

Product Number:TLT5412-M16QF27
Product Name:Mobile Phone Antenna

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M16QF27 antenna The Product Recognition Letter

| | | | |
|------------------------------|---------------------|---------------------|-----------------------|
| The Customer | yanghua | Band range | 2.4/5.8/GPS |
| Model | M16QF27 | Version | Latest version |
| Project code name | TLT 5412 | Approval | |
| RF Designer | Mao Hangzhou | RD Designer | Tang Chunzheng |
| Date of this | 2024-5-20 | Date of this | 2024-5-20 |
| Customer Information: | | | |

Metric

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1.Antenna parameters

This report mainly provides test conditions and results for various electrical and structural properties in devicetests,The antenna designed by TLT.

Electrical parameters

1.1.1 Electrical Performance Assessment

The band range of the antenna is 2400MHz-2500MHz and 5000MHz~5800MHz. below are the basic parameters of the electrical performance of the antenna. This is designed antenna and produced by Tian Lu Tong.

1.1.2 distribution circuit diagram

Use the original matching circuit diagram on the PCB board

1.2 Structural parameters

1.2.1 antenna assembly

Antennas generally consisted of plastic supports and hardware pieces.

1.2.2 can test the requirements

| Test item | description | Acceptance criteri e s |
|------------------------------------|---|--|
| 1. crytemperature test | temperature:-20℃ Time: 24 hours | The 1. had no obvious damage The 2. electrical performance meets the standard |
| The 2. high-temperature test | temperature.: 80℃ Time: 24 hours | The 1. had no obvious damage The 2. electrical performance meets the standard |
| 3. salt fog test | 5 ± 0.1% salt mist PH-value: 6.5-7.2 temperature: 35±1℃ Tim e: e:24 hours | 1.No color was changed 2.There are no obvious cracks in the appearance |
| 4. environmental adaptability test | Total value of Pb, Hg, Cr+6, Cd in packing materials is smaller thall 50PPM Pb, Hg, Cr+6, PBBs, PBDEs in components are smaller than 500PPM,Cd is smaller than 50PPM | |

2. The test

Antenna are installed in a customer provided phone for testing. describes the antenna in mobile) for the equipment (electrical performance test).

2.1 The VSWR test

2.1.1 Test the connection

Test VSWR order of device connections: Agilent E8753 network analyzer → test cable → customer-provided machine

2.1.2 voltage standing to wave ratio

The table below describes the values of the voltage resident wave ratio of the antenna at the two endpoints of the frequency band, involving drawings about the return impairment and resident wave ratio, please refer .

| | GPS | WIFI-2.4G | | WIFI-5.0G | |
|-----------------|--------|-----------|-------|-----------|-------|
| Frequency (MHz) | 1.575G | 2.4G | 2.48G | 5.15G | 5.85G |
| VSWR | 1.65 | 1.69 | 1.82 | 1.71 | 1.68 |
| Return Loss | -12.1 | -11.2 | -13.3 | -11.9 | -12.3 |

2.2 GAIN & EFFICIENCY

2.2.1 test environment

Skyway microwave dark chamber: The test frequency range from 800MHz to 6GHz, in a 50cm diameter spherical area, and the dark chamber is reflected less than-50 dB. from 800MHz—6GHz

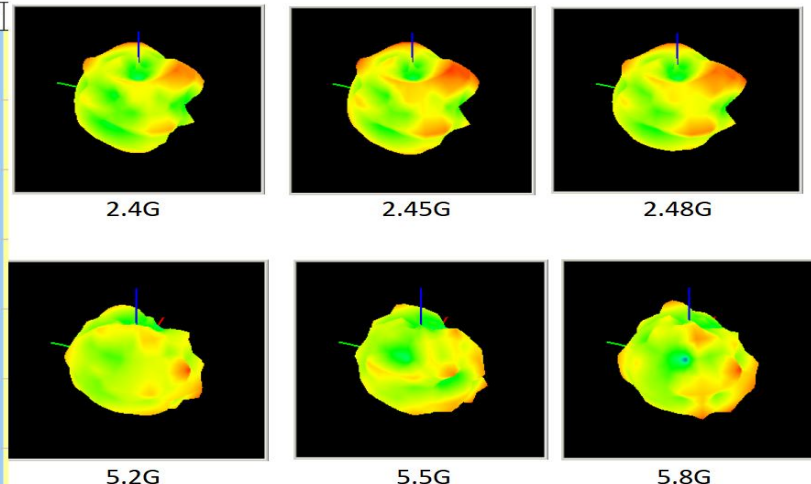
2.2.2 Test the equipment

Agilent 8960 (8753C) Wireless Communication Test Device, Dipole antenna, French Sa t imo Antenna Test System, Printer, etc.

