SHENZHEN TLT COMMUNICATION CO.,LTD

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V13 antenna
The Product Recognition Letter

The Customer	**yanghua**	**Band range**	**2.4/5.8/GPS**
Model	**V13**	**Version**	**Latest version**
Project code name	**TLT 5633**	**Approval**	**PIFA**
RF Designer	**Mao Hangzhou**	**RD Designer**	**Tang Chunzheng**
Date of this	**2025-7-17**	**Date of this**	**2025-7-17**
Customer Information:			

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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).

2.1The VSWR test

2.1.1Test 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	1.75	1.80	1.92	2.01	1.78
Return Loss	-11.9	-12.3	-13.5	-12.9	-11.3

2.2 GAIN & EFFCIENCY

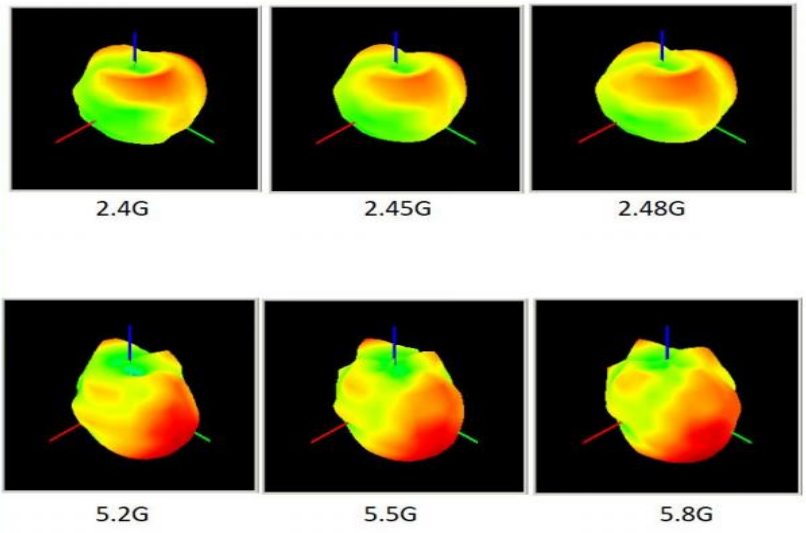
2.2.1 test environment

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 Sa t imo Antenna Test System, Printer, etc.

Test Point ID	Freq. (MHz)	TRP (dBm)	Gain (dBi)	Efficiency (%)	Efficiency (dB)
1	2400.0	2400.00	1.31	36.4%	-4.39
2	2405.0	2405.00	0.01	27.0%	-5.69
3	2410.0	2410.00	1.24	35.8%	-4.46
4	2415.0	2415.00	2.34	45.5%	-3.42
5	2420.0	2420.00	1.85	40.5%	-3.93
6	2425.0	2425.00	1.81	40.1%	-3.97
7	2430.0	2430.00	2.27	45.0%	-3.47
8	2435.0	2435.00	2.08	42.9%	-3.67
9	2440.0	2440.00	1.86	40.6%	-3.91
10	2445.0	2445.00	2.07	42.8%	-3.68
11	2450.0	2450.00	1.64	39.2%	-4.07
12	2455.0	2455.00	1.98	42.7%	-3.69
13	2460.0	2460.00	3.01	53.9%	-2.68
14	2465.0	2465.00	2.14	44.1%	-3.56
15	2470.0	2470.00	1.49	38.5%	-4.14
16	2475.0	2475.00	2.17	45.5%	-3.42
17	2480.0	2480.00	2.31	47.0%	-3.28
18	2485.0	2485.00	1.94	43.4%	-3.63
19	2490.0	2490.00	2.14	45.9%	-3.38
20	2495.0	2495.00	2.91	55.5%	-2.56
21	2500.0	2500.00	2.82	55.0%	-2.60
22	5150.0	5150.00	1.41	38.8%	-4.11
23	5200.0	5200.00	1.72	39.8%	-4.00
24	5250.0	5250.00	1.64	35.3%	-4.52
25	5300.0	5300.00	1.80	40.1%	-3.97
26	5350.0	5350.00	1.29	36.1%	-4.42
27	5400.0	5400.00	1.29	38.7%	-4.12
28	5450.0	5450.00	1.90	40.8%	-3.89
29	5500.0	5500.00	2.88	41.2%	-3.85
30	5550.0	5550.00	1.11	35.6%	-4.49
31	5600.0	5600.00	1.15	37.8%	-4.23
32	5650.0	5650.00	1.93	40.2%	-3.96
33	5700.0	5700.00	2.02	39.1%	-4.08
34	5750.0	5750.00	1.52	38.7%	-4.12
35	5800.0	5800.00	0.19	40.1%	-3.97
36	5850.0	5850.00	2.38	38.5%	-4.15



