



Shenzhen Qianmu Communication Technology Co., Ltd.

Focusing on antenna solutions, design, and production

Customer: Shenzhen Guantian Technology Co., Ltd Technology

Project: GT22 Smart watch

Date: March 29, 2023

Version: A1

RF Engineer: Zhangweijin



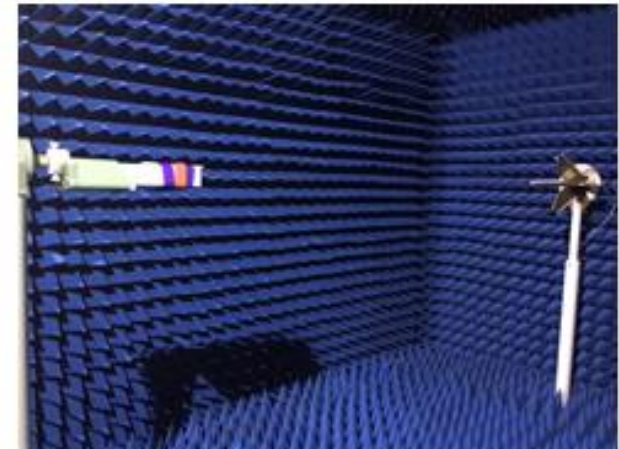
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# testing environment

|                 | Test items                                                     | Device                                                                                                                                                |
|-----------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. S-parameter  | 1. Return Loss<br>2. VSWR                                      | Network analyzer: Agilent E5071B<br>HP 8753D                                                                                                          |
| 2. Active test  | 1. TRP<br>2. TIS<br>3. Frequency error<br>4. Screen off and on | 1. Darkroom: ETS 7x4x3 m (3D) Chamber<br>ETS 5x3x3 m (3D) Chamber<br>2. Comprehensive test instrument:<br>Agilent 8960 E5515B × 2<br>StarPoint SP6011 |
| 3. Passive test | 1. Gain<br>2. Efficiency                                       | 1. Darkroom: ETS 7x4x3 m (3D) Chamber<br>ETS 5x3x3 m (3D) Chamber<br>2. Network analyzer: Agilent E5071B                                              |





# Explanation of previous debugging records

| Date       | Version | Debugging Record Description        |
|------------|---------|-------------------------------------|
| 2023-03-29 | A1      | Electronic cable, debugging machine |

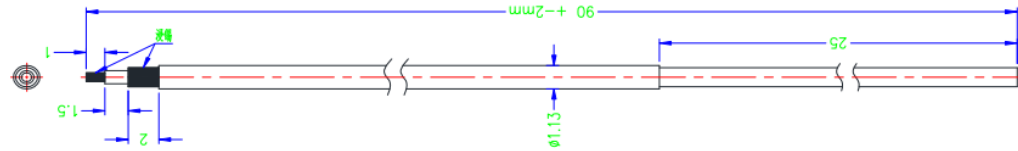


# Complete machine debugging instructions

|                     |                 |    |        |                                |      |                   |    |
|---------------------|-----------------|----|--------|--------------------------------|------|-------------------|----|
| Model               | GT22 smartwatch |    |        |                                |      |                   |    |
| Version             | A1              |    |        |                                |      |                   |    |
| Antenna<br>Overview | BT Antenna      | BT | 2.4GHz | FPC sample                     | PIFA | Shell<br>material | NA |
| Prototype<br>status |                 |    |        | environmen<br>tal<br>treatment |      |                   |    |