WIFI 效率增益:

3D 苹果图

| Test Point ID | Freq. (MHz) | TRP (dBm) | Gain (dBi) | Directivity (dB) | Efficiency (%) | Efficiency (dB) |
|---------------|-------------|-----------|------------|------------------|----------------|-----------------|
| 1 | 2400.0 | 2400.00 | 0.67 | 4.85 | 38.2% | -4.18 |
| 2 | 2405.0 | 2405.00 | 0.10 | 4.81 | 39.8% | -4.01 |
| 3 | 2410.0 | 2410.00 | 1.08 | 4.74 | 43.2% | -3.64 |
| 4 | 2415.0 | 2415.00 | 0.96 | 4.75 | 41.8% | -3.79 |
| 5 | 2420.0 | 2420.00 | 0.11 | 4.77 | 34.2% | -4.66 |
| 6 | 2425.0 | 2425.00 | 0.47 | 4.69 | 37.9% | -4.22 |
| 7 | 2430.0 | 2430.00 | 1.25 | 4.67 | 45.4% | -3.43 |
| 8 | 2435.0 | 2435.00 | 0.79 | 4.72 | 40.5% | -3.93 |
| 9 | 2440.0 | 2440.00 | -0.01 | 4.74 | 33.5% | -4.75 |
| 10 | 2445.0 | 2445.00 | -0.15 | 4.74 | 32.4% | -4.89 |
| 11 | 2450.0 | 2450.00 | -0.40 | 4.76 | 45.5% | -3.36 |
| 12 | 2455.0 | 2455.00 | 0.58 | 4.83 | 37.6% | -4.25 |
| 13 | 2460.0 | 2460.00 | 1.78 | 4.85 | 49.4% | -3.07 |
| 14 | 2465.0 | 2465.00 | 0.39 | 4.83 | 36.0% | -4.44 |
| 15 | 2470.0 | 2470.00 | -0.61 | 4.86 | 38.4% | -4.27 |
| 16 | 2475.0 | 2475.00 | 0.20 | 4.92 | 33.7% | -4.72 |
| 17 | 2480.0 | 2480.00 | 1.02 | 4.98 | 40.2% | -3.96 |
| 18 | 2485.0 | 2485.00 | 1.03 | 4.96 | 40.5% | -3.93 |
| 19 | 2490.0 | 2490.00 | 0.94 | 4.96 | 39.6% | -4.03 |
| 20 | 2495.0 | 2495.00 | 1.19 | 5.00 | 41.6% | -3.81 |
| 21 | 2500.0 | 2500.00 | 1.18 | 5.12 | 40.4% | -3.93 |
| 22 | 5150.0 | 5150.00 | 0.35 | 4.68 | 36.9% | -4.33 |
| 23 | 5200.0 | 5200.00 | 0.96 | 4.92 | 40.1% | -3.97 |
| 24 | 5250.0 | 5250.00 | -1.34 | 5.43 | 41.1% | -3.77 |
| 25 | 5300.0 | 5300.00 | 0.59 | 5.06 | 35.7% | -4.47 |
| 26 | 5350.0 | 5350.00 | -2.07 | 4.58 | 41.6% | -3.82 |
| 27 | 5400.0 | 5400.00 | 1.36 | 5.00 | 43.2% | -3.64 |
| 28 | 5450.0 | 5450.00 | 0.42 | 5.67 | 39.9% | -4.25 |
| 29 | 5500.0 | 5500.00 | -0.43 | 5.84 | 37.6% | -4.30 |
| 30 | 5550.0 | 5550.00 | 1.34 | 5.60 | 37.5% | -4.26 |
| 31 | 5600.0 | 5600.00 | 0.02 | 5.38 | 39.1% | -4.36 |
| 32 | 5650.0 | 5650.00 | 0.75 | 5.84 | 31.0% | -5.09 |
| 33 | 5700.0 | 5700.00 | 0.67 | 6.03 | 39.1% | -4.36 |
| 34 | 5750.0 | 5750.00 | -0.06 | 5.87 | 35.5% | -4.93 |
| 35 | 5800.0 | 5800.00 | 0.63 | 5.08 | 35.9% | -4.45 |

