

# AIW-514 Specification



|                                 |                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Brand name</b>               | Advantech                                                                                                                                                                                                                                                                  |
| <b>Product name</b>             | AIW-514                                                                                                                                                                                                                                                                    |
| <b>Advantech P/N</b>            | 1751000764-01                                                                                                                                                                                                                                                              |
| <b>Manufacturer Part Number</b> | RFA-27-T1000H-2M                                                                                                                                                                                                                                                           |
| <b>Manufacture</b>              | ARISTOTLE                                                                                                                                                                                                                                                                  |
| <b>Manufacture Address</b>      | 5F., No. 27, Xinmin St., Zhonghe Dist., New Taipei City 235, Taiwan (R.O.C.)                                                                                                                                                                                               |
| <b>Description</b>              | <ul style="list-style-type: none"> <li>• External outdoor 2-in-1 Wi-Fi antenna</li> <li>• Tri-band 2.4&amp;5&amp;6 GHz</li> <li>• Screw mounting</li> <li>• Dimension:<br/>    <math>\Phi 45 \times 78.3</math> mm with IP67 housing</li> <li>• 2M cable length</li> </ul> |
| <b>Version</b>                  | 2.0                                                                                                                                                                                                                                                                        |
| <b>Date</b>                     | 2025/04/16                                                                                                                                                                                                                                                                 |

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## 1. Revision History

| Version | Date       | Change Notification             | Description               |
|---------|------------|---------------------------------|---------------------------|
| 1.0     | 2025/02/06 | Initial version                 |                           |
| 2.0     | 2025/04/16 | Antenna - S Parameter Test Data | 增加客戶料號,test data, XYZ架設圖片 |
| 3.0     | 2025/06/09 | Modify 2D                       | 修正線長公差                    |

