



# Antenna Datasheet

**Product OC:** YE0001BA

**Version:** 3.1

**Date:** 2024-01-10

**Status:** Released

**Product Name:** External 5G Antenna

**Key Features:**

Frequency Band: 600–6000 MHz

Dimensions: 221 mm × 27.30 mm × 13.45 mm

Efficiency: Up to 78.3 % (EVB)

RoHS and REACH Compliant

# Overview

This Quectel external 5G antenna covers 5G NR Sub-6 GHz frequency bands and is compatible with 4G/3G/2G/LPWA bands. Featuring high efficiency and gain, it is an ideal omni-directional antenna solution to ensure high-speed data transmission, which can be widely used in a diversity of wireless communication devices such as AP, routers, outdoor equipment, real-time monitoring equipment, and many more. The antenna is designed to work with any ground plane size or in free space for ease of integration. Quectel also offers flexible installation with custom cable length and connector options.

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# 1 Specification

Test Condition: On 130 mm × 130 mm EVB & Free Space

## 1.1. Electrical

| Electrical        |                  |
|-------------------|------------------|
| Frequency Range   | 600–6000 MHz     |
| Impedance         | 50 Ω             |
| Polarization      | Linear           |
| Radiation Pattern | Omni-directional |

| Electrical - Detail         |                |             |             |                     |                   |                     |                  |               |               |               |                     |               |             |
|-----------------------------|----------------|-------------|-------------|---------------------|-------------------|---------------------|------------------|---------------|---------------|---------------|---------------------|---------------|-------------|
| SPEC                        | Band           | Band        | B71         | B12<br>/B13<br>/B28 | B5<br>/B8<br>/B26 | n74<br>/n75<br>/n76 | B1<br>/B2<br>/B3 | B40           | Wi-Fi<br>2G   | B38<br>/B41   | B42<br>/B48<br>/n77 | n79           | Wi-Fi<br>5G |
|                             | Freq.<br>(MHz) | 600–<br>700 | 700–<br>810 | 820–<br>960         | 1420–<br>1520     | 1700–<br>2170       | 2300–<br>2400    | 2400–<br>2500 | 2500–<br>2690 | 3300–<br>4200 | 4400–<br>5000       | 5150–<br>5850 |             |
| Max.<br>VSWR                | EVB            | 3.2         | 3.2         | 3.1                 | -                 | 2.3                 | 1.8              | 2.6           | 2.7           | 3.6           | 3.1                 | 2.6           |             |
|                             | FS             | 1.7         | 2.2         | 2.4                 | -                 | 2.3                 | 1.7              | 1.7           | 2.4           | 2.2           | 2.2                 | 1.7           |             |
| Max.<br>Return<br>Loss (dB) | EVB            | -5.7        | -5.6        | -5.8                | -                 | -8.0                | -10.6            | -7.1          | -6.9          | -4.9          | -5.9                | -6.9          |             |
|                             | FS             | -11.3       | -8.7        | -7.7                | -                 | -8.2                | -11.9            | -12.0         | -7.5          | -8.4          | -8.5                | -12.2         |             |
| AVG Eff.<br>(%)             | EVB            | 50.2        | 54.3        | 50.5                | -                 | 70.4                | 77.0             | 71.7          | 68.8          | 61.7          | 57.6                | 53.6          |             |
|                             | FS             | 36.6        | 37.1        | 37.3                | -                 | 67.3                | 74.1             | 66.9          | 58.7          | 59.5          | 51.9                | 63.1          |             |
| AVG AVG<br>Gain (dB)        | EVB            | -3.0        | -2.7        | -3.0                | -                 | -1.5                | -1.1             | -1.4          | -1.6          | -2.1          | -2.4                | -2.7          |             |
|                             | FS             | -4.4        | -4.3        | -4.3                | -                 | -1.7                | -1.3             | -1.8          | -2.3          | -2.3          | -2.9                | -2.0          |             |

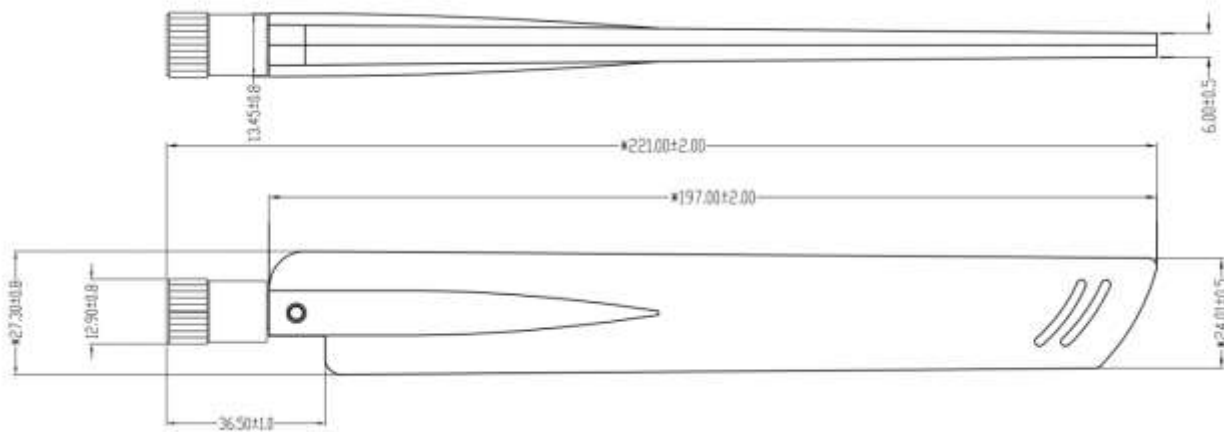
|                      |     |      |      |      |   |           |     |     |     |     |     |     |
|----------------------|-----|------|------|------|---|-----------|-----|-----|-----|-----|-----|-----|
| Max. Peak Gain (dBi) | EVB | 0.4  | 1.3  | 2.0  | - | 4.3       | 3.7 | 3.0 | 2.7 | 3.5 | 2.6 | 2.7 |
|                      | FS  | -1.2 | -1.1 | -1.2 | - | 3.4       | 2.6 | 2.8 | 2.8 | 3.3 | 3.3 | 5.0 |
| VSWR                 |     | EVB  |      |      |   | ≤ 3.6     |     |     |     |     |     |     |
|                      |     | FS   |      |      |   | ≤ 2.4     |     |     |     |     |     |     |
| Return Loss          |     | EVB  |      |      |   | ≤ -4.9 dB |     |     |     |     |     |     |
|                      |     | FS   |      |      |   | ≤ -7.5 dB |     |     |     |     |     |     |
| Peak Gain            |     | EVB  |      |      |   | ≤ 4.3 dBi |     |     |     |     |     |     |
|                      |     | FS   |      |      |   | ≤ 5.0 dBi |     |     |     |     |     |     |

- FS: Free Space
- EVB: On 130 mm × 130 mm EVB

## 1.2. Mechanical & Environmental

| Mechanical               |                              |
|--------------------------|------------------------------|
| Antenna Dimensions       | 221 mm × 27.30 mm × 13.45 mm |
| Material & Color         | ABS & Black                  |
| Connector Type           | SMA Male                     |
| Mounting Type            | Terminal                     |
| Weight                   | Typ. 29 g                    |
| Environmental            |                              |
| Operation Temperature    | -40 °C to +80 °C             |
| Storage Temperature      | -40 °C to +80 °C             |
| RoHS and REACH Compliant | Yes                          |

