

# LYNwave Technology

Antenna solution provider

## Antenna Field Test Report

**Project Name:** EW-7689PTX

**Model Name:**

**Feature:** 2.4G / 5G / 6E

**Application:**

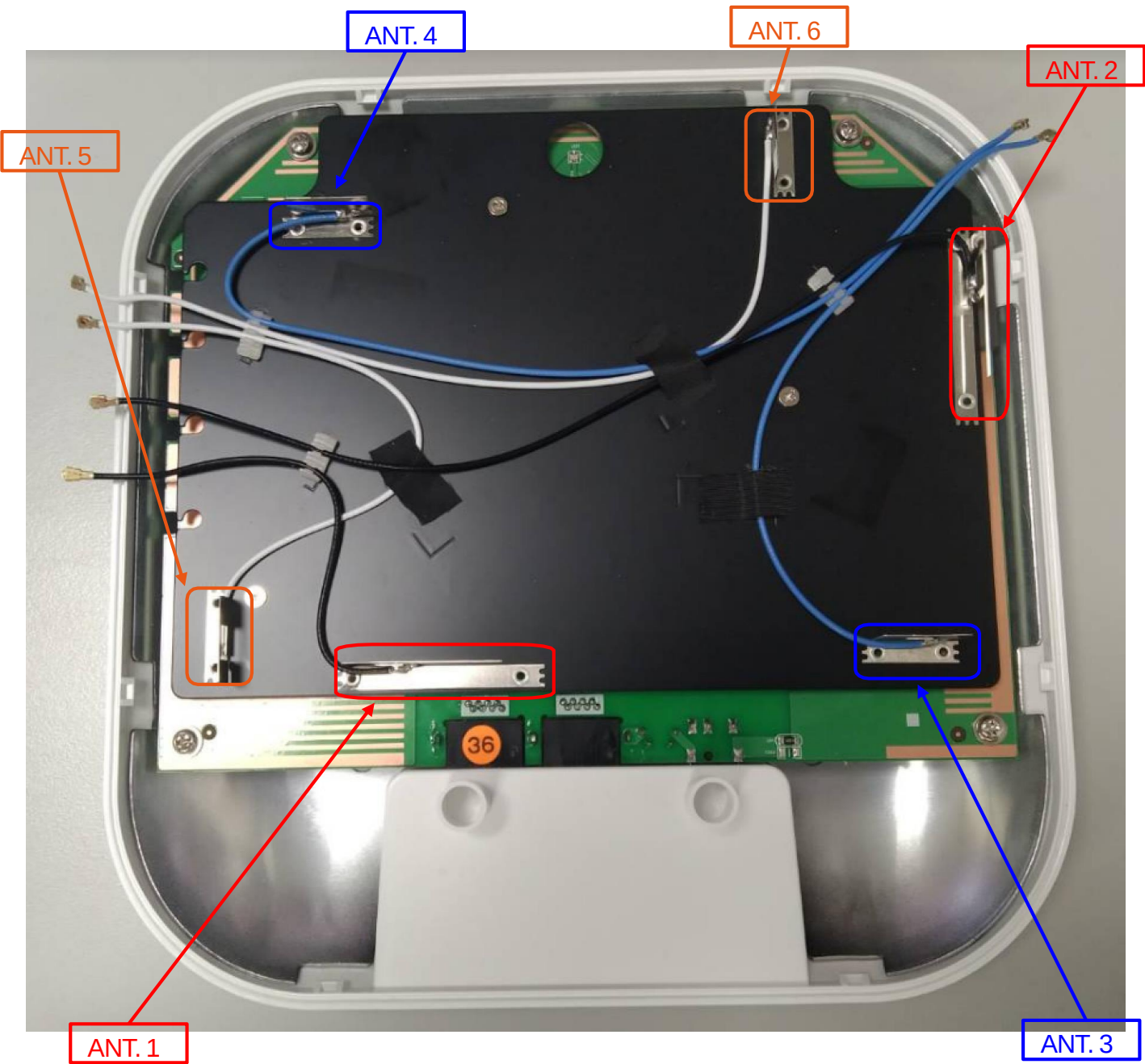
| Date       | Owner        | Revision                                                                  |
|------------|--------------|---------------------------------------------------------------------------|
| 2022/04/19 | Michael Chen | 1. Initial simulation                                                     |
| 2022/08/19 | Michael Chen | 1. Initial simulation                                                     |
| 2022/09/22 | Jamie Su     | 1. Antenna Passive Measurement                                            |
| 2022/09/30 | Jamie Su     | 1. Antenna Passive Measurement (optimizing 6E band)                       |
| 2022/10/17 | Jamie Su     | 1. Antenna Passive Measurement (Adding combine pattern)                   |
| 2022/11/01 | Jamie Su     | 1. Antenna Passive Measurement (Antenna bottom plate cover with graphene) |
| 2022/11/04 | Jamie Su     | 1. Antenna Passive Measurement (New antenna placement)                    |
| 2022/12/02 | Alon         | 1. Antenna Passive Measurement (Antenna Plane with Graphene)              |
| 2023/01/19 | Alon         | 1. Antenna Passive Measurement (with three condition)                     |
| 2023/01/31 | Alon         | 1. Antenna Passive Measurement (EW-7689PTX T1 Sample)                     |
| 2023/11/07 | Michael      | 1. Add Test Setup & 3D Radiation Pattern                                  |
|            |              |                                                                           |
|            |              |                                                                           |
|            |              |                                                                           |
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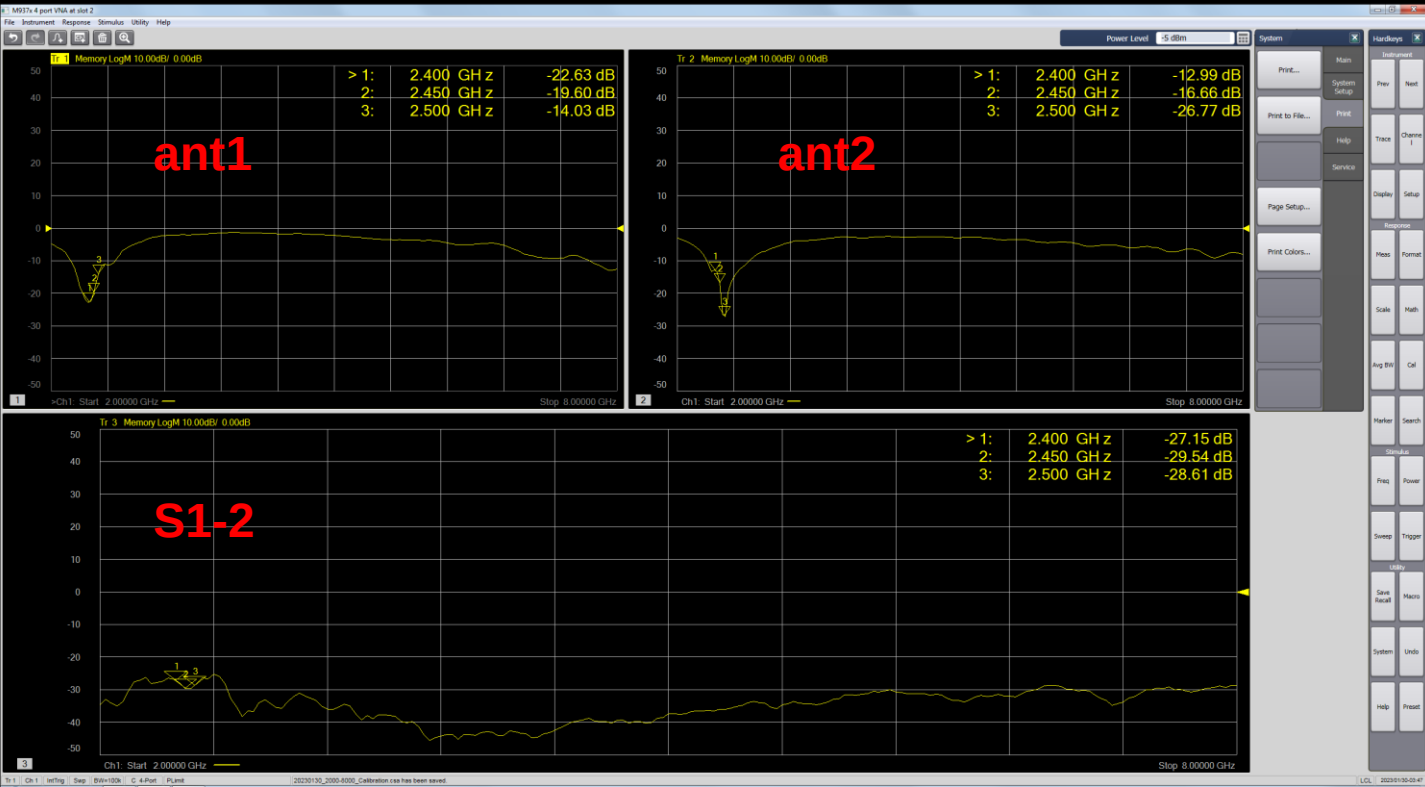
Antenna Placement

