



# TAOGLAS®



# Datasheet

## Guardian 4in1 Adhesive and Wall Mount Antenna

**Part No:**  
MA963.A.B1VW.002

### Description:

Guardian 4in1 Adhesive and Wall Mount Antenna 4\*5G/4G Antennas

### Features:

- Low-Profile Adhesive Mount Panel Antenna
- 4 \* Wideband 5G/4G MIMO – 600MHz – 6GHz
- Covering Worldwide 5G/4G Bands
- Covering 5G NR Sub 6GHz Bands
- Covering CAT-M1 & NB-IoT Bands
- Includes 3G / 2G Fallback
- IP67 Rated Enclosure
- Cables: 3m KSR200-P as Standard
- Connectors: SMA(M)ST Connectors as Standard
- Dimensions: 146\*134\*20mm
- RoHS & REACH Compliant

|                            |    |
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# 1. Introduction



The Taoglas MA963 Guardian is a next-generation 4in1 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. It is a heavy-duty, fully IP67 waterproof external M2M antenna available in both wall and adhesive mount versions.

Typical use cases include

- IoT Gateway 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 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 MA963 comes with 3m, low loss KSR200-P coaxial cables for the LTE antennas as standard. Customized cables and connector versions are also available. Contact your regional Taoglas customer support for more information on how to integrate the MA963 or sales support.

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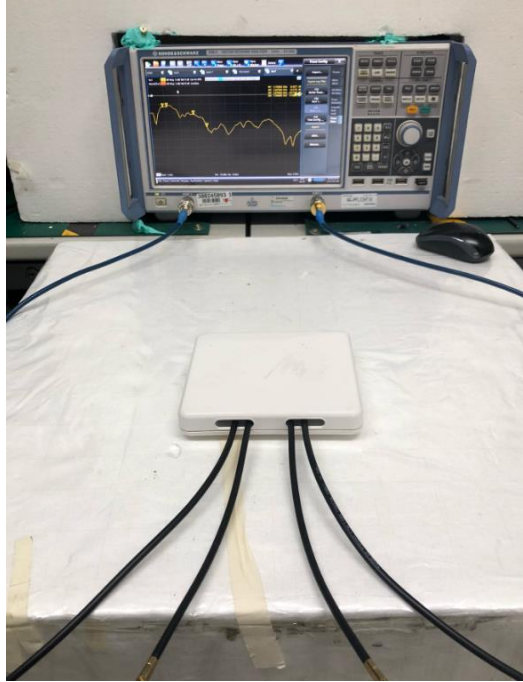
## 2. Specifications

| 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       |
| Efficiency (%)           |    |               |          |            |                       |            |            |            |            |                       |                  |
| 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            |
| Average Gain (dB)        |    |               |          |            |                       |            |            |            |            |                       |                  |
| 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            |
| Peak Gain (dBi)          |    |               |          |            |                       |            |            |            |            |                       |                  |
| 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>  |    | 2 W           |          |            |                       |            |            |            |            |                       |                  |

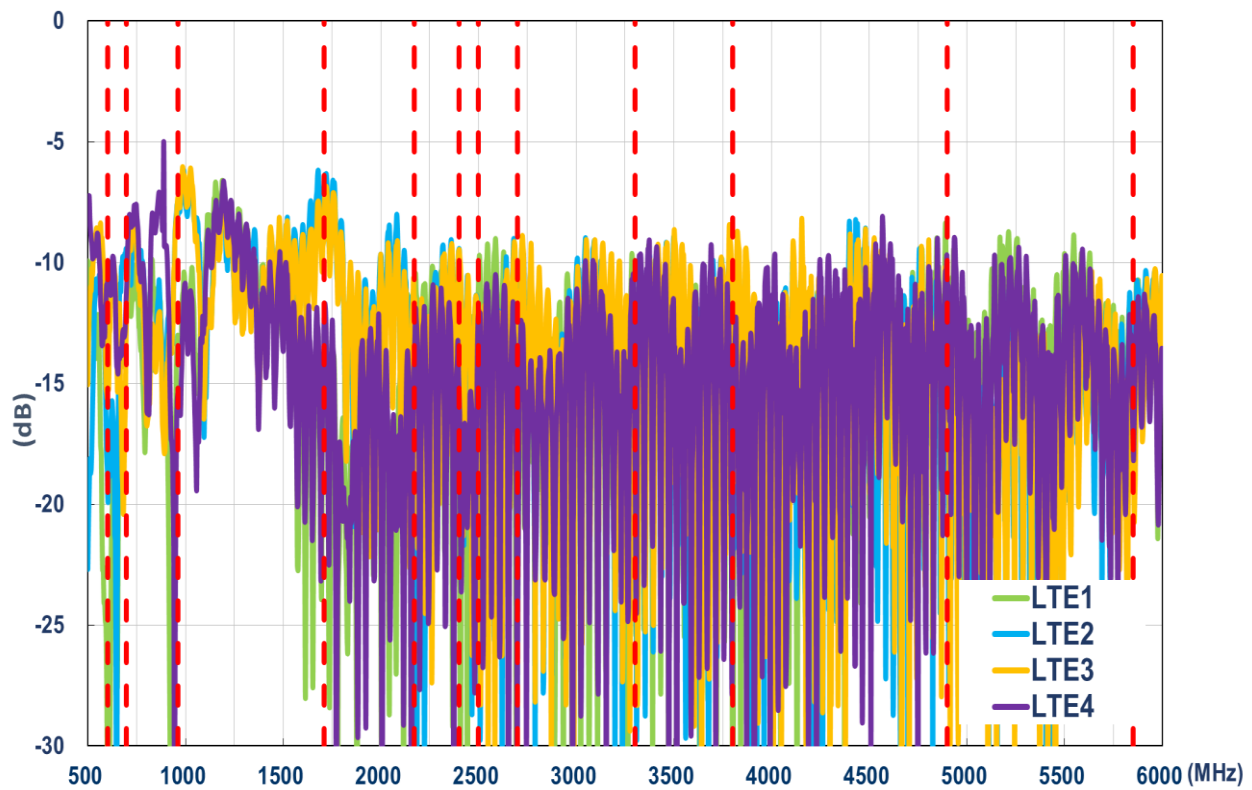
| <b>Mechanical</b>        |                            |
|--------------------------|----------------------------|
| <b>Height</b>            | 20 ±2 mm                   |
| <b>Planner Dimension</b> | 146*134 mm                 |
| <b>Casing</b>            | ASA                        |
| <b>Cable</b>             | KSR200-P 3000 mm           |
| <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. Antenna Characteristics