3. summary

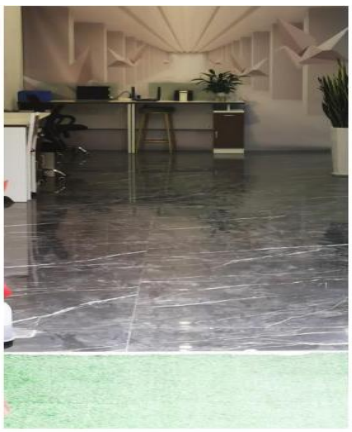
The antenna is designed according to the machine samples provided by the customer, and the electrical parameters and result performance of the antenna meet the standard, and we are sure to make you satisfied.

4.Attachment diagram

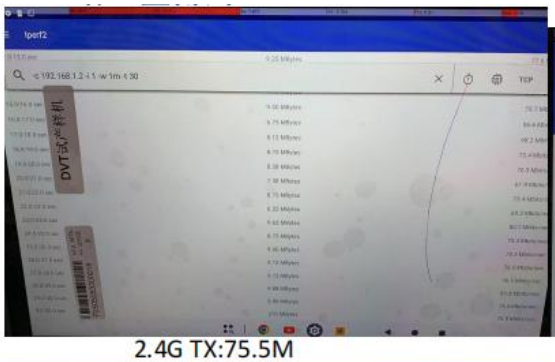
4.1 Parameter diagram of return loss and voltage standing wave ratio

5. WIFI graphics and test data

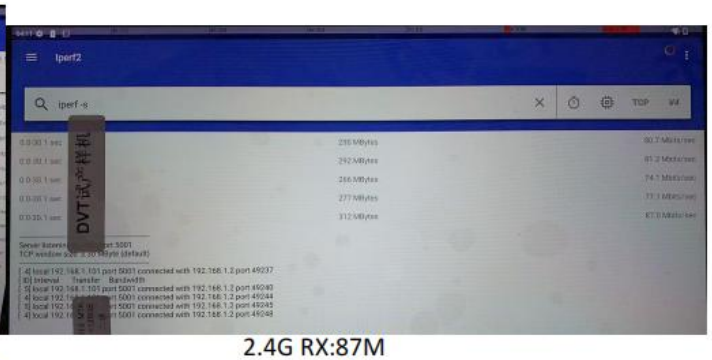
5.1.1WIFI field test: Test environment: open environment, 15 meters away from our router. The test is as follows:



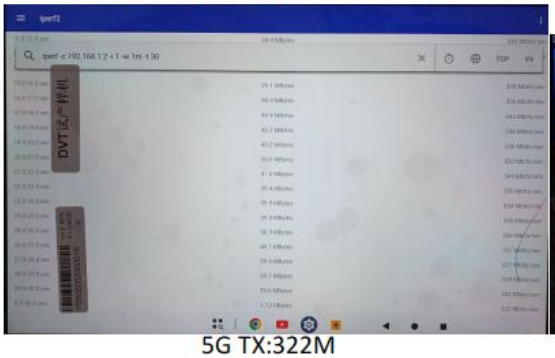
5.1.2 WIFI throughput test:



