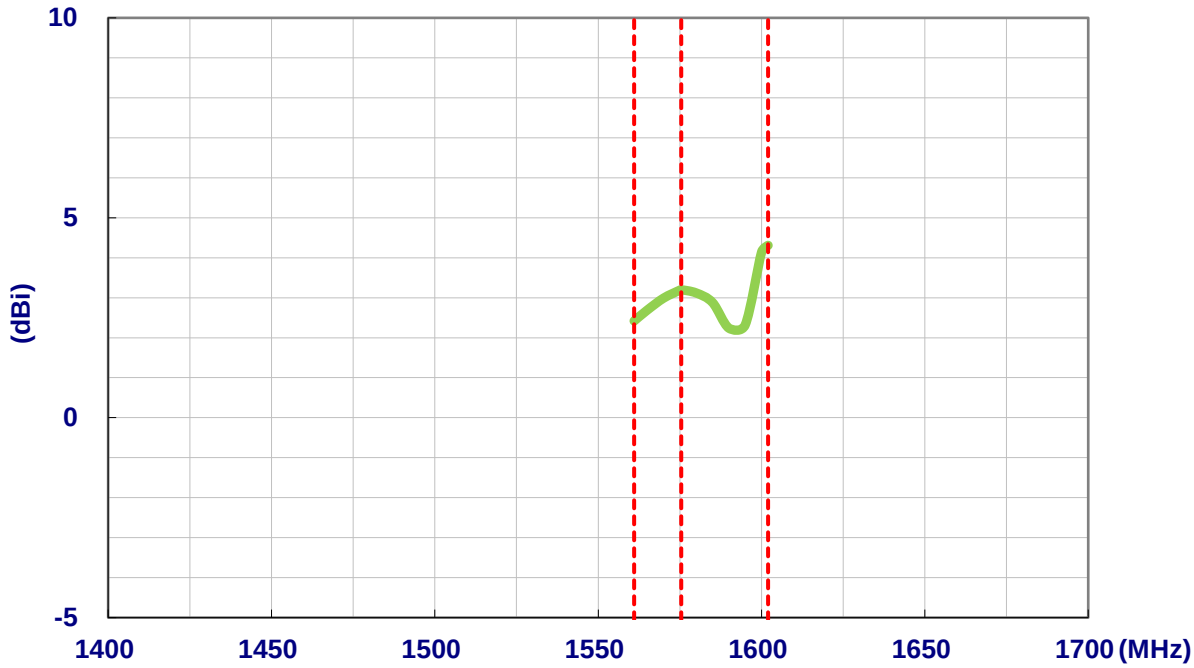
3.2.4. Efficiency – GNSS Antenna (passive measurement)



3.2.5. Average Gain – GNSS Antenna (passive measurement)

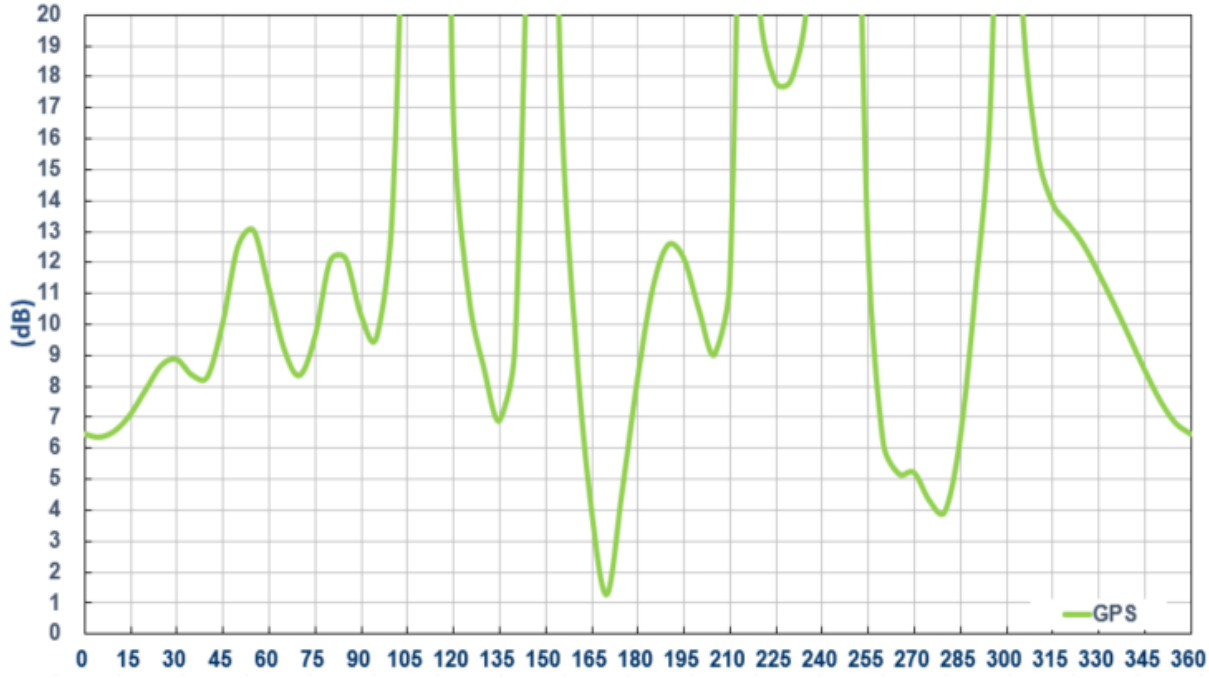


3.2.6. Peak Gain – GNSS Antenna (passive measurement)

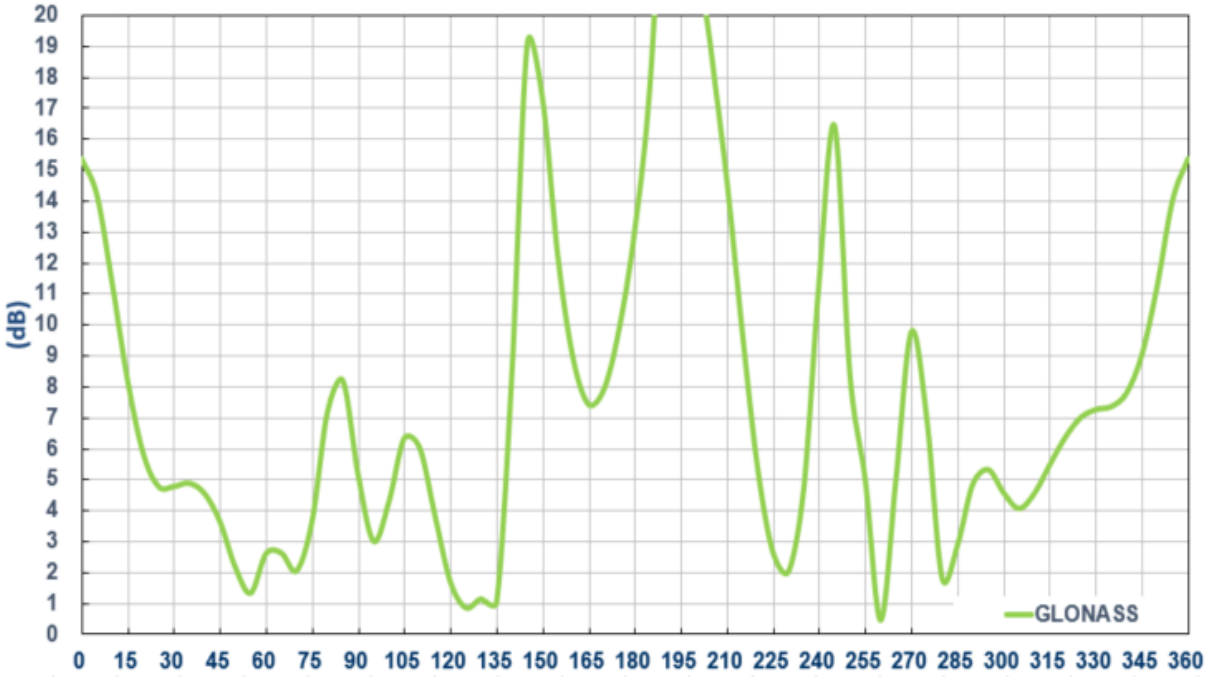


3.2.7. Axial Ratio – GNSS Antenna (Zenith is at 0°)

Axial Ratio at GPS L1 (1575.42 MHz)

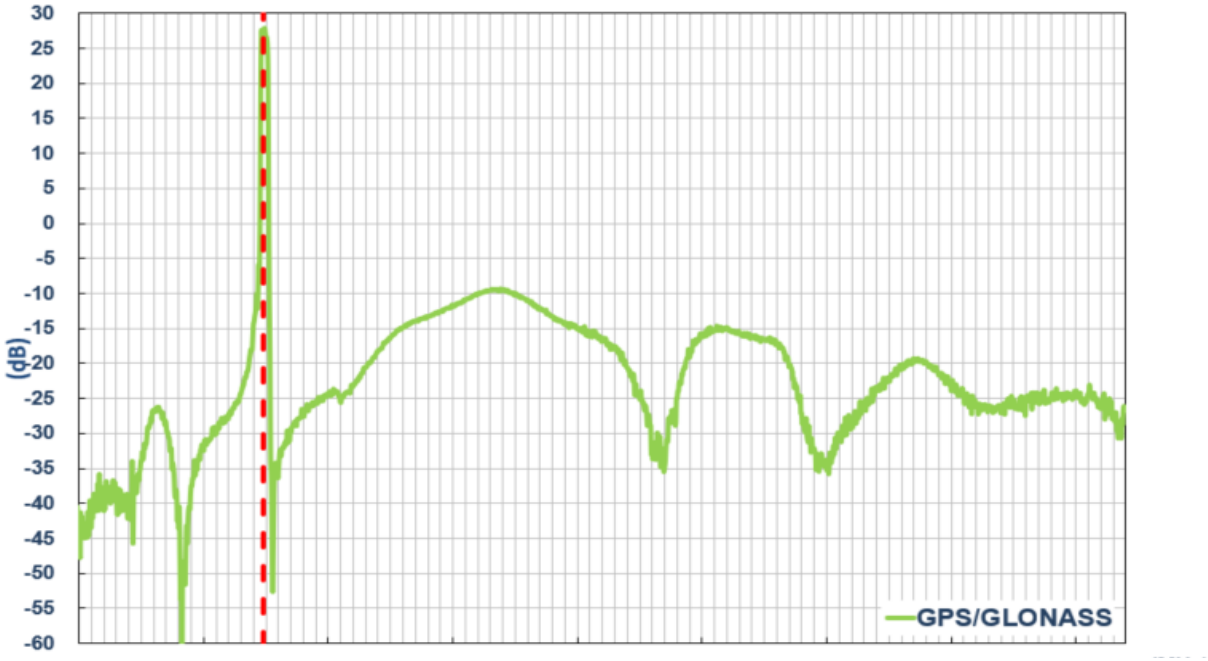


Axial Ratio at GLONASS L1 (1575.42 MHz)



