



# SPECIFICATION FOR APPROVAL

**CUSTOMER/PROJECT :** \_\_\_\_\_

**CUSTOMER P.N./ :** \_\_\_\_\_

**PRODUCT NAME./ :** 4G Antenna

**MODEL NO./ :** 9Z067M

**SPECIFICATION/ :** \_\_\_\_\_

| VERSION | DATE       | REVISION DESCRIPTION |
|---------|------------|----------------------|
| T:A     | 2023/12/7  | newly added          |
| T:B     | 2024/06/25 | Update data          |
|         |            |                      |
|         |            |                      |

| SUPPLIER AUTHORIZED SIGNATURE |         |          |
|-------------------------------|---------|----------|
| PREPARED                      | CHECKED | APPROVED |
| XUHAIJUN                      |         |          |

| CUSTOMER AUTHORIZED SIGNATURE |  |         |  |
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| Project                       |  | Quality |  |

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## 1 DEFINITION

|     |                                    |
|-----|------------------------------------|
| dBi | Decibel relative isotropic antenna |
| Tx  | Transmit frequency                 |
| Rx  | Receive frequency                  |
| TRP | Total Radiated Power               |

|       |   |
|-------|---|
| TIS   | Total Isotropic Sensitivity             |
| VSWR  | Voltage Standing Wave Ratio             |
| GSM   | Global Service for Mobile communication |
| DCS   | Digital Communication System            |
| CDMA  | Code Division Multiple Access           |
| WCDMA | Wideband Code Division Multiple Access  |

## 2 Test equipment

*Can be increased or decreased according to actual situation*

vector network analyzer

Comprehensive test instrument

GTS darkroom

## 3 Applicable frequency band

*Mark the applicable frequency bands with other colors.*

| System       | up                | down              |
|--------------|-------------------|-------------------|
| GSM850       | 824MHz~849MHz     | 869MHz~894MHz     |
| GSM900       | 890MHz~915MHz     | 935MHz~960MHz     |
| DCS1800      | 1710MHz~1785MHz   | 1805MHz~1880MHz   |
| PCS1900      | 1850MHz~1910MHz   | 1930MHz~1990MHz   |
| CDMA800      | 825MHz~835MHz     | 870MHz~880 MHz    |
| CDMA2000     | 824MHz ~849MHz    | 869MHz ~894MHz    |
| WCDMA2100    | 1920MHz~1980MHz   | 2110MHz~2170MHz   |
| WIFI (2. 4G) | 2412MHz~2483MHz   |                   |
| TD-SCDMA2100 | 2010MHz~2025MHz   | 2010MHz~2025MHz   |
| TD-SCDMA B39 | 1880 MHz-1920 MHz | 1880 MHz-1920 MHz |
| <b>LTE</b>   | 700MHz ~2690MHz   |                   |