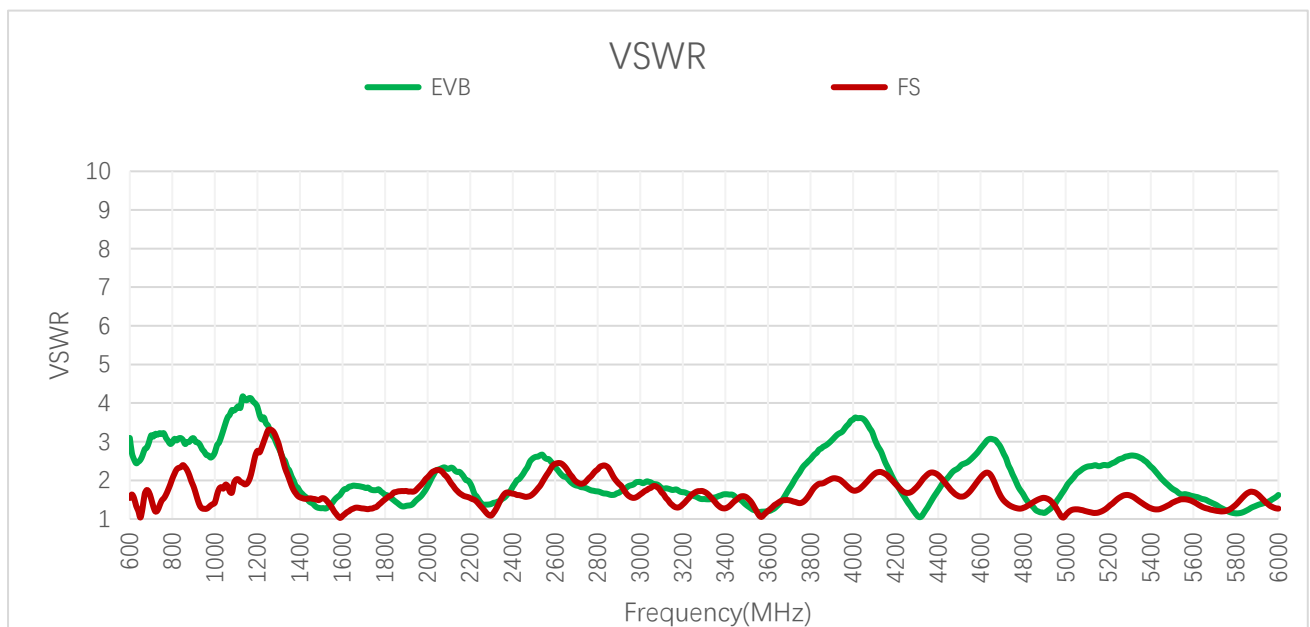
## 2 Drawing



# 3 Detailed Performance

## 3.1. S-Parameter Test

### 3.1.1. VSWR

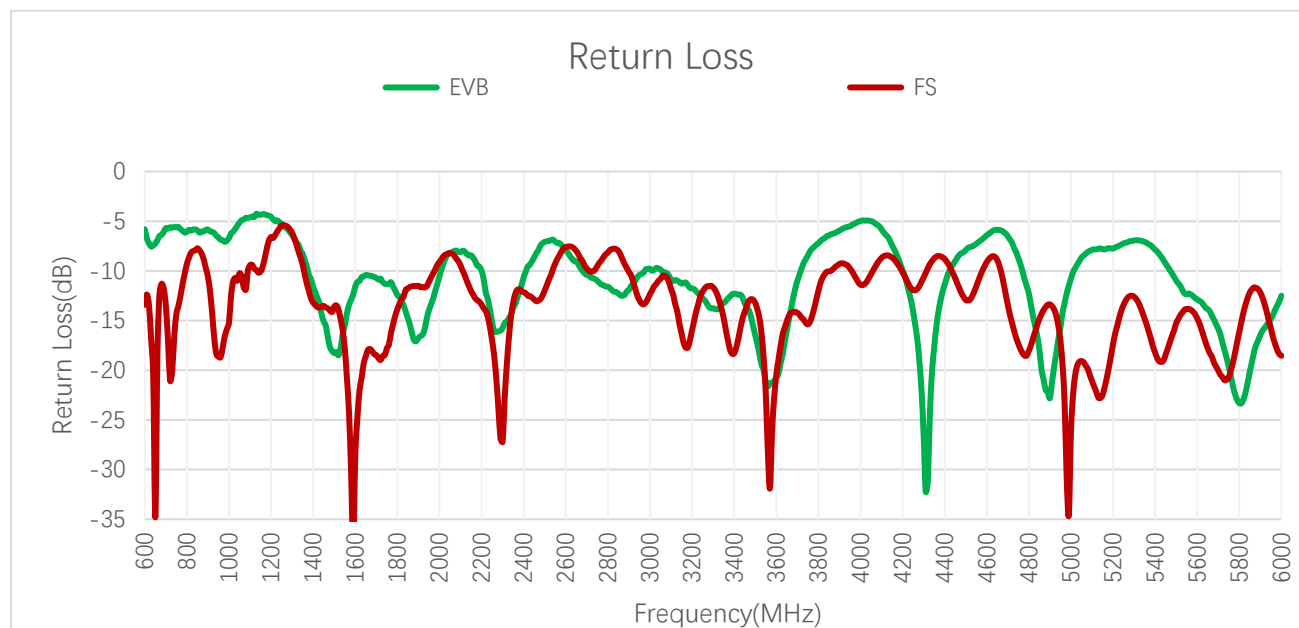


**VSWR**

| Frequency (MHz) |     | 600  | 630  | 710  | 830  | 900  | 960  | 1440 | 1710 | 1740 | 1880 |
|-----------------|-----|------|------|------|------|------|------|------|------|------|------|
| VSWR            | EVB | 3.1  | 2.4  | 3.1  | 3.1  | 3.1  | 2.7  | -    | 1.8  | 1.7  | 1.3  |
|                 | FS  | 1.5  | 1.3  | 1.3  | 2.3  | 1.8  | 1.3  | -    | 1.3  | 1.3  | 1.7  |
| Frequency (MHz) |     | 1950 | 2140 | 2350 | 2450 | 2600 | 3600 | 4700 | 5000 | 5500 | 6000 |
| VSWR            | EVB | 1.5  | 2.2  | 1.5  | 2.2  | 2.3  | 1.2  | 2.8  | 1.8  | 1.8  | 1.6  |
|                 | FS  | 1.8  | 1.7  | 1.6  | 1.6  | 2.4  | 1.2  | 1.5  | 1.1  | 1.4  | 1.3  |



### 3.1.2. Return Loss

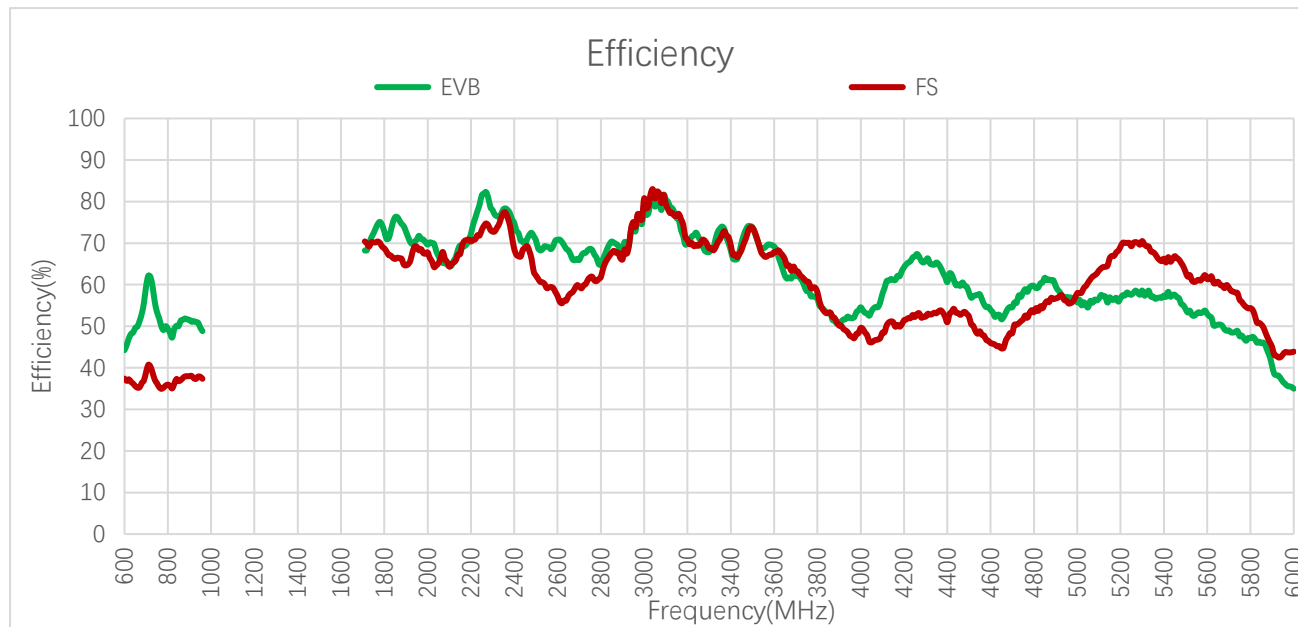


**Return Loss (dB)**

| Frequency (MHz)  |     | 600   | 630   | 710   | 830   | 900   | 960   | 1440  | 1710  | 1740  | 1880  |
|------------------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Return Loss (dB) | EVB | -5.8  | -7.6  | -5.7  | -5.8  | -5.8  | -6.9  | -     | -10.9 | -11.3 | -17.0 |
|                  | FS  | -13.4 | -16.8 | -16.9 | -8.0  | -10.6 | -18.7 | -     | -18.8 | -18.5 | -11.5 |
| Frequency (MHz)  |     | 1950  | 2140  | 2350  | 2450  | 2600  | 3600  | 4700  | 5000  | 5500  | 6000  |
| Return Loss (dB) | EVB | -14.0 | -8.4  | -13.8 | -8.6  | -7.9  | -20.8 | -6.5  | -10.8 | -11.0 | -12.5 |
|                  | FS  | -11.1 | -11.5 | -13.2 | -12.9 | -7.6  | -20.5 | -13.4 | -26.2 | -15.3 | -18.5 |

