



# Antenna Datasheet

**Product OC:** YECN028AA

**Version:** 2.2

**Date:** 2024-11-05

**Status:** Released

**Product Name:** 5G Terminal Mount External Dipole Antenna

**Key Features:**

Frequency Band: 410–470 MHz, 617–960 MHz, 1427–6000 MHz

Dimensions: 225 mm × 54.5 mm × 13 mm

Efficiency: Up to 83.3 % (5G-EVB)

RoHS and REACH Compliant

IP66(housing)

# Overview

YECN028AA is a 5G external antenna measuring 225 mm × 54.5 mm × 13 mm. This ultra-wide-band 5G antenna provides broad coverage from 410–470 MHz, 617–960 MHz, 1427–6000 MHz whilst offering backward-compatibility to support 4G/3G and 2G networks as well as LTE Cat-M and narrowband IoT (NB-IoT). The antenna is terminated with SMA Male connector. Ideal for applications where the antenna is required to be discrete, this low profile, terminal mount omni-directional antenna is easy to install with maximum durability assured thanks to its IP66 rated, PC enclosure. The YECN028AA can be used in harsh environments thanks to its robust UV resistant (UL 746c f1) and flame resistant (UL 94 V-0) enclosure.

The antenna is designed as dipole type to work with various GND plane sizes or in free space for ease of integration with a hinged SMA Male connector to achieve the optimum position. Hinged structure helps to avoid other antennas or objects by rotating to different directions when mounted on terminals. This omni-directional antenna is ideally suited for access points, terminals and routers, high speed video, real-time streaming, public transportation, offering great performance with its high gain and efficiency.

Typical applications include:

- Access points, terminals and routers
- High speed video
- Real-time streaming
- Public transportation

Quectel provides comprehensive antenna design support such as simulation, testing and manufacturing for custom antenna solutions to meet your specific application needs. We have regional R & D centers to offer quick response to meet your requirements. Please contact our sales & FAEs if you have any requests.

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# 1 Specification

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

## 1.1. Electrical

| Electrical        |                                         |
|-------------------|-----------------------------------------|
| Frequency Range   | 410–470 MHz, 617–960 MHz, 1427–6000 MHz |
| Radiation Pattern | Omni-directional                        |
| Polarization      | Linear                                  |
| Impedance         | 50 Ω                                    |

| Electrical – NTN Bands           |      |               |               |               |               |               |
|----------------------------------|------|---------------|---------------|---------------|---------------|---------------|
| SPEC                             | Band | L Band        | L Band        | L Band        | B256 / B23    | B256 / B23    |
|                                  |      | 1518–1559     | 1620–1665     | 1668–1675     | 1980–2020     | 2170–2200     |
| Max. VSWR                        | FS   | 1.8           | 2.2           | 2.2           | 2.2           | 1.5           |
|                                  | EVB  | 1.7           | 2.3           | 2.4           | 2.1           | 1.9           |
| Max. Return Loss (dB)            | FS   | -10.8         | -8.7          | -8.5          | -8.6          | -14.1         |
|                                  | EVB  | -11.8         | -8.0          | -7.7          | -8.8          | -10.3         |
| AVG Eff. (%)                     | FS   | 64.0          | 60.1          | 62.3          | 65.7          | 68.3          |
|                                  | EVB  | 74.7          | 64.6          | 62.5          | 71.0          | 72.2          |
| AVG AVG Gain (dB)                | FS   | -1.9          | -2.2          | -2.1          | -1.8          | -1.7          |
|                                  | EVB  | -1.3          | -1.9          | -2.0          | -1.5          | -1.4          |
| Max. Peak Gain (dBi)             | FS   | 2.5<br>(1560) | 0.8<br>(1630) | 0.4<br>(1670) | 1.4<br>(1990) | 2.4<br>(2200) |
|                                  | EVB  | 3.4           | 2.5           | 2.0           | 2.8           | 3.7           |
| Upper Hemisphere Efficiency (dB) | FS   | -3.5          | -3.5          | -3.8          | -2.5          | -2.2          |
|                                  | EVB  | -6.1          | -5.9          | -5.9          | -3.9          | -3.6          |

|             |     |           |
|-------------|-----|-----------|
| VSWR        | FS  | ≤ 2.2     |
|             | EVB | ≤ 2.4     |
| Return Loss | FS  | ≤ -8.5 dB |
|             | EVB | ≤ -7.7 dB |
| Peak Gain   | FS  | ≤ 2.5 dBi |
|             | EVB | ≤ 3.7 dBi |

**Note:**

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

**Electrical – Detail**

| SPEC                 | Band | Band           | B31          | B5/B8<br>/B12<br>/B13<br>/B26<br>/B28<br>/B71 | n74<br>/n75<br>/n76 | B1<br>/B2<br>/B3 | B40<br>/Wi-Fi<br>2G | Wi-Fi<br>2G   | B42<br>/B48<br>/n77<br>/n79 | Wi-Fi<br>5G   |
|----------------------|------|----------------|--------------|-----------------------------------------------|---------------------|------------------|---------------------|---------------|-----------------------------|---------------|
|                      |      | Freq.<br>(MHz) | 410–470      | 617–<br>960                                   | 1420–<br>1520       | 1710–<br>2170    | 2300–<br>2500       | 2500–<br>2690 | 3300–<br>5000               | 5150–<br>6000 |
| Max VSWR             | FS   |                | 4.9          | 3.0                                           | 1.6                 | 2.8              | 2.0                 | 1.9           | 2.9                         | 2.4           |
|                      | EVB  |                | 6.5          | 3.8                                           | 1.7                 | 3.3              | 2.0                 | 1.9           | 2.8                         | 4.6           |
| Max Return Loss (dB) | FS   |                | -3.6         | -6.0                                          | -12.4               | -6.4             | -9.7                | -10.4         | -6.4                        | -7.6          |
|                      | EVB  |                | -2.7         | -4.7                                          | -12.1               | -5.5             | -9.6                | -10.2         | -6.5                        | -3.8          |
| AVG Eff. (%)         | FS   |                | 45.1         | 64.5                                          | 54.9                | 64.4             | 75.2                | 65.2          | 58.7                        | 60.9          |
|                      | EVB  |                | 49.9         | 68.6                                          | 74.4                | 65.1             | 74.1                | 74.9          | 62.1                        | 51.2          |
| AVG AVG Gain (dB)    | FS   |                | -3.5         | -2.0                                          | -2.6                | -1.9             | -1.2                | -1.9          | -2.3                        | -2.2          |
|                      | EVB  |                | -3.3         | -1.7                                          | -1.3                | -1.9             | -1.3                | -1.3          | -2.1                        | -3.0          |
| Max Peak Gain(dBi)   | FS   |                | 0.0<br>(430) | 0.5<br>(880)                                  | 2.8<br>(1470)       | 2.0<br>(2170)    | 2.5<br>(2360)       | 2.2<br>(2690) | 5.5<br>(4900)               | 5.8<br>(5300) |
|                      | EVB  |                | 0.5          | 1.3                                           | 3.6                 | 3.7              | 3.7                 | 3.0           | 5.5                         | 5.3           |
| VSWR                 | FS   |                | ≤ 4.9        |                                               |                     |                  |                     |               |                             |               |
|                      | EVB  |                | ≤ 6.5        |                                               |                     |                  |                     |               |                             |               |
| Return Loss          | FS   |                | ≤ -3.6 dB    |                                               |                     |                  |                     |               |                             |               |
|                      | EVB  |                | ≤ -2.7 dB    |                                               |                     |                  |                     |               |                             |               |
| Peak Gain            | FS   |                | ≤ 5.8 dBi    |                                               |                     |                  |                     |               |                             |               |
|                      | EVB  |                | ≤ 5.5 dBi    |                                               |                     |                  |                     |               |                             |               |

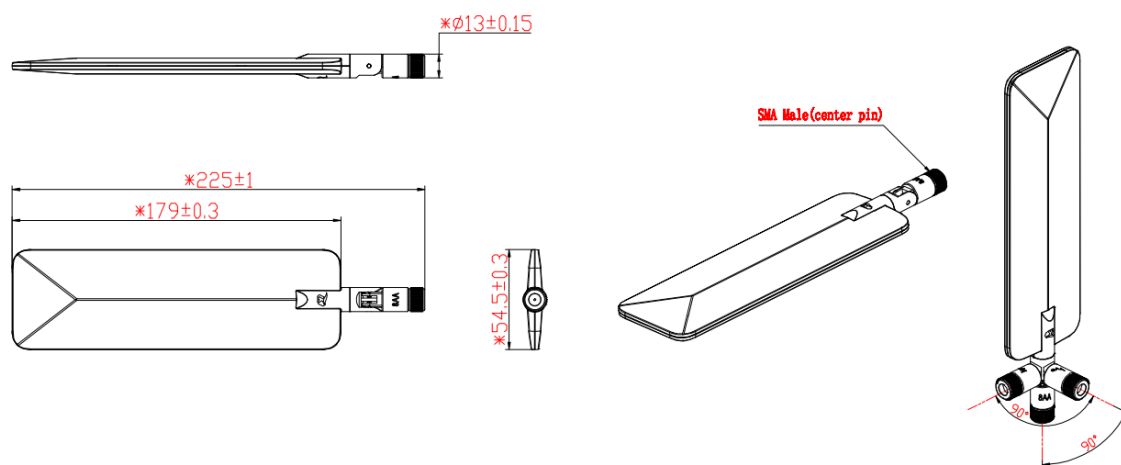
**Note:**

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

## 1.2. Mechanical & Environmental

| Mechanical                     |                                                                                                                                                  |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Antenna Dimensions             | 225 mm × 54.5 mm × 13 mm                                                                                                                         |
| Casing Material & Color        | PC & Black                                                                                                                                       |
| Connector Type                 | SMA Male                                                                                                                                         |
| Mounting Type                  | Terminal                                                                                                                                         |
| Weight                         | Typ. 75 g                                                                                                                                        |
| Environmental                  |                                                                                                                                                  |
| Operation Temperature          | -40 °C to +85 °C                                                                                                                                 |
| Storage Temperature            | -40 °C to +85 °C                                                                                                                                 |
| Ingress Protection (IP) Rating | Antenna plastic housing could meet IP66, SMA connector is not waterproof. After installation, SMA connector needs additional waterproof methods. |
| RoHS & REACH Compliant         | Yes                                                                                                                                              |
| Housing Flame Rating           | UL 94 V-0                                                                                                                                        |
| Housing UV Resistant           | UL 746c f1                                                                                                                                       |

