



# TAOGLAS®



# Datasheet

## Guardian 5in1 Adhesive and Wall Mount Antenna

**Part No:**  
MA952.A.LBIVW.001

### **Description:**

Guardian 5in1 Adhesive and Wall Mount Antenna 4\*LTE GNSS Antenna

### **Features:**

Low-Profile Adhesive Mount Panel Antenna

4\* LTE MIMO 600MHz-6GHz

1\* GPS-GLONASS-GALILEO-BeiDou Antenna

Covering Worldwide LTE Bands

Covering 5G NR Sub 6GHz Bands

Covering CAT-M1 & NB-IoT Bands

Includes 3G / 2G Fallback

IP67 Waterproof ASA Enclosure

Dimensions: 146\*134\*20mm

3m Low Loss KSR200-P and RG-174 Cables with SMA(M) connectors

Cables and Connectors Customizable

RoHS & REACH Compliant

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# 1. Introduction



The MA952 Guardian is a next generation 5in1 combination antenna. It is the world-first panel antenna designed for IoT Gateway and Router devices with multiple wireless technologies. This antenna delivers powerful MIMO antenna technology for LTE and Sub-6GHz 5G bands covering 600MHz - 6GHz. This antenna is designed for LTE bands worldwide (including 3G & 2G fallback) for access points, terminals, and routers. CAT-M1 and NB-IoT and the recently introduced 600MHz Extended LTE Band 71 are also covered. This wide bandwidth enables designers to cover a wide range of technologies by installing a single antenna installation. The MA952 Guardian also covers GPS/GLONASS/BeiDou/Galileo bands along with 4 LTE MIMO antennas for superb location accuracy. It is a heavy-duty, fully IP67 waterproof external M2M antenna available in both wall and adhesive mount versions.

Typical use cases include:

- IoT Gateways and Routers
- HD Video Streaming
- Transportation

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 L1 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 3M adhesive. The antenna can be mounted internally or externally on a vehicle. The MA952 comes with 3m, low loss KSR200-P coaxial cables for the LTE antennas as standard and 3m, RG-174 on the GNSS connection. Customized cables and connector versions are also available. Contact your regional Taoglas customer support for more information on how to integrate the MA952 or sales support.

## 2. Specifications

GNSS Frequency Band							
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	E1 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					
	□	■					

GNSS ELECTRICAL			
Frequency (MHz)	1561	1575.42	1602
VSWR (max.)	2.0:1	2.0:1	2.0:1
Passive Antenna Efficiency (%) (Without cable loss)	63	48	57
Passive Antenna Gain at Zenith (dBi) (Without cable loss)	3	1.98	3.01
Axial Ratio (dB)	<9.7	<14.2	<5.9
Polarization	RHCP		
Impedance	50Ω		
Cable	RG174, 3 meter standard, fully customizable		
Connector	SMA(M) standard, fully customizable		

<b>LNA and Filter Electrical Properties</b>			
<b>Frequency (MHz)</b>	1561	1575.42	1602
<b>VSWR (max.)</b>	2.0:1	2.0:1	2.0:1
<b>Gain@1.8V (Typ.)</b>	28 dB	28 dB	28 dB
<b>Gain@3.0V (Typ.)</b>	30 dB	30 dB	30 dB
<b>Gain@5.5V (Typ.)</b>	33 dB	33 dB	33 dB
<b>Noise@1.8V (Typ.)</b>	1.13 dB	1.13 dB	1.13 dB
<b>Noise@3.0V (Typ.)</b>	1.13 dB	1.13 dB	1.13 dB
<b>Noise@5.5V (Typ.)</b>	1.14 dB	1.14 dB	1.14 dB
<b>Power consumption@1.8V (Typ.)</b>	7.9 mA		
<b>Power consumption@3.0V (Typ.)</b>	9.0 mA		
<b>Power consumption@5.5V (Typ.)</b>	9.9 mA		
<b>Total Specification (Through Antenna, SAW Filter and LNA)</b>			
<b>Frequency (MHz)</b>	1561	1575.42	1602
<b>Gain@3V (dBi)</b>	28 ± 3	28 ± 3	28 ± 3
<b>Output Impedance</b>	50 Ω		

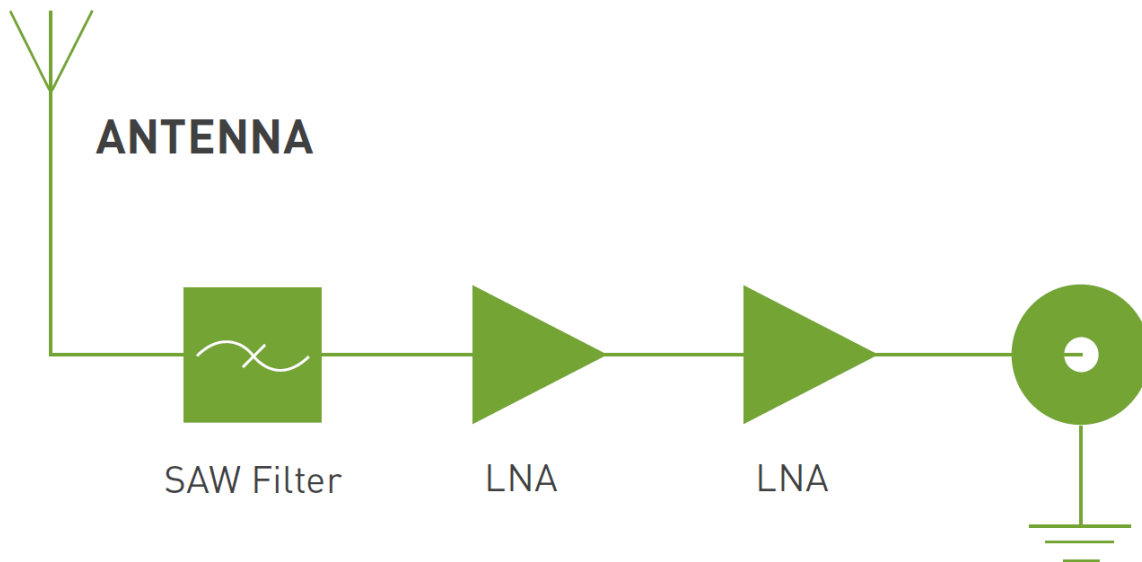
### LTE Antenna

Frequency (MHz)		5G NR Band 71	LTE700	GSM850/900	5G NR Band 74, 75, 76	DCS	PCS	UMTS1	LTE2600	5G NR Band 77, 78, 79	LTE5200/WiFi5800
		617 ~698	698 ~806	824 ~960	1427 ~1518	1710 ~1880	1850 ~1990	1920 ~2170	2490 ~2690	3300 ~3500	5150 ~5925
<b>Efficiency (%)</b>											
MIMO 1	3m	33.03	42.85	54.27	56.48	62.58	57.98	55.61	57.04	43.44	32.23
MIMO 2	3m	39.89	55.17	56.75	45.73	48.59	43.62	41.21	40.46	37.88	32.60
MIMO 3	3m	46.38	51.55	55.06	43.81	46.39	45.05	44.82	51.22	42.86	34.02
MIMO 4	3m	32.78	34.87	35.74	49.14	61.44	58.48	54.84	53.27	42.94	28.30
<b>Average Gain (dB)</b>											
MIMO 1	3m	-4.81	-3.68	-2.65	-2.48	-2.04	-2.37	-2.55	-2.44	-3.62	-4.92
MIMO 2	3m	-3.99	-2.58	-2.46	-3.40	-3.13	-3.60	-3.85	-3.93	-4.22	-4.87
MIMO 3	3m	-3.34	-2.88	-2.59	-3.58	-3.34	-3.46	-3.49	-2.91	-3.68	-4.68
MIMO 4	3m	-4.84	-4.58	-4.47	-3.09	-2.12	-2.33	-2.61	-2.74	-3.67	-5.48
<b>Peak Gain (dBi)</b>											
MIMO 1	3m	1.42	1.28	3.56	3.24	3.55	3.21	3.21	3.11	3.06	3.84
MIMO 2	3m	1.59	2.76	3.38	3.42	3.06	3.06	4.08	4.76	2.07	1.92
MIMO 3	3m	1.93	2.26	2.86	3.12	4.71	4.71	4.32	3.89	2.88	2.39
MIMO 4	3m	1.08	0.76	3.02	3.62	3.11	3.11	2.92	2.77	2.97	2.46
<b>Impedance</b>		50Ω									
<b>Polarization</b>		Linear									
<b>Radiation Pattern</b>		Omni									
<b>Max. input power</b>		2W									

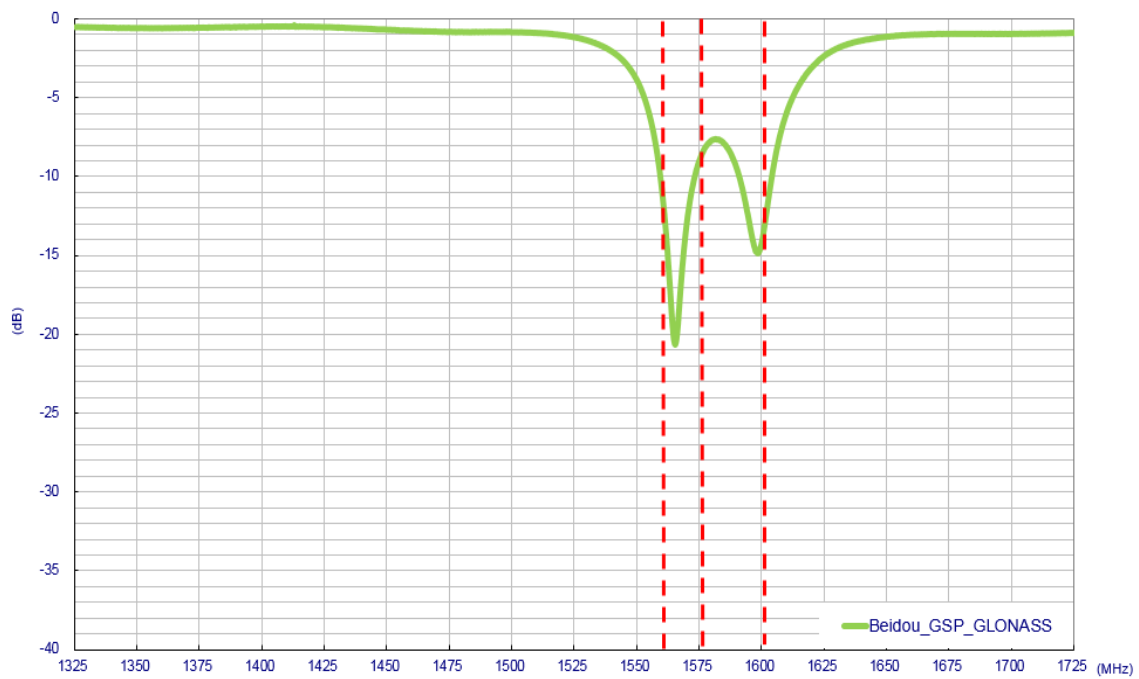
<b>Mechanical</b>	
<b>Height</b>	20 ±2 mm
<b>Planner Dimension</b>	146*134 mm
<b>Casing</b>	ASA
<b>Cable</b>	KSR200-P, 3000 mm for LTE RG-174, 3000mm for GNSS
<b>Connector</b>	SMA(M)
<b>Weight</b>	450g
<b>Environmental</b>	
<b>Protection</b>	IP67
<b>Temperature Range</b>	-40°C to 85°C
<b>Humidity</b>	Non-condensing 65°C 95% RH

