



**Product specification acknowledgment.**

**Shenzhen Maya antenna lab**

**R&D center in ShenZhen**

**The mobile communication terminal antenna**

**PRODUCT NAME** **GQ5017**

**CUSTOMER NAME** 冠群

| account party         | Development party  |                |             |
|-----------------------|--------------------|----------------|-------------|
| Customer acknowledges | Quality Department | R&D Department | approved by |
|                       |                    | ME:<br>RF:     |             |
| Date:                 | Date:              |                |             |

**Shenzhen Maya communication equipment Co., LTD**

Site: A second floor, minqing road, minqing road, longhua street, baoan district, shenzhen city.

Tel: 86-755-82916162 Fax: 86-755-82916227



## 1. aim

For the Production from shenzhen maya communication equipment co., LTD. That mobile communication terminal antenna product specifications and test methods for specification, avoid the test conditions, the error caused by different methods

Antenna debug design requirement frequency band.

| Fre   | BAND                                                              |
|-------|-------------------------------------------------------------------|
| 2G    | GSM900/850/1800/1900 BC0/1/10                                     |
| 3G    | WCDMA1/2/5/8                                                      |
| 4G    | LTE-1/2/3/4/5/7/8/12/13/17/18/19/20/25/26/28/34/38/39/40/41/66/71 |
| 5G    | NR-1/2/3/5/7/8/20/25/28/66/38/40/41/71/77/78/79                   |
| other | GPS/WIFI/BT NFC FM                                                |

## 2. Electrical

Test method description and data.

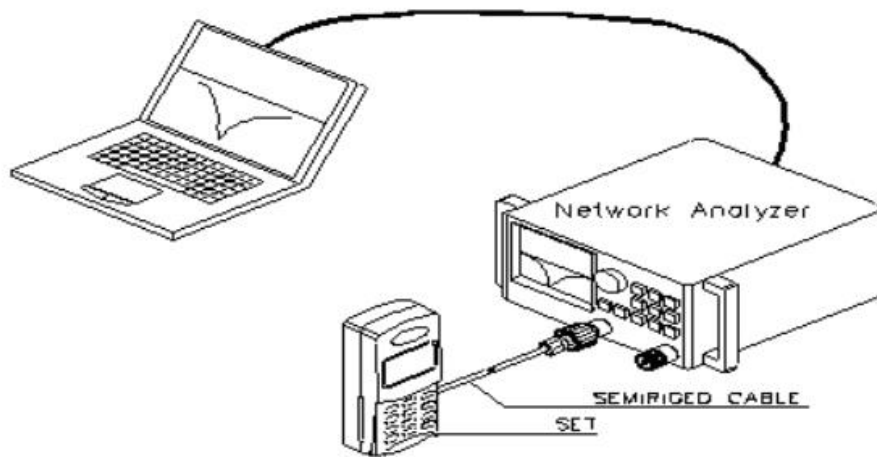
| Device name                          | use                                                                                                                 |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Vector Network Analyzer              | S11/Impedance/ Passive Test                                                                                         |
| Agilent 8960<br>SP6010<br>R&S CMU200 | <b>GSM, GPRS, EDGE, CDMA2000, 1xev-do, td-scdma, WCDMA, HSDPA mobile phone mobile communication equipment test.</b> |
| R&S CMW500<br>MT8820C                | <b>Including td-scdma, WCDMA, HSDPA, LTE, WIFI, GPS mobile phone mobile communication equipment test.</b>           |
| SP9500E                              | 5G、SA、NSA                                                                                                           |
| Agilent E4438C                       | <b>Test active GPS</b>                                                                                              |
| MVG Chamber                          | <b>Passive Test / OTA active Test / Efficiency/Gain</b>                                                             |



### 3. Passive Test Report

#### Test equipment: network analyzer.

Test method: with a 50 ohm CABLE CABLE from the instrument test port is derived, using the calibration after a calibration mechanism of SMA connector, connecting hand records related to the frequency points corresponding return loss and standing wave ratio data.



测试示意图

### 3.1 Active Test Report

#### TRP/TIS

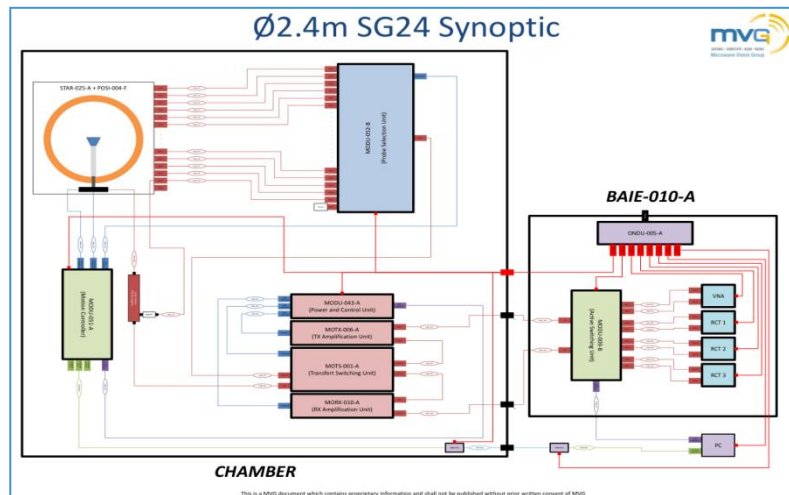
From testing tools, measuring, network analyzer, full waves far field ETS, French MVG SG24LT (Salmio) near field 3 d microwave dark room, the high precision positioning system and its controller and the computer with automatic test procedure test environment: the temperature of 22 °C + 3 °C, humidity 60% plus or minus 60% test methods: Using EST or 24 It Satimo system software Test method and calculation of TRP when tested TRP, DUT (Device Under Test) is in a state of maximum transmitted power, including three to choose channel Test, by positioning system control the location of the DUT, with 15 degrees for step length, measuring three dimensional space, the effective radiated power (EIRP) at various points through the average of the integral sphere, computation formula is as follows