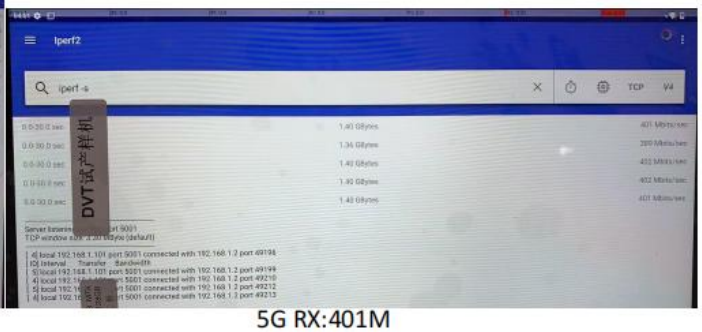
2.4G TX:75.5M



2.4G RX:87M



5G TX:322M

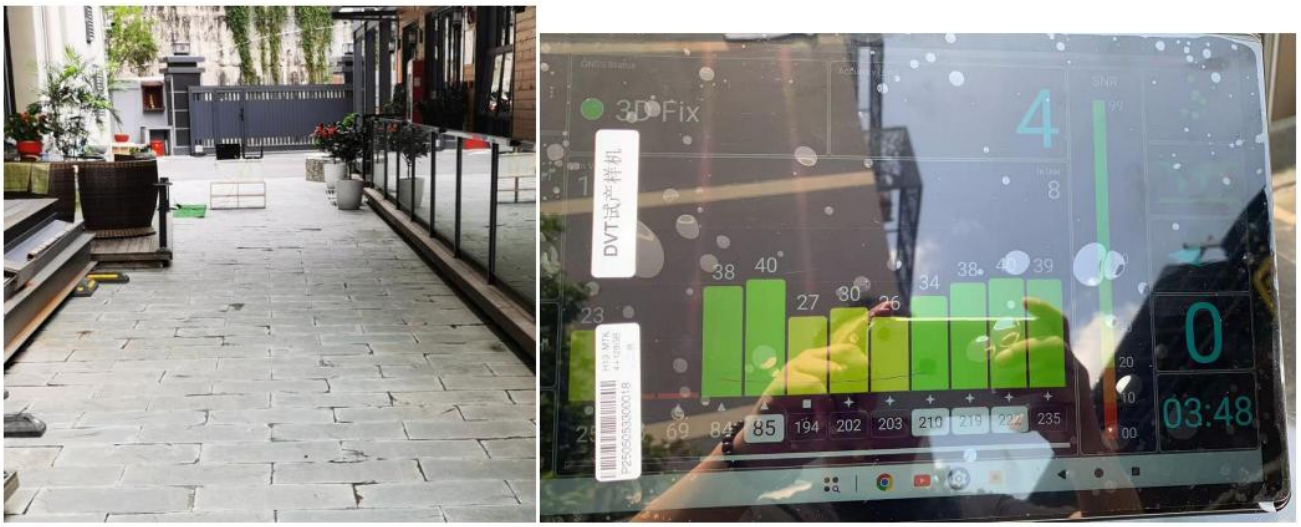


5G RX:401M

WIFI OTA

