Product Number：TLT5588-M87QF68L-WBG
Product Name： Mobile Phone Antenna

Acknowledgement of Sam-ple

P/N		
Samples adapt to the model		M87QF68L
Sample description		
development dep-artment	**electron**	Confirmation results:□qualified □unqualified
	structure	Confirmation results:□qualified □unqualified
Development acknow-ledgment		Confirmation results:□qualified □unqualified
quality depa-rtment		Confirmation results:□qualified □unqualified
purchase depa-rtment		Confirmation results:□qualified □unqualified
remarks		

Form No.: QESP-023-F06C

Shenzhen Tielu Tong Electronic Technology Co., LTD

天路通

SHENZHEN TLT COMMUNICATION CO.,LTD.

M87QF68L-WBG antenna FPC

Acknowledgement of Product

cus-tomer	**Yanghua Digital**	**Antenna type**	**2.4/5.8G/GPS**
Type of phone	**M87QF68L**	**edition**	**latest version**
Project code	**TLT5588**	**ratify**	**An Qingrong**
RF credence	**MAO Haiz-hou**	**RD credence**	**Tang Chun-cheng**
date	**2025-6-13**	**date**	**2025-6-13**
Customer info-rmation:			

Metric

1. Antenna Parameters

This report provides the test conditions and results of various electrical and structural properties in mobile phone tests. The antenna was designed by Tianlutong.

Electrical parameters

1.1.1 Electrical Performance Evaluation

The antenna band range is 2400MHz~2480MHz, which is designed and made by Tianlutong.

1.1.2 Match the Circuit Diagram

Use the original matching circuit on the PCB

1.2 Configuration Parameter

1.2.1 Antenna Assembly

The antenna is generally composed of plastic brackets and metal sheets.

1.2.2 Performance Test Requirements

test item	description	Acceptance criteries
1. Low temperature test	temperature： -20℃ Time: 24 hours	1. No apparent damage 2. The electrical performance meets the standard
2. High temperature test	temperature 。： 80℃ Time: 24 hours	1. No apparent damage 2. The electrical performance meets the standard
3. Salt Spray Test	5±0.1% salt spray PH value: 6.5-7.2 temperature： 35±1℃ Time e: 24 hours	1. There was no color change 2. No obvious cracks in 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.Test

The antenna is installed in the customer-provided equipment for testing. The antenna is installed in the equipment for electrical performance testing.

VSWR Test

test connection

Order of connection of equipment for testing VSWR: AgilentE5062A network analyzer → test cable → customer provided equipment

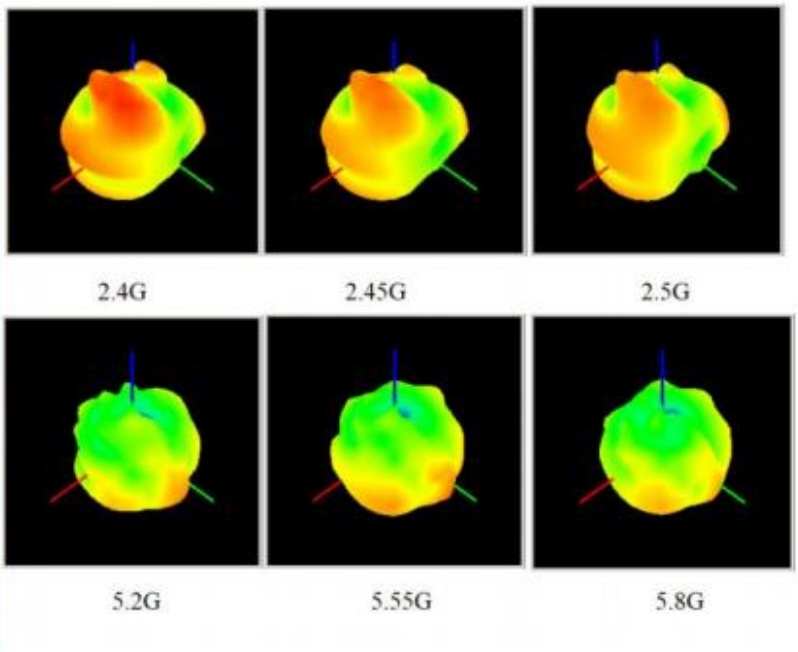
2.1.2 VSWR

The following table describes the values of the voltage standing wave ratio at both ends of the band of the antenna, involving back loss and standing wave ratio

	GPS	WIFI-2.4G		WIFI-5.0G	
Frequency (MHz)	1.575G	2.4G	2.48G	5.15G	5.85G
VSWR	1.7	1.60	1.72	1.71	1.68
Return Loss	-11.5	-10.2	-12.3	-11.9	-12.3

