



## K5 Antenna admission book

|                                                      |                 |                 |                                                                                                                                                                                   |    |               |
|------------------------------------------------------|-----------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------------|
| Project name:                                        | K5 - Antenna    | Frequency band: | GSM:GSM850/GSM900/DCS1800/PCS1900<br>WCDMA:W1/W2/W4/W5/W8<br>FDD:B1/B2/B3/B4/B5/B7/B8/B9/B12<br>B13/B17/B18/B19/B20/B25/B26/B28/B34<br>TDD:B38/B39/B40/B41<br>WIFI2.4G/WIFI5G/GPS |    |               |
| Internal material number:                            | 175-014-OK-A    | Version number: | R:B                                                                                                                                                                               |    |               |
| Material code:                                       |                 | Date:           | 2023-06-26                                                                                                                                                                        |    |               |
| ShenZhen Frequency Extension Iot Technology Co., Ltd |                 |                 |                                                                                                                                                                                   |    |               |
| examine and verify                                   | RF              |                 | design                                                                                                                                                                            | RF | LI donghai    |
|                                                      | MD              |                 |                                                                                                                                                                                   |    |               |
|                                                      | character       |                 |                                                                                                                                                                                   |    |               |
|                                                      | project         |                 |                                                                                                                                                                                   | MD | Zhong Fangmin |
|                                                      | vocational work |                 |                                                                                                                                                                                   |    |               |
| 深圳市优克联新技术有限公司                                        |                 |                 |                                                                                                                                                                                   |    |               |
| date                                                 |                 |                 |                                                                                                                                                                                   |    |               |
| affirm                                               | RF              |                 |                                                                                                                                                                                   |    |               |
|                                                      | MD              |                 |                                                                                                                                                                                   |    |               |
| remarks                                              |                 |                 |                                                                                                                                                                                   |    |               |



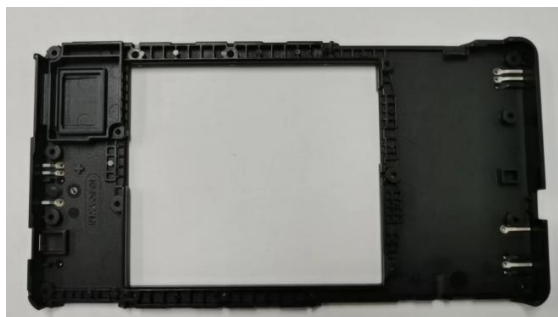
---

catalogue

|                                                                          |          |
|--------------------------------------------------------------------------|----------|
| 一，                                                                       |          |
| 1.The Mobilephone picture picture and the antenna finished picture. .... | 3        |
| Main antenna finished picture .....                                      | 3        |
| Mobilephone picture .....                                                | 3        |
| Main antenna matching .....                                              | 3        |
| 二，                                                                       |          |
| Antenna passive parameters .....                                         | 5        |
| Main Antenna Return Loss and VSWR .....                                  | 5/6      |
| Gain、Efficiency test .....                                               | 7/8/9    |
| Directivity .....                                                        | 10/11/12 |
| 三，OTA Test Report .....                                                  | 13/14    |
| 四、Antenna assembly drawing.....                                          | 16       |
| 五，Reliability test report .....                                          | 17       |
| 六、manner of packing .....                                                | 18       |



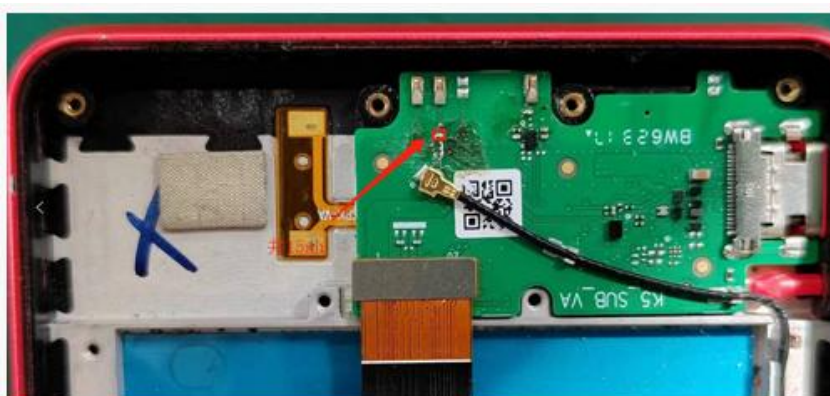
一. The Mobilephone picture picture and the antenna finished picture.



antenna finished picture



Mobile phone



信号路: 并15NH/串0Ω

tuner逻辑如下:

RF1: 0Ω--GSM900/DCS1800/PCS1900  
WCDMA:W1/W2/W4/W8  
FDD:B1/B2/B3/B4/B7/B8/B9/B25  
TDD:B34/B38/B39/40/41  
RF2: 3.3NH--GSM850  
WCDMA:W5  
FDD:B5/B18/B19/B20/B26  
RF3:7.5NH--FDD:B13  
RF4:12NH--FDD:B12/B17/B28

tuner:

antenna matching



## Test System

SATIMO, Agilent E5071C, Anristu MT8820C





二、

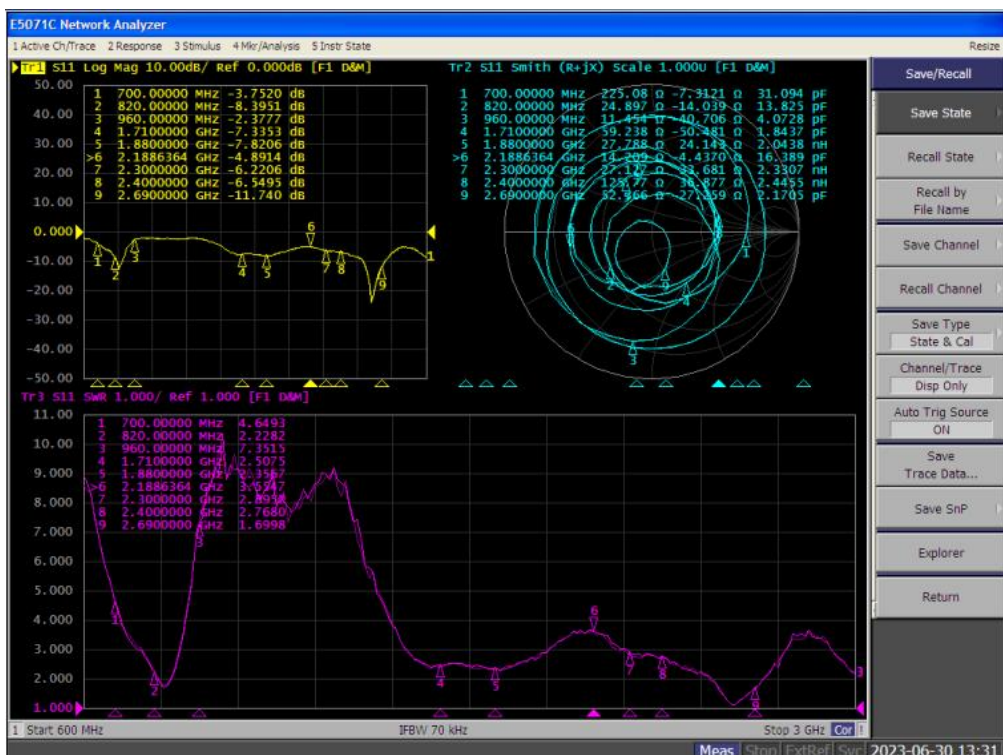
Antenna passive parameters

Main Antenna Return Loss and VSW

LTE-RF1

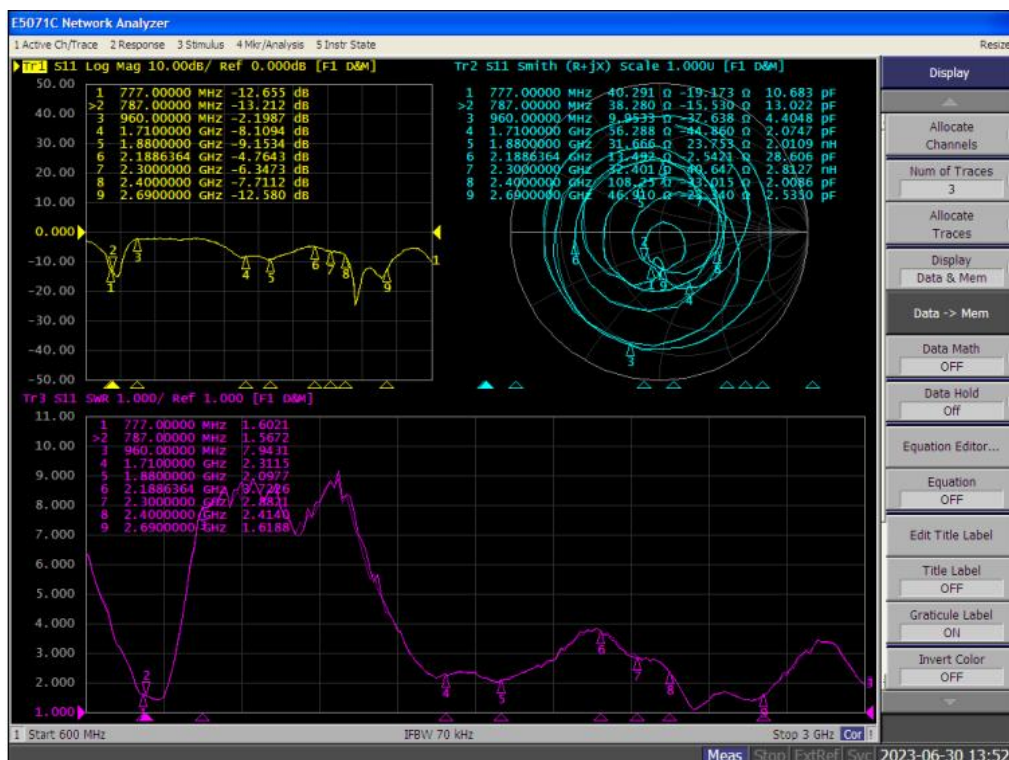


LTE-RF2

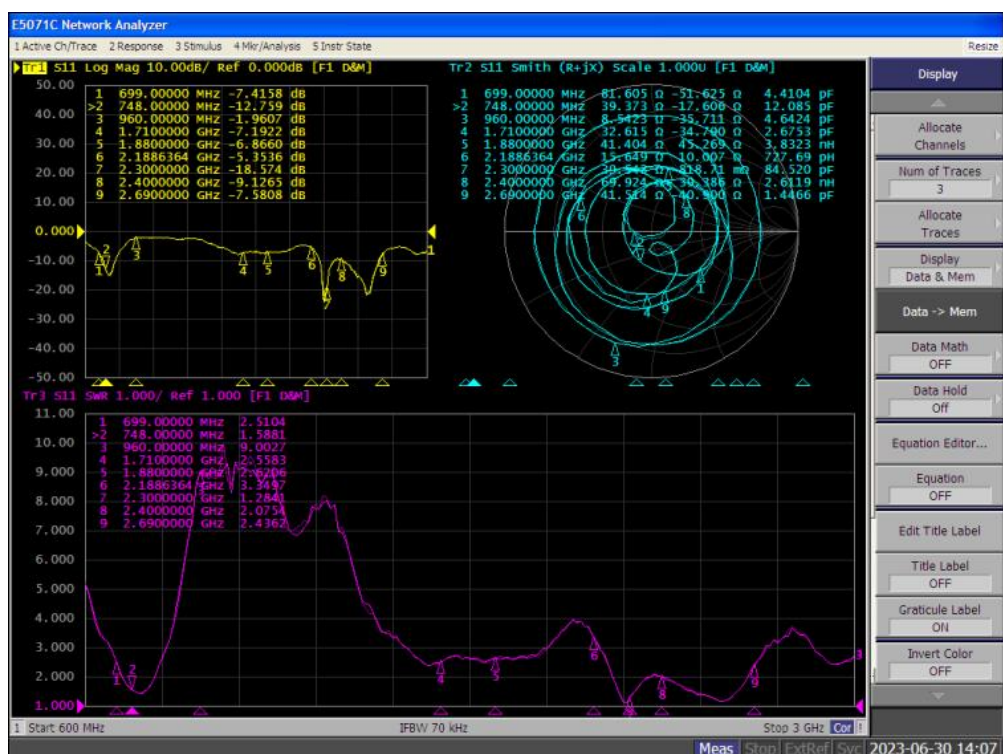




LTE-RF3



LTE-RF4

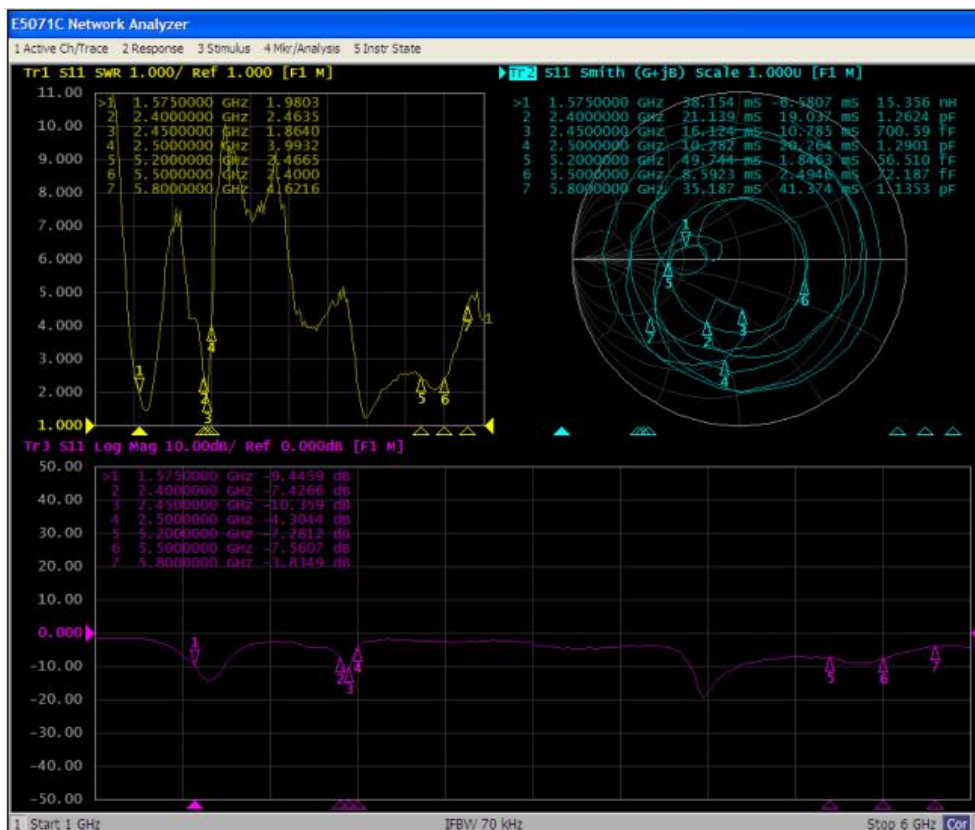




## DIV Antenna Return Loss and VSW



## WIFI/GPS Antenna Return Loss and VSW





### 3, Gain、Efficiency test

#### 3.1 LTE

| Frequen<br>cy | Efficien<br>cy | Gain. d<br>Bi | Frequen<br>cy | Efficien<br>cy | Gain. d<br>Bi | Frequen<br>cy | Efficien<br>cy | Gain. d<br>Bi |
|---------------|----------------|---------------|---------------|----------------|---------------|---------------|----------------|---------------|
| 680MHz        | 28%            | -1.73         | 820MHz        | 52%            | 1.69          | 980MHz        | 34%            | -0.38         |
| 686MHz        | 30%            | -1.23         | 825MHz        | 54%            | 1.97          | 990MHz        | 31%            | -0.96         |
| 692MHz        | 32%            | -0.88         | 830MHz        | 54%            | 1.77          | 1000MHz       | 27%            | -1.66         |
| 698MHz        | 32%            | -1.04         | 835MHz        | 55%            | 1.79          | 1700MHz       | 37%            | -0.95         |