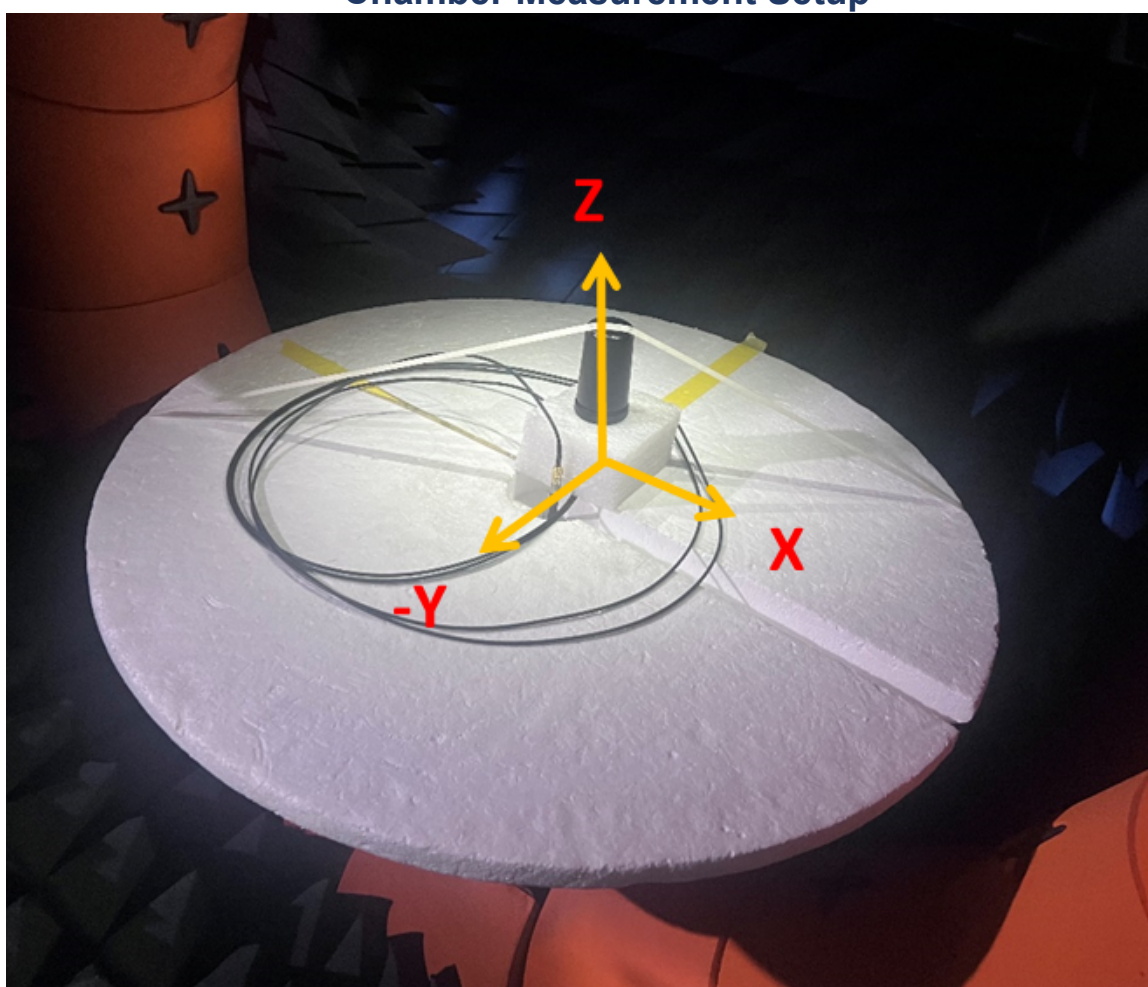


## 2. Specification

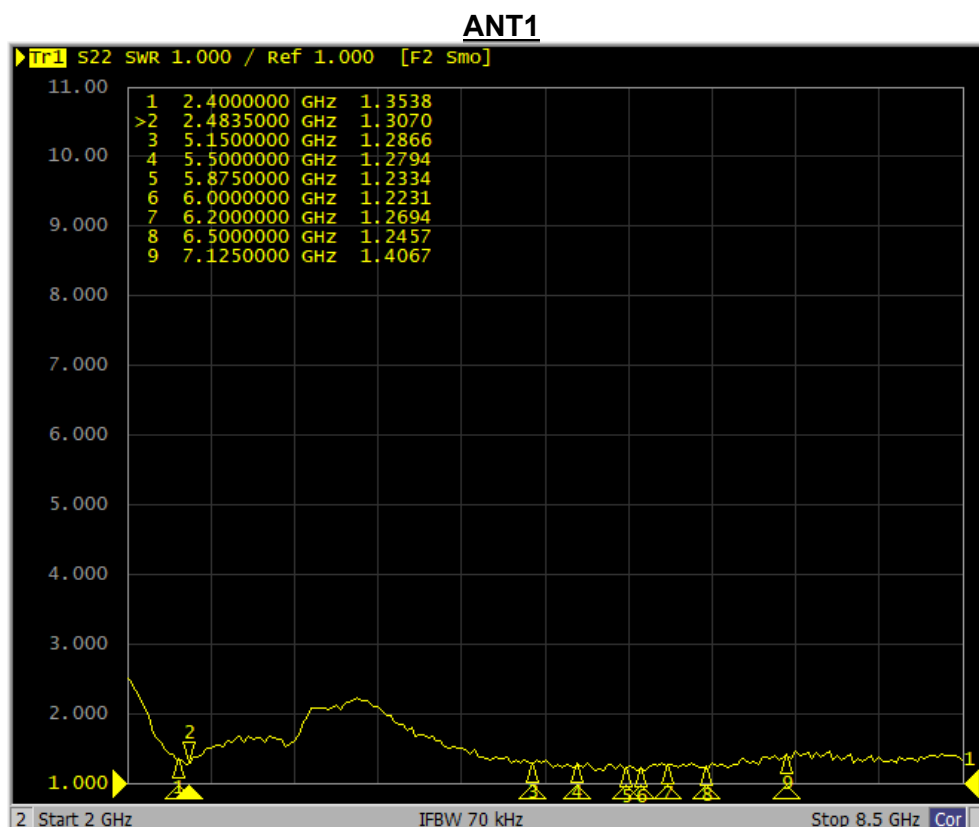
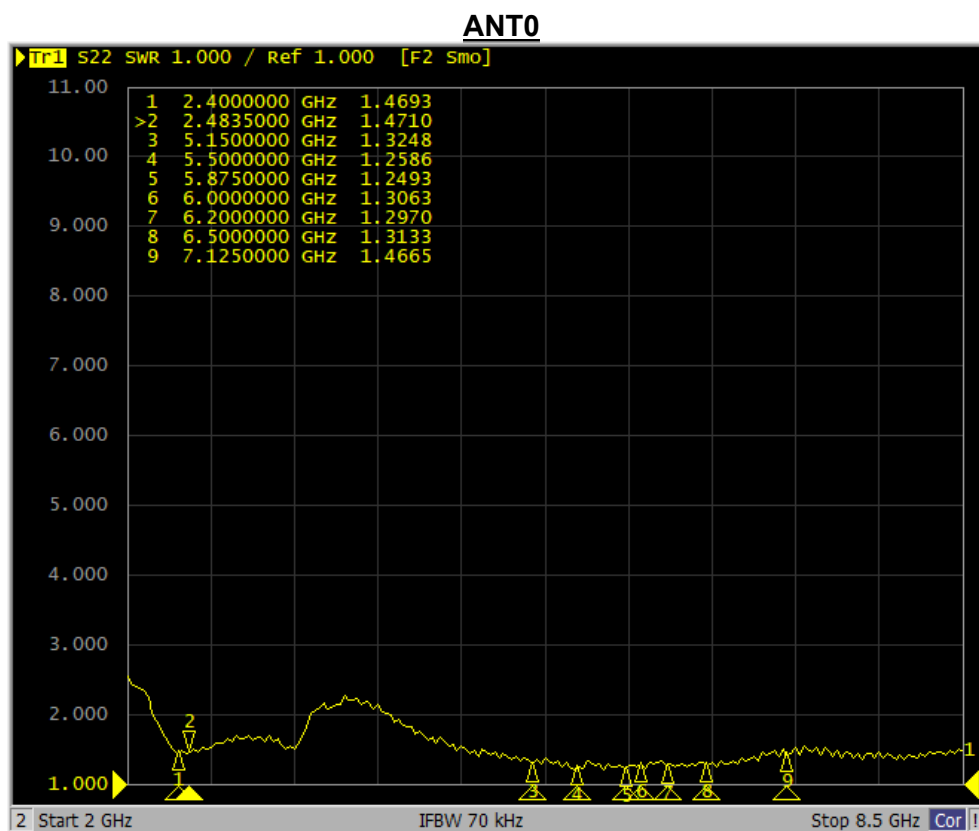
| Sample Photo                                                                                                                                                         |                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <div data-bbox="949 504 1292 616"> <p>Antenna Dimension:<br/>Φ45x78.3mm</p> </div> |                                                                                                                                                                                                                  |
| Electrical Characteristics                                                                                                                                           |                                                                                                                                                                                                                  |
| Frequency                                                                                                                                                            | 2400 – 2500 MHz, 5150 – 5850 MHz, 5925 – 7125 MHz                                                                                                                                                                |
| V.S.W. R                                                                                                                                                             | <b>ANT0:</b><br>≤ 2.0 @ 2400 – 2500 MHz<br>≤ 2.0 @ 5150 – 5850 MHz<br>≤ 2.0 @ 5925 – 7125 MHz<br><b>ANT1:</b><br>≤ 2.0 @ 2400 – 2500 MHz<br>≤ 2.0 @ 5150 – 5850 MHz<br>≤ 2.0 @ 5925 – 7125 MHz                   |
| Peak Gain                                                                                                                                                            | <b>ANT0:</b><br>1.59 dBi @ 2400 – 2500 MHz<br>2.19 dBi @ 5150 – 5850 MHz<br>1.66 dBi @ 5925 – 7125 MHz<br><b>ANT1:</b><br>1.58 dBi @ 2400 – 2500 MHz<br>2.56 dBi @ 5150 – 5850 MHz<br>2.99 dBi @ 5925 – 7125 MHz |
| Efficiency                                                                                                                                                           | <b>ANT0:</b><br>47.53 % @ 2400 – 2500 MHz<br>37.09 % @ 5150 – 5850 MHz<br>29.75% @ 5925 – 7125 MHz<br><b>ANT1:</b><br>46.71 % @ 2400 – 2500 MHz<br>35.34% @ 5150 – 5850 MHz<br>29.75% @ 5925 – 7125 MHz          |
| Polarization                                                                                                                                                         | Linear                                                                                                                                                                                                           |
| Radiation Pattern                                                                                                                                                    | Omni-direction                                                                                                                                                                                                   |
| Impedance                                                                                                                                                            | 50 ohm                                                                                                                                                                                                           |
| Application                                                                                                                                                          | Wi-Fi 5 & 6 & 6E & 7, BT, Zigbee                                                                                                                                                                                 |
| Antenna Type                                                                                                                                                         | Dipole                                                                                                                                                                                                           |
| Material & Mechanical Characteristics                                                                                                                                |                                                                                                                                                                                                                  |
| Antenna Length                                                                                                                                                       | 78.3 mm                                                                                                                                                                                                          |
| Antenna Diameter                                                                                                                                                     | 45 mm                                                                                                                                                                                                            |
| Material of Plastic                                                                                                                                                  | PC                                                                                                                                                                                                               |