## 4 Basic testing items

4.1 Standing wave ratio diagram

4.2 Smith impedance diagram

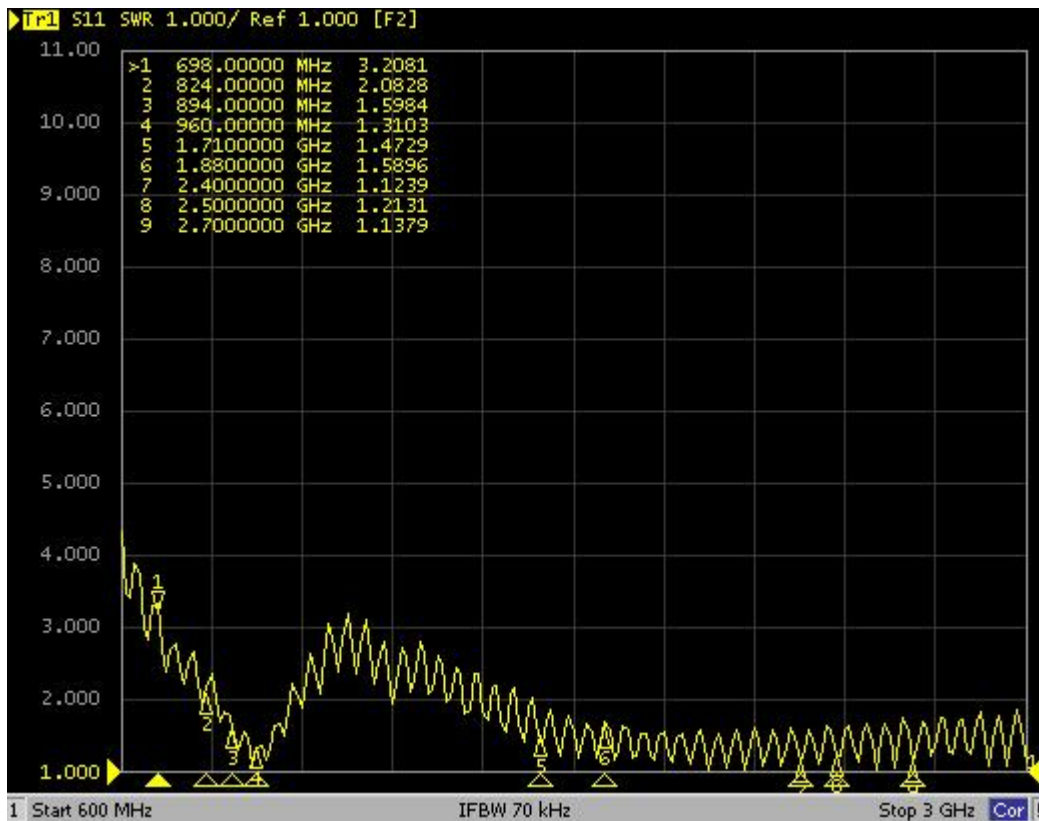
4.3 Radiation pattern

#### 4.4 Gain and efficiency

### 5 Test indicators and data charts

#### 5.1 standing-wave ratio

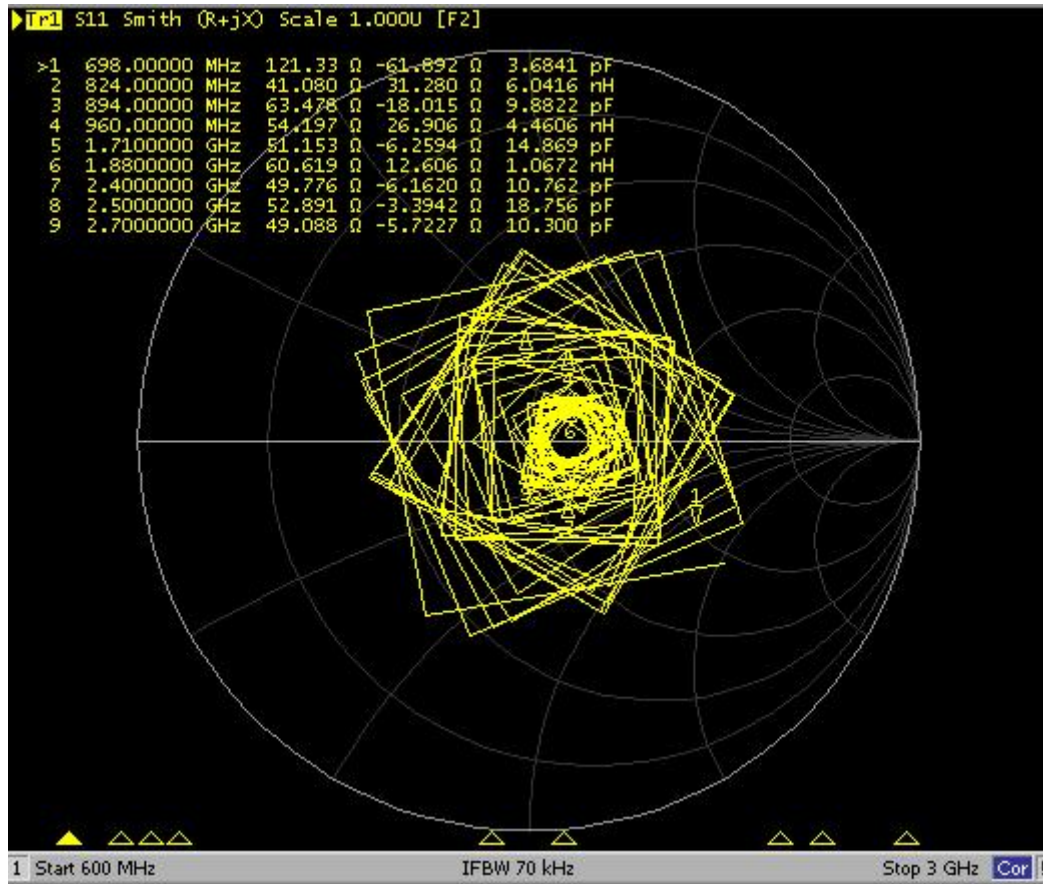
##### 5.1.1 Standing wave ratio diagram



##### 5.1.2 VSWR data

|          |             |             |             |             |             |             |             |             |             |
|----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Freq/MHz | <b>698</b>  | <b>824</b>  | <b>894</b>  | <b>960</b>  | <b>1710</b> | <b>1880</b> | <b>2400</b> | <b>2500</b> | <b>2690</b> |
| VSWR     | <b>3.20</b> | <b>2.08</b> | <b>1.59</b> | <b>1.31</b> | <b>1.47</b> | <b>1.58</b> | <b>1.12</b> | <b>1.21</b> | <b>1.13</b> |