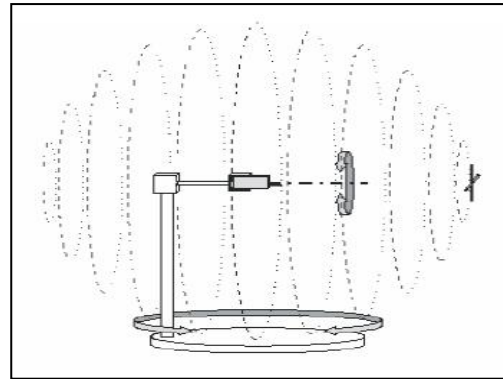
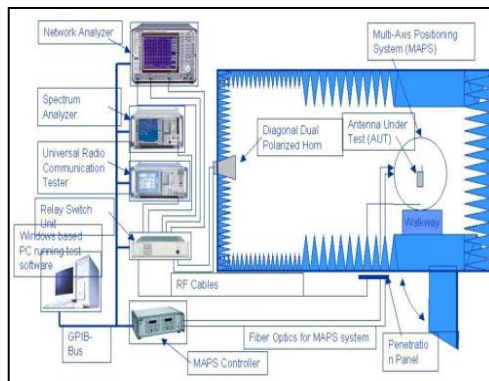
$$TRP \cong \frac{\pi}{2NM} \sum_{i=1}^{N-1} \sum_{j=0}^{M-1} [EiRP_{\theta}(\theta_i, \phi_j) + EiRP(\theta_i, \phi_j)] \sin(\theta_i)$$



In TIS test, the DUT at the maximum transmission power of the state, including three to choose channel test, by controlling the location of the DUT, at 30 degrees for the step length, measuring the three dimensional space each point receiving sensitivity, the average of the sphere by integral calculation, calculation formula is as follows:

$$TIS \cong \frac{2NM}{\pi \sum_{i=1}^{N-1} \sum_{j=0}^{M-1} \left[ \frac{1}{EIS_{\theta}(\theta_i, \phi_j)} + \frac{1}{EIS_{\phi}(\theta_i, \phi_j)} \right] \sin(\theta_i)}$$







### 3.2 Active Report.

|    |         |           |        |         |          |        |         |
|----|---------|-----------|--------|---------|----------|--------|---------|
| 2G | BAND    | GSM900    |        |         | DCS1800  |        |         |
|    | CHANNEL | 1         | 62     | 124     | 512      | 699    | 885     |
|    | TRP     | 25.56     | 26.28  | 26.33   | 25.61    | 25.52  | 25.2    |
|    | TIS     |           |        | -101.93 |          |        | -101.38 |
|    | BAND    | GSM850    |        |         | PCS1900  |        |         |
|    | CHANNEL | 128       | 192    | 251     | 512      | 661    | 810     |
|    | TRP     | 25.85     | 26.24  | 26.5    | 25.94    | 25.6   | 24.97   |
|    | TIS     |           |        | -102.06 |          |        | -102.23 |
| 3G | BAND    | WCDMA-B1  |        |         | WCDMA-B2 |        |         |
|    | CHANNEL | Low       | Medium | High    | Low      | Medium | High    |
|    | TRP     | 16.4      | 16.6   | 16.5    | 16.7     | 16.7   | 16.6    |
|    | TIS     |           |        | -103.1  |          |        | -103.5  |
|    | BAND    | WCDMA-B4  |        |         | WCDMA-B5 |        |         |
|    | CHANNEL | Low       | Medium | High    | Low      | Medium | High    |
|    | TRP     | 16.7      | 16.8   | 16.7    | 15.6     | 15.7   | 16.0    |
|    | TIS     |           |        | -103.4  |          |        | -102.6  |
| 3G | BAND    | WCDMA-B6  |        |         | WCDMA-B8 |        |         |
|    | CHANNEL | Low       | Medium | High    | Low      | Medium | High    |
|    | TRP     | 15.7      | 15.6   | 15.7    | 15.5     | 16.0   | 16.1    |
|    | TIS     |           |        | -101.1  |          |        | -102.3  |
|    | BAND    | WCDMA-B19 |        |         |          |        |         |
|    | CHANNEL | Low       | Medium | High    |          |        |         |
|    | TRP     | 15.7      | 15.7   | 15.7    |          |        |         |
|    | TIS     |           |        | -101.2  |          |        |         |
| 4G | BAND    | LTE-B1    |        |         | LTE-B2   |        |         |
|    | CHANNEL | Low       | Middle | High    | Low      | Middle | High    |
|    | TRP     | 15.41     | 15.97  | 15.52   | 15.3     | 15.66  | 15.48   |
|    | TIS     |           |        | -90.26  |          |        | -90.61  |
|    | BAND    | LTE-B3    |        |         | LTE-B4   |        |         |
|    | CHANNEL | Low       | Middle | High    | Low      | Middle | High    |
|    | TRP     | 16.44     | 16.93  | 16.83   | 16.56    | 16.29  | 16.91   |
|    | TIS     |           |        | -92.49  |          |        | -92.28  |



|    |                |         |        |        |         |        |        |
|----|----------------|---------|--------|--------|---------|--------|--------|
| 4G | <b>BAND</b>    | LTE-B5  |        |        | LTE-B7  |        |        |
|    | <b>CHANNEL</b> | Low     | Middle | High   | Low     | Middle | High   |
|    | <b>TRP</b>     | 15.58   | 15.65  | 15.81  | 13.08   | 12.86  | 12.19  |
|    | <b>TIS</b>     |         |        | -89.49 |         |        | -89.34 |
|    | <b>BAND</b>    | LTE-B8  |        |        | LTE-B12 |        |        |
|    | <b>CHANNEL</b> | Low     | Middle | High   | Low     | Middle | High   |
|    | <b>TRP</b>     | 15.51   | 15.86  | 16.26  | 15.56   | 15.97  | 16.32  |
|    | <b>TIS</b>     |         |        | -88.24 |         |        | -88.31 |
| 4G | <b>BAND</b>    | LTE-B13 |        |        | LTE-B17 |        |        |
|    | <b>CHANNEL</b> | Low     | Middle | High   | Low     | Middle | High   |
|    | <b>TRP</b>     | 15.15   | 15.36  | 15.72  | 15.77   | 15.89  | 15.48  |
|    | <b>TIS</b>     |         |        | -88.49 |         |        | -87.19 |
|    | <b>BAND</b>    | LTE-B18 |        |        | LTE-B19 |        |        |
|    | <b>CHANNEL</b> | Low     | Middle | High   | Low     | Middle | High   |
|    | <b>TRP</b>     | 16.18   | 16.37  | 15.39  | 15.32   | 15.13  | 15.98  |
|    | <b>TIS</b>     |         |        | -89.76 |         |        | -93.28 |
| 4G | <b>BAND</b>    | LTE-B20 |        |        | LTE-B25 |        |        |
|    | <b>CHANNEL</b> | Low     | Middle | High   | Low     | Middle | High   |
|    | <b>TRP</b>     | 15.13   | 14.66  | 14.16  | 15.87   | 16.28  | 16.04  |
|    | <b>TIS</b>     |         |        | -90.58 |         |        | -91.34 |
|    | <b>BAND</b>    | LTE-B26 |        |        | LTE-B28 |        |        |
|    | <b>CHANNEL</b> | Low     | Middle | High   | Low     | Middle | High   |
|    | <b>TRP</b>     | 16.12   | 15.16  | 15.74  | 15.33   | 15.62  | 15.95  |
|    | <b>TIS</b>     |         |        | -90.28 |         |        | -92.24 |
| 4G | <b>BAND</b>    | LTE-B66 |        |        | LTE-71  |        |        |
|    | <b>CHANNEL</b> | Low     | Middle | High   | Low     | Middle | High   |
|    | <b>TRP</b>     | 16.18   | 16.94  | 16.85  | 15.42   | 15.73  | 16.24  |
|    | <b>TIS</b>     |         |        | -90.72 |         |        | -90.29 |
|    | <b>BAND</b>    | LTE-B34 |        |        |         |        |        |
|    | <b>CHANNEL</b> | Low     | Middle | High   |         |        |        |
|    | <b>TRP</b>     | 14.28   | 14.43  | 14.67  |         |        |        |
|    | <b>TIS</b>     |         |        | -89.15 |         |        |        |
| 4G | <b>BAND</b>    | LTE-B38 |        |        | LTE-B39 |        |        |
|    | <b>CHANNEL</b> | Low     | Middle | High   | Low     | Middle | High   |
|    | <b>TRP</b>     | 17.76   | 17.94  | 18.71  | 15.77   | 15.58  | 15.46  |
|    | <b>TIS</b>     |         |        | -90.78 |         |        | -92.16 |
|    | <b>BAND</b>    | LTE-B40 |        |        | LTE-41  |        |        |
|    | <b>CHANNEL</b> | Low     | Middle | High   | Low     | Middle | High   |
|    | <b>TRP</b>     | 15.83   | 14.38  | 14.33  | 17.91   | 18.06  | 18.19  |
|    | <b>TIS</b>     |         |        | -90.52 |         |        | -90.57 |