| Cable length          | 2 M            |
|-----------------------|----------------|
| Antenna housing color | Black          |
| Cable Type            | ULA100         |
| Connector Type        | RP-SMA Male x2 |
| Environmental         |                |
| Operation Temperature | -40 ~ 85 °C    |
| Storage Temperature   | -40 ~ 85 °C    |
| Ingress Protection    | IP67           |

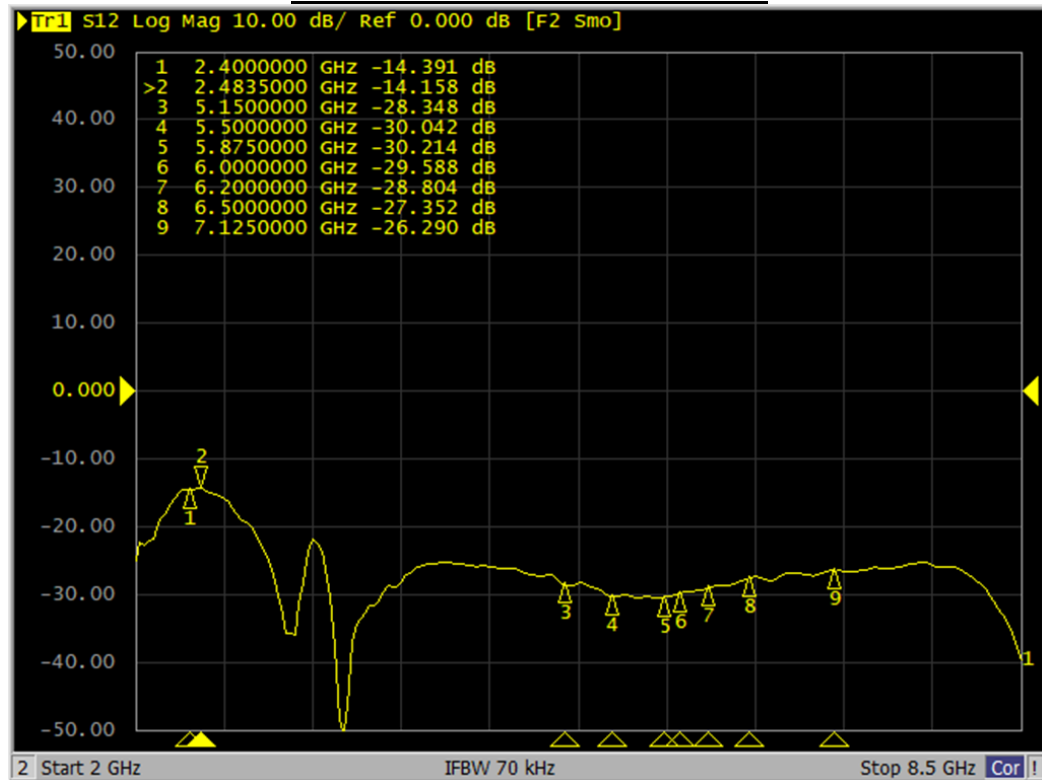
### Chamber Measurement Setup



### 3. Antenna - S Parameter Test Data



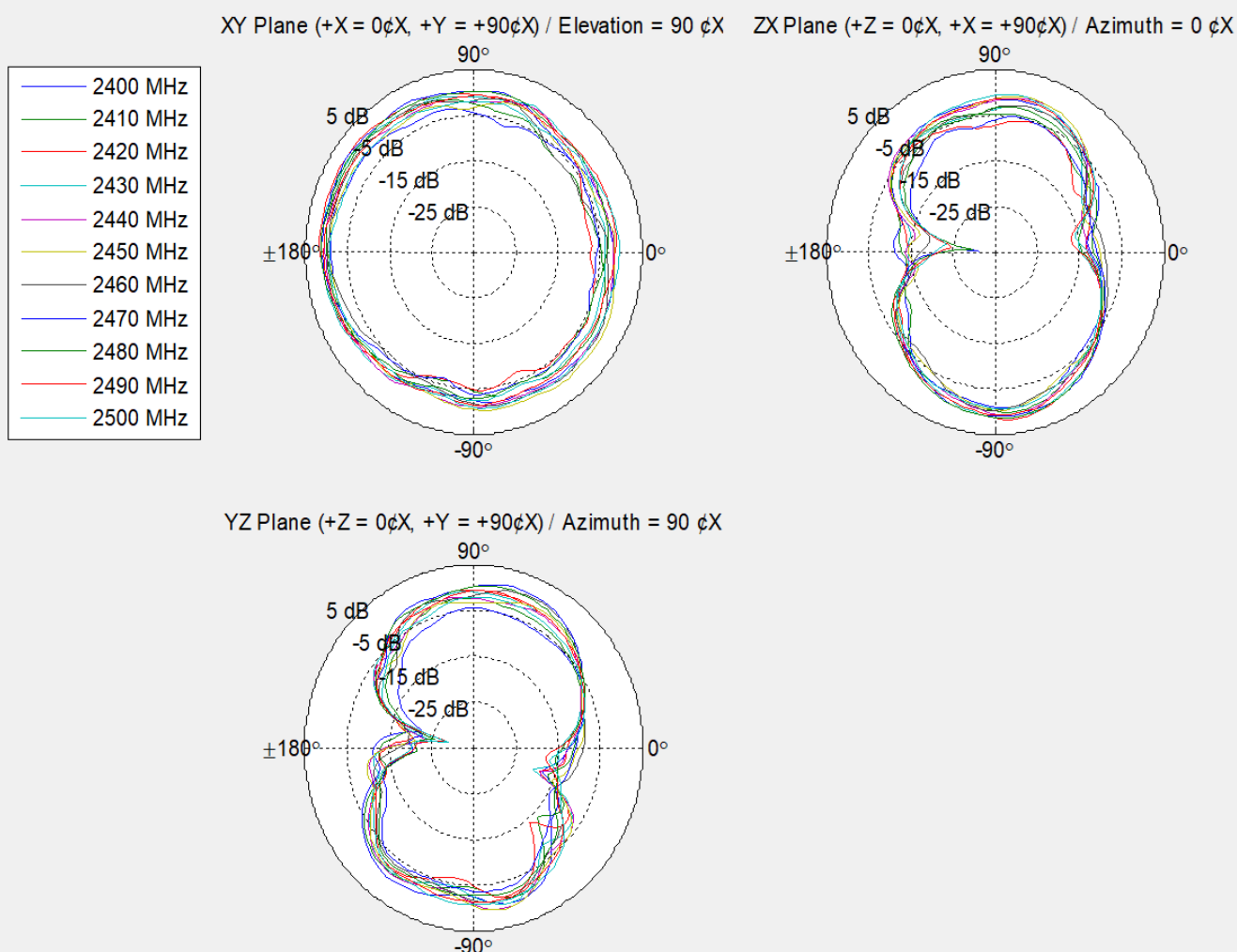
### Isolation between ANT0 and ANT1



## 4. Antenna – Gain & Radiation Pattern Test Data

### ANT0

2G Band = 2400 - 2500 MHz % 2G BAND

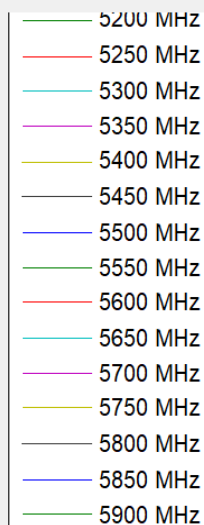


### ANT0

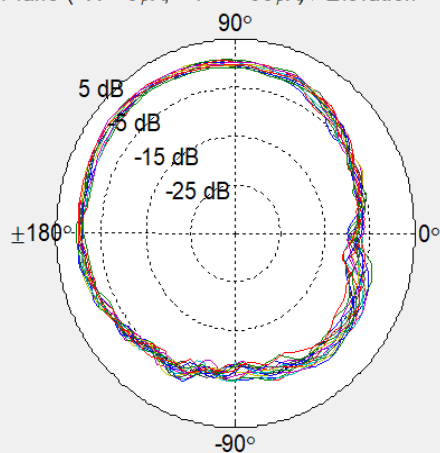
| Frequency(MHz) | 2400  | 2410  | 2420  | 2430  | 2440  | 2450  | 2460  | 2470  | 2480  | 2490  | 2500  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peak Gain(dBi) | 0.71  | 0.68  | 1.59  | 1.33  | 1.09  | 1.47  | 0.74  | 1.54  | 1.44  | 0.83  | 0.60  |
| Efficiency(%)  | 43.13 | 42.61 | 46.12 | 50.74 | 50.94 | 47.89 | 43.00 | 46.74 | 51.34 | 52.06 | 48.21 |
| Efficiency(dB) | -3.65 | -3.71 | -3.36 | -2.95 | -2.93 | -3.20 | -3.67 | -3.30 | -2.90 | -2.83 | -3.17 |

