
SHENZHEN TLT COMMUNICATION CO.,LTD

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1010D antenna The Product Recognition Letter

The Customer	Huaqun	Band range	WiFi/BT
Model	1010D	Version	Latest version
Project code name	TLT 5532	Approval	
RF Designer	MaoHangzhou	RD Designer	Tang Chunzheng
Date of this	2025-5-12	Date of this	2025-5-12
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 device tests. An antenna designed by TLT.

Electrical parameters

1.1.1 Electrical Performance Assessment

The band range of the antenna is 2400MHz~2480MHz and 5200MHz~5800MHz. Below are the basic parameters of the electrical performance of the antenna.

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 consist of FPC and coaxial line.

1.2.2 can test the requirements

Test item	description	Acceptance criteria
1. cryotemperature 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

Antennas are installed in a customer provided phone for testing. Antenna installation in the terminal for electrical performance testing

2.1 The VSWR test

Test the connection

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

2.1.2 VSWR

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

WIFI Main Antenna frequency (MHz)	2400	2450	2480	5700	5800
Smith Chart	19.07	-1.41	-9.30	-29.01	-41.38
VSWR	1.49	1.21	1.26	2.22	3.00
RETRUN LOSS(DB)	-14.13	-20.68	-18.71	-8.40	-6.01

WIFI Aux Antenna frequency (MHz)	2400	2450	2480	5700	5800
Smith Chart	12.54	-5.29	-10.56	-1.48	-27.79
VSWR	2.68	1.36	2.25	2.26	2.29
RETRUN LOSS(DB)	-6.80	-18.22	-8.28	-8.22	-8.12

2.2 Gain and power tests

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 (5515C) Wireless Communication Test Device, Dipole antenna, French Satimo Antenna Test System, Printer, etc.

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

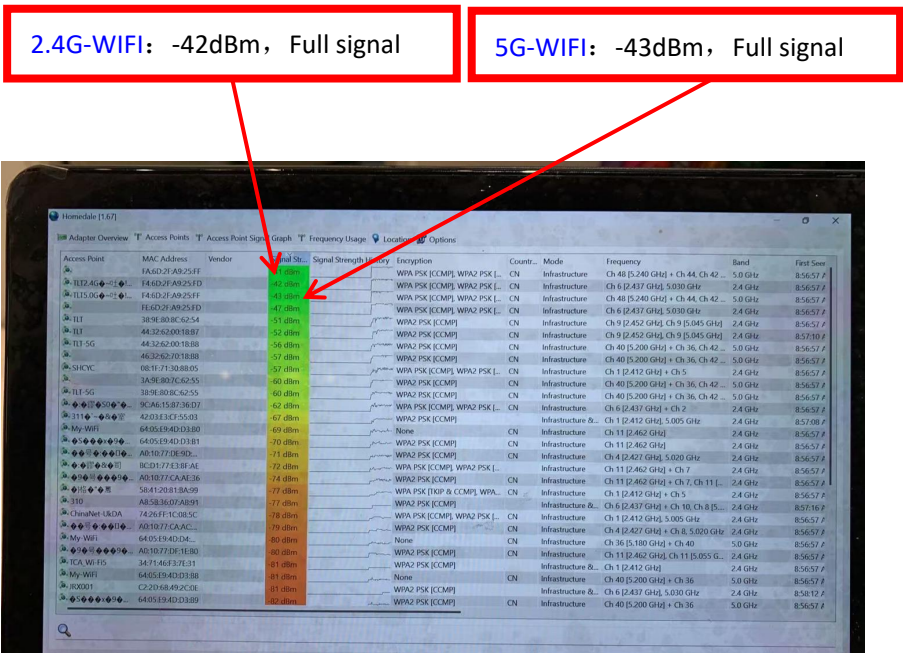


Main Antenna

Aux Antenna

5. WIFI graphics and test data

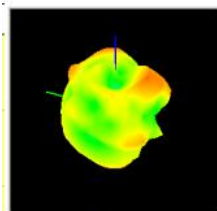
5.1WIFI field test: Test environment: open environment, 15 meters away from our router. The test is as follows:



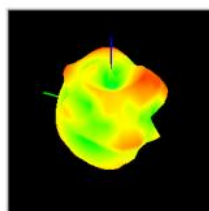
5.2 WIFI gain and efficiency test:

Main Antenna

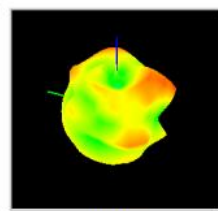
Test Point ID	Freq. (MHz)	TRP (dBm)	Gain (dBi)	Directivity (dBi)	Efficiency (%)	Efficiency (dB)
1	2400.0	2400.00	0.67	4.85	38.2%	-4.18
2	2405.0	2405.00	0.10	4.81	39.8%	-4.01
3	2410.0	2410.00	1.09	4.74	43.2%	-3.64
4	2415.0	2415.00	0.96	4.75	41.8%	-3.79
5	2420.0	2420.00	0.11	4.77	34.2%	-4.66
6	2425.0	2425.00	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	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%	-4.46



