

Antenna specification for approval

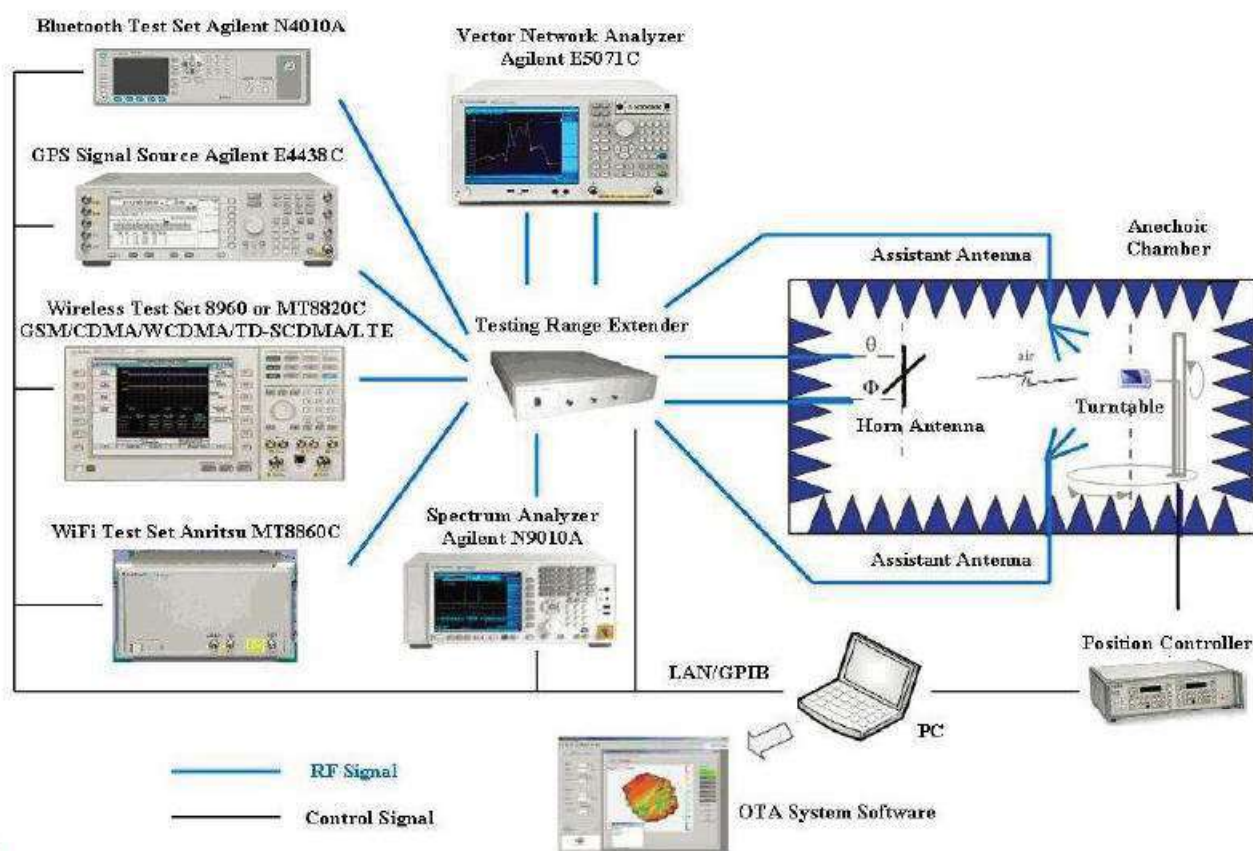
Customer name	Huiwei Intelligence		
Model	1079M-4G		
Antenna frequency	1.575GHz&2.4GHz&5GHz		
Antenna function	GPS&WIFI&BT&5Gwifi antenna		
Antenna material	PCB	PCB color	green
model	PCB-077-2B3-A		
Material number	PCBA-077-2B3-A		
Customer Part Number			
Ward accepted the signature		Client acknowledges signature	
structure		Purchase	
Document control		structure	
radio frequency		engineering	
To examine		QC	
Responsible LTT		To examine	
date 2025.06.04	Seal area	date 2025.06.04	Seal area

Serial number	Certification number	Material type	Date of issue	Remarks
1	SHAEC24025471005	Tinned copper wire	2024-11-25	One year
2	SHAEC24027284565	halogen	2024-12-06	One year
3	SHAEC24027480902	Adhesive	2024-12-06	One year
4	SHAEC24029171725	FEP sheath	2024-12-26	One year
5	SHAEC24027284563	FEP insulation	2024-12-05	One year
6	SZXEC24002306404	Tin wire	2024-07-24	One year
7	SZXEC24002306408	Tin	2024-07-24	One year
8	ETR24600712	Printing ink	2024-06-14	One year
9	A2250132593101001E	Substrate	2025-03-10	One year
10	CANEC24028865417	EVA foam	2025-01-03	One year
11	A2240439752101001	Conductive cloth	2024-07-29	One year
12	SZXEC24002471802	Gold plating	2024-08-08	One year

catalogue

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一: Device support & testable antenna types