## 3.2. Radiation Performance Test

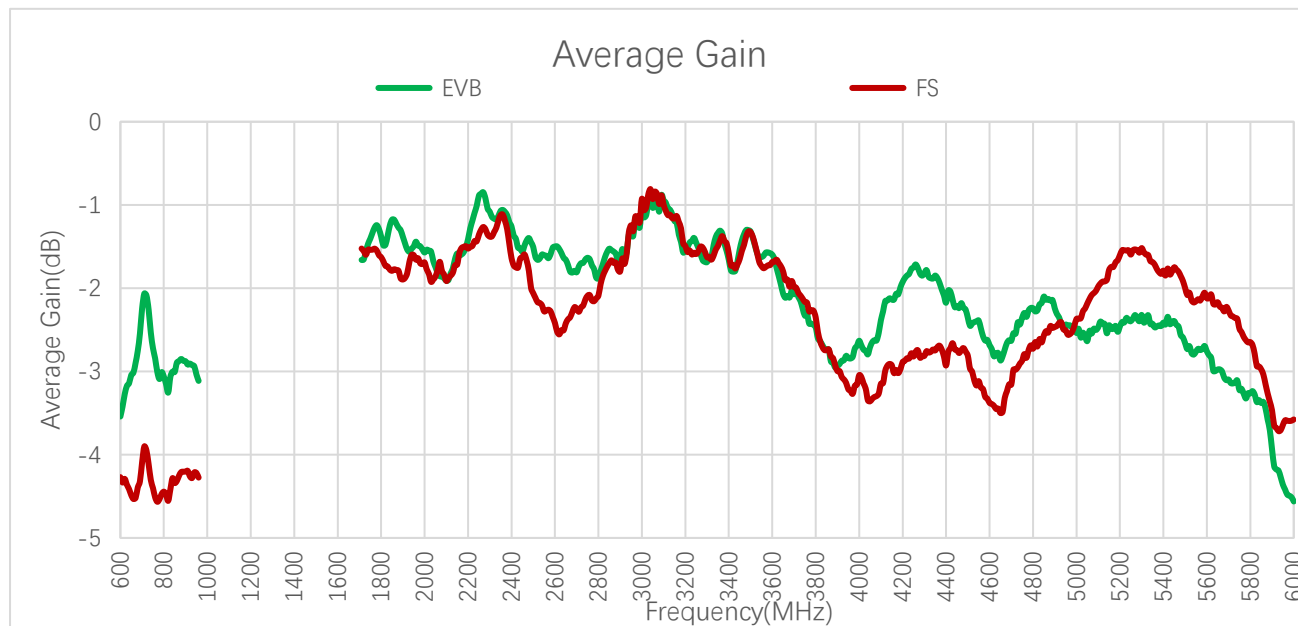
### 3.2.1. Efficiency



Efficiency (%)

| Frequency (MHz) |     | 600  | 630  | 710  | 830  | 900  | 960  | 1440 | 1710 | 1740 | 1880 |
|-----------------|-----|------|------|------|------|------|------|------|------|------|------|
| Efficiency (%)  | EVB | 44.2 | 48.2 | 62.2 | 49.4 | 51.6 | 48.8 | -    | 68.2 | 71.4 | 74.6 |
|                 | FS  | 37.4 | 36.6 | 40.7 | 36.2 | 38.0 | 37.4 | -    | 70.4 | 70.2 | 66.2 |
| Frequency (MHz) |     | 1950 | 2140 | 2350 | 2450 | 2600 | 3600 | 4700 | 5000 | 5500 | 6000 |
| Efficiency (%)  | EVB | 70.8 | 68.4 | 78.2 | 69.8 | 70.8 | 69.2 | 54.6 | 55.7 | 54.2 | 35.0 |
|                 | FS  | 69.1 | 67.2 | 77.2 | 68.8 | 57.3 | 67.8 | 48.3 | 58.0 | 63.1 | 43.9 |

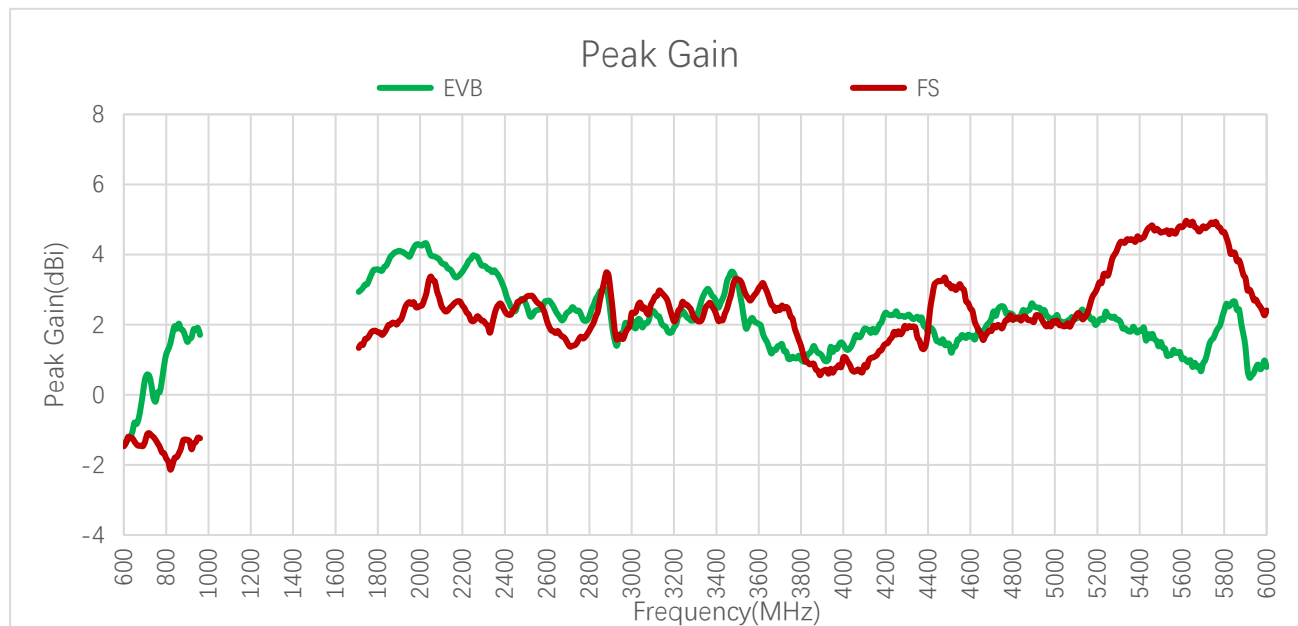
### 3.2.2. Average Gain



**Average Gain (dB)**

| Frequency (MHz)   |     | 600  | 630  | 710  | 830  | 900  | 960  | 1440 | 1710 | 1740 | 1880 |
|-------------------|-----|------|------|------|------|------|------|------|------|------|------|
| Average Gain (dB) | EVB | -3.5 | -3.2 | -2.1 | -3.1 | -2.9 | -3.1 | -    | -1.7 | -1.5 | -1.3 |
|                   | FS  | -4.3 | -4.4 | -3.9 | -4.4 | -4.2 | -4.3 | -    | -1.5 | -1.5 | -1.8 |
| Frequency (MHz)   |     | 1950 | 2140 | 2350 | 2450 | 2600 | 3600 | 4700 | 5000 | 5500 | 6000 |
| Average Gain (dB) | EVB | -1.5 | -1.6 | -1.1 | -1.6 | -1.5 | -1.6 | -2.6 | -2.5 | -2.7 | -4.6 |
|                   | FS  | -1.6 | -1.7 | -1.1 | -1.6 | -2.4 | -1.7 | -3.2 | -2.4 | -2.0 | -3.6 |

