# Sample Acknowledgement

Shenzhen Sanhao Wireless Communication Co., Ltd.

| | | | |
|---|---|---|---|
| client | Billion Road | | |
| Customer Model | **T1** | | |
| Material Code | **YD-T1** | | |
| Three-in-one antenna coding | **YD-T1-03** | | |
| Edition | **T:A** | | |
| Production Date | **2024.08.01** | | |
| Prepare RF | Review Structure | Review | Approval/Stamp |
| Zhu Kun | Guan Bingkun | Li Fulun | Zhou Wu |
| Customer confirmation signature: | | | |

Table of contents

1. Basic information and pictures of the project:

1.1 Basic information of the project

| | |
|---|---|
| Machine type | flat |
| Antenna Material | FPC |
| Antenna frequency band | GPS/BT/WIFI |
| Operating frequency | 1550-1600MHz, 2400-2500MHz, 5150-5850MHz |

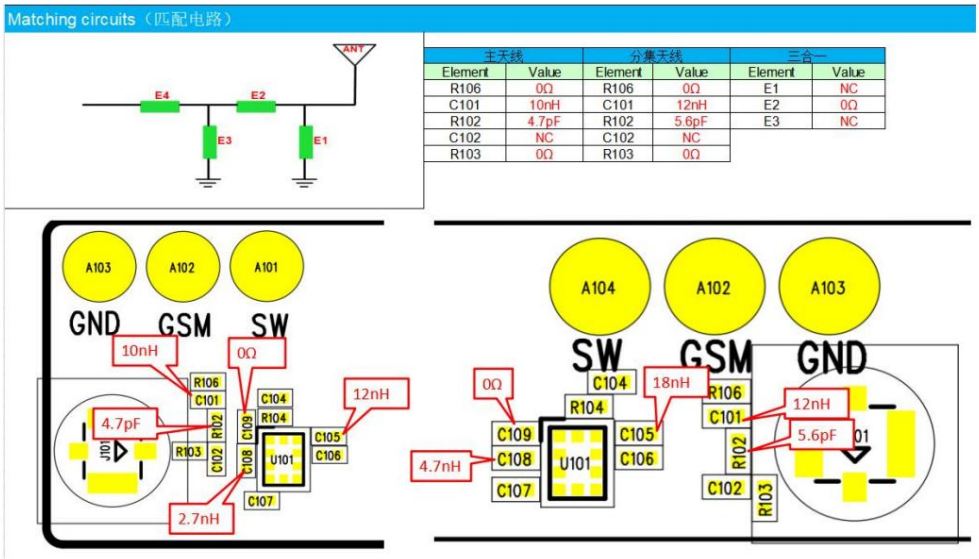
1.2 Tablet appearance and antenna sample picture

2. Electrical properties

2.1 Electrical performance items

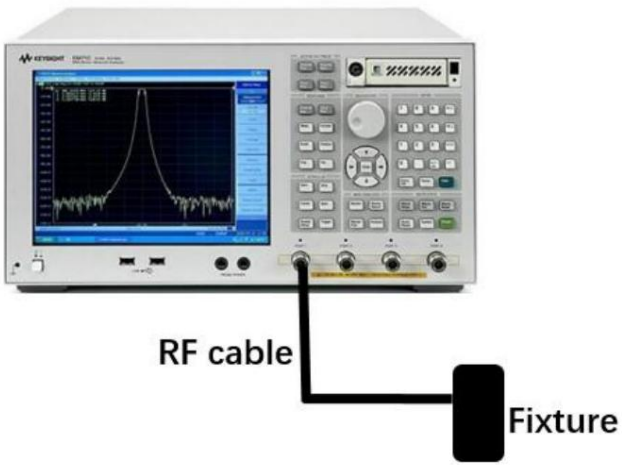
| | | |
|---|---|---|
| Passive Test | S11 | VSWR/R.L/Simth Chart |
| | S21 | Isolation |
| | S21 | Effi./Gain |
| Active Test | TRP | Total Radiated Power |
| | TIS | Total Istropic Sensitivity |