3.2.8. GNSS Antenna Active Measurements

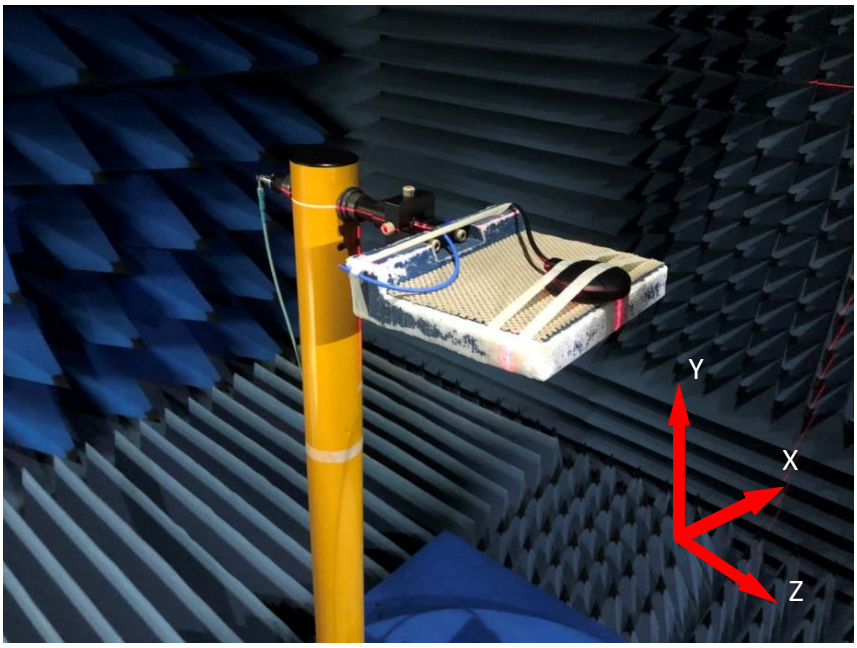
LNA Gain @ 3.0V



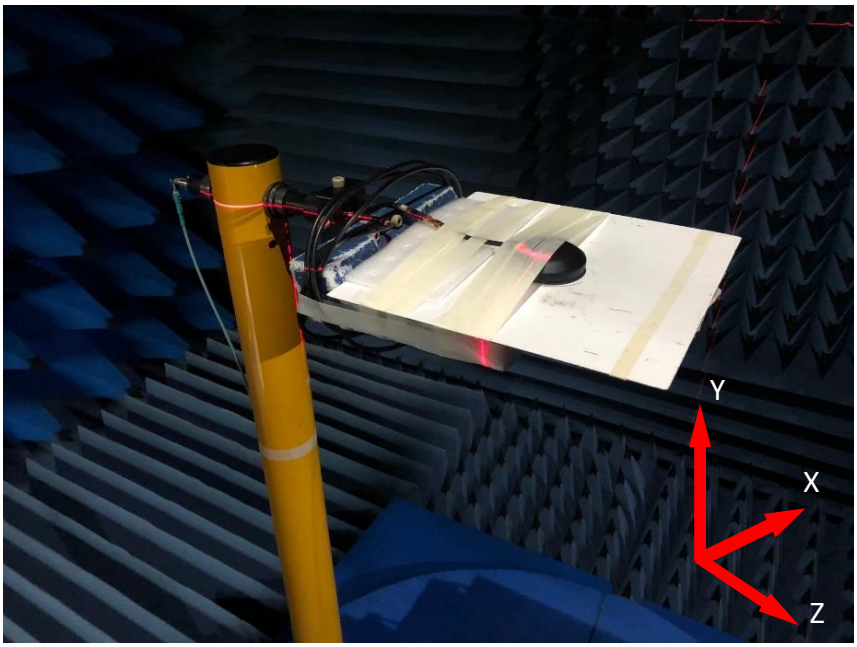
LNA Gain and Noise Figure @ 3.0V

4. Antenna Radiation Patterns

4.1 Test Setup



Free space

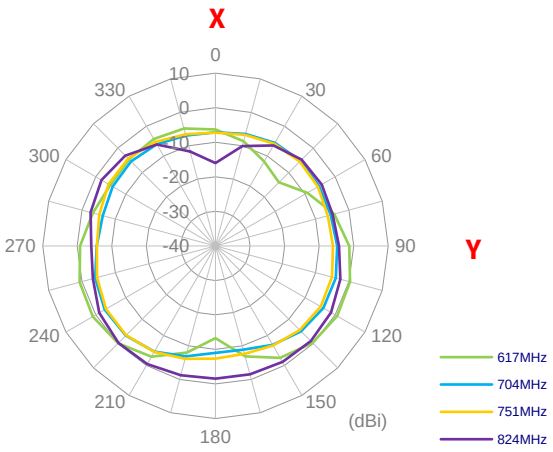


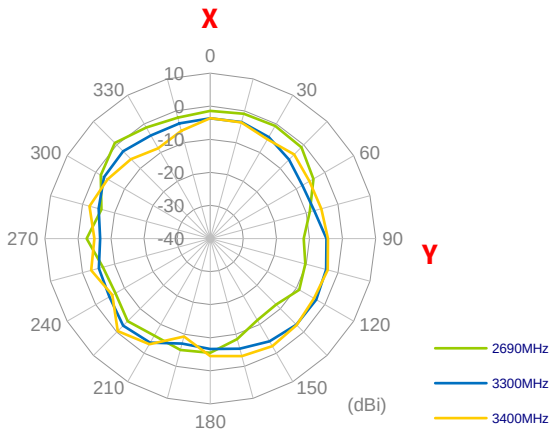
On 30*30cm GND

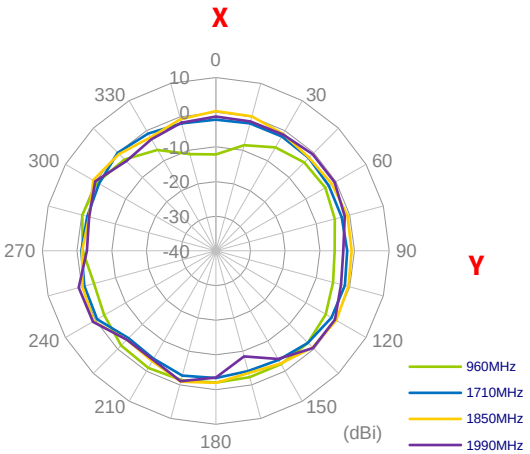
4.2 2D Radiation Patterns

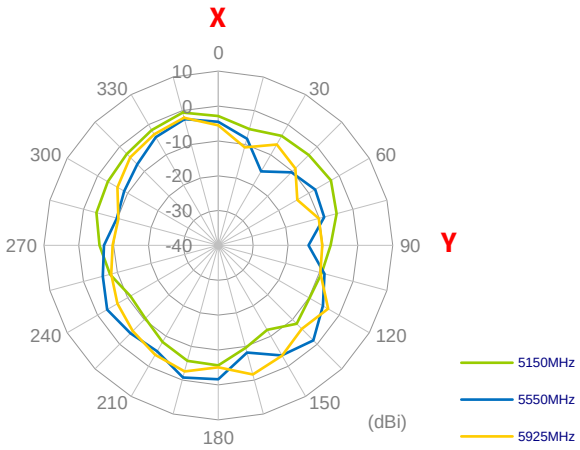
4.2.1. LTE_Free Space

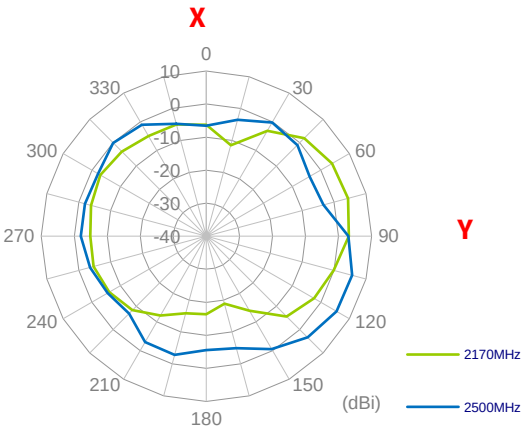
XY Plane



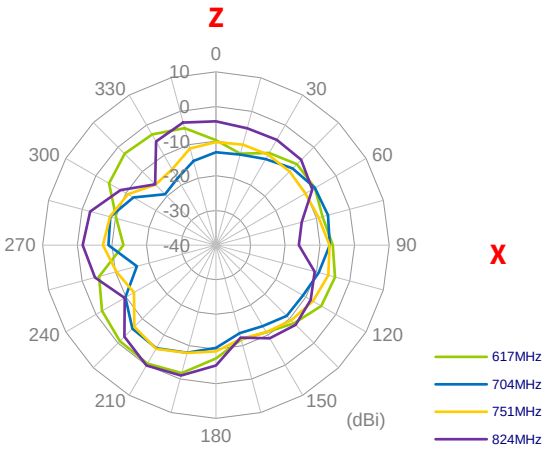








XZ Plane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(dBi)
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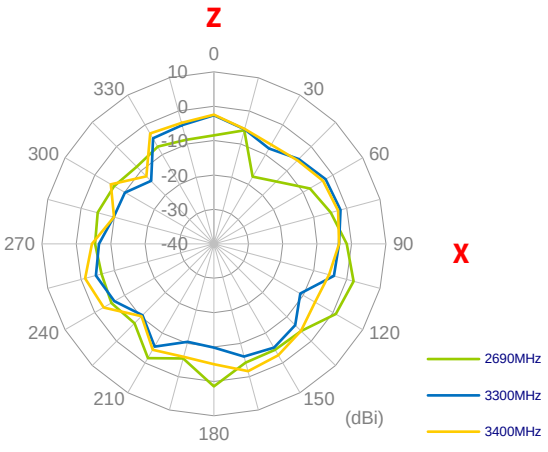
704MHz
751MHz
824MHz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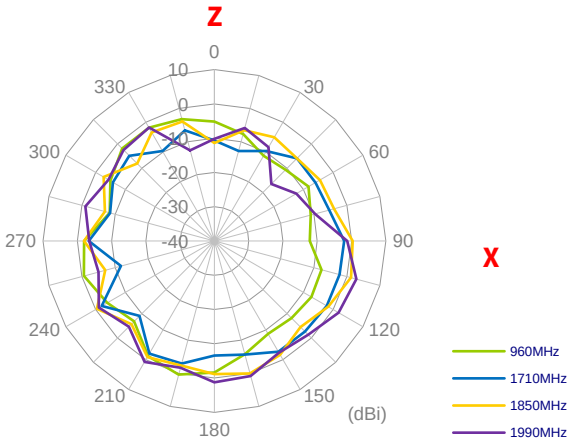
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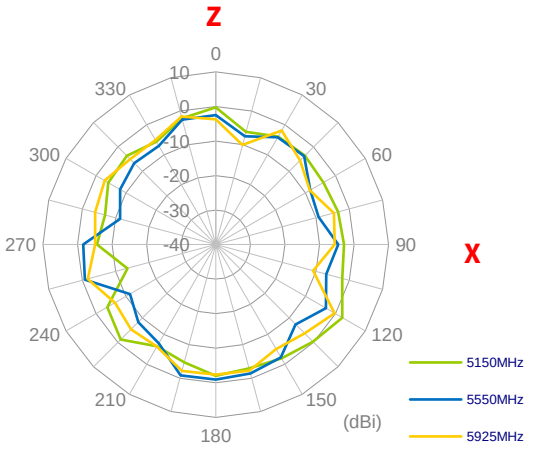
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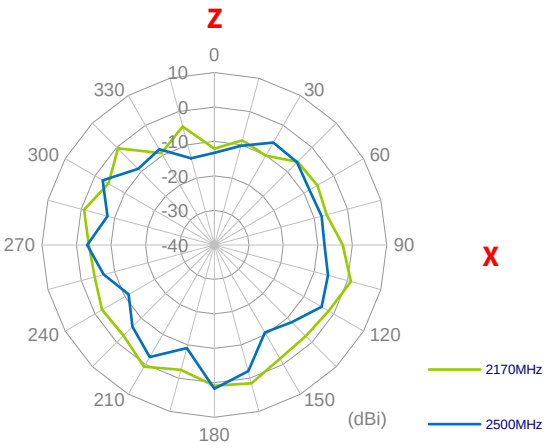