### 3.2.3. Peak Gain



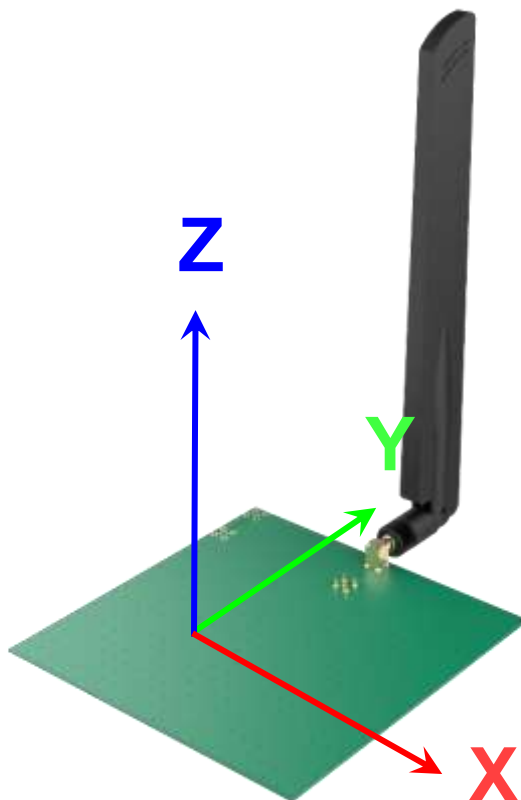
**Peak Gain (dBi)**

| Frequency (MHz) |     | 600  | 630  | 710  | 830  | 900  | 960  | 1440 | 1710 | 1740 | 1880 |
|-----------------|-----|------|------|------|------|------|------|------|------|------|------|
| Peak Gain (dBi) | EVB | -1.4 | -1.2 | 0.6  | 1.7  | 1.5  | 1.7  | -    | 2.9  | 3.1  | 4.1  |
|                 | FS  | -1.5 | -1.2 | -1.1 | -2.0 | -1.3 | -1.2 | -    | 1.3  | 1.6  | 2.0  |
| Frequency (MHz) |     | 1950 | 2140 | 2350 | 2450 | 2600 | 3600 | 4700 | 5000 | 5500 | 6000 |
| Peak Gain (dBi) | EVB | 3.9  | 3.6  | 3.6  | 2.4  | 2.7  | 2.0  | 2.2  | 2.2  | 1.5  | 0.8  |
|                 | FS  | 2.6  | 2.5  | 2.3  | 2.5  | 2.1  | 3.0  | 1.8  | 2.1  | 4.6  | 2.4  |

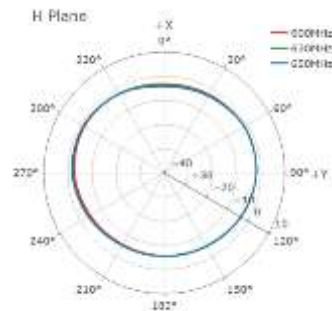
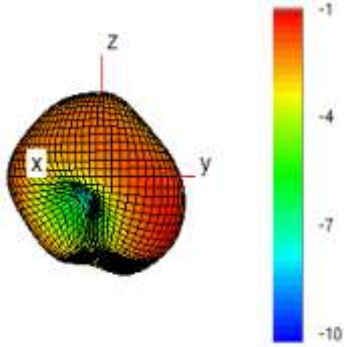
### 3.2.4. 3D & 2D Radiation Pattern

#### 3.2.4.1. Test Condition: On 130 mm × 130 mm EVB

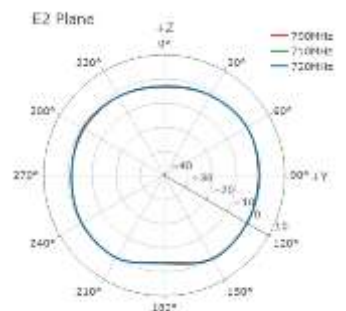
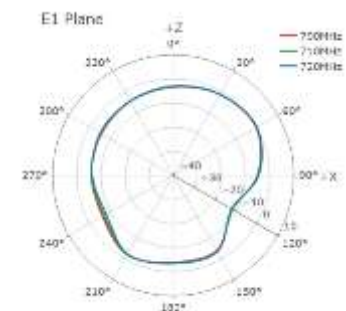
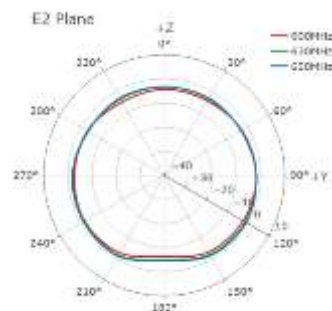
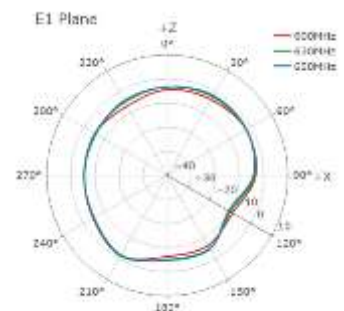
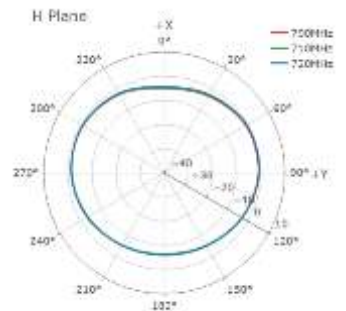
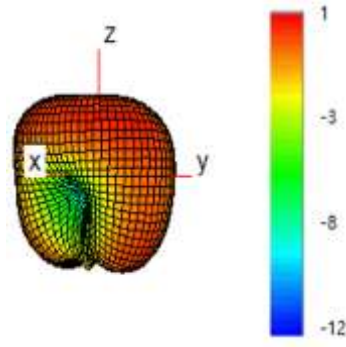
- Test Chamber: HF-G-1



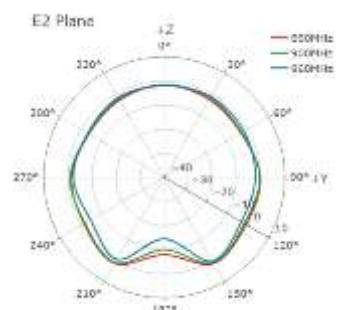
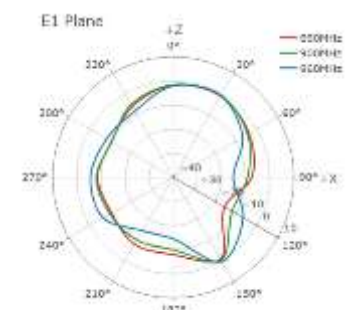
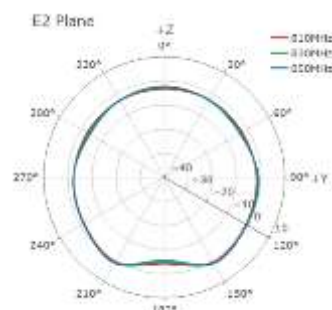
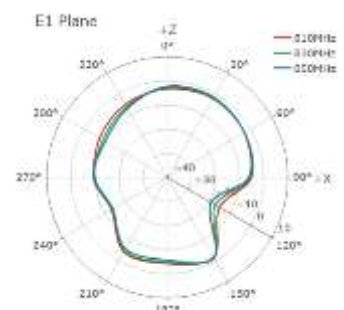
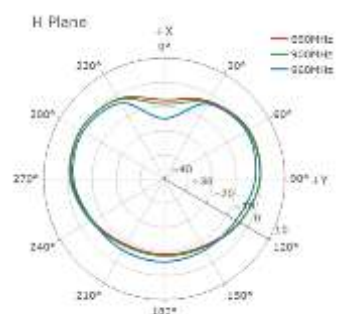
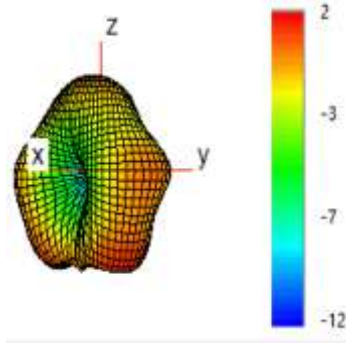
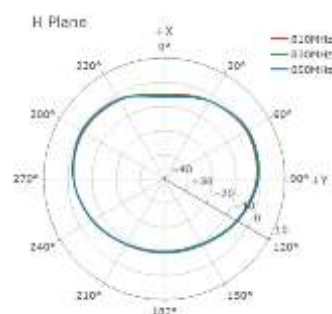
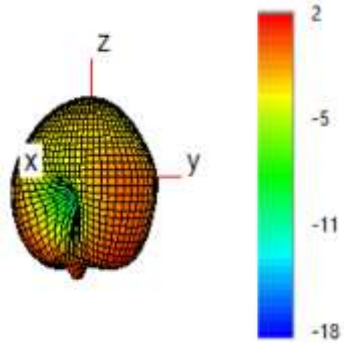
630 MHz