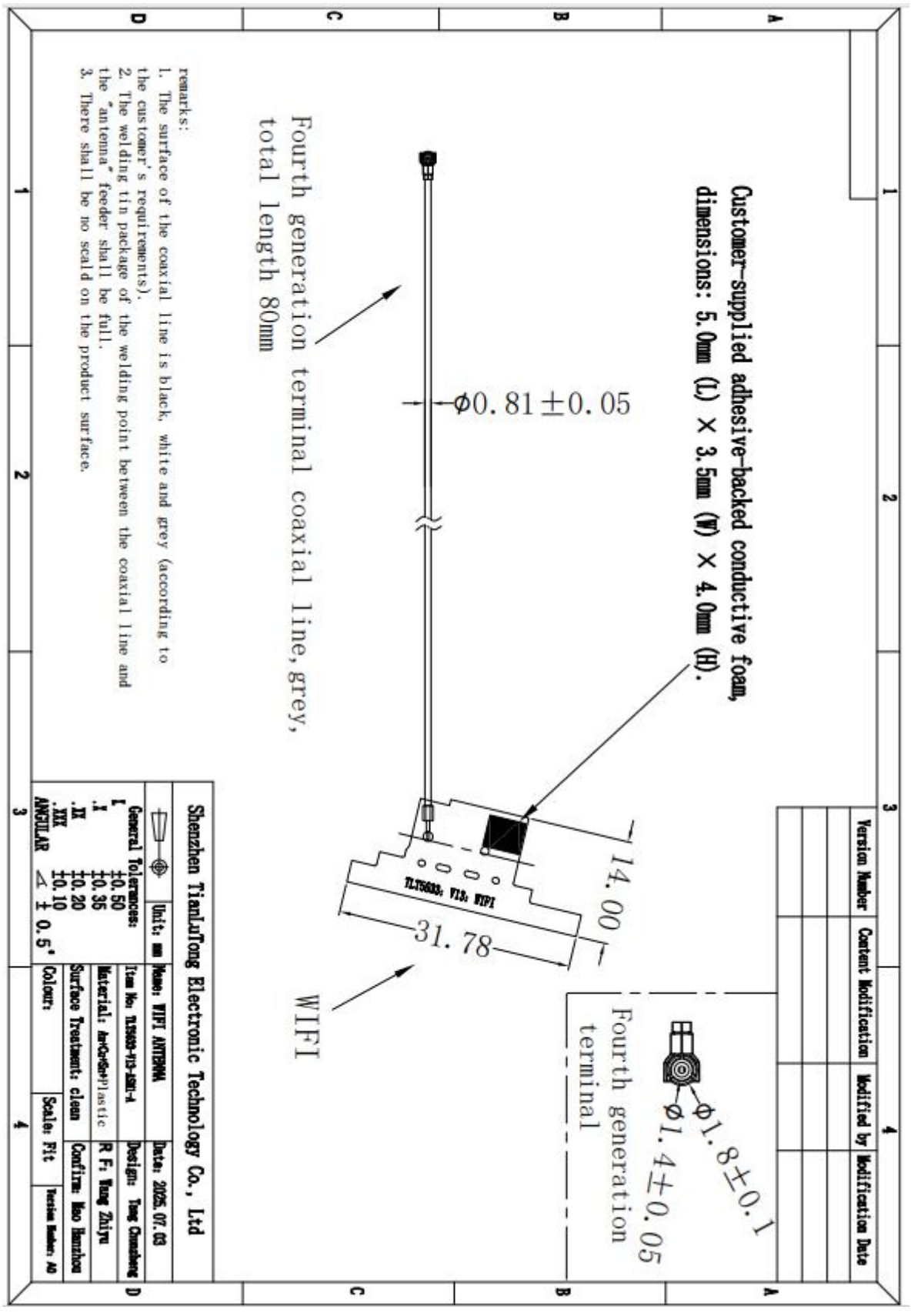
WIFI 2.4G RF Testing		11B(11Mbps)		
Channel		TCH 1	TCH 6	TCH 11
Frequency(Mhz)		2412	2437	2462
	TRP(dBm)	12. 37	12.89	12.43
	TIS(dBm)	-75	-76	-77