### 3. Active Antenna Characteristics

#### 3.1 Block Diagram (Active antenna)

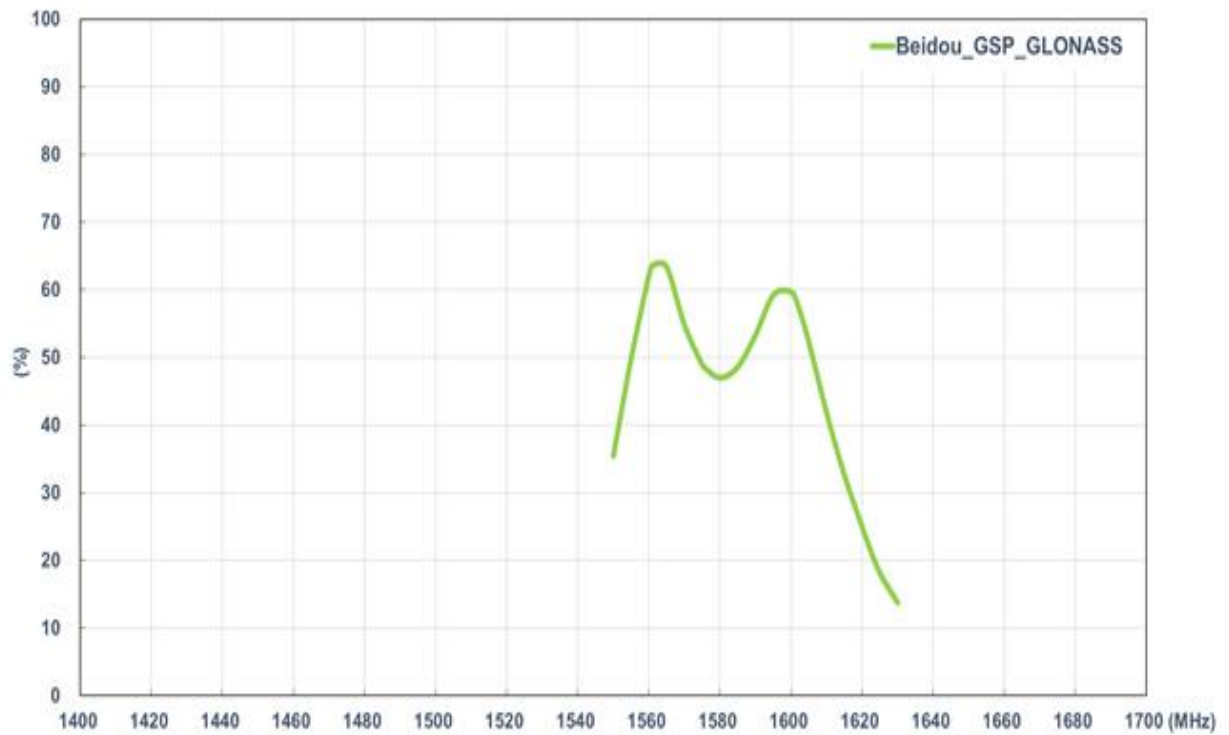


#### 3.2 Passive Antenna Return Loss

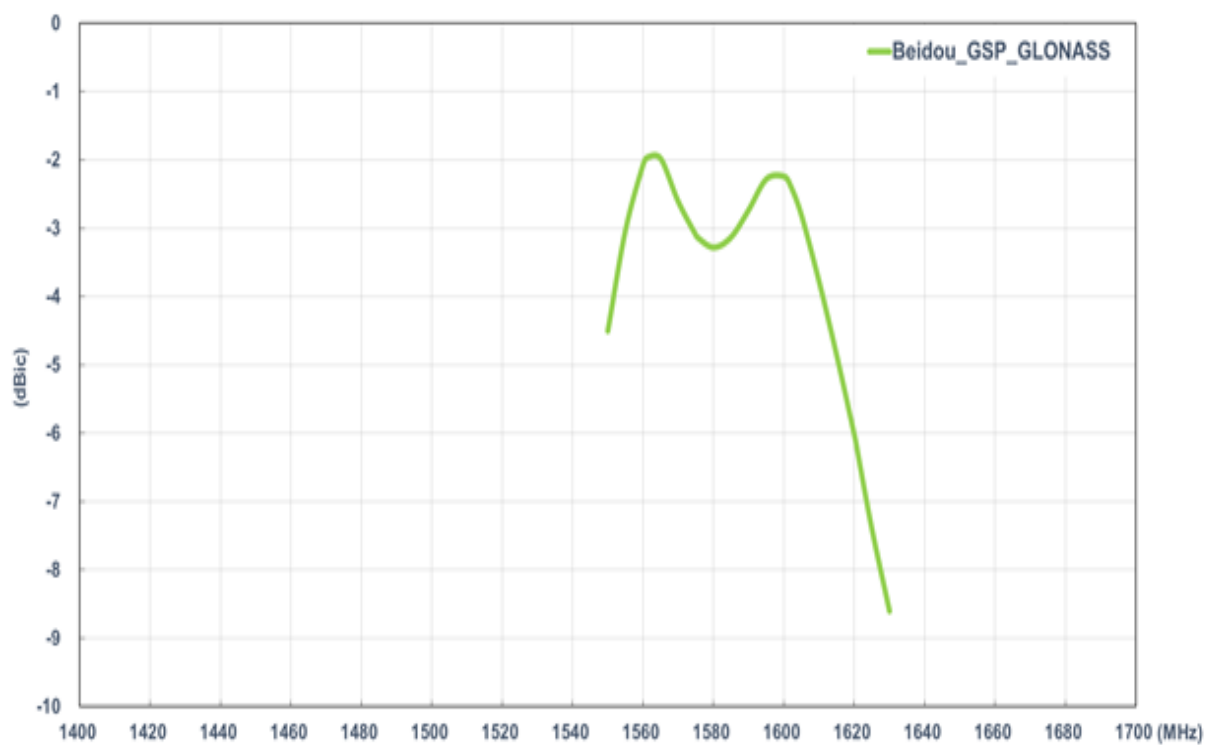




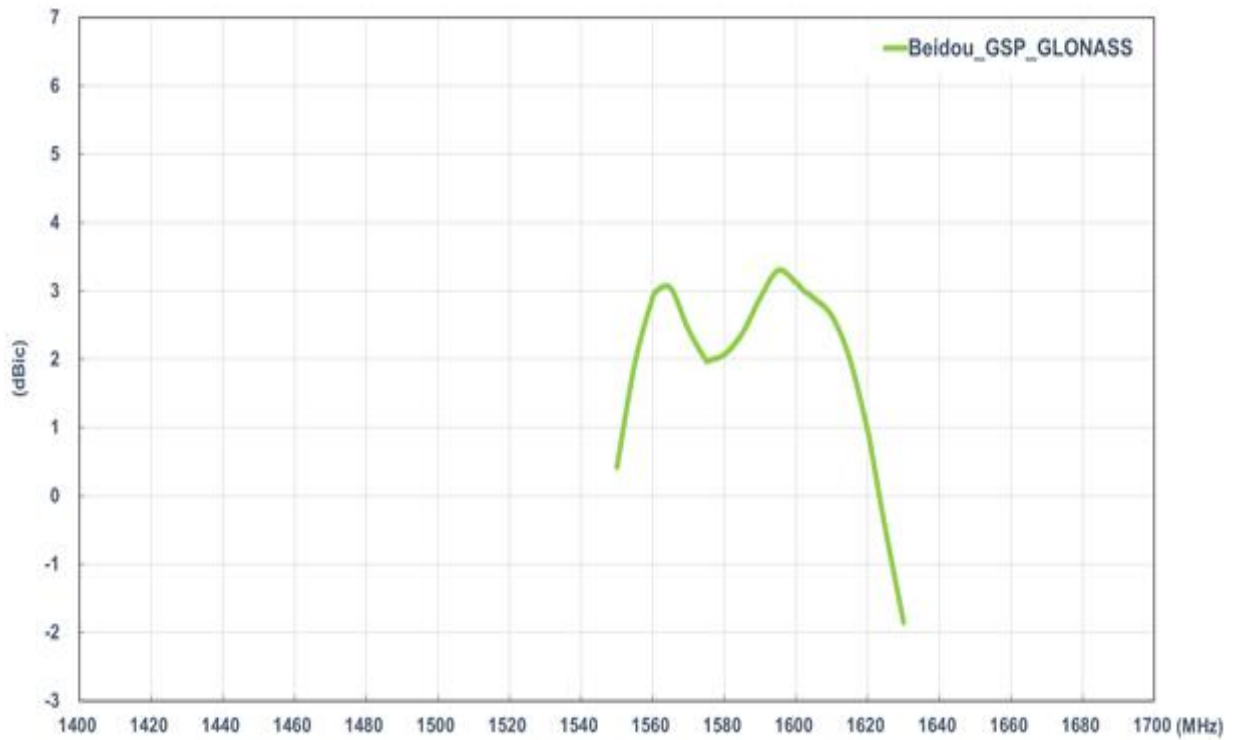
### 3.3 Passive Antenna Efficiency



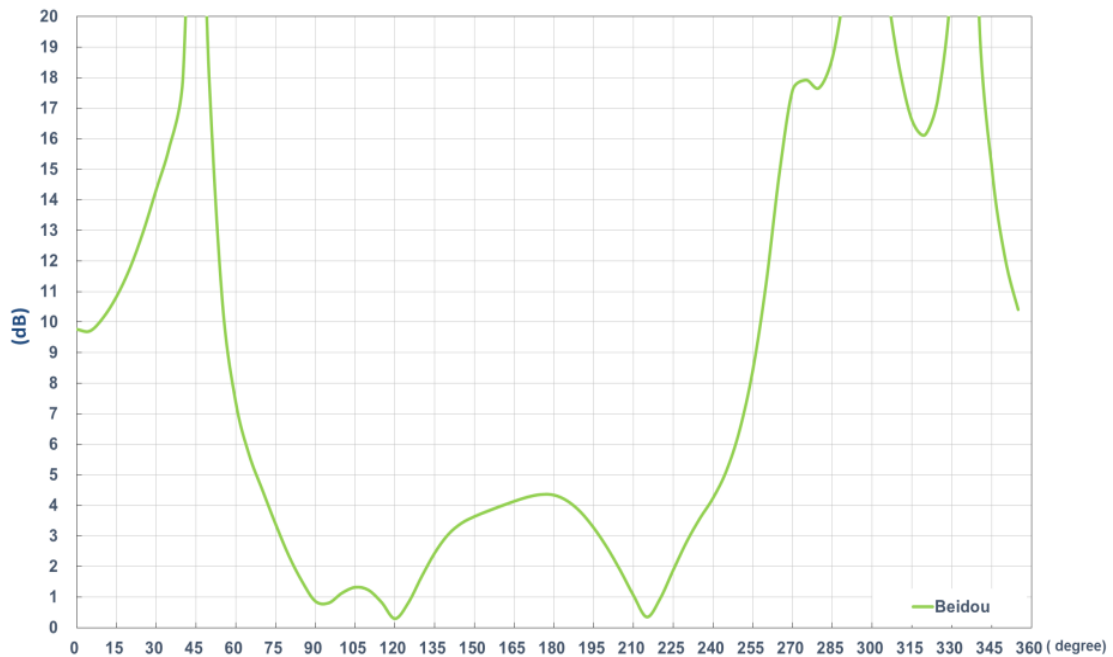
### 3.4 Passive Antenna Average Gain



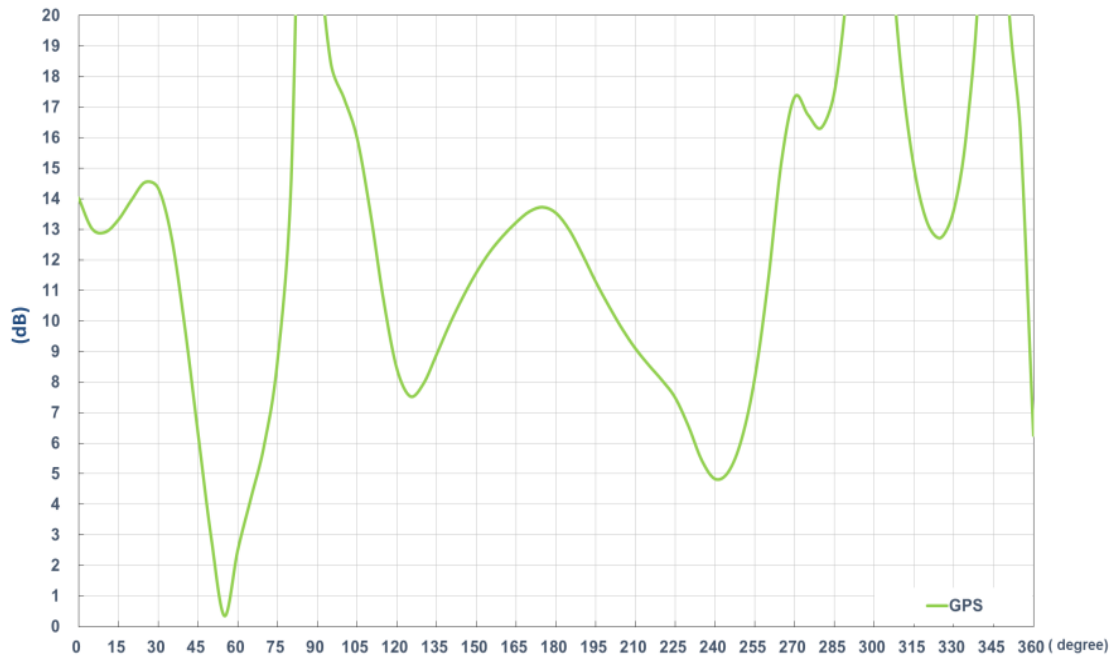
### 3.5 Passive Antenna Peak Gain



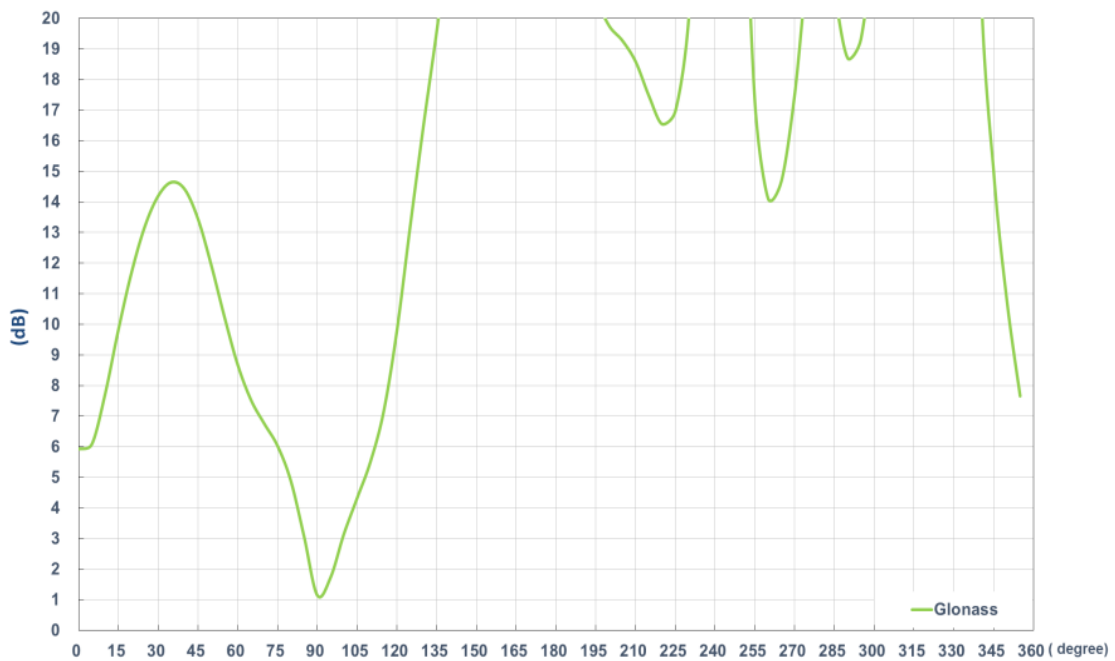
### 3.6 Passive Antenna Axial Ratio (Zenith is at 0°)