|      |         |        |        |        |        |        |        |
|------|---------|--------|--------|--------|--------|--------|--------|
| 5G   | BAND    | N1     |        |        | N2     |        |        |
|      | CHANNEL | Low    | Middle | High   | Low    | Middle | High   |
|      | TRP     | 17.04  | 17.61  | 16.34  | 16.25  | 16.53  | 17.23  |
|      | TIS     |        |        | -91.01 |        |        | -91.64 |
|      | BAND    | N3     |        |        | N5     |        |        |
|      | CHANNEL | Low    | Middle | High   | Low    | Middle | High   |
|      | TRP     | 16.48  | 17.21  | 17.06  | 17.08  | 17.34  | 17.36  |
|      | TIS     |        |        | -91.27 |        |        | -86.81 |
| 5G   | BAND    | N7     |        |        | N8     |        |        |
|      | CHANNEL | Low    | Middle | High   | Low    | Middle | High   |
|      | TRP     | 15.05  | 15.25  | 15.35  | 15.97  | 16.47  | 16.85  |
|      | TIS     |        |        |        |        |        | -86.42 |
|      | BAND    | N20    |        |        | N28    |        |        |
|      | CHANNEL | Low    | Middle | High   | Low    | Middle | High   |
|      | TRP     | 16.74  | 15.11  | 16.28  | 15.85  | 16.12  | 16.34  |
|      | TIS     |        |        | -86.79 |        |        | -86.25 |
| 5G   | BAND    | N25    |        |        | N66    |        |        |
|      | CHANNEL | Low    | Middle | High   | Low    | Middle | High   |
|      | TRP     | 16.29  | 16.98  | 16.64  | 17.26  | 16.17  | 16.55  |
|      | TIS     |        |        | -91.26 |        |        | -91.65 |
|      | BAND    | N38    |        |        | N40    |        |        |
|      | CHANNEL | Low    | Middle | High   | Low    | Middle | High   |
|      | TRP     | 18.79  | 18.04  | 18.68  | 16.67  | 17.82  | 16.11  |
|      | TIS     |        |        | -90.79 |        |        | -89.31 |
| 5G   | BAND    | N41    |        |        | N77    |        |        |
|      | CHANNEL | Low    | Middle | High   | Low    | Middle | High   |
|      | TRP     | 18.41  | 18.75  | 18.39  | 18.37  | 18.26  | 18.55  |
|      | TIS     |        |        | -84.89 |        |        | -85.92 |
|      | BAND    | N78    |        |        | N79    |        |        |
|      | CHANNEL | Low    | Middle | High   | Low    | Middle | High   |
|      | TRP     | 18.49  | 18.31  | 18.24  | 16.25  | 17.44  | 17.89  |
|      | TIS     |        |        | -84.98 |        |        | -84.86 |
| 5G   | BAND    | N71    |        |        |        |        |        |
|      | CHANNEL | Low    | Middle | High   |        |        |        |
|      | TRP     | 15.42  | 15.78  | 16.01  |        |        |        |
|      | TIS     |        |        | -84.89 |        |        |        |
| WIFI | BAND    | WiFi-b |        |        | WiFi-a |        |        |
|      | CHANNEL | L      | M      | H      | L      | M      | H      |
|      | TRP     | 12.02  | 12.45  | 12.81  | 12.15  | 12.25  | 12.57  |
|      | TIS     |        |        | -81.26 |        |        | -70.26 |



### 3.3 Passive Test Report.

WIFI/GPS Gain(ANT-8)

| Freq | Gain | Freq | Gain | Freq | Gain |
|------|------|------|------|------|------|
| 1560 | 0.1  | 2400 | -0.3 | 5200 | 2.4  |
| 1570 | 0.2  | 2420 | 0.02 | 5300 | 2.7  |
| 1580 | 0.5  | 2440 | 0.70 | 5400 | 2.2  |
| 1590 | 0.5  | 2460 | 0.71 | 5500 | 2.1  |
| 1176 | -2.3 | 2480 | 0.81 | 5600 | 2.1  |
|      |      | 2500 | 0.52 | 5700 | 1.5  |
|      |      |      |      | 5800 | 1.3  |
|      |      |      |      | 6000 | -3.3 |
|      |      |      |      | 6300 | -4.2 |
|      |      |      |      | 6600 | -4.3 |
|      |      |      |      | 6900 | -4.7 |

WIFI/GPS Gain(ANT-0)

| Freq | Gain | Freq | Gain |
|------|------|------|------|
| 2400 | 0.58 | 5200 | 3.81 |
| 2420 | 0.95 | 5300 | 3.87 |
| 2440 | 1.33 | 5400 | 3.14 |
| 2460 | 1.27 | 5500 | 2.79 |
| 2480 | 0.88 | 5600 | 1.76 |
| 2500 | 0.75 | 5700 | 0.53 |
|      |      | 5800 | 0.23 |
|      |      | 6000 | 1.34 |
|      |      | 6300 | 1.64 |
|      |      | 6600 | 1.28 |
|      |      | 6900 | 1.67 |