2.2 Gain and Efficiency Test

Test Point ID	Freq. (MHz)	TRP (dBm)	Gain (dBi)	Efficiency (%)	Efficiency (dB)
1	2400.0	2400.00	1.74	44.3%	-3.53
2	2405.0	2405.00	1.07	37.8%	-4.22
3	2410.0	2410.00	1.88	45.8%	-3.39
4	2415.0	2415.00	1.61	43.1%	-3.66
5	2420.0	2420.00	0.84	36.2%	-4.42
6	2425.0	2425.00	1.53	42.4%	-3.73
7	2430.0	2430.00	2.40	51.9%	-2.85
8	2435.0	2435.00	1.42	41.5%	-3.82
9	2440.0	2440.00	0.07	30.2%	-5.20
10	2445.0	2445.00	0.06	30.2%	-5.21
11	2450.0	2450.00	0.45	32.9%	-4.83
12	2455.0	2455.00	1.47	41.2%	-3.86
13	2460.0	2460.00	1.47	40.9%	-3.88
14	2465.0	2465.00	0.85	36.8%	-5.72
15	2470.0	2470.00	0.73	34.5%	-6.11
16	2475.0	2475.00	0.89	35.8%	-4.46
17	2480.0	2480.00	1.26	39.2%	-4.06
18	2485.0	2485.00	0.19	31.0%	-5.08
19	2490.0	2490.00	0.04	30.5%	-5.16
20	2495.0	2495.00	1.01	38.8%	-4.11
21	2500.0	2500.00	1.52	44.5%	-3.51
22	5150.0	5150.00	0.41	41.4%	-3.83
23	5200.0	5200.00	0.50	43.2%	-3.65
24	5250.0	5250.00	0.91	36.8%	-5.72
25	5300.0	5300.00	1.02	46.9%	-3.38
26	5350.0	5350.00	0.83	34.0%	-6.19
27	5400.0	5400.00	1.18	45.4%	-3.43
28	5450.0	5450.00	-0.46	30.8%	-5.11
29	5500.0	5500.00	0.45	35.5%	-5.94
30	5550.0	5550.00	0.85	46.2%	-3.36
31	5600.0	5600.00	0.23	40.4%	-3.93
32	5650.0	5650.00	0.73	42.8%	-3.69
33	5700.0	5700.00	-0.08	33.5%	-4.74
34	5750.0	5750.00	-0.67	28.7%	-5.42
35	5800.0	5800.00	0.46	37.0%	-4.32



2.2.1 Testing Environment

Tiantuomicrowave anechoic chamber: The test frequency range is from 800MHz to 6GHz, in the 50 cm diameter spherical area, the anechoic chamber has less than-50dB reflection from 800MHz to 6GHz.

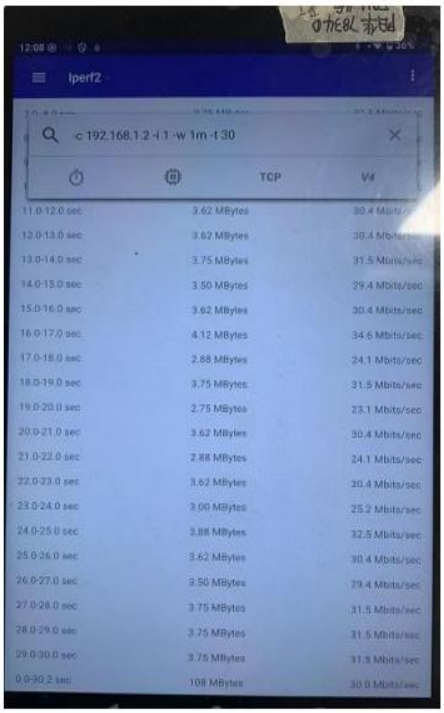
2.2.2 Testing Facility

Agilent 8960 (5515C) wireless communication test device, dipole antenna, French Satimo antenna test system, printer, etc.

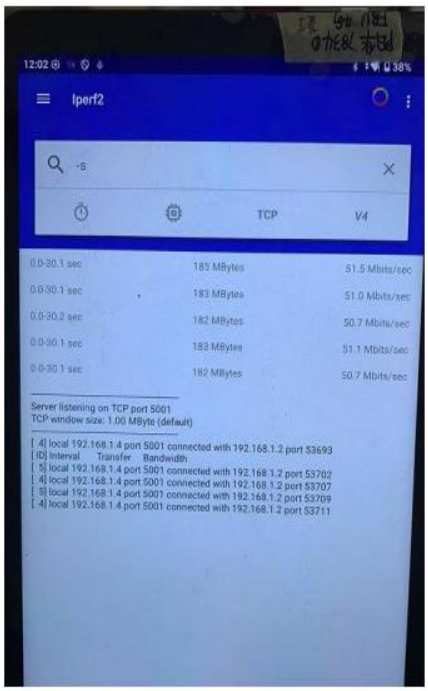
3. Sum up

The antenna is designed according to the equipment sample provided by the customer, and the electrical parameters and results of the antenna meet the standards. We believe that we can make you satisfied.