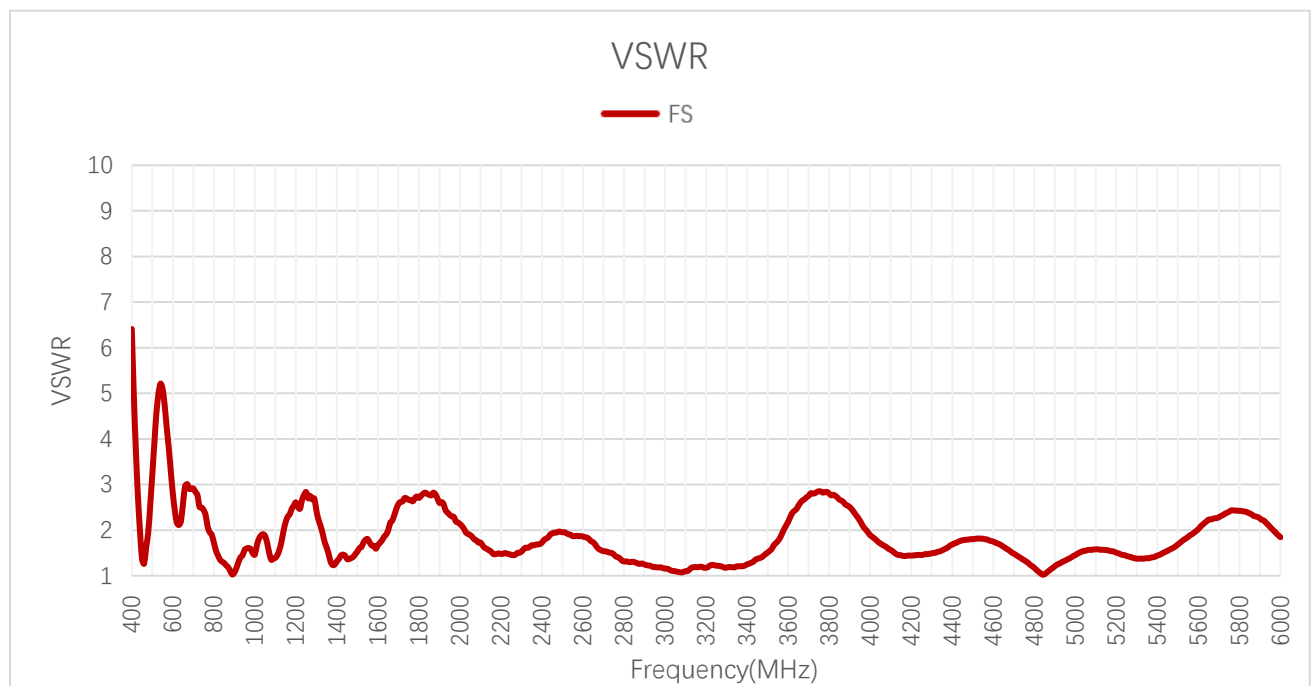
## 2 Drawing

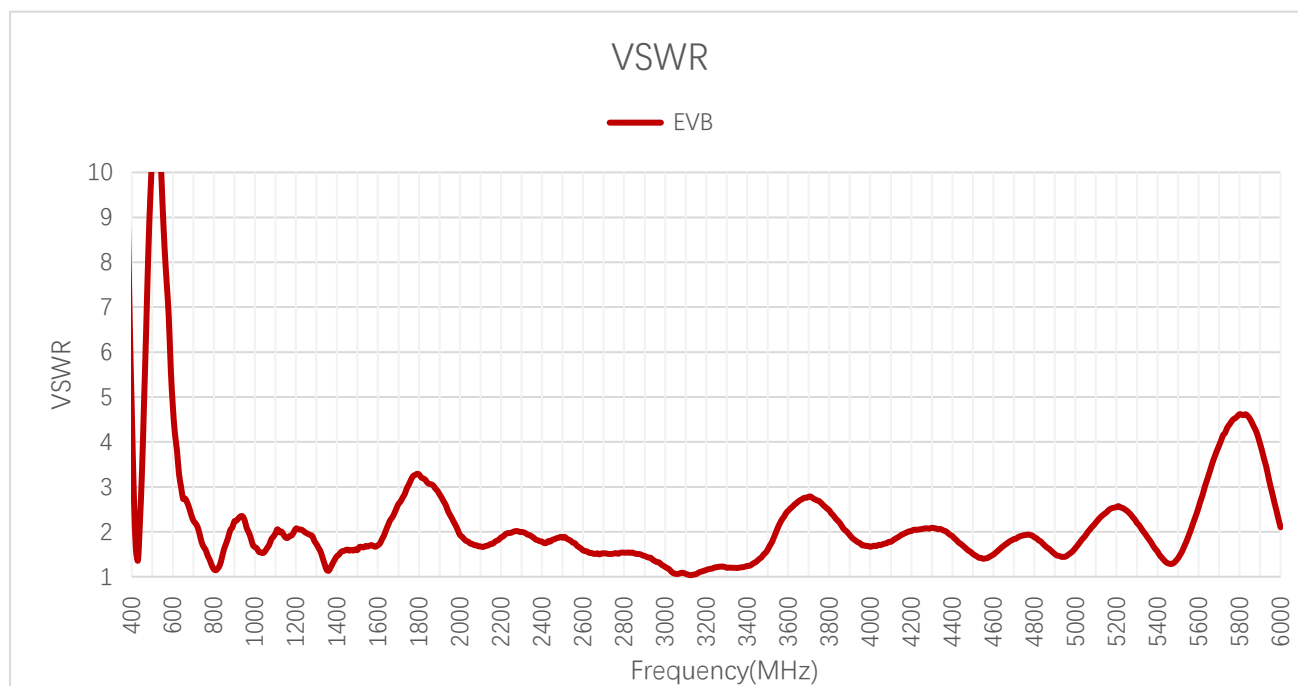


# 3 Detailed Performance

## 3.1. S-Parameter Test

### 3.1.1. VSWR





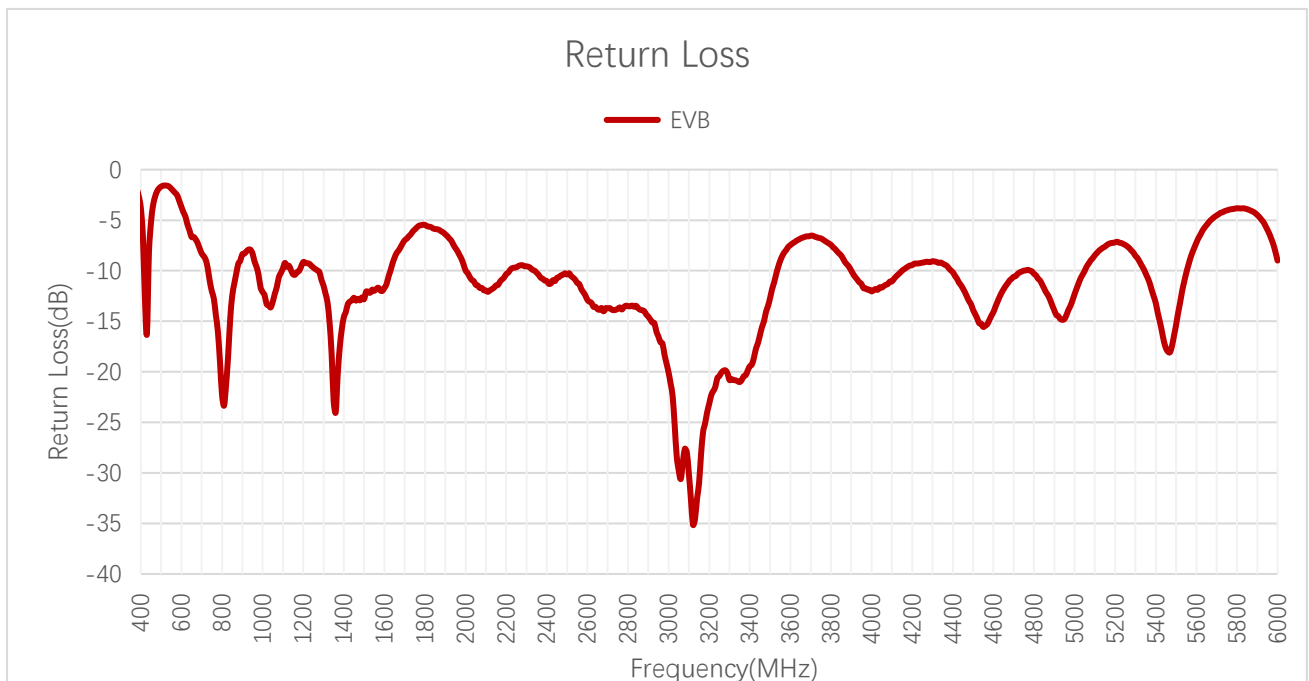
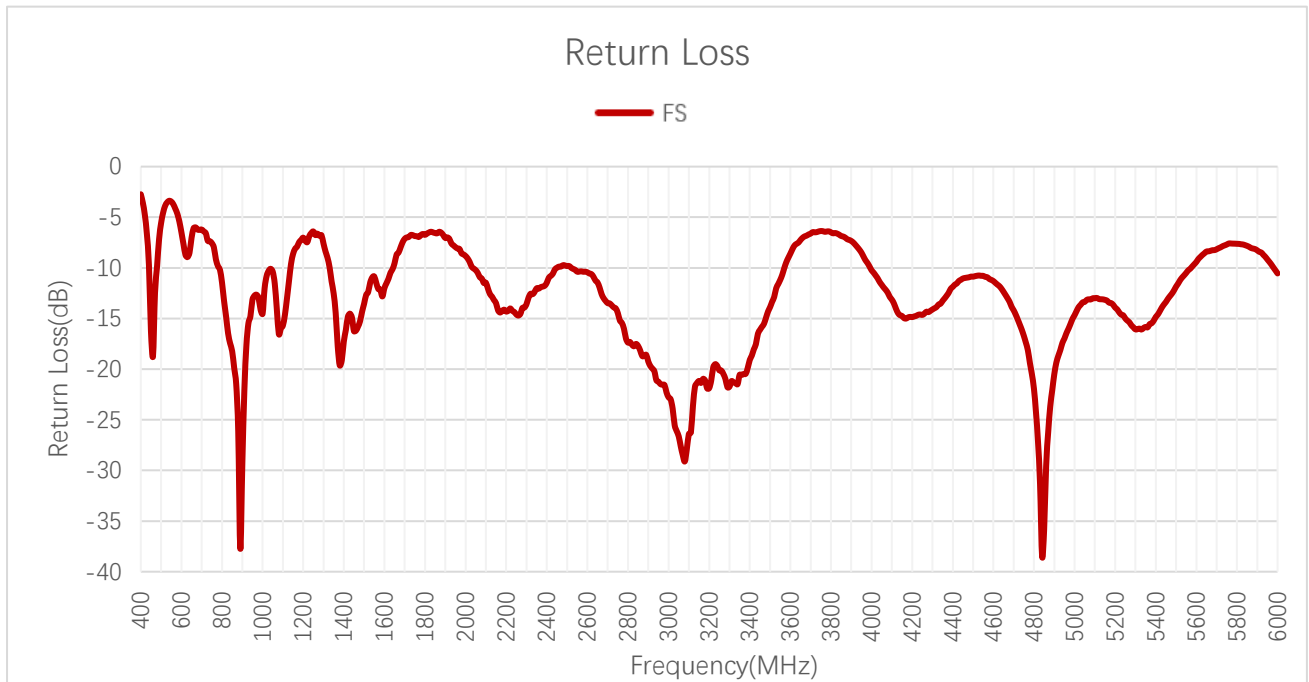
**VSWR**

| Frequency (MHz) | 410  | 420  | 460  | 470  | 600  | 630  | 700  | 710  | 810  |
|-----------------|------|------|------|------|------|------|------|------|------|
| FS              | 4.9  | 3.7  | 1.3  | 1.6  | 2.8  | 2.1  | 2.9  | 2.8  | 1.6  |
| EVB             | 2.8  | 1.6  | 4.9  | 6.5  | 4.8  | 3.3  | 2.3  | 2.2  | 1.1  |
| Frequency (MHz) | 830  | 900  | 960  | 1440 | 1710 | 1740 | 1880 | 1950 | 2140 |
| FS              | 1.4  | 1.1  | 1.6  | 1.4  | 2.6  | 2.7  | 2.8  | 2.3  | 1.6  |
| EVB             | 1.3  | 2.2  | 2.1  | 1.6  | 2.7  | 3.0  | 3.0  | 2.4  | 1.7  |
| Frequency (MHz) | 2350 | 2450 | 2600 | 2700 | 3600 | 4000 | 4700 | 5500 | 6000 |
| FS              | 1.7  | 1.9  | 1.9  | 1.5  | 2.2  | 1.9  | 1.5  | 1.7  | 1.8  |
| EVB             | 1.9  | 1.8  | 1.6  | 1.5  | 2.5  | 1.7  | 1.8  | 1.4  | 2.1  |

**VSWR – NTN Bands**

| Frequency (MHz) | 1520 | 1560 | 1630 | 1680 | 2000 | 2200 |
|-----------------|------|------|------|------|------|------|
| FS              | 1.6  | 1.7  | 1.9  | 2.3  | 2.1  | 1.5  |
| EVB             | 1.7  | 1.7  | 1.9  | 2.4  | 1.9  | 1.9  |

### 3.1.2. Return Loss



## Return Loss (dB)

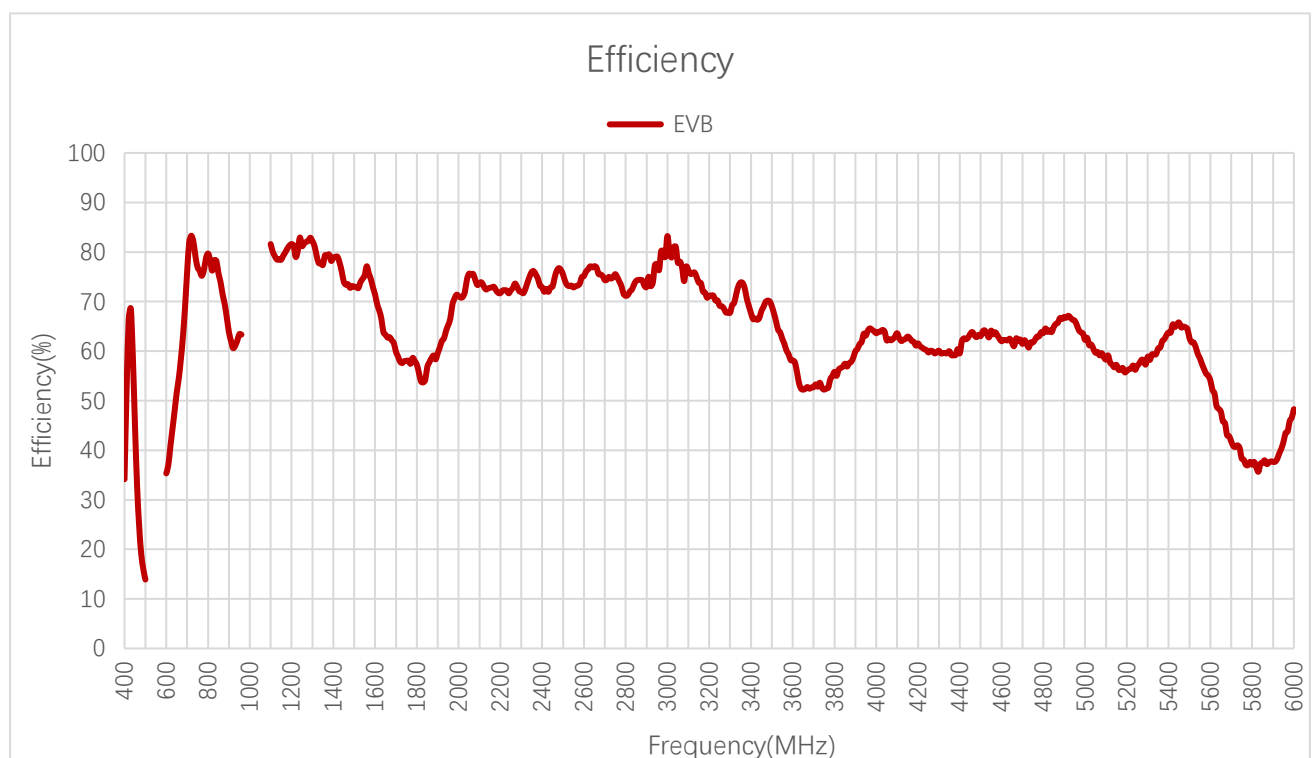
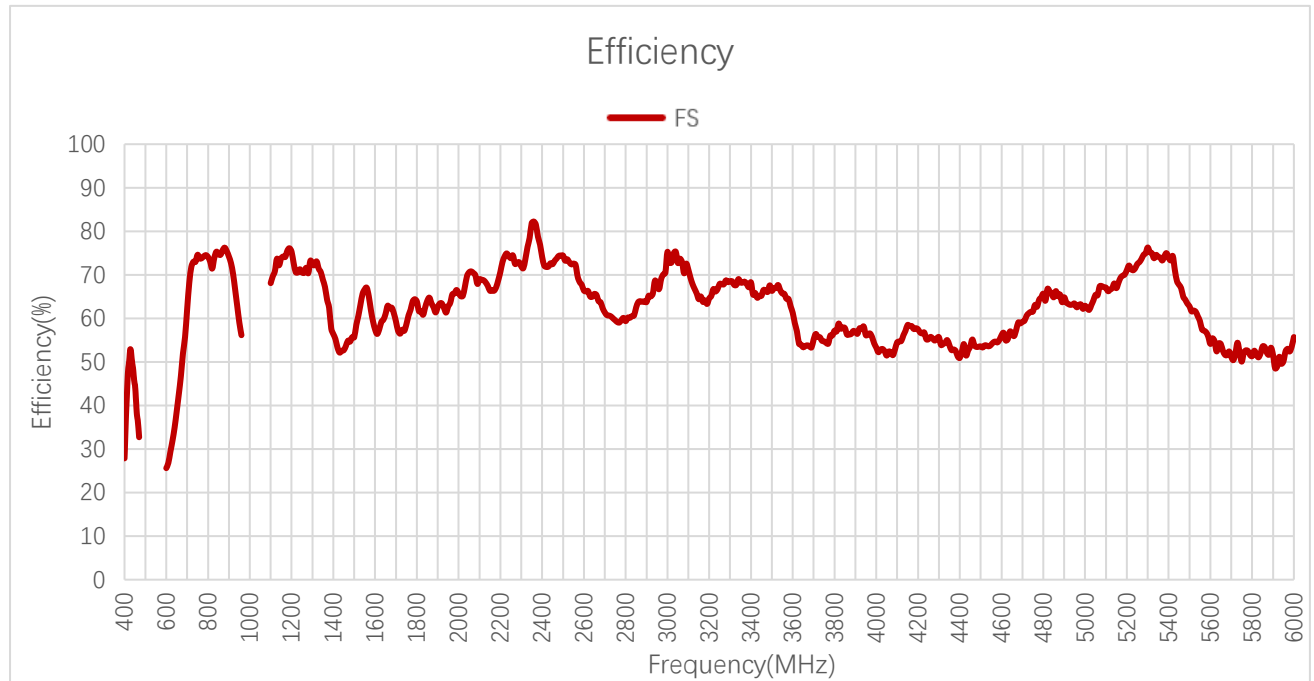
| Frequency (MHz) | 410   | 420   | 460   | 470   | 600  | 630   | 700   | 710   | 810   |
|-----------------|-------|-------|-------|-------|------|-------|-------|-------|-------|
| FS              | -3.6  | -4.8  | -18.7 | -12.5 | -6.5 | -8.9  | -6.2  | -6.4  | -13.2 |
| EVB             | -6.5  | -12.6 | -3.6  | -2.7  | -3.7 | -5.4  | -8.3  | -8.6  | -23.3 |
| Frequency (MHz) | 830   | 900   | 960   | 1440  | 1710 | 1740  | 1880  | 1950  | 2140  |
| FS              | -16.5 | -29.4 | -12.7 | -14.9 | -7.0 | -6.8  | -6.5  | -7.9  | -13.2 |
| EVB             | -18.5 | -8.4  | -9.1  | -12.9 | -6.8 | -6.1  | -6.1  | -7.8  | -11.7 |
| Frequency (MHz) | 2350  | 2450  | 2600  | 2700  | 3600 | 4000  | 4700  | 5500  | 6000  |
| FS              | -12.0 | -10.0 | -10.4 | -13.5 | -8.6 | -10.2 | -14.2 | -11.9 | -10.5 |
| EVB             | -10.2 | -10.7 | -12.9 | -13.7 | -7.5 | -12.0 | -10.6 | -15.4 | -9.0  |

## Return Loss (dB) – NTN Bands

| Frequency (MHz) | 1520  | 1560  | 1630  | 1680 | 2000  | 2200  |
|-----------------|-------|-------|-------|------|-------|-------|
| FS              | -12.4 | -11.5 | -10.5 | -8.0 | -8.8  | -14.3 |
| EVB             | -12.1 | -11.8 | -10.0 | -7.7 | -10.0 | -10.3 |

