

Product Number:TLT5375-M86QF7  
Product Name:Mobile Phone Antenna

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# SHENZHEN TLT COMMUNICATION CO.,LTD

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## M86QF7 antenna The Product Recognition Letter

<b>The Customer</b>	<b>yanghua</b>	<b>Band range</b>	<b>2.4/5.8/GPS</b>
<b>Model</b>	<b>M86QF7</b>	<b>Version</b>	<b>Latest version</b>
<b>Project code name</b>	<b>TLT 5375</b>	<b>Approval</b>	
<b>RF Designer</b>	<b>Mao Hangzhou</b>	<b>RD Designer</b>	<b>Tang Chunzheng</b>
<b>Date of this</b>	<b>2024-4-10</b>	<b>Date of this</b>	<b>2024-4-10</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 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	1.71	1.69	1.82	1.70	1.68
Return Loss	-12.2	-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

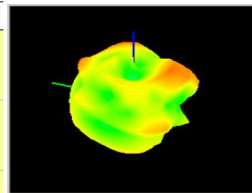
### 2.2.2 Test the equipment

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

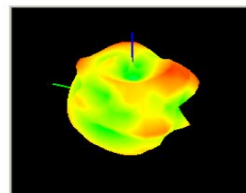
#### WIFI 效率增益:

#### 3D 苹果图

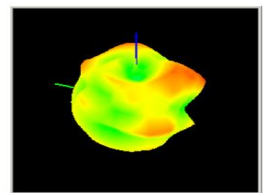
Test Point ID	Freq. (MHz)	TRP (dBm)	Gain (dBi)	Directivity (dBi)	Efficiency (%)	Efficiency (dB)
1	2400.0	2400.00	0.67	4.85	38.2%	-4.18
2	2405.0	2405.00	0.10	4.81	39.8%	-4.01
3	2410.0	2410.00	1.09	4.74	43.2%	-3.64
4	2415.0	2415.00	0.96	4.75	41.8%	-3.79
5	2420.0	2420.00	0.11	4.77	34.2%	-4.66
6	2425.0	2425.00	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	46.5%	-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	-0.51	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



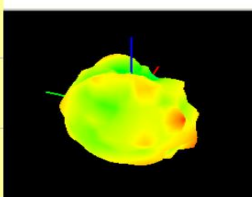
2.4G



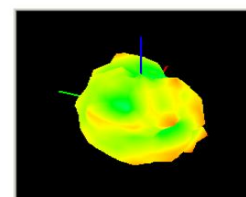
2.45G



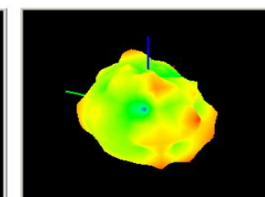
2.48G



5.2G



5.5G



5.8G

### 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:

2.4G-WIFI display -37DBM , full signal      5G-WIFI display -45DBM , full signal

2.1WIFI 场测：测试环境：空旷环境，距离我司路由器 15 米，测试如下：



5.1.2 WIFI throughput test:

2.2WIFI 吞吐量测试

Time	Transfer	Bandwidth
1.0-2.0 sec	3.88 MBytes	32.5 Mbits/sec
2.0-3.0 sec	4.50 MBytes	37.7 Mbits/sec
3.0-4.0 sec	5.25 MBytes	44.0 Mbits/sec
4.0-5.0 sec	3.75 MBytes	31.5 Mbits/sec
5.0-6.0 sec	3.88 MBytes	32.5 Mbits/sec
6.0-7.0 sec	5.25 MBytes	44.0 Mbits/sec
7.0-8.0 sec	3.75 MBytes	31.5 Mbits/sec
8.0-9.0 sec	4.38 MBytes	36.7 Mbits/sec
9.0-10.0 sec	4.38 MBytes	36.7 Mbits/sec
10.0-11.0 sec	4.50 MBytes	37.7 Mbits/sec
11.0-12.0 sec	4.38 MBytes	36.7 Mbits/sec
12.0-13.0 sec	3.88 MBytes	32.5 Mbits/sec
13.0-14.0 sec	3.62 MBytes	30.4 Mbits/sec
14.0-15.0 sec	4.62 MBytes	38.8 Mbits/sec
15.0-16.0 sec	4.38 MBytes	36.7 Mbits/sec
16.0-17.0 sec	3.75 MBytes	31.5 Mbits/sec
17.0-18.0 sec	4.50 MBytes	37.7 Mbits/sec
18.0-19.0 sec	4.25 MBytes	35.7 Mbits/sec
19.0-20.0 sec	3.75 MBytes	31.5 Mbits/sec
20.0-21.0 sec	4.38 MBytes	36.7 Mbits/sec
21.0-22.0 sec	3.75 MBytes	31.5 Mbits/sec
22.0-23.0 sec	4.25 MBytes	35.7 Mbits/sec
23.0-24.0 sec	4.00 MBytes	33.6 Mbits/sec
24.0-25.0 sec	3.75 MBytes	31.5 Mbits/sec
25.0-26.0 sec	4.50 MBytes	37.7 Mbits/sec
26.0-27.0 sec	3.88 MBytes	32.5 Mbits/sec
27.0-28.0 sec	4.38 MBytes	36.7 Mbits/sec
28.0-29.0 sec	4.62 MBytes	38.8 Mbits/sec
29.0-30.0 sec	4.75 MBytes	39.8 Mbits/sec
0.0-30.0 sec	129 MBytes	35.8 Mbits/sec