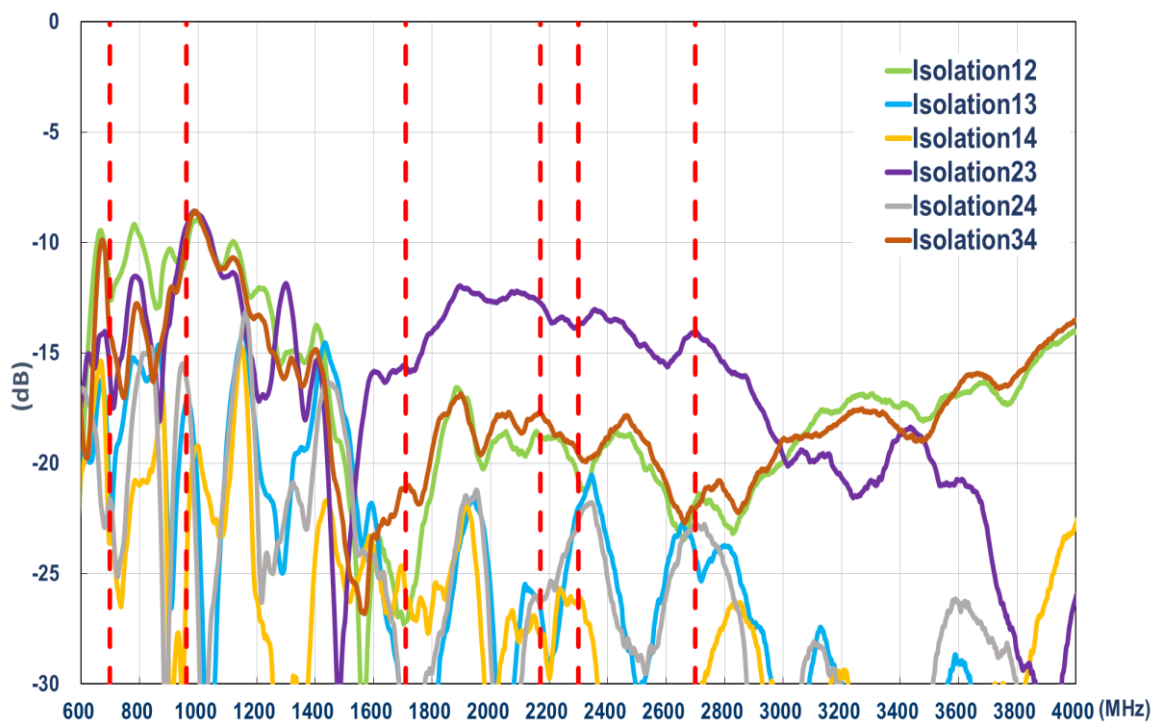
### 3.1 Test Setup – Free Space



### 3.2 Return Loss

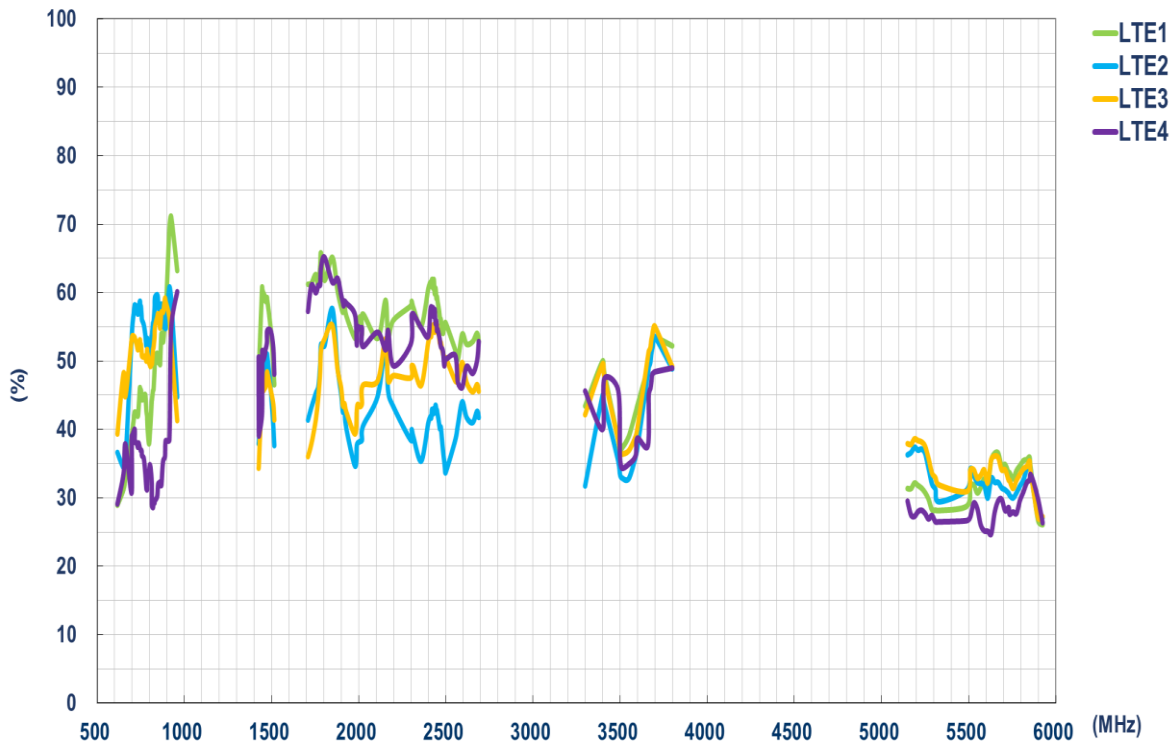


### 3.3 Isolation

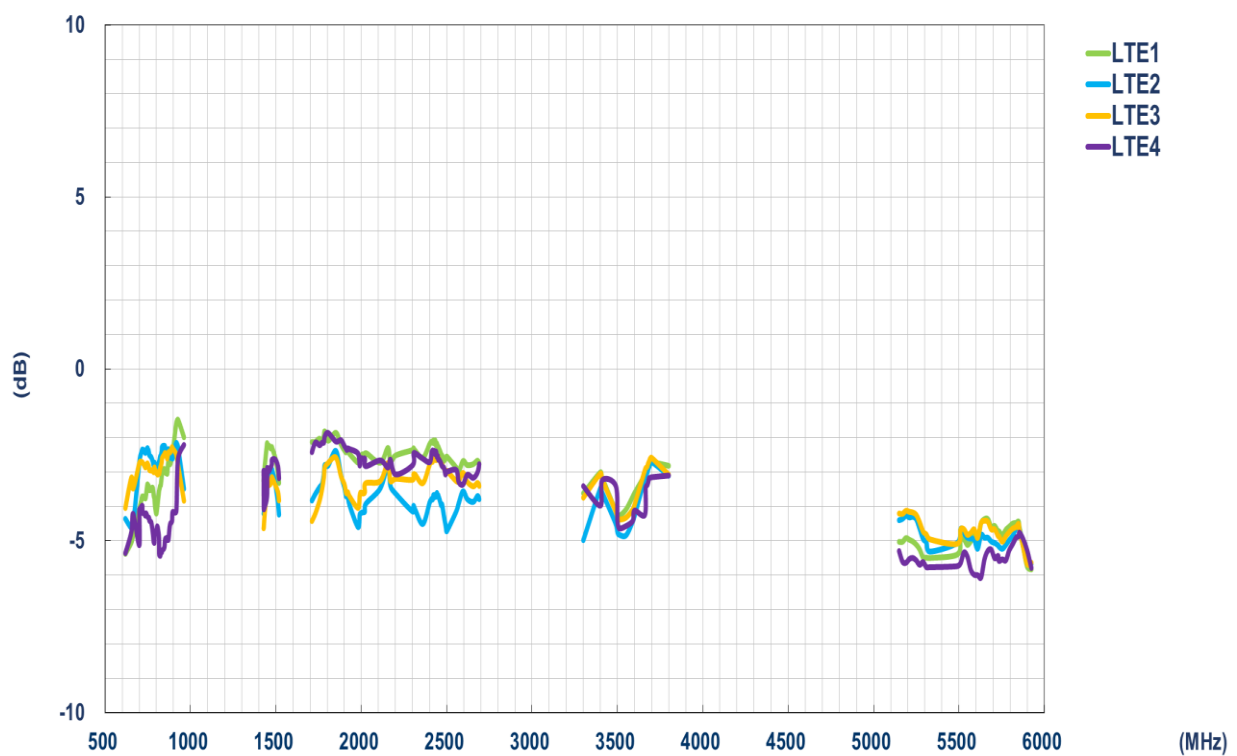




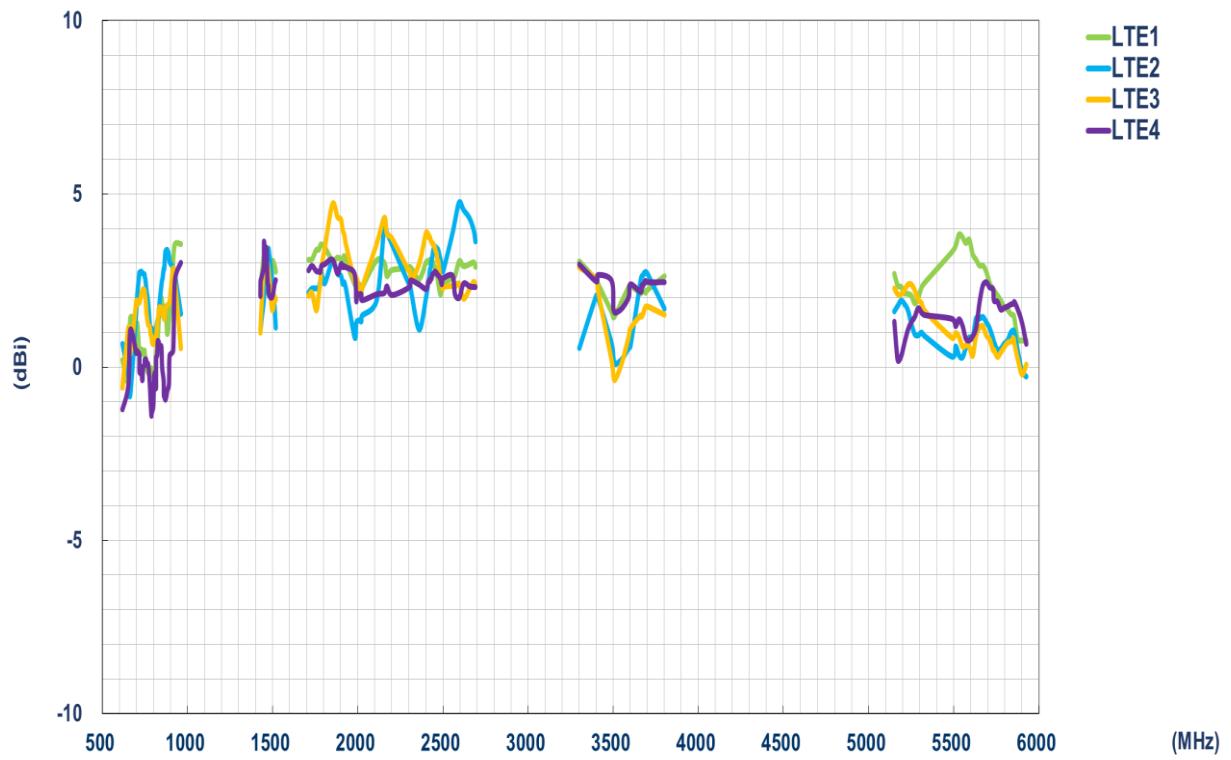
### 3.4 Efficiency



### 3.5 Average gain



### 3.6 Peak gain



## 4. Radiation Patterns

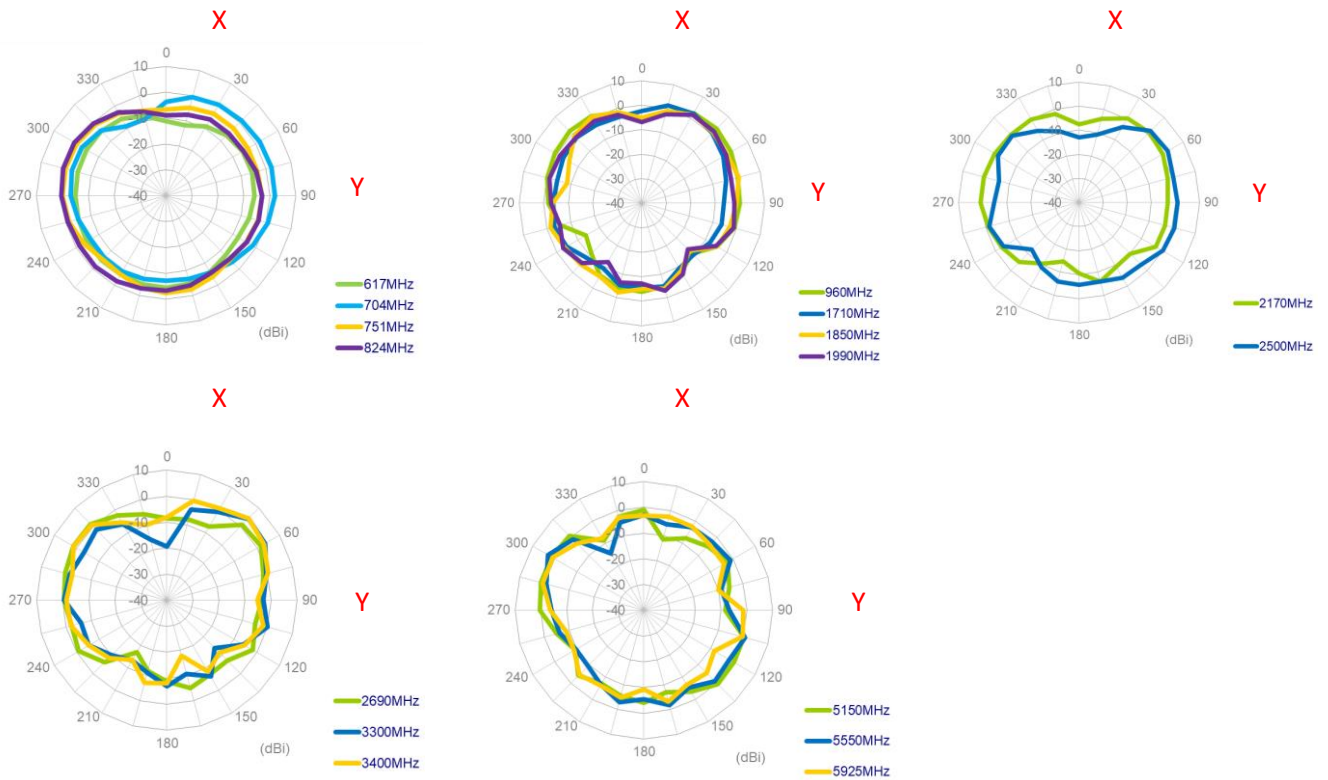