## 3.2. Radiation Performance Test

### 3.2.1. Efficiency



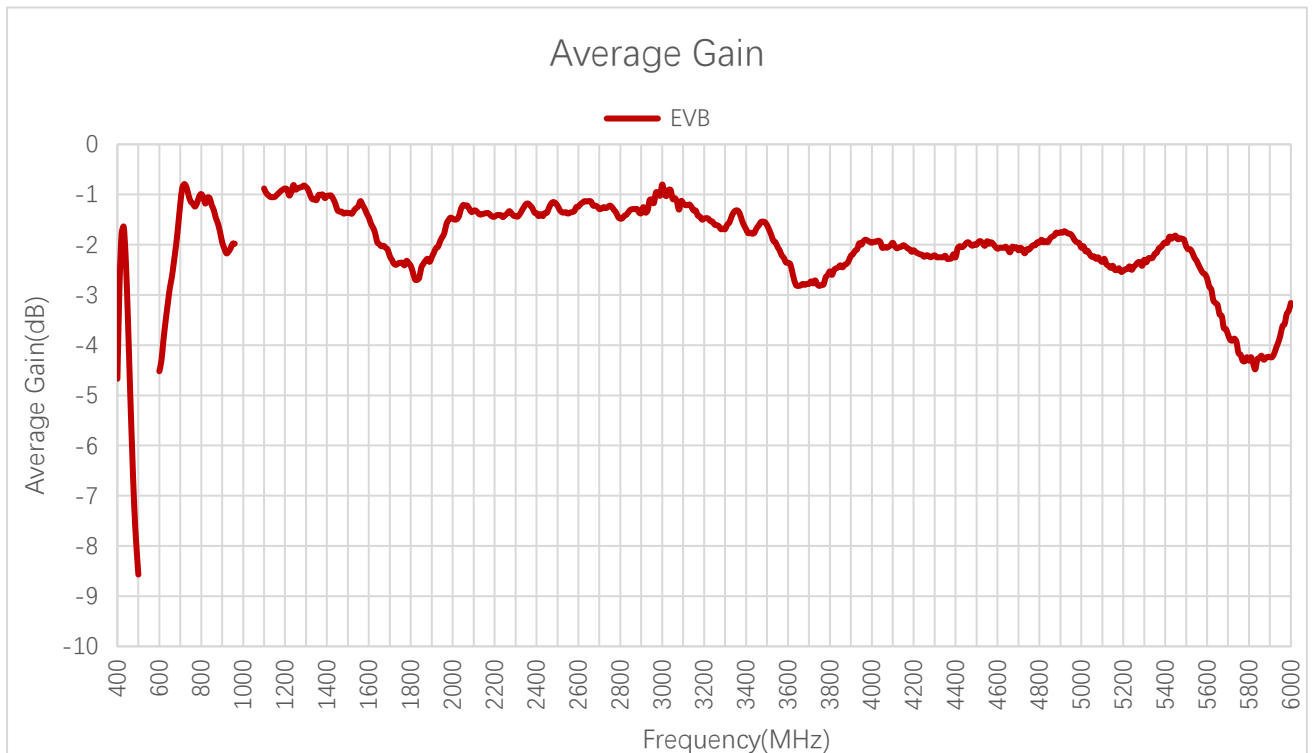
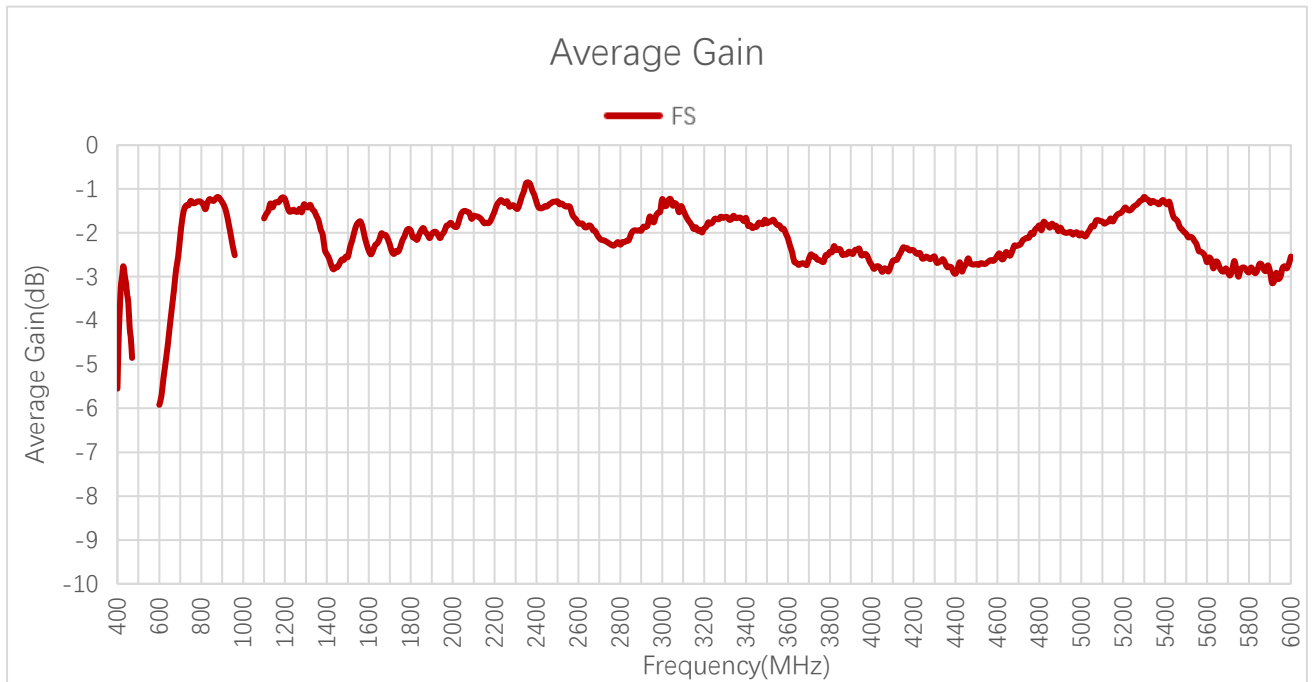
### Efficiency (%)

| Frequency (MHz) | 410  | 420  | 460  | 470  | 600  | 630  | 700  | 710  | 810  |
|-----------------|------|------|------|------|------|------|------|------|------|
| FS              | 40.8 | 49.2 | 37.7 | 32.7 | 25.6 | 32.0 | 62.1 | 68.1 | 73.1 |
| EVB             | 52.2 | 66.3 | 33.0 | 24.9 | 35.3 | 44.4 | 76.1 | 82.0 | 78.4 |
| Frequency (MHz) | 830  | 900  | 960  | 1440 | 1710 | 1740 | 1880 | 1950 | 2140 |
| FS              | 73.9 | 74.2 | 56.1 | 52.6 | 57.2 | 57.2 | 62.6 | 62.7 | 67.4 |
| EVB             | 78.3 | 63.9 | 63.3 | 76.1 | 58.9 | 58.0 | 59.1 | 65.3 | 72.6 |
| Frequency (MHz) | 2350 | 2450 | 2600 | 2700 | 3600 | 4000 | 4700 | 5500 | 6000 |
| FS              | 81.9 | 72.4 | 66.4 | 61.4 | 61.3 | 53.3 | 59.2 | 62.8 | 55.7 |
| EVB             | 76.0 | 73.0 | 75.1 | 74.4 | 58.1 | 63.6 | 61.5 | 62.6 | 48.3 |

### Efficiency (%) – NTN Bands

| Frequency (MHz) | 1520 | 1560 | 1630 | 1680 | 2000 | 2200 |
|-----------------|------|------|------|------|------|------|
| FS              | 60.6 | 67.0 | 59.2 | 62.4 | 65.8 | 70.7 |
| EVB             | 72.7 | 77.1 | 66.6 | 62.2 | 71.1 | 71.7 |

### 3.2.2. Average Gain



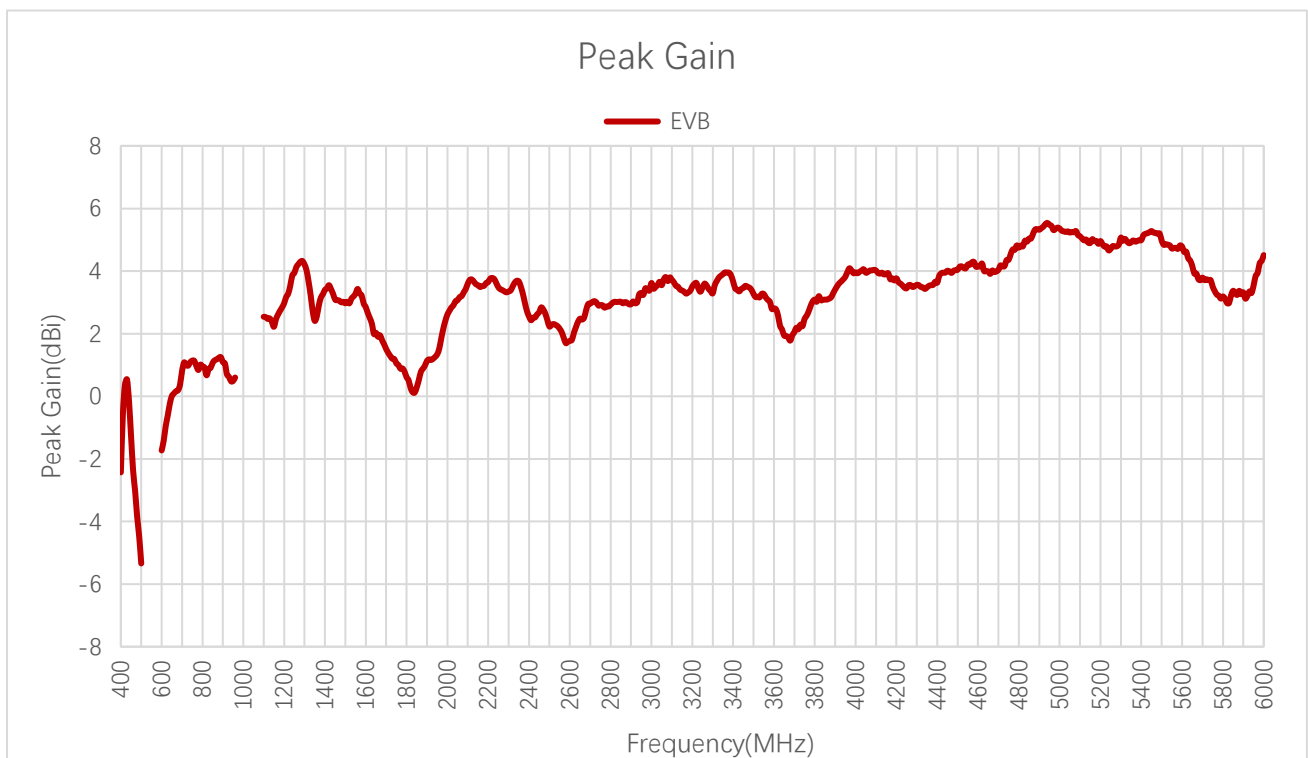
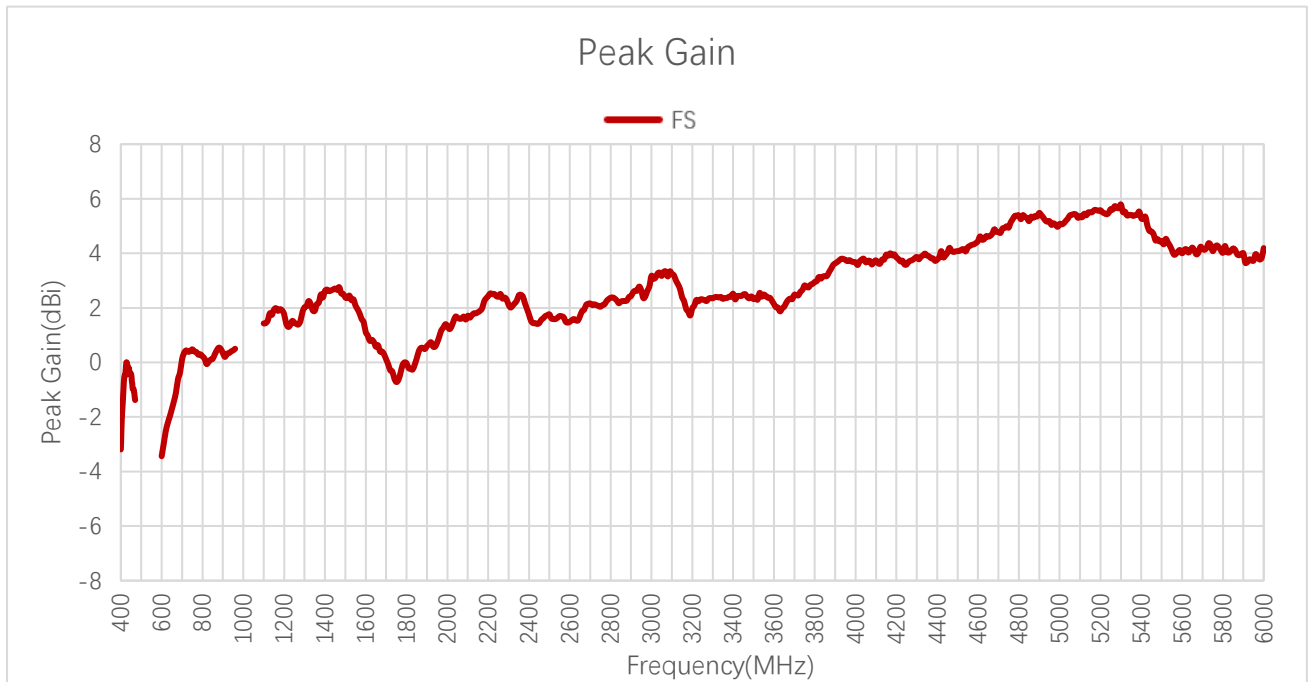
Average Gain (dB)

| Frequency (MHz) | 410  | 420  | 460  | 470  | 600  | 630  | 700  | 710  | 810  |
|-----------------|------|------|------|------|------|------|------|------|------|
| FS              | -3.9 | -3.1 | -4.2 | -4.9 | -5.9 | -5.0 | -2.1 | -1.7 | -1.4 |
| EVB             | -2.8 | -1.8 | -4.8 | -6.1 | -4.5 | -3.5 | -1.2 | -0.9 | -1.1 |
| Frequency (MHz) | 830  | 900  | 960  | 1440 | 1710 | 1740 | 1880 | 1950 | 2140 |
| FS              | -1.3 | -1.3 | -2.5 | -2.8 | -2.4 | -2.4 | -2.0 | -2.0 | -1.7 |
| EVB             | -1.1 | -2.0 | -2.0 | -1.2 | -2.3 | -2.4 | -2.3 | -1.9 | -1.4 |
| Frequency (MHz) | 2350 | 2450 | 2600 | 2700 | 3600 | 4000 | 4700 | 5500 | 6000 |
| FS              | -0.9 | -1.4 | -1.8 | -2.1 | -2.1 | -2.7 | -2.3 | -2.0 | -2.5 |
| EVB             | -1.2 | -1.4 | -1.2 | -1.3 | -2.4 | -2.0 | -2.1 | -2.0 | -3.2 |

Average Gain (dB) – NTN Bands

| Frequency (MHz) | 1520 | 1560 | 1630 | 1680 | 2000 | 2200 |
|-----------------|------|------|------|------|------|------|
| FS              | -2.2 | -1.7 | -2.3 | -2.1 | -1.8 | -1.5 |
| EVB             | -1.4 | -1.1 | -1.8 | -2.1 | -1.5 | -1.4 |