MAIN Gain

| Freq | Gain | Freq | Gain | Freq | Gain |
|------|------|------|------|------|------|
| 700  | -4.8 | 950  | -3.0 | 2160 | 0.5  |
| 710  | -4.3 | 960  | -3.8 | 2180 | 0.6  |
| 720  | -5.0 | 1700 | -1.0 | 2300 | 0.4  |
| 730  | -4.0 | 1720 | -1.4 | 2320 | 0.7  |
| 740  | -3.9 | 1740 | -1.0 | 2340 | 0.8  |
| 750  | -3.5 | 1760 | -0.6 | 2360 | 0.4  |
| 760  | -3.0 | 1780 | -0.5 | 2380 | 0.6  |



|     |      |      |      |      |       |
|-----|------|------|------|------|-------|
| 770 | -3.5 | 1800 | -0.4 | 2400 | 0.3   |
| 780 | -3.0 | 1820 | -0.2 | 2420 | 0.3   |
| 790 | -3.5 | 1840 | -0.2 | 2440 | 0.01  |
| 800 | -2.9 | 1860 | -0.4 | 2460 | 0.3   |
| 810 | -2.4 | 1880 | -0.6 | 2480 | 0.5   |
| 820 | -4.1 | 1900 | -0.5 | 2500 | 0.2   |
| 830 | -3.5 | 1920 | -0.8 | 2520 | 0.1   |
| 840 | -3.3 | 1940 | -0.4 | 2540 | -0.05 |
| 850 | -3.2 | 1960 | -0.6 | 2560 | -0.01 |
| 860 | -2.9 | 1980 | -0.5 | 2580 | -0.05 |
| 870 | -2.7 | 2000 | -0.4 | 2600 | -0.12 |
| 880 | -2.6 | 2020 | -0.4 | 2620 | -0.2  |
| 890 | -3.2 | 2040 | -0.2 | 2640 | -0.5  |
| 900 | -2.6 | 2060 | 0.2  | 2660 | -0.6  |
| 910 | -2.0 | 2080 | 0.4  | 2680 | -0.7  |
| 920 | -1.7 | 2100 | 0.5  | 2700 | -0.8  |
| 930 | -1.5 | 2120 | 0.5  |      |       |
| 940 | -1.4 | 2140 | 0.6  |      |       |