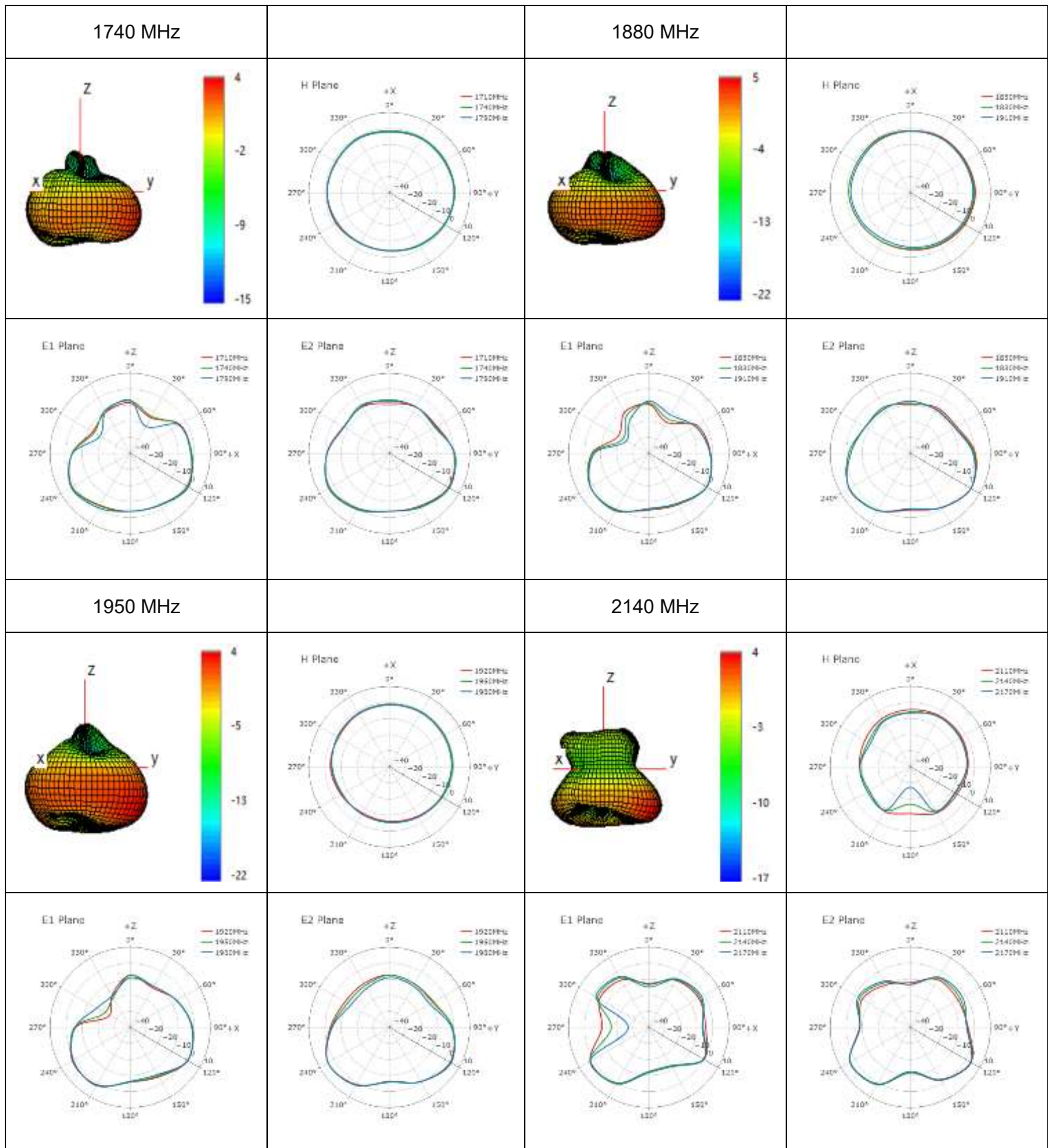


710 MHz

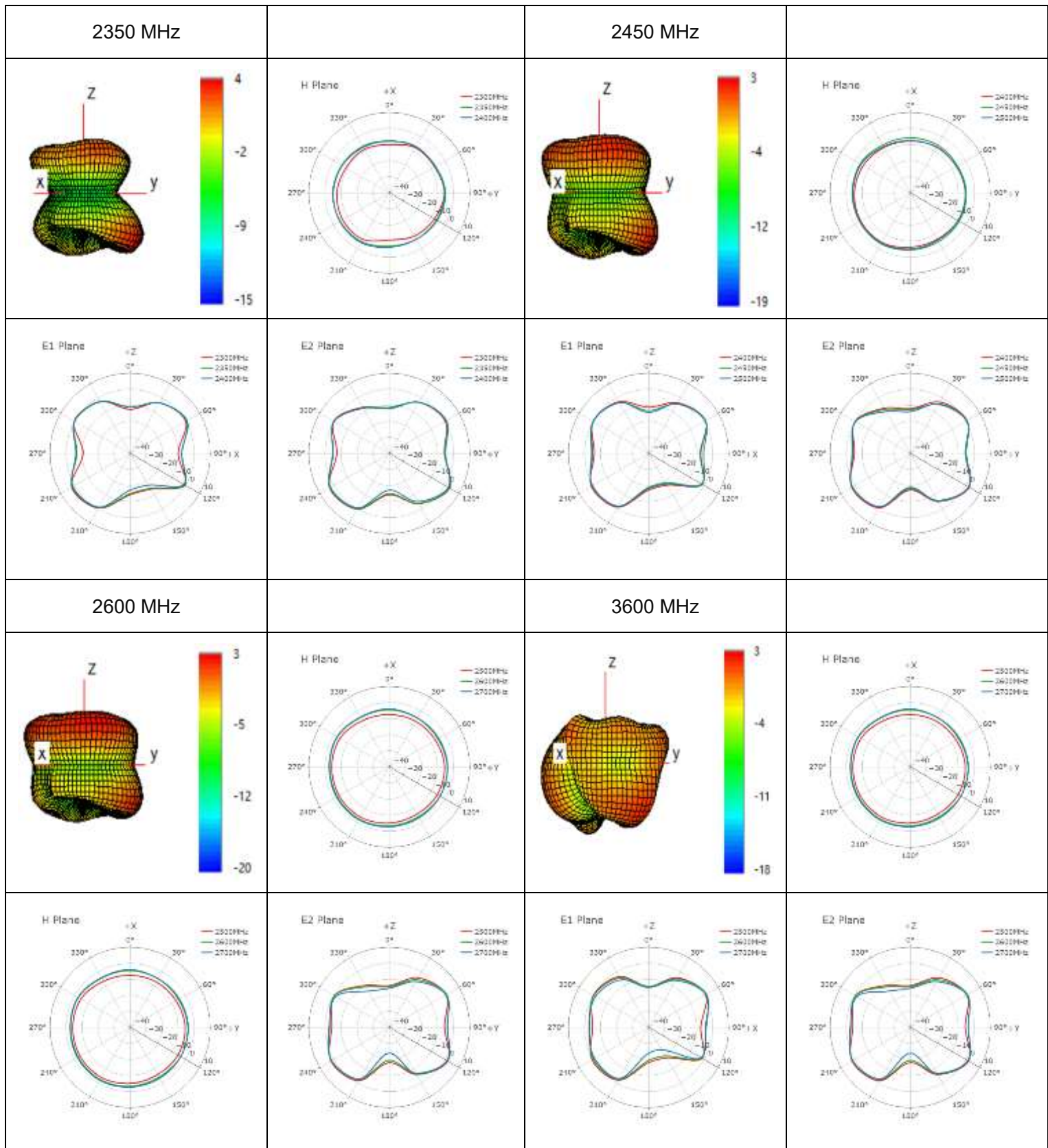


830 MHz

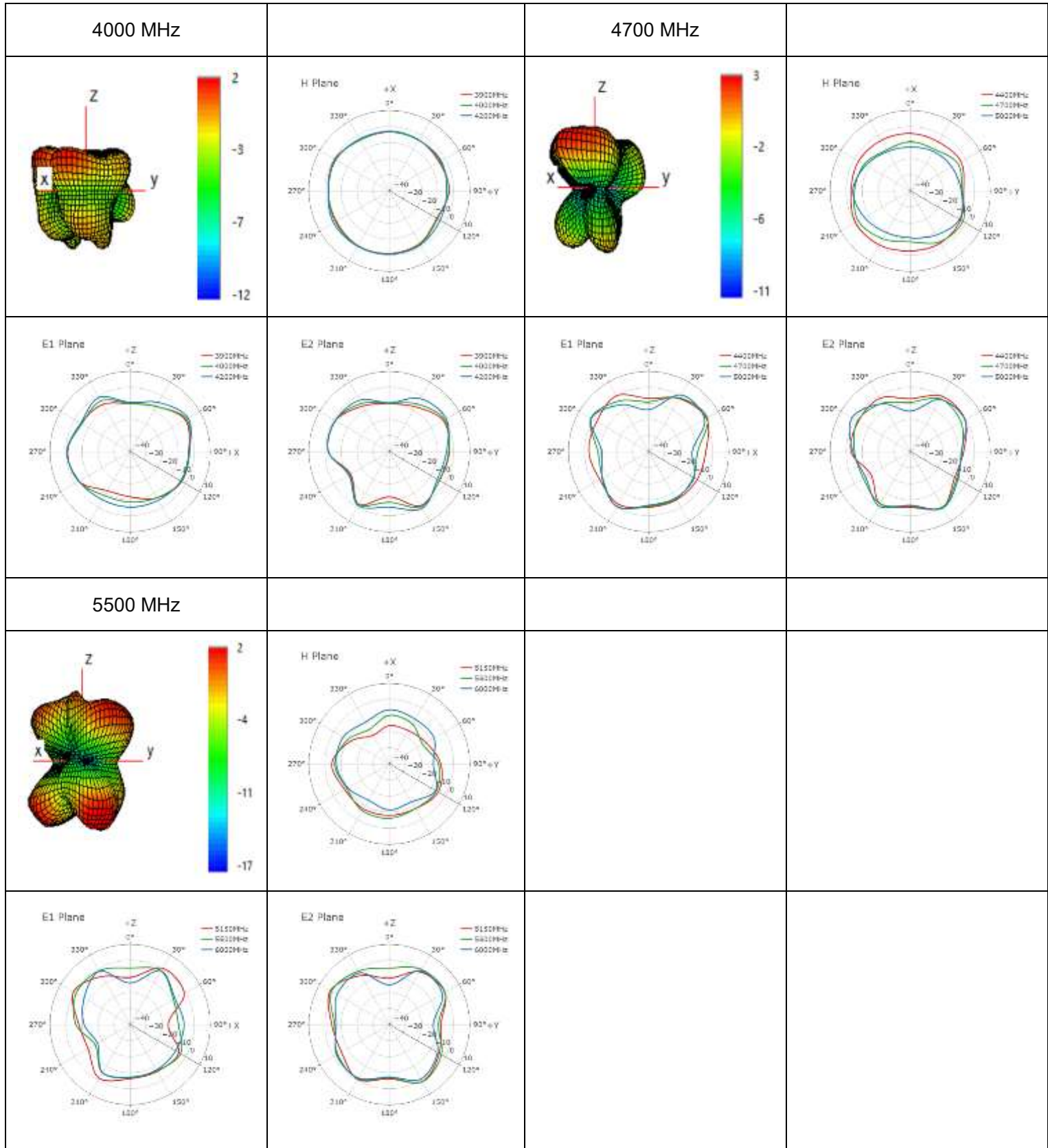






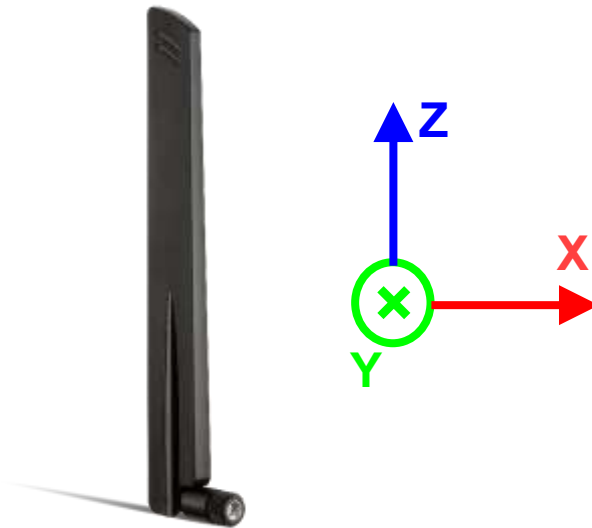




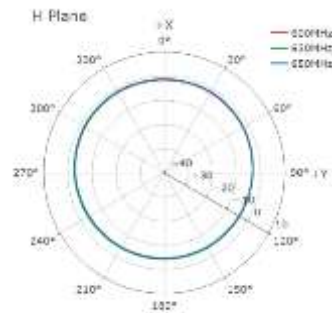
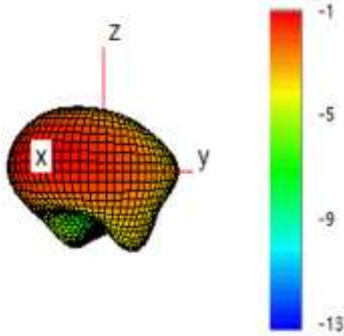