### 3.2.3. Peak Gain



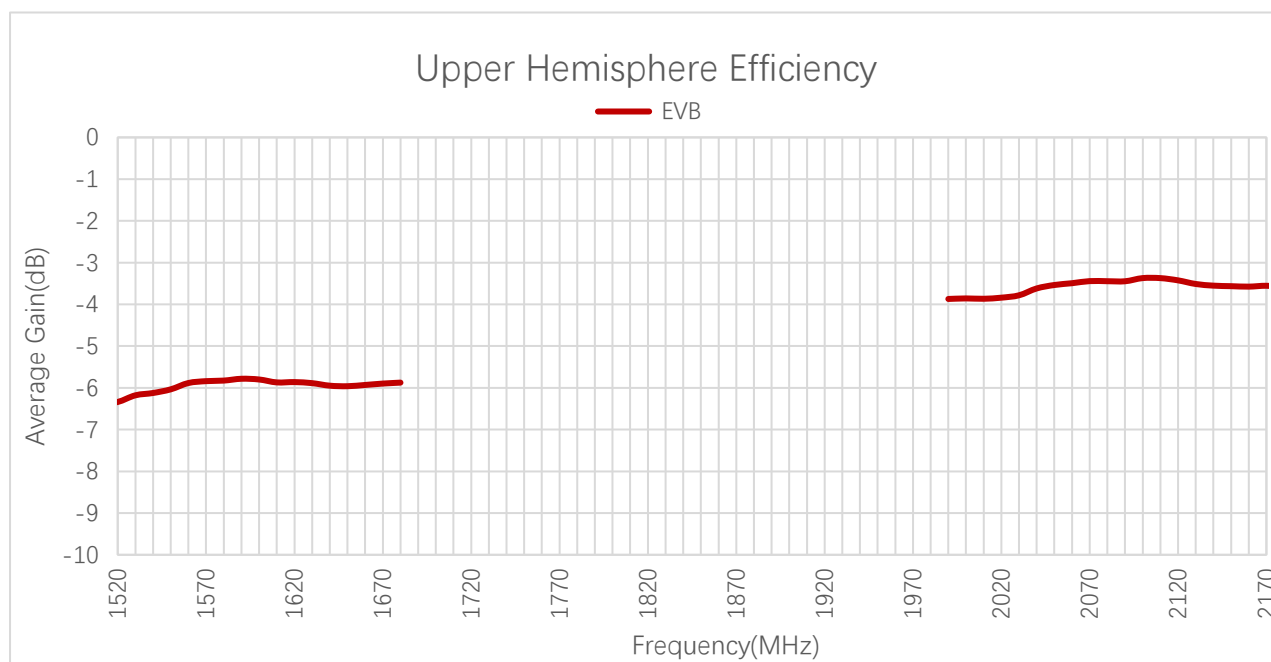
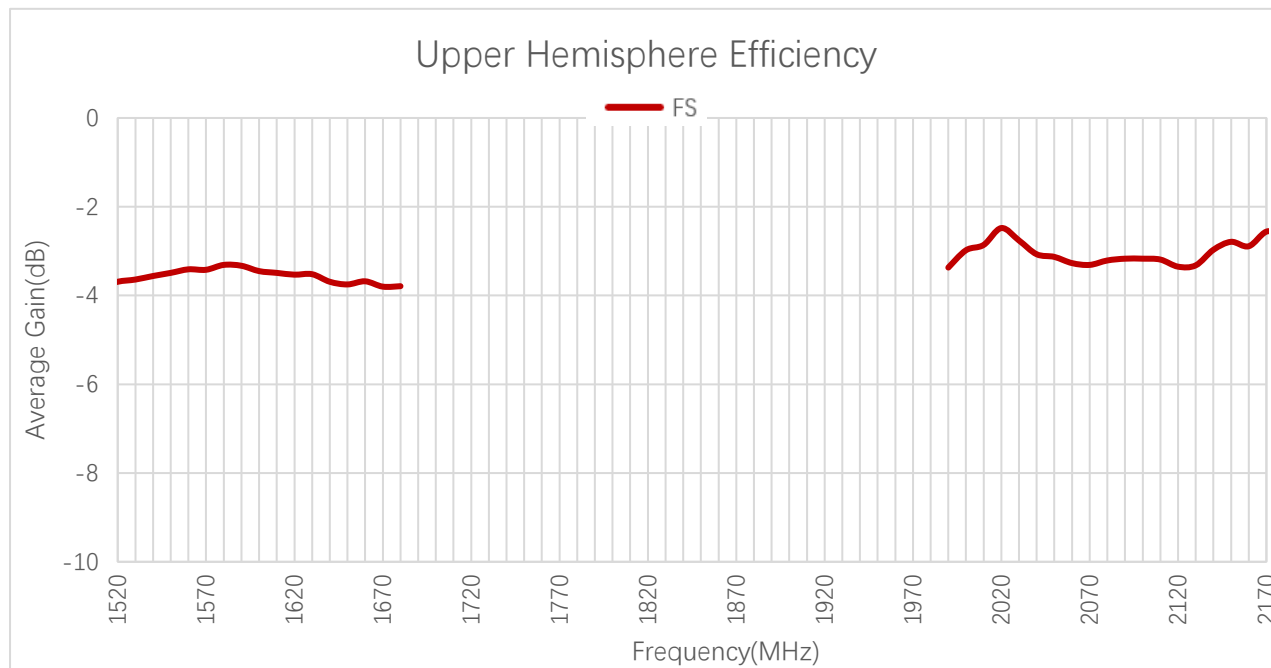
**Peak Gain (dBi)**

| Frequency (MHz) | 410  | 420  | 460  | 470  | 600  | 630  | 700  | 710  | 810  |
|-----------------|------|------|------|------|------|------|------|------|------|
| FS              | -1.4 | -0.5 | -1.0 | -1.4 | -3.4 | -2.2 | 0.1  | 0.4  | 0.1  |
| EVB             | -0.6 | 0.4  | -2.4 | -3.0 | -1.7 | -0.6 | 0.8  | 1.1  | 0.9  |
| Frequency (MHz) | 830  | 900  | 960  | 1440 | 1710 | 1740 | 1880 | 1950 | 2140 |
| FS              | 0.0  | 0.3  | 0.5  | 2.7  | -0.1 | -0.6 | 0.5  | 0.7  | 1.8  |
| EVB             | 0.9  | 1.1  | 0.6  | 3.3  | 1.4  | 1.2  | 0.9  | 1.3  | 3.6  |
| Frequency (MHz) | 2350 | 2450 | 2600 | 2700 | 3600 | 4000 | 4700 | 5500 | 6000 |
| FS              | 2.5  | 1.4  | 1.5  | 2.2  | 2.1  | 3.7  | 4.8  | 4.5  | 4.2  |
| EVB             | 3.7  | 2.7  | 1.8  | 3.0  | 2.8  | 4.0  | 4.0  | 5.0  | 4.5  |

**Peak Gain (dBi) – NTN Bands**

| Frequency (MHz) | 1520 | 1560 | 1630 | 1680 | 2000 | 2200 |
|-----------------|------|------|------|------|------|------|
| FS              | 2.5  | 2.0  | 0.8  | 0.4  | 1.3  | 2.4  |
| EVB             | 3.0  | 3.4  | 2.3  | 1.8  | 2.6  | 3.7  |

### 3.2.4. Upper Hemisphere Efficiency



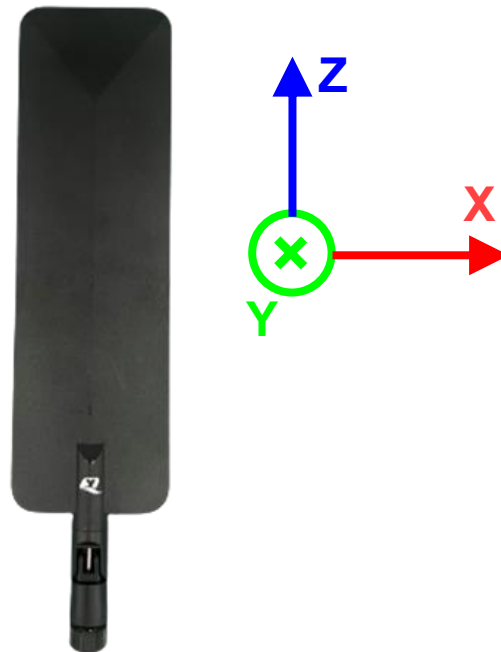
**Upper Hemisphere Efficiency (dB) – NTN Bands**

| Frequency (MHz) | 1520 | 1560 | 1630 | 1680 | 2000 | 2200 |
|-----------------|------|------|------|------|------|------|
| <b>FS</b>       | -3.7 | -3.4 | -3.5 | -3.8 | -3.0 | -2.2 |
| <b>EVB</b>      | -6.3 | -5.9 | -5.9 | -5.9 | -3.9 | -3.6 |

### 3.2.5. 3D & 2D Radiation Pattern

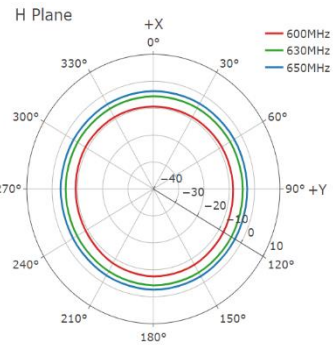
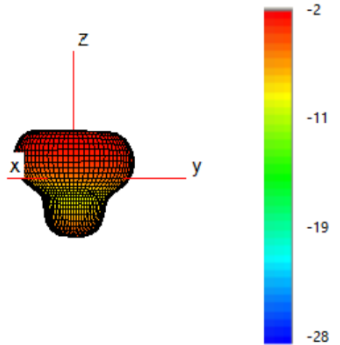
#### 3.2.5.1. Test Condition: In Free Space

- Test Chamber: HF-G-1

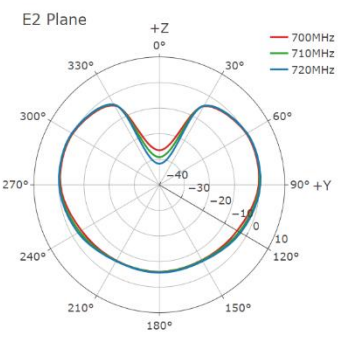
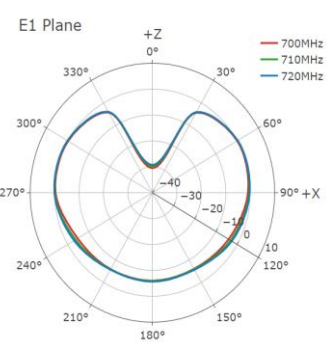
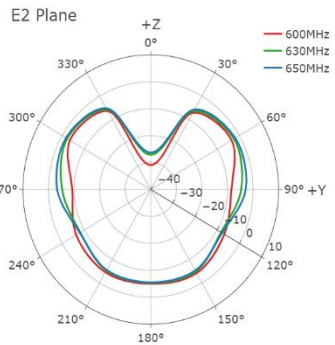
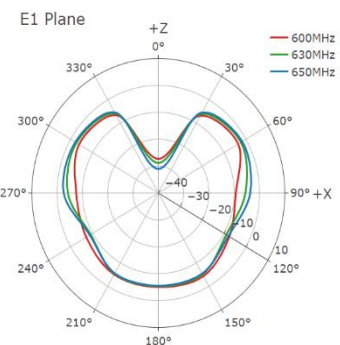
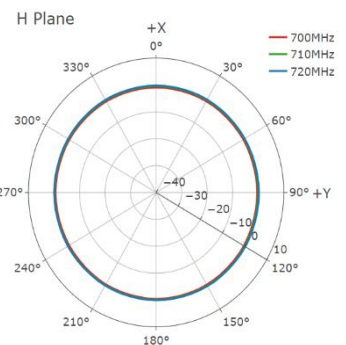
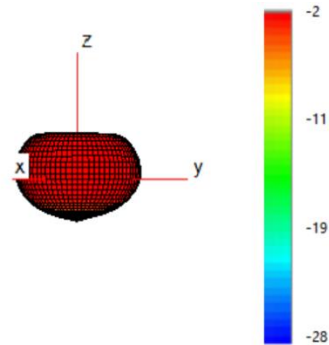


● 5G Bands

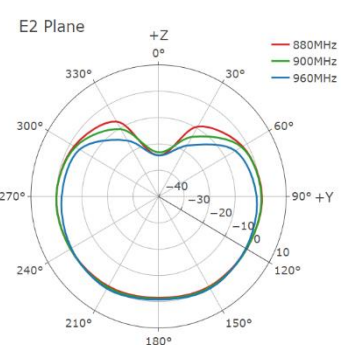
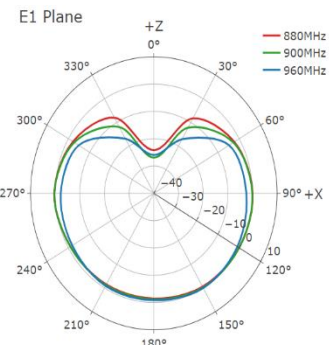
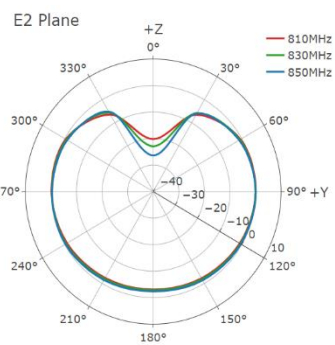
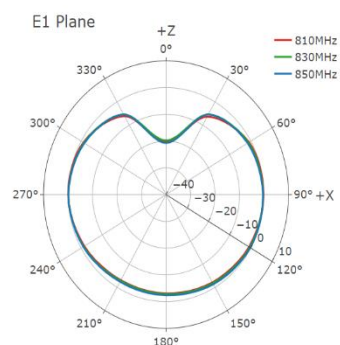
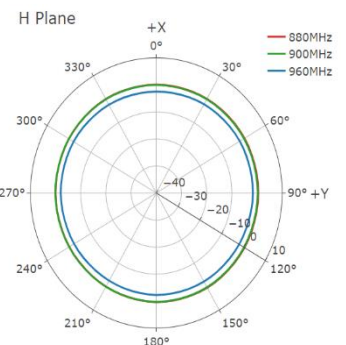
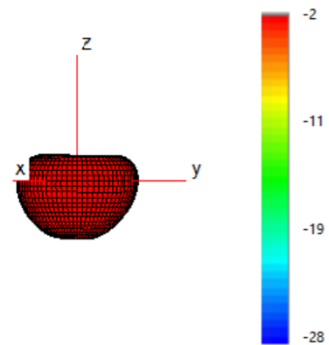
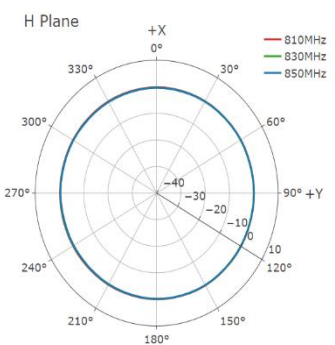
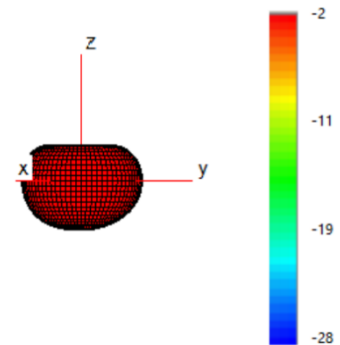
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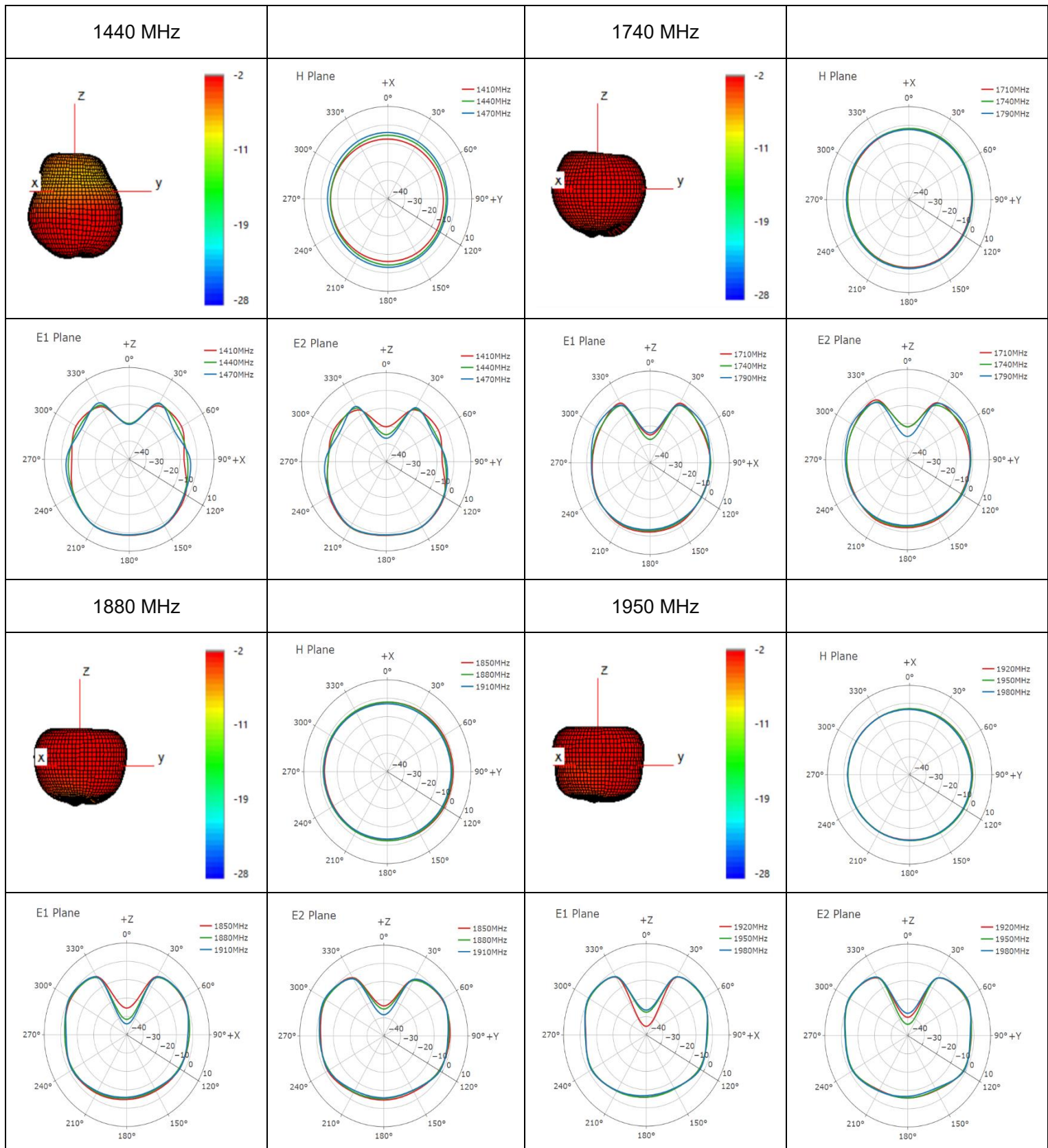