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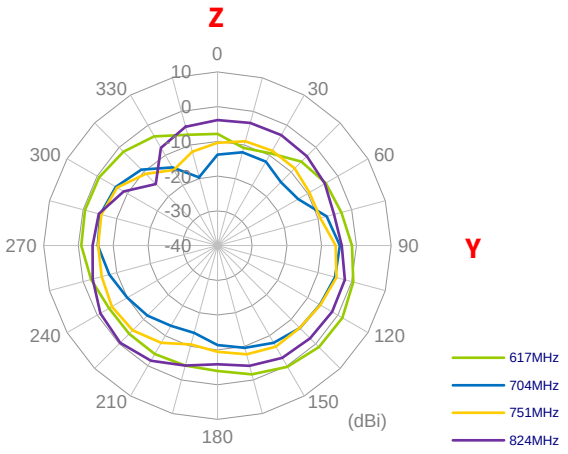
(dBi)
2170MHz
2500MHz

YZ Plane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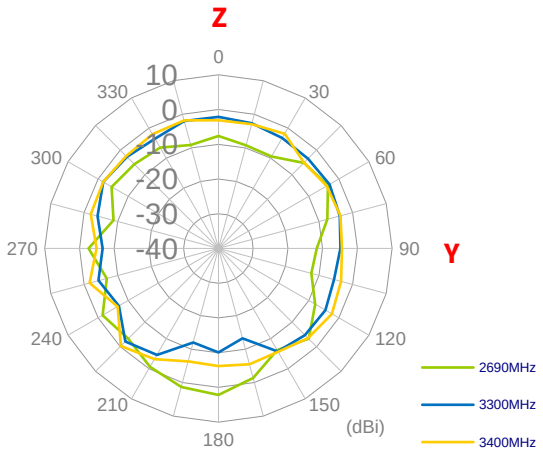
751MHz
824MHz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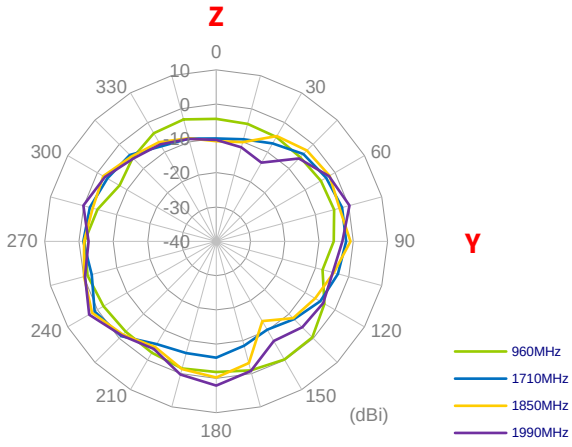
3400MHz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(dBi)
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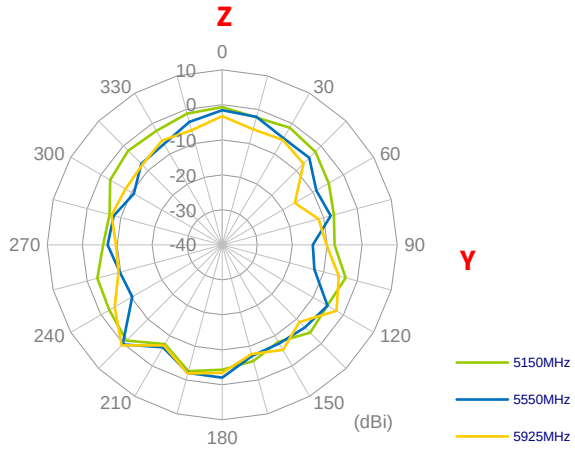
1710MHz
1850MHz
1990MHz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(dBi)
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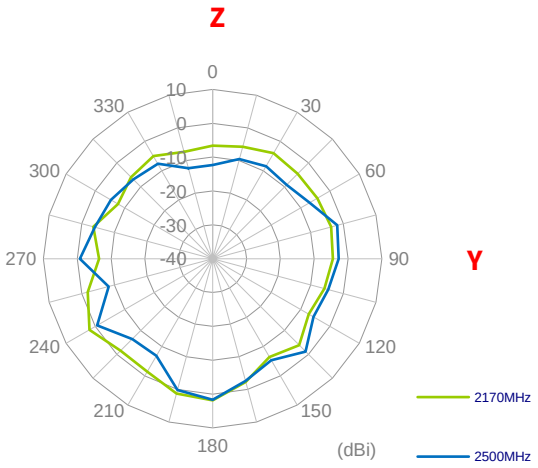
5550MHz
5925MHz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-10
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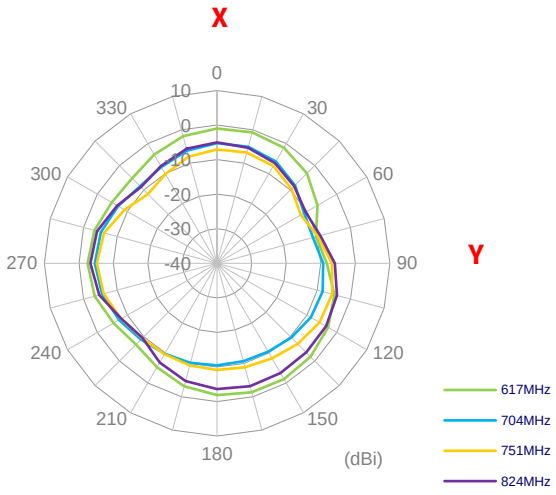
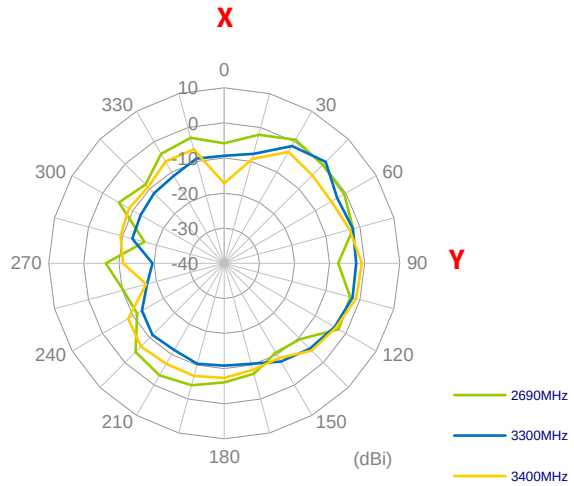
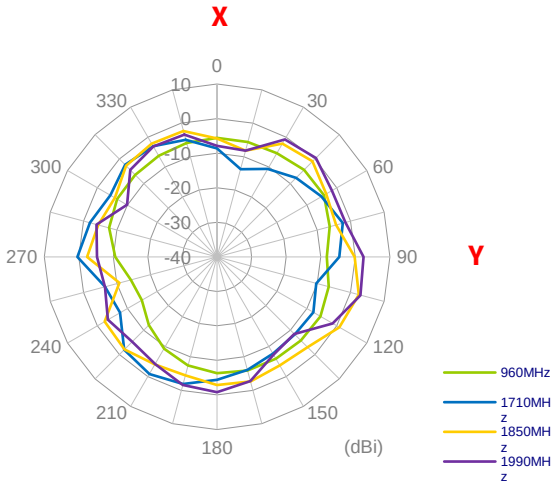
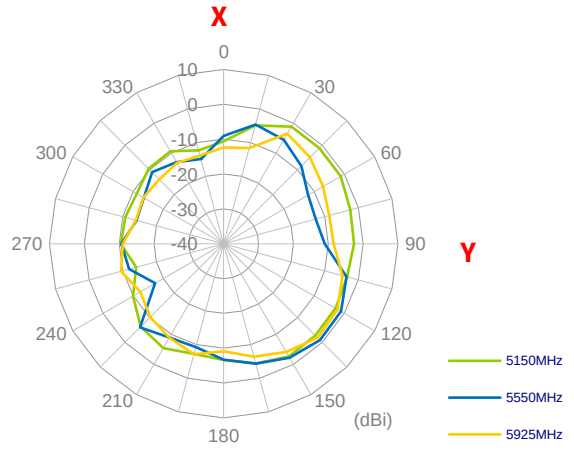
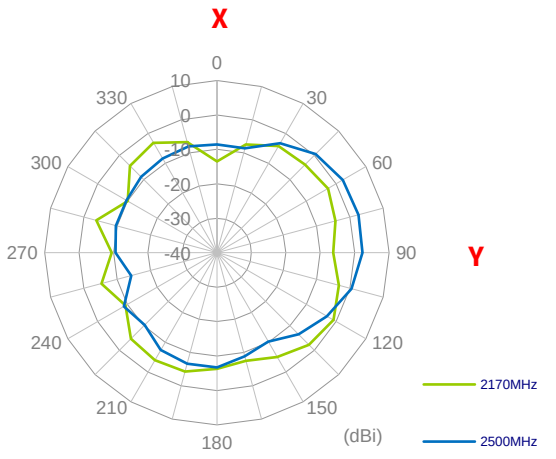
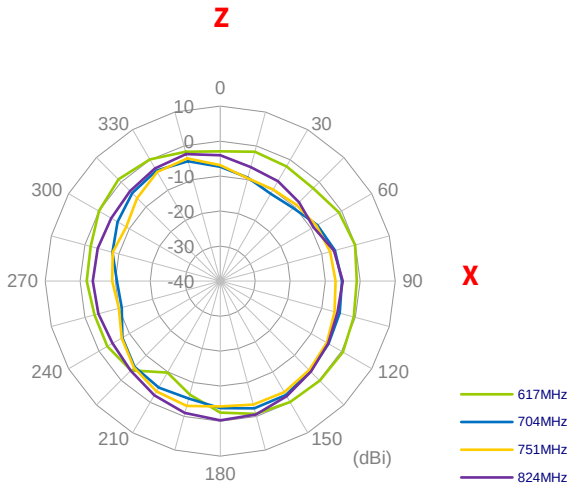
-40
(dBi)
2170MHz
2500MHz