**3.2.4.2. Test Condition: Free Space**

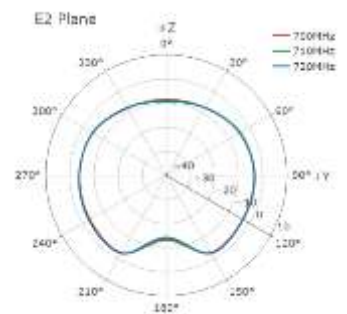
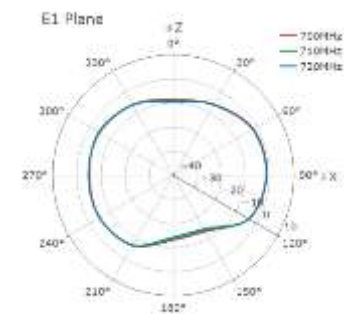
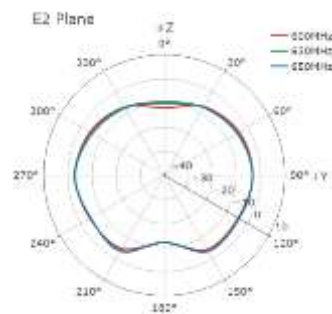
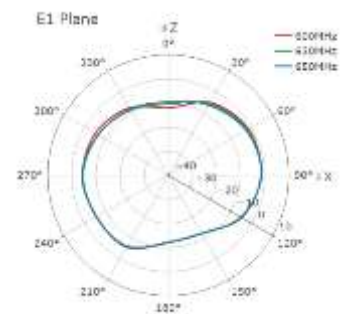
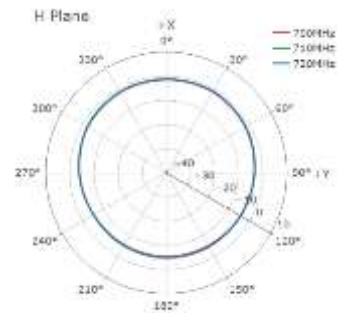
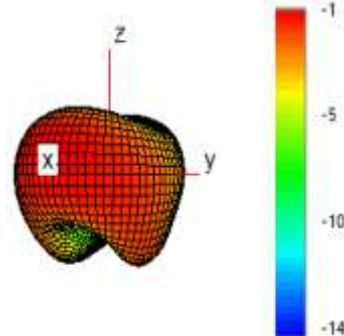
- Test Chamber: HF-G-1