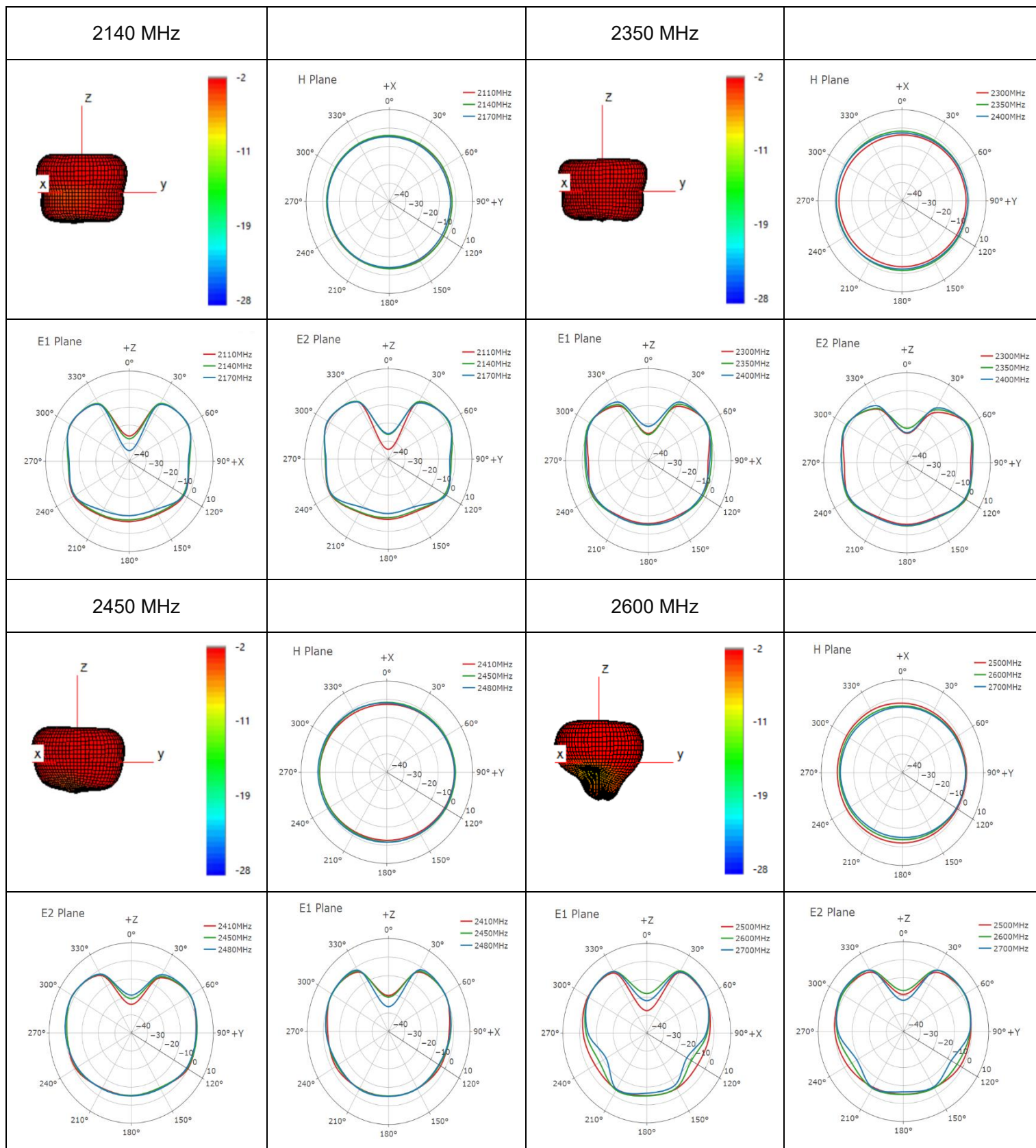
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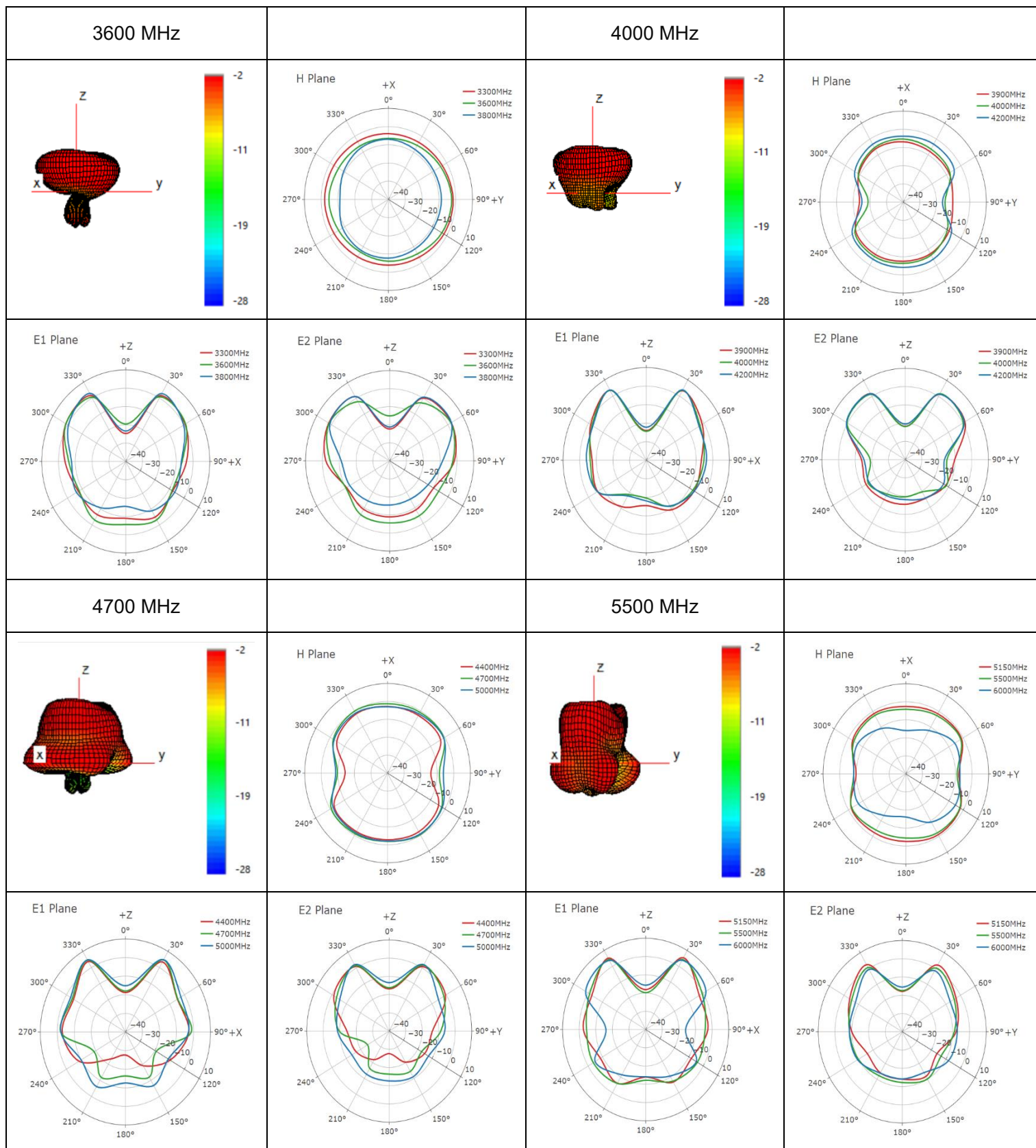


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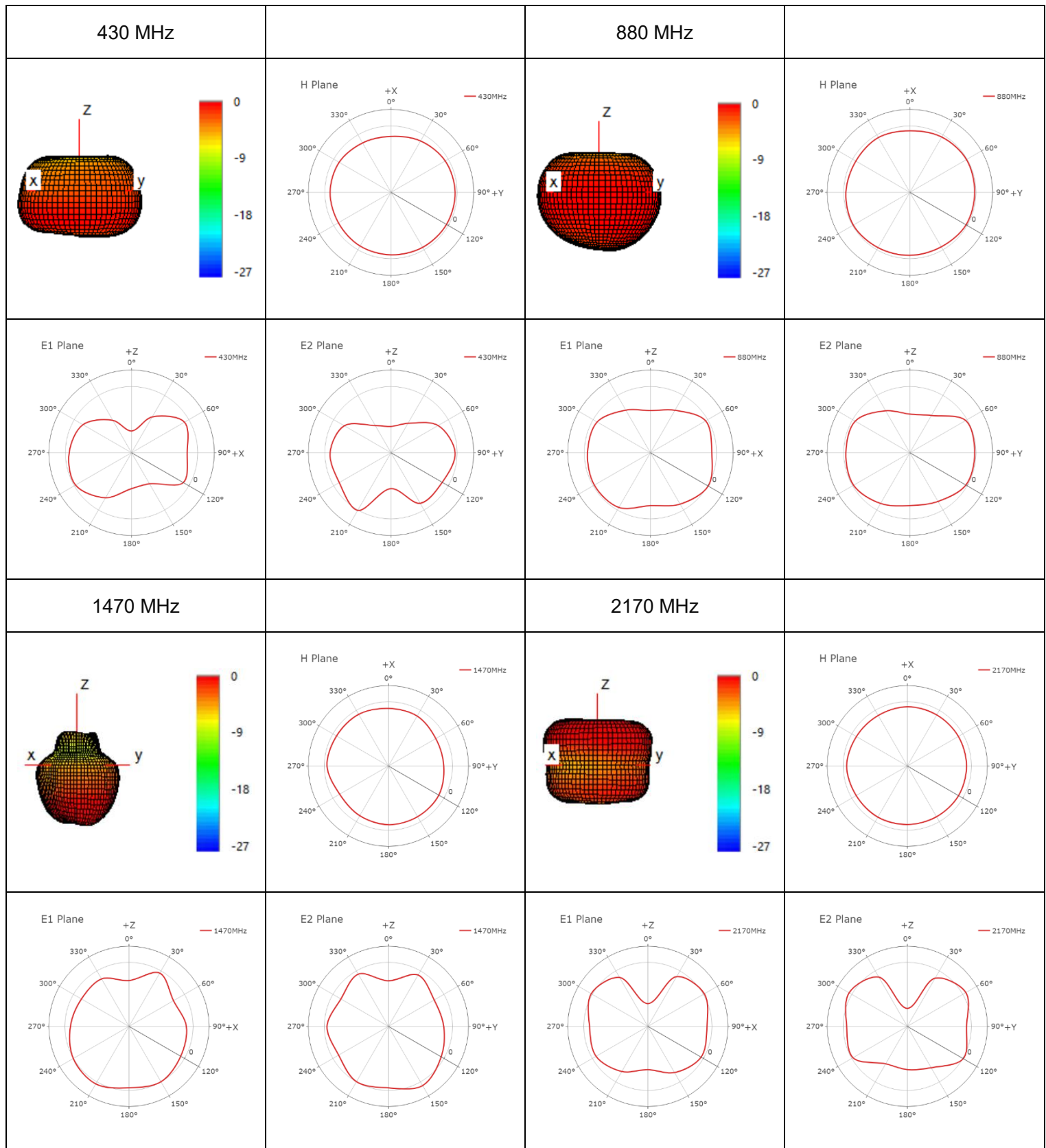