2.2 Antenna Matching Circuit

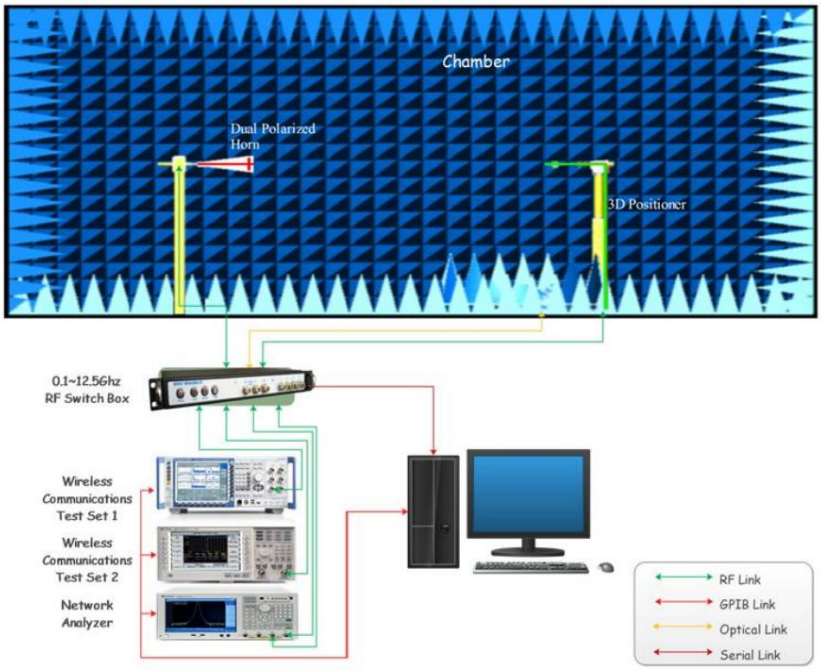



2.3 Test methods and test equipment

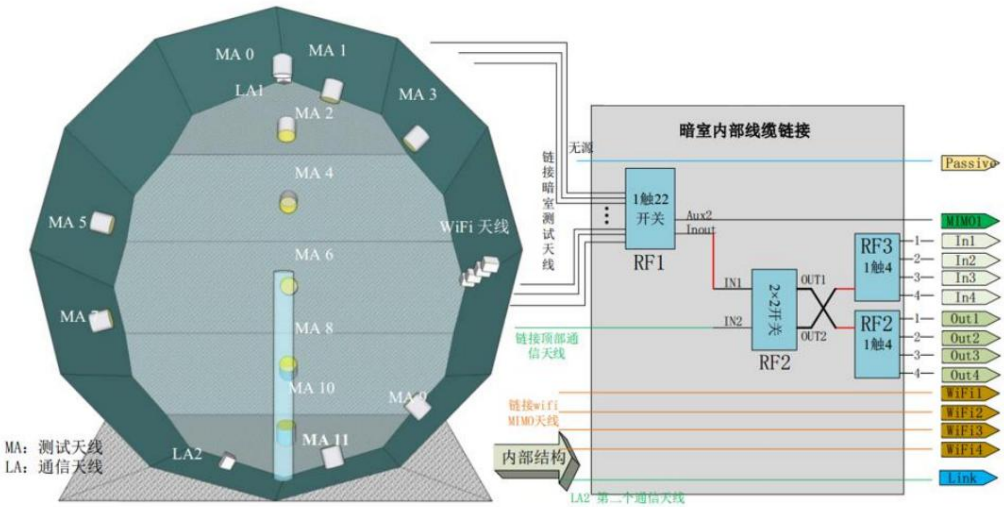
2.3.1 S11 test



## 2.3.2 Gain/Efficiency (Effi./Gain) & Active (Trp/Tis)

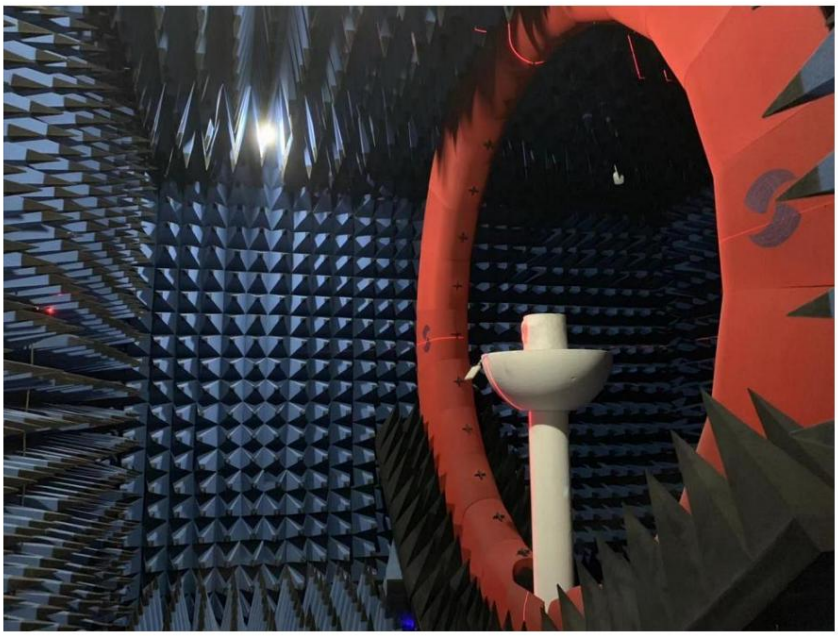



Single probe measurement system