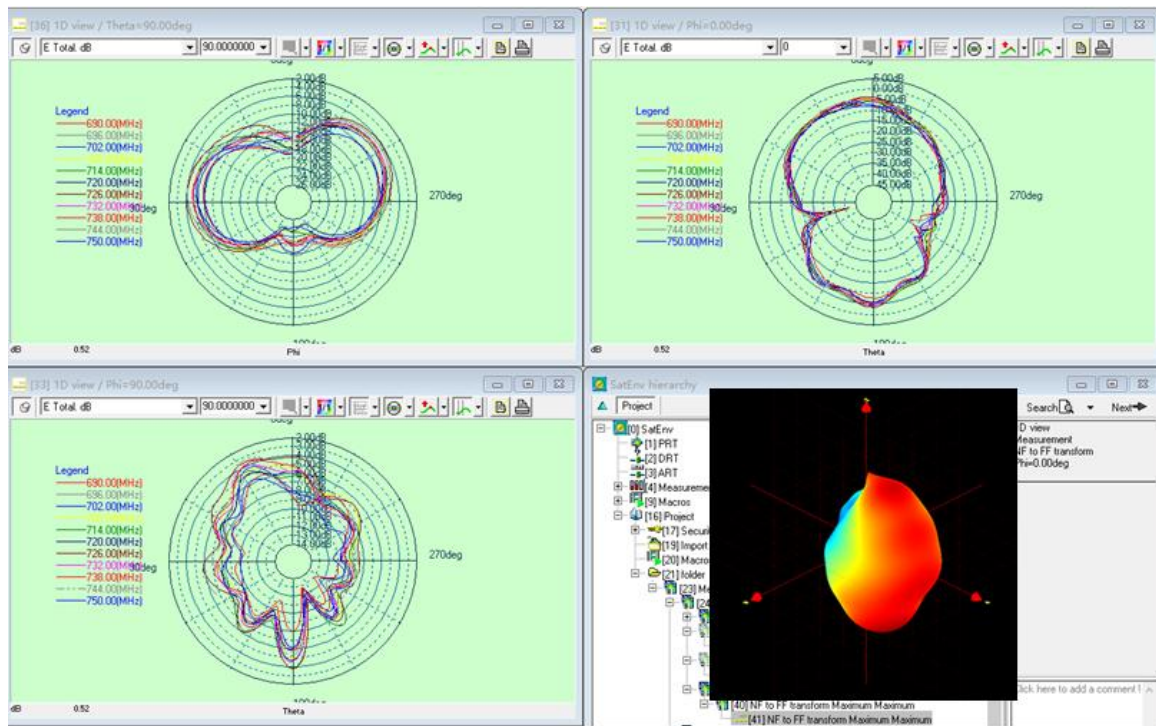
## 5G MAIN Gain

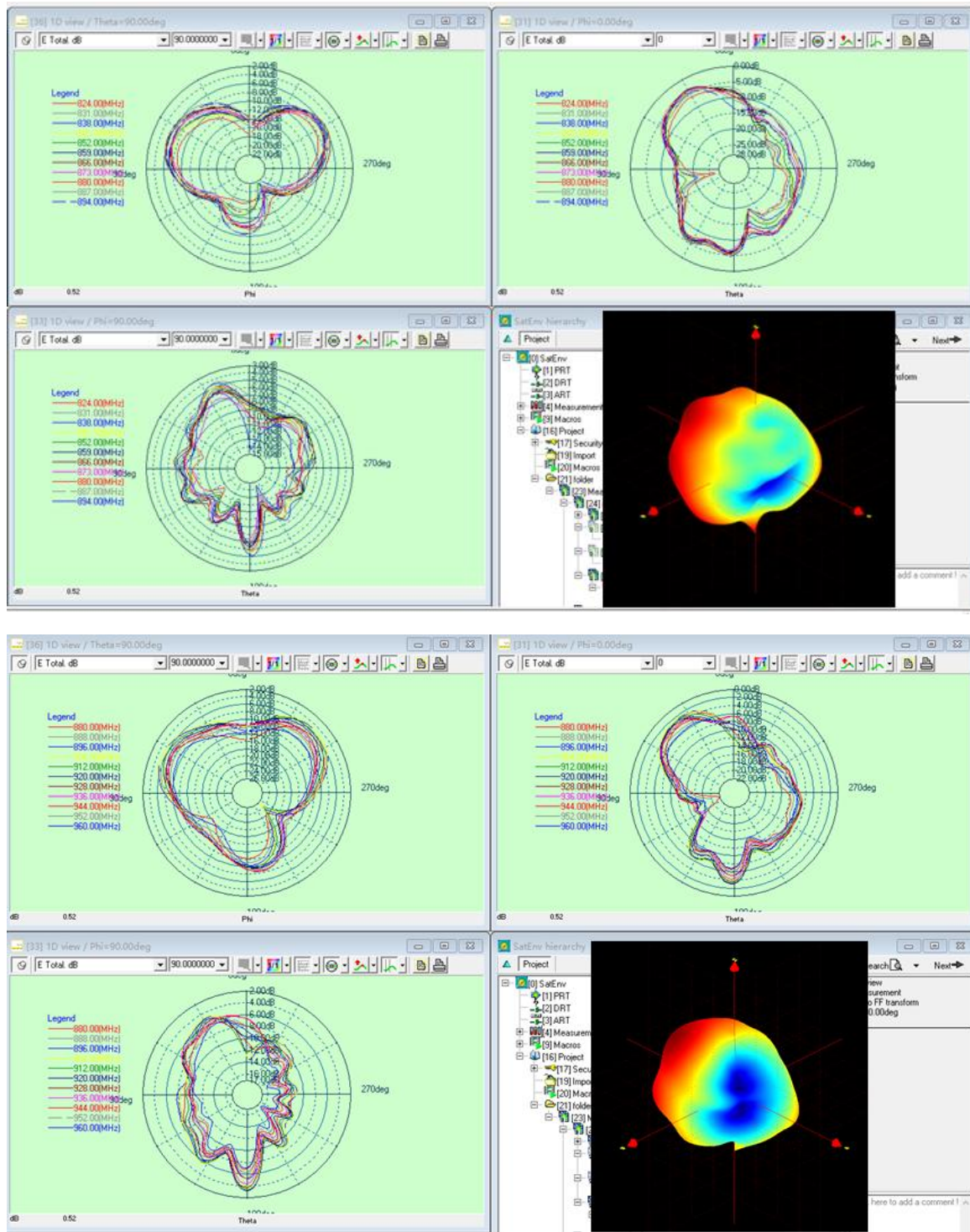
| Freq | Gain |
|------|------|
| 3300 | 1.6  |
| 3400 | 2.3  |
| 3500 | 2.3  |
| 3600 | 1.6  |
| 3700 | 1.5  |
| 3800 | 1.3  |
| 3900 | 1.3  |
| 4000 | 1.5  |
| 4100 | 1.0  |
| 4200 | 1.1  |
| 4300 | 1.2  |
| 4600 | 0.9  |
| 4900 | 0.3  |