### ANT0

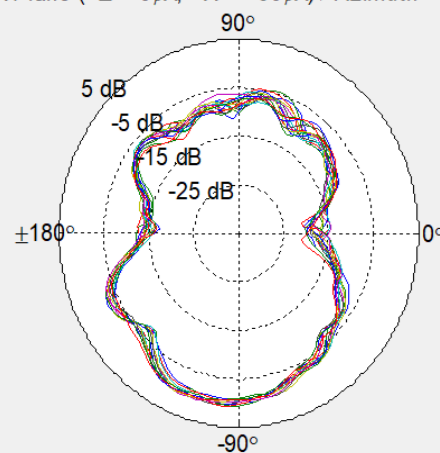
5G Band = 4900 - 5975 MHz



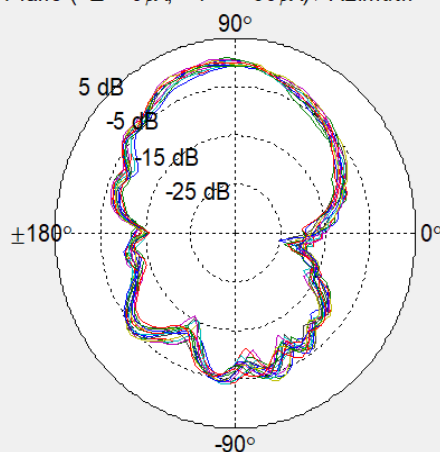
XY Plane (+X = 0°X, +Y = +90°X) / Elevation = 90 °X



ZX Plane (+Z = 0°X, +X = +90°X) / Azimuth = 0 °X



YZ Plane (+Z = 0°X, +Y = +90°X) / Azimuth = 90 °X



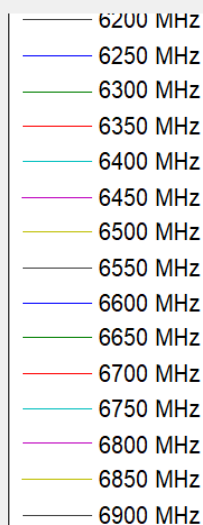
### ANT0

| Frequency(MHz) | 5150  | 5200  | 5250  | 5300  | 5350  | 5400  | 5450  | 5500  | 5550  | 5600  | 5650  | 5700  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peak Gain(dBi) | 0.07  | 0.22  | 0.36  | 0.37  | 0.59  | 1.20  | 1.15  | 1.15  | 1.57  | 1.53  | 1.41  | 2.19  |
| Efficiency(%)  | 33.25 | 34.10 | 34.96 | 35.56 | 37.56 | 40.90 | 39.54 | 39.25 | 40.30 | 38.39 | 37.25 | 39.07 |
| Efficiency(dB) | -4.78 | -4.67 | -4.56 | -4.49 | -4.25 | -3.88 | -4.03 | -4.06 | -3.95 | -4.16 | -4.29 | -4.08 |

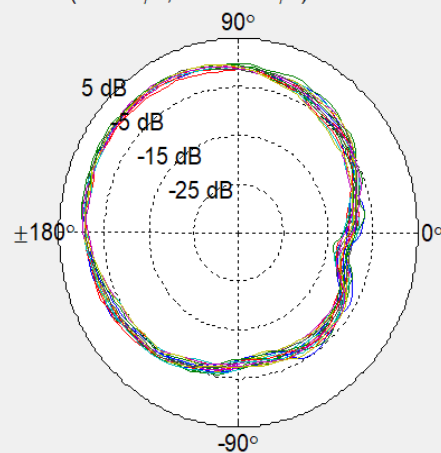
| Frequency(MHz) | 5750  | 5800  | 5850  |
|----------------|-------|-------|-------|
| Peak Gain(dBi) | 2.02  | 1.41  | 1.26  |
| Efficiency(%)  | 38.23 | 35.87 | 35.68 |
| Efficiency(dB) | -4.18 | -4.45 | -4.48 |

### ANT0

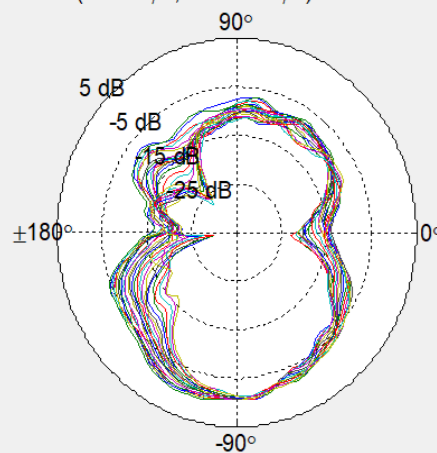
6G Band = 5900 - 8500 MHz



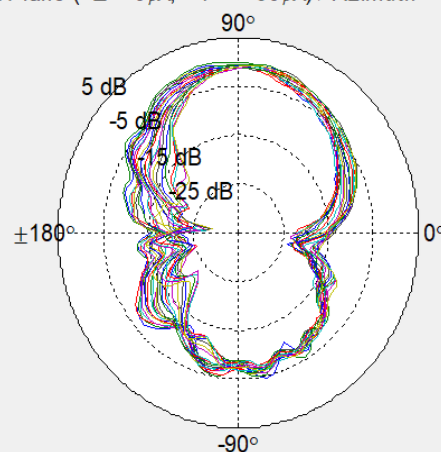
XY Plane (+X = 0°X, +Y = +90°X) / Elevation = 90°X