1561MHz



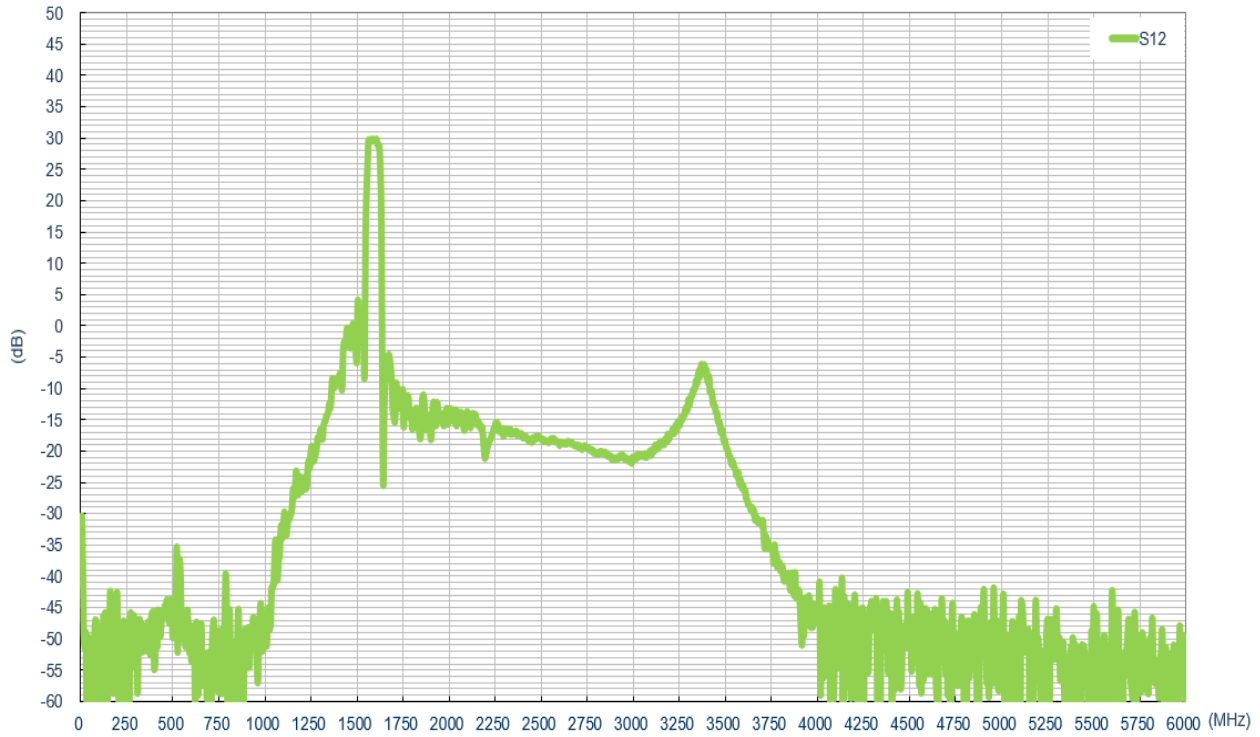
1575.42MHz



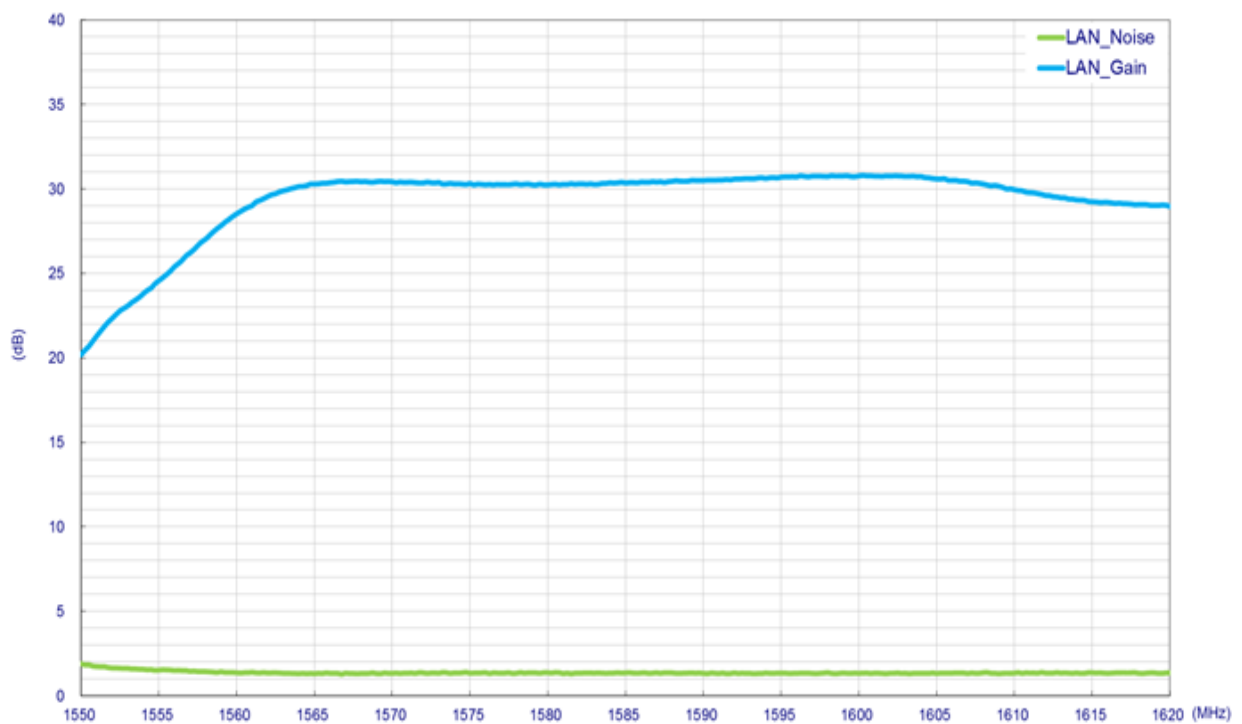
1602MHz

### 3.7 Active measurements

#### LNA Gain @ 3.0V

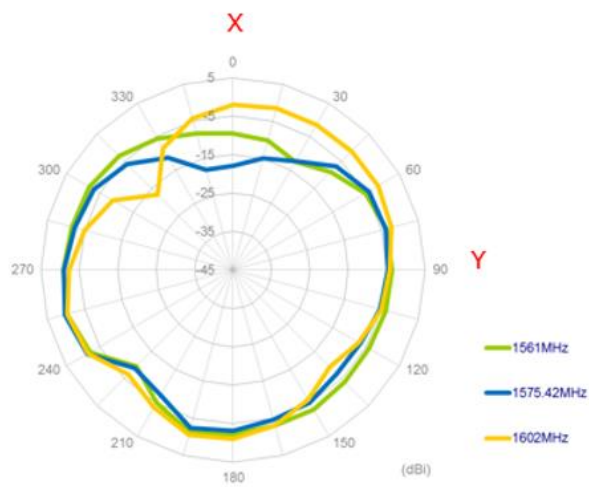


#### Noise Figure @ 3.0V

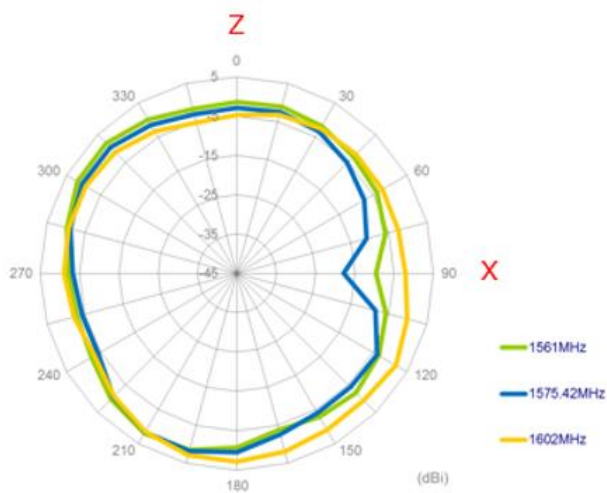


### 3.8 Passive Antenna 2D Radiation Patterns

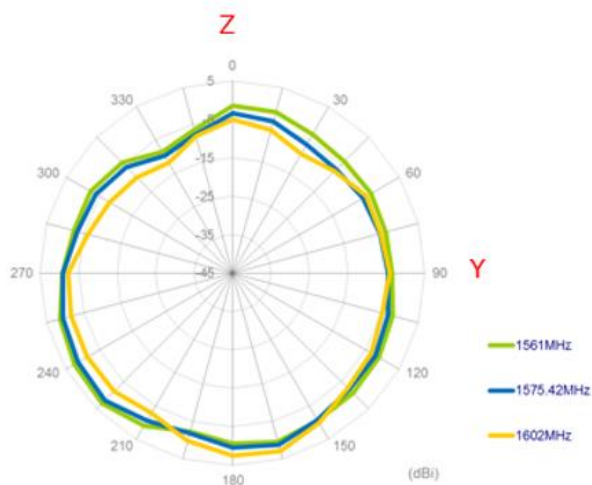
XY Plane



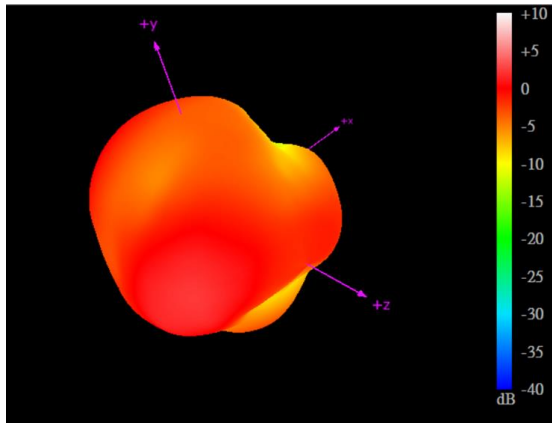
XY Plane



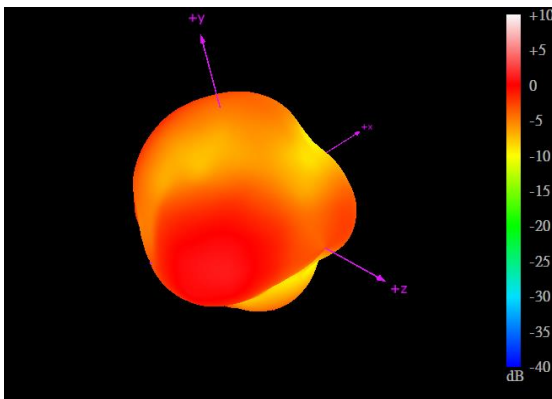
XY Plane



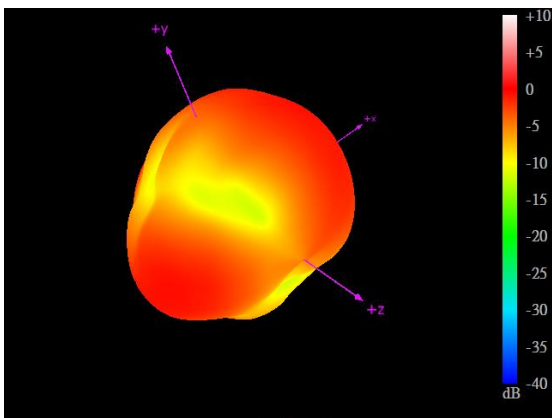
### 3.9 Passive Antenna 3D Radiation patterns