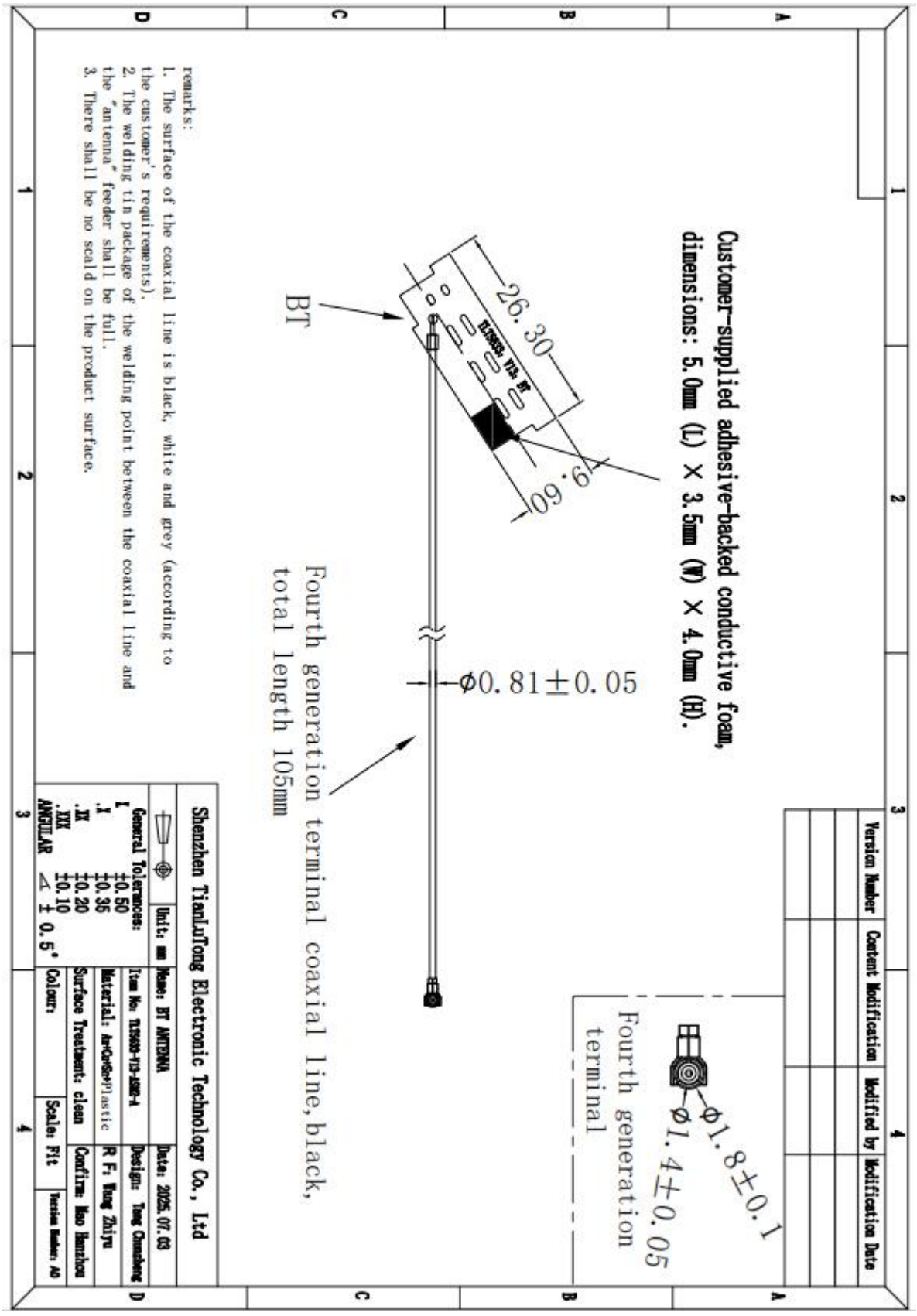
WIFI 5G RF Testing		11A(6Mbps)		
Channel		TCH 36	TCH 100	TCH 157
Frequency(Mhz)		5180	5500	5785
	TRP(dBm)	11. 35	12.15	12.34
	TIS(dBm)	-84	-85	-85