Multi-probe measurement system

### 2.3.3 Test darkroom images

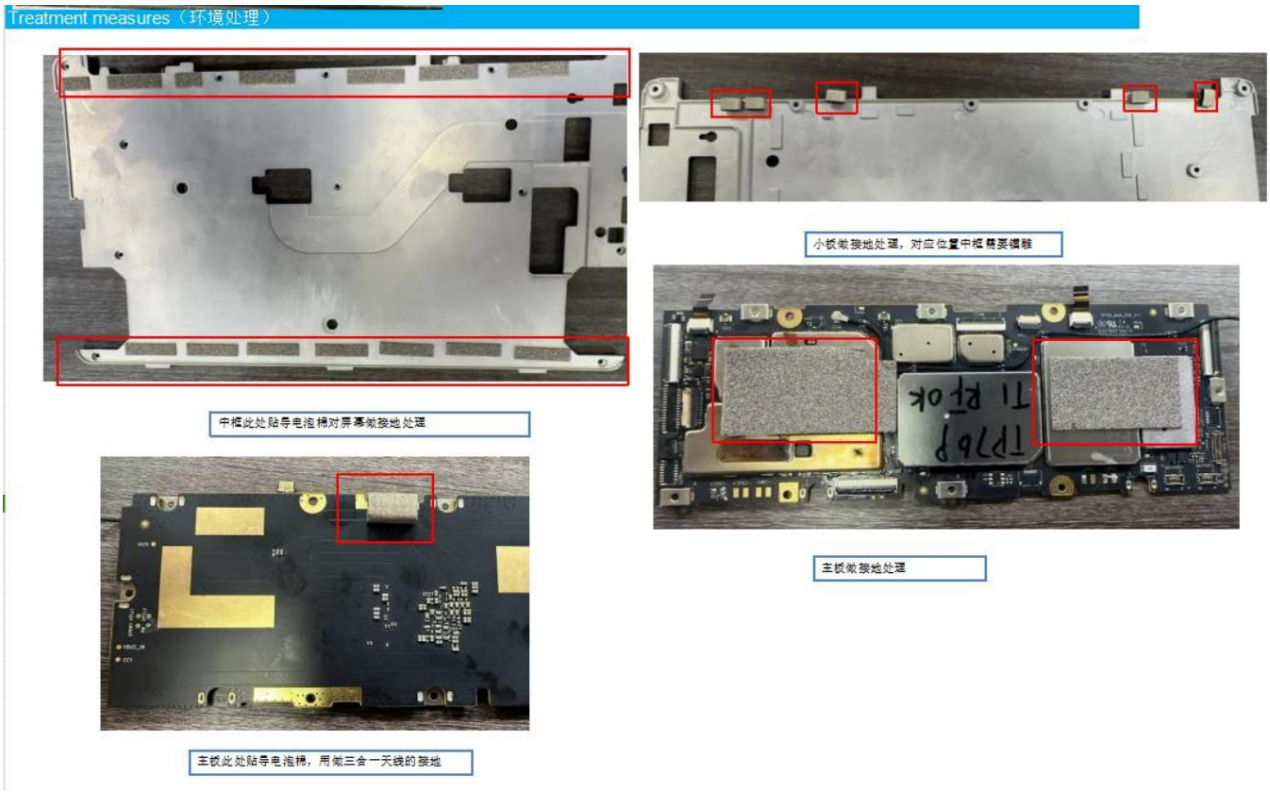


Internal diagram of multi-probe microwave darkroom system

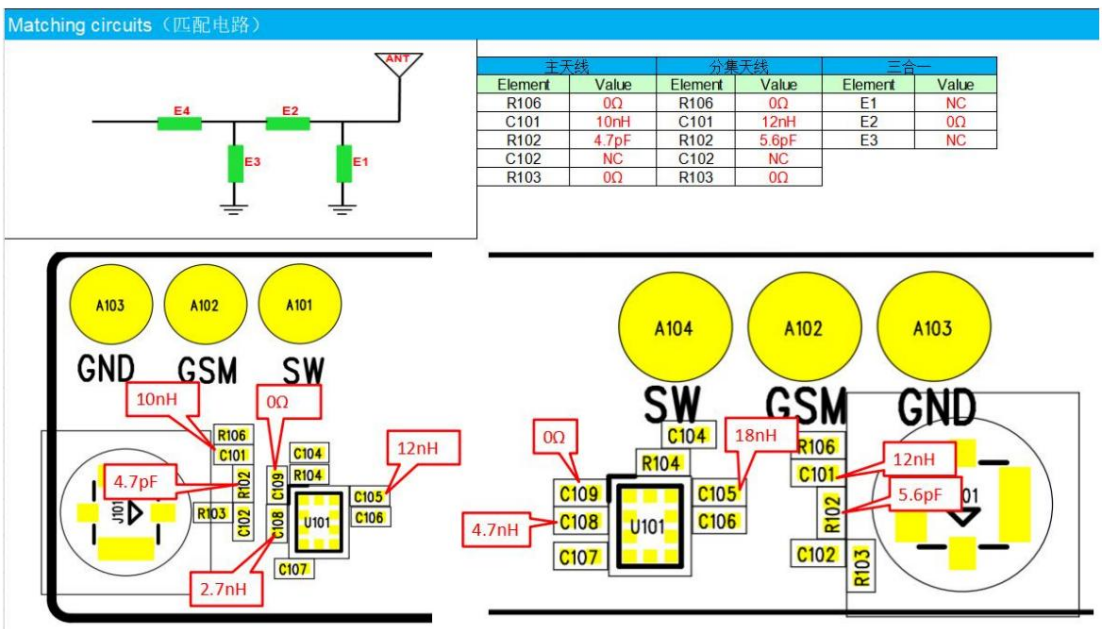

External view of microwave darkroom (darkroom + cabinet equipment)