1561MHz



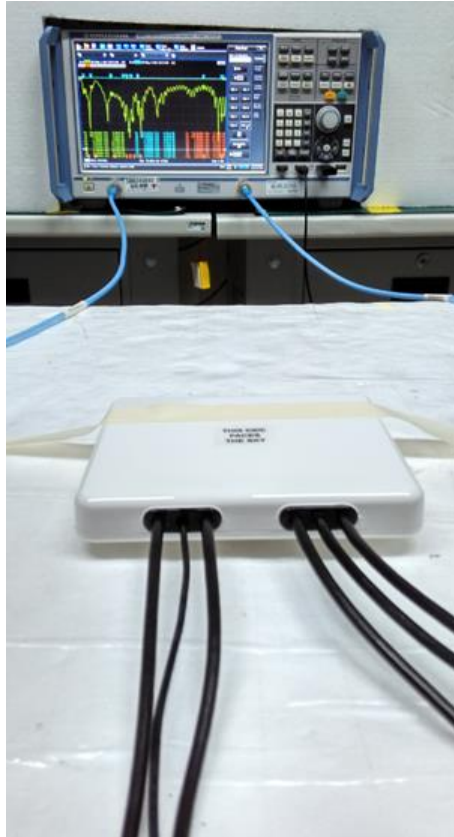
1575.42MHz



1602MHz

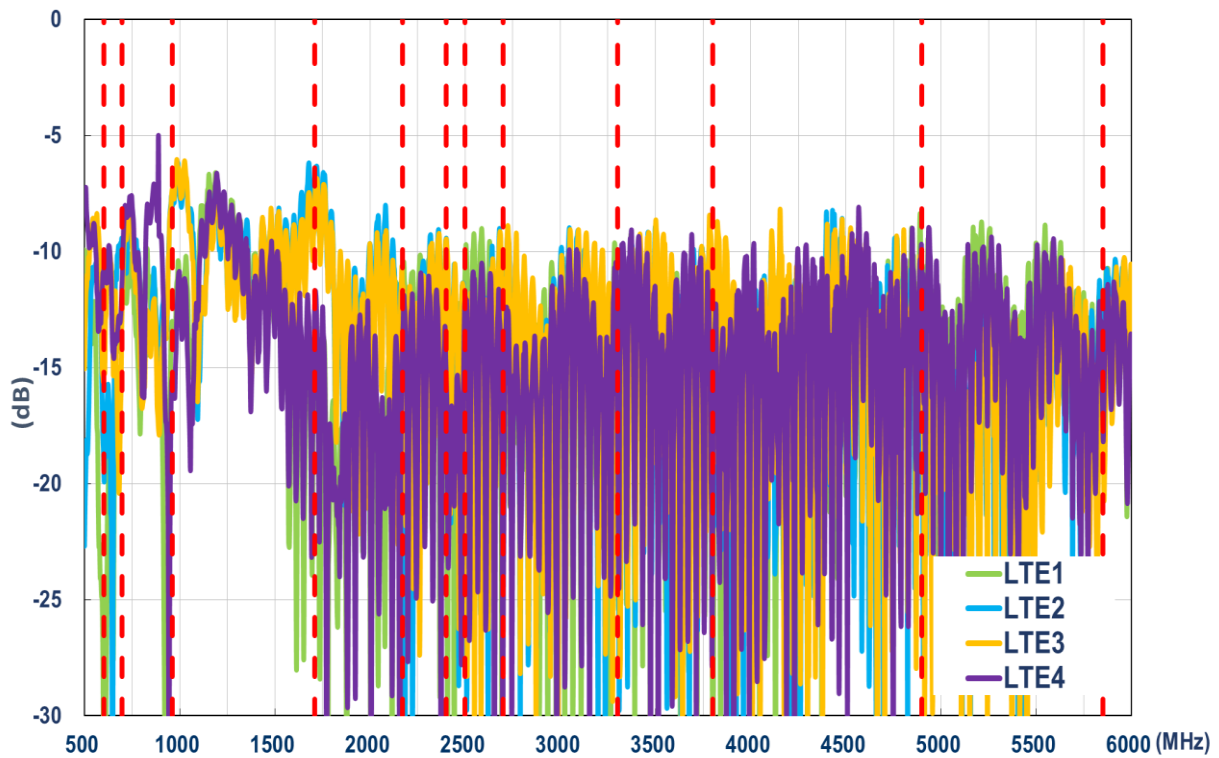
## 4. Antenna Characteristics

### 4.1 Test Setup

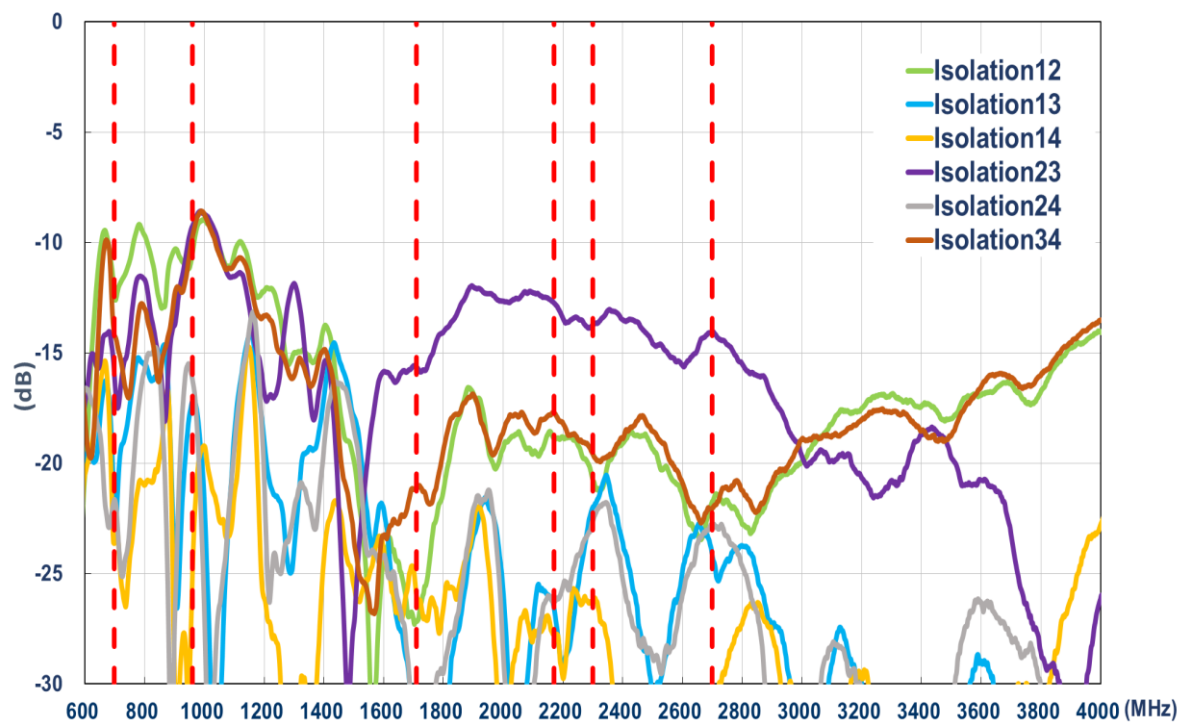


Free space

## 4.2 Return Loss

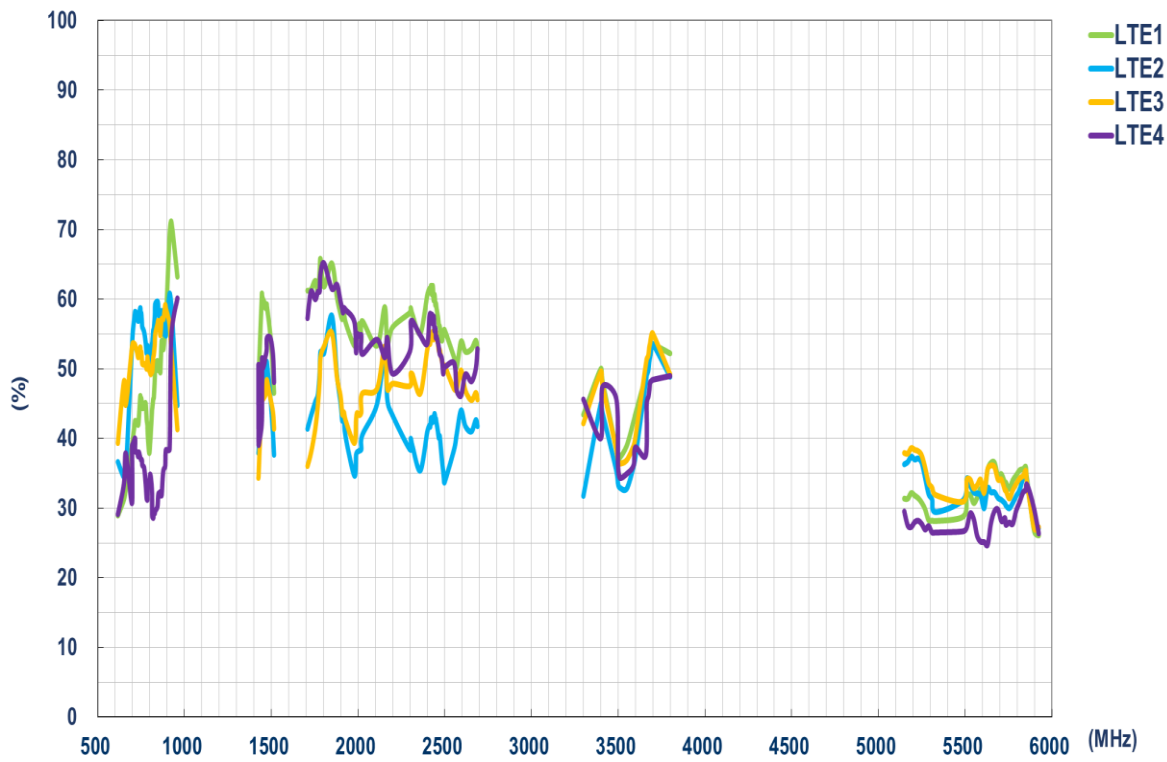


## 4.3 Isolation

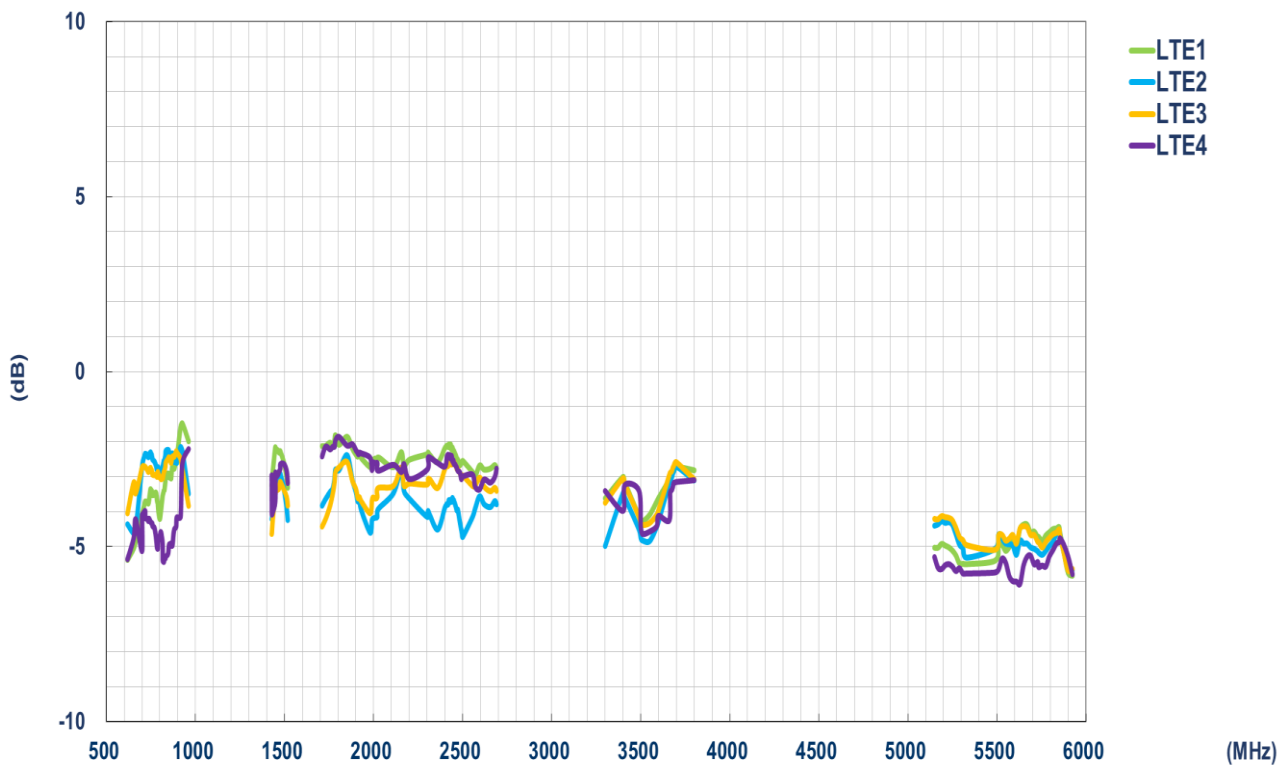




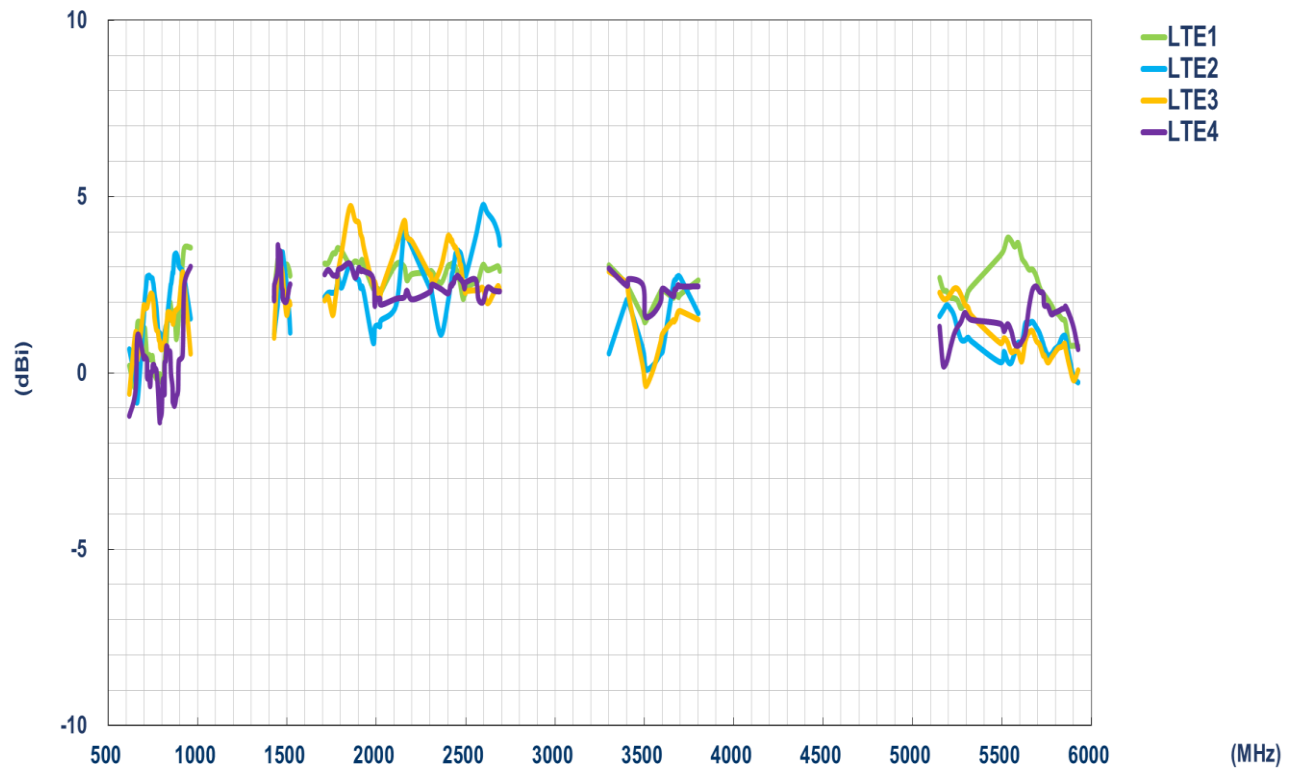
## 4.4 Efficiency



## 4.5 Average gain



## 4.6 Peak gain



## 5. Radiation Patterns

### 5.1 Test Setup

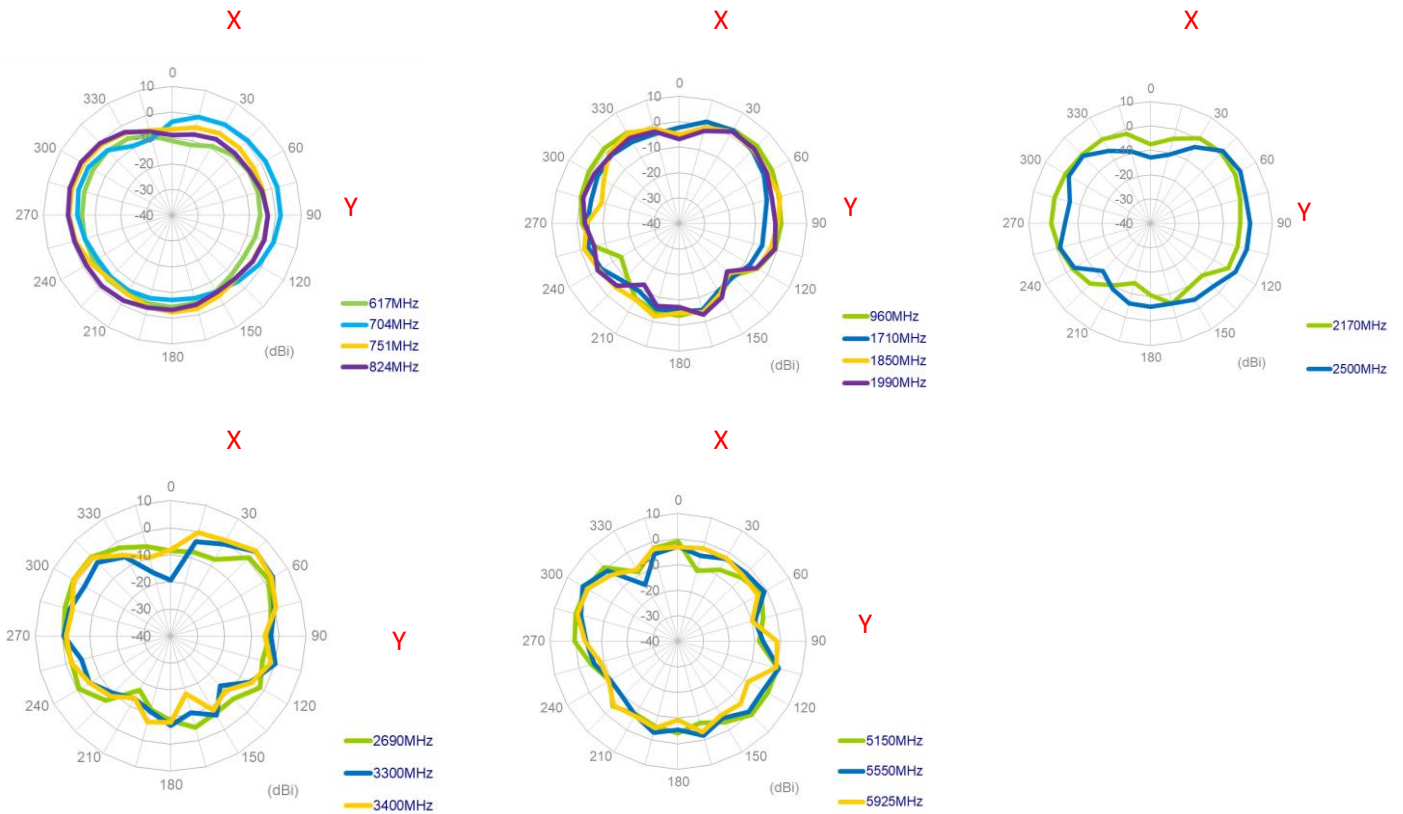


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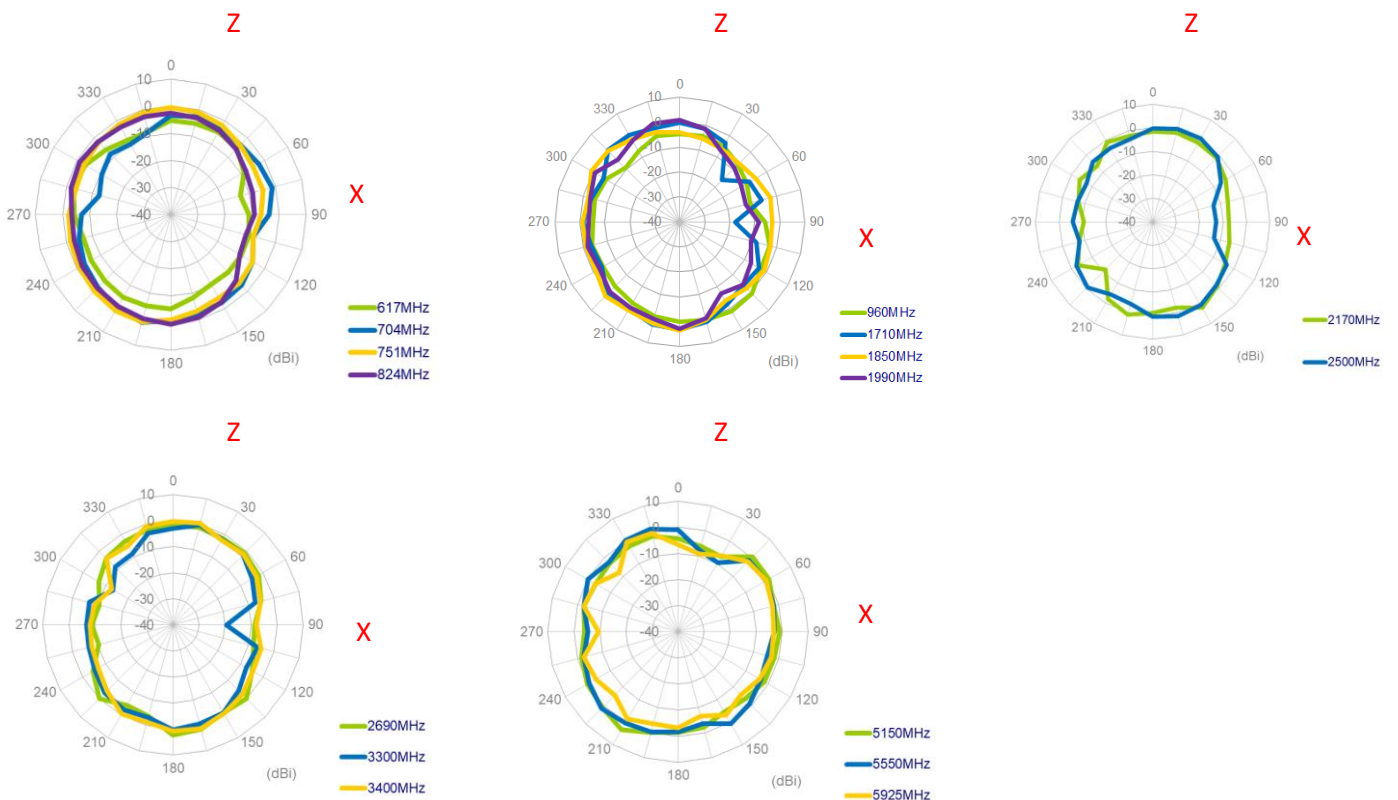
## 5.2 2D Radiation Patterns