2.4G 上传: 35.8M (20M 带宽测试)

2.4G RX 35.8M(40M)

Time	Transfer	Bandwidth
0.0-30.1 sec	146 MBytes	40.6 Mbits/sec
0.0-30.2 sec	209 MBytes	58.3 Mbits/sec
0.0-30.1 sec	211 MBytes	58.8 Mbits/sec
0.0-30.2 sec	210 MBytes	58.5 Mbits/sec
0.0-30.2 sec	207 MBytes	57.6 Mbits/sec

2.4G 下载: 57.6M (20M 带宽测试)

2.4G TX: 57.6M(40M)

Time	Transfer	Bandwidth
1.0-2.0 sec	29.5 MBytes	247 Mbits/sec
2.0-3.0 sec	29.6 MBytes	249 Mbits/sec
3.0-4.0 sec	30.9 MBytes	259 Mbits/sec
4.0-5.0 sec	30.5 MBytes	256 Mbits/sec
5.0-6.0 sec	30.8 MBytes	258 Mbits/sec
6.0-7.0 sec	31.6 MBytes	265 Mbits/sec
7.0-8.0 sec	30.9 MBytes	259 Mbits/sec
8.0-9.0 sec	30.8 MBytes	258 Mbits/sec
9.0-10.0 sec	31.6 MBytes	265 Mbits/sec
10.0-11.0 sec	31.8 MBytes	266 Mbits/sec
11.0-12.0 sec	30.6 MBytes	257 Mbits/sec
12.0-13.0 sec	31.0 MBytes	260 Mbits/sec
13.0-14.0 sec	32.1 MBytes	269 Mbits/sec
14.0-15.0 sec	31.2 MBytes	262 Mbits/sec
15.0-16.0 sec	31.6 MBytes	265 Mbits/sec
16.0-17.0 sec	30.1 MBytes	253 Mbits/sec
17.0-18.0 sec	31.8 MBytes	266 Mbits/sec
18.0-19.0 sec	32.1 MBytes	269 Mbits/sec
19.0-20.0 sec	31.9 MBytes	267 Mbits/sec
20.0-21.0 sec	33.0 MBytes	277 Mbits/sec
21.0-22.0 sec	31.5 MBytes	264 Mbits/sec
22.0-23.0 sec	32.2 MBytes	271 Mbits/sec
23.0-24.0 sec	32.5 MBytes	273 Mbits/sec
24.0-25.0 sec	31.9 MBytes	267 Mbits/sec
25.0-26.0 sec	33.0 MBytes	277 Mbits/sec
26.0-27.0 sec	31.5 MBytes	264 Mbits/sec
27.0-28.0 sec	32.2 MBytes	271 Mbits/sec
28.0-29.0 sec	33.0 MBytes	277 Mbits/sec
29.0-30.0 sec	31.8 MBytes	266 Mbits/sec
0.0-30.0 sec	939 MBytes	262 Mbits/sec

5G 上传: 262M

5G RX 262M

Time	Transfer	Bandwidth
0.0-30.0 sec	1.04 GBytes	298 Mbits/sec
0.0-30.0 sec	1011 MBytes	282 Mbits/sec
0.0-30.0 sec	1.12 GBytes	319 Mbits/sec
0.0-29.8 sec	1.10 GBytes	319 Mbits/sec
0.0-30.0 sec	1.12 GBytes	319 Mbits/sec
0.0-30.0 sec	1.11 GBytes	317 Mbits/sec

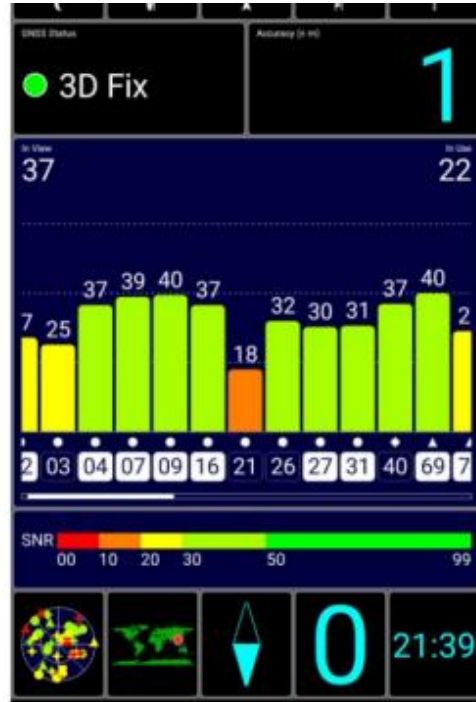
5G 下载: 317M

5G TX 317M



## GPS

测试环境：在我司工业园 1 楼，用 GPS test 测试如下：



## 6. Antenna assembly and processing drawing file

### 4. 天线装配和处理图档



## 7. Antenna 2D profile