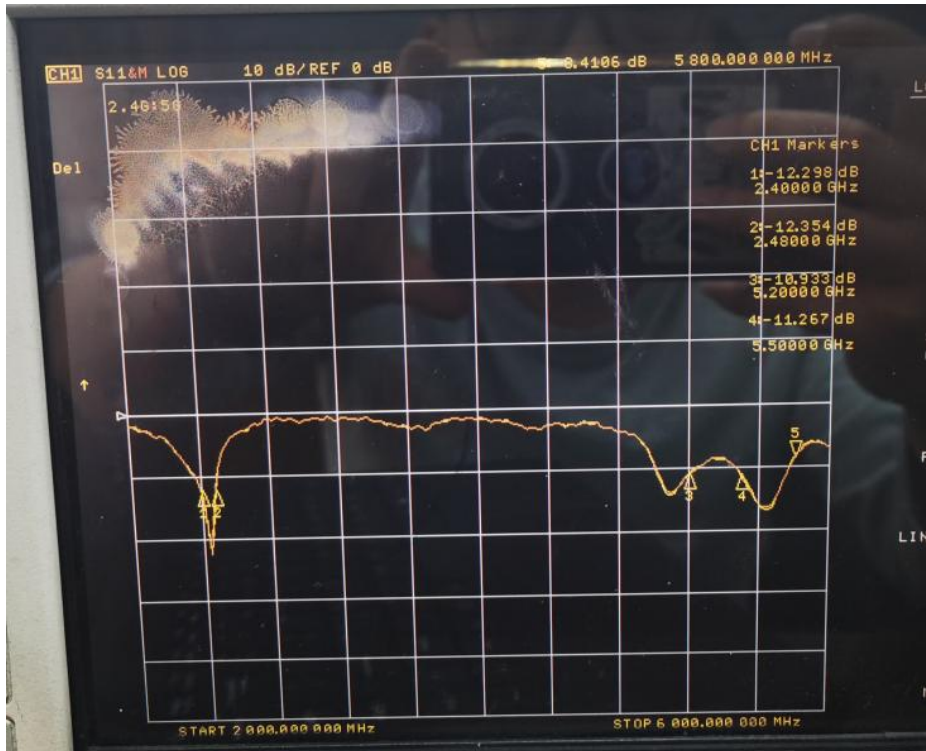


3. summary

The antenna is designed according to the machine samples provided by the customer, and the electrical parameters and result performance of the antenna meet the standard, and we are sure to make you satisfied.

4.Attachment diagram

4.1 Parameter diagram of return loss and voltage standing wave ratio

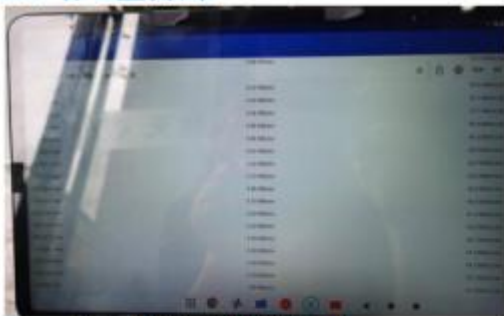


5. WIFI graphics and test data

5.1.1WIFI field test: Test environment: open environment, 15 meters away from our router. The test is as follows:



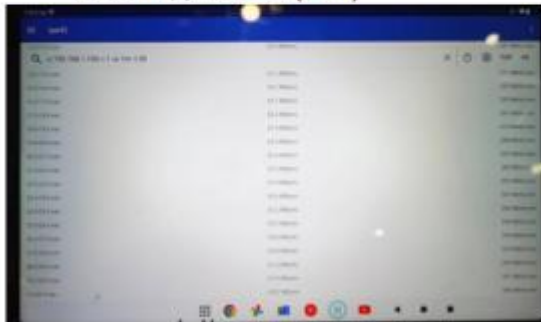
5.1.2 WIFI throughput test:



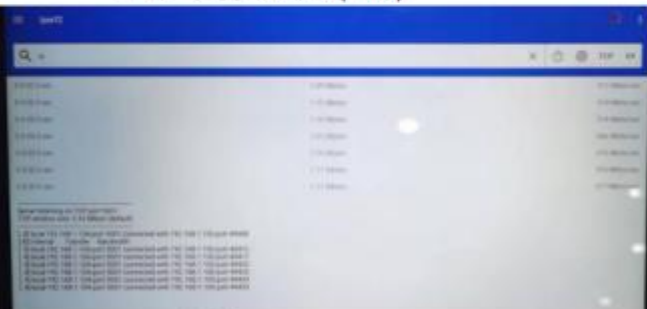
2.4G 上传: 41.8M(20M)