| 704MHz        | 31%            | -1.01         | 840MHz        | 54%            | 1.73          | 1750MHz       | 37%            | -0.96         |
| 710MHz        | 34%            | -0.48         | 845MHz        | 52%            | 1.44          | 1800MHz       | 38%            | -0.54         |
| 716MHz        | 36%            | -0.15         | 850MHz        | 53%            | 1.62          | 1850MHz       | 38%            | 0.01          |
| 722MHz        | 36%            | -0.25         | 855MHz        | 53%            | 1.67          | 1900MHz       | 40%            | 0.44          |
| 728MHz        | 36%            | -0.24         | 860MHz        | 52%            | 1.52          | 1950MHz       | 42%            | 0.94          |
| 734MHz        | 37%            | 0.04          | 865MHz        | 51%            | 1.49          | 2000MHz       | 40%            | 0.88          |
| 740MHz        | 40%            | 0.4           | 870MHz        | 48%            | 1.26          | 2050MHz       | 35%            | 0.63          |
| 746MHz        | 41%            | 0.95          | 875MHz        | 47%            | 1.04          | 2100MHz       | 33%            | 0.52          |
| 752MHz        | 41%            | 0.87          | 880MHz        | 44%            | 0.85          | 2150MHz       | 34%            | 0.7           |
| 758MHz        | 42%            | 0.93          | 885MHz        | 41%            | 0.53          | 2200MHz       | 31%            | -0.07         |