### 5.2.1 LTE MIMO1

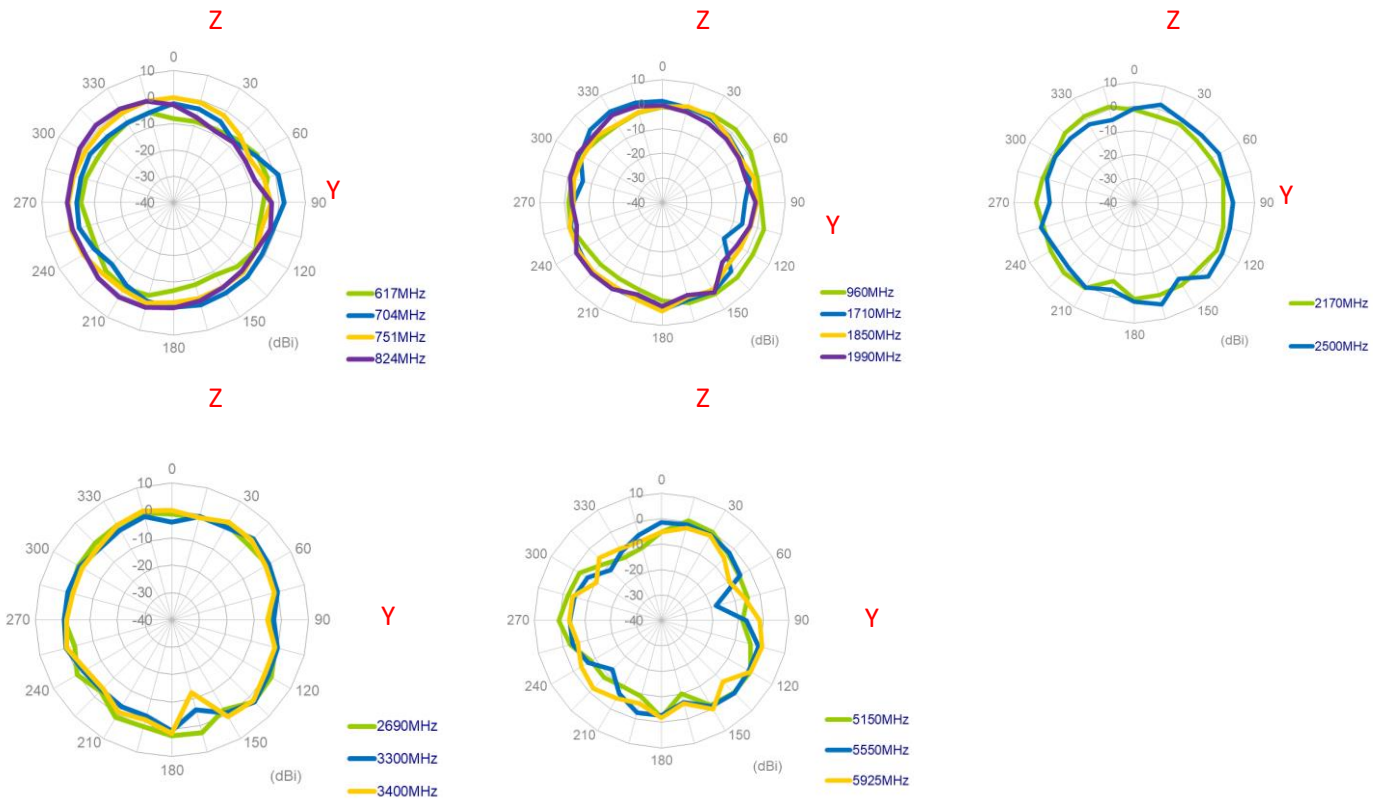
#### XY Plane



#### XZ Plane

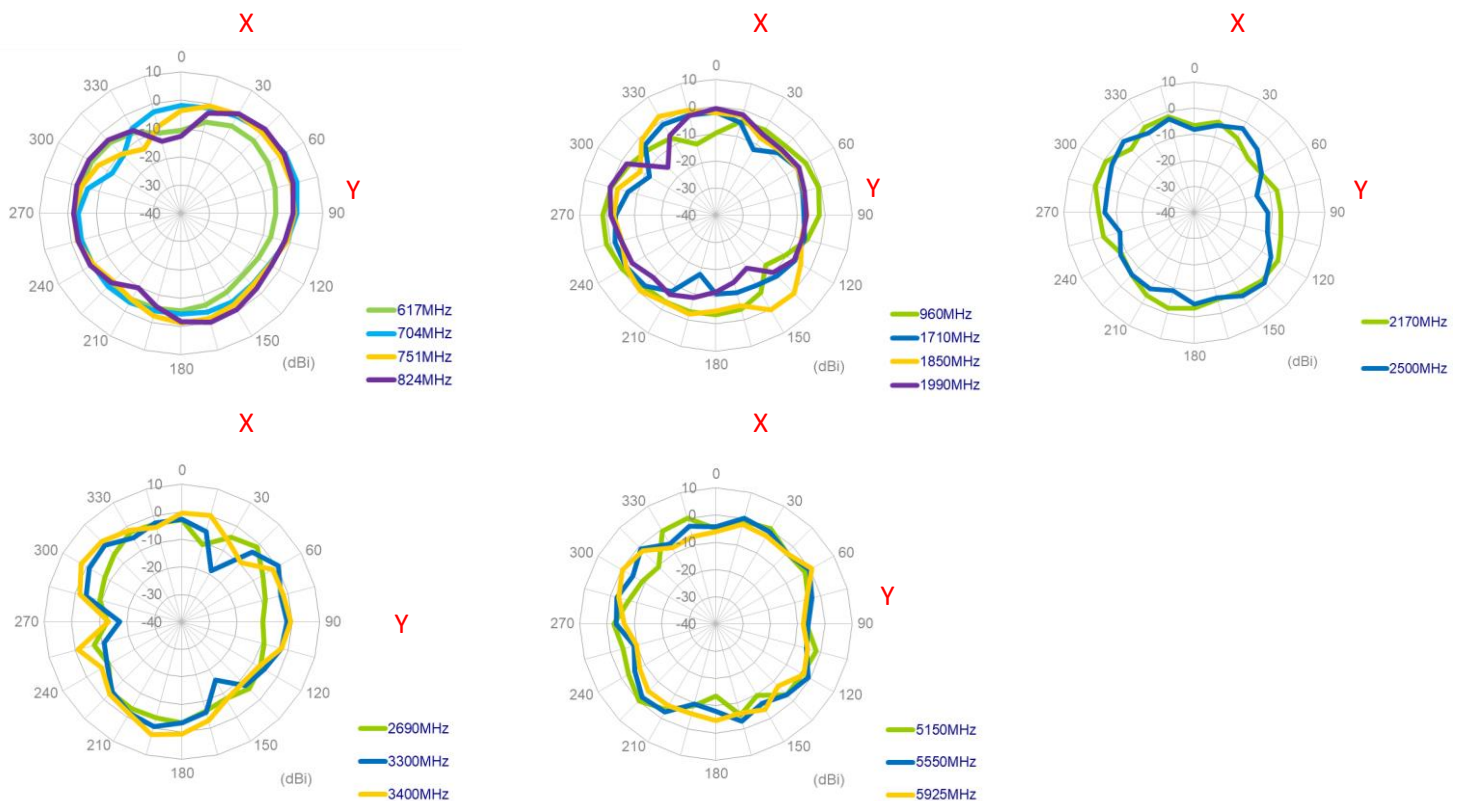


## YZ Plane

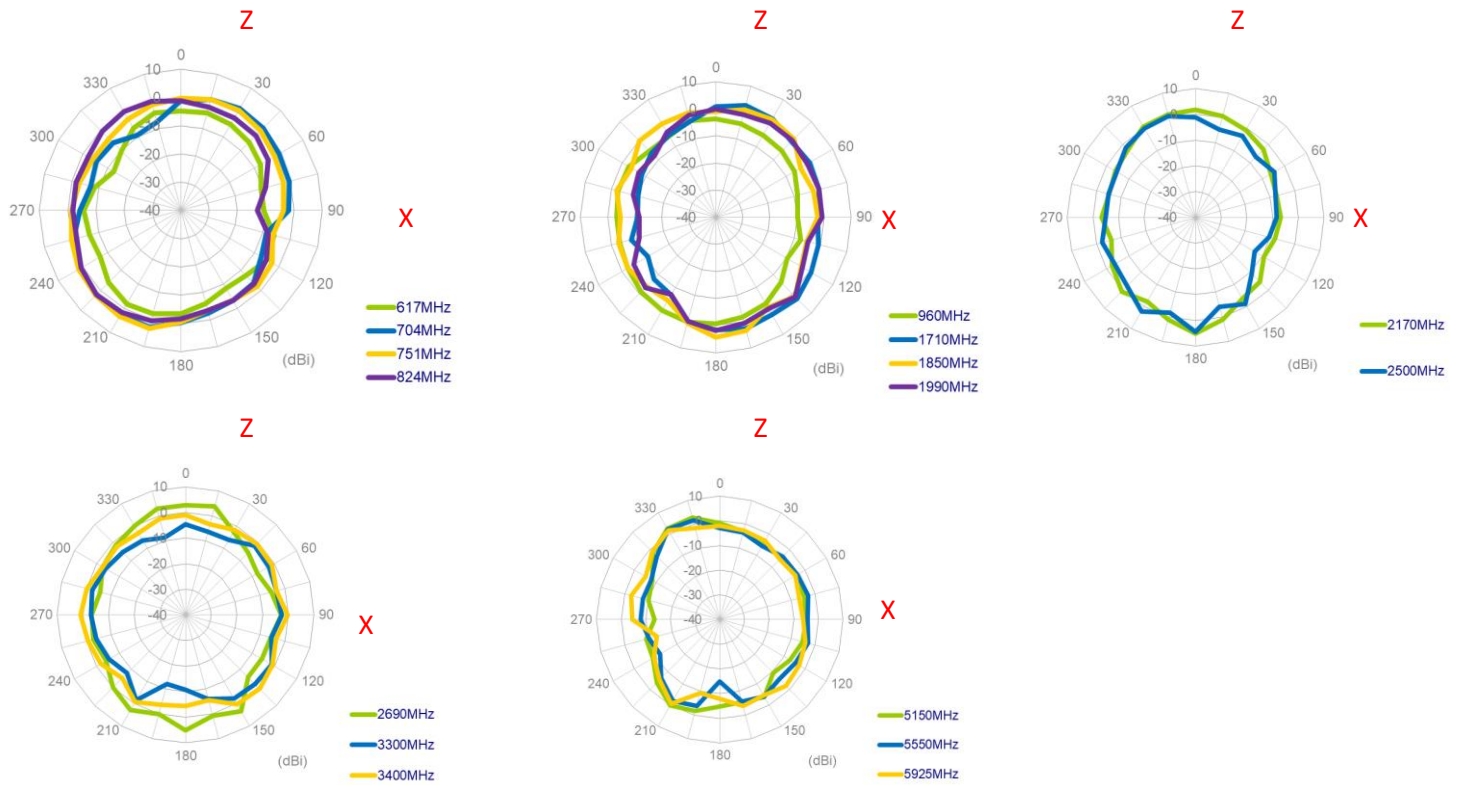


## 5.2.1 LTE MIMO2

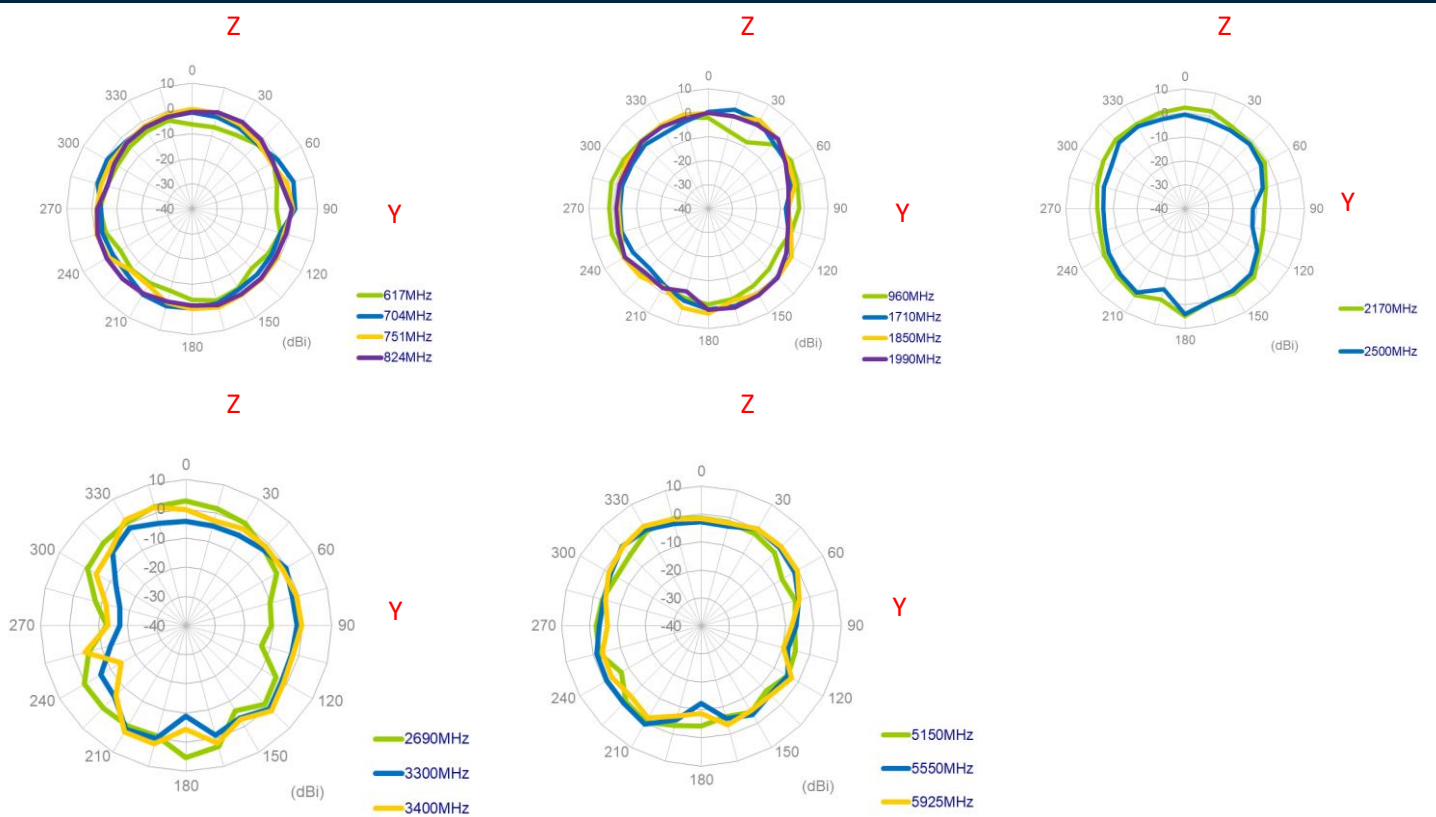
### XY Plane



## XZ Plane

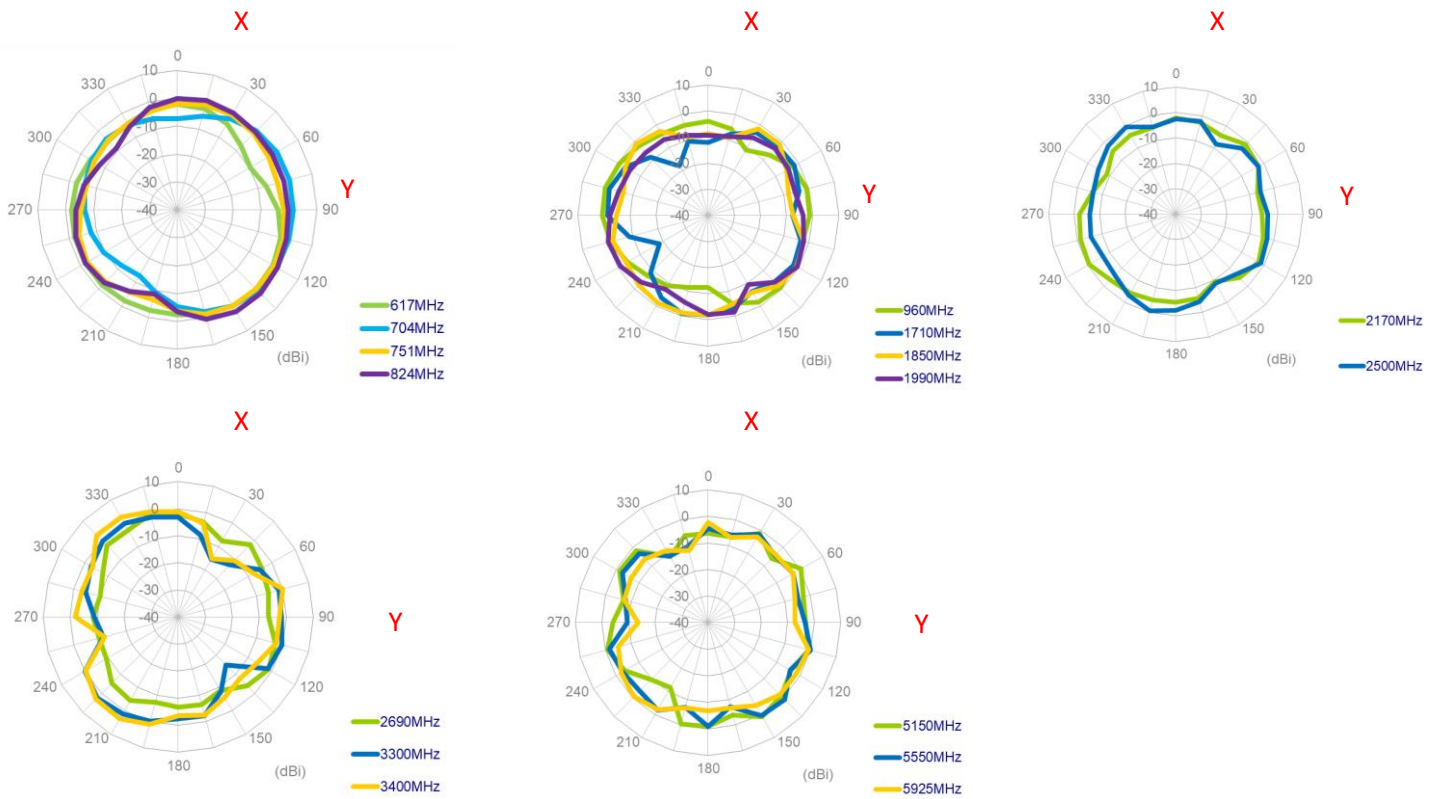


## YZ Plane

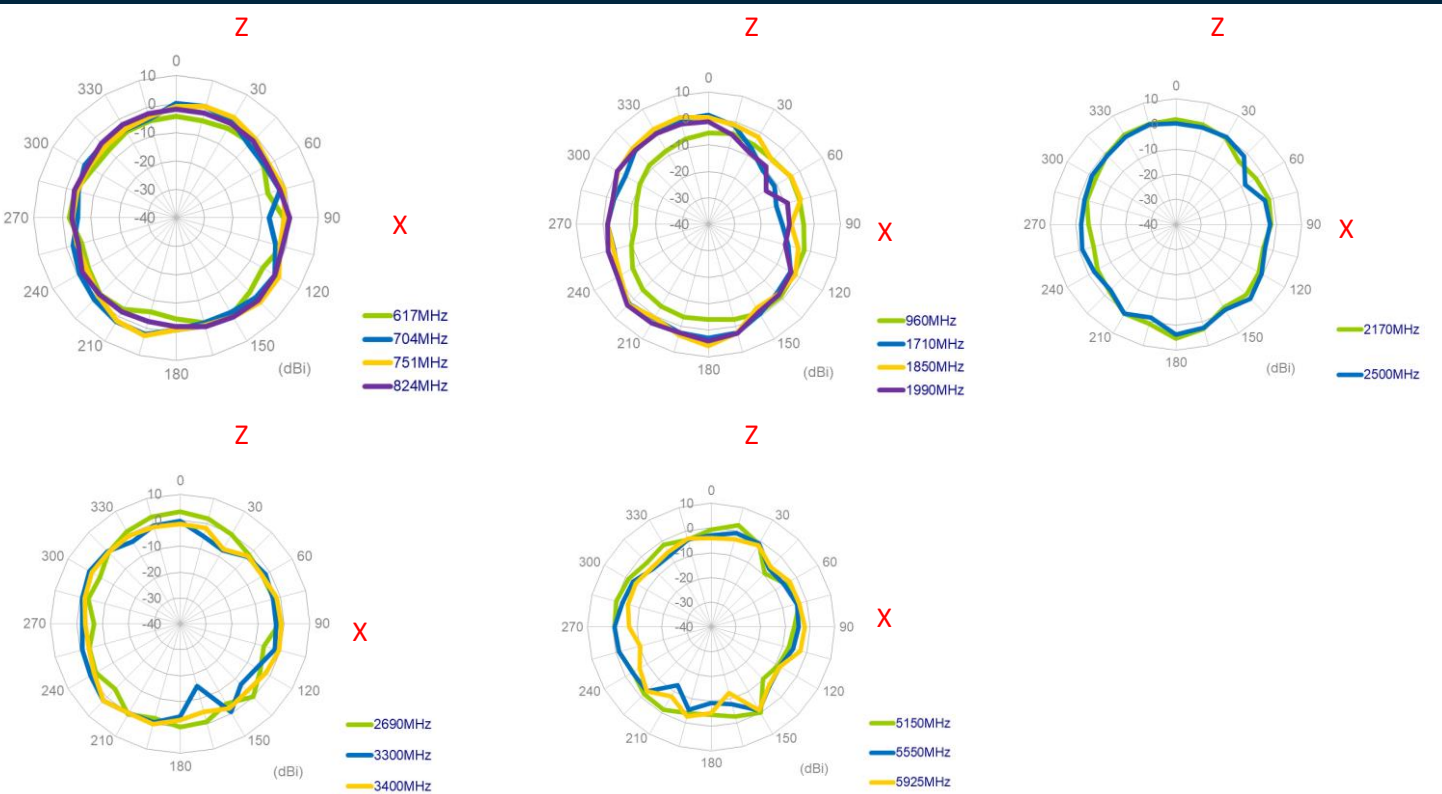


### 5.2.3 LTE MIMO3

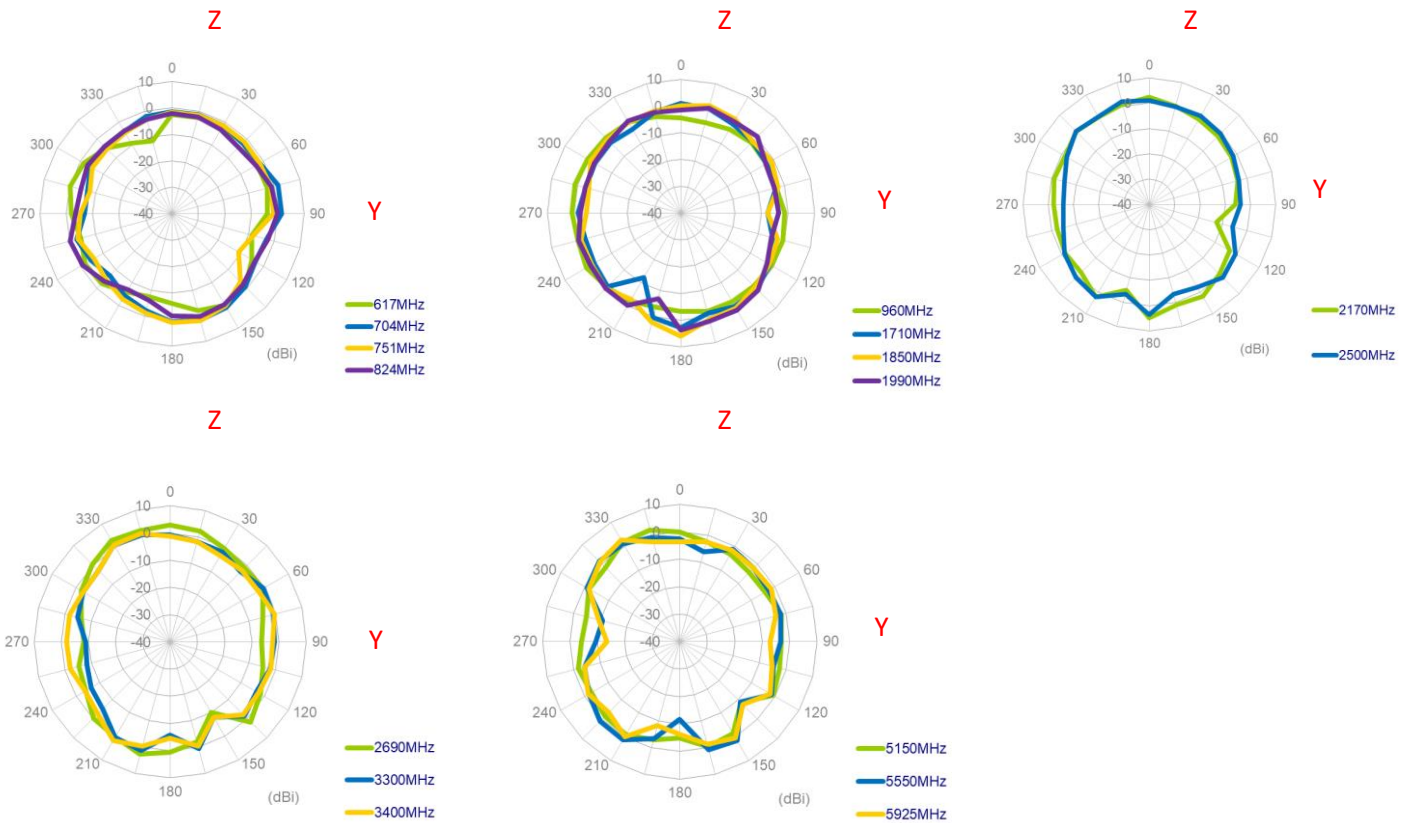
#### XY Plane



#### XZ Plane

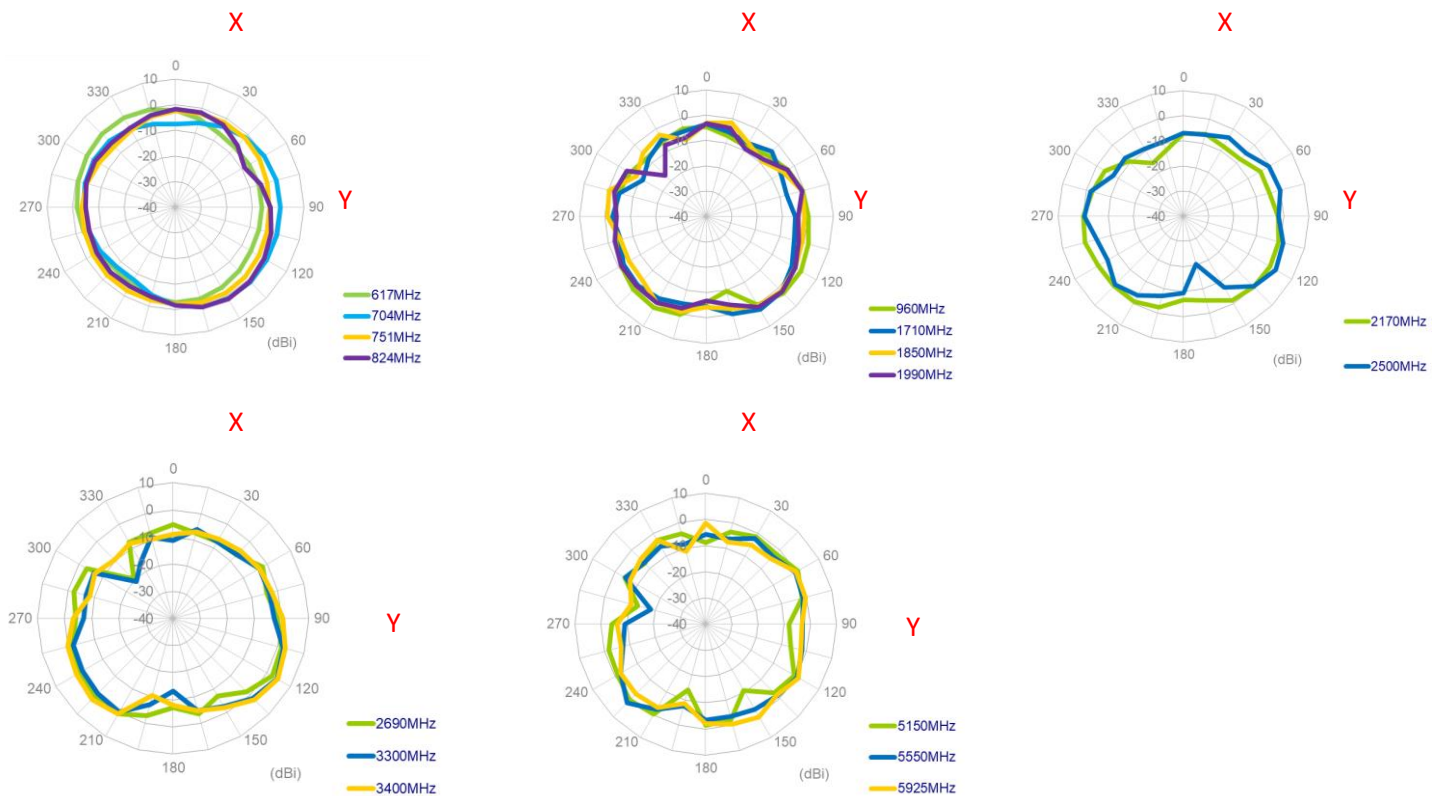