| Antenna | Description | Frequency       | Cable Length | Color |
|---------|-------------|-----------------|--------------|-------|
| Ant.1   | Single Band | 2400 ~ 2500 MHz | 115mm        | Black |
| Ant.2   | Single Band | 2400 ~ 2500 MHz | 215mm        | Black |
| Ant.3   | Single Band | 5150 ~ 5825 MHz | 180mm        | Blue  |
| Ant.4   | Single Band | 5150 ~ 5825 MHz | 234mm        | Blue  |
| Ant.5   | Single Band | 5925 ~ 7125 MHz | 165mm        | White |
| Ant.6   | Single Band | 5925 ~ 7125 MHz | 205mm        | White |

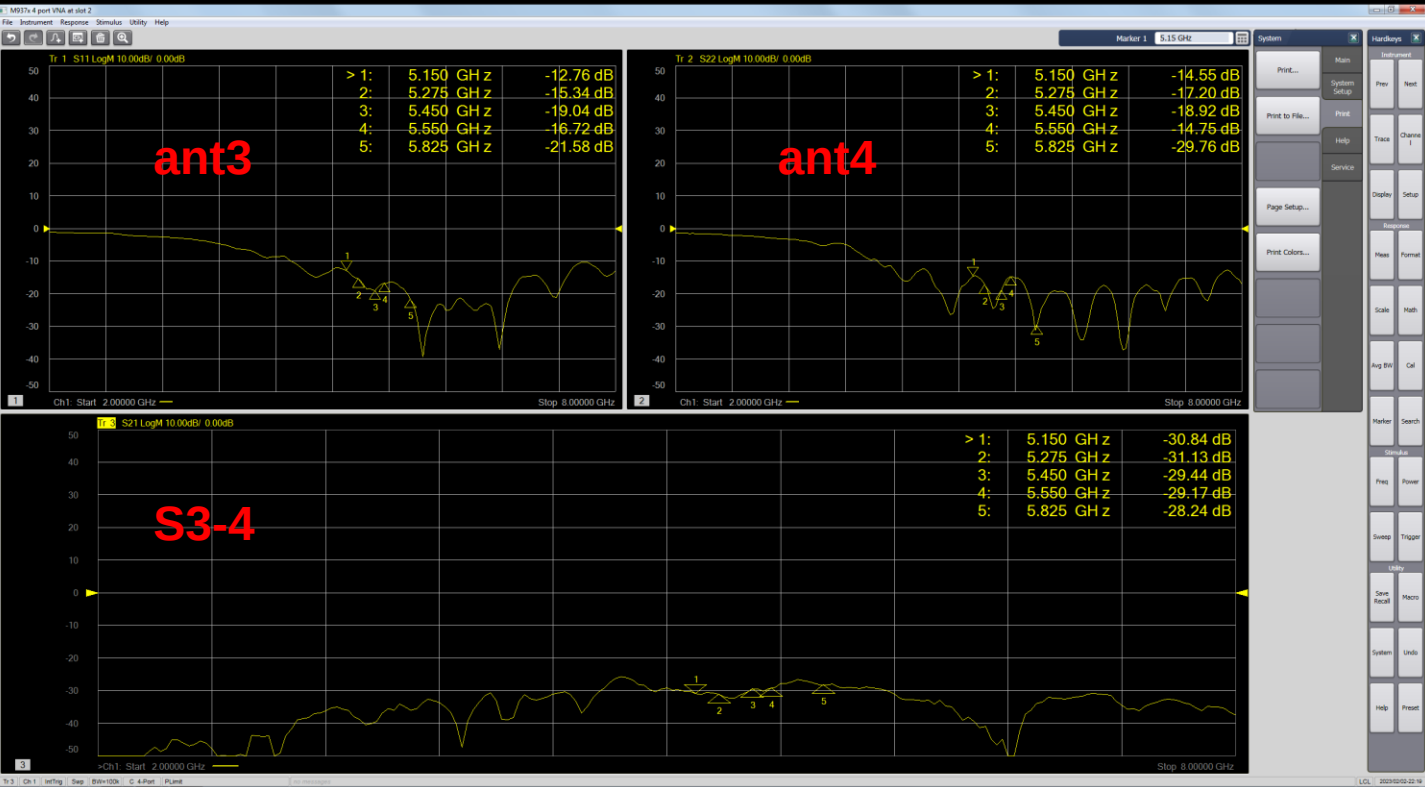


S-Parameter

2G

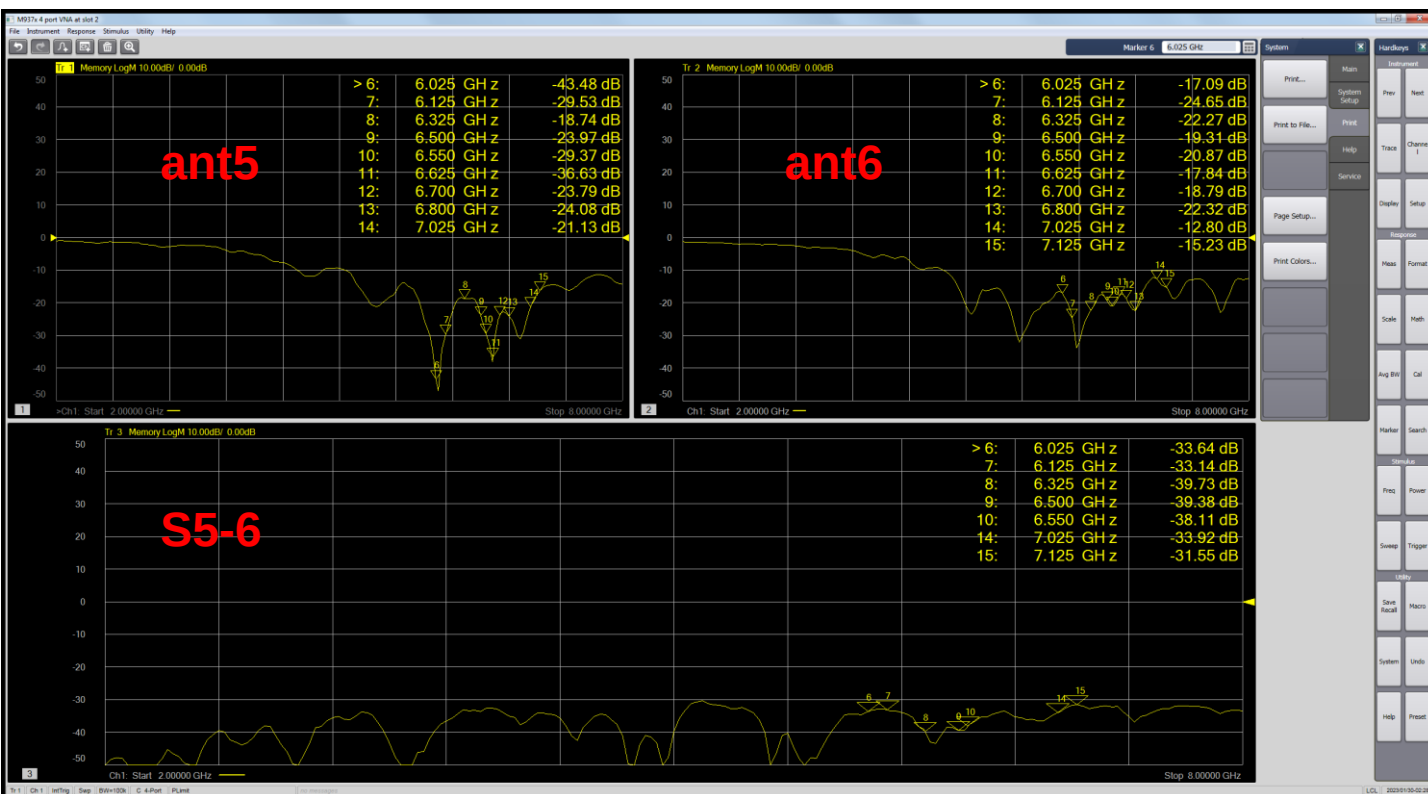


5G

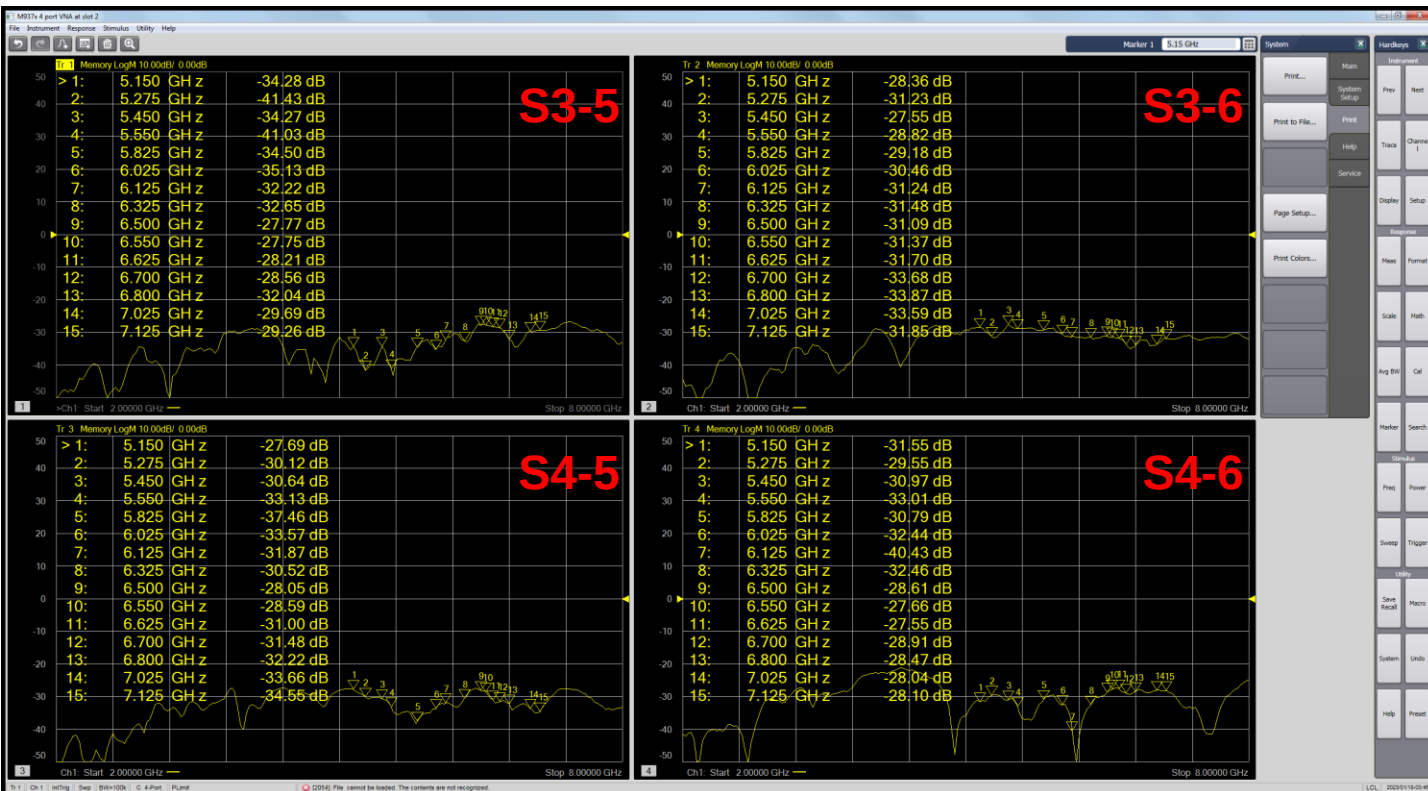


## S-Parameter

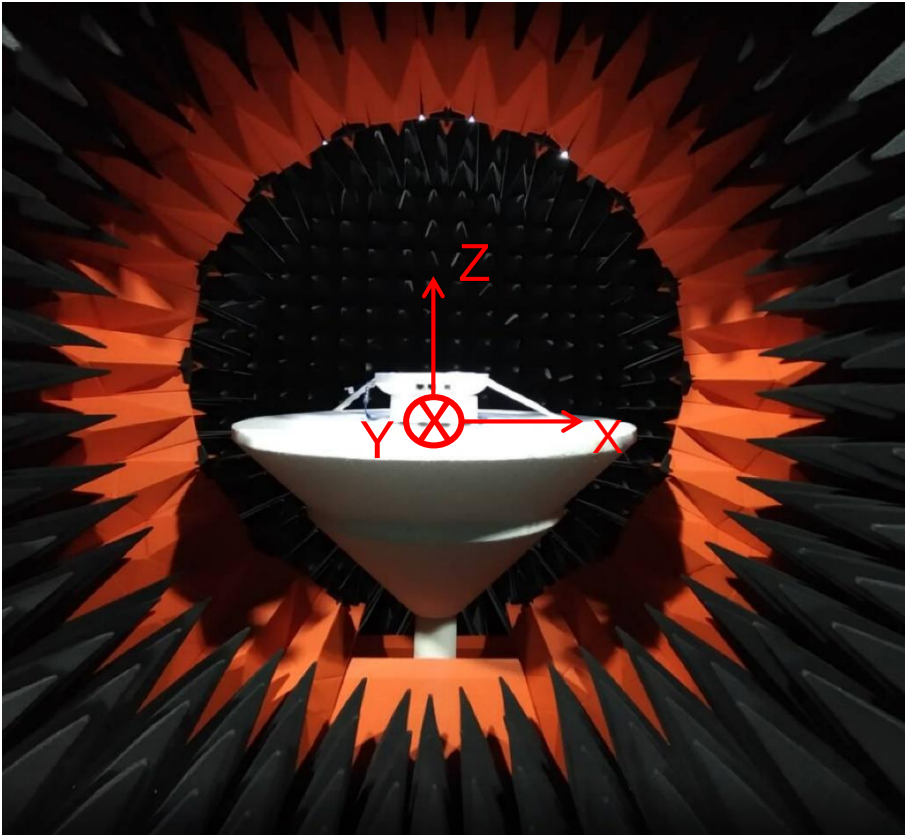
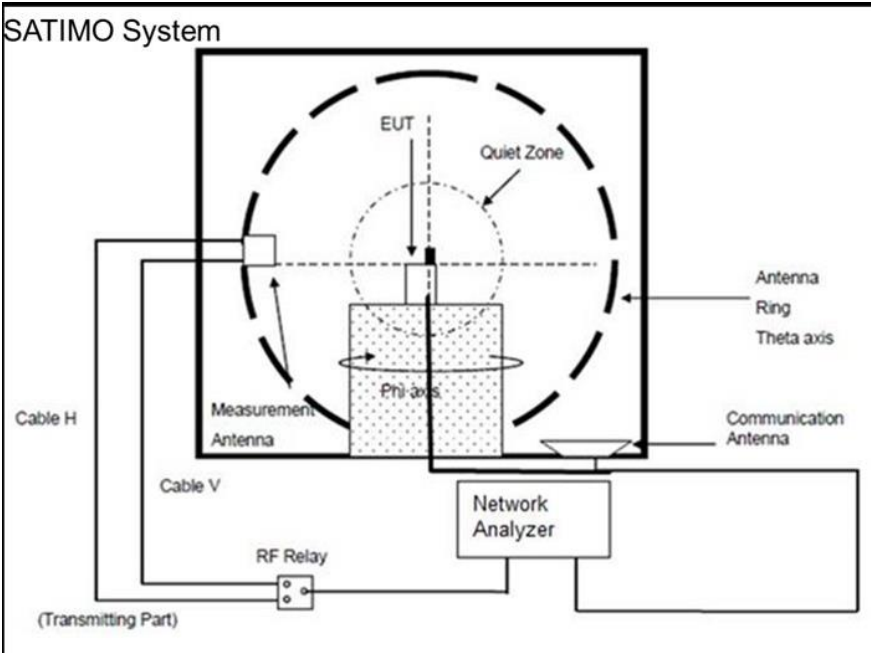
6E



## 5G+6E Cross isolation



Equipment :Satimo Chamber & Test Setup Photo



## Table of calibrated equipment

| Description & Manufacturer | Model No. | Cal. Date    | Cal. Date    |
|----------------------------|-----------|--------------|--------------|
| 3D Chamber<br>SATIMO       | StarLab   | Sep. 15,2022 | Sep. 15,2023 |

## Test date and test personnel

| Test Software | Operator     | Date       | Time        |
|---------------|--------------|------------|-------------|
| Wave Studio   | Michael Chen | 2023/01/31 | 09:00~18:00 |

## Description of test setup

1. Position the DUT on the test turntable.
2. Record the coordinates and take picture.
3. Connect the RF Cable.
4. Leave the chamber and close the door.
5. Run the software.
6. Wait for the test to end and confirm the data.