| 764MHz        | 46%            | 1.57          | 890MHz        | 40%            | 0.44          | 2250MHz       | 30%            | -0.05         |
| 770MHz        | 46%            | 1.66          | 895MHz        | 37%            | 0.12          | 2300MHz       | 32%            | 0.43          |
| 776MHz        | 47%            | 1.88          | 900MHz        | 36%            | 0.14          | 2350MHz       | 36%            | 0.83          |
| 782MHz        | 47%            | 1.86          | 910MHz        | 34%            | -0.41         | 2400MHz       | 37%            | 0.75          |
| 788MHz        | 49%            | 2.09          | 920MHz        | 39%            | 0.72          | 2450MHz       | 38%            | 0.75          |
| 794MHz        | 49%            | 2.28          | 930MHz        | 42%            | 0.39          | 2500MHz       | 41%            | 0.75          |
| 800MHz        | 47%            | 1.91          | 940MHz        | 42%            | 0.4           | 2550MHz       | 42%            | 0.78          |
| 805MHz        | 48%            | 1.46          | 950MHz        | 42%            | 0.59          | 2600MHz       | 38%            | -0.19         |
| 810MHz        | 50%            | 1.66          | 960MHz        | 40%            | 0.91          | 2650MHz       | 34%            | -0.96         |
| 815MHz        | 48%            | 1.33          | 970MHz        | 36%            | -0.2          | 2700MHz       | 24%            | -2.3          |