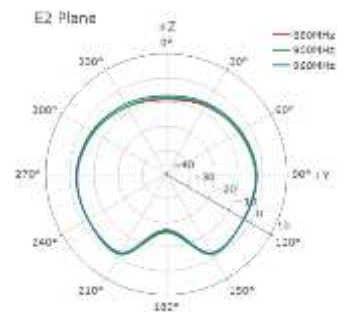
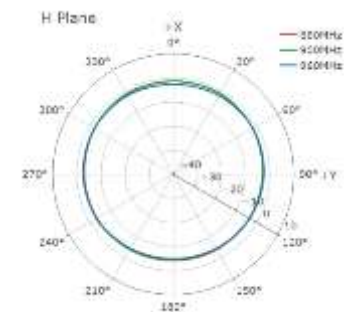
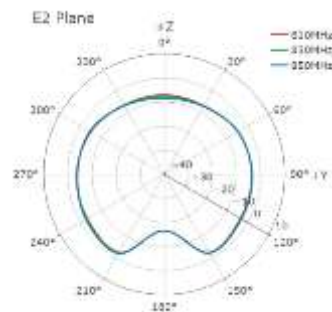
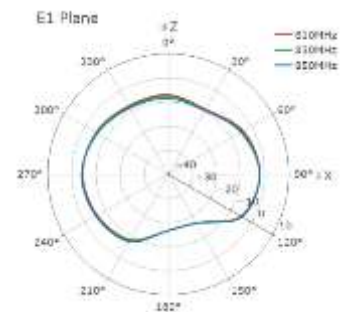
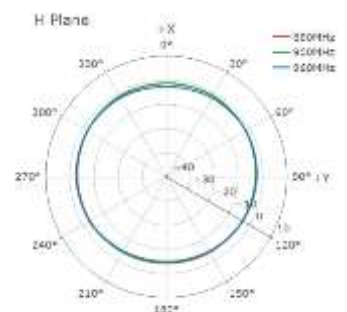
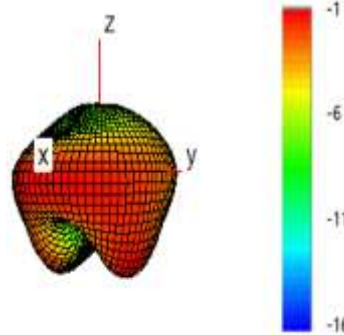
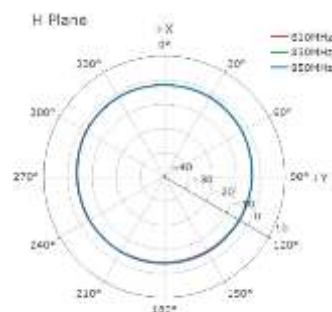
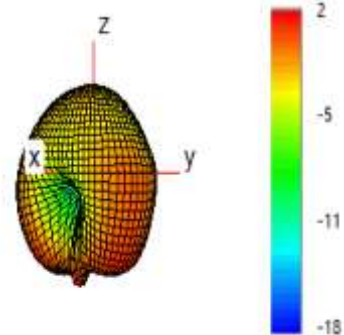
630 MHz