## Passive Pattern

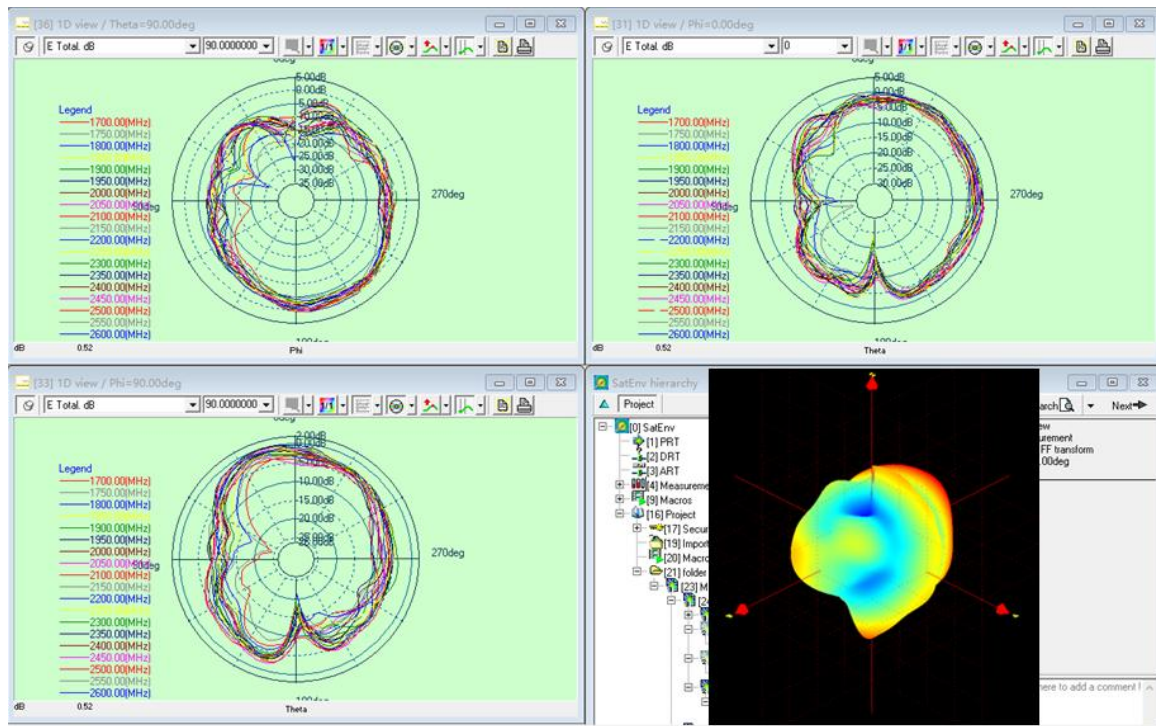
690-960MHz



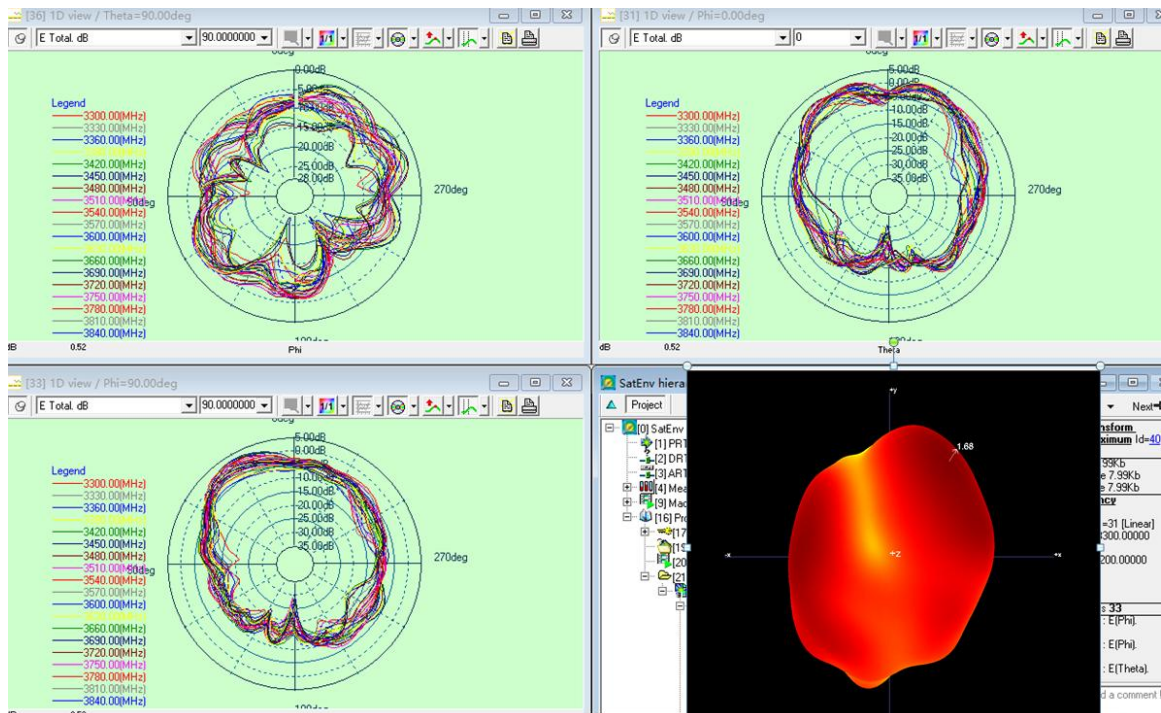




## 1700-2700MHz

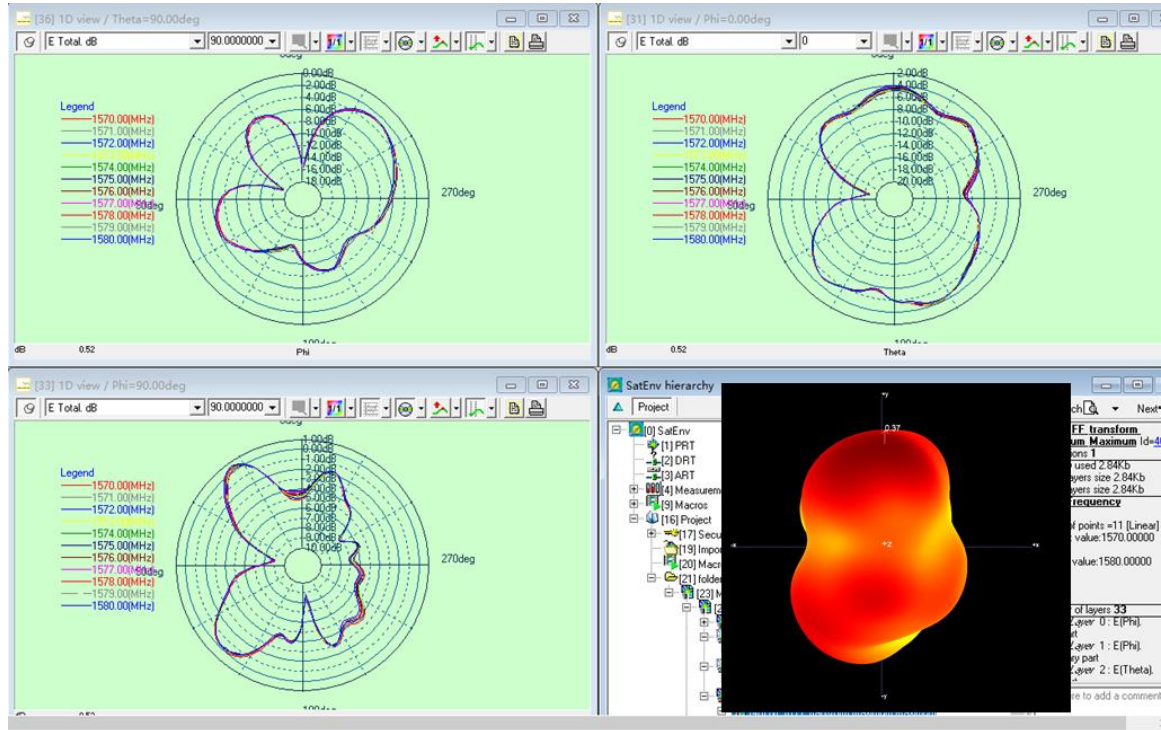


## 3300-5000MHz

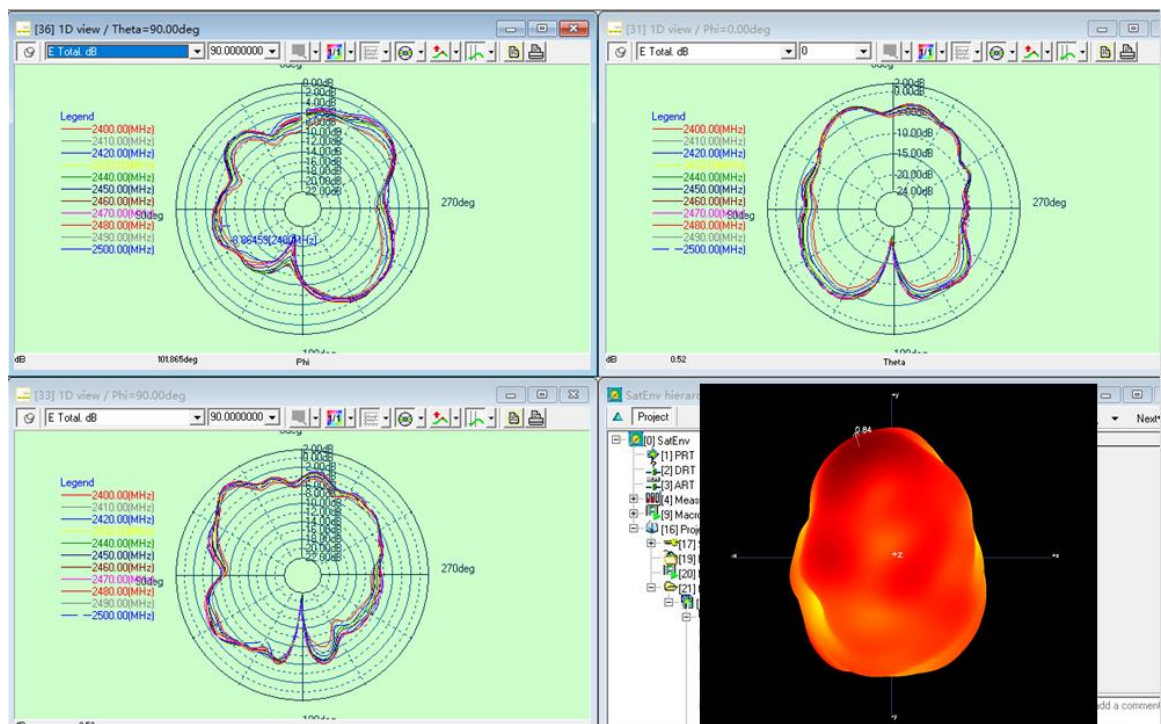




## 1570-1580MHz

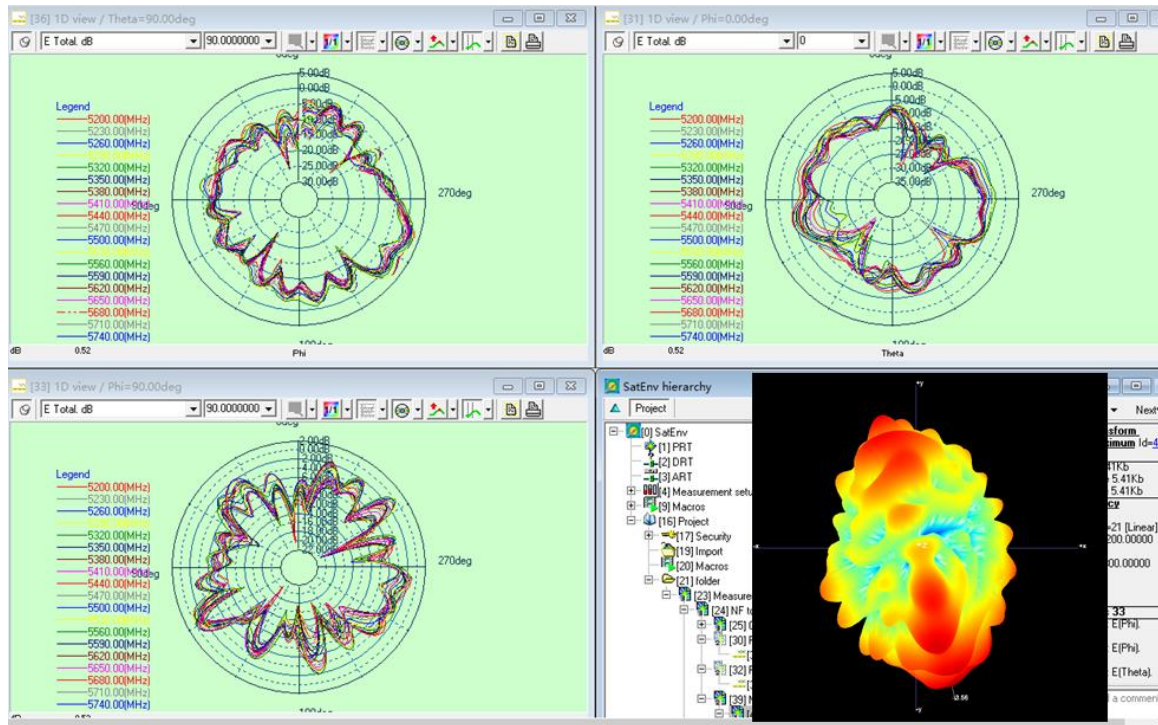


## 2400-2500MHz





## 5200-6000MHz



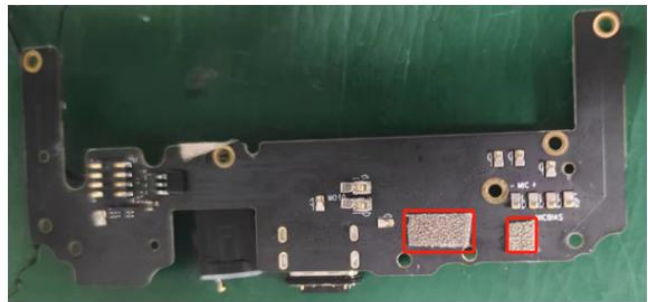
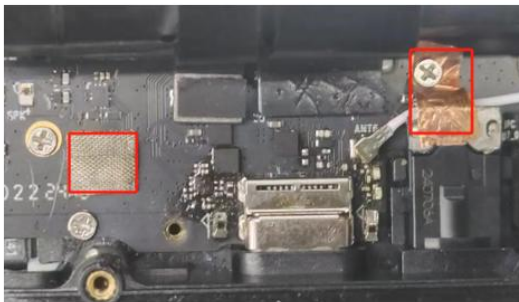