## 5.2 Return loss



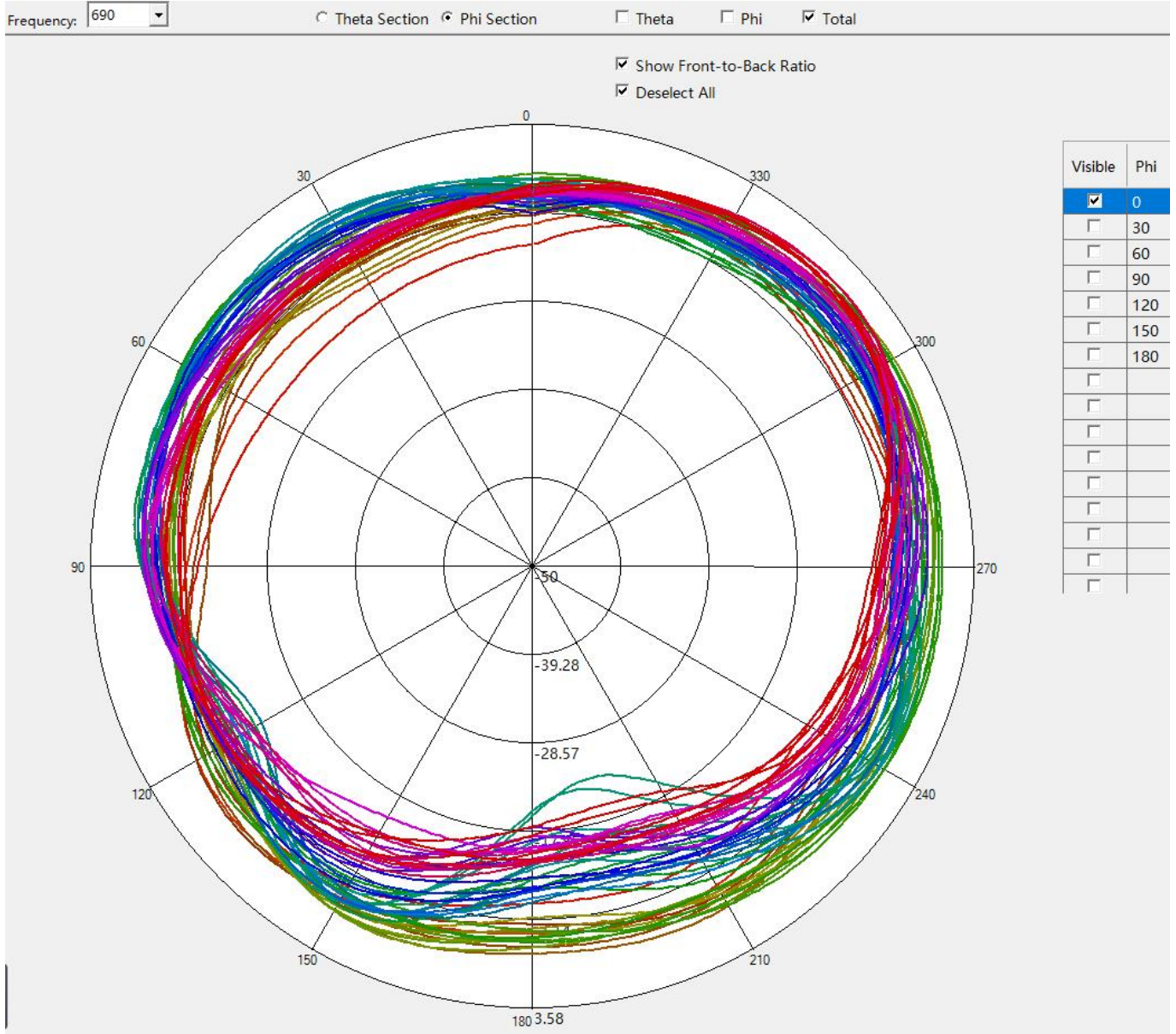
## 5.3 Radiation pattern





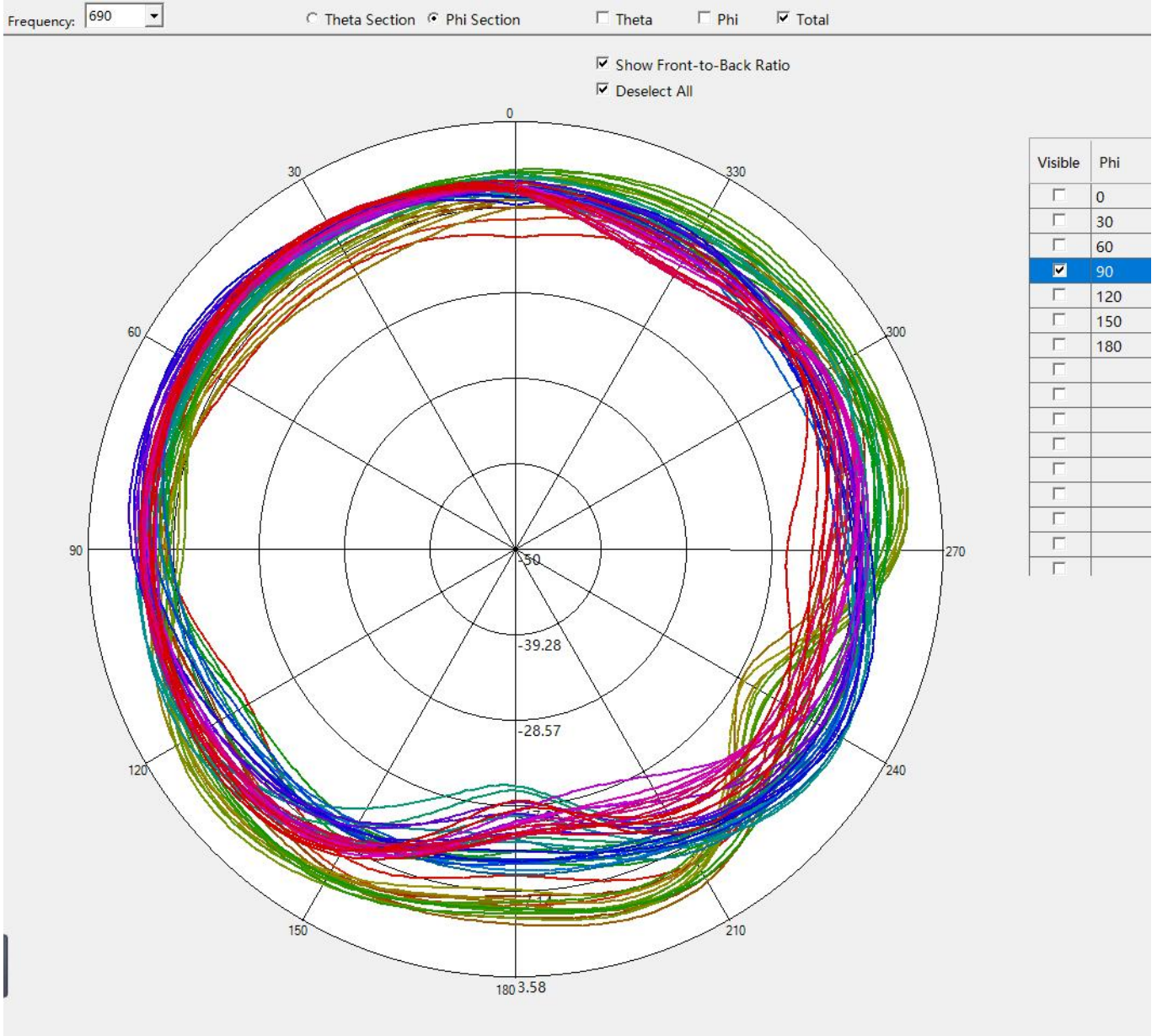
5.3.2 E-plane

**E1**





## E2



#### 5.4 Gain & Efficiency

| Frequency [MHz] | Efficiency | Max Gain [dBi] |
|-----------------|------------|----------------|
| 690             | 25%        | 0.259642       |
| 710             | 28%        | 0.404248       |
| 730             | 30%        | 0.215736       |
| 750             | 30%        | 0.398516       |
| 770             | 29%        | -0.625538      |
| 790             | 34%        | -0.237311      |
| 810             | 35%        | -0.17563       |
| 824             | 38%        | 0.93626        |
| 834             | 39%        | 1.184688       |
| 844             | 35%        | 1.340972       |
| 854             | 31%        | 1.19999        |
| 864             | 34%        | 1.129361       |
| 874             | 31%        | 1.1675         |