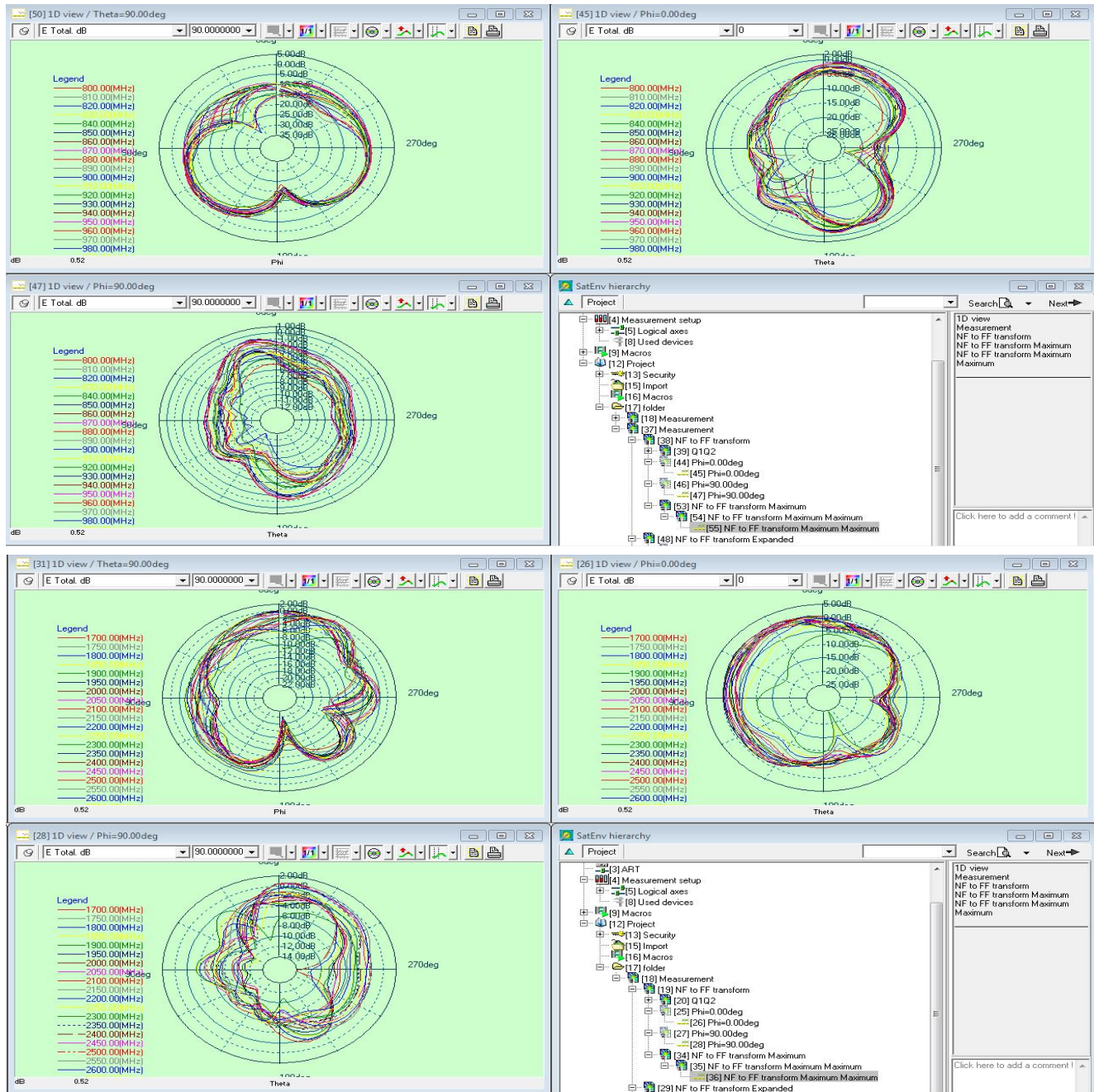
WIFI/GPS Gain、Efficiency test

| GPS Efficiency |            |           | wifi2.4G Efficiency |            |           | wifi5.8G Efficiency |            |           |
|----------------|------------|-----------|---------------------|------------|-----------|---------------------|------------|-----------|
| Frequency      | Efficiency | Gain. dBi | Frequency           | Efficiency | Gain. dBi | Frequency           | Efficiency | Gain. dBi |
| 1500MHz        | 39%        | 0.75      | 2400MHz             | 38%        | 0.84      | 5100MHz             | 39%        | 2.56      |
| 1505MHz        | 40%        | 0.82      | 2405MHz             | 38%        | 0.66      | 5140MHz             | 41%        | 2.82      |
| 1510MHz        | 40%        | 0.79      | 2410MHz             | 38%        | 0.76      | 5180MHz             | 37%        | 2.2       |
| 1515MHz        | 40%        | 0.83      | 2415MHz             | 37%        | 0.45      | 5220MHz             | 38%        | 2.2       |
| 1520MHz        | 38%        | 0.65      | 2420MHz             | 38%        | 0.64      | 5260MHz             | 33%        | 1.38      |
| 1525MHz        | 41%        | 0.84      | 2425MHz             | 37%        | 0.68      | 5300MHz             | 31%        | 0.98      |
| 1530MHz        | 40%        | 0.84      | 2430MHz             | 37%        | 0.42      | 5340MHz             | 27%        | 0.1       |
| 1535MHz        | 42%        | 1.04      | 2435MHz             | 35%        | 0.4       | 5380MHz             | 26%        | -0.59     |
| 1540MHz        | 42%        | 0.95      | 2440MHz             | 34%        | 0.35      | 5420MHz             | 23%        | -0.94     |
| 1545MHz        | 41%        | 0.89      | 2445MHz             | 32%        | -0.09     | 5460MHz             | 23%        | -1.13     |
| 1550MHz        | 40%        | 0.87      | 2450MHz             | 32%        | -0.04     | 5500MHz             | 21%        | -1.46     |
| 1555MHz        | 40%        | 0.86      | 2455MHz             | 30%        | -0.31     | 5540MHz             | 22%        | -1.18     |
| 1560MHz        | 41%        | 0.93      | 2460MHz             | 29%        | -0.27     | 5580MHz             | 22%        | -1.26     |
| 1565MHz        | 41%        | 0.91      | 2465MHz             | 27%        | -0.69     | 5620MHz             | 22%        | -0.95     |
| 1570MHz        | 42%        | 0.98      | 2470MHz             | 25%        | -1.14     | 5660MHz             | 23%        | -0.49     |
| 1575MHz        | 41%        | 0.9       | 2475MHz             | 23%        | -1.3      | 5700MHz             | 27%        | 1.05      |
| 1580MHz        | 41%        | 0.87      | 2480MHz             | 22%        | -1.52     | 5740MHz             | 26%        | 0.5       |
| 1585MHz        | 41%        | 0.92      | 2485MHz             | 23%        | -1.47     | 5780MHz             | 31%        | 1.52      |
| 1590MHz        | 42%        | 0.9       | 2490MHz             | 22%        | -1.62     | 5820MHz             | 26%        | 0.11      |
| 1595MHz        | 42%        | 0.9       | 2495MHz             | 20%        | -1.96     | 5860MHz             | 28%        | 0.66      |
| 1600MHz        | 41%        | 0.85      | 2500MHz             | 18%        | -2.42     | 5900MHz             | 25%        | -0.12     |