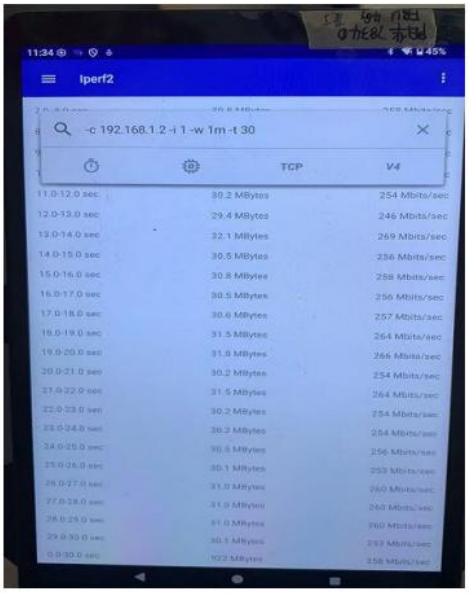
3. WiFi&GPS Graphics and Test Data



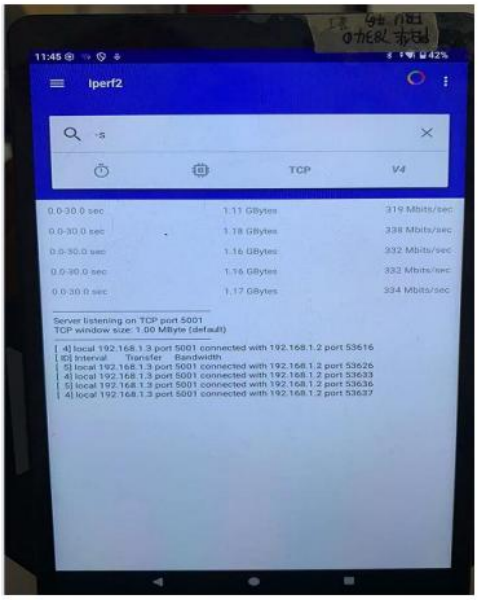
2.4G 上传：30.0M



2.4G 下载：50.7M



5G 上传：258M



5G 下载：334M

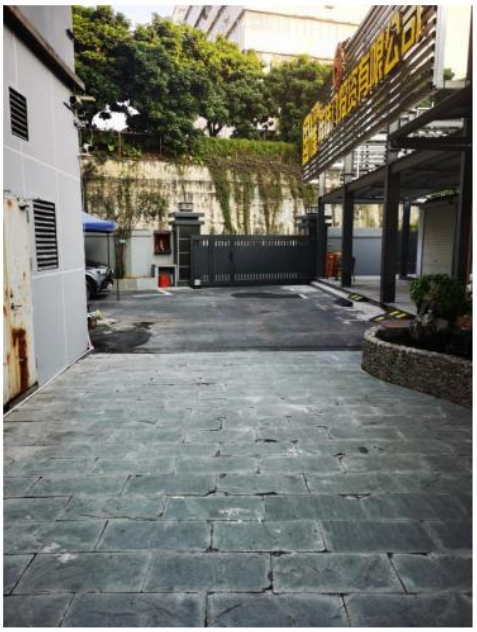
3.3 WIFI OTA 测试数据

WIFI 2.4G RF Testing		11B(11Mbps)		
Channel		TCH 1	TCH 6	TCH 11
Frequency(Mhz)		2412	2437	2462
	TRP(dBm)	11.68	12.38	12.86
	TIS(dBm)	-74	-73	-73

WIFI 5G RF Testing		11A(6Mbps)		
Channel		TCH 36	TCH 100	TCH 157
Frequency(Mhz)		5180	5500	5785
	TRP(dBm)	11.96	13.58	12.36
	TIS(dBm)	-83	-84	-82

3.4 GPS 场测：

测试环境：在我司 1 楼，用 GPS test 测试如下：



4. Antenna Assembly and Processing Drawings:

（注意:接地导电泡棉要保证充分接地,泡棉导通率要保持在 1.5Ω 以内）

5. Antenna 2D Diagram: