

SHENZHEN TLT COMMUNICATION CO.,LTD.

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M16QF6E antenna

The Product Recognition Letter

The Customer	yanghua	Band range	2.4/5.8/GPS
Model	M16QF6E	Version	Latest version
Project code name	TLT 5050	Approval	
RF Designer	Mao Hangzhou	RD Designer	Tang Chunzheng
Date of this	2023-5-12	Date of this	2023-5-12
Customer Information:			

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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-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. cryotemperature test	temperature:-20°C Time: 24 hours	The 1. had no obvious damage The 2. electrical performance meets the standard
The 2. high-temperature test	temperature.: 80°C 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°C 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 50PPM, Cd is smaller than 50PPM	

2.The test

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

2.1The 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 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

2.2.1 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

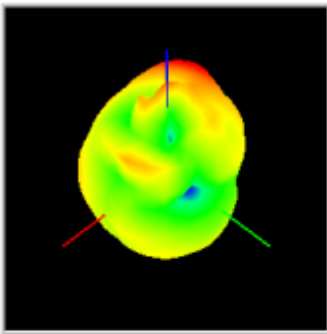
Agilent 8960 ((5515C) Wireless Communication Test Device, Dipole antenna, French Sa t imo Antenna Test System, Printer, etc.

3. summary

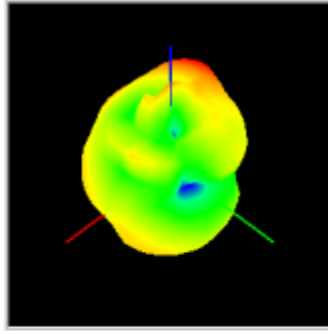
The antenna is designed according to the machine samples provided by the customer, and the electrical parameters and result performance of the antenna meet the standard, and we are sure to make you satisfied.

5. WIFI & GPS graphics and test data

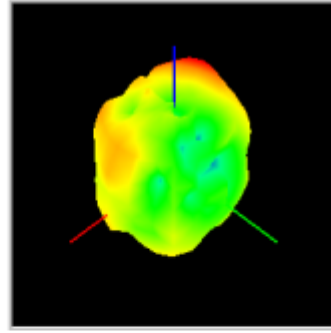
5.2 Gain and efficiency tests



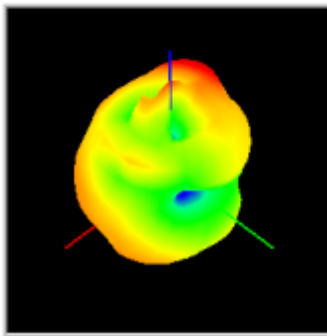
2.4G



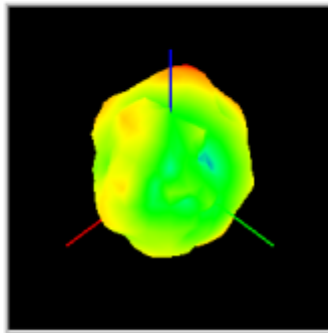
2.45G



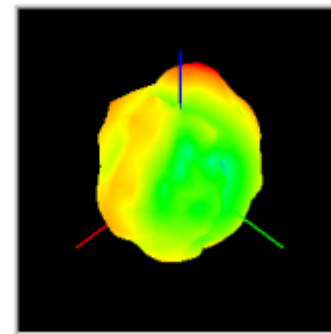
2.48G



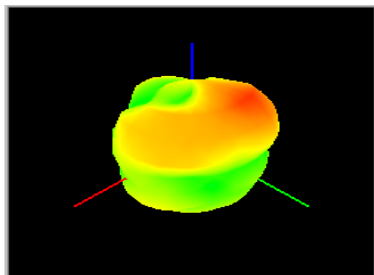
5.0G



5.5G



5.8G

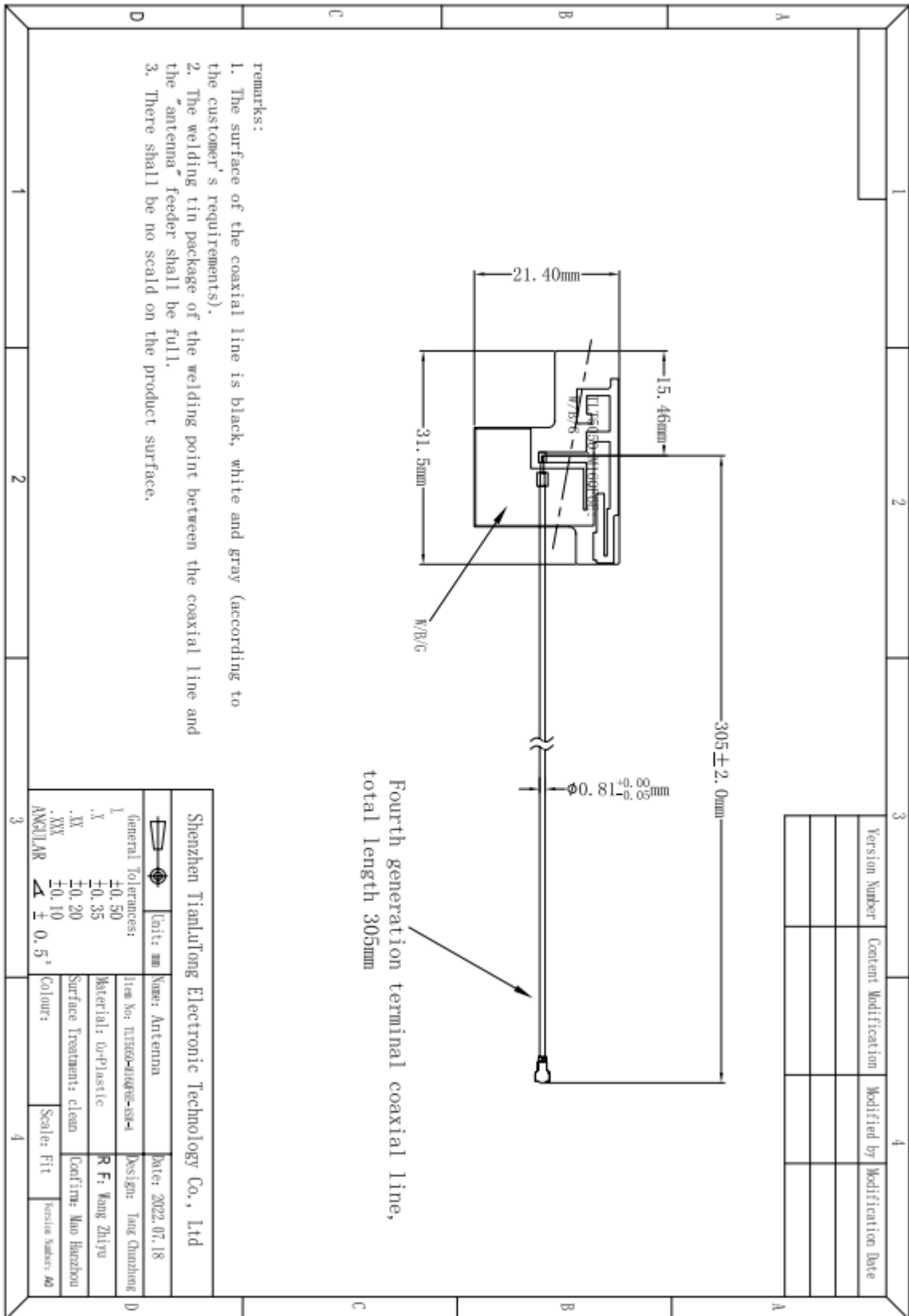


1.57G

Test Point ID	Freq. (MHz)	TRP (dBm)	Gain (dBi)	Directivity (dBi)	Efficiency (%)	Efficiency (dB)	Max (dBm)	Theta of Max	Phi of Max	Min (dBm)
1	2400.0	2400.00	3.59	5.69	61.7%	-2.10	3.59	3000	3180	-14.87
2	2405.0	2405.00	2.84	5.78	50.8%	-2.94	2.84	3000	3180	-16.43
3	2410.0	2410.00	2.22	5.71	44.7%	-3.50	2.22	3000	3180	-17.71
4	2415.0	2415.00	2.74	5.70	50.7%	-2.95	2.74	3000	1680	-17.80
5	2420.0	2420.00	2.71	5.75	49.7%	-3.04	2.71	3000	1680	-18.42
6	2425.0	2425.00	3.65	5.80	60.9%	-2.15	3.65	3000	1680	-17.86
7	2430.0	2430.00	3.43	5.79	58.1%	-2.36	3.43	3000	1680	-18.17
8	2435.0	2435.00	2.09	5.78	42.8%	-3.69	2.09	3000	1680	-19.50
9	2440.0	2440.00	2.14	5.81	43.0%	-3.66	2.14	3000	1680	-19.14
10	2445.0	2445.00	2.15	5.82	42.9%	-3.68	2.15	3000	1680	-18.76
11	2450.0	2450.00	2.83	5.79	50.5%	-2.97	2.83	3000	1680	-17.80
12	2455.0	2455.00	3.38	5.76	57.8%	-2.38	3.38	3000	1680	-16.83
13	2460.0	2460.00	2.16	5.79	43.4%	-3.63	2.16	3000	1680	-17.63
14	2465.0	2465.00	2.17	5.82	43.1%	-3.66	2.17	3000	1680	-17.86
15	2470.0	2470.00	2.43	5.80	46.0%	-3.37	2.43	3000	1680	-18.50
16	2475.0	2475.00	2.64	5.78	48.5%	-3.14	2.64	3000	1680	-19.34
17	2480.0	2480.00	2.91	5.85	50.8%	-2.94	2.91	3000	1680	-19.94