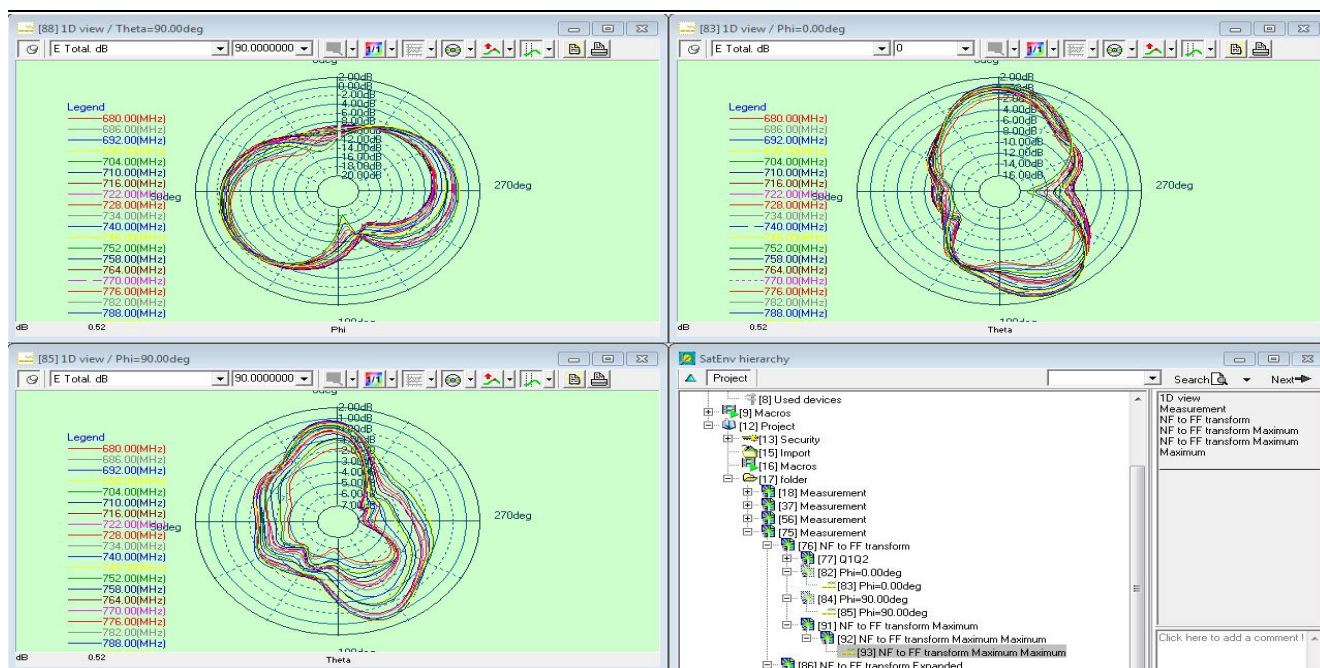


## 4、Directivity

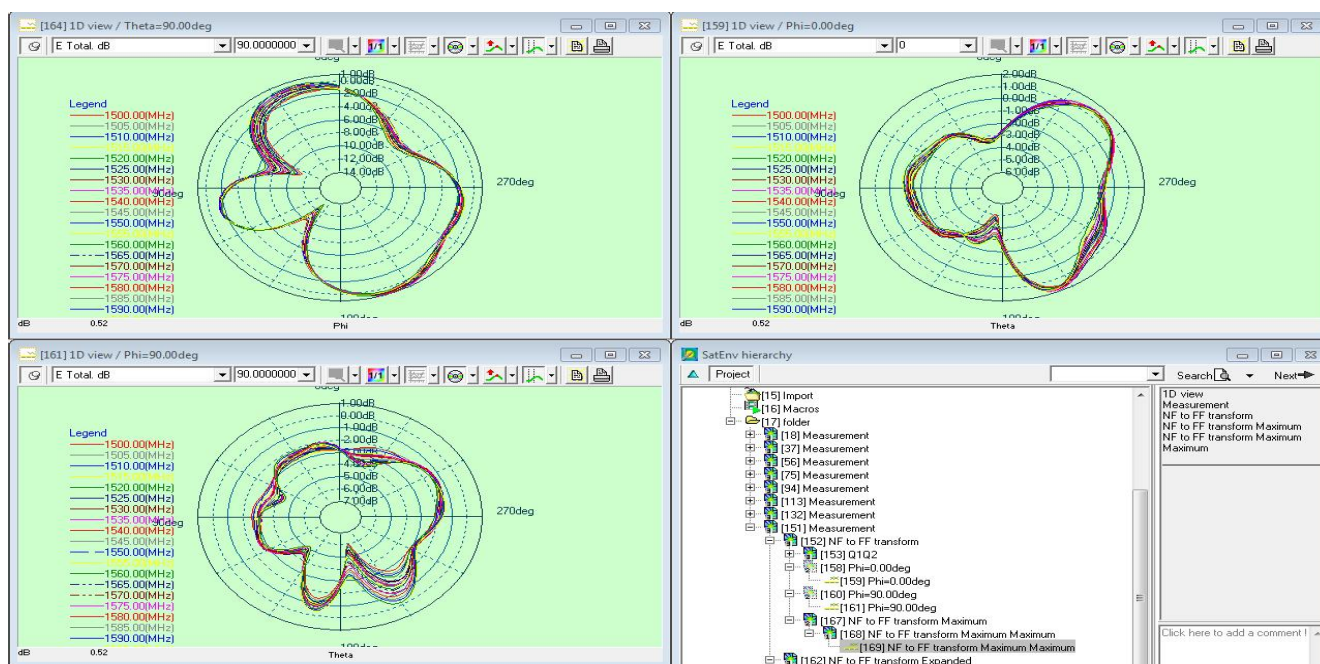
### 4.1 LTE

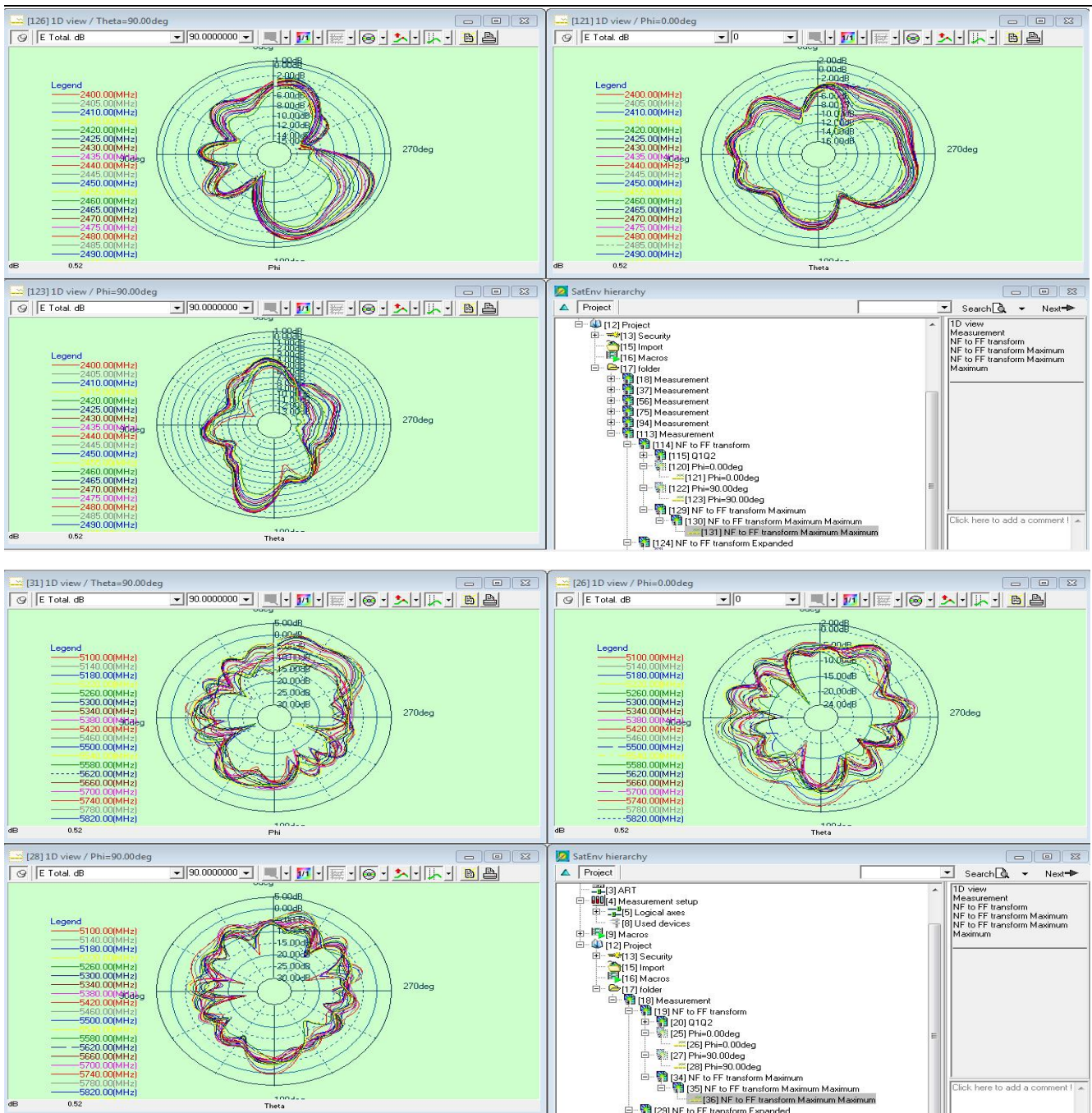






## 4.2 GPS/WIFI







三，OTA Test Report - LTE

Antenna Performance Table

| Antenna Performance Table |    |             |           |           |         |         |             |           |           |        |
|---------------------------|----|-------------|-----------|-----------|---------|---------|-------------|-----------|-----------|--------|
|                           |    | Channel No. | TRP (dBm) | TIS (dBm) |         |         | Channel No. | TRP (dBm) | TIS (dBm) |        |
| WCDMA                     | W1 | L           | 18.8      |           | LTE:FDD | B12     | L           | 15.66     |           |        |
|                           |    | M           | 19.18     |           |         |         | M           | 16.08     |           |        |
|                           |    | H           | 18.79     | -108.02   |         |         | H           | 16.6      | -91.08    |        |
|                           | W2 | L           | 19.15     |           |         | B13     | L           | 17.07     |           |        |
|                           |    | M           | 19.05     |           |         |         | M           | 16.78     |           |        |
|                           |    | H           | 18.9      | -105.45   |         |         | H           | 17        | -94.05    |        |
|                           | W4 | L           | 18.34     |           |         | B17     | L           | 15.77     |           |        |
|                           |    | M           | 18.07     |           |         |         | M           | 16.14     |           |        |
|                           |    | H           | 18.3      | -105.1    |         |         | H           | 16.36     | -91.81    |        |
|                           | W5 | L           | 18.67     |           |         | B18     | L           | 17.73     |           |        |
|                           |    | M           | 17.8      |           |         |         | M           | 18.39     |           |        |
|                           |    | H           | 17.93     | -104.05   |         |         | H           | 18.89     | -93.28    |        |
|                           | W8 | L           | 20.12     |           |         | B19     | L           | 18.1      |           |        |
|                           |    | M           | 19.34     |           |         |         | M           | 17.48     |           |        |
|                           |    | H           | 18.25     | -104.25   |         |         | H           | 18.2      | -92.91    |        |