## Gain Table

| Ant.1           |             |             |             |             |             |             |             |             |             |             |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Frequency (MHz) | 2400        |             |             | 2450        |             |             | 2500        |             |             |             |
| Efficiency(%)   | 65          |             |             | 64          |             |             | 63          |             |             |             |
| Peak Gain(dBi)  | 4.3         |             |             | 4.0         |             |             | 3.5         |             |             |             |
| Ant.2           |             |             |             |             |             |             |             |             |             |             |
| Frequency (MHz) | 2400        |             |             | 2450        |             |             | 2500        |             |             |             |
| Efficiency(%)   | 66          |             |             | 61          |             |             | 62          |             |             |             |
| Peak Gain(dBi)  | 3.6         |             |             | 3.0         |             |             | 3.5         |             |             |             |
| Ant.3           |             |             |             |             |             |             |             |             |             |             |
| Frequency (MHz) | 5150 – 5250 |             | 5251 – 5300 |             | 5301 - 5490 |             | 5491 - 5725 |             | 5726 - 5835 |             |
| Efficiency(%)   | 68          |             | 65          |             | 65          |             | 69          |             | 70          |             |
| Peak Gain(dBi)  | 4.4         |             | 4.6         |             | 4.6         |             | 5.2         |             | 5.4         |             |
| Ant.4           |             |             |             |             |             |             |             |             |             |             |
| Frequency (MHz) | 5150 – 5250 |             | 5251 – 5300 |             | 5301 - 5490 |             | 5491 - 5725 |             | 5726 - 5835 |             |
| Efficiency(%)   | 70          |             | 70          |             | 68          |             | 66          |             | 69          |             |
| Peak Gain(dBi)  | 6.0         |             | 5.8         |             | 5.5         |             | 5.0         |             | 4.9         |             |
| Ant.5           |             |             |             |             |             |             |             |             |             |             |
| Frequency (MHz) | 5945 - 6105 | 6106 - 6265 | 6266 - 6425 | 6426 - 6525 | 6526 - 6585 | 6586 - 6745 | 6746 - 6865 | 6866 - 6905 | 6906 - 7065 | 7066 - 7125 |
| Efficiency(%)   | 67          | 65          | 66          | 68          | 66          | 68          | 67          | 67          | 67          | 69          |
| Peak Gain(dBi)  | 5.4         | 5.8         | 5.5         | 5.8         | 6.0         | 5.8         | 5.3         | 5.3         | 5.4         | 6.0         |
| Ant.6           |             |             |             |             |             |             |             |             |             |             |
| Frequency (MHz) | 5945 - 6105 | 6106 - 6265 | 6266 - 6425 | 6426 - 6525 | 6526 - 6585 | 6586 - 6745 | 6746 - 6865 | 6866 - 6905 | 6906 - 7065 | 7066 - 7125 |
| Efficiency(%)   | 67          | 66          | 66          | 66          | 67          | 65          | 65          | 67          | 65          | 65          |
| Peak Gain(dBi)  | 4.4         | 4.2         | 5.2         | 4.3         | 4.9         | 5.2         | 4.6         | 4.7         | 5.0         | 5.8         |

## The antenna characteristics

- Return loss < -10dB in operating band
- Isolation
  - 2.4GHz to 2.4GHz >20dB
  - 5GHz to 5GHz >25dB
  - 6GHz to 6GHz >30dB
- Cross isolation
  - 5GHz to 6GHz >27dB
- Gain
  - 2.4GHz Band 3.5~4.3dBi
  - 5GHz Band 4.4~6.0dBi
  - 6GHz Band 4.2~6.0dBi
- Efficiency
  - 2.4GHz Band  $\geq 60\%$
  - 5GHz Band  $\geq 65\%$
  - 6GHz Band  $\geq 65\%$

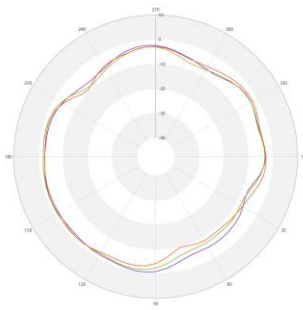
# Ant.1\_2.4GHz 2D/3D Radiation Pattern

Frequency(MHz) : 2D:2400~2500  
3D:2450

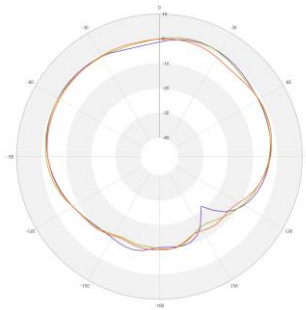
— 2400.00 MHz  
— 2450.00 MHz  
— 2500.00 MHz

Radiation Pattern :

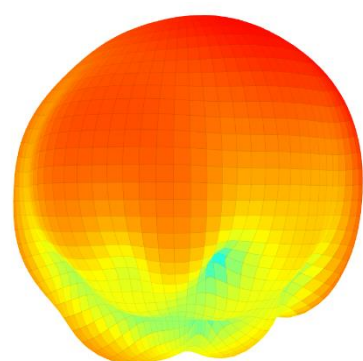
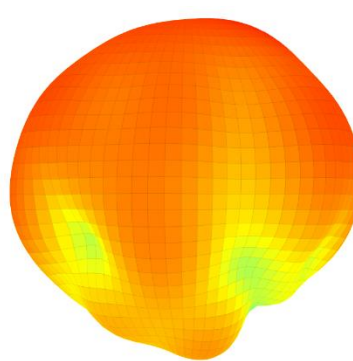
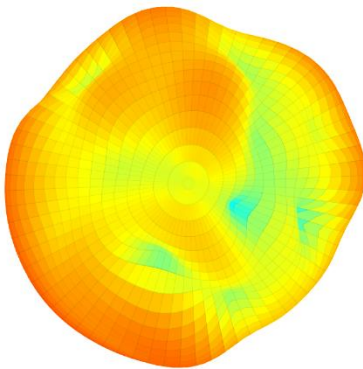
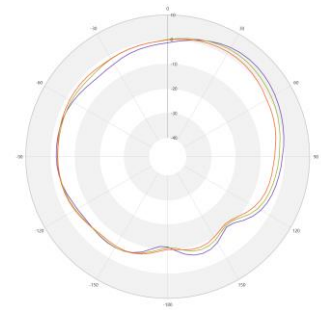
Azimuth Plane  
Theta = 90



Elevation Plane  
phi = 0

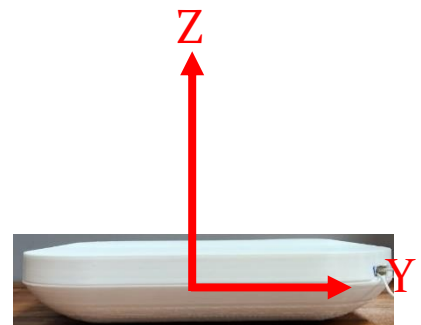
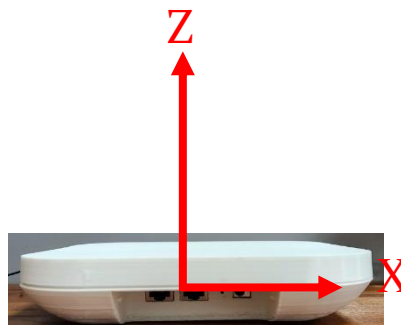
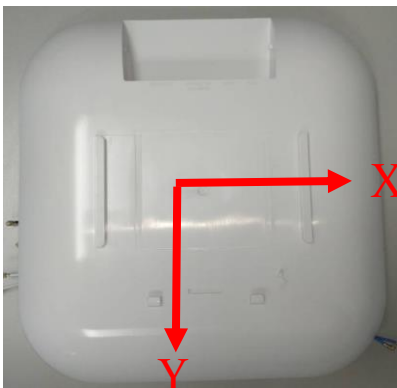


Elevation Plane  
phi = 90



dB  
10  
5  
0  
-5  
-10  
-15  
-20  
-25  
-30  
-35  
-40

Setup :



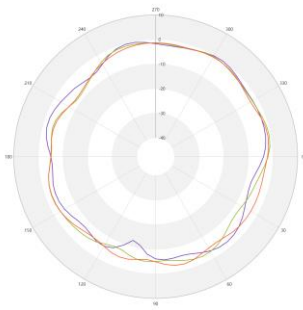
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Frequency(MHz) : 2D:2400~2500  
3D:2450