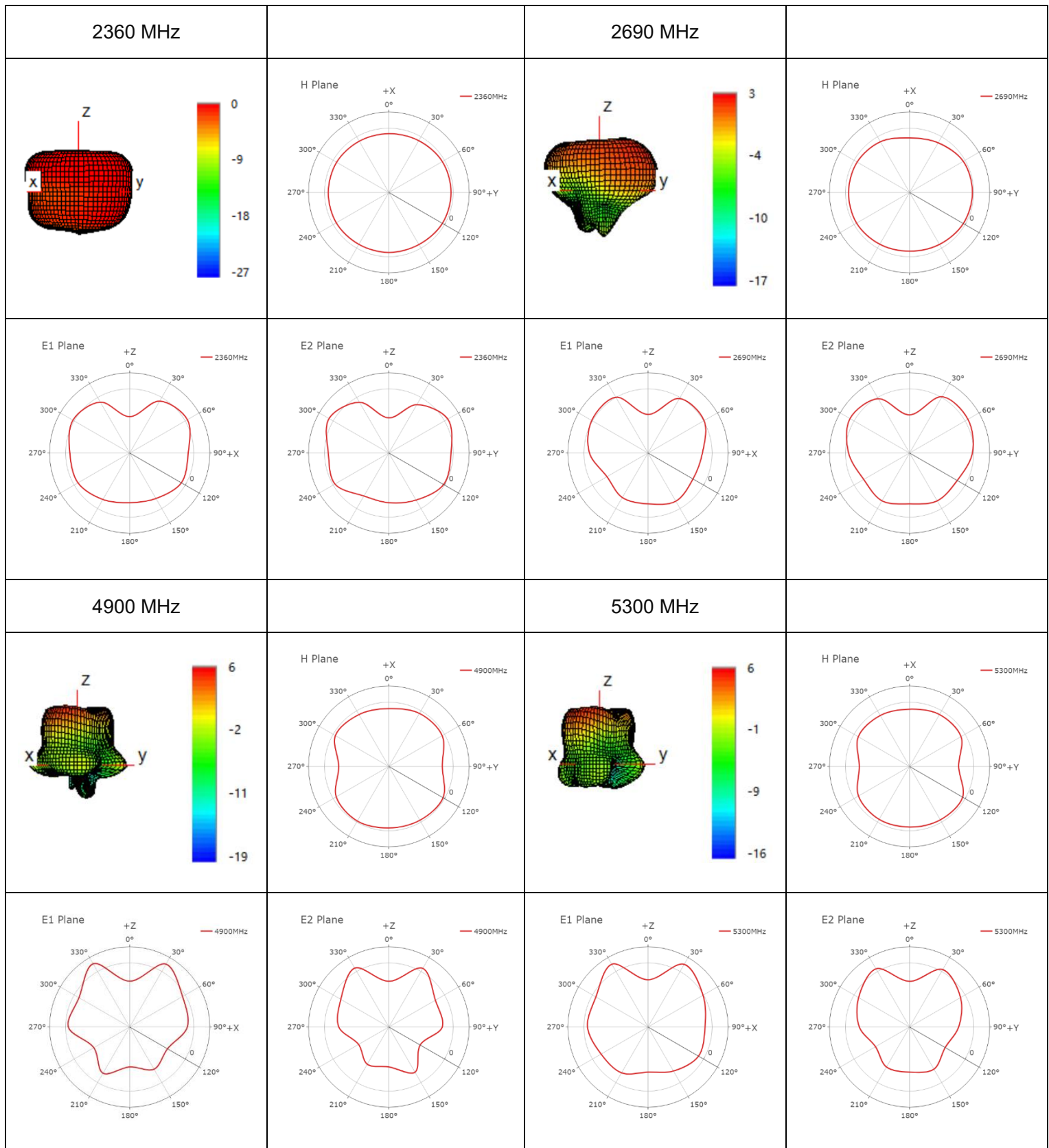




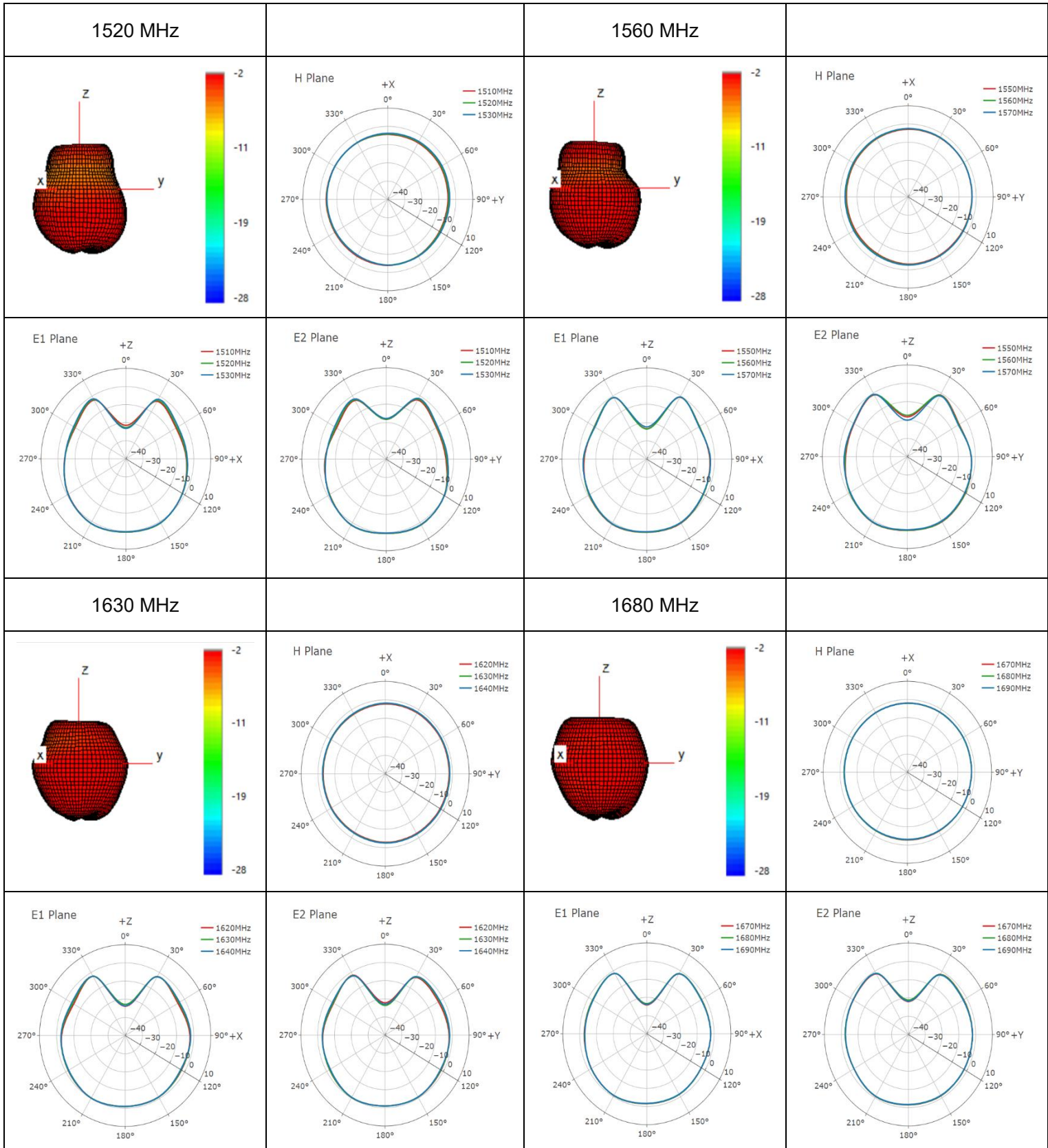


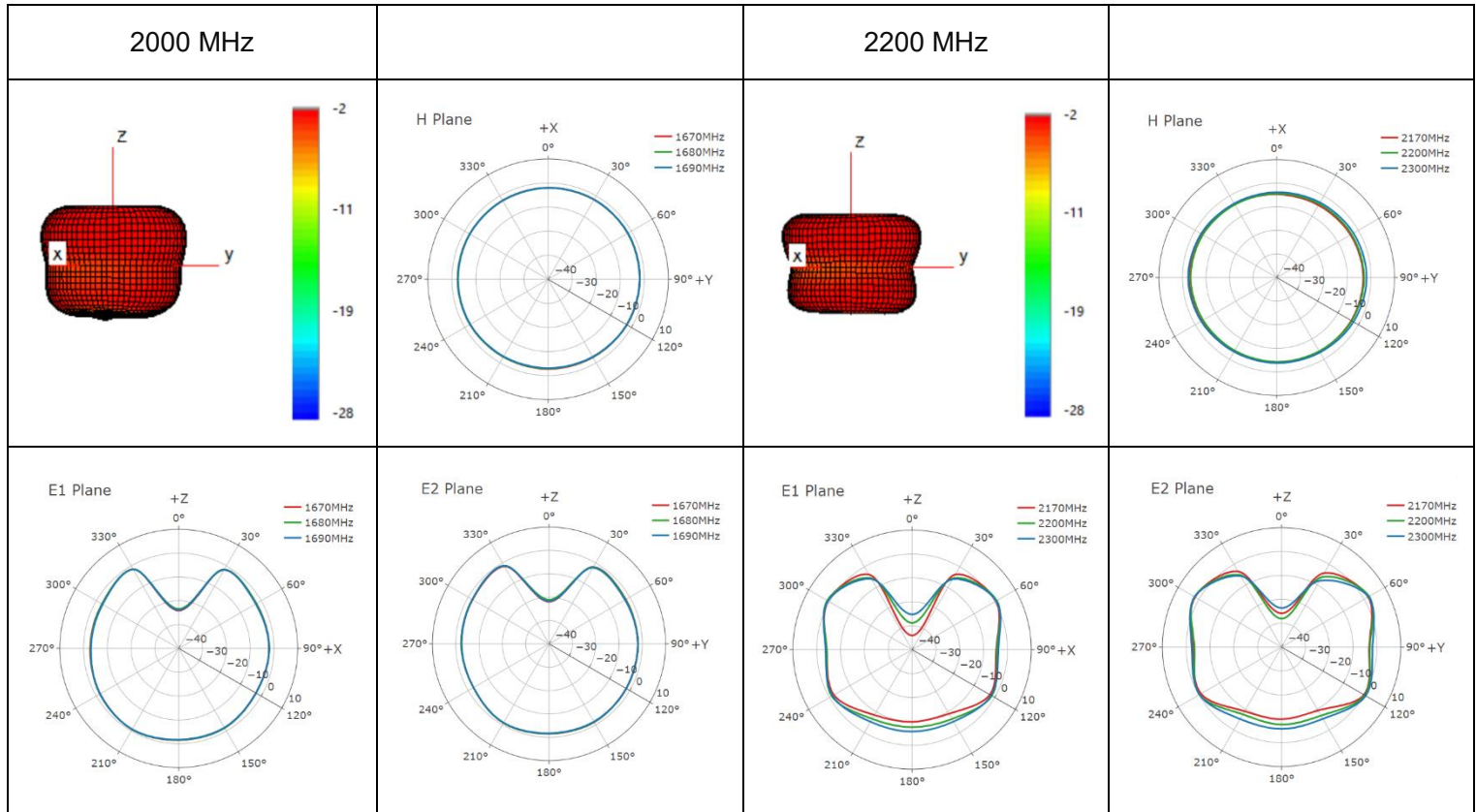
● 5G Bands-Max Peak Gain



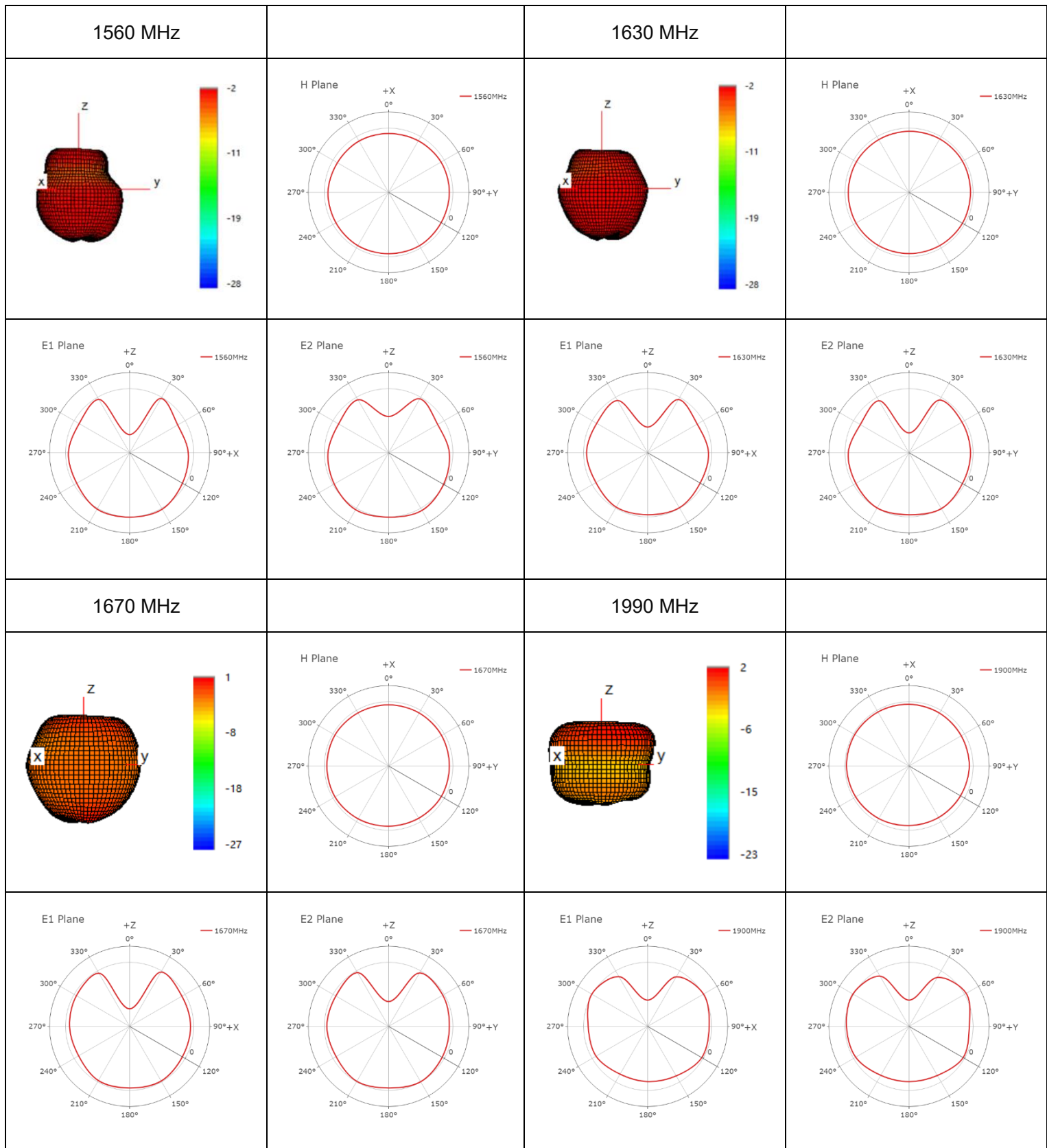


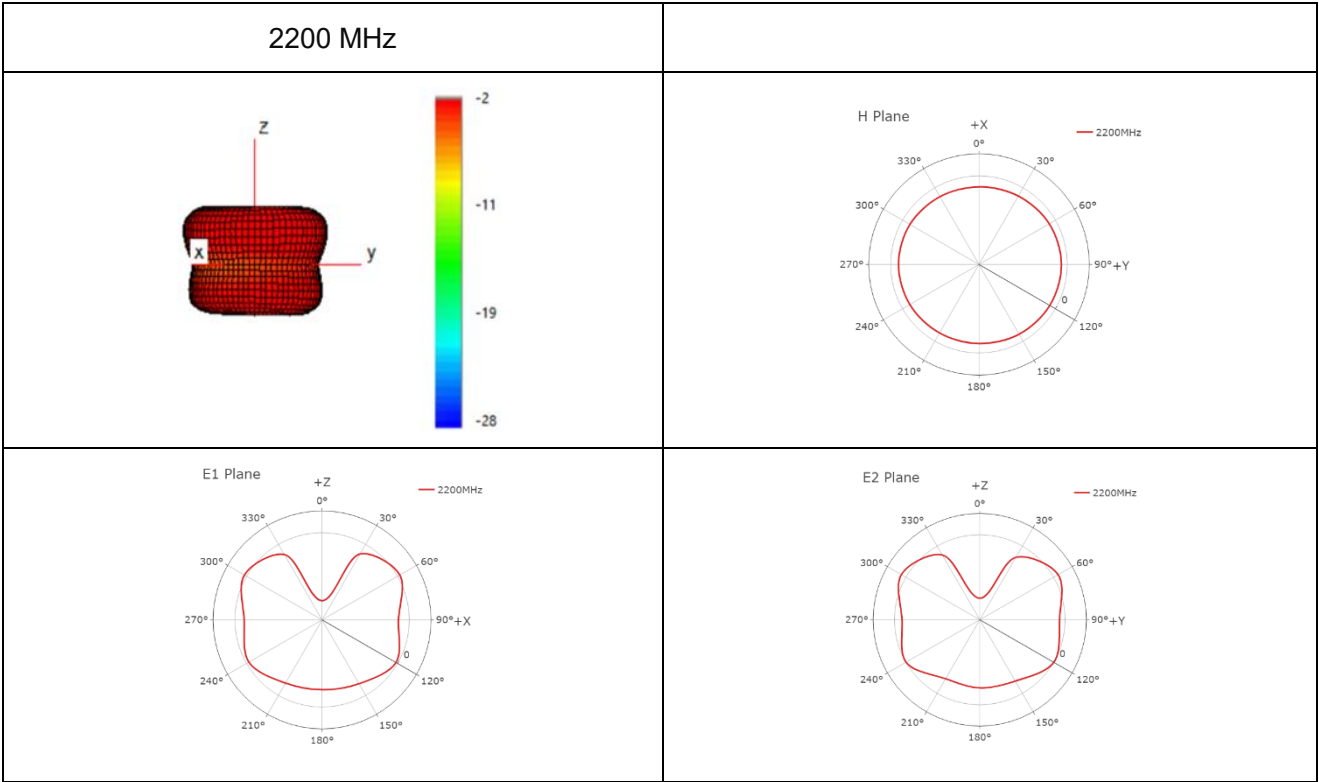
● NTN Bands





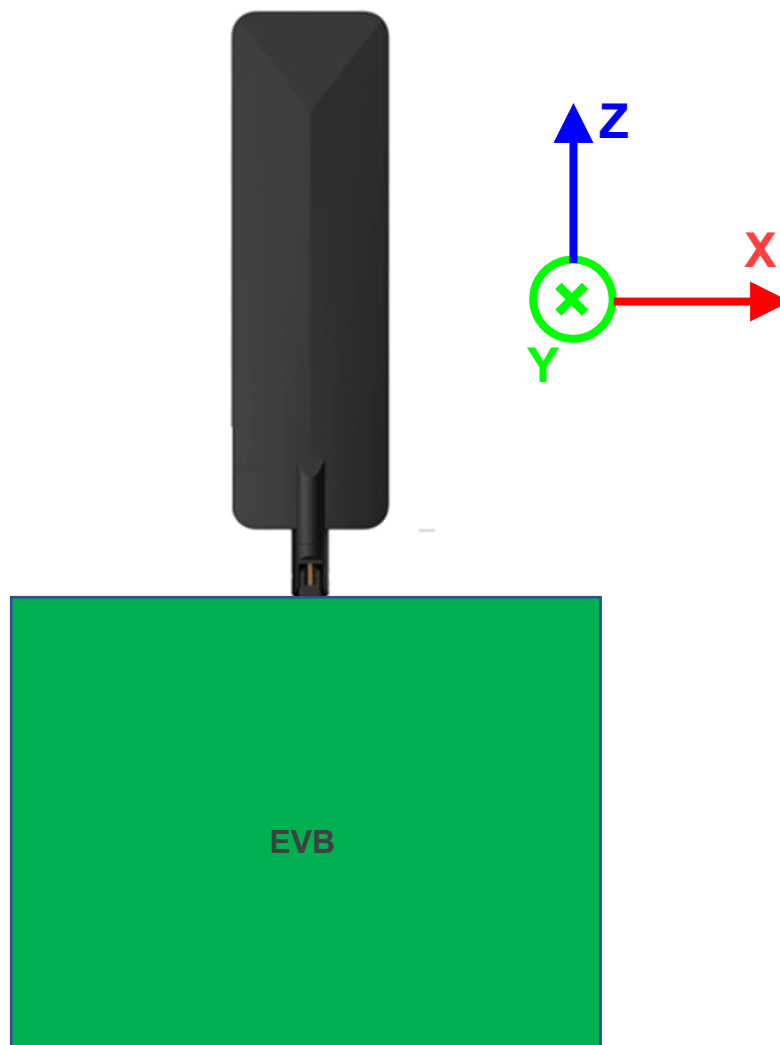
● NTN Bands- Max Peak Gain





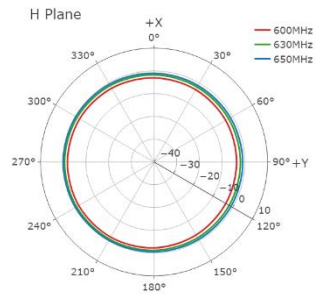
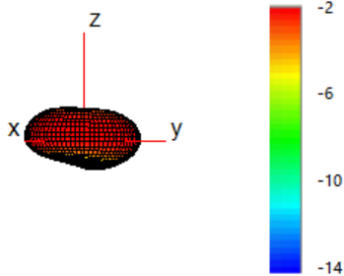
### 3.2.5.2. Test Condition: On 130 mm × 130 mm EVB

- Test Chamber: HF-G-1

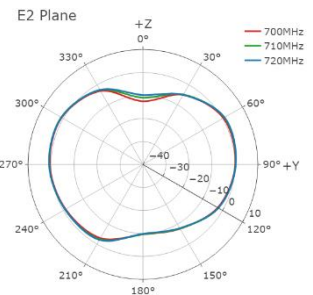
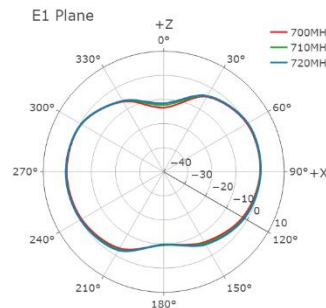
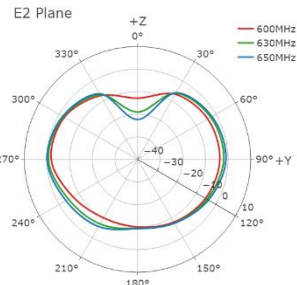
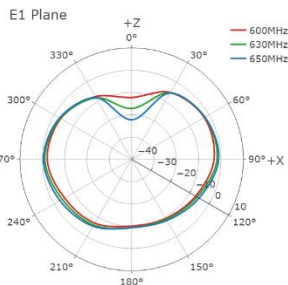
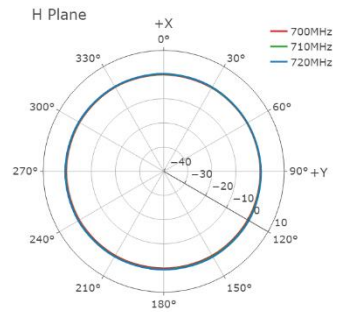
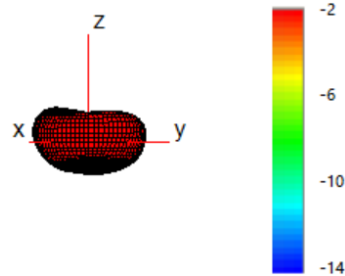


● 5G Bands

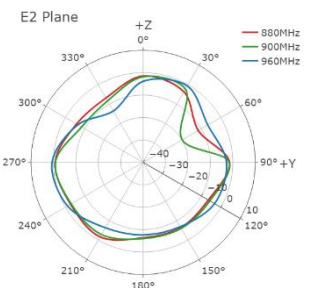