| LTE:FDD                   | B1 | L           | 17.7      |           | LTE:FDD | B20     | L           | 18.25     |           |        |
|                           |    | M           | 18.19     |           |         |         | M           | 17.16     |           |        |
|                           |    | H           | 18.43     | -96.79    |         |         | H           | 18.43     | -93.43    |        |
|                           | B2 | L           | 16.79     |           |         | B25     | L           | 16.83     |           |        |
|                           |    | M           | 16.9      |           |         |         | M           | 17.28     |           |        |
|                           |    | H           | 18.83     | -94.78    |         |         | H           | 17.6      | -97.8     |        |
|                           | B3 | L           | 16.9      |           |         | B26     | L           | 16.73     |           |        |
|                           |    | M           | 16.76     |           |         |         | M           | 17.91     |           |        |
|                           |    | H           | 16.73     | -94.87    |         |         | H           | 17.18     | -93.41    |        |
|                           | B4 | L           | 17.1      |           |         | LTE:FDD | B28         | L         | 15.73     |        |
|                           |    | M           | 17.39     |           |         |         |             | M         | 16.31     |        |
|                           |    | H           | 17.19     | -94.1     |         |         |             | H         | 16.79     | -91.31 |
| LTE:FDD                   | B5 | L           | 17.68     |           | B34     |         | L           | 17.36     |           |        |
|                           |    | M           | 17.35     |           |         |         | M           | 17.93     |           |        |
|                           |    | H           | 17.25     | -93.35    |         |         | H           | 17.48     | -94.18    |        |
|                           | B7 | L           | 17.1      |           | B38     |         | L           | 17.84     |           |        |
|                           |    | M           | 17.35     |           |         |         | M           | 17.22     |           |        |
|                           |    | H           | 16.97     | -92.01    |         |         | H           | 17.23     | -92.93    |        |
|                           | B8 | L           | 18.7      |           | B39     |         | L           | 17.61     |           |        |
