

# SHENZHEN TLT COMMUNICATION CO.,LTD

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## M15QF5P antenna The Product Recognition Letter

<b>The Customer</b>	<b>yanghua</b>	<b>Band range</b>	<b>2.4/5.8</b>
<b>Model</b>	<b>M15QF5P</b>	<b>Version</b>	<b>Latest version</b>
<b>Project code name</b>	<b>TLT 5589</b>	<b>Antenna type</b>	<b>PIFA</b>
<b>RF Designer</b>	<b>Mao Hangzhou</b>	<b>RD Designer</b>	<b>Tang Chunzheng</b>
<b>Date of this</b>	<b>2025-07-22</b>	<b>Date of this</b>	<b>2025-07-22</b>
<b>Customer Information:</b>			

# 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 criteria
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℃ Time: 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 than 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 .

	WIFI-2.4G		WIFI-5.0G	
Frequency (MHz)	2.4G	2.48G	5.15G	5.85G
VSWR	1.64	1.63	1.9	2.22
Return Loss	-12.3	-12.4	-10.1	-8.4

## 2.2 GAIN & EFFCIENCY

### 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 Satimo Antenna Test System, Printer, etc.

Main antenna	2.40G	2.48G	5.20G	5.85G
Gain (dBi)	1.85	0.61	1.96	3.00
Efficiency (%)	56.3	42.0	31.2	36.6