ZX Plane (+Z = 0°X, +X = +90°X) / Azimuth = 0°X



YZ Plane (+Z = 0°X, +Y = +90°X) / Azimuth = 90°X



### ANT0

| Frequency(MHz) | 5950  | 6000  | 6050  | 6100  | 6150  | 6200  | 6250  | 6300  | 6350  | 6400  | 6450  | 6500  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peak Gain(dBi) | 1.57  | 0.28  | 0.77  | 0.69  | 1.08  | 1.01  | 0.60  | 1.20  | 0.31  | 0.81  | 0.88  | 0.61  |
| Efficiency(%)  | 37.30 | 30.69 | 31.69 | 31.95 | 32.60 | 32.59 | 31.70 | 33.06 | 30.15 | 31.24 | 30.96 | 29.67 |
| Efficiency(dB) | -4.28 | -5.13 | -4.99 | -4.96 | -4.87 | -4.87 | -4.99 | -4.81 | -5.21 | -5.05 | -5.09 | -5.28 |

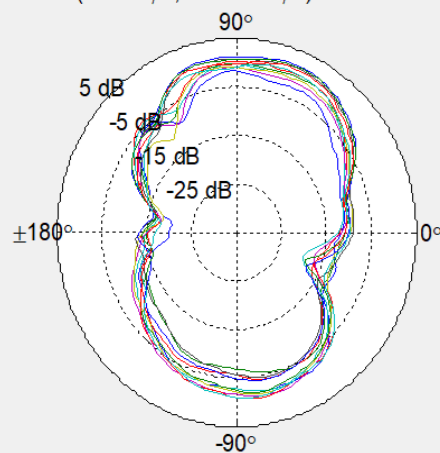
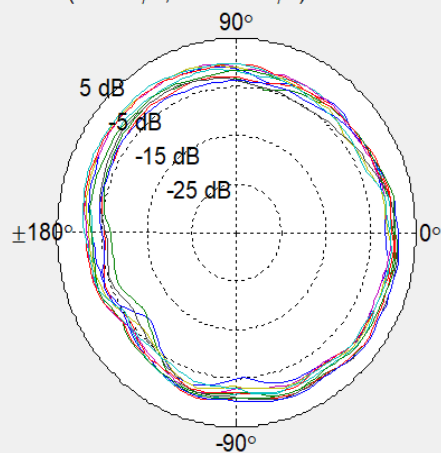
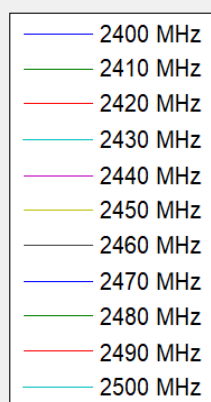
| Frequency(MHz) | 6550  | 6600  | 6650  | 6700  | 6750  | 6800  | 6850  | 6900  | 6950  | 7000  | 7050  | 7100  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peak Gain(dBi) | 1.64  | 1.30  | 1.61  | 1.42  | 1.66  | 1.09  | 0.98  | 0.87  | 0.62  | 0.36  | 0.44  | 0.44  |
| Efficiency(%)  | 31.33 | 29.98 | 30.13 | 29.76 | 30.05 | 28.35 | 27.97 | 27.41 | 26.25 | 26.22 | 26.49 | 26.19 |
| Efficiency(dB) | -5.04 | -5.23 | -5.21 | -5.26 | -5.22 | -5.47 | -5.53 | -5.62 | -5.81 | -5.81 | -5.77 | -5.82 |

### ANT1

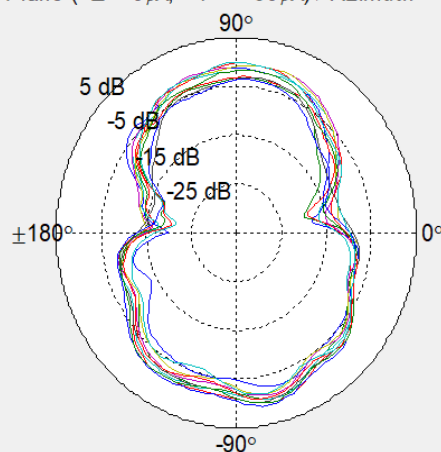
2G Band = 2400 - 2500 MHz % 2G BAND

XY Plane (+X = 0°X, +Y = +90°X) / Elevation = 90°X

ZX Plane (+Z = 0°X, +X = +90°X) / Azimuth = 0°X



YZ Plane (+Z = 0°X, +Y = +90°X) / Azimuth = 90°X

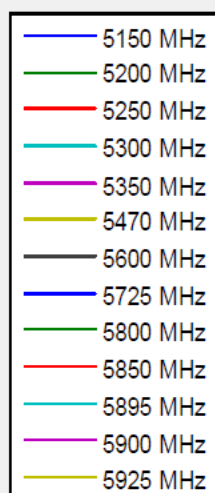


### ANT1

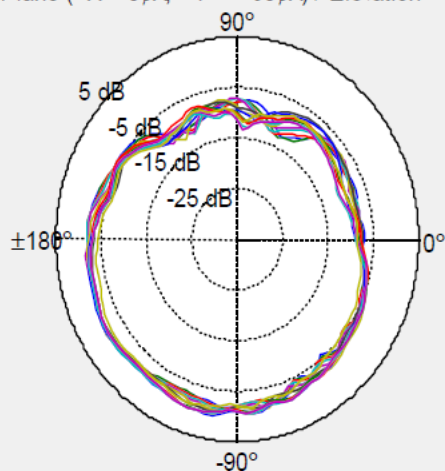
| Frequency(MHz) | 2400  | 2410  | 2420  | 2430  | 2440  | 2450  | 2460  | 2470  | 2480  | 2490  | 2500  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peak Gain(dBi) | 0.70  | 1.51  | 1.58  | 1.36  | 1.01  | 1.19  | 1.36  | 1.40  | 1.27  | 1.43  | 0.88  |
| Efficiency(%)  | 41.81 | 41.43 | 47.56 | 49.74 | 48.56 | 44.13 | 43.18 | 49.45 | 51.57 | 50.86 | 45.53 |
| Efficiency(dB) | -3.79 | -3.83 | -3.23 | -3.03 | -3.14 | -3.55 | -3.65 | -3.06 | -2.88 | -2.94 | -3.42 |