| 884             | 31%        | 1.09106        |
| 894             | 35%        | 0.901505       |
| 900             | 34%        | 0.783117       |
| 910             | 34%        | 0.991452       |
| 920             | 36%        | 1.43704        |
| 930             | 36%        | 1.812445       |
| 940             | 35%        | 2.37196        |
| 950             | 38%        | 2.715385       |
| 960             | 38%        | 2.902979       |
| 1710            | 42%        | 1.58191        |
| 1730            | 42%        | 1.25186        |
| 1750            | 41%        | 1.57148        |
| 1770            | 43%        | 1.23616        |
| 1790            | 43%        | 1.38944        |
| 1810            | 40%        | 1.07249        |
| 1830            | 39%        | 1.56431        |
| 1850            | 40%        | 1.33824        |
| 1860            | 41%        | 1.29771        |
| 1880            | 44%        | 1.31452        |
| 1900            | 43%        | 1.46623        |
| 1920            | 43%        | 1.46533        |
| 1940            | 42%        | 1.054756       |

|      |     |          |
|------|-----|----------|
| 1960 | 43% | 1.39114  |
| 1980 | 45% | 1.48126  |
| 2000 | 46% | 1.09387  |
| 2020 | 44% | 1.47711  |
| 2040 | 44% | 1.11968  |
| 2060 | 46% | 1.309831 |
| 2080 | 44% | 1.043453 |
| 2100 | 42% | 1.305294 |
| 2300 | 42% | 0.667    |
| 2320 | 41% | 0.87656  |
| 2340 | 42% | 1.544    |
| 2360 | 41% | 1.36304  |
| 2380 | 41% | 1.03735  |
| 2400 | 38% | 1.79229  |
| 2420 | 39% | 1.25332  |
| 2440 | 40% | 1.72723  |
| 2460 | 38% | 1.6411   |
| 2480 | 39% | 1.54483  |
| 2500 | 40% | 1.276007 |
| 2520 | 38% | 1.17682  |
| 2540 | 41% | 1.15828  |
| 2560 | 40% | 1.807038 |
| 2580 | 40% | 1.34901  |
| 2600 | 37% | 1.441757 |
| 2620 | 39% | 1.607505 |
| 2640 | 40% | 1.928624 |
| 2660 | 40% | 1.873034 |
| 2680 | 41% | 1.01914  |
| 2700 | 41% | 1.479912 |