4.2.2. LTE_On 30x30cm GND

XY Plane	
	
	
	

XZ Plane


Z
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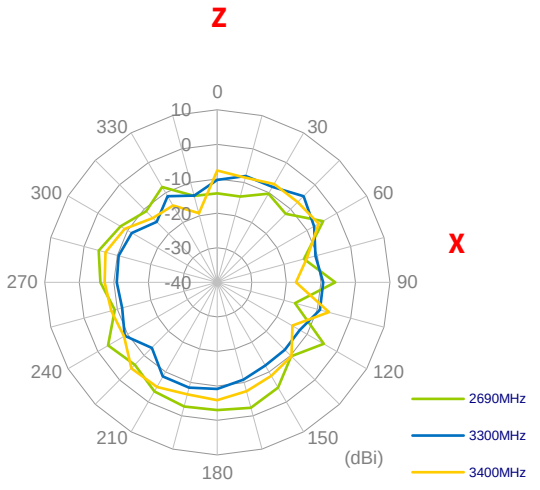
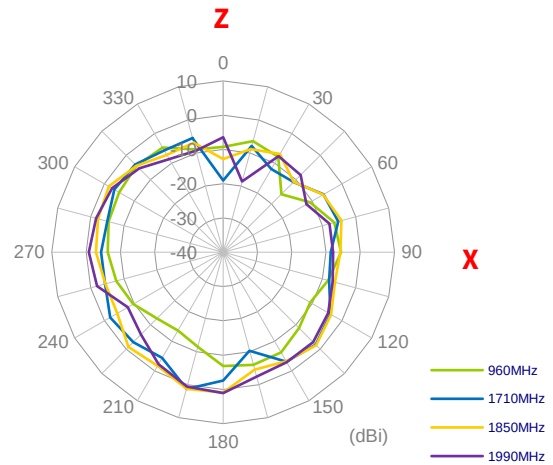
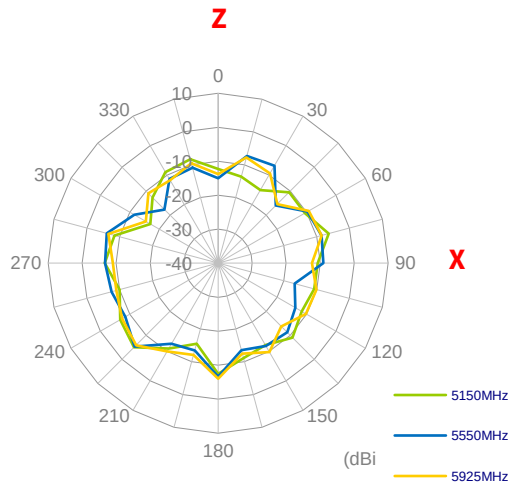
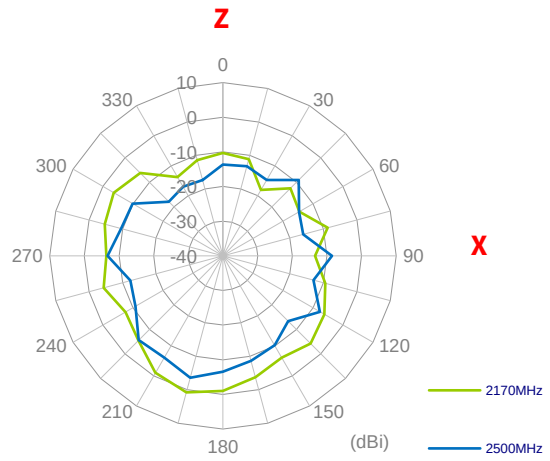
-10
-20
-30
-40
(dBi)
617MHz
704MHz
751MHz
824MHz

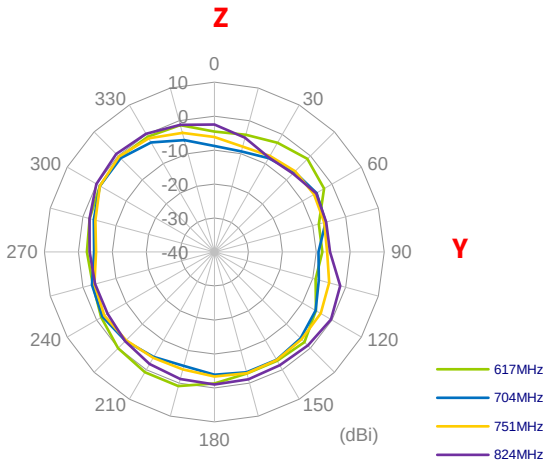

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
2690MHz
3300MHz
3400MHz

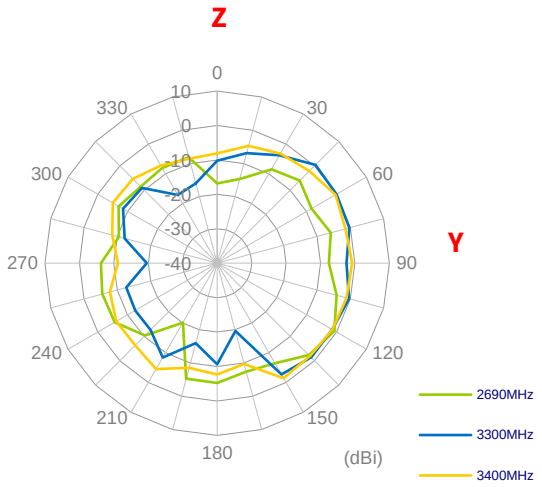

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
960MHz
1710MHz
1850MHz
1990MHz

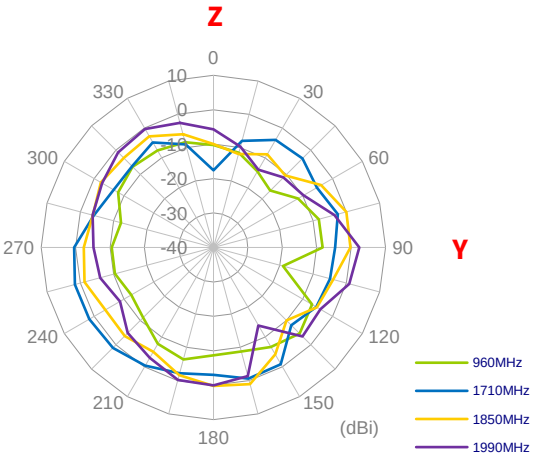

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi
5150MHz
5550MHz
5925MHz

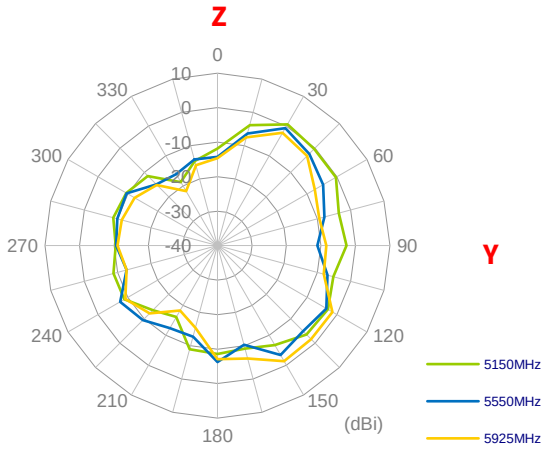

Z
X
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
2170MHz
2500MHz

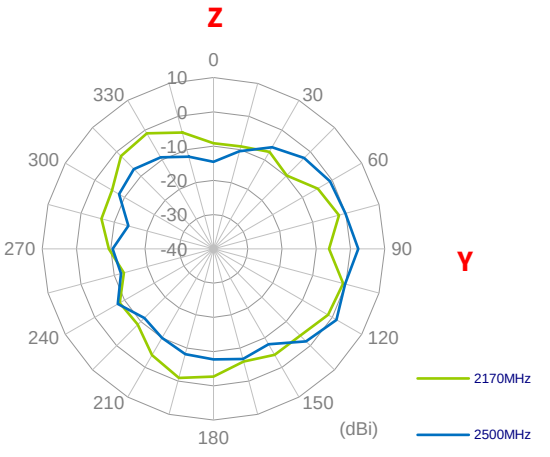
YZ Plane


Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
617MHz
704MHz
751MHz
824MHz


Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
2690MHz
3300MHz
3400MHz

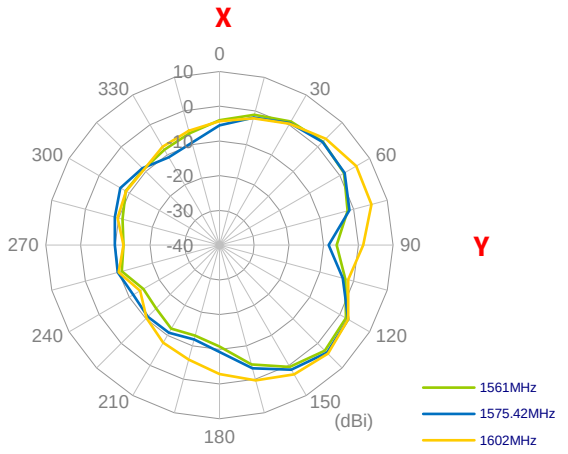

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
960MHz
1710MHz
1850MHz
1990MHz


Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
5150MHz
5550MHz
5925MHz

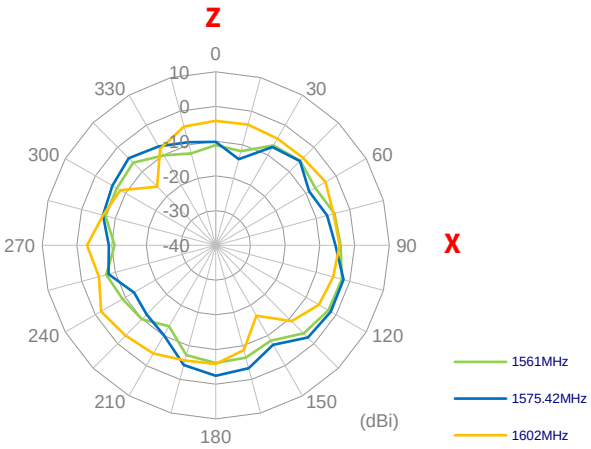

Z
Y
0
30
60
90
120
150
180
210
240
270
300
330
10
0
-10
-20
-30
-40
(dBi)
2170MHz
2500MHz