# ANT Specification



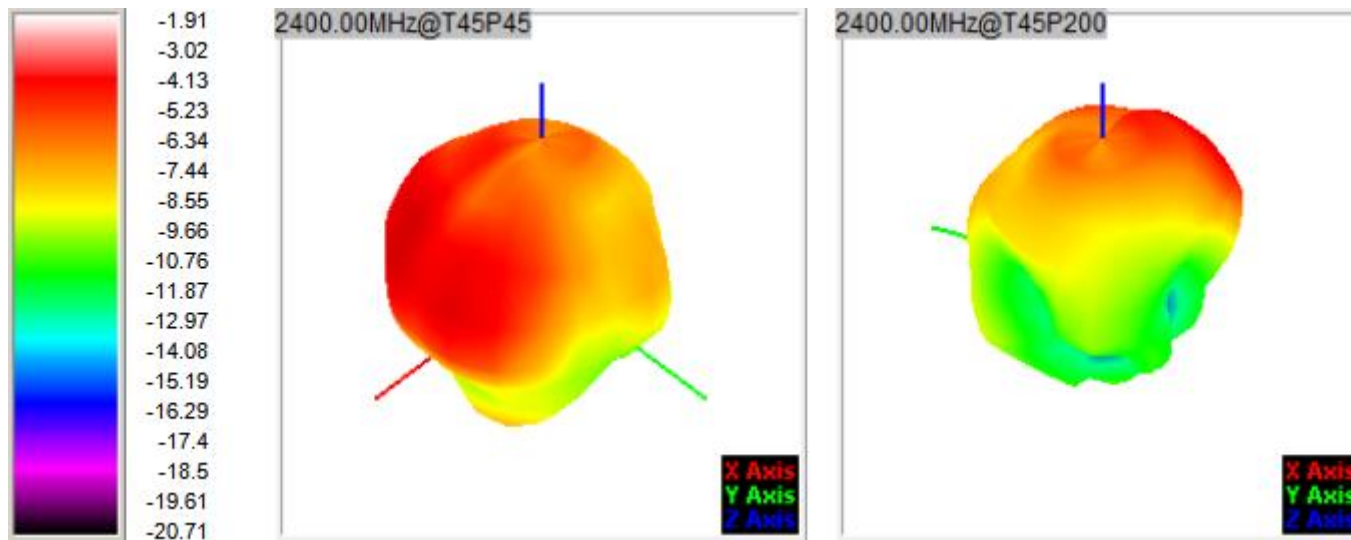


## Antenna passive efficiency gain data

| Frequency ID               | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     |
|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Frequency (MHz)            | 2400.0 | 2410.0 | 2420.0 | 2430.0 | 2440.0 | 2450.0 | 2460.0 | 2470.0 | 2480.0 | 2490.0 | 2500.0 |
| Point Values               |        |        |        |        |        |        |        |        |        |        |        |
| Ant. Port Input Pwr. (dBm) | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   |
| Tot. Rad. Pwr. (dBm)       | -8.16  | -8.26  | -8.09  | -8.12  | -7.99  | -7.91  | -7.89  | -8.26  | -8.28  | -8.33  | -8.31  |
| Peak EIRP (dBm)            | -1.91  | -2.04  | -1.93  | -2.07  | -2.07  | -2.11  | -2.28  | -2.84  | -2.94  | -2.93  | -2.84  |
| Directivity (dBi)          | 6.25   | 6.22   | 6.16   | 6.05   | 5.92   | 5.80   | 5.61   | 5.42   | 5.34   | 5.40   | 5.46   |
| Efficiency (dB)            | -8.16  | -8.26  | -8.09  | -8.12  | -7.99  | -7.91  | -7.89  | -8.26  | -8.28  | -8.33  | -8.31  |
| Efficiency (%)             | 15.30  | 14.90  | 15.50  | 15.40  | 15.90  | 16.20  | 16.30  | 14.90  | 14.90  | 14.70  | 14.80  |
| Gain (dBi)                 | -1.91  | -2.04  | -1.93  | -2.07  | -2.07  | -2.11  | -2.28  | -2.84  | -2.94  | -2.93  | -2.84  |
| NHPRP $\pm\pi/4$ (dBm)     | -10.21 | -10.28 | -10.10 | -10.13 | -10.00 | -9.91  | -9.88  | -10.29 | -10.36 | -10.45 | -10.46 |
| NHPRP $\pm\pi/6$ (dBm)     | -12.24 | -12.29 | -12.09 | -12.10 | -11.95 | -11.84 | -11.82 | -12.23 | -12.32 | -12.41 | -12.40 |
| NHPRP $\pm\pi/8$ (dBm)     | -13.84 | -13.86 | -13.63 | -13.61 | -13.45 | -13.34 | -13.31 | -13.73 | -13.83 | -13.92 | -13.89 |
| Upper Hem. PRP (dBm)       | -9.40  | -9.49  | -9.32  | -9.36  | -9.23  | -9.18  | -9.19  | -9.59  | -9.64  | -9.71  | -9.69  |
| Lower Hem. PRP (dBm)       | -14.21 | -14.35 | -14.18 | -14.19 | -14.03 | -13.89 | -13.77 | -14.04 | -13.98 | -13.98 | -13.96 |
| Upper Hem. PRP (%)         | 11.48  | 11.25  | 11.70  | 11.59  | 11.93  | 12.09  | 12.06  | 10.98  | 10.86  | 10.68  | 10.75  |
| Lower Hem. PRP (%)         | 3.80   | 3.68   | 3.82   | 3.81   | 3.96   | 4.09   | 4.20   | 3.94   | 4.00   | 4.00   | 4.02   |