3. Whole machine environment processing and antenna matching circuit

3.1 Machine environment processing



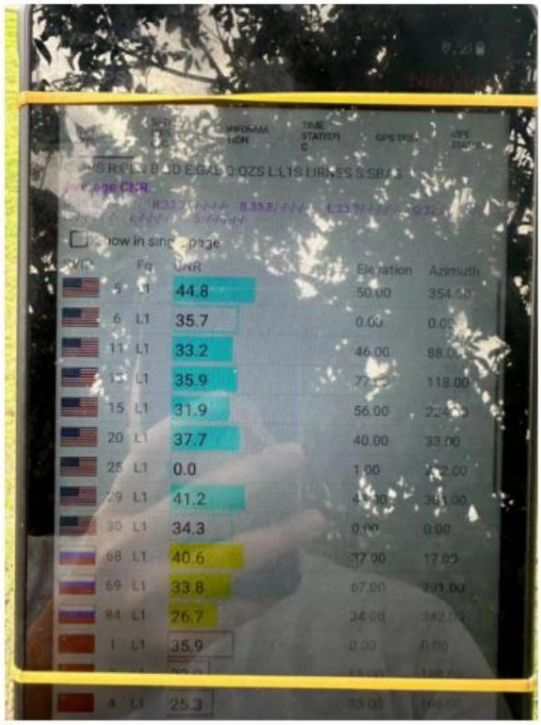

3.2 Antenna Matching Circuit




| 主天线 | | 分集天线 | | 三合一 | |
|---|---|---|---|---|---|
| Element | Value | Element | Value | Element | Value |
| R106 | 0Ω | R106 | 0Ω | E1 | NC |
| C101 | 10nH | C101 | 12nH | E2 | 0Ω |
| R102 | 4.7pF | R102 | 5.6pF | E3 | NC |
| C102 | NC | C102 | NC | | |
| R103 | 0Ω | R103 | 0Ω | | |