4.2.3. GNSS

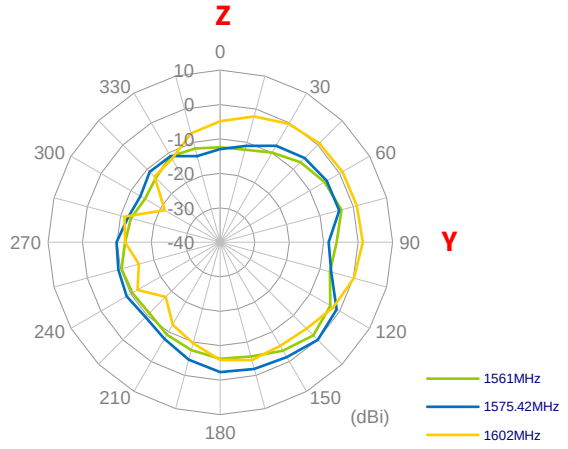
XY Plane



XZ Plane

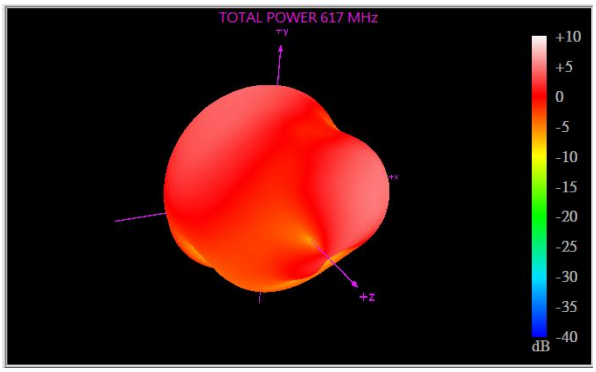


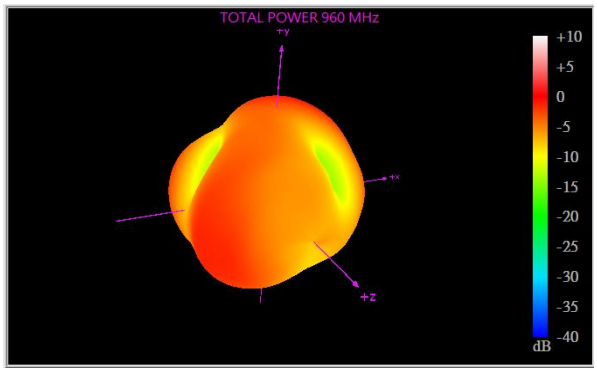
YZ Plane

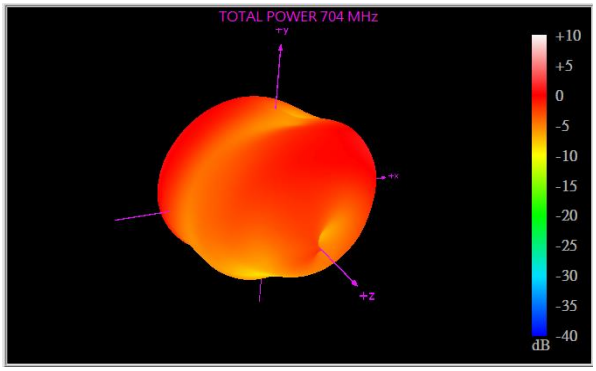


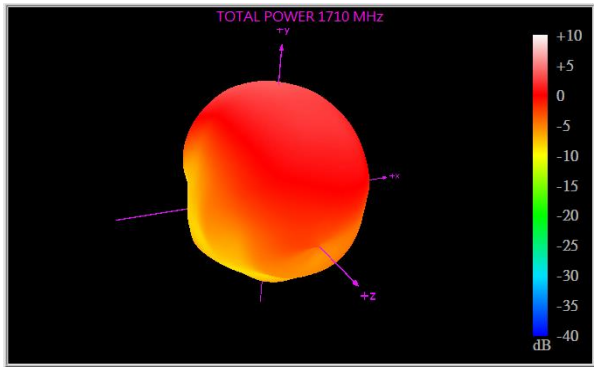
4.3 3D Radiation Patterns

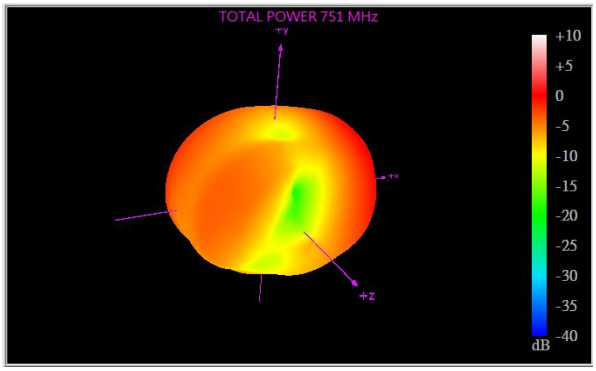
4.3.1. LTE

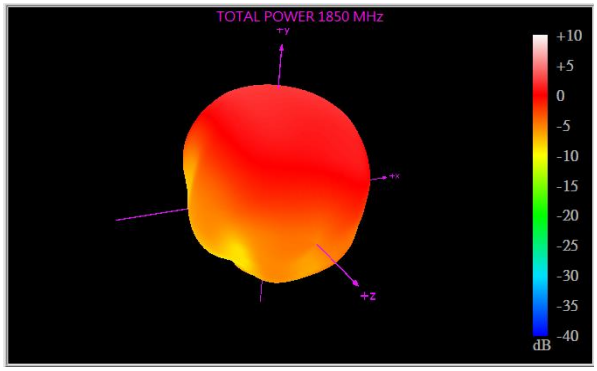


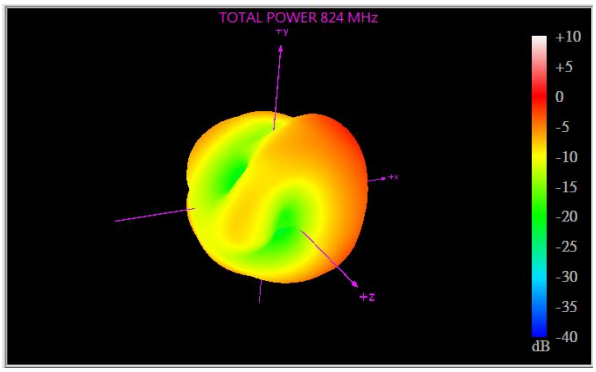


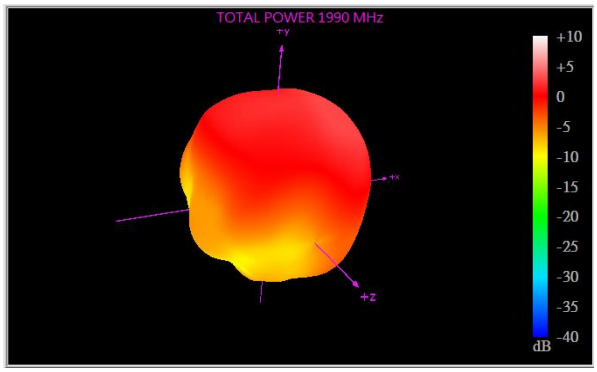


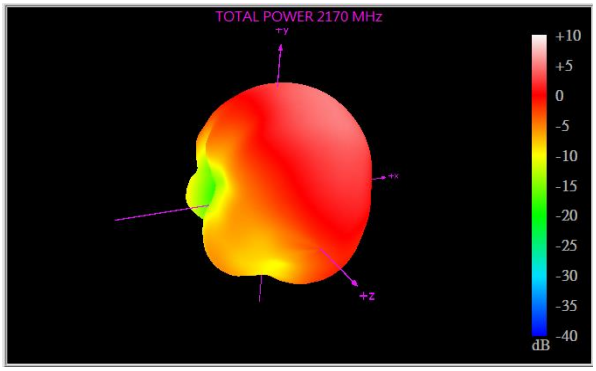


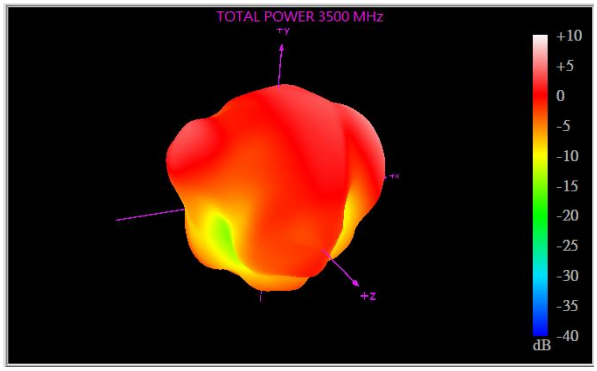


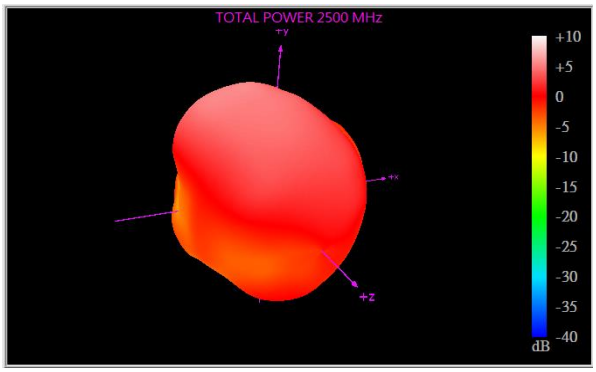


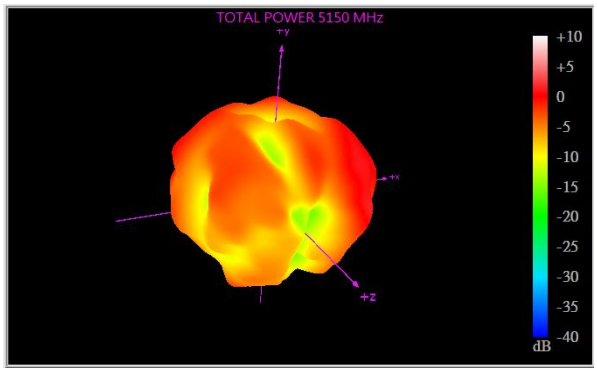


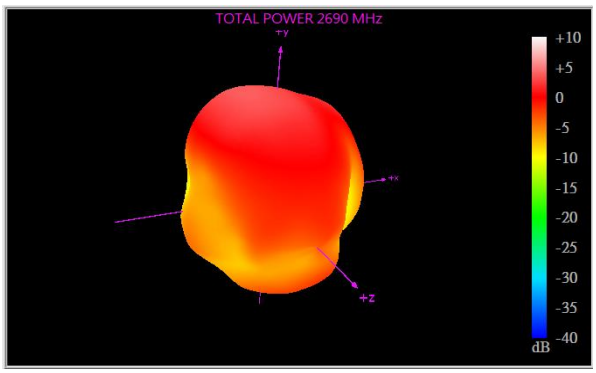


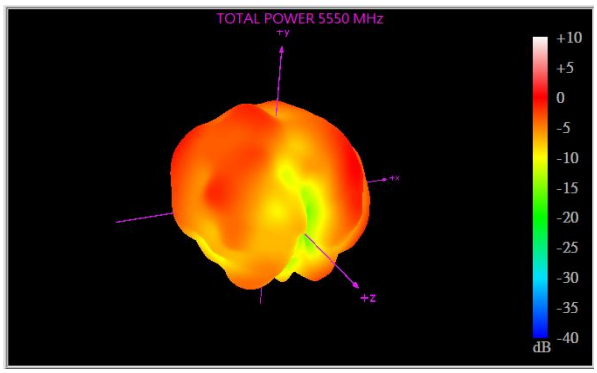

TOTAL POWER 2170 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB

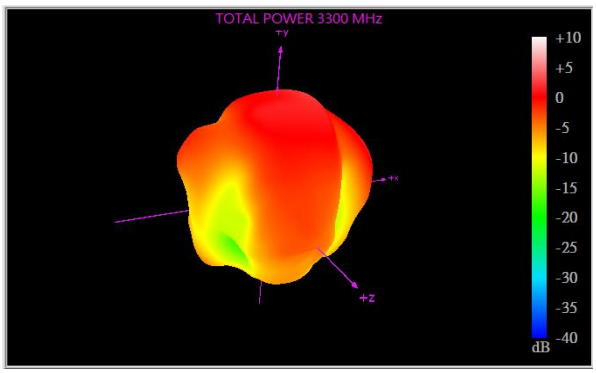

TOTAL POWER 3500 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB

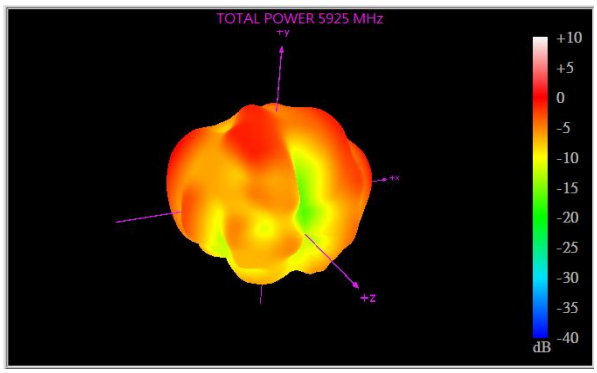

TOTAL POWER 2500 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB

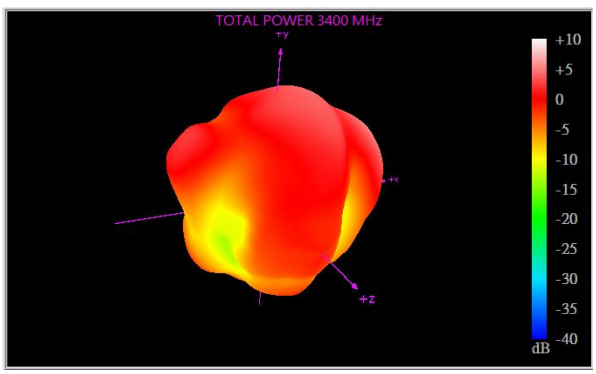

TOTAL POWER 5150 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB


TOTAL POWER 2690 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB

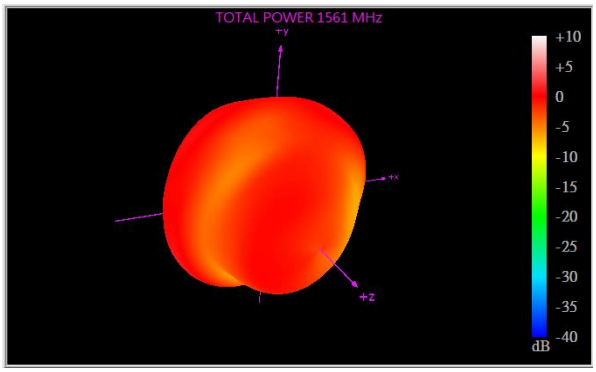

TOTAL POWER 5550 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB

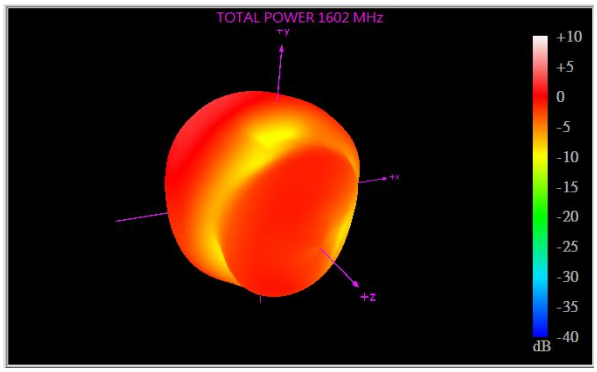

TOTAL POWER 3300 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB

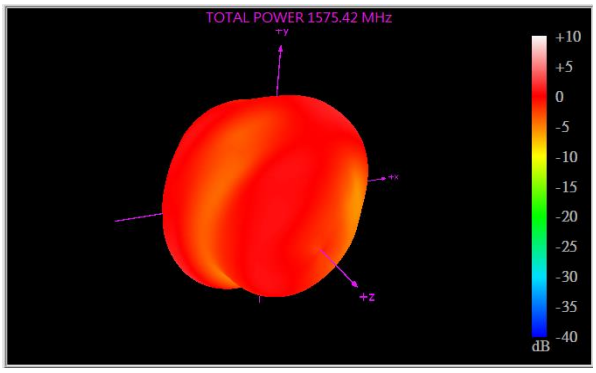

TOTAL POWER 5925 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB


TOTAL POWER 3400 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB

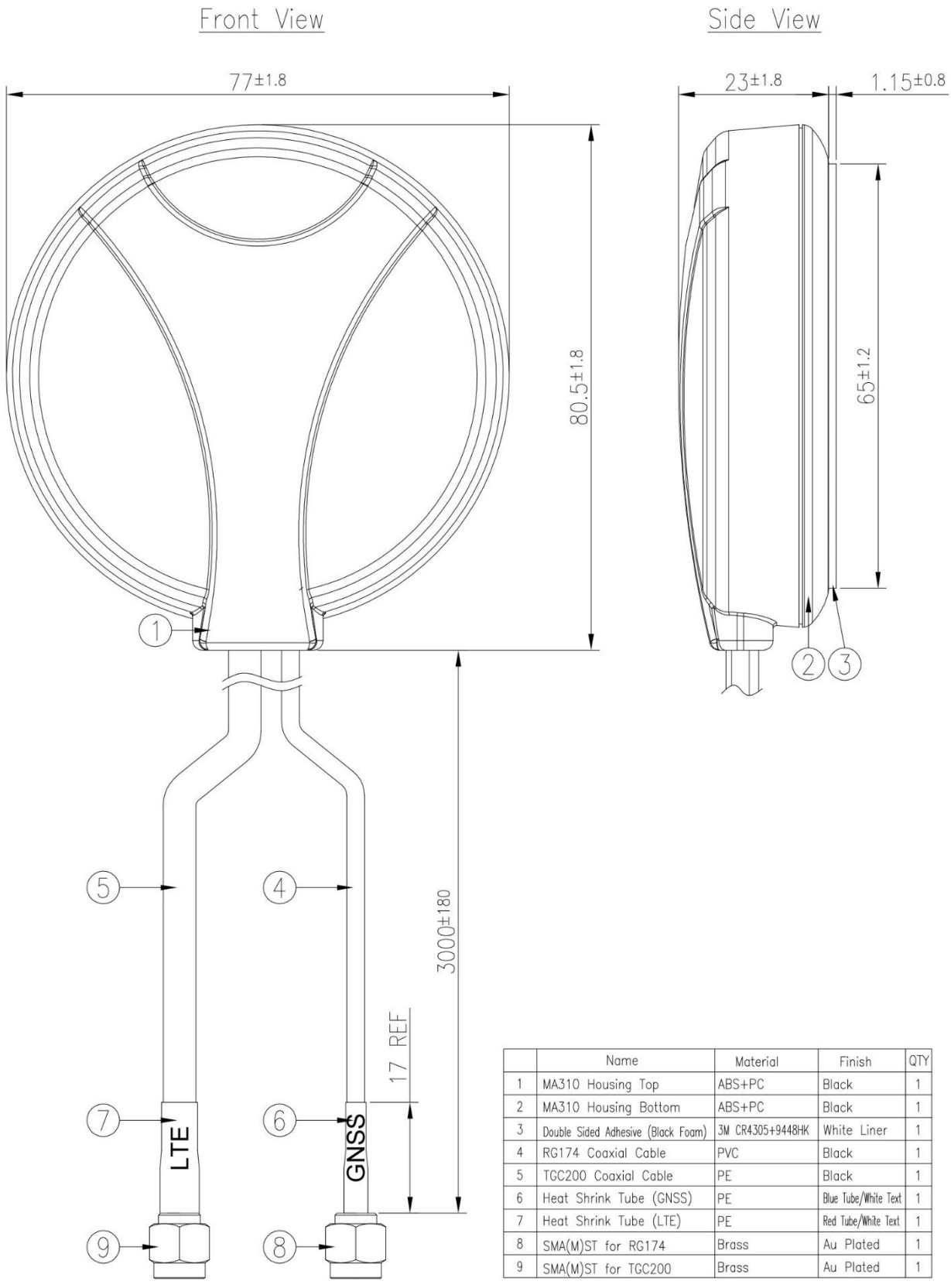
4.3.2. GNSS


TOTAL POWER 1561 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB


TOTAL POWER 1602 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB


TOTAL POWER 1575.42 MHz
+y
+x
+z
+10
+5
0
-5
-10
-15
-20
-25
-30
-35
-40
dB

5. Mechanical Drawing (Units: mm)

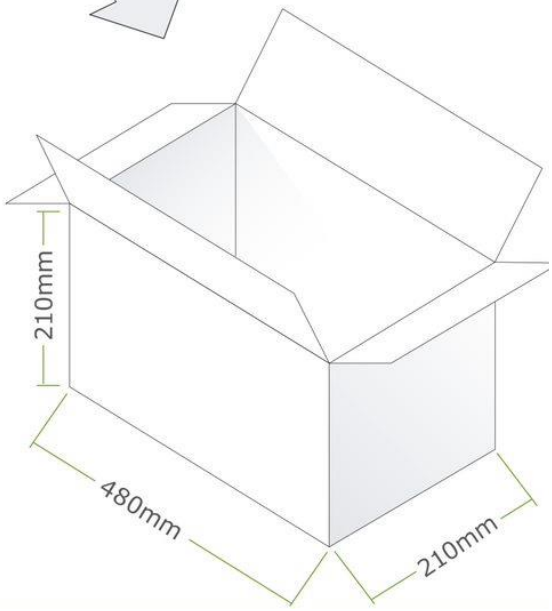


	Name	Material	Finish	QTY
1	MA310 Housing Top	ABS+PC	Black	1
2	MA310 Housing Bottom	ABS+PC	Black	1
3	Double Sided Adhesive (Black Foam)	3M CR4305+9448HK	White Liner	1
4	RG174 Coaxial Cable	PVC	Black	1
5	TGC200 Coaxial Cable	PE	Black	1
6	Heat Shrink Tube (GNSS)	PE	Blue Tube/White Text	1
7	Heat Shrink Tube (LTE)	PE	Red Tube/White Text	1
8	SMA(M)ST for RG174	Brass	Au Plated	1
9	SMA(M)ST for TGC200	Brass	Au Plated	1