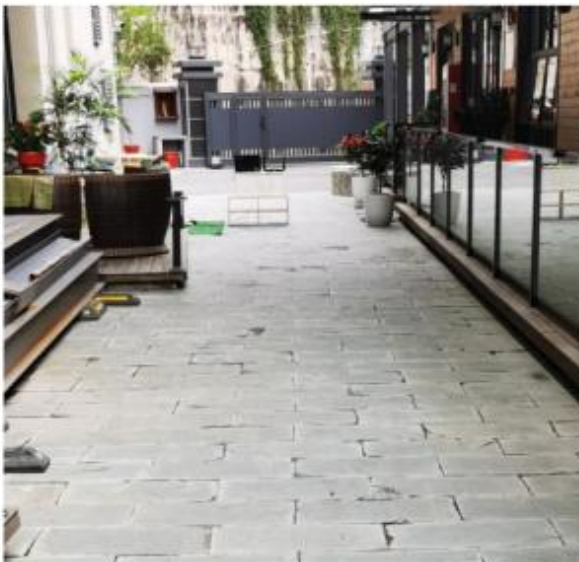
2.4G 下载: 49.9M(40M)



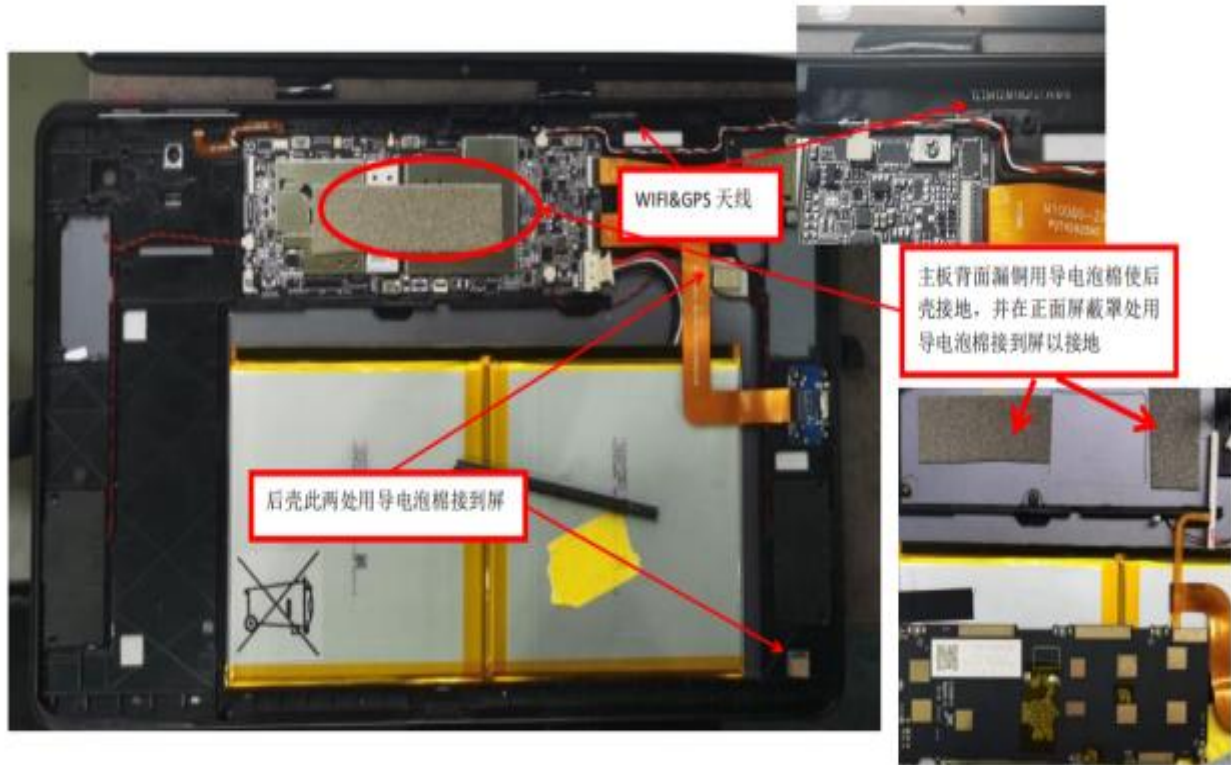
5G 上传: 286M



5G 下载: 317M



6. Antenna assembly and processing drawing file



7. Antenna 2D profile