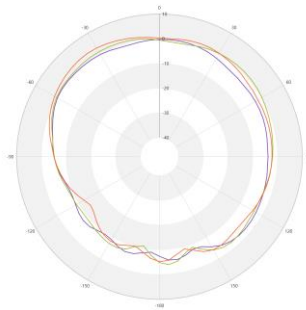
— 2400.00 MHz  
— 2450.00 MHz  
— 2500.00 MHz

Radiation Pattern :

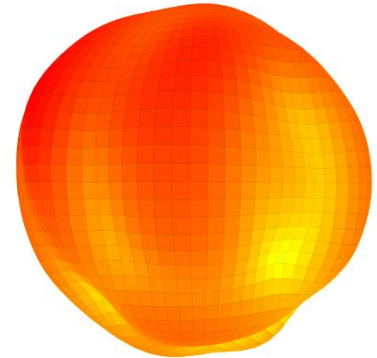
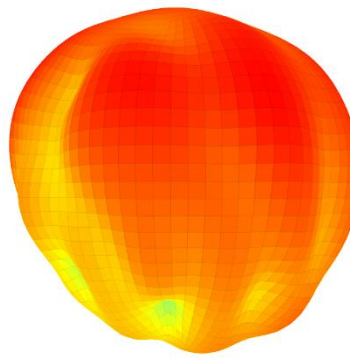
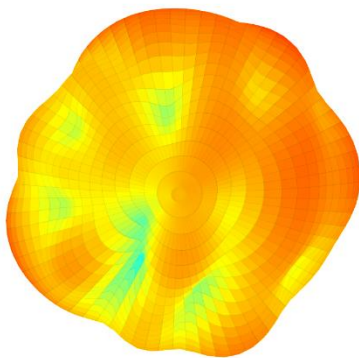
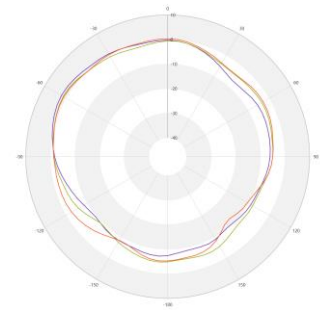
Azimuth Plane  
Theta = 90



Elevation Plane  
phi = 0

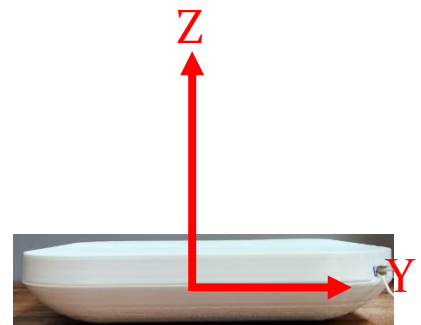
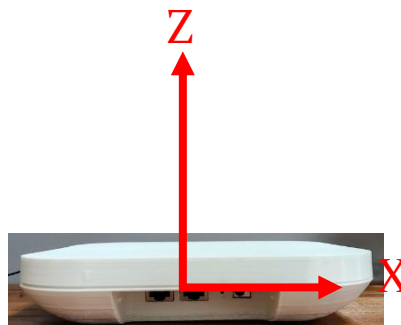
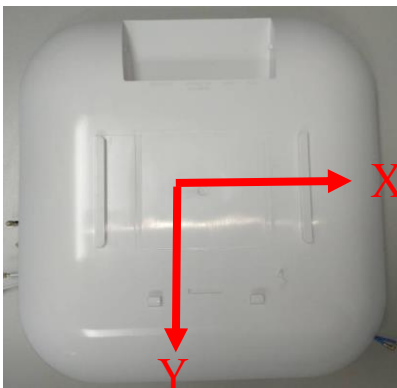


Elevation Plane  
phi = 90



dB  
10  
5  
0  
-5  
-10  
-15  
-20  
-25  
-30  
-35  
-40

Setup :



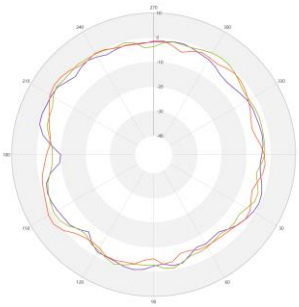
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Frequency(MHz) : 2D:5150~5825  
3D:5550

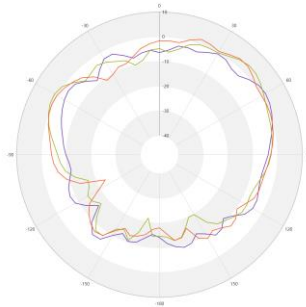
— 5150.00 MHz  
— 5550.00 MHz  
— 5825.00 MHz

Radiation Pattern :

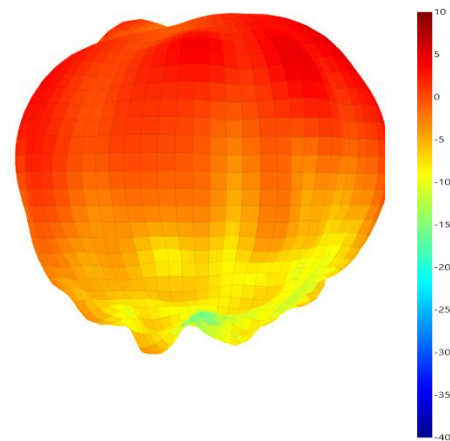
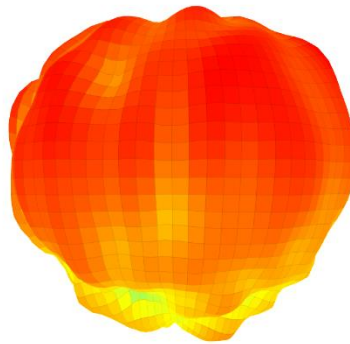
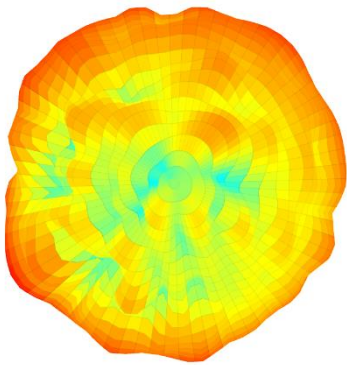
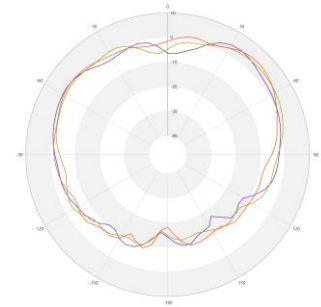
Azimuth Plane  
Theta = 90