# 4. Test Data

## 4.1 GPS/WIFI/BT test



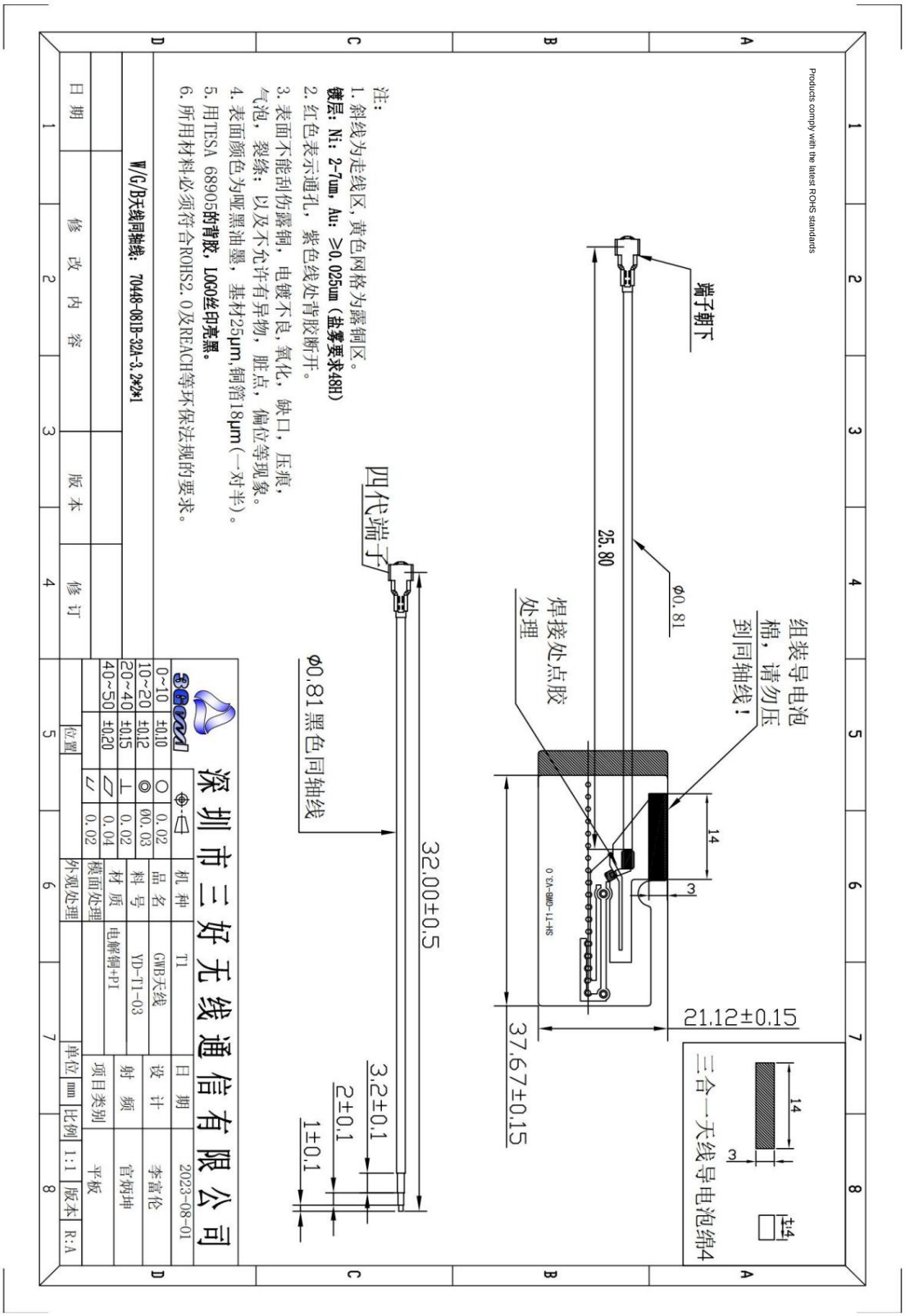

| | CH | TRP | TIS |
|---|---|---|---|
| WIFI-B | 1 | 12.35 | -80.37 |
| | 7 | 12.34 | -80.34 |
| | 13 | 12.45 | -80.36 |
| WIFI-A | 36 | 11.02 | -70.24 |
| | 149 | 11.23 | -70.34 |
| | 165 | 11.31 | -70.28 |
| BT | 0 | 8.35 | -87.36 |
| | 39 | 8.45 | -87.24 |
| | 78 | 8.92 | -87.33 |

### 4.2 Test Conclusion

The indicators meet the requirements of GPS/WIFI/BT and the actual test performance is OK. Note: This antenna is only suitable for debugging prototypes. Any changes in the motherboard version or RF materials, or changes in mobile phone accessories (such as microphones, screens, speakers, motors, etc.) must be tested and verified by our company before use.