| <b>LTE-FDD</b> |                | <b><u>TRP</u></b>    | <b><u>TIS</u></b>    |
|----------------|----------------|----------------------|----------------------|
|                | <b>Channel</b> | <b>Average value</b> | <b>Average value</b> |
| BAND2          | 650            | 17.81                |                      |
|                | 900            | 18.15                |                      |
|                | 1150           | 18.11                | -94.26               |
|                |                |                      |                      |
| BAND4          | 2000           | 17.60                |                      |
|                | 2175           | 18.12                |                      |
|                | 2300           | 17.83                | -93.15               |
|                |                |                      |                      |
| BAND5          | 2450           | 19.92                |                      |
|                | 2525           | 19.50                |                      |
|                | 2600           | 19.53                | -95.86               |
|                |                |                      |                      |
| BAND12         | 5060           | 16.95                |                      |
|                | 5095           | 17.11                |                      |
|                | 5130           | 17.22                | -93.92               |
|                |                |                      |                      |
| BAND13         |                |                      |                      |
|                | 5230           | 19.09                | -87.01               |
|                |                |                      |                      |
| BAND25         | 8065           | 18.06                |                      |
|                | 8365           | 17.94                |                      |
|                | 8665           | 17.84                | -93.31               |
|                |                |                      |                      |
| BAND26         | 8740           | 19.94                |                      |
|                | 8865           | 20.13                |                      |
|                | 8890           | 20.10                | -95.26               |

| <b>WCDMA</b> |                | <b><u>TRP</u></b>    | <b><u>TIS</u></b>    |
|--------------|----------------|----------------------|----------------------|
|              | <b>Channel</b> | <b>Average value</b> | <b>Average value</b> |
| BAND2        | 9262           | 18.16                |                      |
|              | 9400           | 18.02                |                      |

|       |      |       |         |
|-------|------|-------|---------|
|       | 9538 | 17.85 | -106.47 |
|       |      |       |         |
| BAND4 | 1312 | 18.01 |         |
|       | 1413 | 18.31 |         |
|       | 1513 | 17.66 | -105.82 |
|       |      |       |         |
| BAND5 | 4132 | 20.20 |         |
|       | 4183 | 20.07 |         |
|       | 4233 | 20.02 | -108.76 |