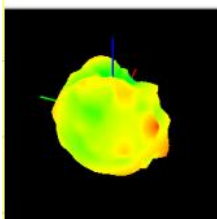
2.4G



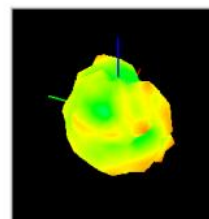
2.45G



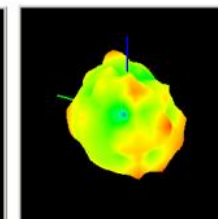
2.48G



5.2G



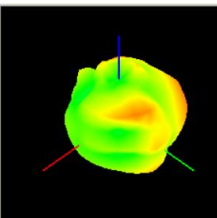
5.5G



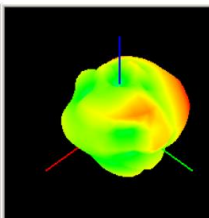
5.8G

Aux Antenna

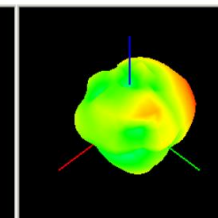
Test Point ID	Freq. (MHz)	TRP (dBm)	Gain (dBi)	Efficiency (%)	Efficiency (dB)
1	2400.0	2400.00	1.34	40.7%	-3.90
2	2405.0	2405.00	-0.22	28.6%	-5.43
3	2410.0	2410.00	0.05	30.0%	-5.23
4	2415.0	2415.00	0.75	34.7%	-4.59
5	2420.0	2420.00	1.04	36.8%	-4.34
6	2425.0	2425.00	1.32	39.2%	-4.07
7	2430.0	2430.00	1.32	39.6%	-4.03
8	2435.0	2435.00	0.65	34.3%	-4.65
9	2440.0	2440.00	0.54	33.7%	-4.72
10	2445.0	2445.00	1.01	37.8%	-4.23
11	2450.0	2450.00	0.48	33.0%	-4.82
12	2455.0	2455.00	0.65	34.7%	-4.60
13	2460.0	2460.00	1.84	47.2%	-3.26
14	2465.0	2465.00	1.19	39.9%	-3.99
15	2470.0	2470.00	0.10	31.0%	-5.08
16	2475.0	2475.00	0.45	33.4%	-4.76
17	2480.0	2480.00	1.13	38.6%	-4.14
18	2485.0	2485.00	1.37	40.5%	-3.93
19	2490.0	2490.00	1.29	39.1%	-4.08
20	2495.0	2495.00	1.28	39.3%	-4.06
21	2500.0	2500.00	0.97	37.2%	-4.30
22	5150.0	5150.00	2.43	31.9%	-4.96
23	5200.0	5200.00	2.95	36.2%	-5.06
24	5250.0	5250.00	2.51	32.0%	-6.58
25	5300.0	5300.00	3.27	41.1%	-3.86
26	5350.0	5350.00	2.10	31.0%	-6.79
27	5400.0	5400.00	2.16	38.4%	-4.16
28	5450.0	5450.00	2.25	30.7%	-5.57
29	5500.0	5500.00	2.31	34.3%	-6.14
30	5550.0	5550.00	4.68	47.1%	-3.27
31	5600.0	5600.00	4.70	43.9%	-3.58
32	5650.0	5650.00	5.14	44.8%	-3.49
33	5700.0	5700.00	5.04	40.1%	-3.97
34	5750.0	5750.00	4.58	36.7%	-4.36
35	5800.0	5800.00	4.56	46.2%	-2.50
36	5850.0	5850.00	3.00	36.6%	-4.37



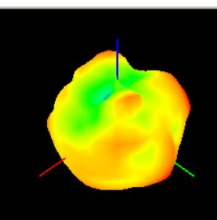
2.4G



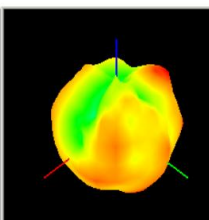
2.45G



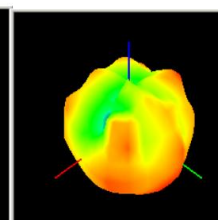
2.8G



5.2G



5.5G



5.8G

5.3 WIFI OTA test:

WIFI 2.4G RF Testing		11B(11Mbps)		
Channel		TCH 1	TCH 6	TCH 11
Frequency(Mhz)		2412	2437	2462
	TRP(dBm)	11. 53	12. 72	12. 19
	TIS(dBm)	-72	-72	-74

WIFI 5G RF Testing		11A(6Mbps)		
Channel		TCH 36	TCH 100	TCH 157
Frequency(Mhz)		5180	5500	5785
	TRP(dBm)	12. 49	13. 56	13. 77
	TIS(dBm)	-83	-84	-84

5.4 BT test:

Test environment: open field test

Test type	Model number	Test distance (m)	Test results	Note
Bluetooth speaker playback		15	PASS	Play music smoothly without stuttering
Data Transmission		5	PASS	TX: 100. 4KB/S RX: 103. 6KB/S
Conclusion	☒PASS ☐ Fail			

6.Antenna 2D profile