**5.** Engineering drawings

5.1 Three-in-one antenna



# T1 调试报告

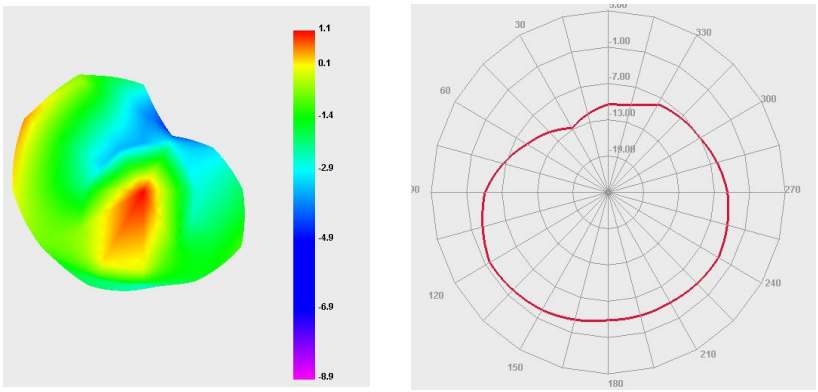
## Test data（测试数据）

## GPS/WIFI Field test（GPS/WIFI场测）

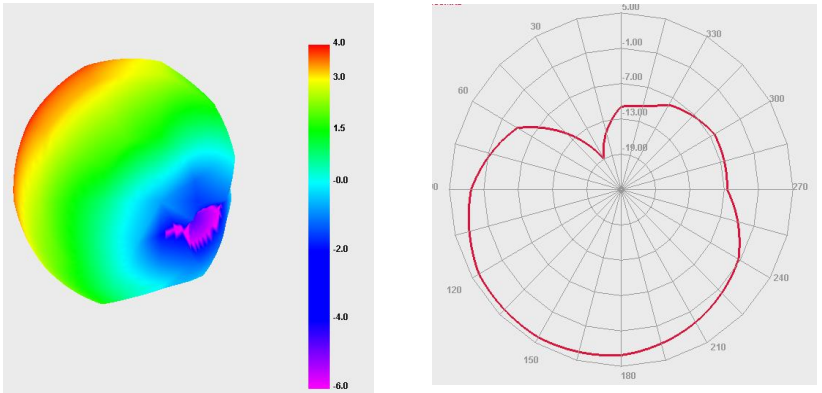
三合一天线

| Freq (MHz) | Effi (%) | Effi (dB) | Gain (dBi) | Freq (MHz) | Effi (%) | Effi (dB) | Gain (dBi) | Freq (MHz) | Effi (%) | Effi (dB) | Gain (dBi) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1550 | 41.96 | -3.77 | 0.2 | 5150 | 42.44 | -3.72 | 1.93 | 5500 | 45.35 | -3.43 | 3.86 |
| 1555 | 41.2 | -3.85 | 0.2 | 5160 | 41.62 | -3.81 | 1.8 | 5510 | 45.36 | -3.43 | 3.83 |
| 1560 | 42.62 | -3.7 | 0.44 | 5170 | 41.12 | -3.86 | 1.73 | 5520 | 46.4 | -3.33 | 3.83 |
| 1565 | 42.44 | -3.72 | 0.44 | 5180 | 40.56 | -3.92 | 1.66 | 5530 | 49.94 | -3.02 | 4.16 |
| 1570 | 41.59 | -3.81 | 0.43 | 5190 | 41.27 | -3.84 | 1.86 | 5540 | 51.71 | -2.86 | 4.19 |
| 1575 | 41.39 | -3.83 | 0.68 | 5200 | 40.99 | -3.87 | 1.74 | 5550 | 49.84 | -3.02 | 4.02 |
| 1580 | 40.88 | -3.89 | 0.89 | 5210 | 42.66 | -3.7 | 1.97 | 5560 | 48.58 | -3.14 | 3.71 |
| 1585 | 40.5 | -3.93 | 1.02 | 5220 | 42.43 | -3.72 | 1.98 | 5570 | 49.4 | -3.06 | 3.81 |
| 1590 | 38.22 | -4.18 | 0.85 | 5230 | 43.86 | -3.58 | 2.18 | 5580 | 50.98 | -2.93 | 3.94 |
| 1595 | 40.31 | -3.95 | 1.08 | 5240 | 42.03 | -3.76 | 2.09 | 5600 | 52.5 | -2.8 | 3.87 |
| 1600 | 38.73 | -4.12 | 1.03 | 5250 | 42.4 | -3.73 | 2.19 | 5610 | 50.36 | -2.98 | 3.75 |
| 2400 | 52.68 | -2.78 | 3.33 | 5260 | 43.19 | -3.65 | 2.47 | 5620 | 50.29 | -2.98 | 3.98 |
| 2410 | 41.92 | -3.78 | 2.02 | 5270 | 43.06 | -3.66 | 2.48 | 5630 | 50.03 | -3.01 | 4.06 |
| 2420 | 42.99 | -3.67 | 2.32 | 5280 | 43.69 | -3.6 | 2.69 | 5640 | 49.67 | -3.04 | 4.3 |
| 2430 | 43.77 | -3.59 | 2.54 | 5290 | 45.84 | -3.39 | 2.96 | 5650 | 49.48 | -3.06 | 4.44 |
| 2440 | 45.34 | -3.44 | 2.8 | 5300 | 43.08 | -3.66 | 2.93 | 5660 | 51.89 | -2.85 | 4.66 |
| 2450 | 47.91 | -3.2 | 3.09 | 5310 | 42.8 | -3.69 | 2.98 | 5670 | 50.18 | -3 | 4.76 |
| 2460 | 49.79 | -3.03 | 3.24 | 5320 | 45.54 | -3.42 | 3.5 | 5680 | 51.05 | -2.92 | 4.66 |
| 2470 | 51.02 | -2.92 | 3.38 | 5330 | 43.69 | -3.6 | 3.31 | 5690 | 50.08 | -3 | 4.62 |
| 2480 | 52.39 | -2.81 | 3.28 | 5340 | 45.69 | -3.4 | 3.66 | 5700 | 50.96 | -2.93 | 4.73 |
| 2490 | 52.44 | -2.8 | 3.39 | 5350 | 47.52 | -3.23 | 3.94 | 5710 | 50.56 | -2.96 | 4.59 |
| 2500 | 53.64 | -2.7 | 3.43 | 5360 | 45.61 | -3.41 | 3.89 | 5720 | 49.28 | -3.07 | 4.47 |
| | | | | 5370 | 44.9 | -3.48 | 3.93 | 5730 | 50.11 | -3 | 4.5 |
| | | | | 5380 | 45.89 | -3.38 | 4.03 | 5740 | 52.23 | -2.82 | 4.57 |
| | | | | 5390 | 43.61 | -3.6 | 3.89 | 5750 | 54.73 | -2.62 | 4.84 |
| | | | | 5400 | 50.6 | -2.96 | 4.52 | 5760 | 51.41 | -2.89 | 4.51 |
| | | | | 5410 | 49.32 | -3.07 | 4.49 | 5770 | 52.88 | -2.77 | 4.79 |
| | | | | 5420 | 49.78 | -3.03 | 4.53 | 5780 | 49.56 | -3.05 | 4.59 |
| | | | | 5430 | 49.23 | -3.08 | 4.44 | 5790 | 49.72 | -3.03 | 4.52 |
| | | | | 5440 | 48.86 | -3.11 | 4.45 | 5800 | 48.03 | -3.19 | 4.36 |
| | | | | 5450 | 49.13 | -3.09 | 4.46 | 5810 | 48.86 | -3.11 | 4.51 |
| | | | | 5460 | 49.2 | -3.08 | 4.35 | 5820 | 51.29 | -2.9 | 4.79 |
| | | | | 5470 | 48.43 | -3.15 | 4.24 | 5830 | 50.44 | -2.97 | 4.8 |
| | | | | 5480 | 45.77 | -3.39 | 3.94 | 5840 | 49.11 | -3.09 | 4.81 |
| | | | | 5490 | 46.45 | -3.33 | 4.04 | 5850 | 51.76 | -2.86 | 4.99 |