## YZ Plane



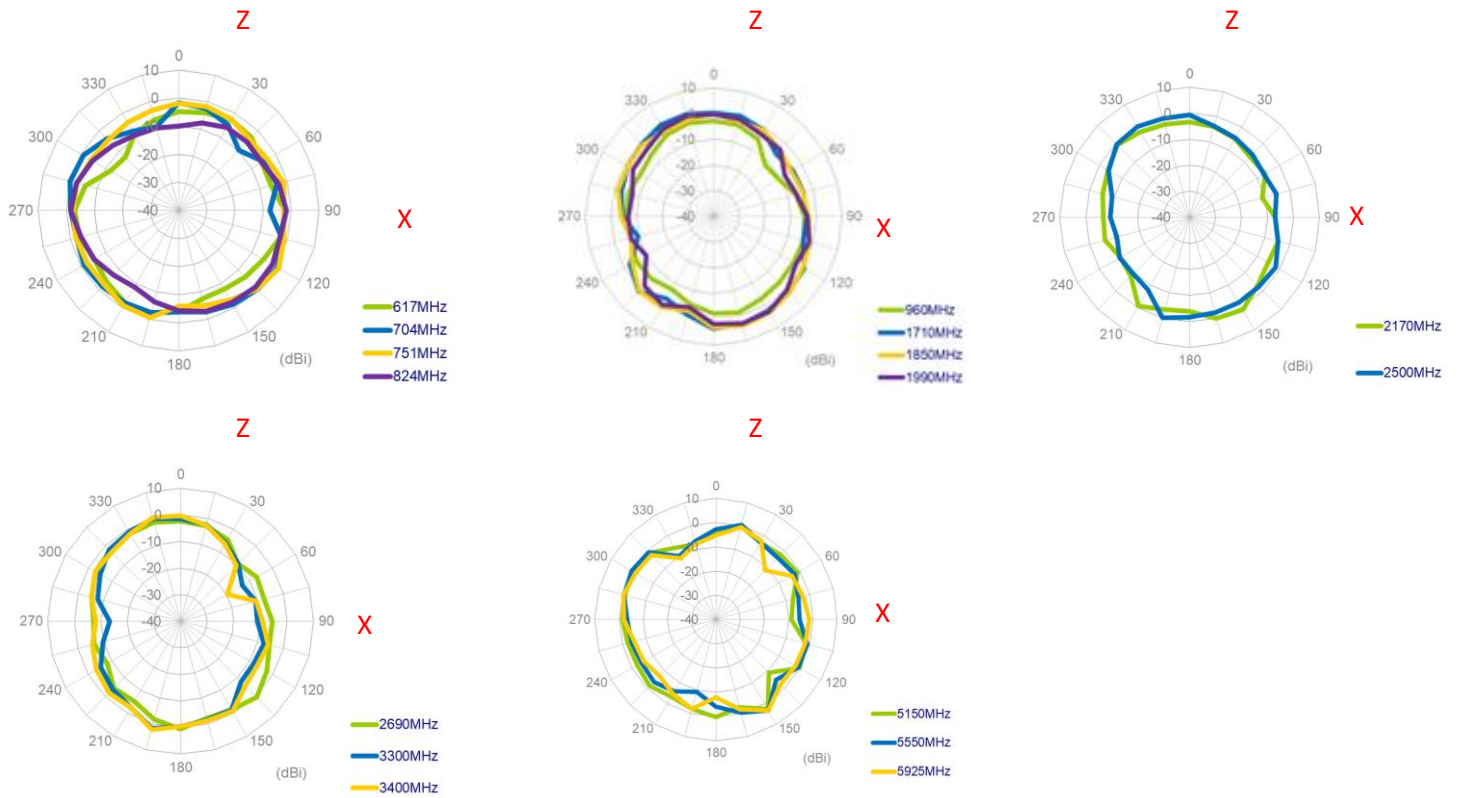
## 5.2.4 LTE MIMO4

## XY Plane

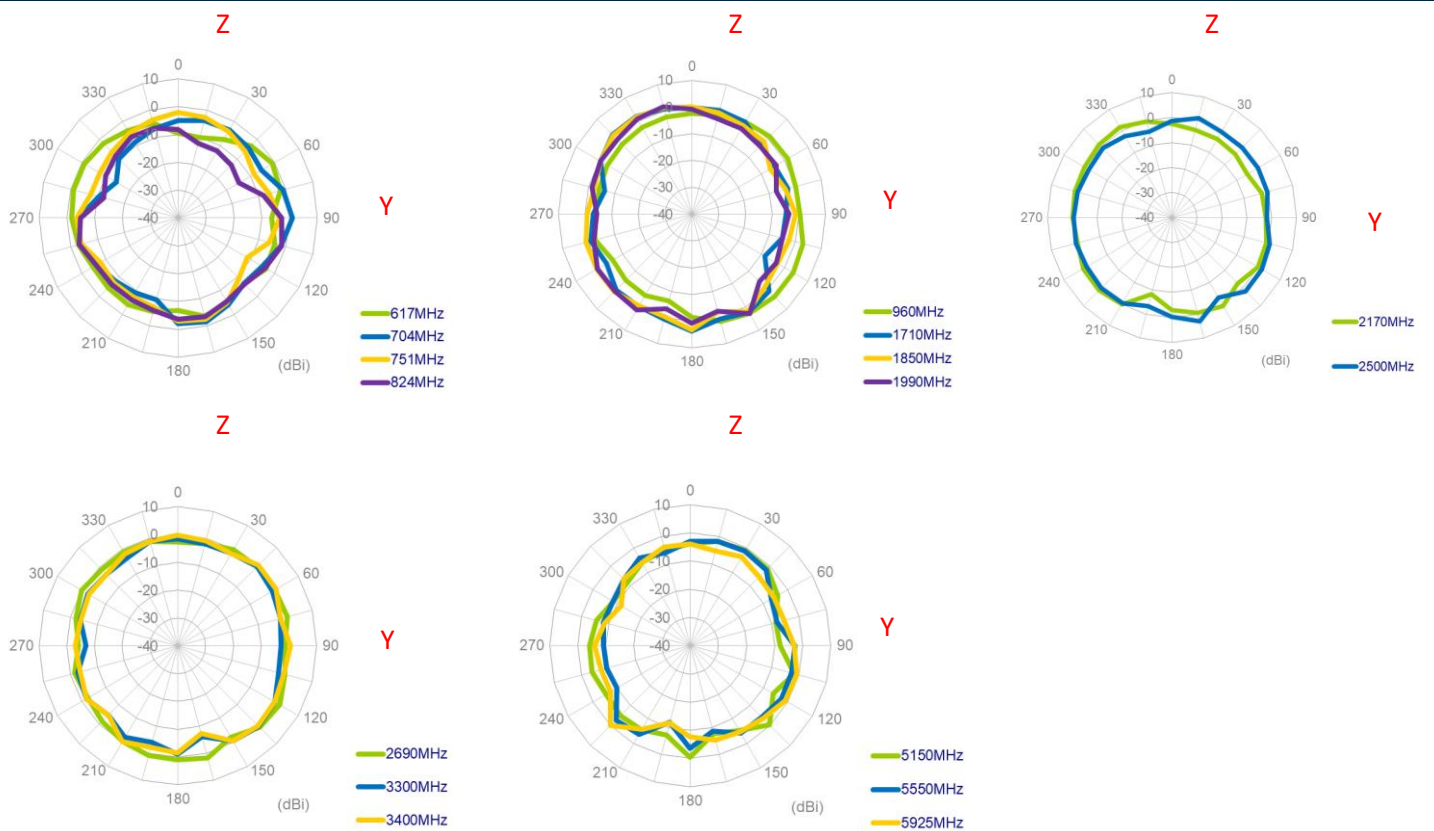




## XZ Plane

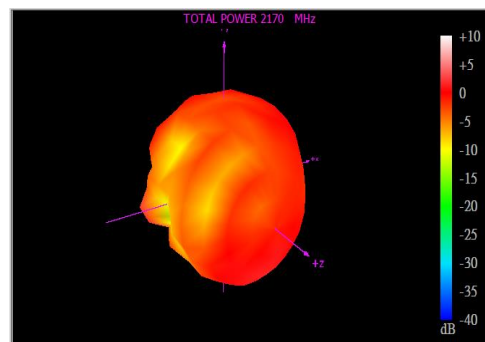
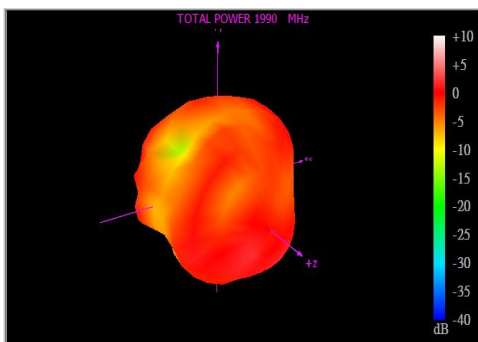
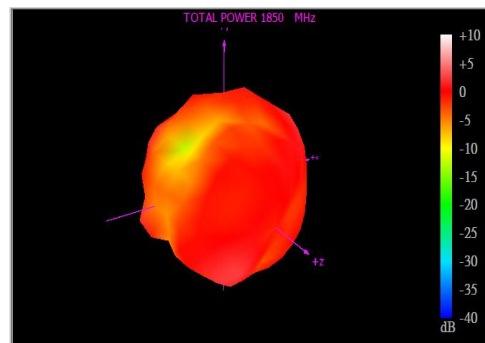
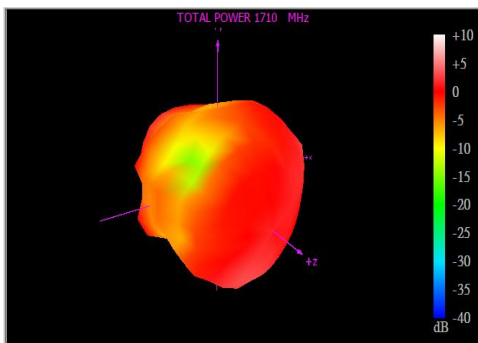
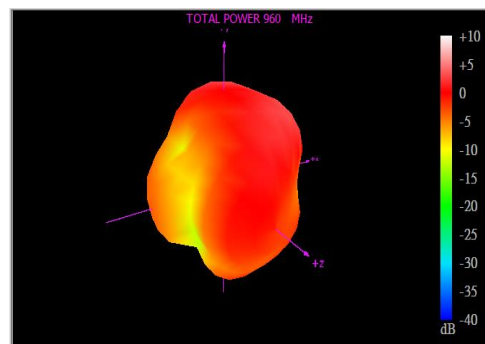
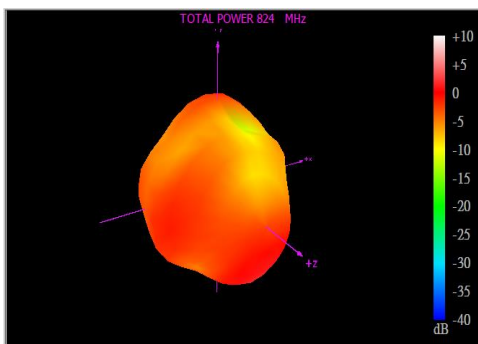
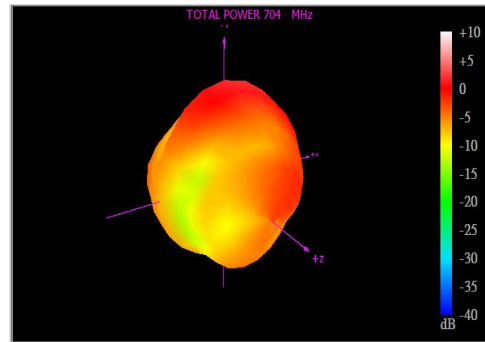
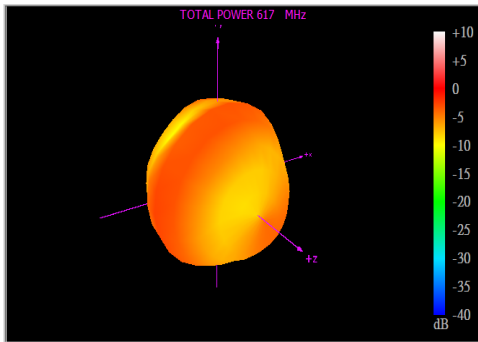