# **ANT1**

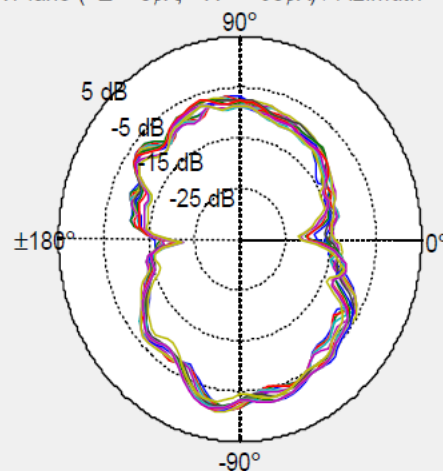
5G Band = 4900 - 5975 MHz



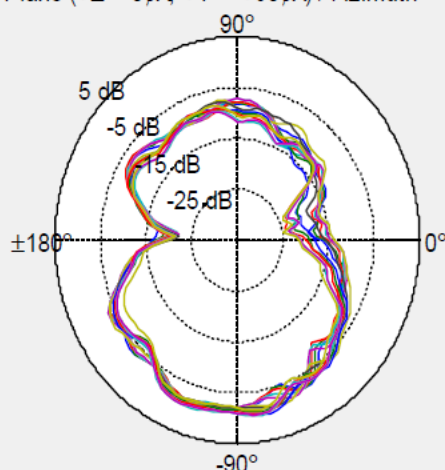
XY Plane (+X = 0°X, +Y = +90°X) / Elevation = 90°X



ZX Plane (+Z = 0°X, +X = +90°X) / Azimuth = 0°X



YZ Plane (+Z = 0°X, +Y = +90°X) / Azimuth = 90°X



# **ANT1**

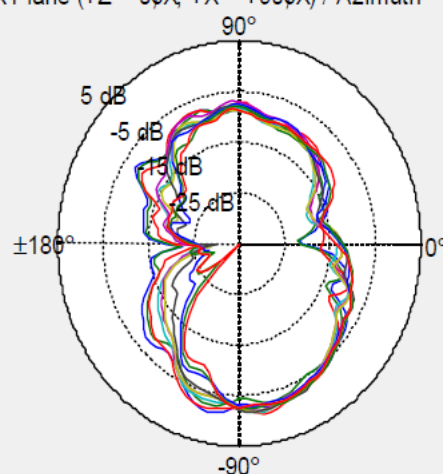
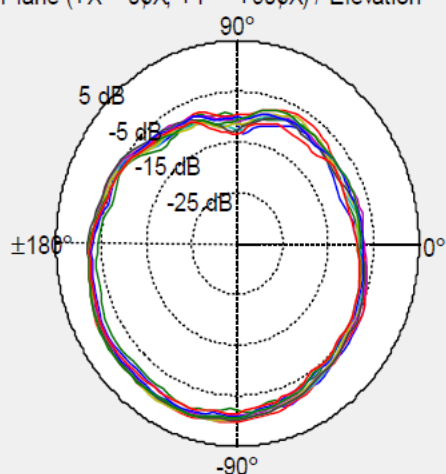
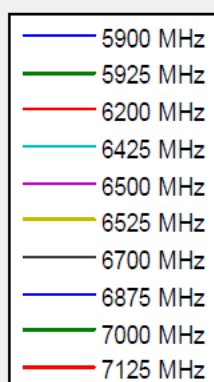
| Frequency(MHz) | 5150  | 5200  | 5250  | 5300  | 5350  | 5400  | 5450  | 5500  | 5550  | 5600  | 5650  | 5700  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peak Gain(dBi) | 1.65  | 1.52  | 1.61  | 2.04  | 1.94  | 2.49  | 2.38  | 2.47  | 2.35  | 1.98  | 2.55  | 2.16  |
| Efficiency(%)  | 31.75 | 32.59 | 32.88 | 34.85 | 35.66 | 39.89 | 38.35 | 38.40 | 38.32 | 35.98 | 36.25 | 35.54 |
| Efficiency(dB) | -4.98 | -4.87 | -4.83 | -4.58 | -4.48 | -3.99 | -4.16 | -4.16 | -4.17 | -4.44 | -4.41 | -4.49 |

| Frequency(MHz) | 5750  | 5800  | 5850  |
|----------------|-------|-------|-------|
| Peak Gain(dBi) | 2.48  | 2.42  | 2.56  |
| Efficiency(%)  | 35.41 | 33.49 | 34.24 |
| Efficiency(dB) | -4.51 | -4.75 | -4.66 |

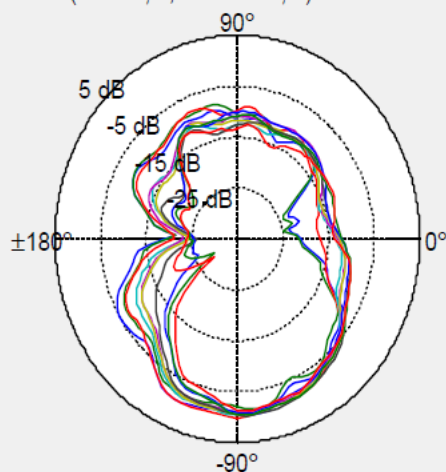
# **ANT1**

6G Band = 5900 - 8500 MHz

XY Plane (+X = 0°X, +Y = +90°X) / Elevation = 90°X    ZX Plane (+Z = 0°X, +X = +90°X) / Azimuth = 0°X