6. Packaging

1pc MA310.A.LB.003 per PE Bag
PE Bag Dimensions - 240*180mm
Weight - 0.22Kg

10 Large PE Bags per Carton
Box Dimensions - 480*210*210mm
Weight - 2.9Kg

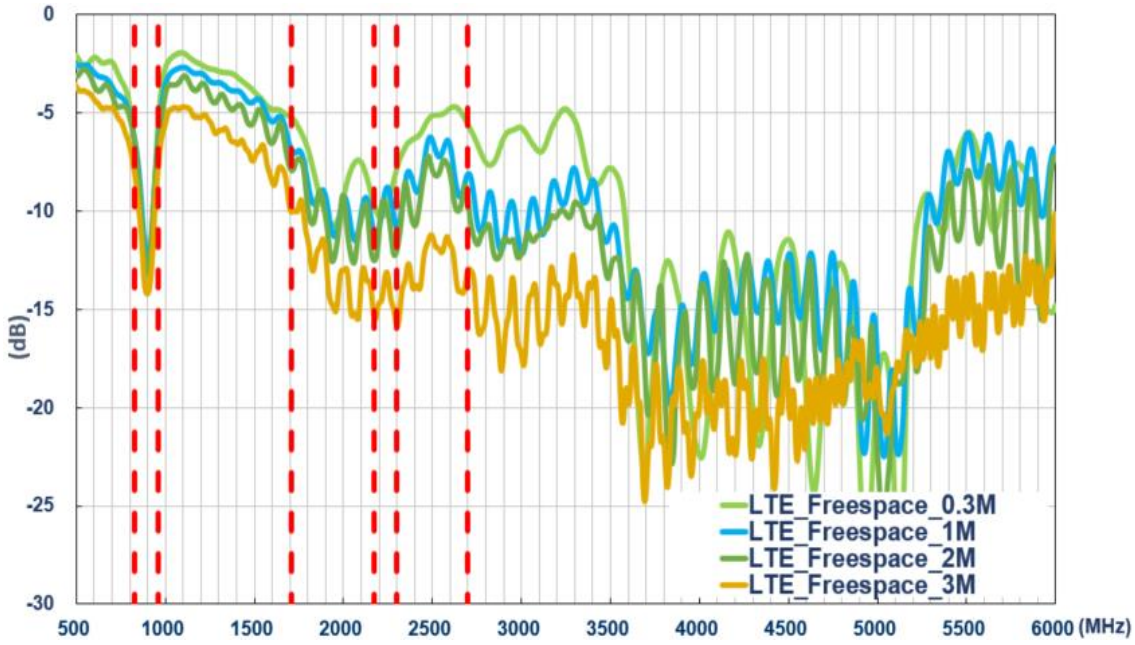


7. Application Note

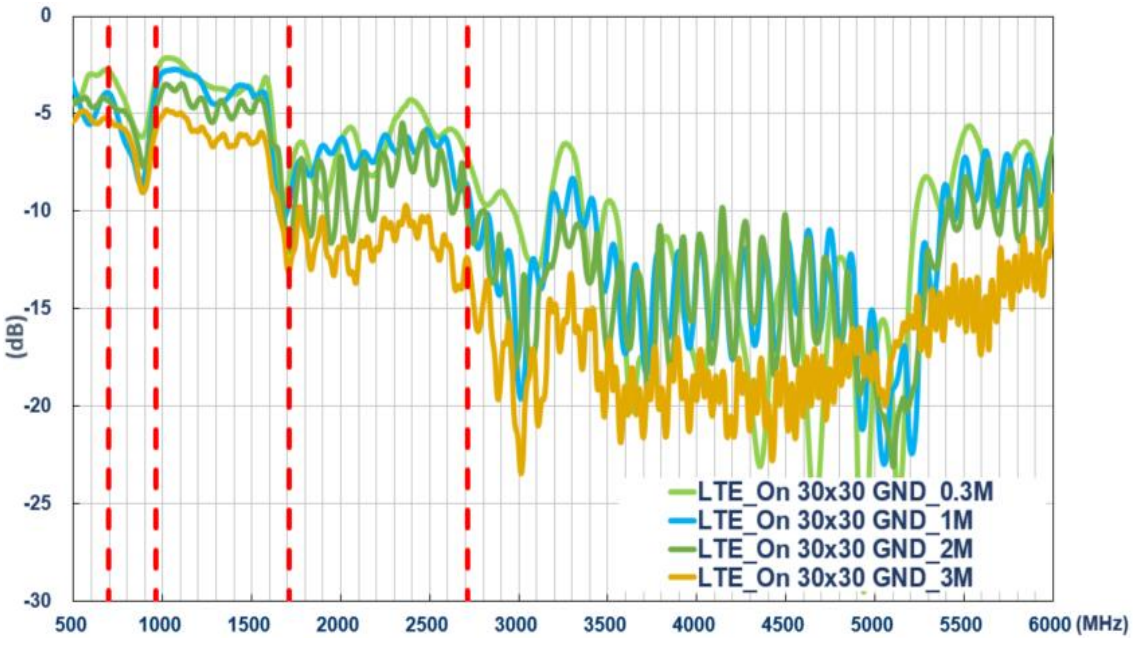
The MA310.A.LB.003 antenna performance with different cable lengths is shown below.

7.1 Return Loss

Return Loss – LTE Antenna (Free Space)

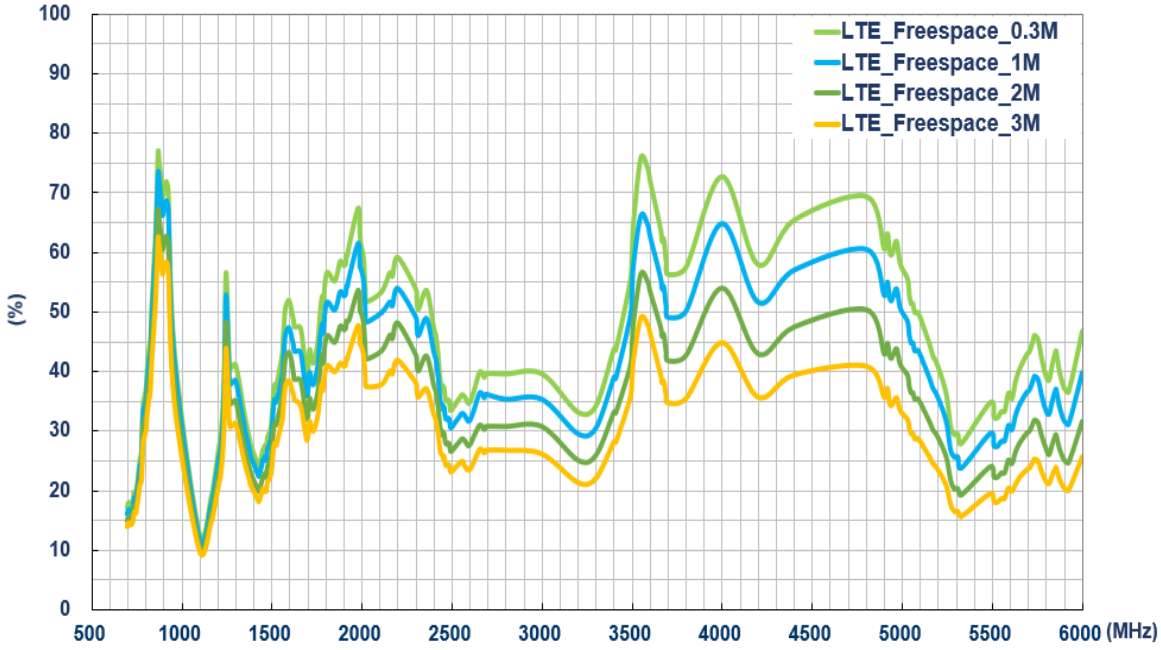


Return Loss – LTE Antenna (On 30*30cm GND)

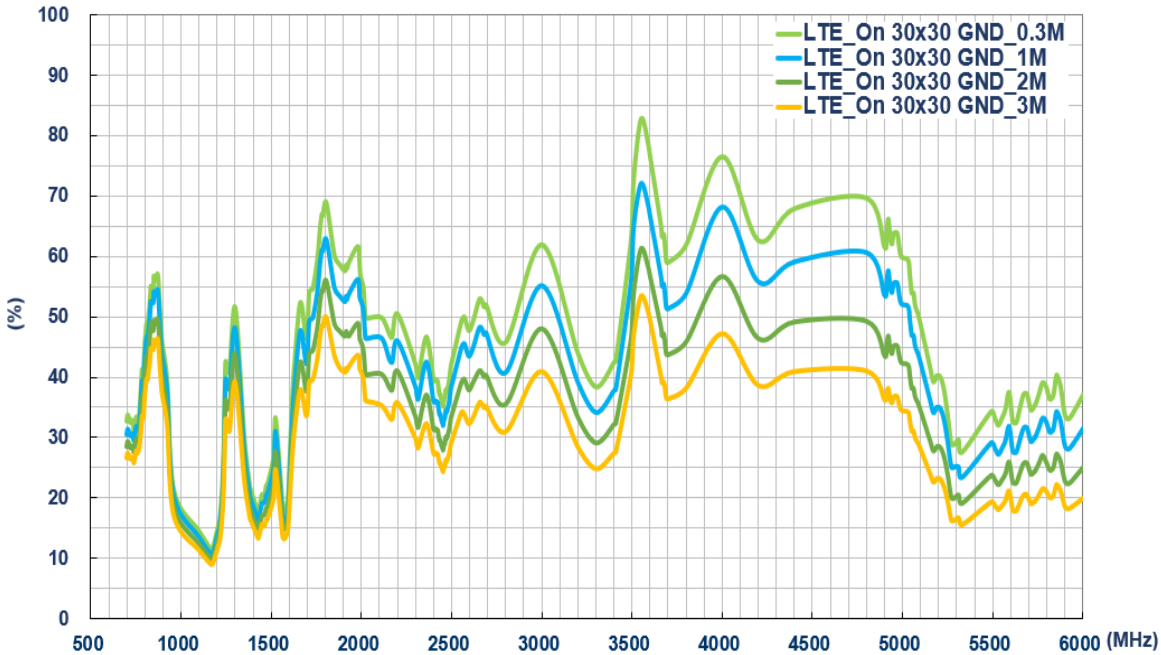


7.2 Efficiency

Efficiency – LTE Antenna (Free Space)