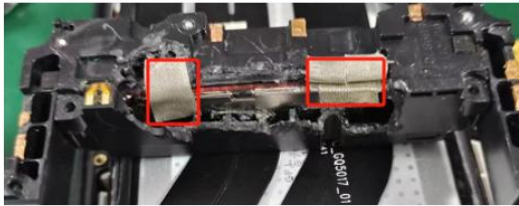


| ANT-0天线设计<br>main antenna design |            |
|----------------------------------|------------|
| 位号<br>Element                    | 值<br>Value |
| C2801                            | 5.1nH      |



## 5.Environmental treatment

Figure: The motherboard is grounded with a conductive sponge.



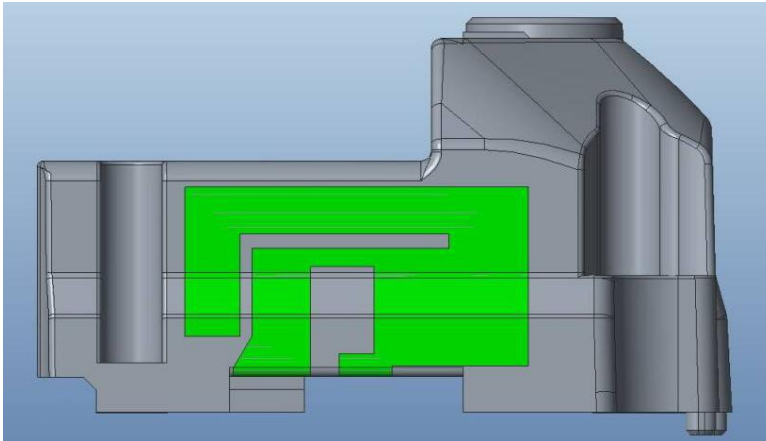
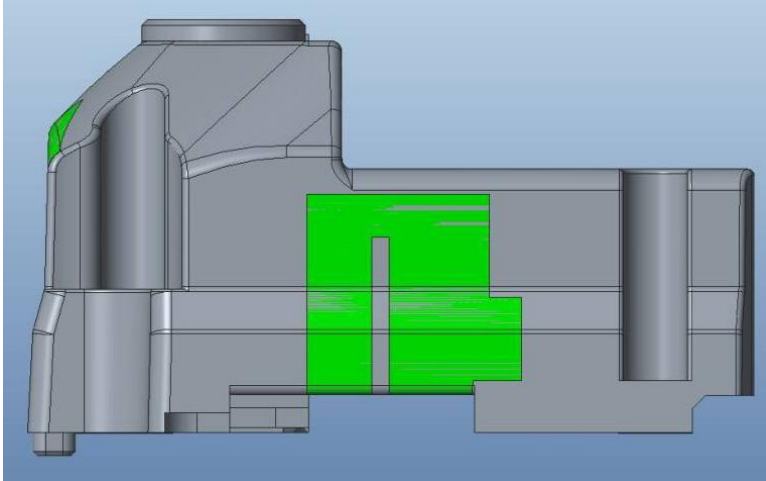
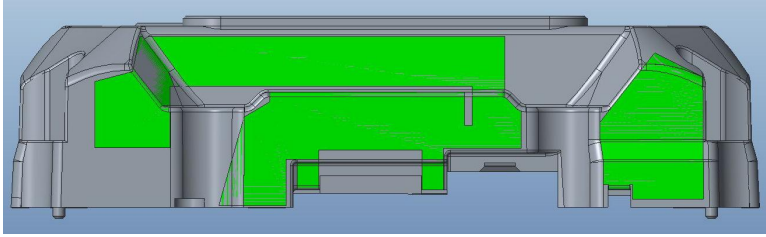