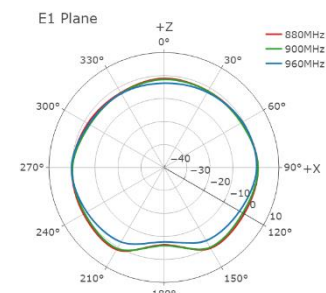
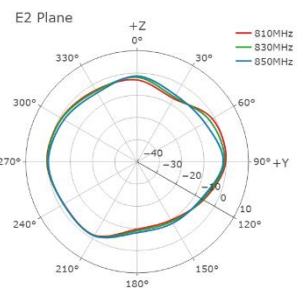
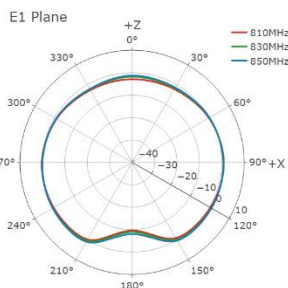
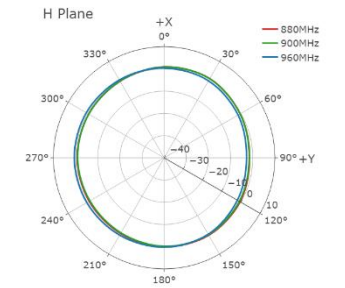
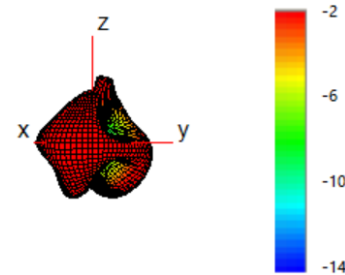
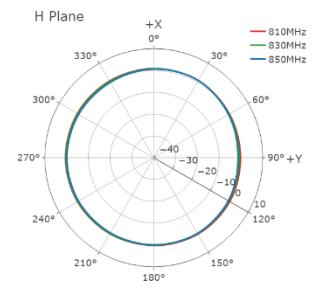
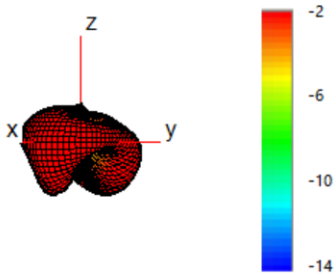
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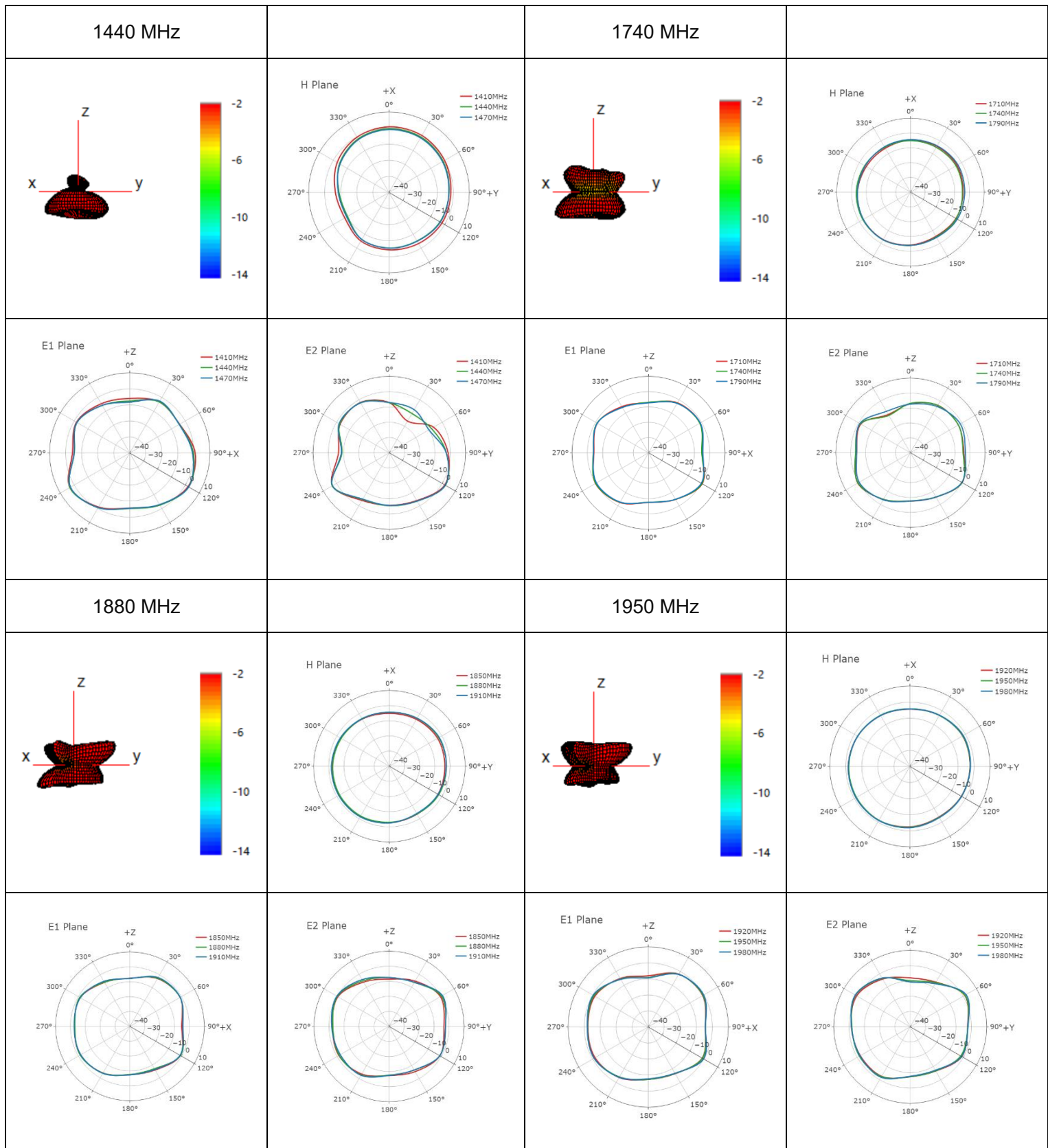


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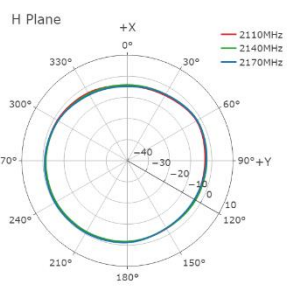
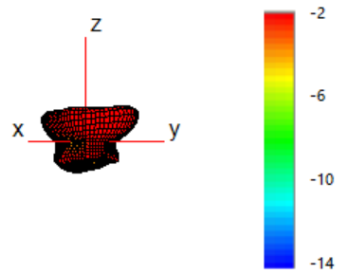


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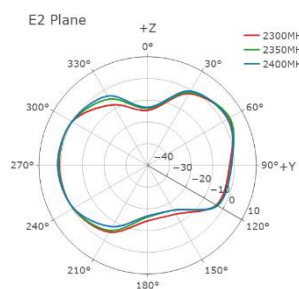
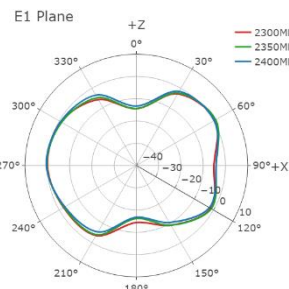
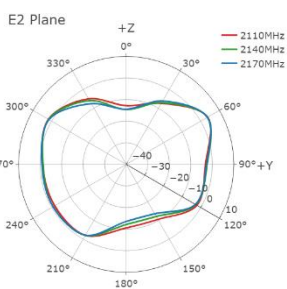
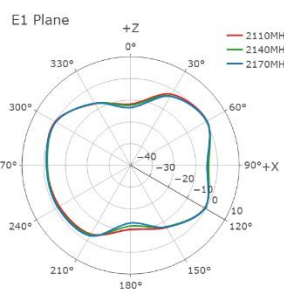
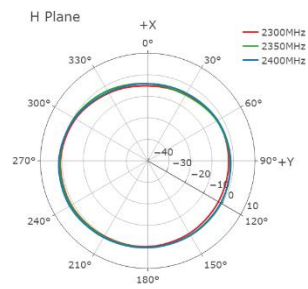
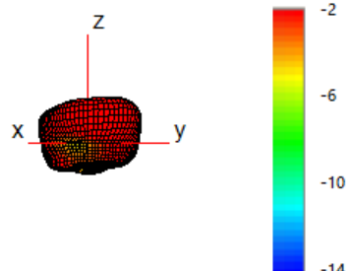