|                           |    | M           | 18.26     |           |         |         | M           | 17.38     |           |        |
|                           |    | H           | 17.05     | -92.97    |         |         | H           | 17.49     | -92.71    |        |
| B9                        | L  | 17.33       |           | B40       | L       | 17.45   |             |           |           |        |
|                           | M  | 17.39       |           |           | M       | 17.81   |             |           |           |        |
|                           | H  | 17.18       | -92.69    |           | H       | 18.67   | -92.37      |           |           |        |
|                           |    |             |           |           |         | B41     | L           | 18.35     |           |        |
|                           |    |             |           |           |         |         | M           | 18        |           |        |
|                           |    |             |           |           |         |         | H           | 17.1      | -93.13    |        |



WIFI- Active data

| Antenna Performance Table |             |             |              |        |                     |
|---------------------------|-------------|-------------|--------------|--------|---------------------|
|                           |             | Channel No. | TRP<br>(dBm) |        | TIS (dBm)           |
| WIFI                      | WIFI-2.4G-B | 1           | 13.74        |        | 802.11b :<br>11MBps |
|                           |             | 7           | 13.66        |        |                     |
|                           |             | 13          | 14.68        | -81.97 |                     |
|                           | WIFI-5G-A   | 36          | 13.56        |        | 802.11g :<br>54MBps |
|                           |             | 64          | 13.71        |        |                     |
|                           |             | 149         | 14.54        | -68.67 |                     |
|                           |             |             |              |        |                     |
|                           |             |             |              |        |                     |
|                           |             |             |              |        |                     |
|                           |             |             |              |        |                     |
|                           |             |             |              |        |                     |
|                           |             |             |              |        |                     |

#### 四、

## Antenna assembly drawing