## 6. Structural drawings

### Mobile phone figure

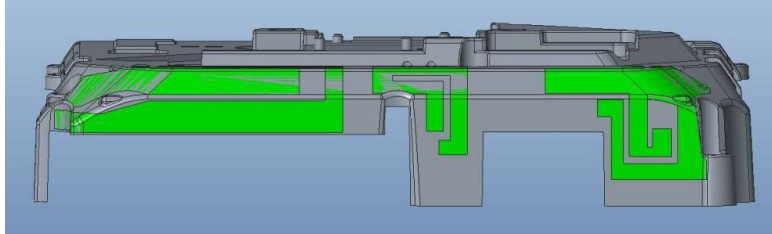


### Lower bracket Antenna

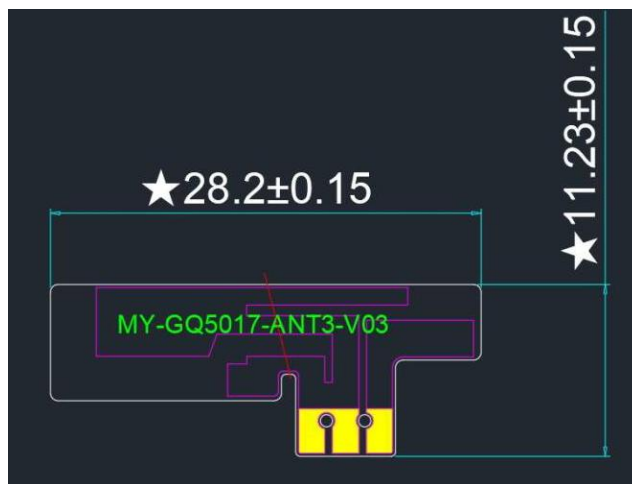




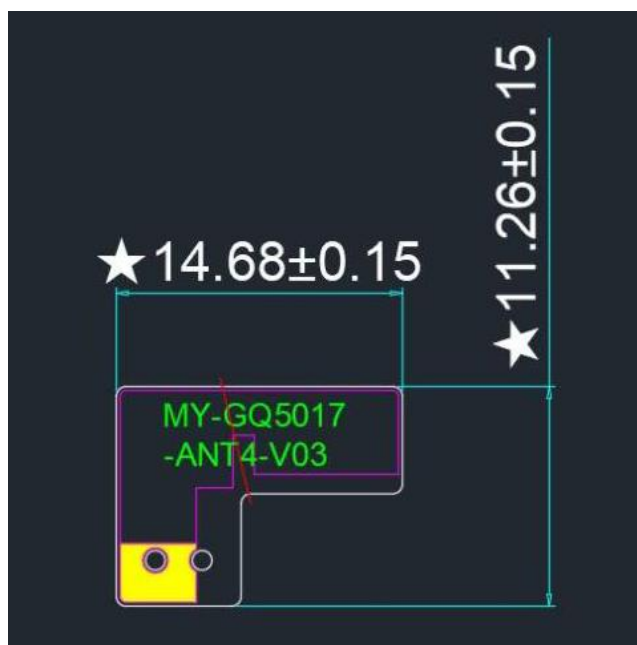
## Upper bracket Antenna



## ANT3 Antenna

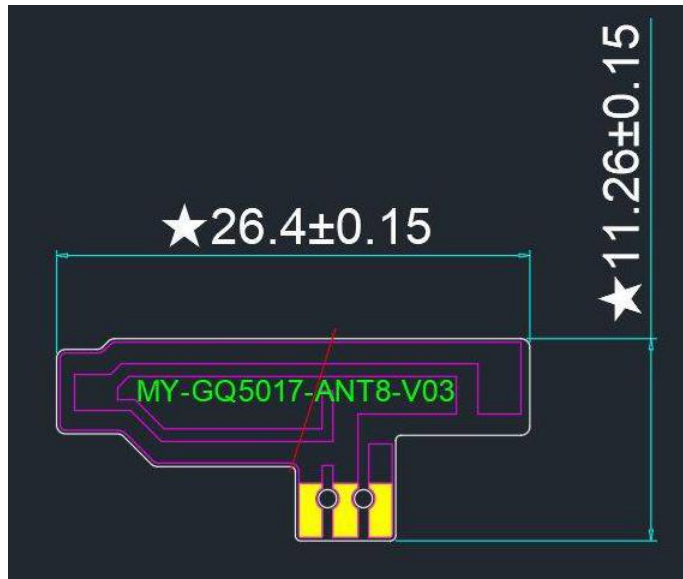


## ANT4 Antenna

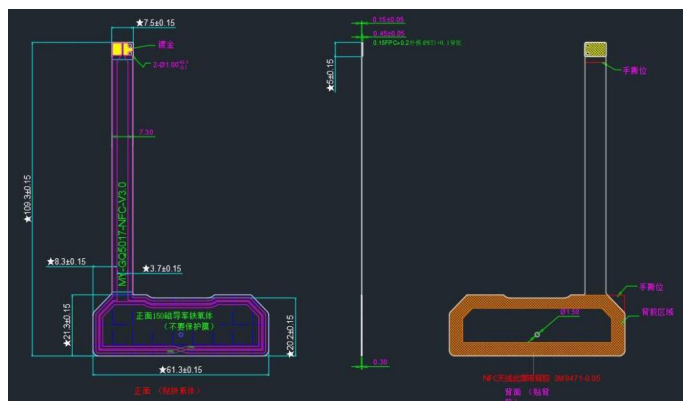




## ANT8 Antenna



## NFC Antenna



## FM Antenna