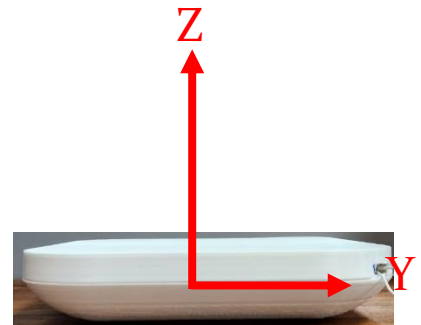
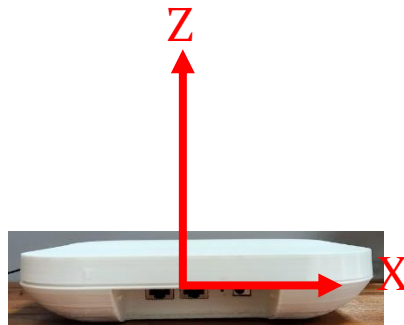
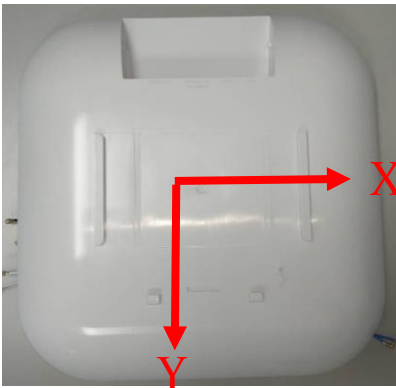
Elevation Plane  
phi = 0



Elevation Plane  
phi = 90



Setup :



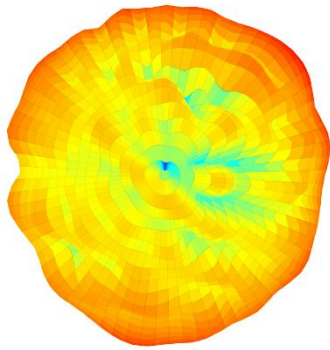
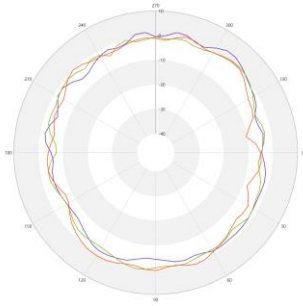
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Frequency(MHz) : 2D:5150~5825  
3D:5550

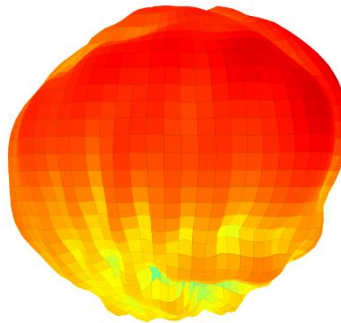
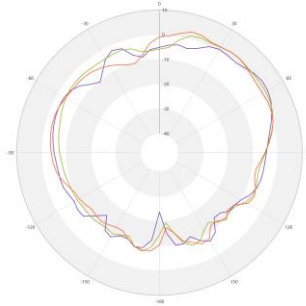
— 5150.00 MHz  
— 5550.00 MHz  
— 5825.00 MHz

Radiation Pattern :

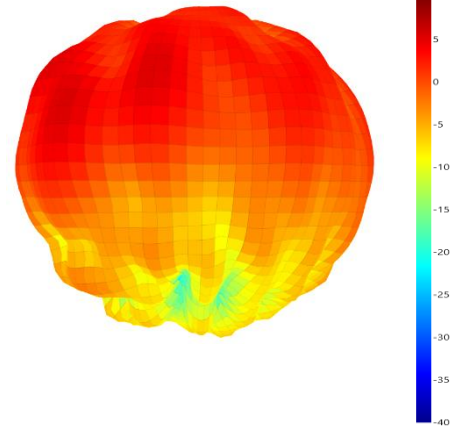
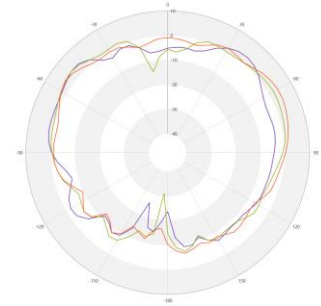
Azimuth Plane  
Theta = 90



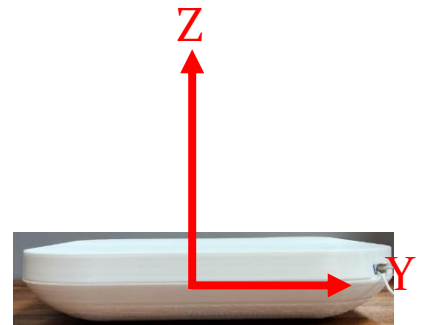
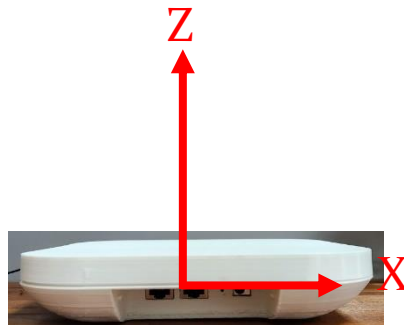
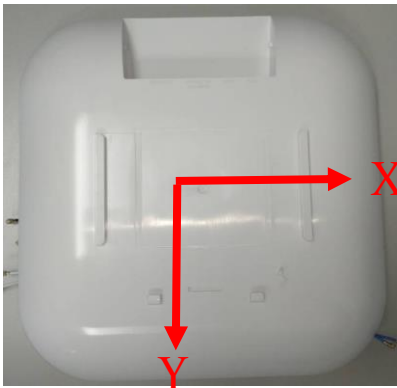
Elevation Plane  
phi = 0



Elevation Plane  
phi = 90



Setup :



# Ant.5\_6GHz 2D/3D Radiation Pattern

Frequency(MHz) : 2D:5925~7125

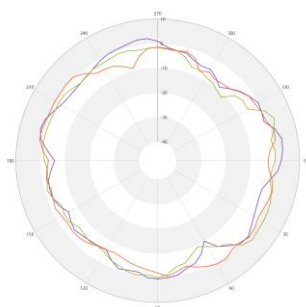
3D:6500

— 5925.00 MHz  
— 6500.00 MHz  
— 7125.00 MHz

Radiation Pattern :