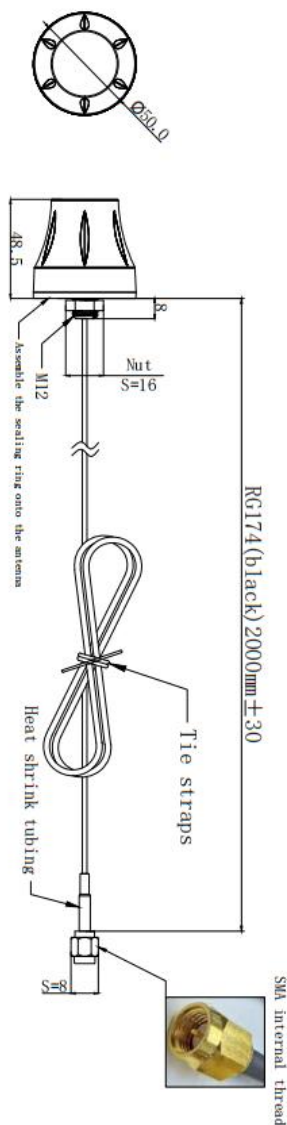




## 6 Environmental treatment suggestions

The environment doesn't need to be treated

## 7 Impedance matching

No changes are required to match

## 8 Antenna plan

|   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
|---|--|--------------------------|---|---|---|---|---|---|---|---|-------------------|---|-----------------------|---|--|--------------------------|---------------|--|------------------|-------------|--|-------------------|-------------|--|-----------------|--------------------------|--|--------------------|--------------|--|--------------------------|
| A   | 0  | 1                        | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| B   |  <p style="text-align: center;">RG174 (b)lack) 2000mm ±30</p> <p style="text-align: center;">SMA internal thread male core(gold-plated)</p> <p style="text-align: center;">Nut<br/>S=16</p> <p style="text-align: center;">M12</p> <p style="text-align: center;">Assemble the sealing ring onto the antenna</p> <p style="text-align: center;">Heat shrink tubing</p> <p style="text-align: center;">Tie straps</p> <p style="text-align: center;">Ø50.0</p> <p style="text-align: center;">4R.5</p> |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| C   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| D   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| E   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| F   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| G   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| H   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| I   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| J   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| K   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| <p>Notes:</p> <ol style="list-style-type: none"> <li>1. no bad appearance</li> <li>2. with * size for the key size.</li> <li>3. of all related materials and processing technology to meet the requirements of ROHS.</li> </ol>   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Edition</td> <td style="width: 45%;"></td> <td style="width: 15%;"></td> <td style="width: 25%;"></td> </tr> <tr> <td></td> <td style="text-align: center;">Modify the content</td> <td style="text-align: center;">Modified Date</td> <td></td> </tr> </table>   |  |                          |   |   |   |   |   |   |   |   | Edition           |   |                       |   |  | Modify the content       | Modified Date |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| Edition   |  |                          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
|   | Modify the content   | Modified Date            |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"><b>PROJECTION</b></td> <td style="width: 10%;"></td> <td style="width: 60%;"><b>Name :</b> antenna</td> </tr> <tr> <td><b>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN mm GENERAL TOLERANCE:</b></td> <td></td> <td><b>Model No.:</b> 9Z067M</td> </tr> <tr> <td><b>NAME</b></td> <td></td> <td><b>Checked :</b></td> </tr> <tr> <td><b>DATE</b></td> <td></td> <td><b>Approved :</b></td> </tr> <tr> <td><b>UNIT</b></td> <td></td> <td><b>Unit:</b> mm</td> </tr> <tr> <td><b>SURFACE TREATMENT</b></td> <td></td> <td><b>Scale :</b> 1:1</td> </tr> <tr> <td><b>COLOR</b></td> <td></td> <td><b>Date :</b> 2024.03.19</td> </tr> </table> |  |                          |   |   |   |   |   |   |   |   | <b>PROJECTION</b> |  | <b>Name :</b> antenna | <b>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN mm GENERAL TOLERANCE:</b> |  | <b>Model No.:</b> 9Z067M | <b>NAME</b>   |  | <b>Checked :</b> | <b>DATE</b> |  | <b>Approved :</b> | <b>UNIT</b> |  | <b>Unit:</b> mm | <b>SURFACE TREATMENT</b> |  | <b>Scale :</b> 1:1 | <b>COLOR</b> |  | <b>Date :</b> 2024.03.19 |
| <b>PROJECTION</b>   |   | <b>Name :</b> antenna    |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| <b>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN mm GENERAL TOLERANCE:</b>   |  | <b>Model No.:</b> 9Z067M |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| <b>NAME</b>   |  | <b>Checked :</b>         |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| <b>DATE</b>   |  | <b>Approved :</b>        |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| <b>UNIT</b>   |  | <b>Unit:</b> mm          |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| <b>SURFACE TREATMENT</b>  |  | <b>Scale :</b> 1:1       |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
| <b>COLOR</b>  |  | <b>Date :</b> 2024.03.19 |   |   |   |   |   |   |   |   |                   |   |                       |   |  |                          |               |  |                  |             |  |                   |             |  |                 |                          |  |                    |              |  |                          |
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## **9 Antenna installation guide**

### 9.1 Antenna installation instructions

## **10 Other**