18	2485.0	2485.00	2.52	5.87	46.2%	-3.35	2.52	3000	1680	-21.14
19	2490.0	2490.00	2.56	5.84	47.0%	-3.28	2.56	3000	1680	-21.35
20	2495.0	2495.00	3.33	5.79	56.7%	-2.46	3.33	3000	1680	-20.29
21	2500.0	2500.00	3.31	5.81	56.2%	-2.50	3.31	3000	1680	-19.71
22	5150.0	5150.00	3.05	6.47	45.4%	-3.43	3.05	9000	3180	-14.09
23	5200.0	5200.00	2.63	6.76	38.6%	-4.13	2.63	9000	3180	-16.15
24	5250.0	5250.00	3.50	6.65	48.5%	-3.15	3.50	9000	3180	-17.00
25	5300.0	5300.00	4.37	6.59	60.0%	-2.22	4.37	6000	3180	-16.45
26	5350.0	5350.00	3.84	6.85	50.0%	-3.01	3.84	6000	3180	-15.02
27	5400.0	5400.00	4.32	6.70	57.9%	-2.37	4.32	6000	3180	-13.51
28	5450.0	5450.00	3.94	6.57	54.6%	-2.63	3.94	6000	3180	-14.75
29	5500.0	5500.00	4.20	6.48	59.2%	-2.28	4.20	6000	3180	-15.62
30	5550.0	5550.00	3.61	6.45	52.0%	-2.84	3.61	6000	3180	-15.09
31	5600.0	5600.00	4.40	6.19	66.2%	-1.79	4.40	6000	3180	-15.16
32	5650.0	5650.00	3.64	5.73	61.7%	-2.10	3.64	4500	3180	-16.03
33	5700.0	5700.00	2.59	5.61	49.9%	-3.02	2.59	4500	3180	-17.40
34	5750.0	5750.00	2.32	5.22	51.2%	-2.91	2.32	4500	3180	-14.75
35	5800.0	5800.00	2.31	5.74	45.4%	-3.43	2.31	15000	12000	-18.07
36	5850.0	5850.00	3.07	6.21	48.6%	-3.13	3.07	15000	12000	-21.41

6. Antenna assembly and processing drawing file

7. Antenna 2D profile



- remarks:
1. The surface of the coaxial line is black, white and gray (according to the customer's requirements).
 2. The welding tin package of the welding point between the coaxial line and the "antenna" feeder shall be full.
 3. There shall be no scald on the product surface.