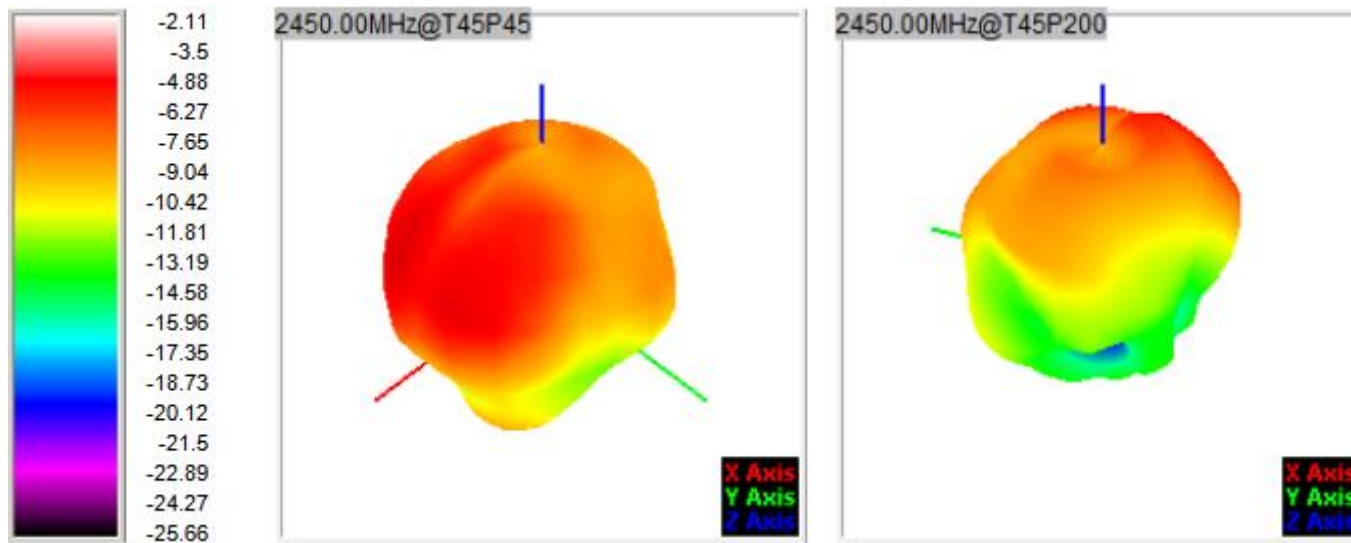


## Antenna pattern and apple pattern



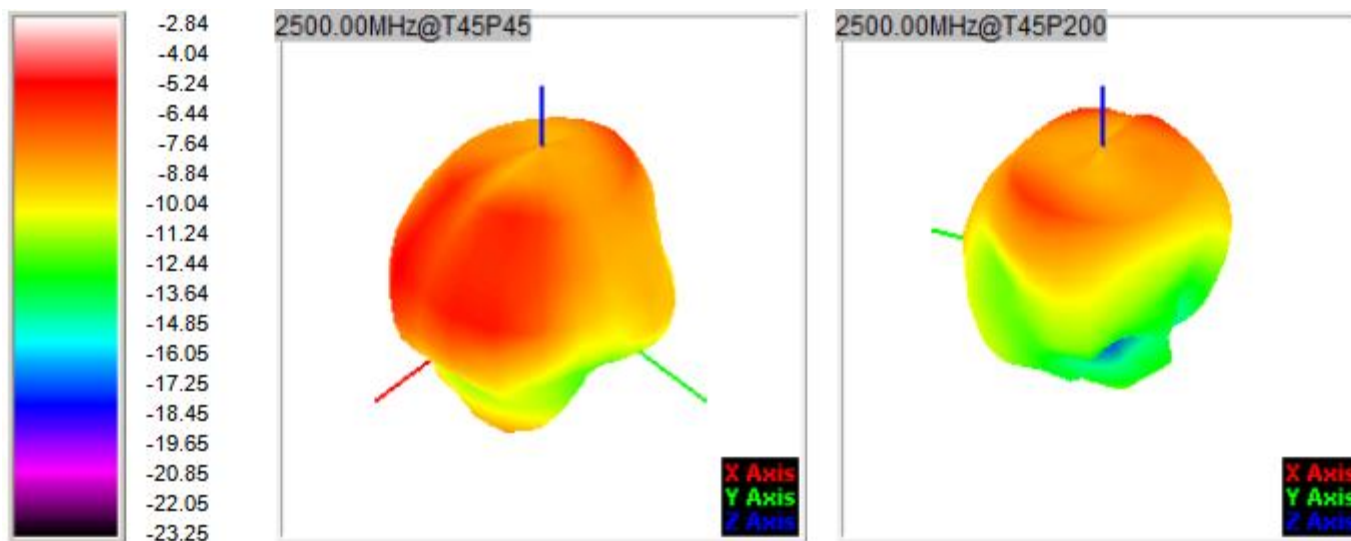


## Antenna pattern and apple pattern





## Antenna pattern and apple pattern





## Reminder Description

Reminder:

- 1、 This data is only for the data generated by the prototype provided by the customer and does not represent the final mass production status of the customer;
- 2、 Please carefully confirm the instructions for modifying the matching circuit and handling the environment in our company's report;
- 3、 Please cooperate with us to provide a trial production prototype for secondary verification before mass production; Please inform us in advance if there are any changes to materials, software updates, or environmental treatments;
- 4、 If the customer needs a third-party retest or sends the customer for testing, please go to our company for verification before sending the prototype; Prevent differences between the machine and the debugging machine;
- 5: Our company does not accept machine data and miscellaneous suggestion test data beyond our debugging, but we can refer to them, except for the certified darkroom. If there are differences in data, the debugging machine will prevail and the cause will be found.



Thank you!