### 4.1 Test Setup – Free Space



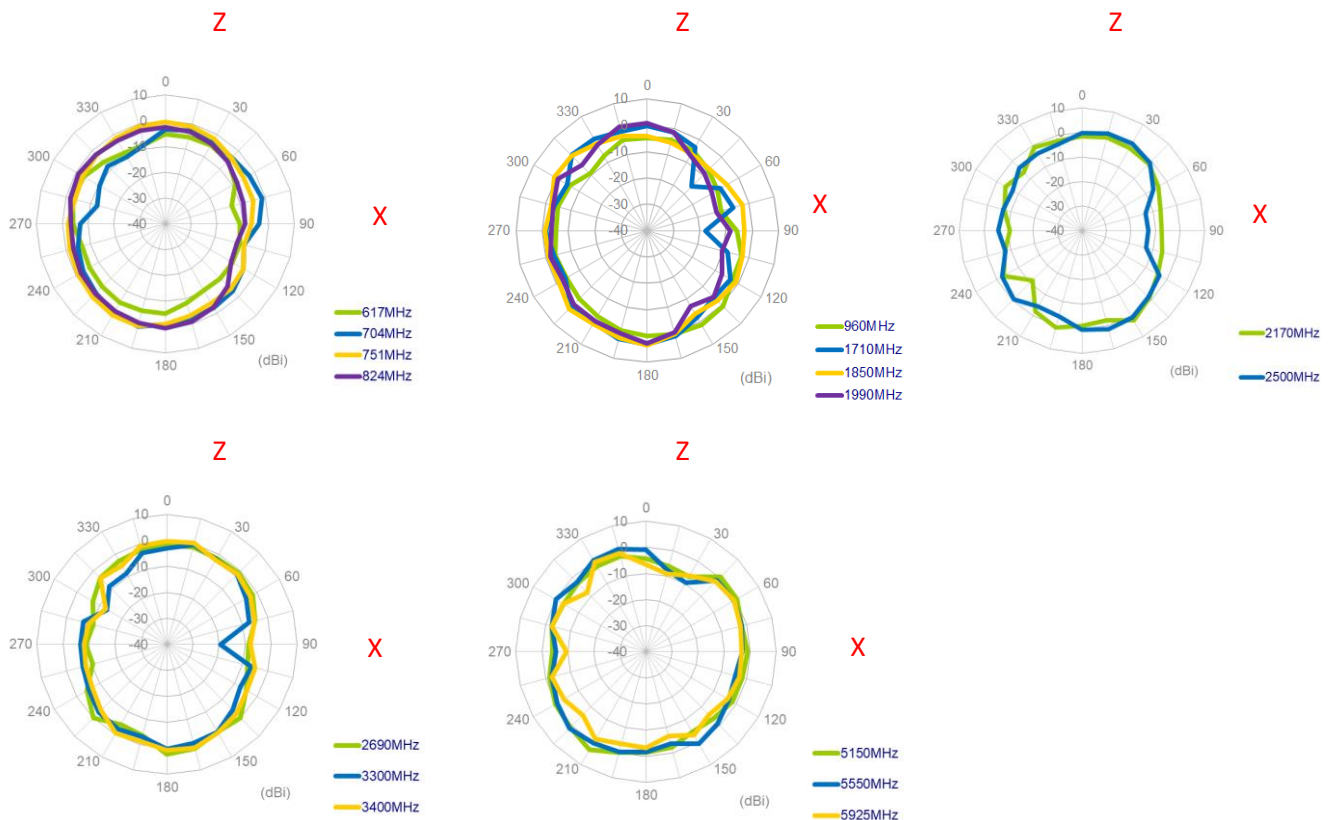
## 4.2 2D Radiation Patterns

### 4.2.1 5G/4G MIMO1

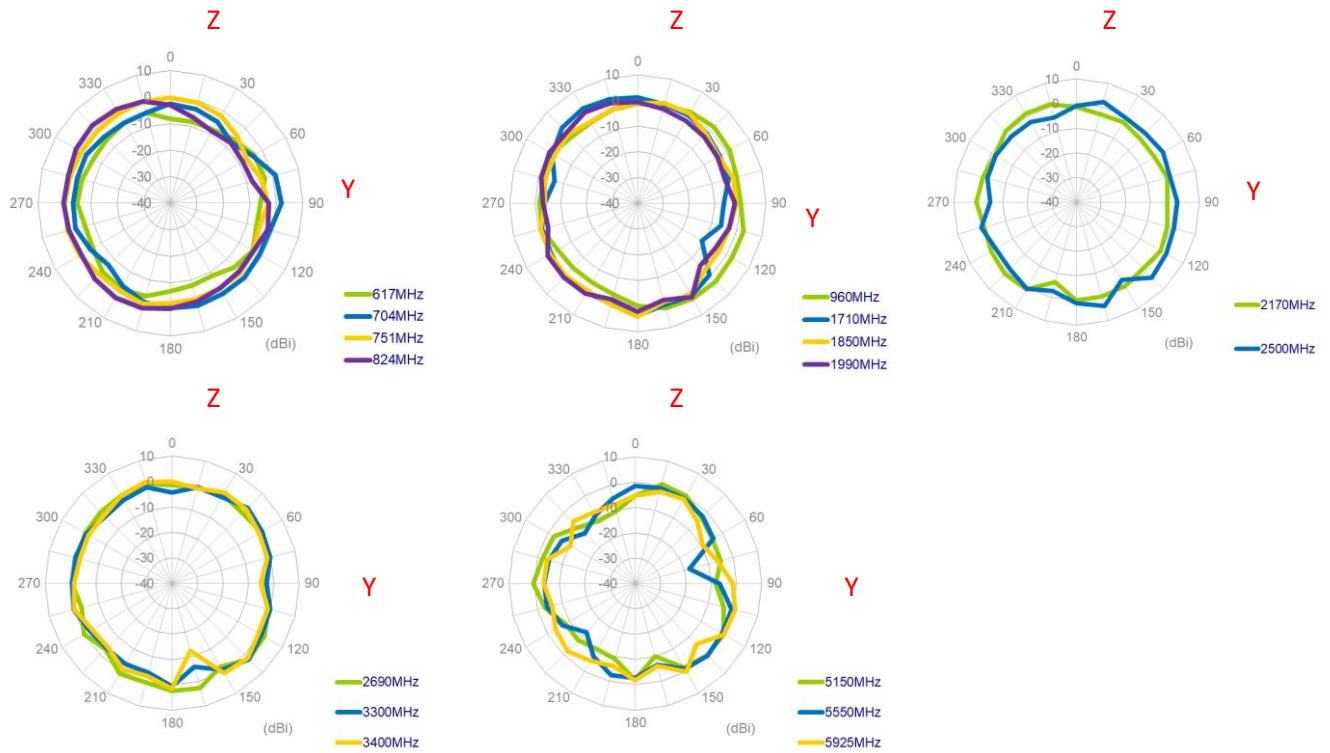
#### XY Plane



#### XZ Plane

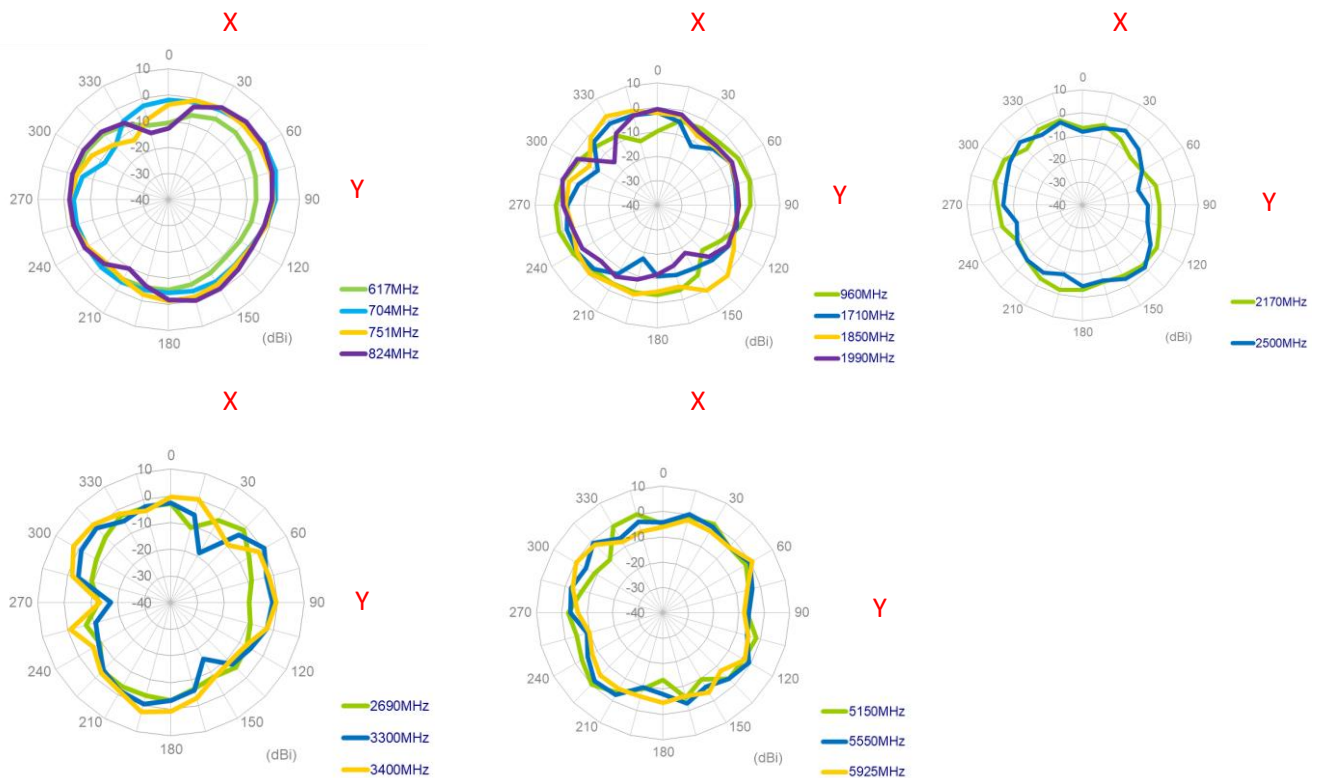


## YZ Plane

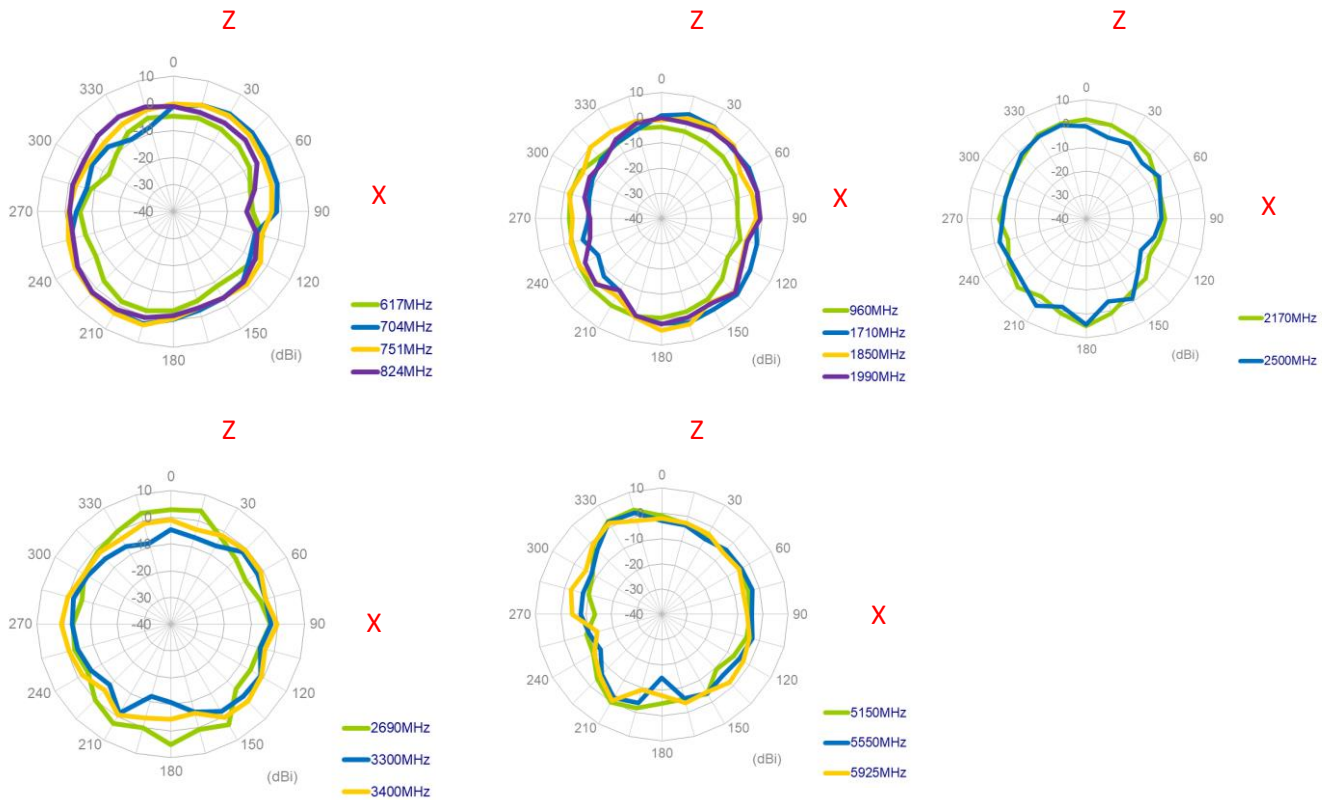


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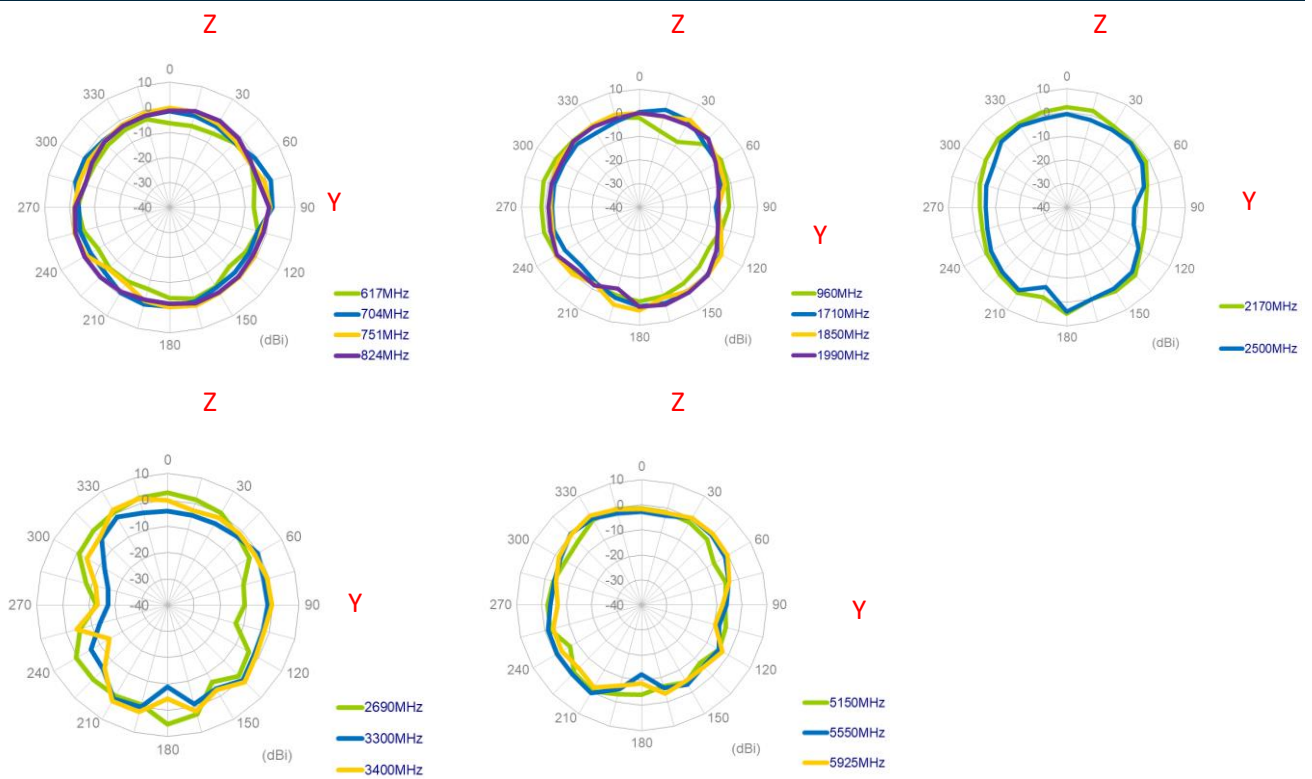
## XY Plane



## XZ Plane

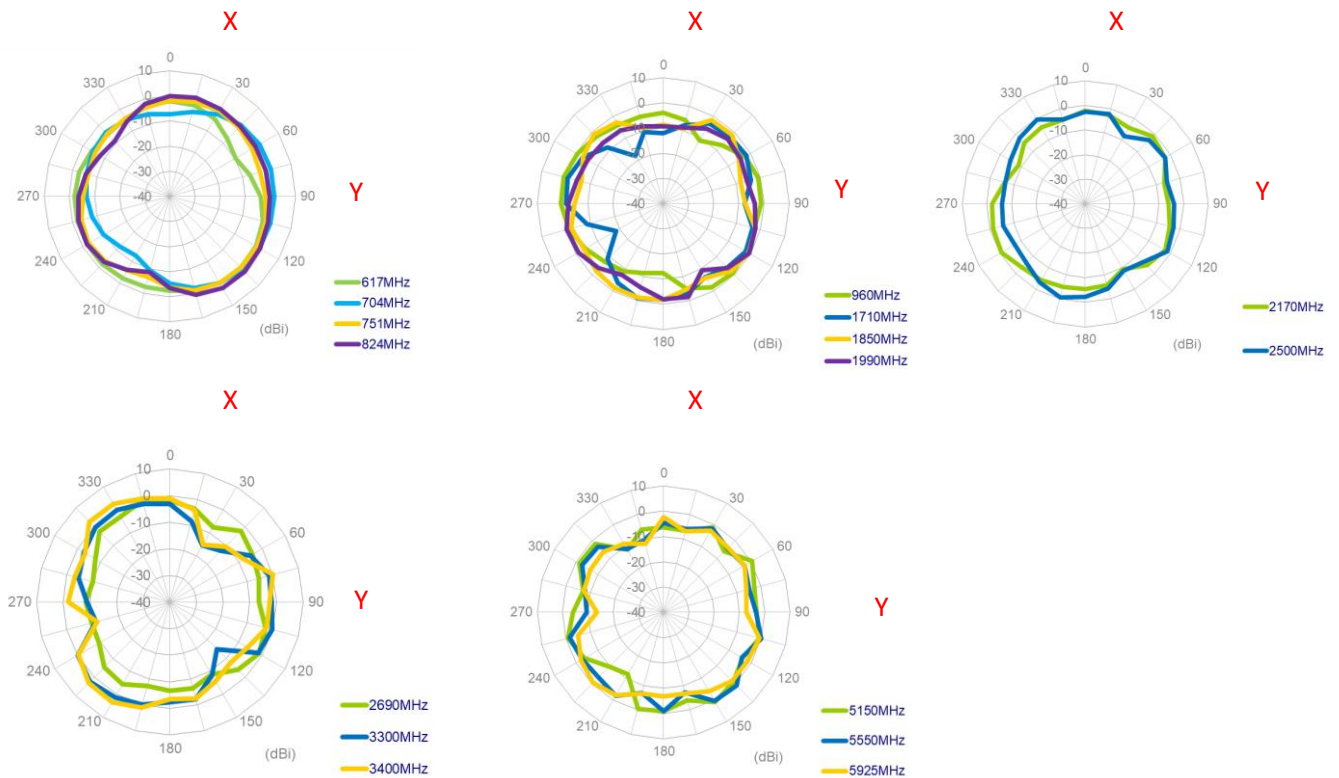


## YZ Plane

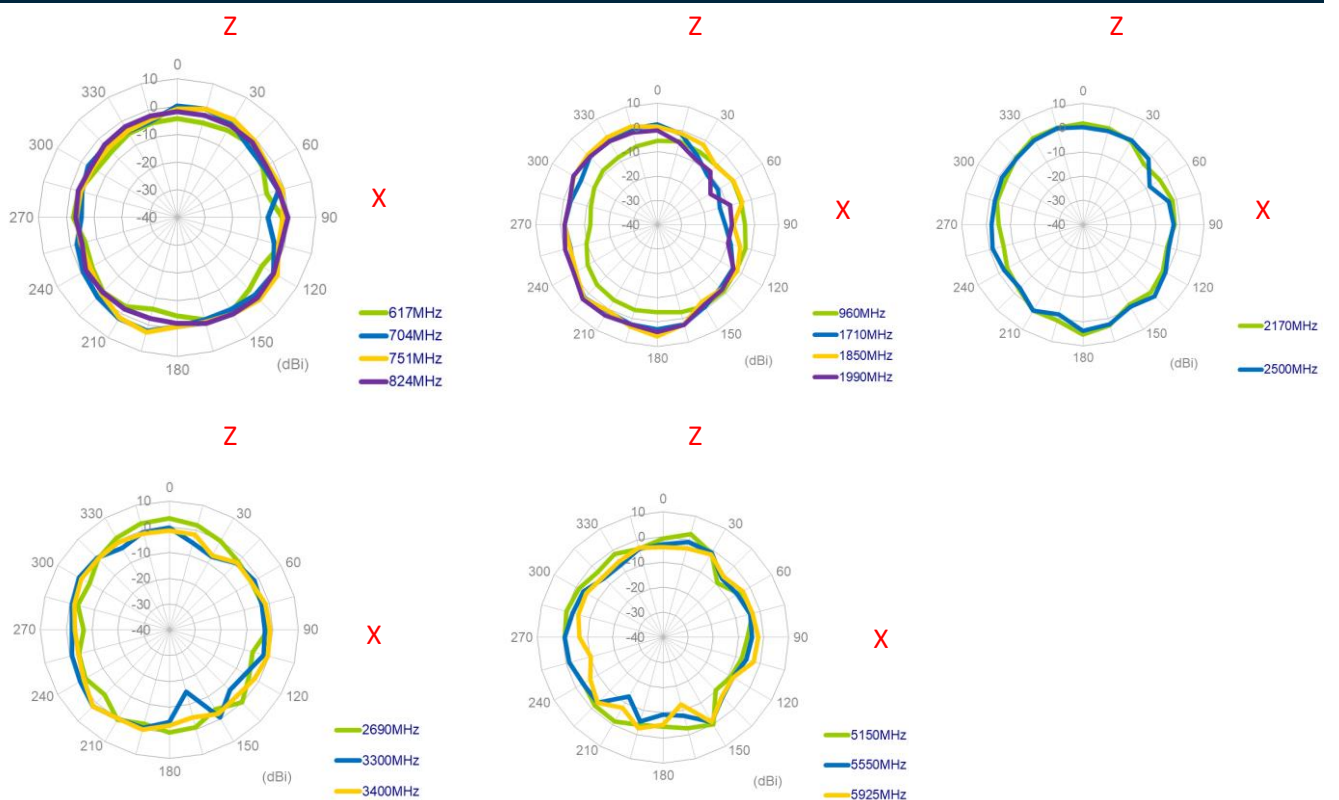


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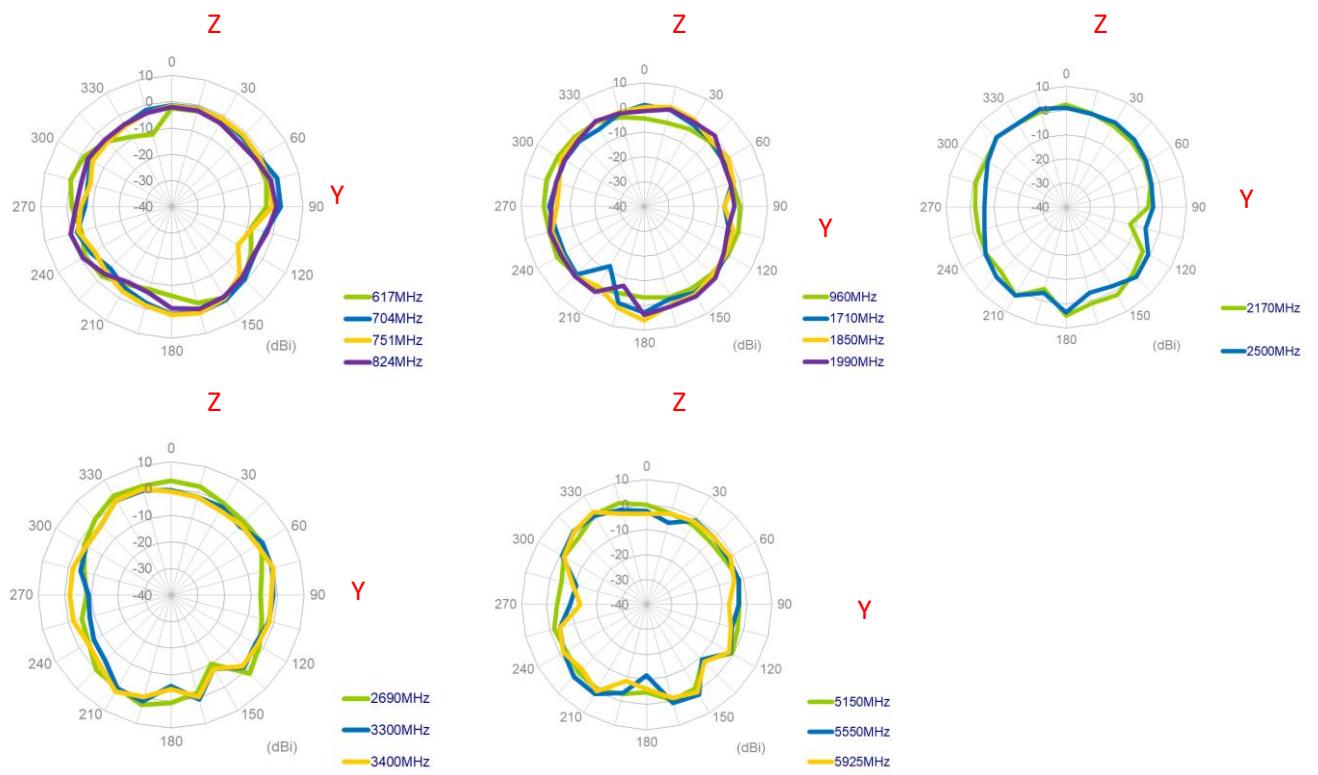
#### XY Plane



#### XZ Plane

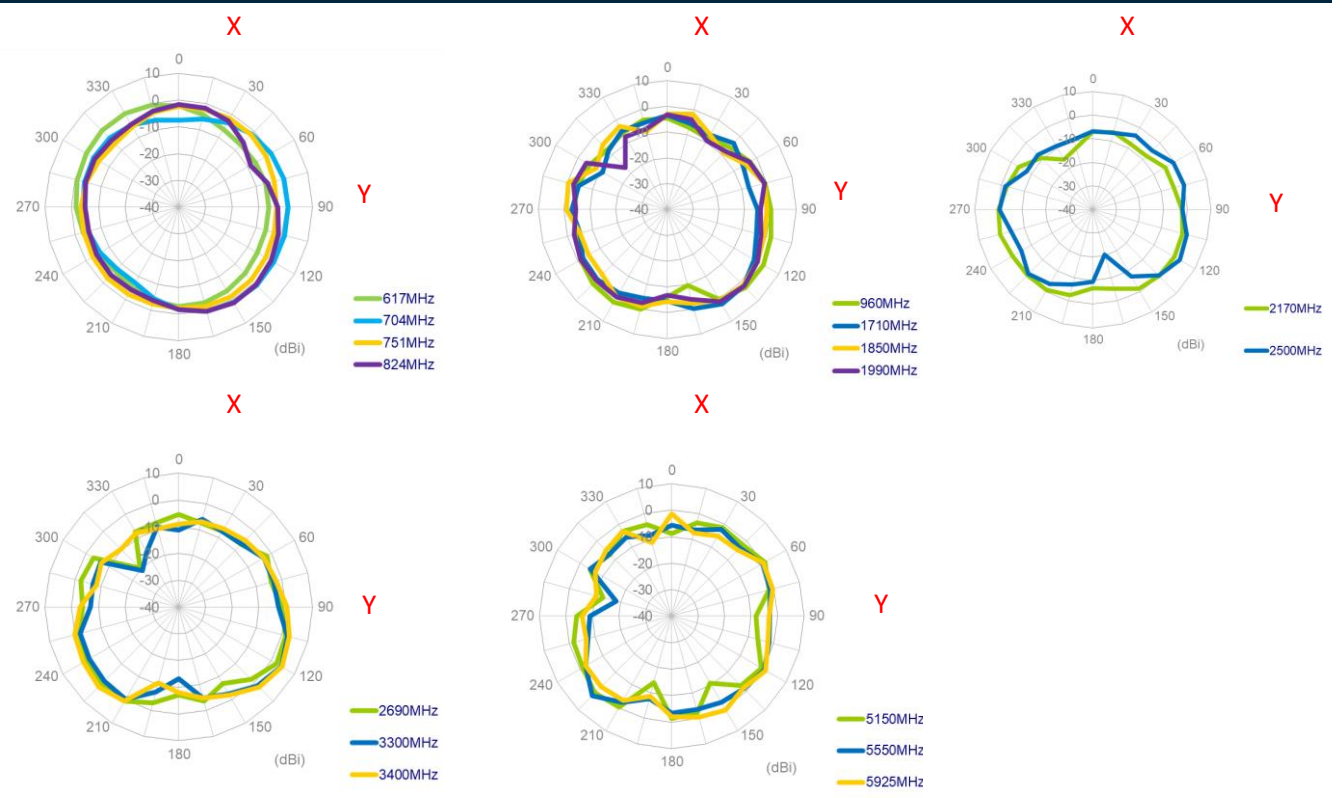


## YZ Plane



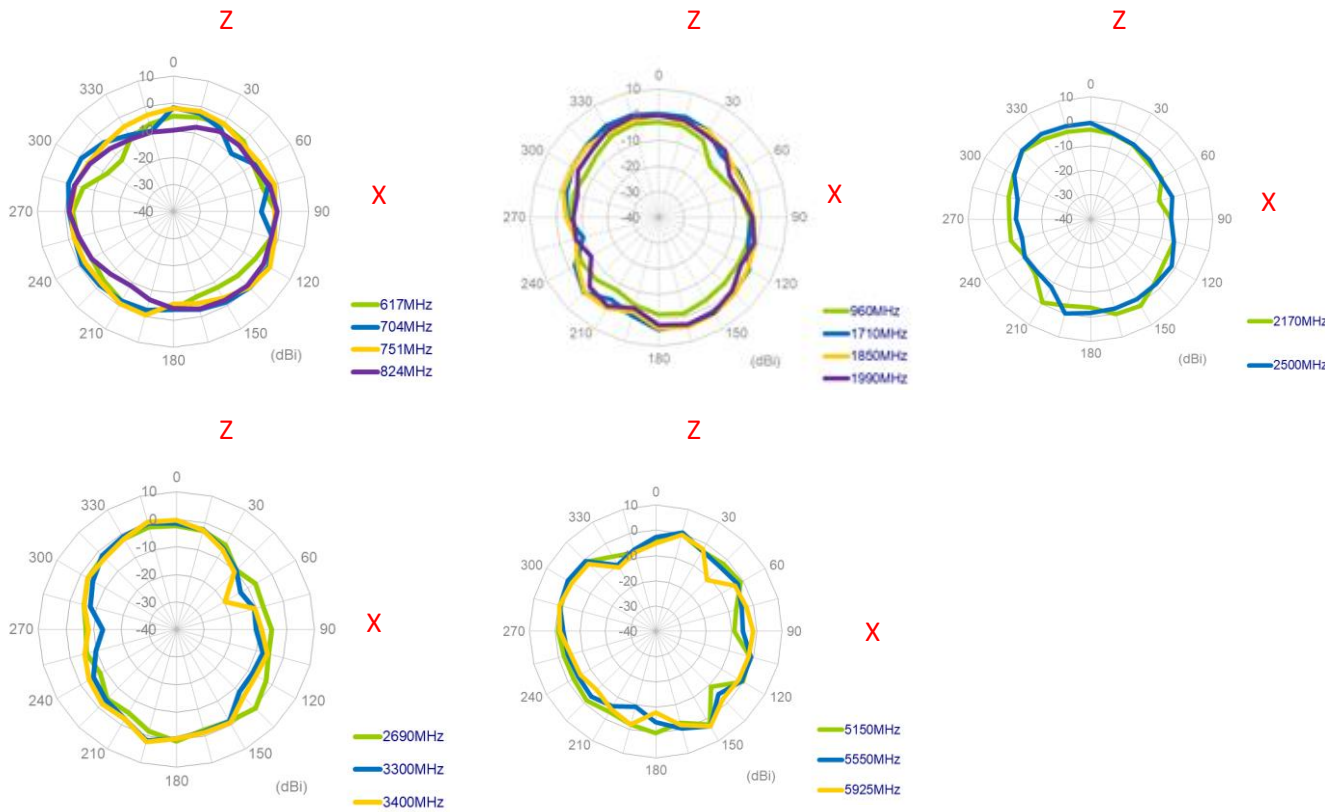
### 4.2.4 5G/4G MIMO4

## XY Plane

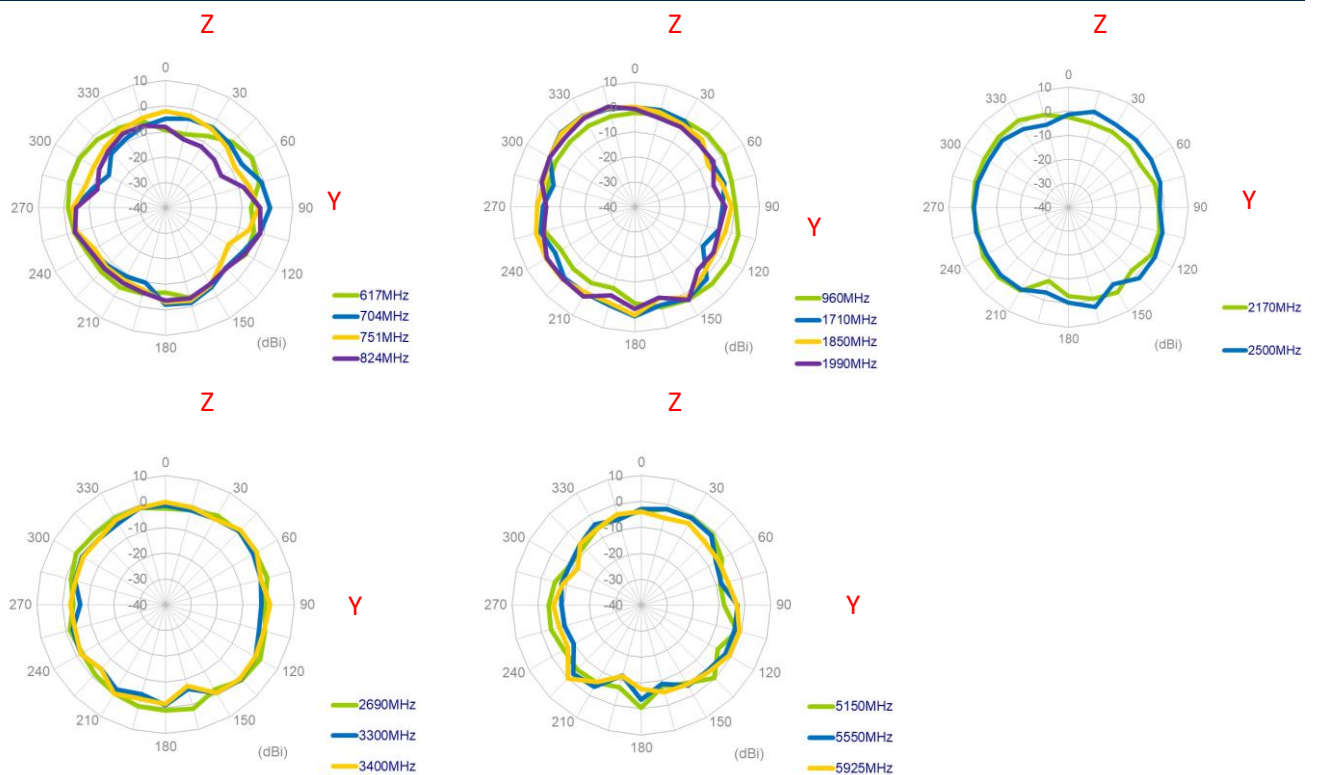




## XZ Plane

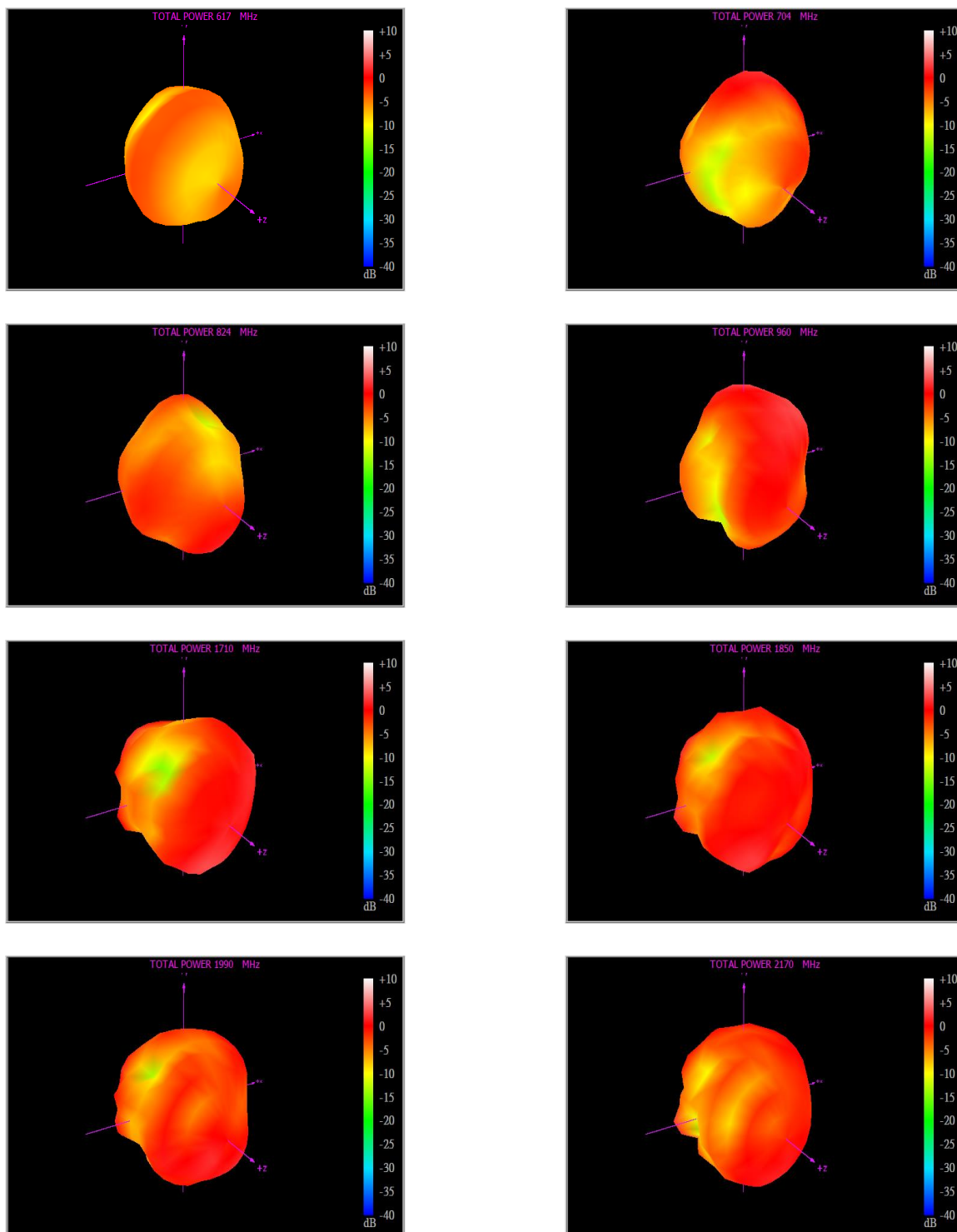


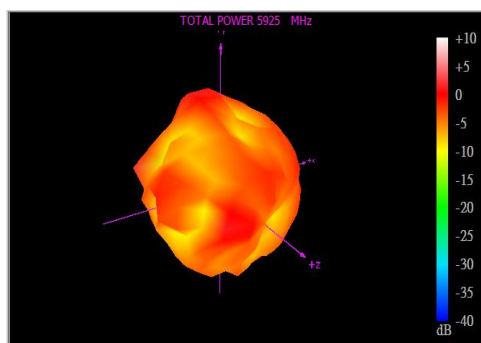
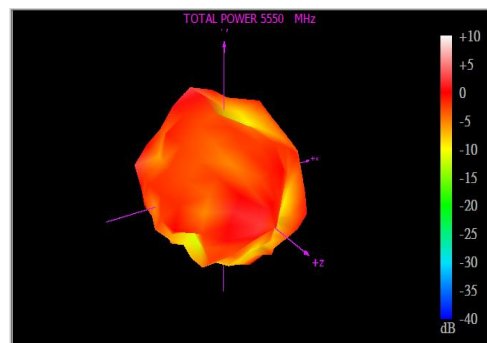
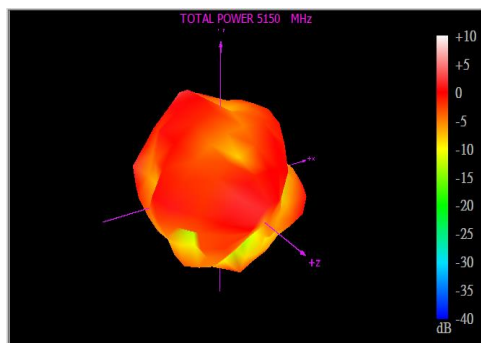
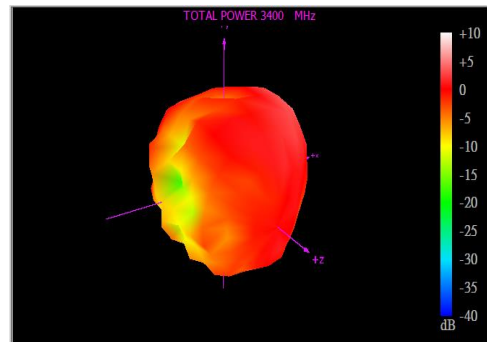
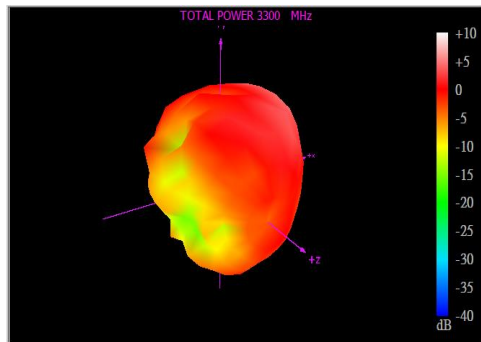
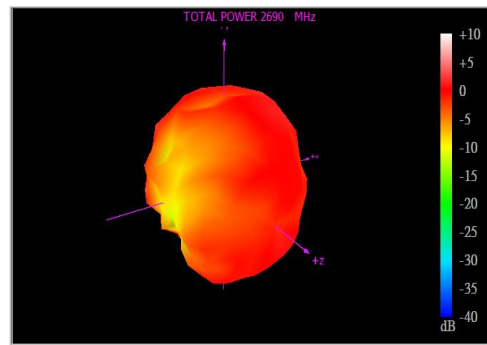
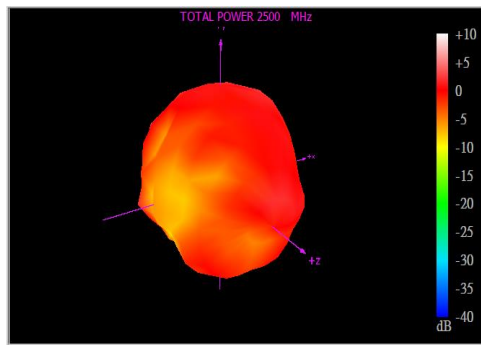
## YZ Plane



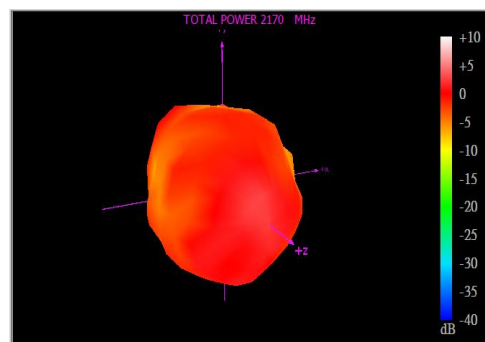
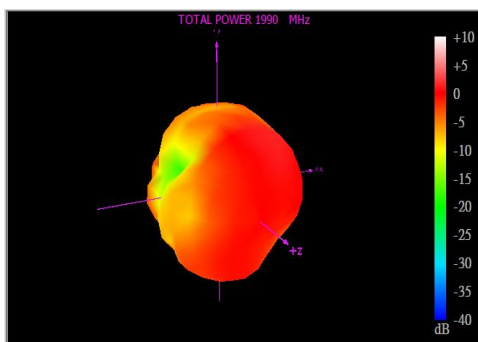
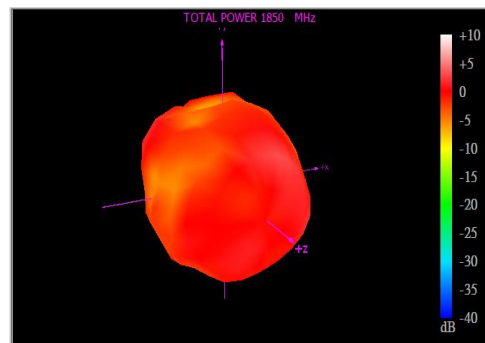
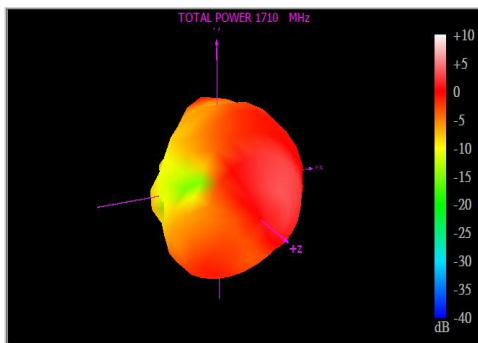
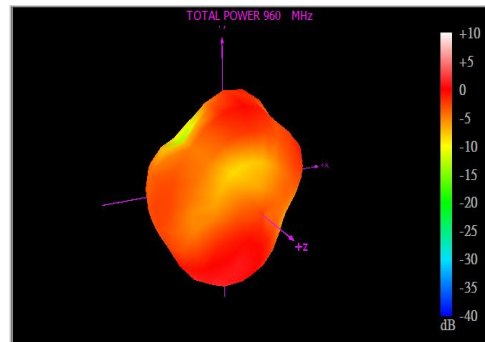
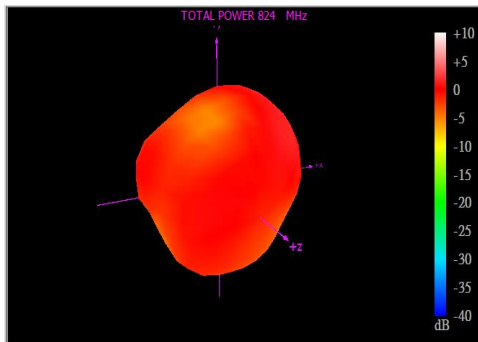
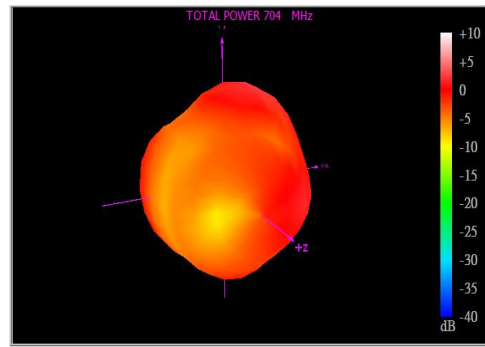
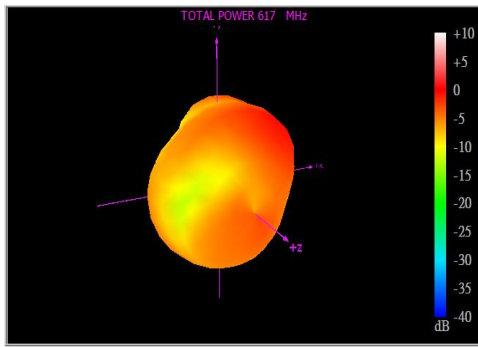
## 4.3 3D Radiation Pattern

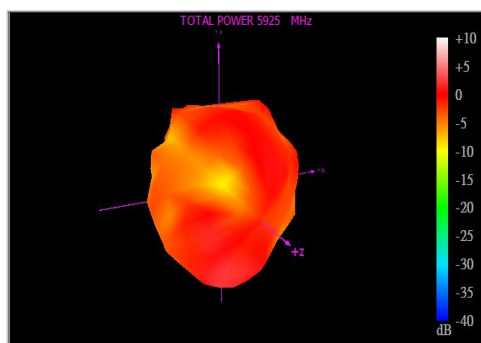
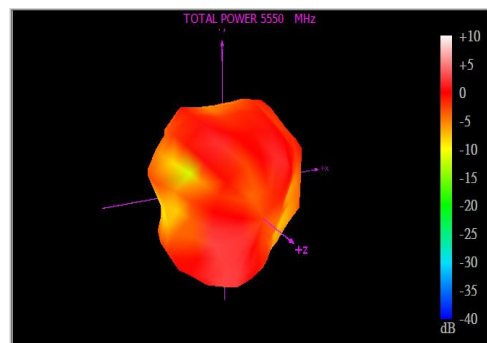
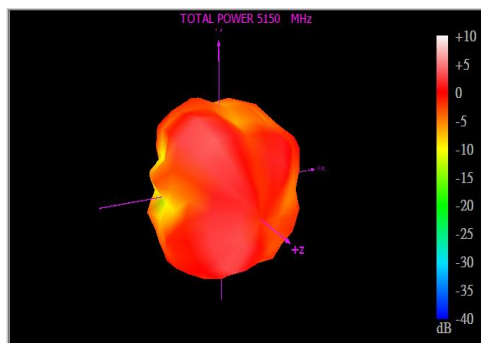
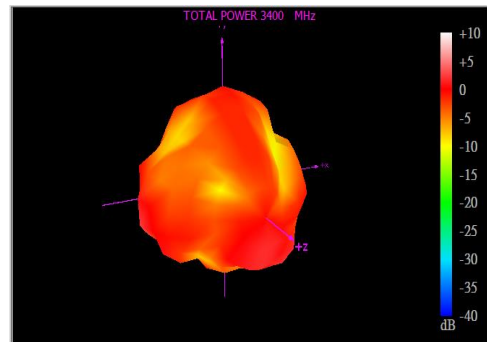
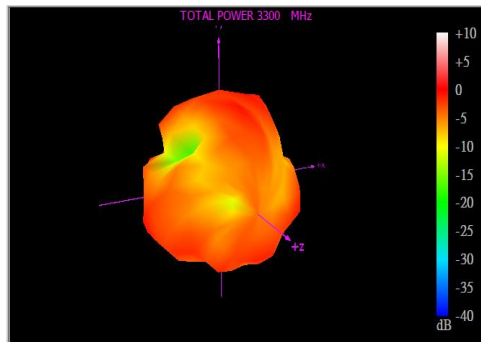
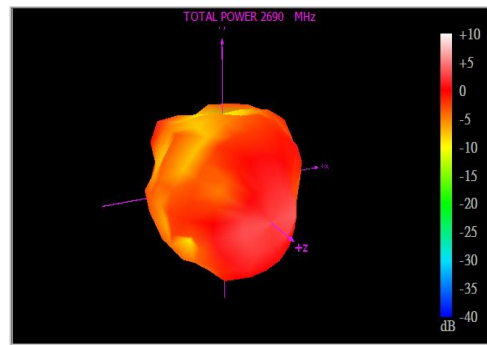
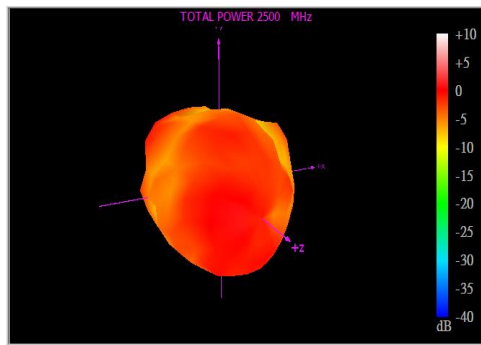
### 4.3.1 5G/4G MIMO1