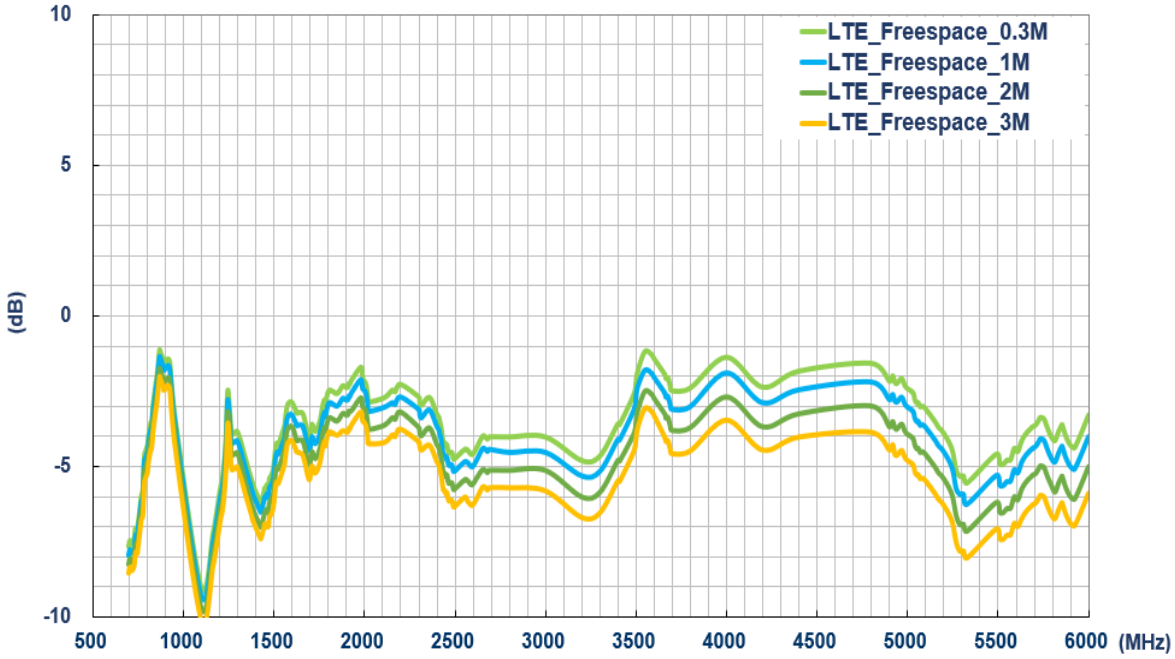


Efficiency – LTE Antenna (On 30*30 GND)

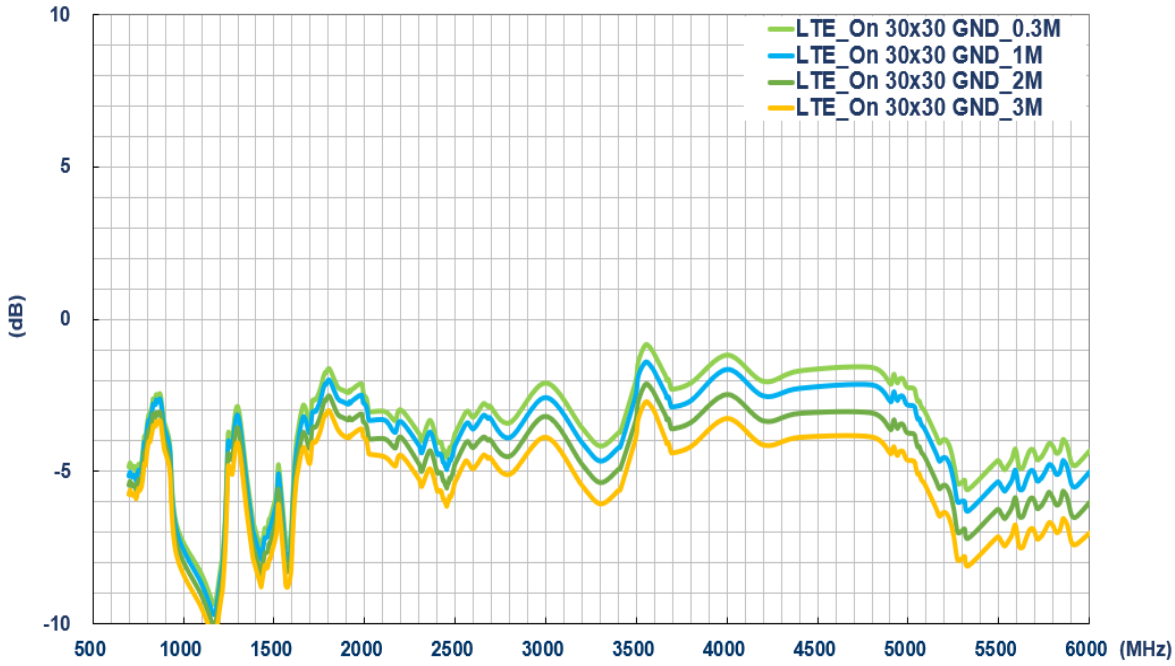


7.3 Average Gain

Average Gain – LTE Antenna (Free Space)

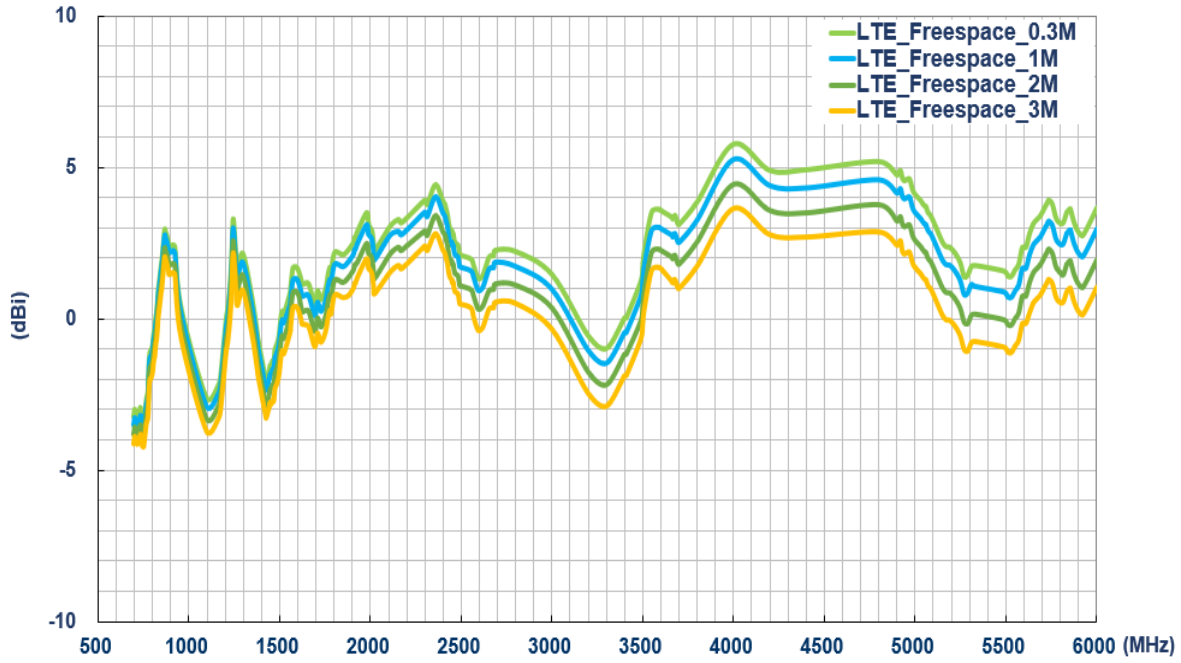


Average Gain – LTE Antenna (On 30*30cm GND)

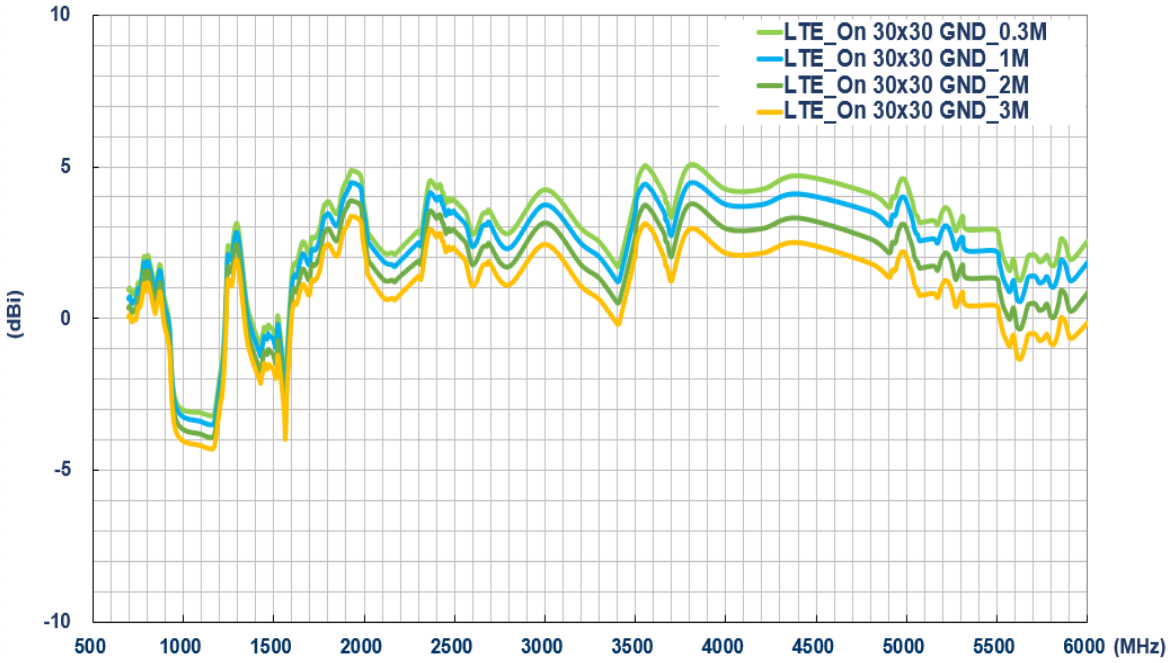


7.4 Peak Gain

Peak Gain – LTE Antenna (Free Space)



Peak Gain – LTE Antenna (On 30*30cm GND)



Changelog for the datasheet

SPE-18-8-089 – MA.310.A.LB.003

Revision: A (Original First Release)	
Date:	2019-02-22
Notes:	Initial Datasheet release
Author:	Yu Kai Yeung

Previous Revisions

Previous Revisions (Continued)

TAOGLAS®

www.taoglas.com

OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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