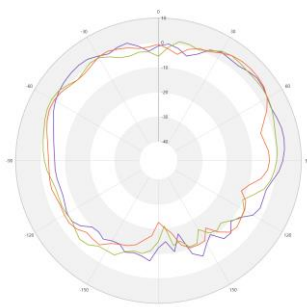
Azimuth Plane

Theta = 90



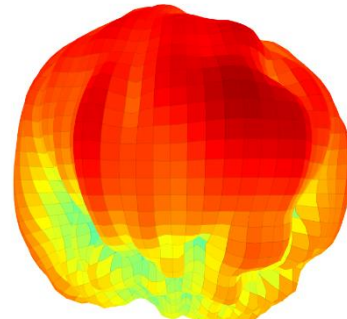
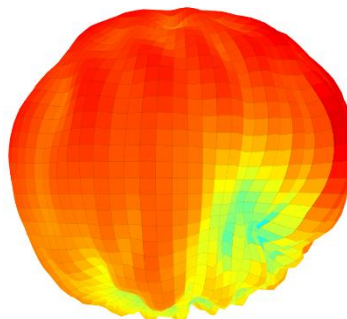
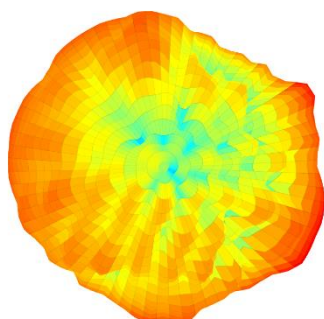
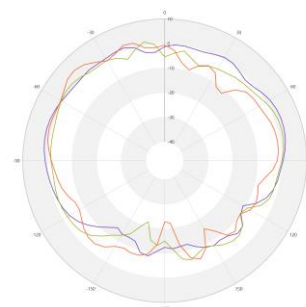
Elevation Plane

phi = 0

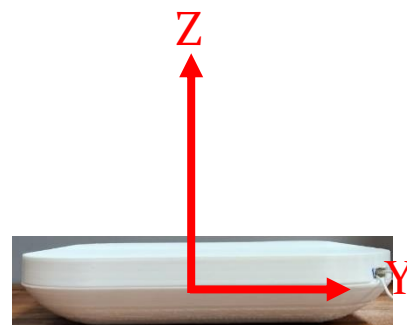
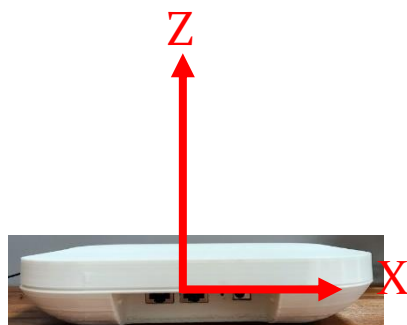
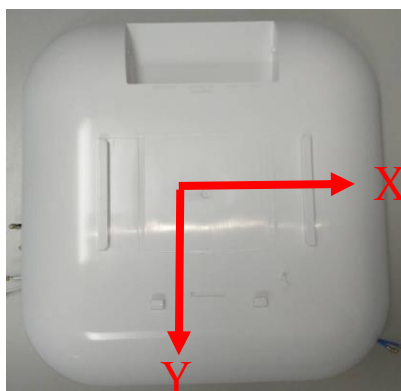


Elevation Plane

phi = 90



Setup :



# Ant.5\_6GHz 2D/3D Radiation Pattern

Frequency(MHz) : 2D:5925~7125

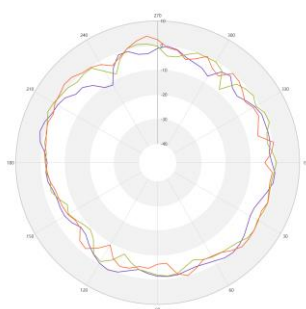
3D:6500

— 5925.00 MHz  
— 6500.00 MHz  
— 7125.00 MHz

Radiation Pattern :

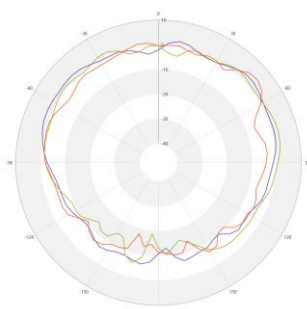
Azimuth Plane

Theta = 90



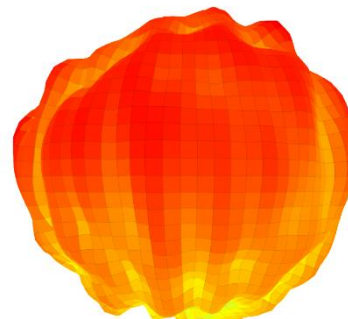
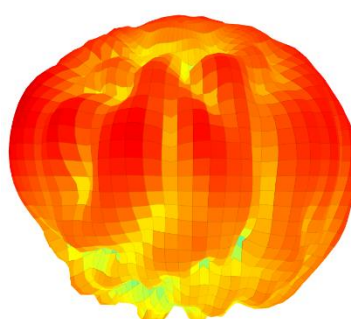
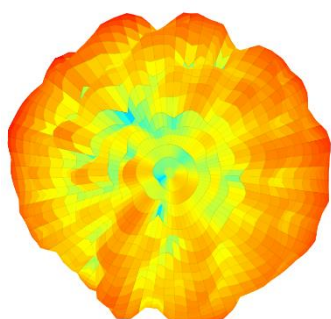
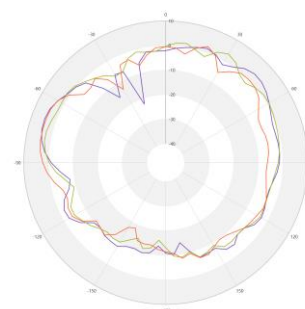
Elevation Plane

phi = 0



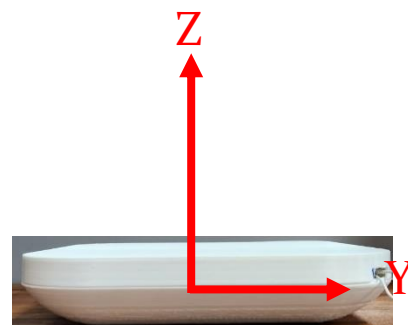
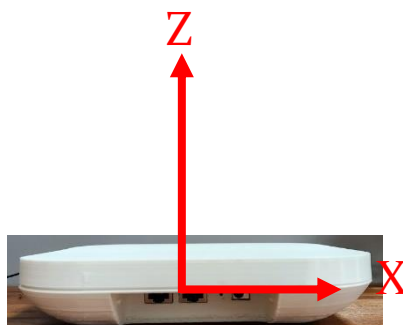
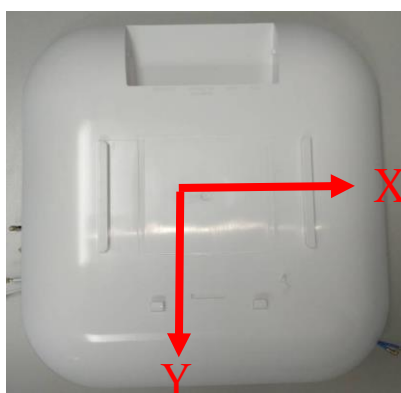
Elevation Plane

phi = 90



dB  
10  
5  
0  
-5  
-10  
-15  
-20  
-25  
-30  
-35  
-40

Setup :



# www.lynwave.com



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<https://www.linkedin.com/company/lynwave-technology-ltd./>



<https://lynwave.en.alibaba.com/>