YZ Plane (+Z = 0°X, +Y = +90°X) / Azimuth = 90°X

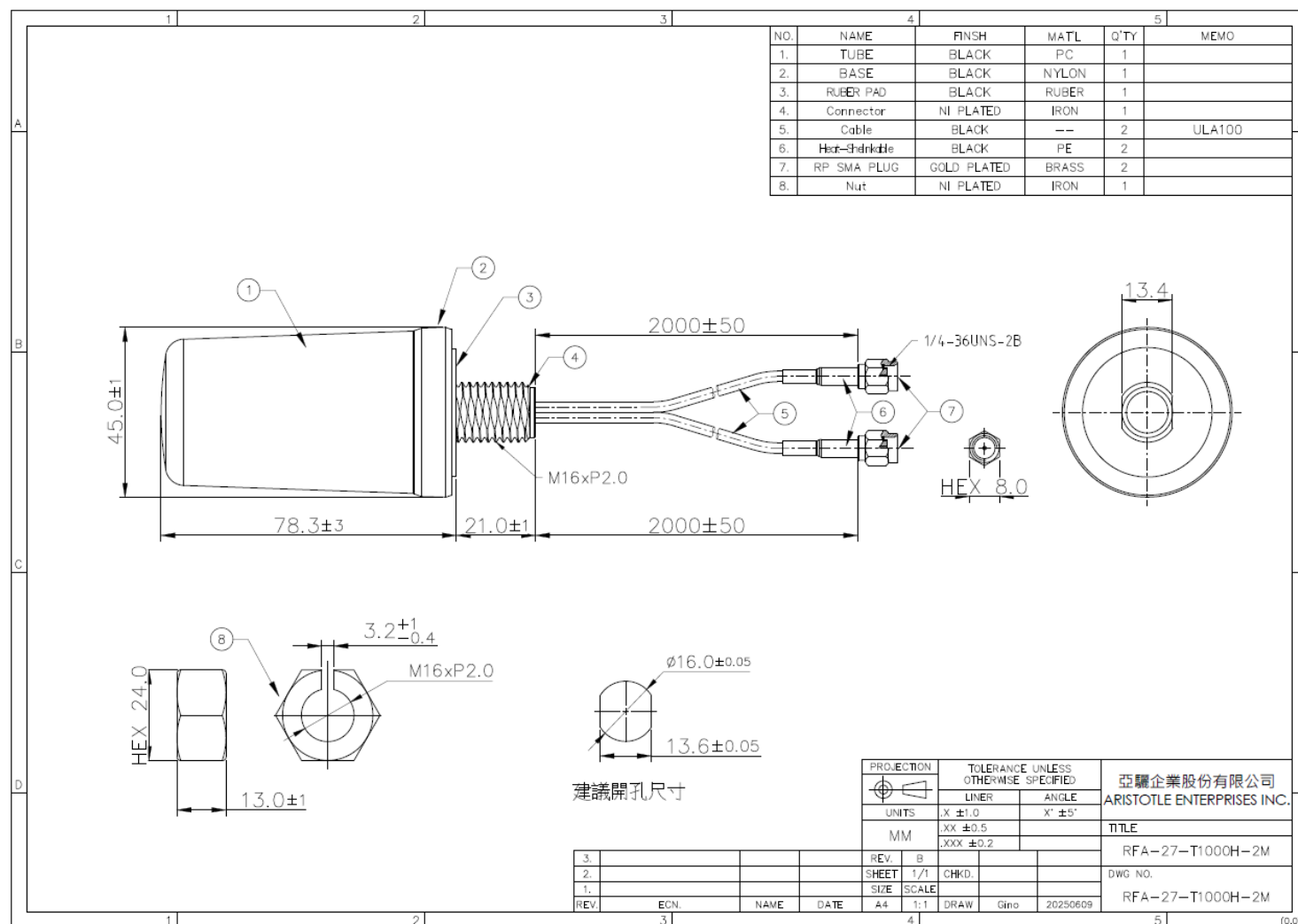


# **ANT1**

| Frequency(MHz) | 5950  | 6000  | 6050  | 6100  | 6150  | 6200  | 6250  | 6300  | 6350  | 6400  | 6450  | 6500  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peak Gain(dBi) | 2.78  | 2.99  | 2.33  | 2.42  | 2.05  | 2.09  | 2.57  | 1.54  | 2.43  | 1.81  | 1.35  | 1.45  |
| Efficiency(%)  | 34.86 | 31.84 | 30.83 | 31.68 | 31.33 | 31.65 | 32.58 | 31.06 | 32.20 | 31.29 | 30.65 | 30.85 |
| Efficiency(dB) | -4.58 | -4.97 | -5.11 | -4.99 | -5.04 | -5.00 | -4.87 | -5.08 | -4.92 | -5.05 | -5.14 | -5.11 |

| Frequency(MHz) | 6550  | 6600  | 6650  | 6700  | 6750  | 6800  | 6850  | 6900  | 6950  | 7000  | 7050  | 7100  |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peak Gain(dBi) | 1.64  | 1.30  | 1.61  | 1.42  | 1.66  | 1.09  | 0.98  | 0.87  | 0.62  | 0.36  | 0.44  | 0.44  |
| Efficiency(%)  | 31.33 | 29.98 | 30.13 | 29.76 | 30.05 | 28.35 | 27.97 | 27.41 | 26.25 | 26.22 | 26.49 | 26.19 |
| Efficiency(dB) | -5.04 | -5.23 | -5.21 | -5.26 | -5.22 | -5.47 | -5.53 | -5.62 | -5.81 | -5.81 | -5.77 | -5.82 |

## 5. Mechanical Drawing



## 6. Packing Drawing

### 產品包裝規範 PACKING CRITERION