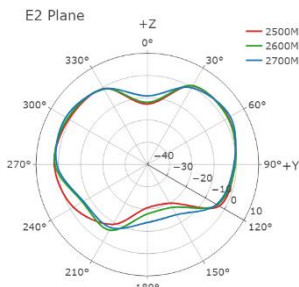
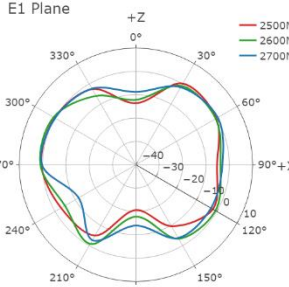
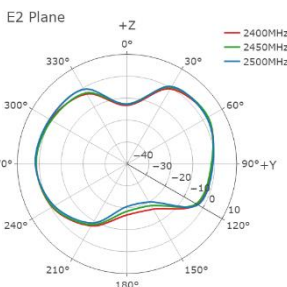
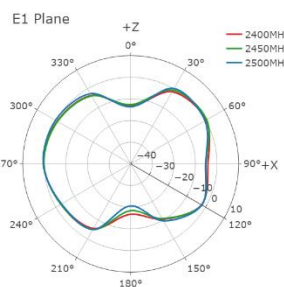
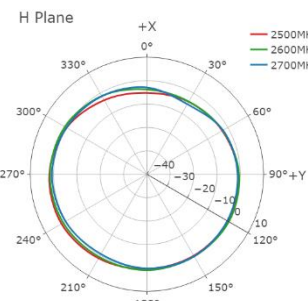
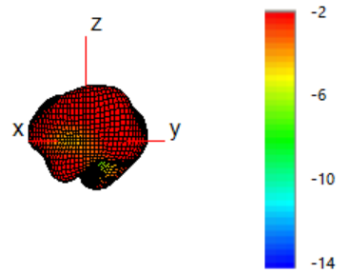
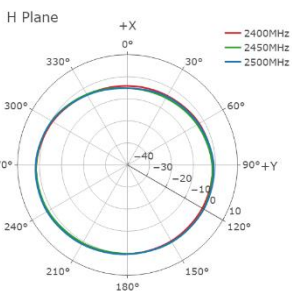
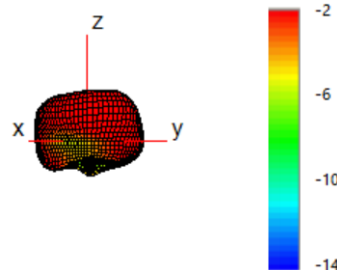
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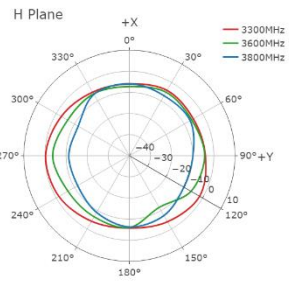
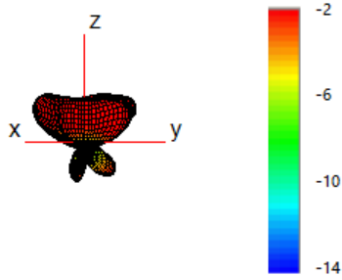
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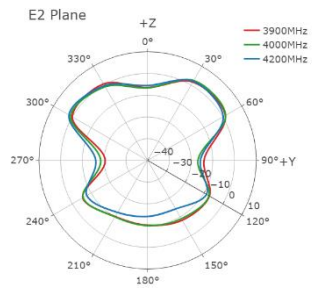
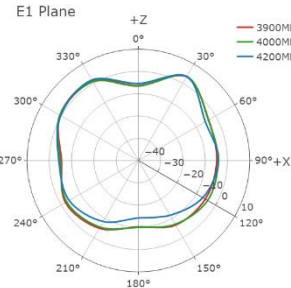
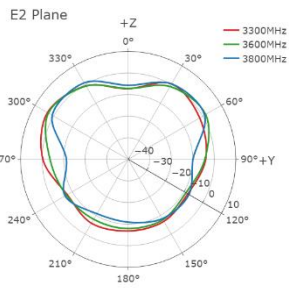
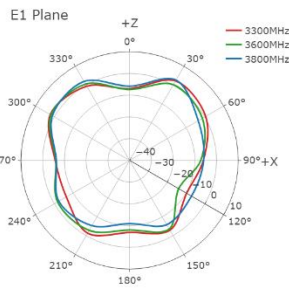
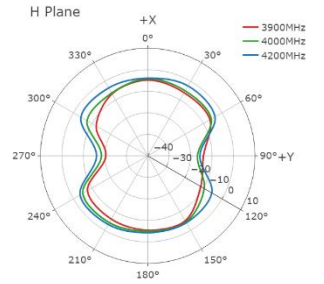
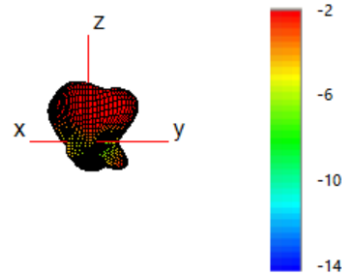
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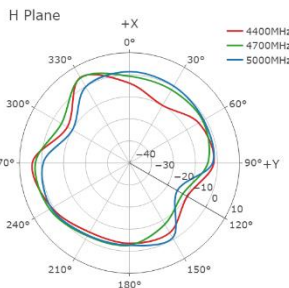
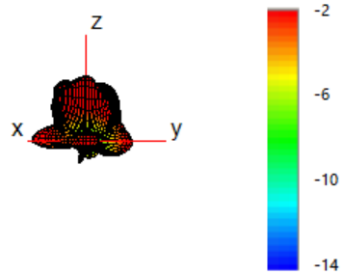
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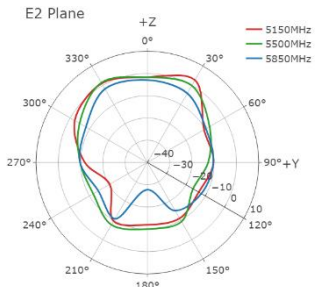
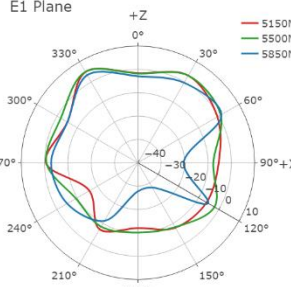
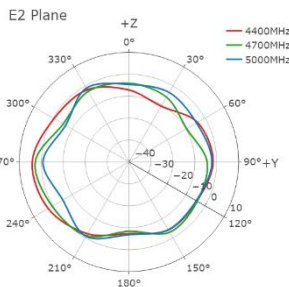
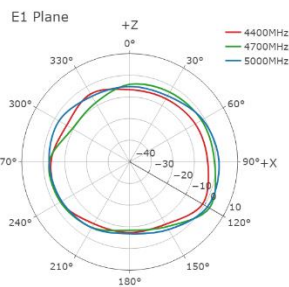
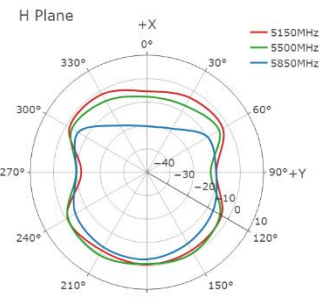
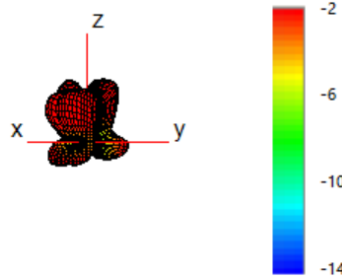
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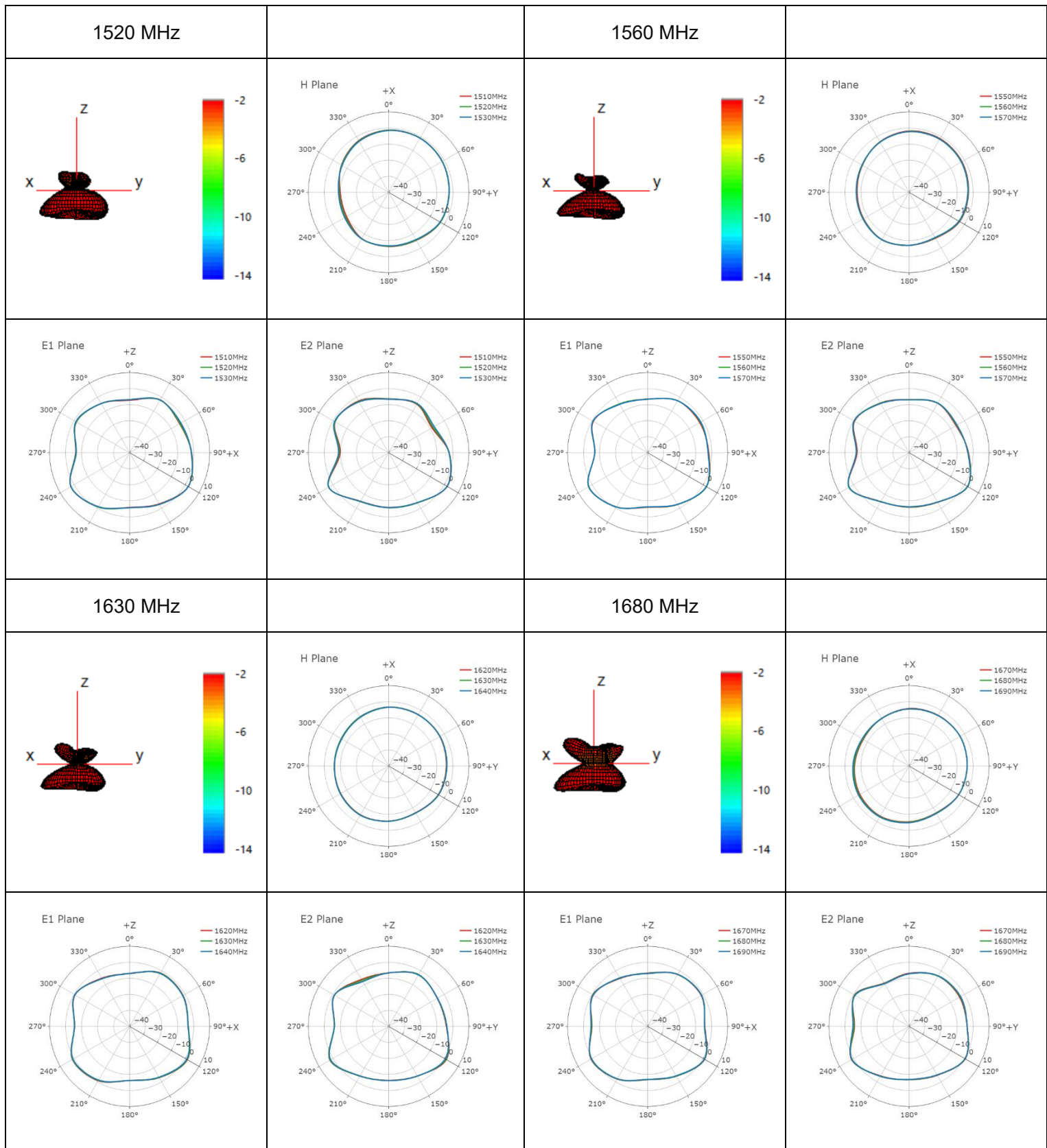
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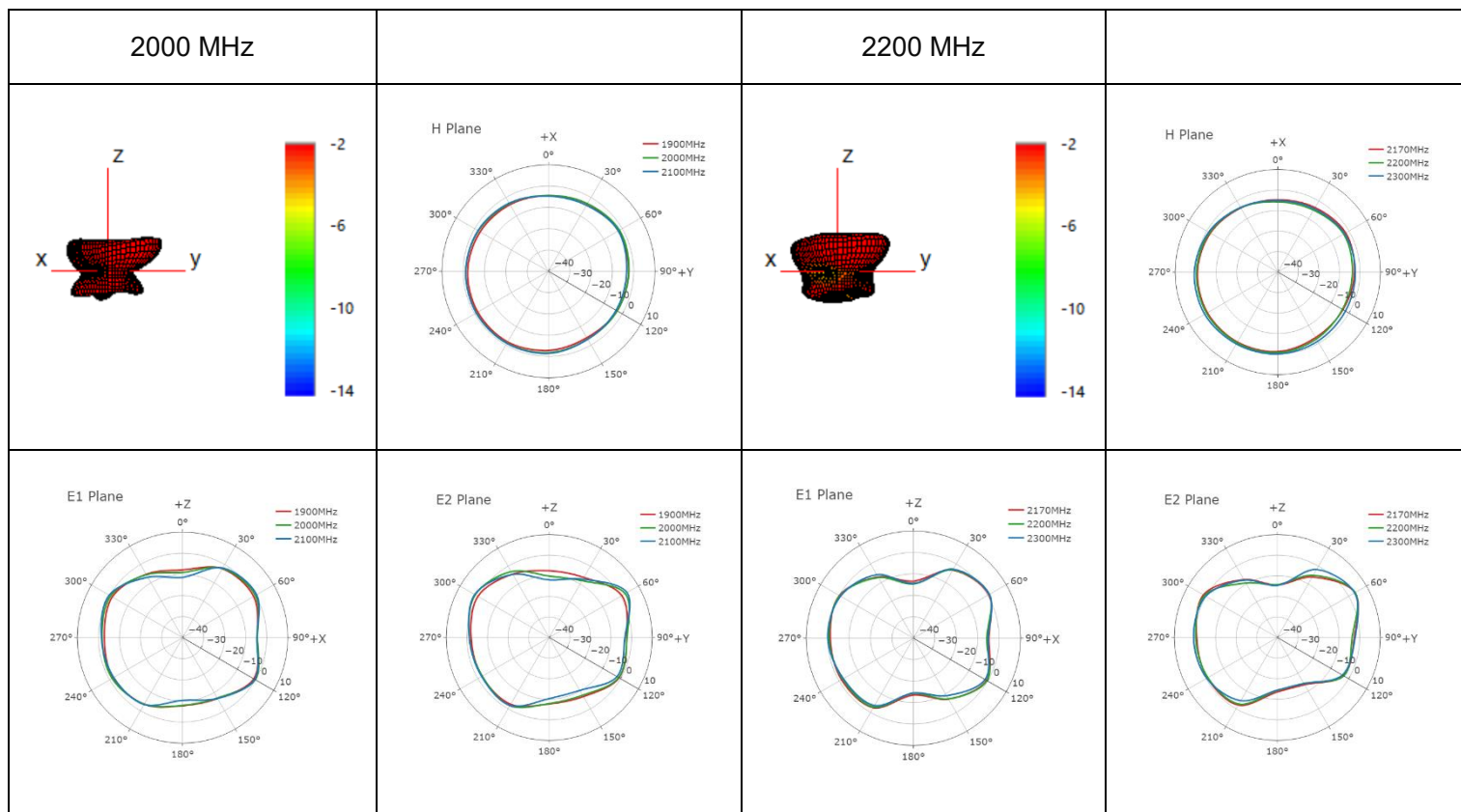


**5500 MHz**



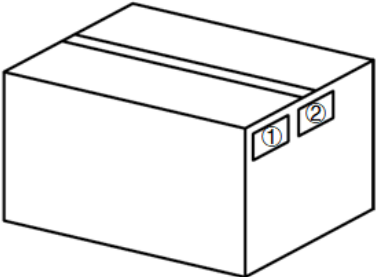
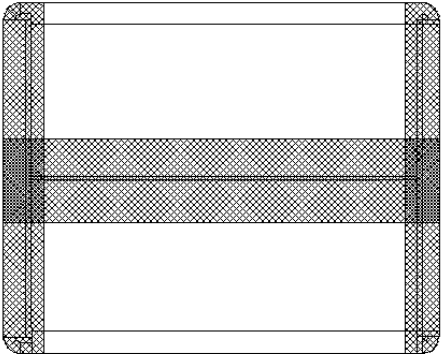
● NTN Bands





# 4 Packaging

| Step | Packaging Picture/2D Picture                                                        | Description                                                                                                                                                                      |
|------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    |    | Put the product in a one-piece bag;<br>Each one-piece bag contains 10 products.                                                                                                  |
| 2    |  | 10 pcs antenna products in a PE bag.<br>(10 PCS / PE Bag)<br><br><u>PE Bag Size: L × W = 320 × 220 mm</u>                                                                        |
| 3    |  | Put bubble bags at the bottom of the carton.<br>(10 PE Bags / Carton Box)<br>(100 PCS Antennas / Carton Box)<br><br><u>Carton Size:</u><br><u>L × W × H = 405 × 293 × 185 mm</u> |

|   |                                                                                   |                                                                                          |
|---|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| 4 |  | <p><b>Position for Attaching Labels</b></p> <p>① Carton Label</p> <p>② Quality Label</p> |
| 5 |  | <p><b>Sealing Cartons</b></p> <p>“工” type sealing cartons</p>                            |

# Contact Us

At Quectel, our aim is to provide timely and comprehensive services to our customers. If you require any assistance, please contact our headquarters:

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# Revision History

| Version | Date       | Author                                              | Note                                                                                                                                                                                                  |
|---------|------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -       | 2023-05-25 | Ezail TAN/<br>Hart HU/<br>David LIU/<br>Bunny ZHANG | Creation of the document                                                                                                                                                                              |
| 1.0     | 2023-05-25 | Ezail TAN/<br>Hart HU/<br>David LIU/<br>Bunny ZHANG | First official release                                                                                                                                                                                |
| 1.1     | 2023-07-14 | Aria CHU                                            | Updated Chapter 1.2.                                                                                                                                                                                  |
| 1.2     | 2023-09-01 | Hart HU                                             | Updated the drawing (Chapter 2).                                                                                                                                                                      |
| 2.0     | 2023-11-07 | Hart HU/<br>Black LI                                | <ol style="list-style-type: none"> <li>Updated efficiency data (Front page)</li> <li>Added antenna installation instructions (Chapter 2).</li> <li>Added EVB status test data (Chapter 3).</li> </ol> |
| 2.1     | 2024-09-23 | Mayes LI/<br>Rainey LIAO                            | Added max peak gain data (Chapter 1 and 3).                                                                                                                                                           |
| 2.2     | 2024-11-05 | Shea LI/<br>Aria CHU                                | <ol style="list-style-type: none"> <li>Updated the overview.</li> <li>Added housing flame rating and housing UV resistant (Chapter 1.2).</li> <li>Updated Chapter 2.</li> </ol>                       |



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