## 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

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



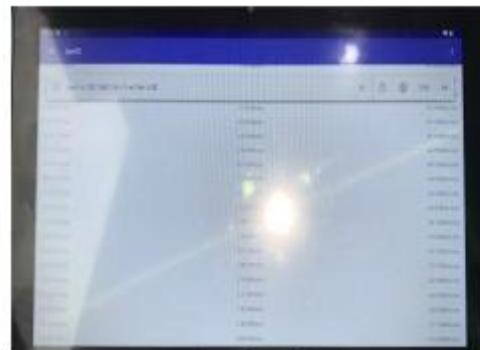
2.4G-WIFI display -31DBM , full signal



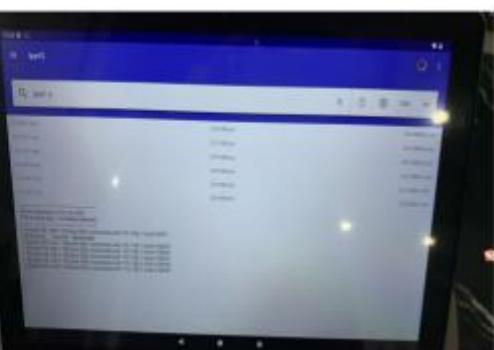
5G-WIFI display -44DBM , full signal



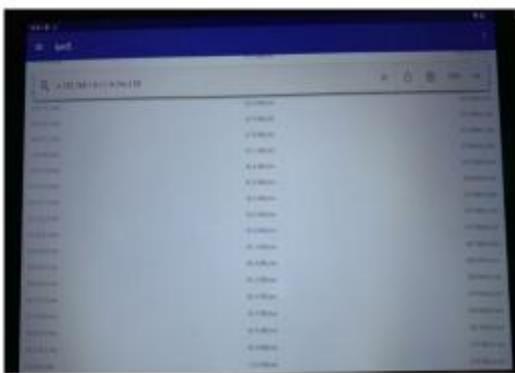
**5.1.2 WIFI throughput test:**



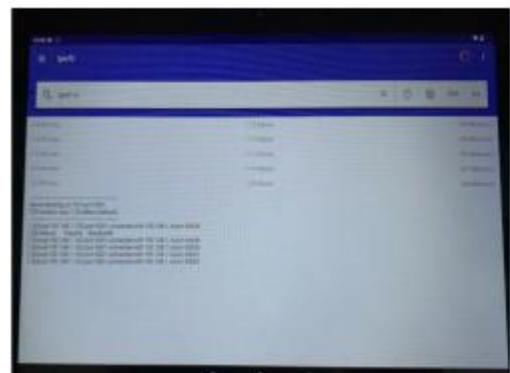
2.4G RX: 61.6M



2.4G TX: 72.5M



5G RX 379M

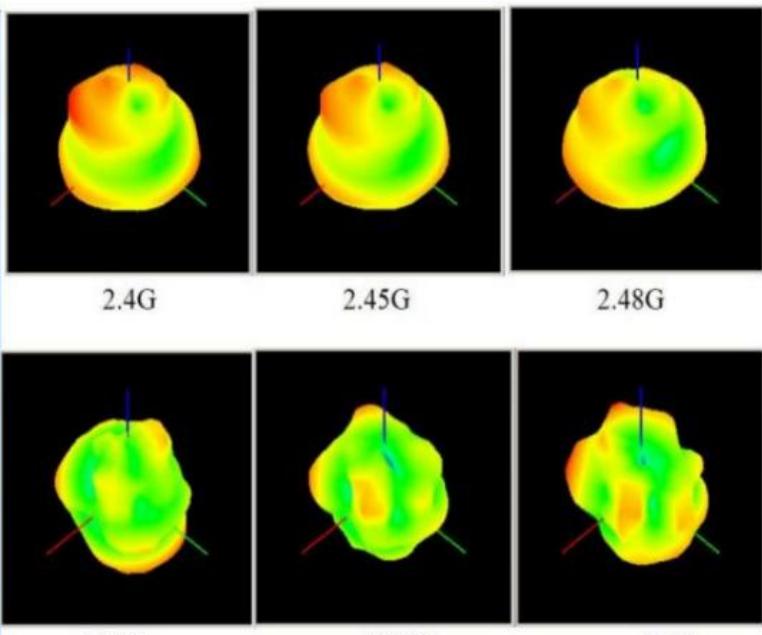


5G TX 344

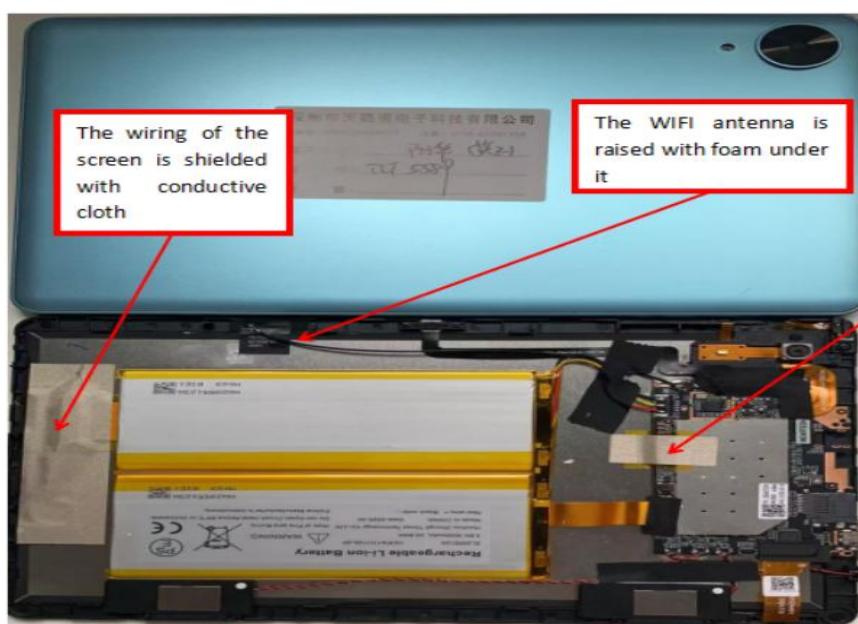
WIFI 2.4G RF Testing		11B(11Mbps)		
Channel		TCH 1	TCH 6	TCH 11
Frequency(Mhz)		2412	2437	2462
TRP(dBm)		11.28	11.78	12.15
TIS(dBm)		-79	-80	-78
WIFI 5G RF Testing		11A(6Mbps)		
Channel		TCH 36	TCH 100	TCH 157
Frequency(Mhz)		5180	5500	5785
TRP(dBm)		11.21	12.22	11.36
TIS(dBm)		-82	-84	-83

## 5.2 WIFI gain and efficiency test:

Test Point ID	Freq. (MHz)	TRP (dBm)	Gain (dBi)	Directivity (dB)	Efficiency (%)	Efficiency (dB)
1	2400.0	2400.00	1.85	4.42	55.3%	-2.57
2	2405.0	2405.00	0.73	4.32	43.8%	-3.59
3	2410.0	2410.00	0.64	4.31	43.0%	-3.67
4	2415.0	2415.00	0.56	4.34	41.9%	-3.78
5	2420.0	2420.00	0.71	4.36	43.2%	-3.84
6	2425.0	2425.00	1.55	4.36	52.3%	-2.81
7	2430.0	2430.00	1.62	4.36	53.2%	-2.74
8	2435.0	2435.00	0.38	4.38	39.7%	-4.01
9	2440.0	2440.00	-0.16	4.42	34.9%	-4.57
10	2445.0	2445.00	0.71	4.39	42.8%	-3.69
11	2450.0	2450.00	0.78	4.39	43.5%	-3.62
12	2455.0	2455.00	0.52	4.37	41.2%	-3.85
13	2460.0	2460.00	0.91	4.32	45.6%	-3.41
14	2465.0	2465.00	0.44	4.32	40.9%	-3.88
15	2470.0	2470.00	0.42	4.31	40.8%	-3.89
16	2475.0	2475.00	0.88	4.35	45.0%	-3.47
17	2480.0	2480.00	0.61	4.38	42.0%	-3.77
18	2485.0	2485.00	0.66	4.39	42.3%	-3.73
19	2490.0	2490.00	1.48	4.40	51.0%	-2.92
20	2495.0	2495.00	2.14	4.40	59.4%	-2.26
21	2500.0	2500.00	1.41	4.44	49.8%	-3.02
22	5150.0	5150.00	2.43	7.39	31.9%	-4.96
23	5200.0	5200.00	1.95	7.02	31.2%	-5.06
24	5250.0	5250.00	0.51	7.09	42.0%	-3.77
25	5300.0	5300.00	3.27	7.13	41.1%	-3.86
26	5350.0	5350.00	-0.10	6.69	41.0%	-3.86
27	5400.0	5400.00	2.16	6.32	38.4%	-4.16
28	5450.0	5450.00	1.25	6.82	37.7%	-4.24
29	5500.0	5500.00	1.31	7.45	34.3%	-4.65
30	5550.0	5550.00	4.68	7.94	47.1%	-3.27
31	5600.0	5600.00	4.70	8.28	43.9%	-3.68
32	5650.0	5650.00	5.14	8.62	44.8%	-3.49
33	5700.0	5700.00	5.04	9.01	40.1%	-3.97
34	5750.0	5750.00	4.58	8.94	36.7%	-4.36
35	5800.0	5800.00	5.76	8.26	56.2%	-2.50
36	5850.0	5850.00	3.00	7.36	36.6%	-4.37



## 6. Antenna assembly and processing drawing file



1. The copper part on the back of the motherboard is grounded to the screen
2. The motherboard shield is grounded to the screen

## 7. Antenna 2D profile