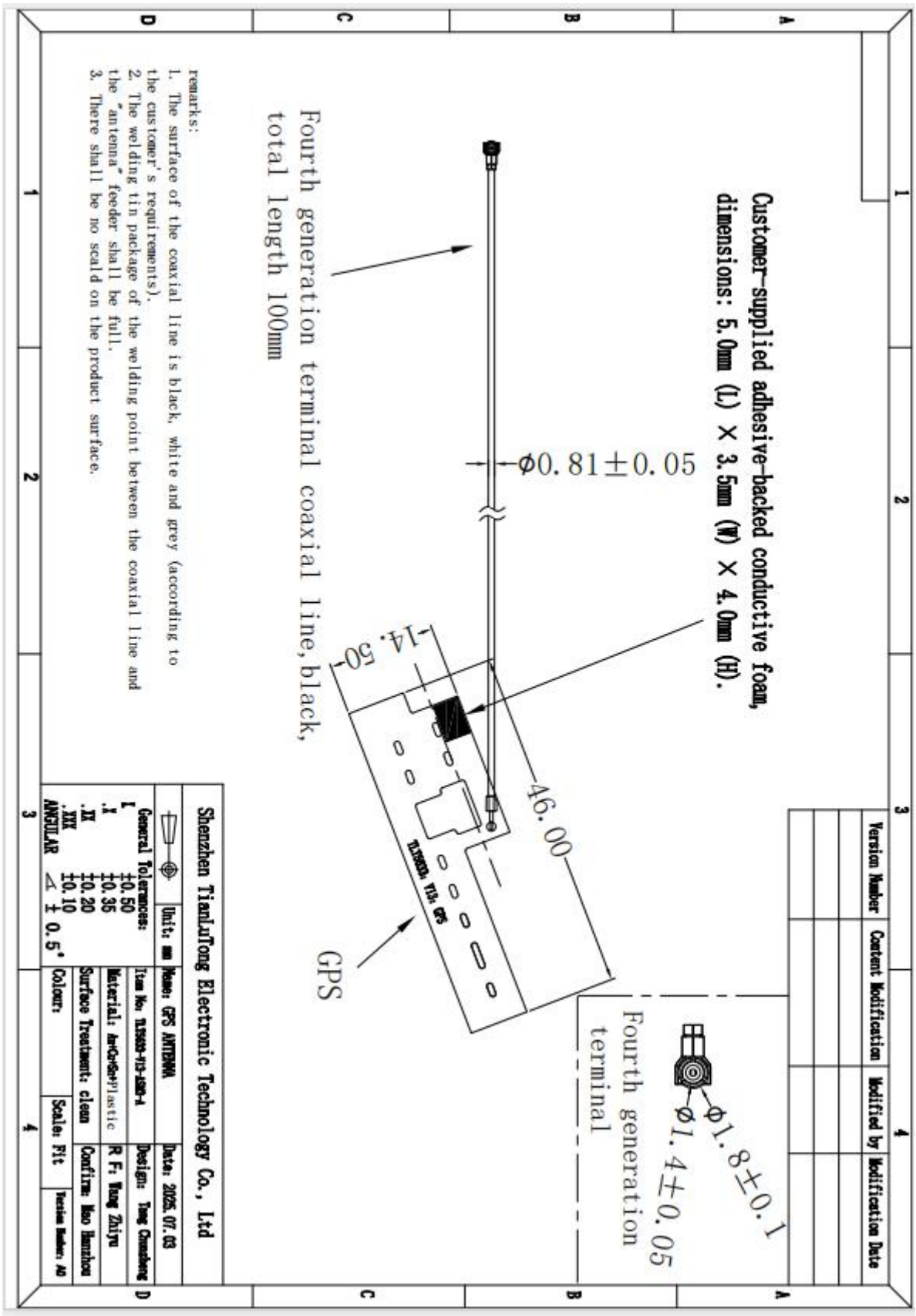


6.Antenna assembly and processing drawing file

7. Antenna 2D profile




Customer-supplied adhesive-backed conductive foam, dimensions: 5.0mm (L) × 3.5mm (W) × 4.0mm (H).
26.30
9.60
BT
Fourth generation terminal coaxial line, black, total length 105mm
φ0.81±0.05
φ1.8±0.1
φ1.4±0.05
Fourth generation terminal
Version Number
Content Modification
Modified by
Modification Date
remarks:
1. The surface of the coaxial line is black, white and grey (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.
Shenzhen TianLuTong Electronic Technology Co., Ltd
Unit: mm
Name: BT ANTENNA
Date: 2025.07.03
General Tolerances:
.X ±0.50
.XX ±0.35
.XXX ±0.20
ANGULAR ±0.10
Item No. TLT5633-V13-ISMC-4
Design: Tang Chunsheng
Material: AntiCorSet-Plastic
R F: Wang Zhiyu
Surface Treatment: clean
Confirm: Mao Wenzhou
Colour:
Scale: Fit
Version Number: A0


Customer-supplied adhesive-backed conductive foam,
dimensions: 5.0mm (L) × 3.5mm (W) × 4.0mm (H).
φ0.81±0.05
46.00
14.50
Fourth generation terminal coaxial line, black,
total length 100mm
GPS
φ1.8±0.1
φ1.4±0.05
Fourth generation terminal
Version Number
Content Modification
Modified by
Modification Date
remarks:
1. The surface of the coaxial line is black, white and grey (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.
Shenzhen TianLuTong Electronic Technology Co., Ltd
Unit: mm
Name: GPS ANTENNA
Date: 2025.07.03
General Tolerances:
.X ±0.50
.XX ±0.35
.XXX ±0.20
ANGULAR ±0.10
Item No: TLT5633-V13-GPS-A
Design: Tang Chunsheng
Material: ABS+Cu+Ni+Plastic
R F: Wang Zhiyu
Surface Treatment: clean
Confirm: Mao Wenzhou
Colour:
Scale: Fit
Version Number: A0