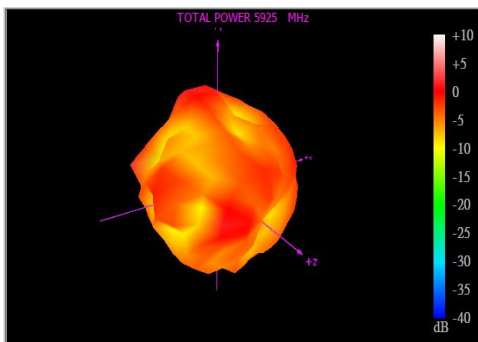
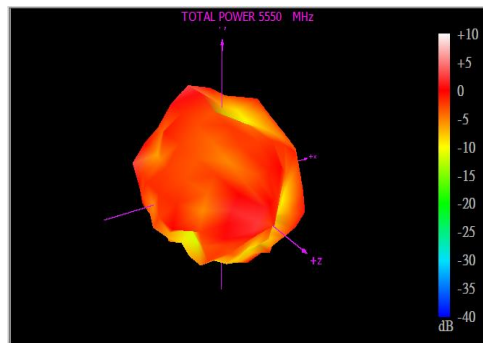
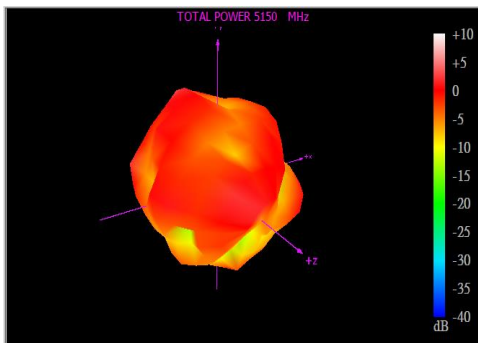
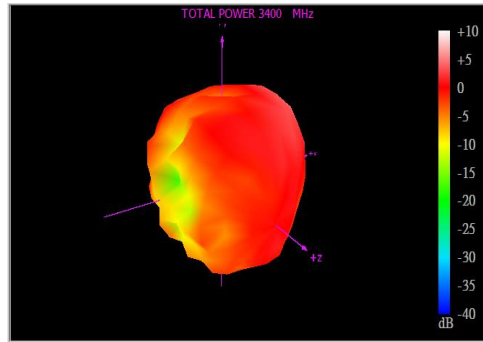
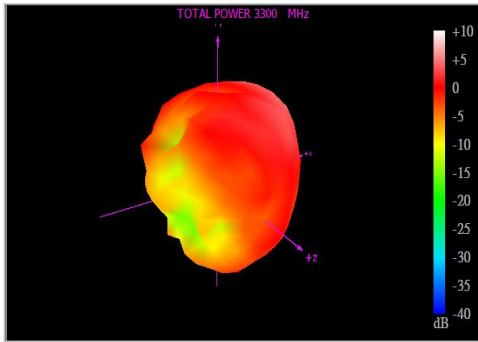
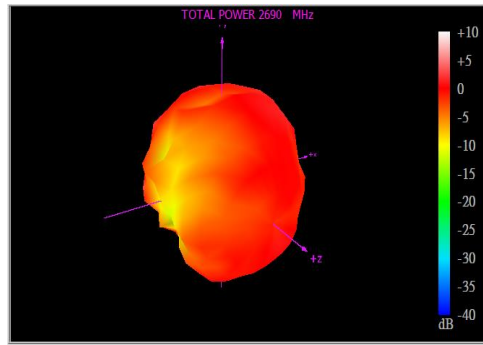
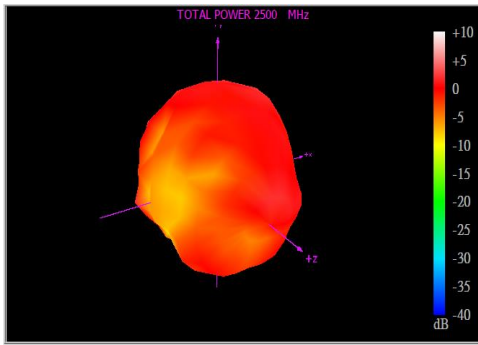
## YZ Plane



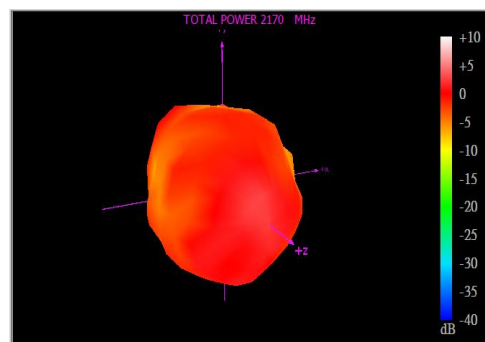
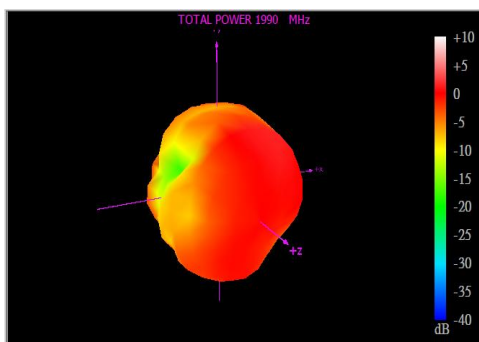
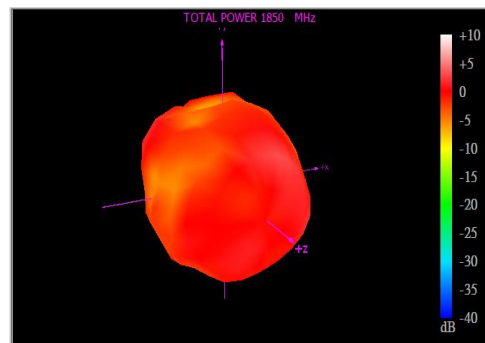
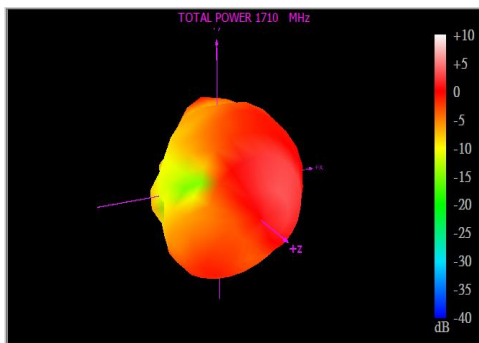
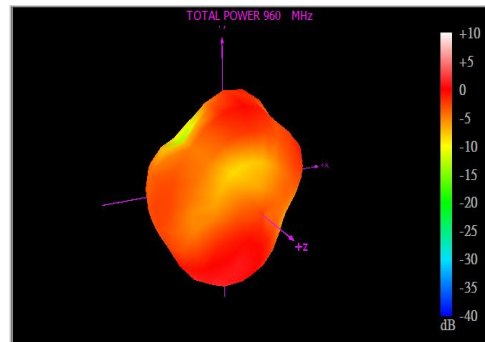
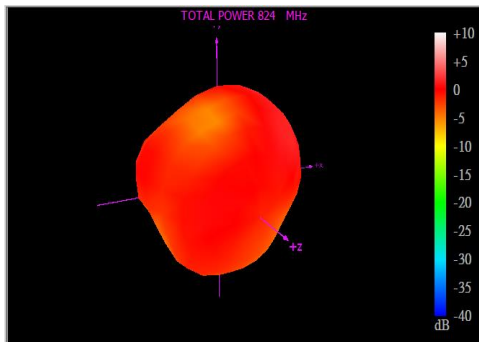
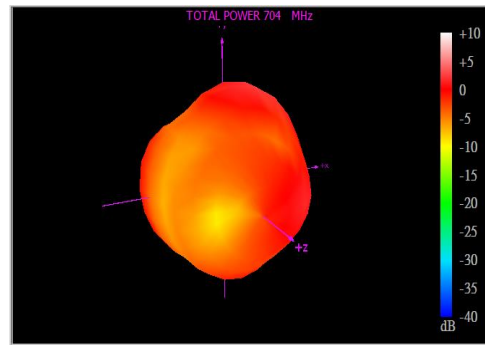
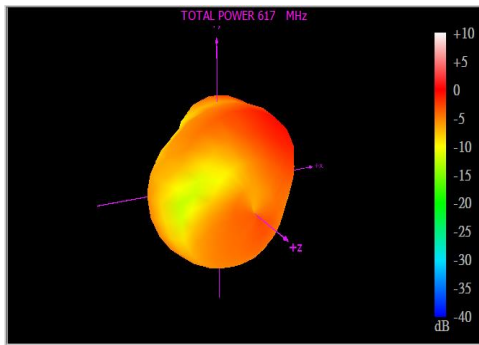
## 5.3 3D Radiation Pattern

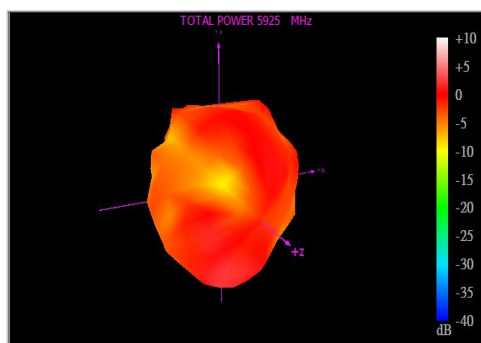
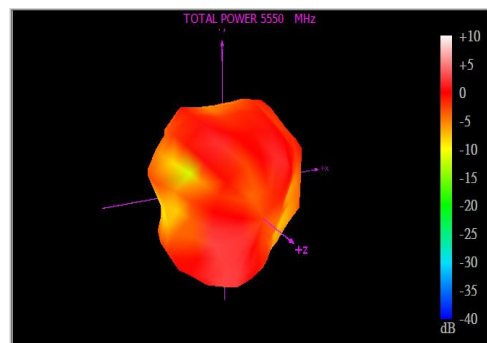
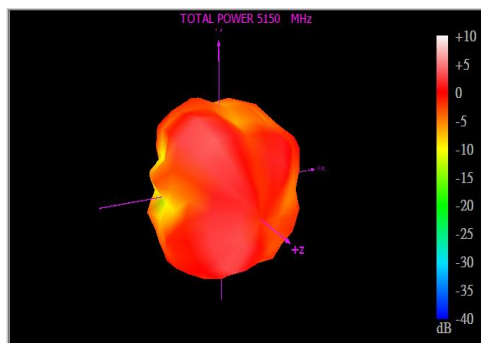
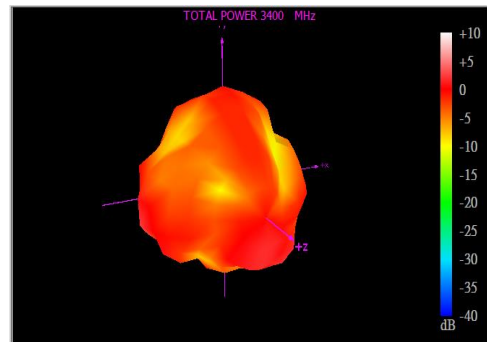
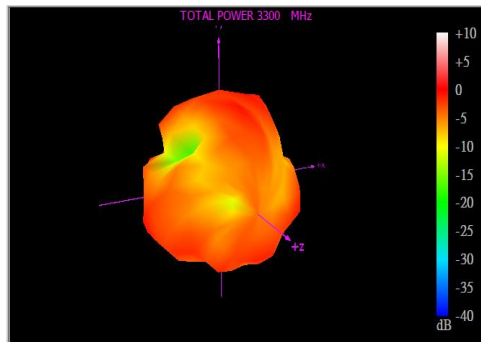
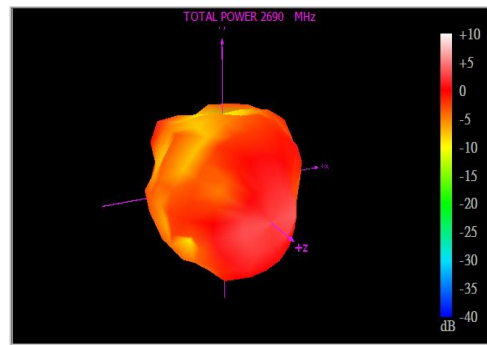
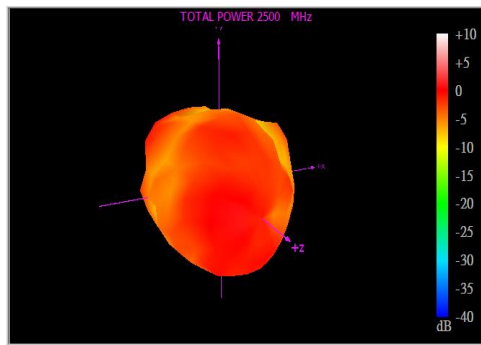
### 5.3.1 LTE MIMO1



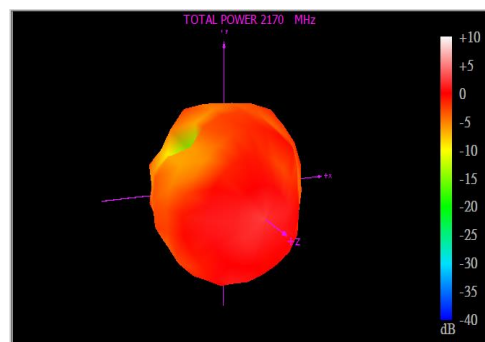
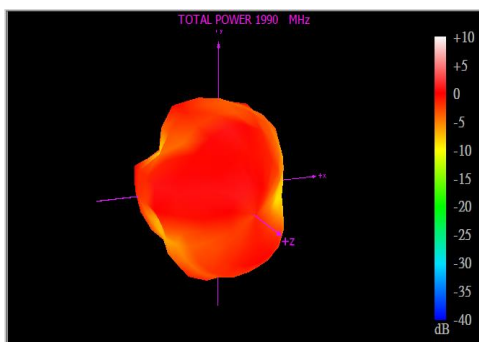
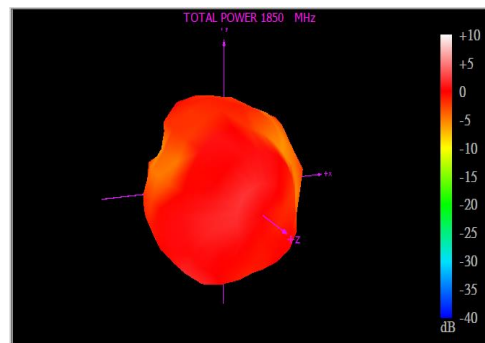
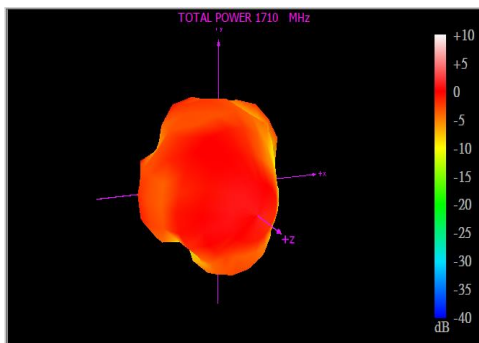
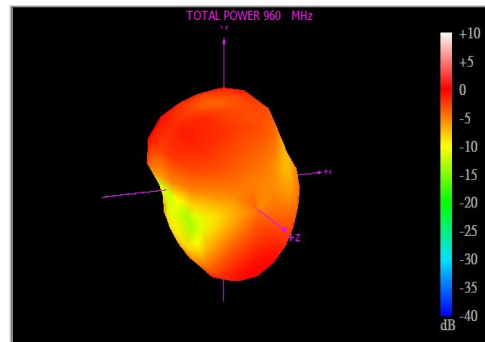
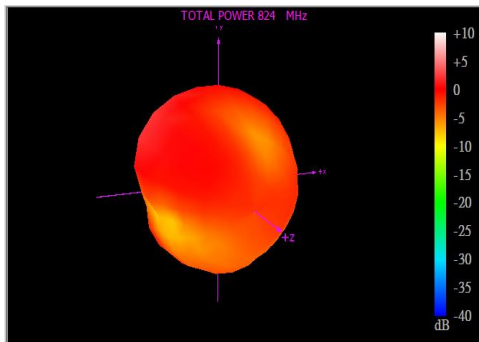
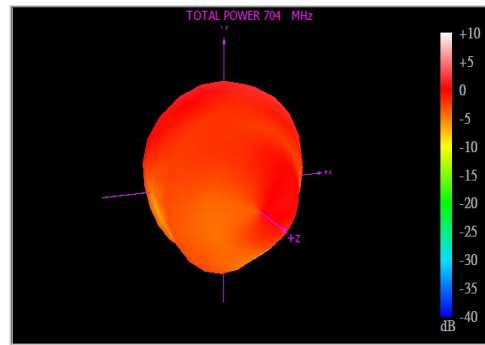
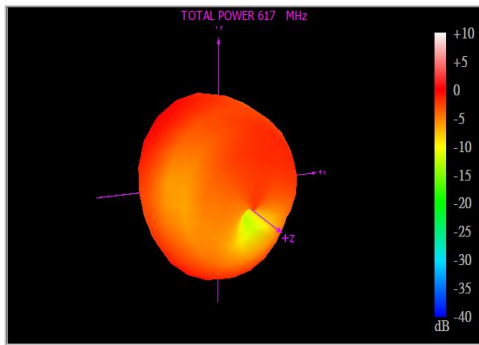


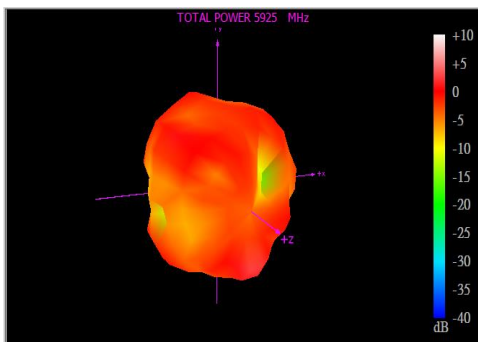
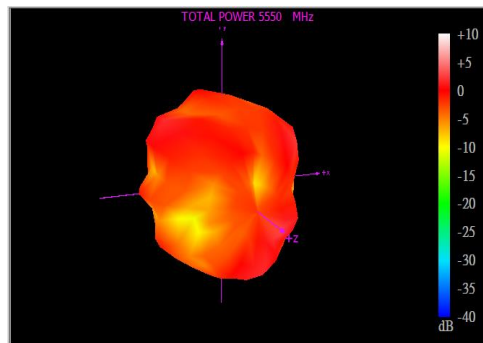
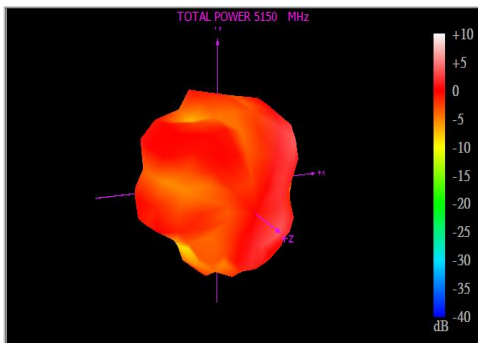
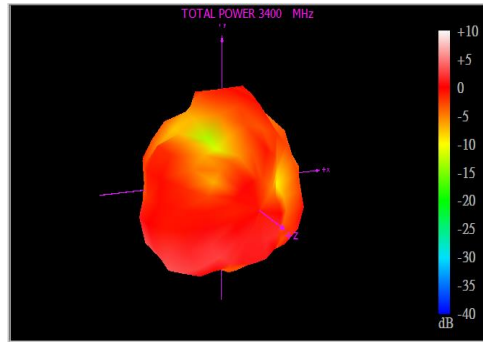
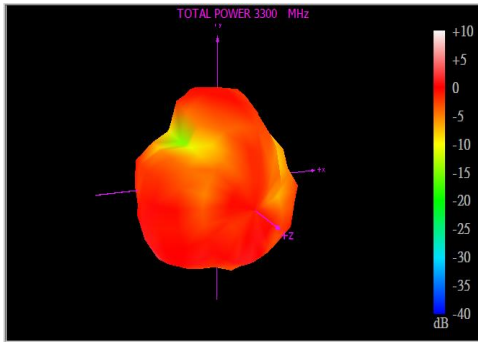
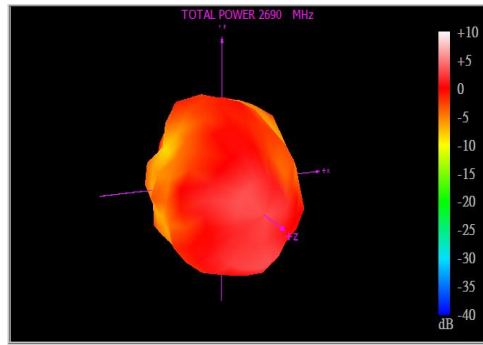
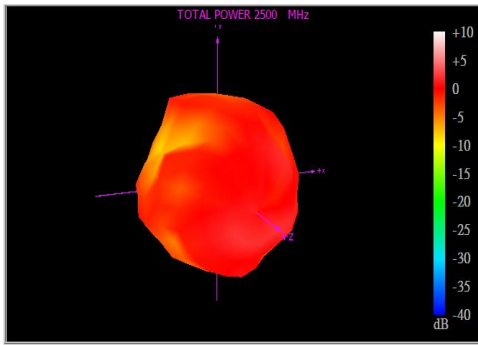
### 5.3.2 LTE MIMO2



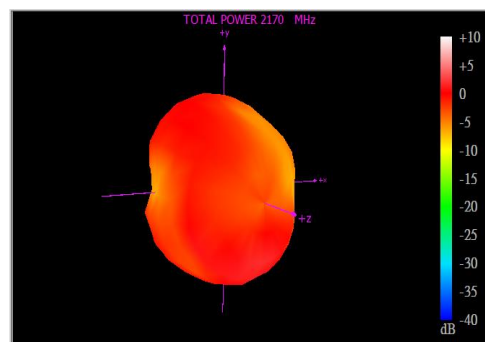
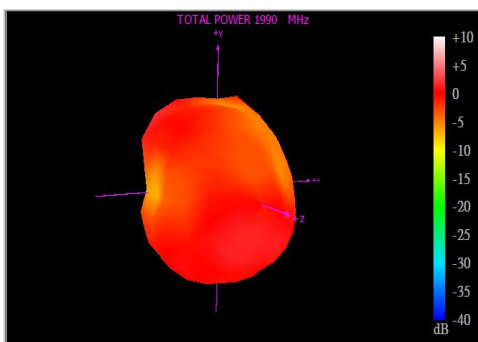
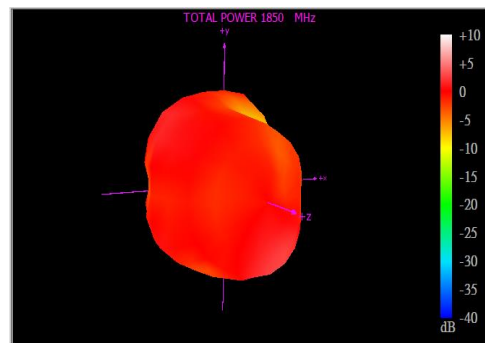
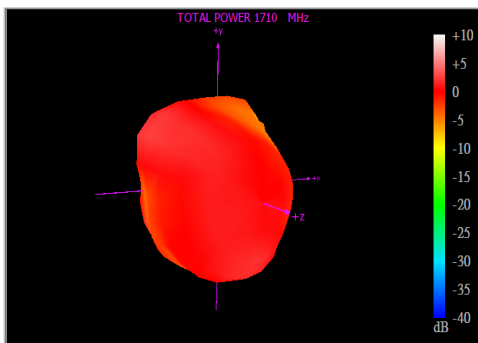
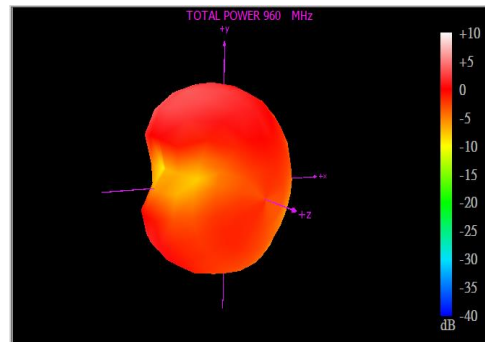
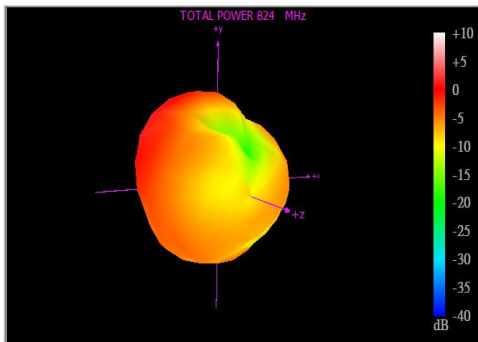
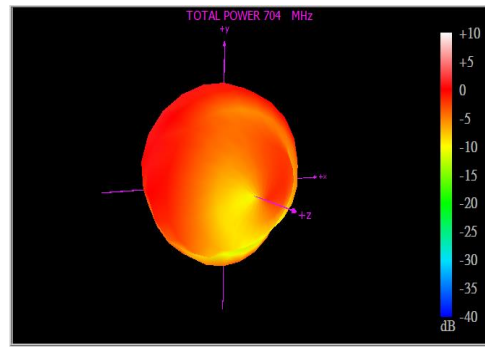
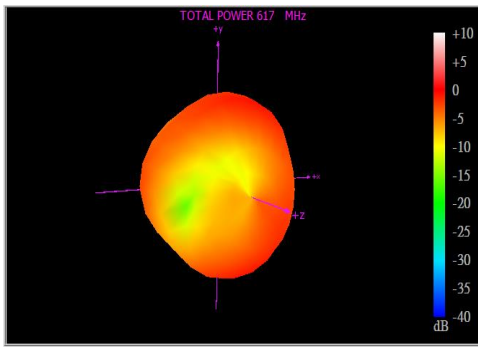


### 5.3.3 LTE MIMO3

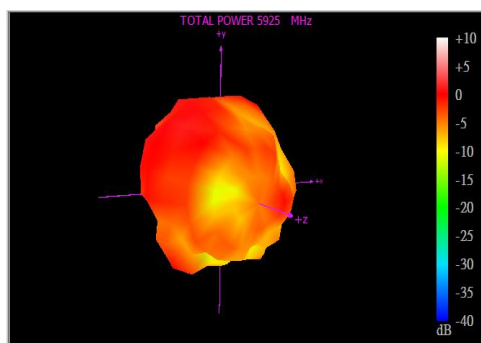
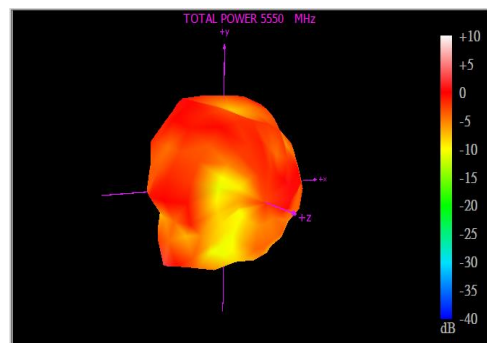
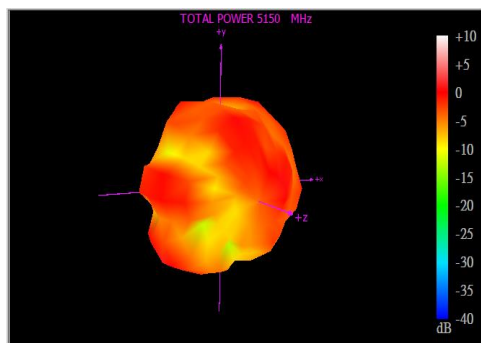
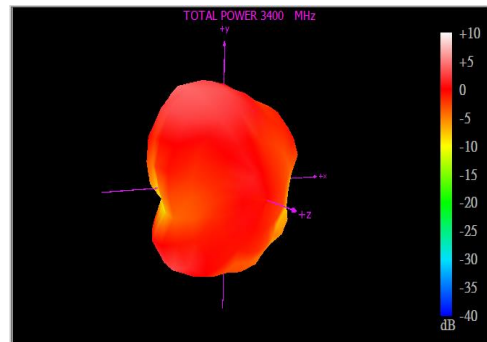
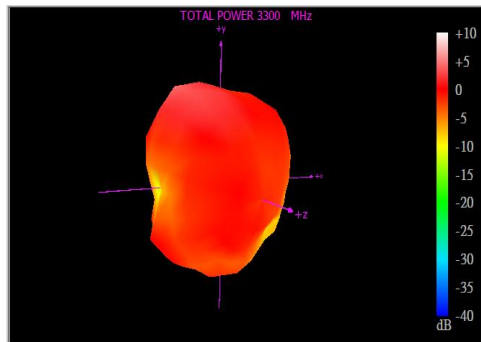
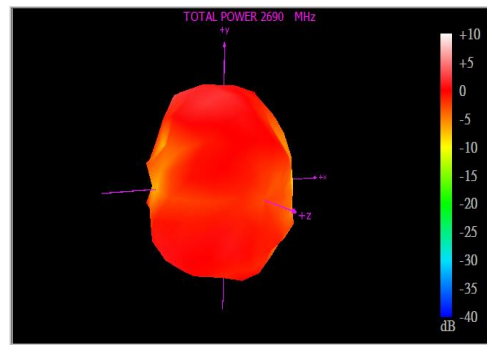
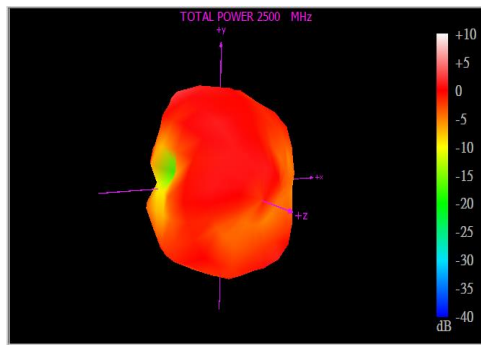




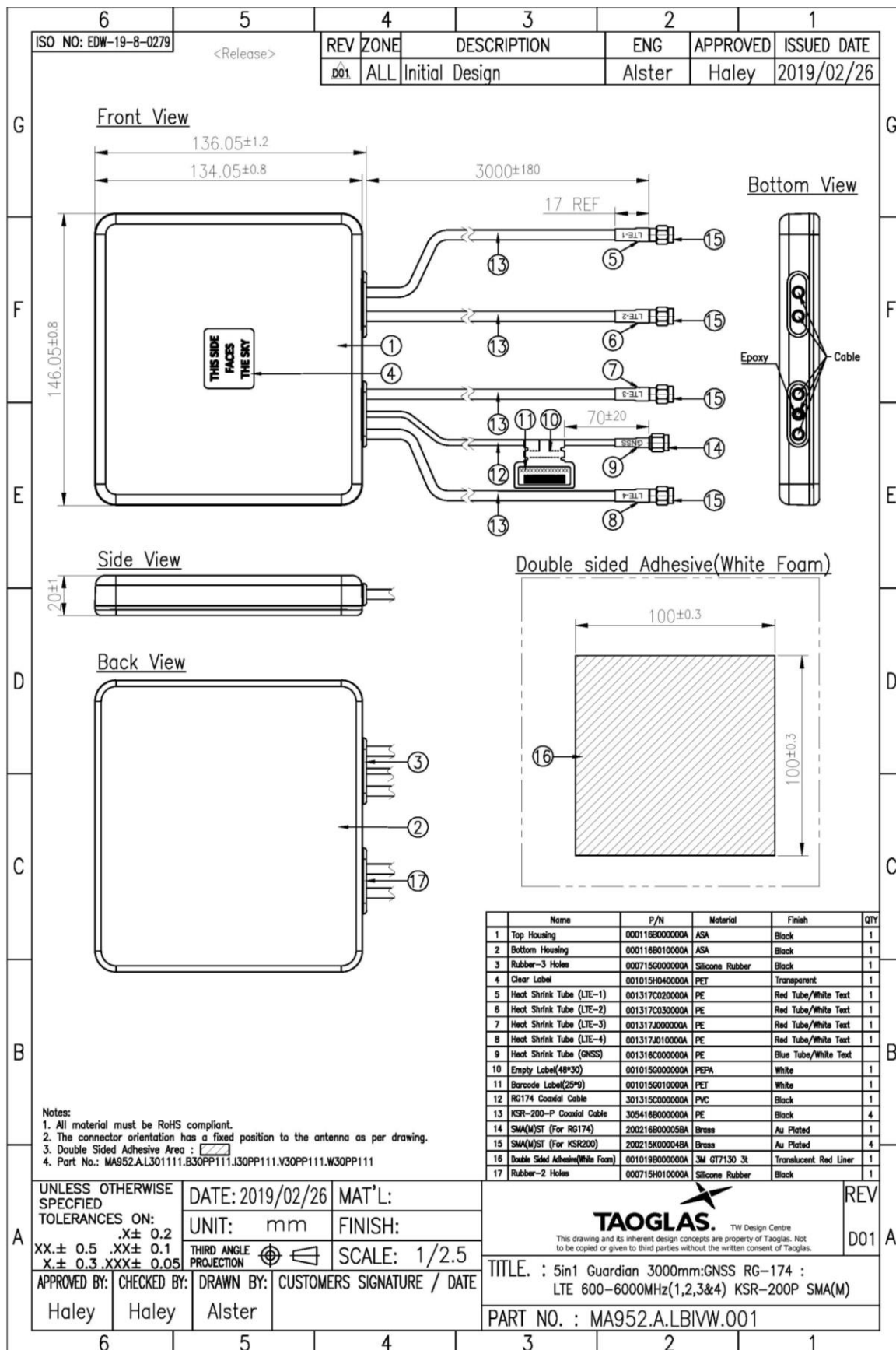
### 5.3.4 LTE MIMO4



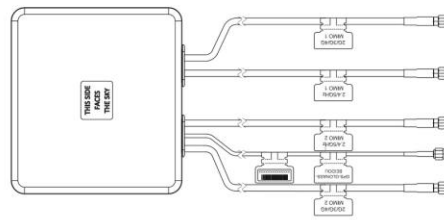




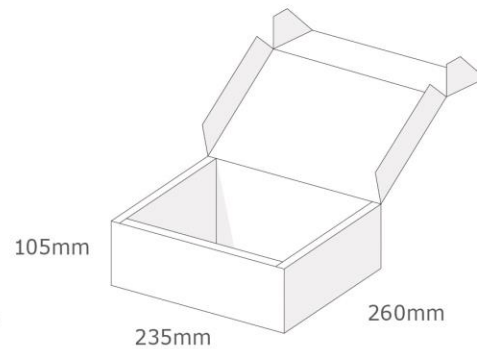
# 6. Mechanical Drawing (Units: mm)



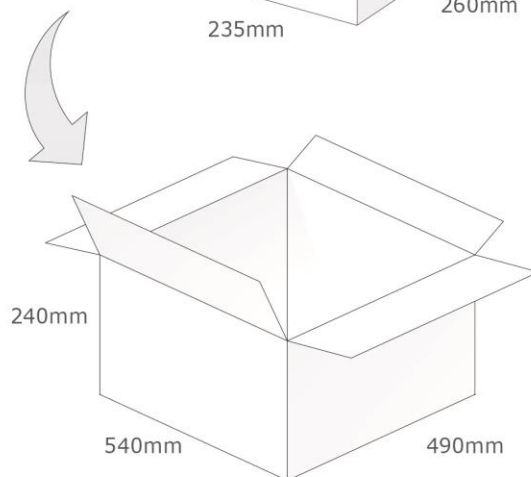
## 7. Packaging



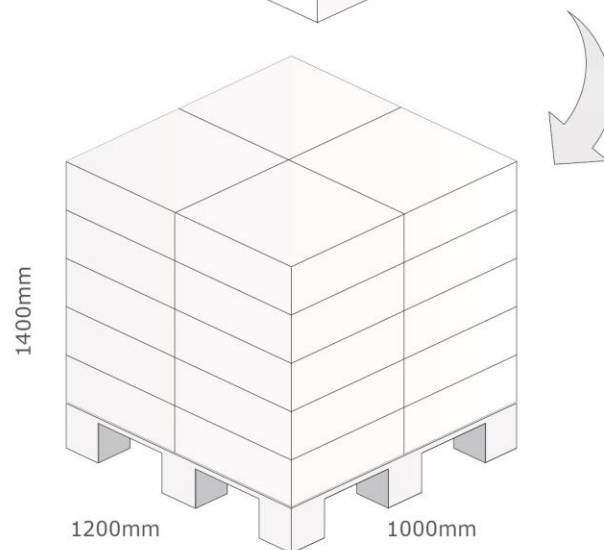
1 No. MA952.A.LBIVW.001 per small box  
 Box Dimensions - 260\*235\*105mm  
 Weight - 0.71Kg



1 Outer Carton  
 Carton Dimensions - 540\*490\*240mm  
 8 pcs MA952.A.LBIVW.001 per carton  
 Weight - 6.3Kg



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



Changelog for the datasheet

**SPE-19-8-054 – MA952.A.LBIVW.001**

<b>Revision: A (Original First Release)</b>	
Date:	2019-04-19
Notes:	
Author:	Jack Conroy

**Previous Revisions**




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- 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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«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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