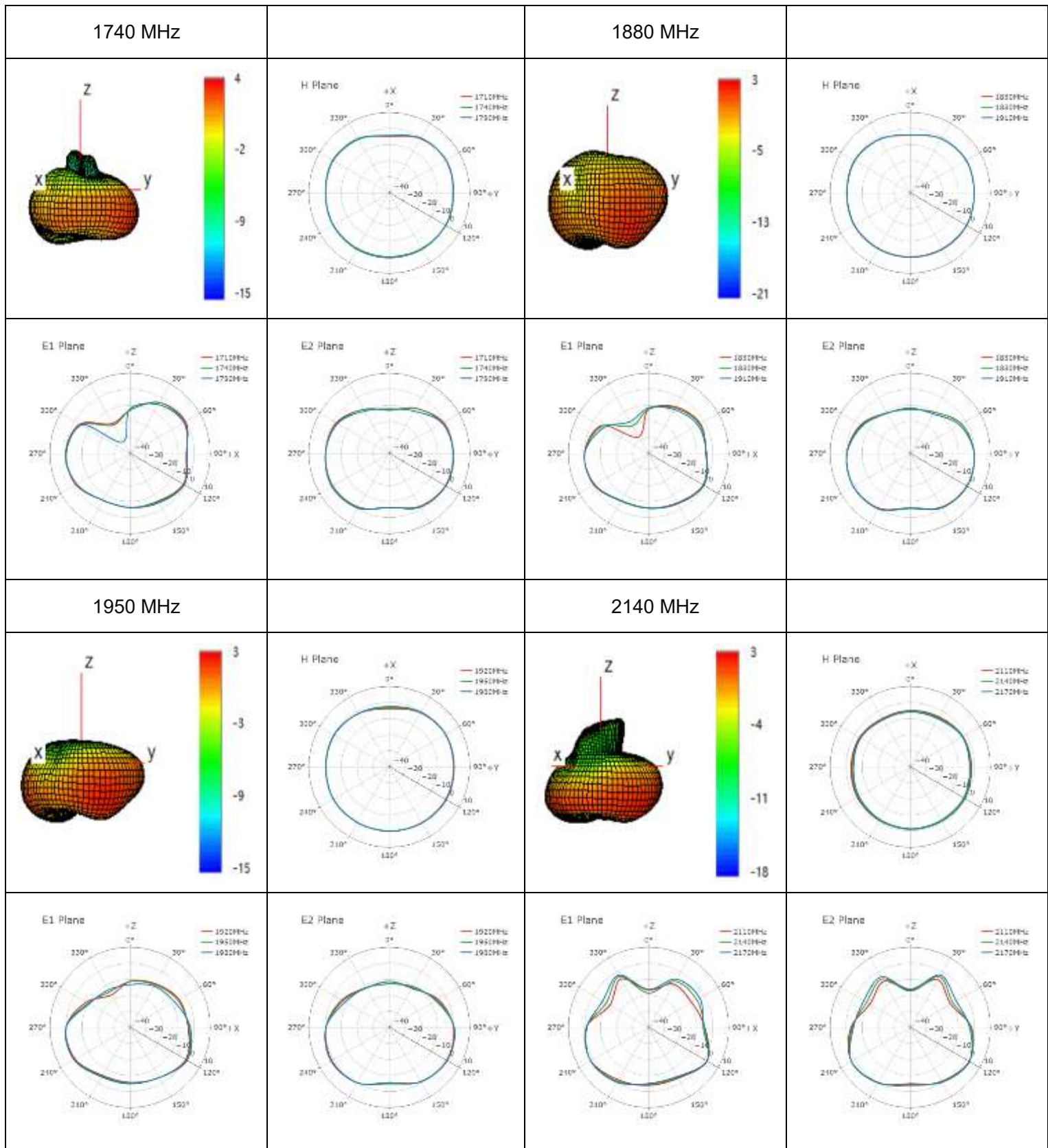


710 MHz

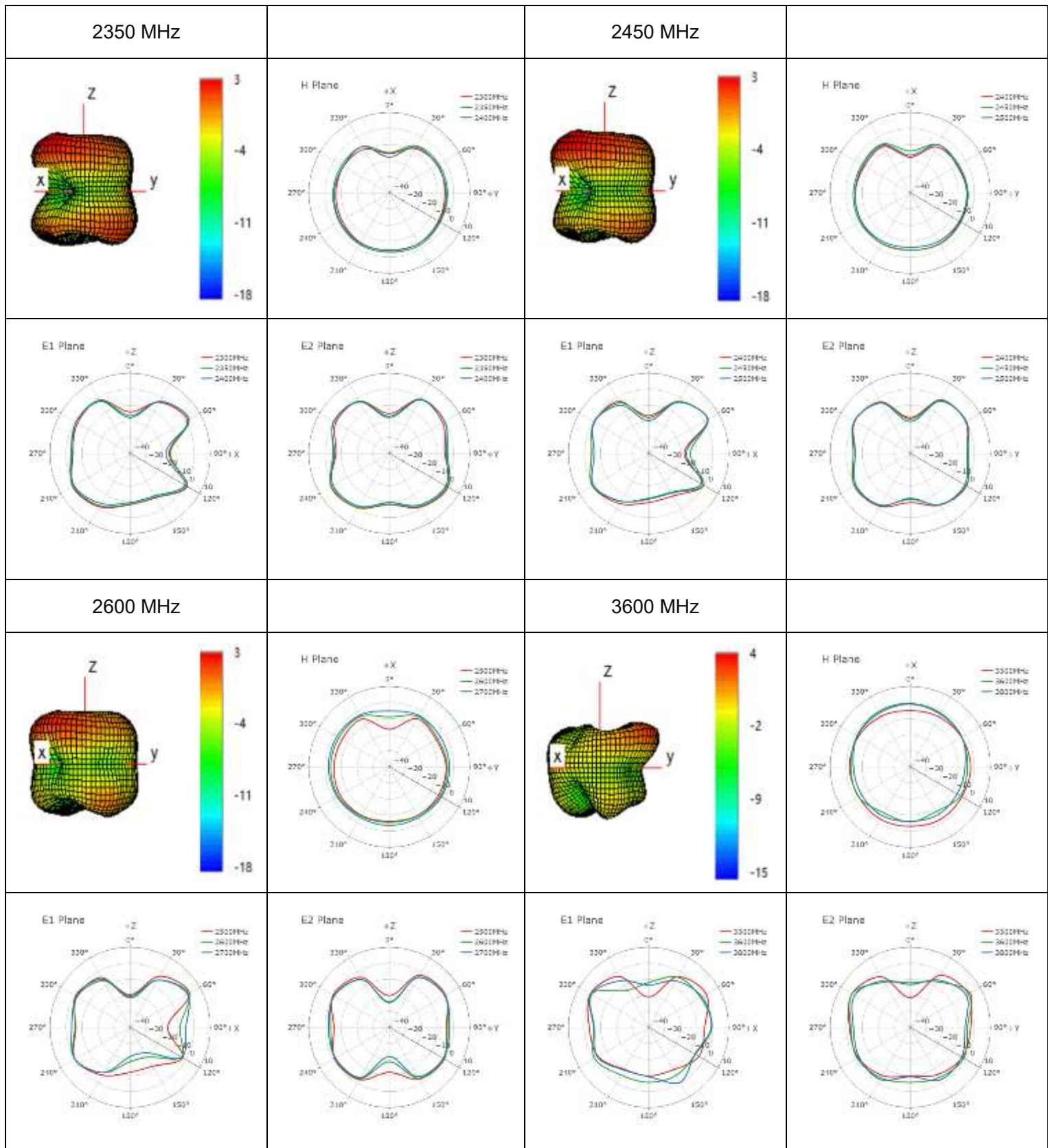


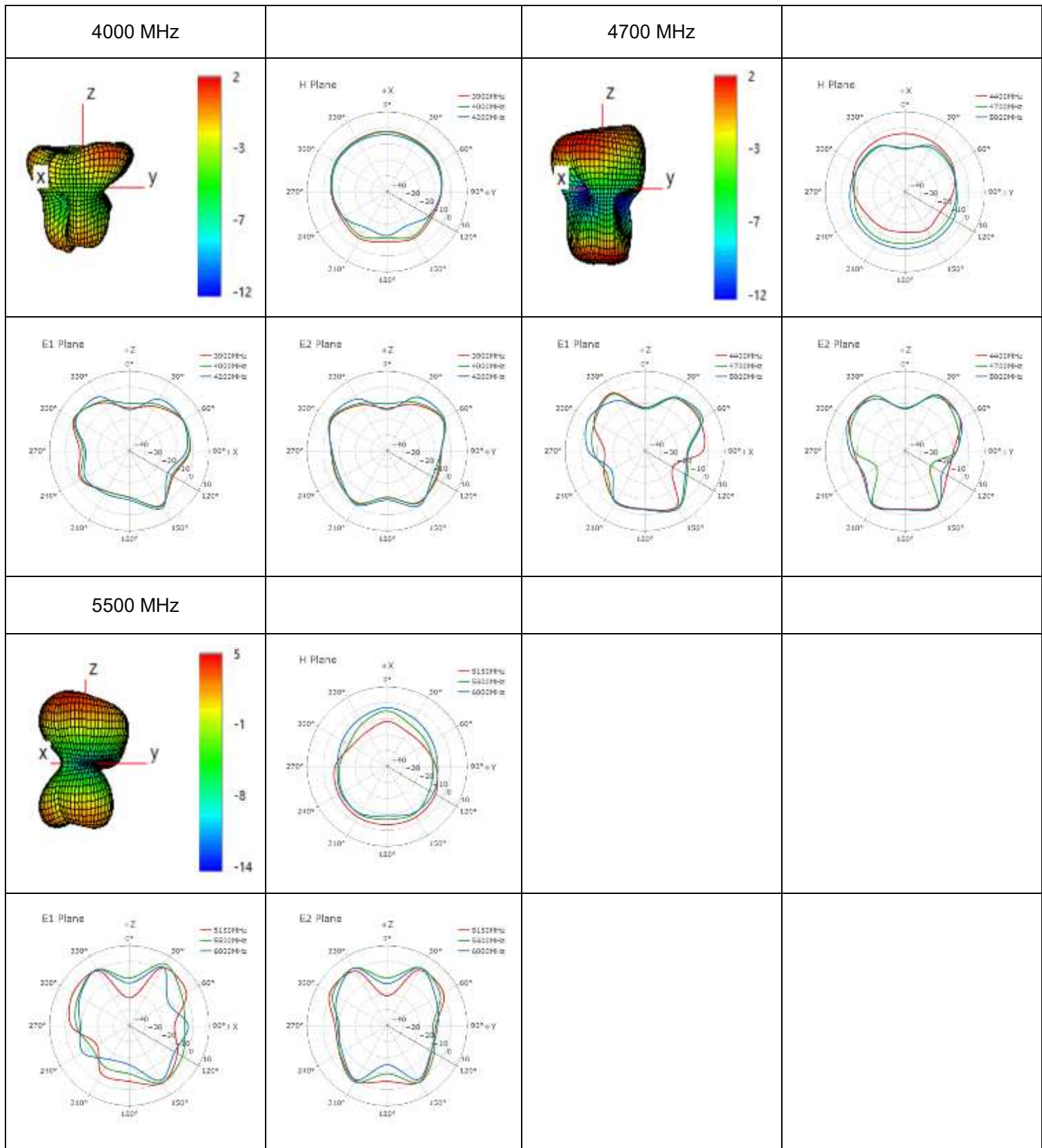
830 MHz



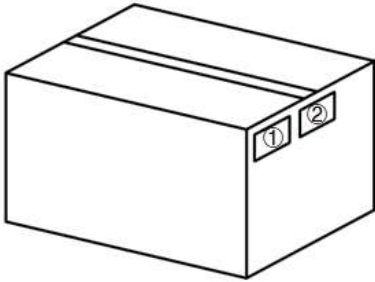


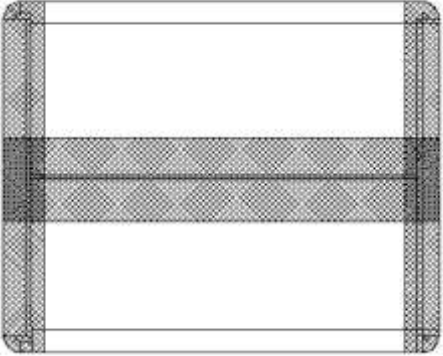






## 4 Packaging

| Step | Packaging Picture / 2D Picture                                                      | Description                                                                                                                      |
|------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 1    |   | 20 pcs antenna products in a PE bag;<br>(20 PCS/ Per PE Bag)                                                                     |
| 2    |  | (18 PE Bags / Carton Box)<br>(360 PCS Antennas / Carton Box)<br><br><u>Carton Size:</u><br><u>L × W × H = 450 × 240 × 290 mm</u> |
| 3    |  | <b>Position for Attaching Labels</b><br>① Carton Label<br>② Quality Label                                                        |

|   |                                                                                   |                                                            |
|---|-----------------------------------------------------------------------------------|------------------------------------------------------------|
| 4 |  | <p><b>Sealing Cartons</b><br/>“工” type sealing cartons</p> |
|---|-----------------------------------------------------------------------------------|------------------------------------------------------------|



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# Revision History

| Version | Date       | Author                                             | Note                                                                                                              |
|---------|------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| -       | 2020-08-27 | Kenny YIN                                          | Creation of the document                                                                                          |
| 1.0     | 2020-08-27 | Kenny YIN                                          | First official release                                                                                            |
| 1.1     | 2020-12-16 | Kenny YIN                                          | Updated the antenna image (Chapter 2).                                                                            |
| 1.2     | 2021-01-27 | Kenny YIN                                          | Added IP rating description.                                                                                      |
| 1.3     | 2021-07-25 | Kenny YIN                                          | 1. Updated working temperature. (Chapter 3).<br>2. Added detailed passive electrical specifications. (Chapter 3). |
| 1.4     | 2021-11-30 | Kenny YIN                                          | Updated the product description (Chapter 1).                                                                      |
| 1.5     | 2022-01-14 | Kenny YIN                                          | Updated the drawing (Chapter 5).                                                                                  |
| 1.6     | 2022-10-17 | Aria CHU                                           | Deleted the IP rating.                                                                                            |
| 2.0     | 2023-04-26 | Tina GAN/<br>Lucky FENG/<br>David LIU/<br>Aria CHU | Updated all data and datasheet template.                                                                          |
| 2.1     | 2023-10-10 | Lucky FENG                                         | Updated the temperature and materials (Chapter 1.1).                                                              |
| 3.0     | 2023-10-30 | Nico PAN                                           | Numerous changes were made to this document. It should be read in its entirety.                                   |
| 3.1     | 2024-01-10 | Lucky FENG                                         | Updated antenna material (Chapter 1.2).                                                                           |



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