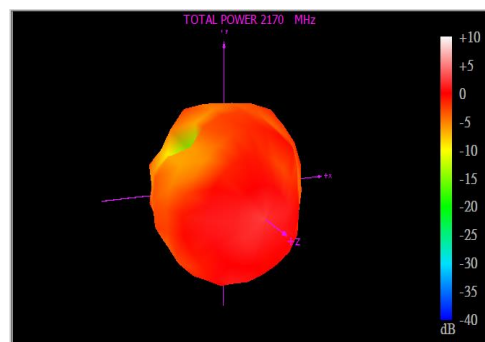
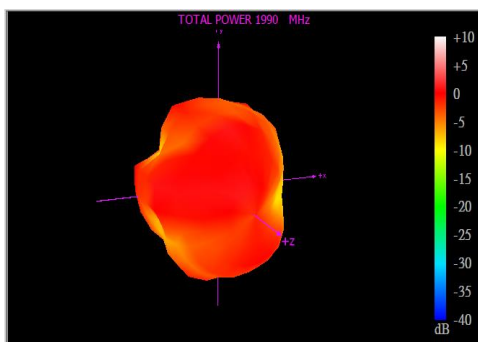
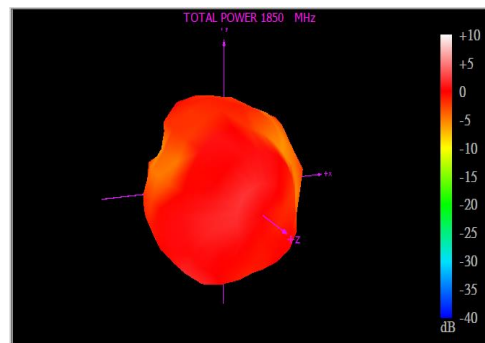
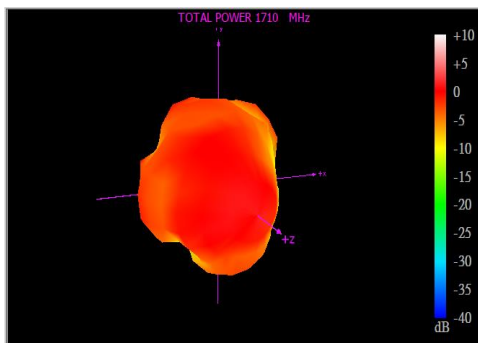
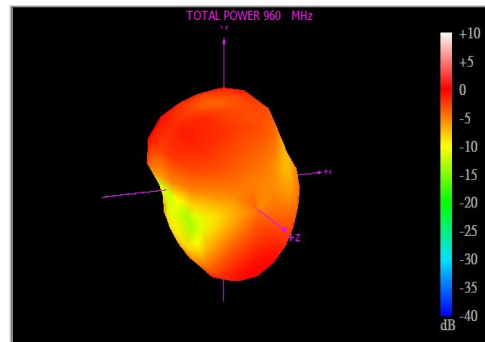
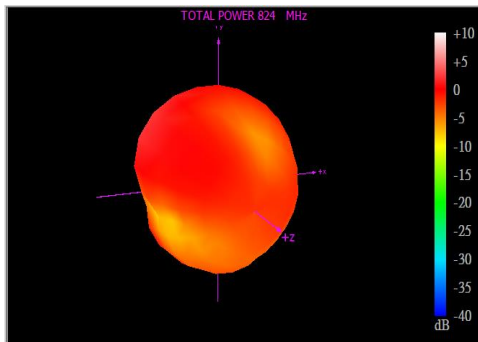
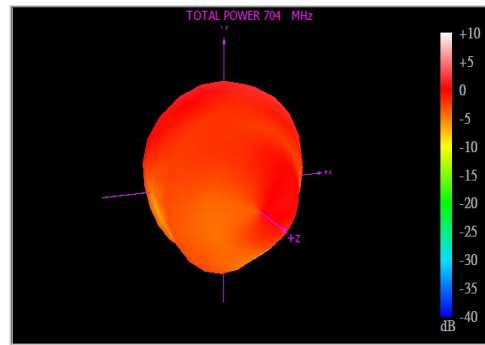
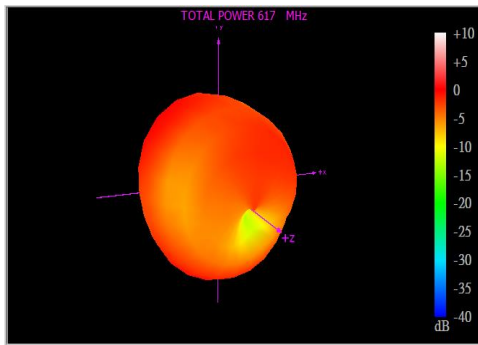


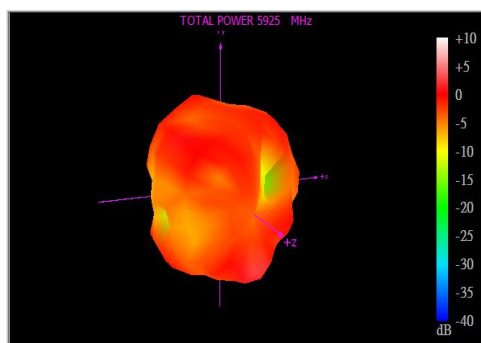
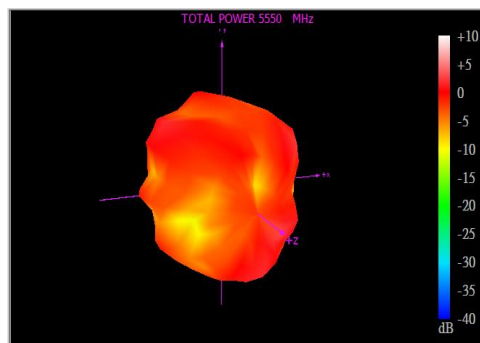
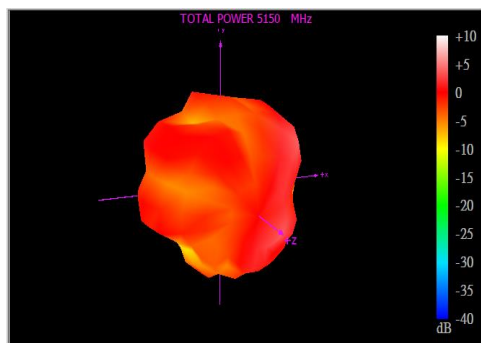
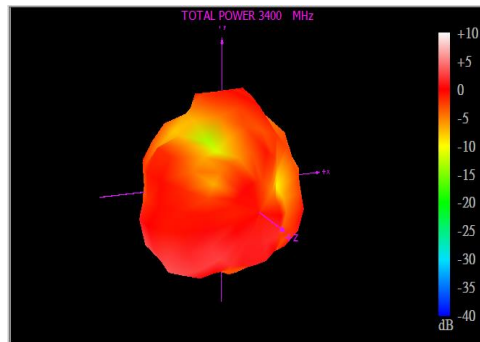
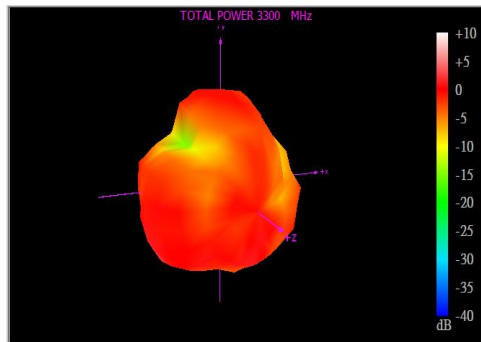
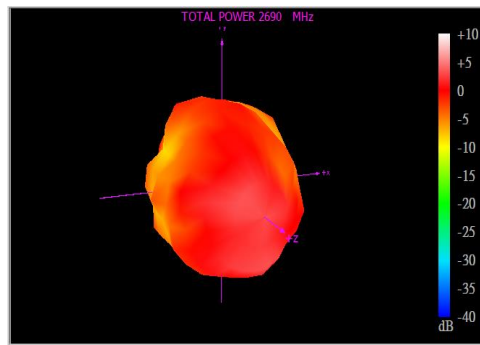
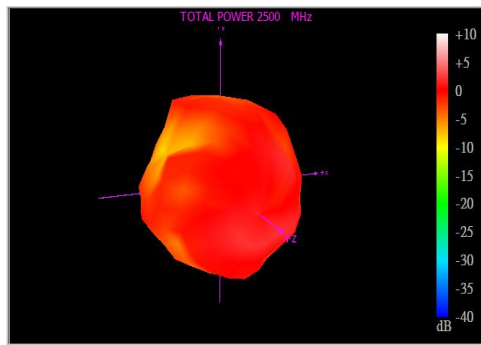
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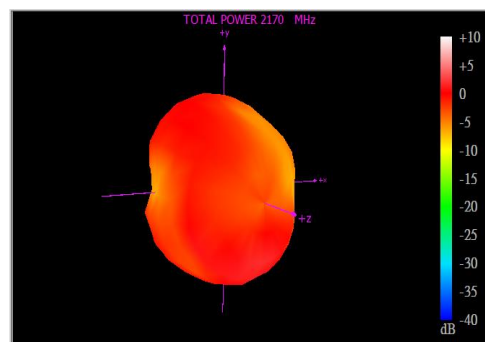
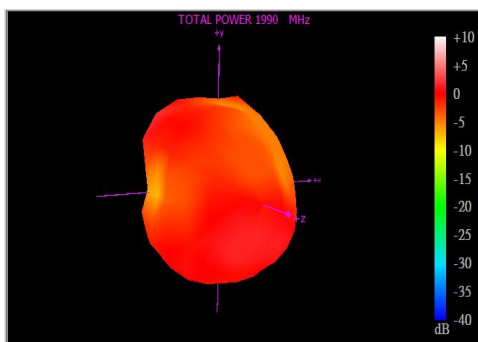
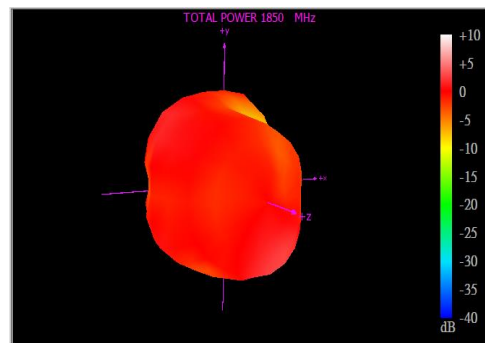
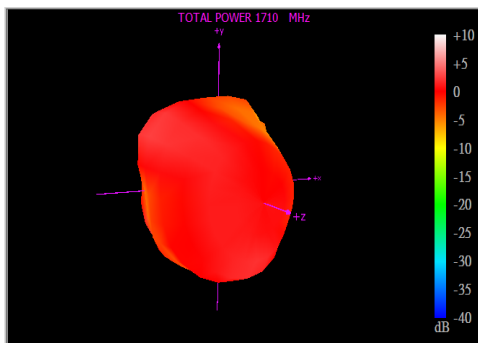
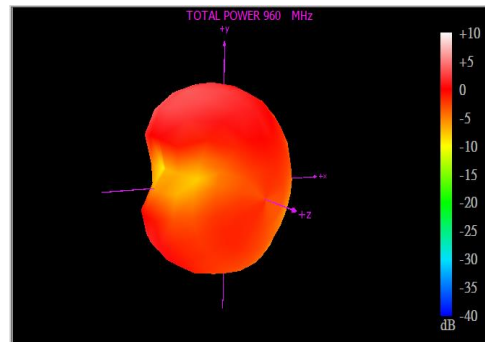
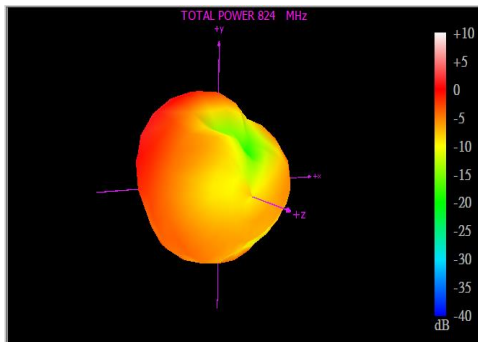
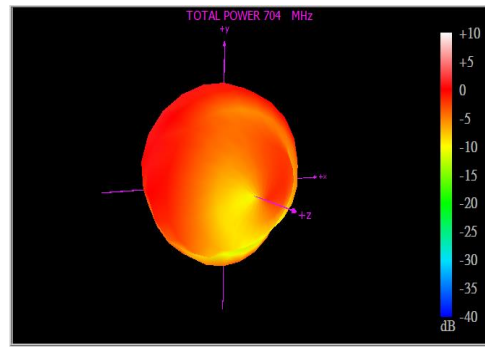
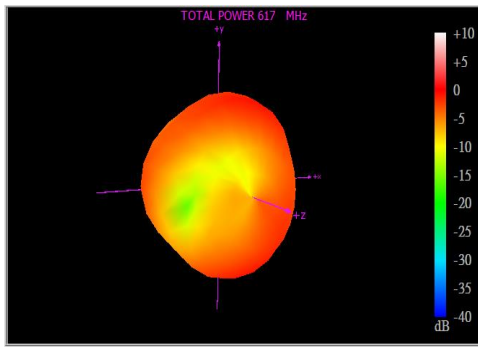