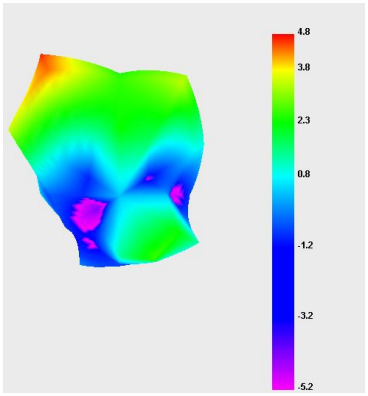
1575

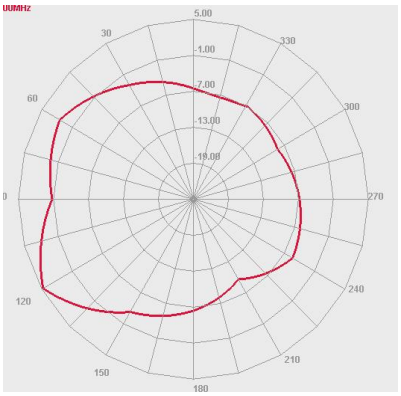



2450

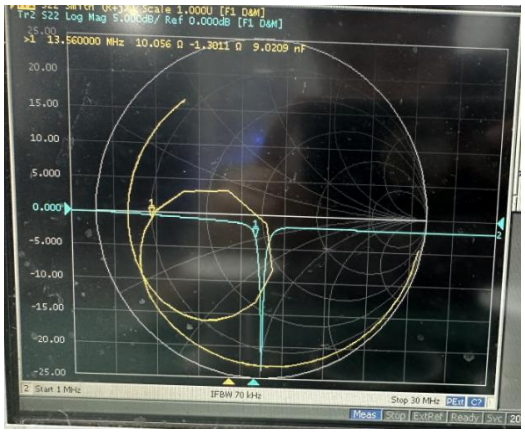


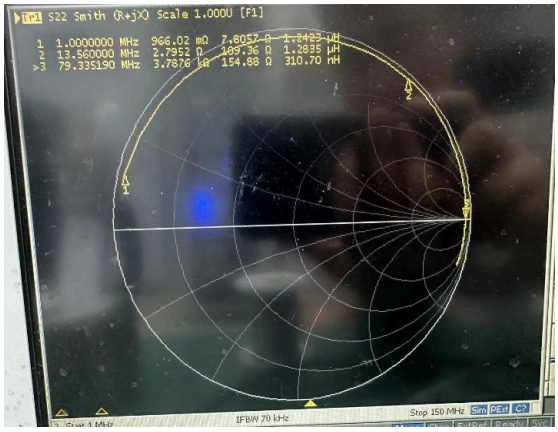
5550




## NFC test（NFC测试数据）




## The end