### 4.3.3 5G/4G MIMO3

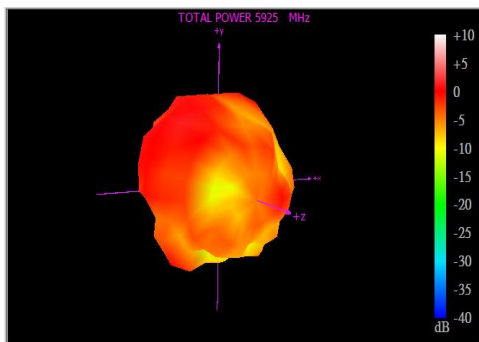
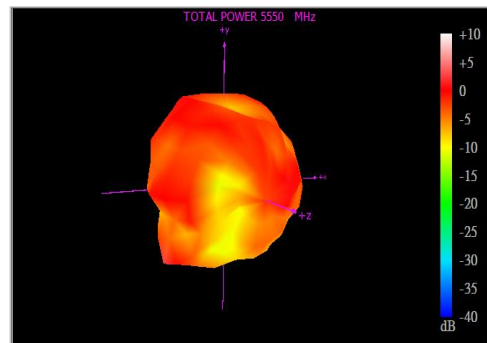
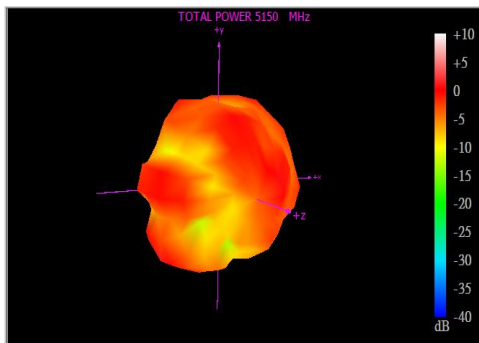
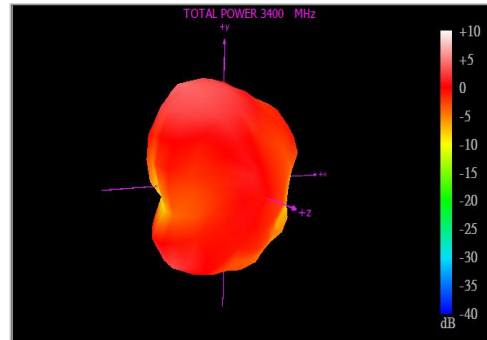
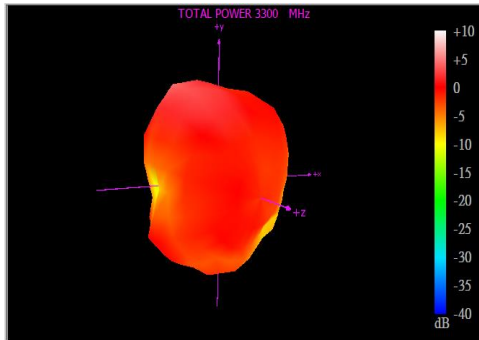
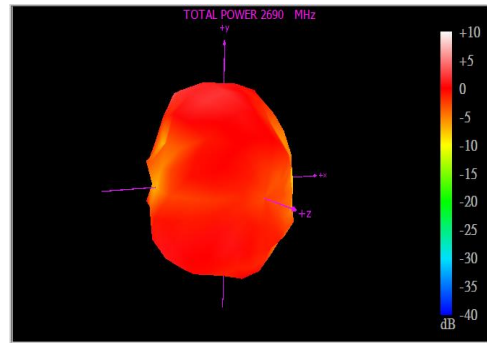
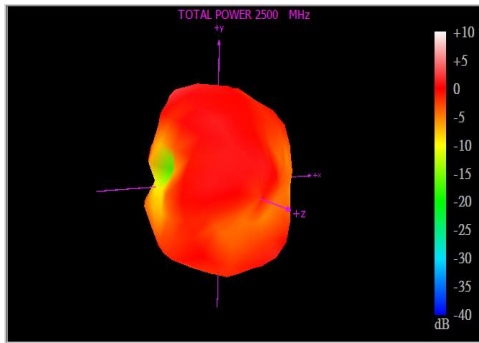




### 4.3.4 5G/4G MIMO4







# 5. Mechanical Drawing (Units: mm)

|                       |           |     |      |  |        |          |             |
|-----------------------|-----------|-----|------|--|--------|----------|-------------|
| 6                     | 5         | 4   | 3    | 2  | 1      |          |             |
| ISO NO: EDW-19-8-0280 | <Release> | REV | ZONE | DESCRIPTION  | ENG    | APPROVED | ISSUED DATE |
|                       |           | 1   | ALL  | Change Printing Heat Shrink Tube and Label Position and Change Form. | Bonnie | Aaron    | 2019/07/26  |
|                       |           | 2   | ALL  | Change LTE 1-4 Location  | Rachel | Aaron    | 2019/10/09  |
|                       |           | 3   | ALL  | Amend the Double sided Adhesive Description                          | Ruby   | Aaron    | 2019/11/20  |

**Front View**

**Side View**

**Back View**

**Bottom View**

**Double sided Adhesive(Black Foam)**

**NOTES:**

- All material must be RoHS compliant.
- The connector orientation has a fixed position to the antenna as per drawing.
- Part No.: MA963.W.A.B30PP111.I30PP111.V30PP111.W30PP111
- Double Sided Adhesive Area :

| Name                                | P/N            | Material        | Finish              | QTY |
|-------------------------------------|----------------|-----------------|---------------------|-----|
| 1 Top Housing                       | 000116B000000A | ASA             | Black               | 1   |
| 2 Bottom Housing                    | 000116B010000A | ASA             | Black               | 1   |
| 3 Rubber-2 Holes                    | 000715H010000A | Silicone Rubber | Black               | 2   |
| 4 Clear Label                       | 001015H040000A | PET             | Transparent         | 1   |
| 5 Heat Shrink Tube (LTE-1)          | 001317C020000A | PE              | Red Tube/White Text | 1   |
| 6 Heat Shrink Tube (LTE-2)          | 001317C030000A | PE              | Red Tube/White Text | 1   |
| 7 Heat Shrink Tube (LTE-3)          | 001317J000000A | PE              | Red Tube/White Text | 1   |
| 8 Heat Shrink Tube (LTE-4)          | 001317J010000A | PE              | Red Tube/White Text | 1   |
| 9 Double Sided Adhesive(Black Foam) | 001019C010000A | DK95:MMH9K 15H  | White Liner         | 1   |
| 10 Empty Label                      | 001015G000000A | PEPA            | White               | 1   |
| 11 Barcode Label                    | 001015G010000A | PET             | White               | 1   |
| 12 KSR-200-P Cable                  | 305416B000000A | PE              | Black               | 4   |
| 13 SMA(M)ST                         | 200215K00004BA | Brass           | Au Plated           | 4   |

UNLESS OTHERWISE SPECIFIED  
TOLERANCES ON:

.X± 0.2  
XX± 0.5 .XX± 0.1  
X± 0.3 .XXX± 0.05

APPROVED BY: Aaron    CHECKED BY: Aaron    DRAWN BY: Rachel

DATE: 2019/10/09    MAT'L:

UNIT: mm    FINISH:

THIRD ANGLE PROJECTION    SCALE: 1/2.5

CUSTOMERS SIGNATURE / DATE

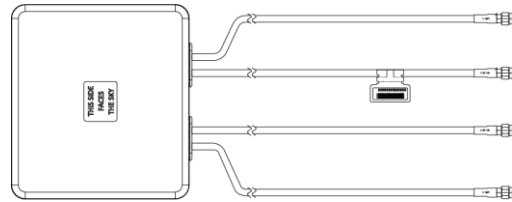
TW Design Centre  
This drawing and its inherent design concepts are property of Taoglas. Not to be copied or given to third parties without the written consent of Taoglas.

TITLE : 4in1 Adhesive 3000mm:  
LTE 600-6000MHz(1,2,3,4) KSR-200P SMA(M)

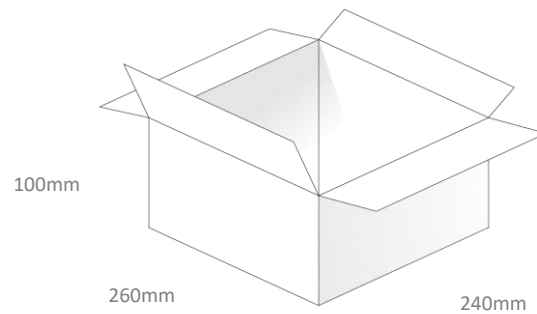
PART NO. : MA963.A.BIVW.002

|   |   |   |   |   |            |
|---|---|---|---|---|------------|
| 6 | 5 | 4 | 3 | 2 | 1          |
|   |   |   |   |   | REV<br>D04 |

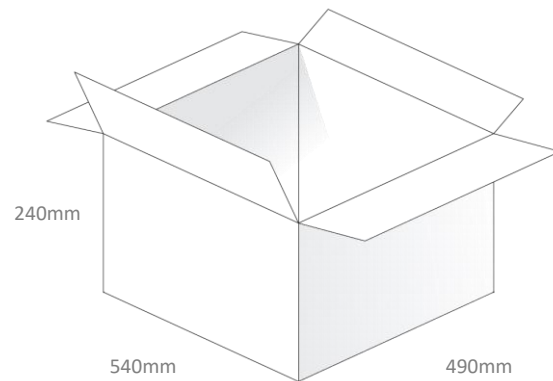
## 6. Packaging



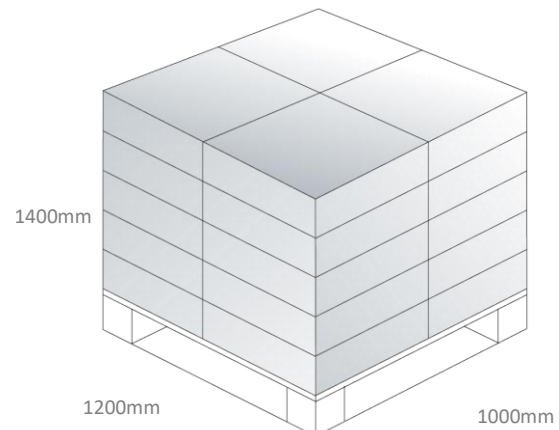
1 MA963.A.BIVW.002 per small box  
 Box Dimensions - 260\*240\*100mm  
 Weight - 450g



Box Dimensions - 540\*490\*240mm  
 8 pcs MA963.A.BIVW.002 per carton  
 Weight - 4Kg



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



Changelog for the datasheet

**SPE-19-8-051 – MA963.A.B1VW.002**

**Revision: B (Current Versions)**

|         |                 |
|---------|-----------------|
| Date:   | 2020-04-28      |
| Notes:  | Updated Drawing |
| Author: | Jack Conroy     |

**Previous Revisions**

**Revision: A (Original First Release)**

|         |                           |
|---------|---------------------------|
| Date:   | 2019-04-16                |
| Notes:  | Initial Datasheet Release |
| Author: | Yu Kai Yeung              |



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