Antenna function	frequency range	Testing instruments	Testing method	Testing standards
2G antenna (GSM)	824MHz-960MHz, 1710MHz-1990MHz	5071B, 8960, OTA darkroom	Active testing, passive testing	Soward standards, customer requirements
3G antenna (WCDMA/TDSCDMA/CDMA-EVDO/2000)	824MHz-960MHz, 1710MHz-2170MHz	5071B, 8960, OTA darkroom	Active testing, passive testing	Soward standards, customer requirements
4G天线 (LTE-FDD/LTE-TDD)		5071B, CMW500, SP8011, OTAdarkroom	Active testing, passive testing	Soward standards, customer requirements
WIFI antenna	2.4GHz-2.48GHz, 5.15GHz-5.35GHz, 5.725GHz-5.825GHz	5071B, CMW500, OTAdarkroom, Router, PC	Active testing, passive testing, APK testing, throughput testing	Soward standards, customer requirements
BT antenna	2.4GHz-2.48GHz	5071B, OTAdarkroom, Bluetooth Speaker	Active testing, passive testing, actual testing	Soward standards, customer requirements
Positioning antenna (GPS, GLONASS, Beidou, Galileo)	1575.42MHz ± 10MHz 1602MHz+0.5625MHz 1561MHz+2.046MHz	5071B, OTAdarkroom, APK	Active testing, passive testing, actual testing	Soward standards, customer requirements
NFC antenna	13.56MHz	5071B, Specialized testing fixture, OTAdarkroom, APK	Passive testing and actual measurement	Soward standards, customer requirements
Remote control antenna	433MHz	5071B, OTAdarkroom	Passive testing and actual measurement	Soward standards, customer requirements
NB_IOT	with LTE-FDD	CMW500 (high-end version)	Active testing, passive testing	Under construction (power standard basically consistent with 4G)

二:Overview

(1)Antenna performance

- 1.This approval sheet supports for MID project. PCB antennas include in this project. This report is for the performance of GPS&WIFI&BT antenna.
- 2.Antenna shape size: Meet the requirement of MID
- 3.Antenna band: 1570MHz~1580MHz, 2400MHz~2500MHz&5400MHz
- 4.Antenna material: Antenna material meet the requirement of MID
- 5.Adhesive performance: Adhesive performance meet the requirement of MID
- 6.Antenna performance meet the spec below:

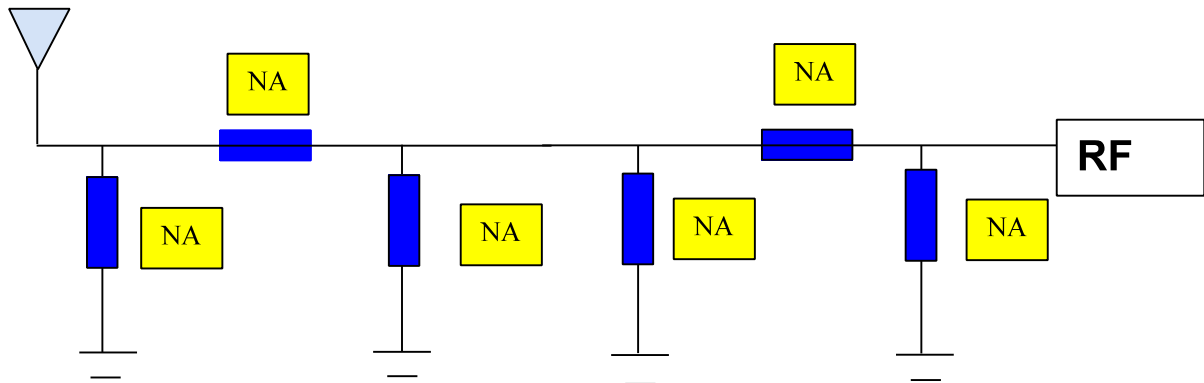
Description	1. 57GHz~1. 58GHz 2. 4GHz~2. 5GHz&5GHz	Units
VSWR	≤ 2.0	
Average Antenna Gain	≥ -4.5	dB
Feed Impedance	50 ohms	
Operating Temperature	-40 to +85 deg C	
Polarization / Azimuth	Linear / Omni-directional	

(2)Mechanical Information

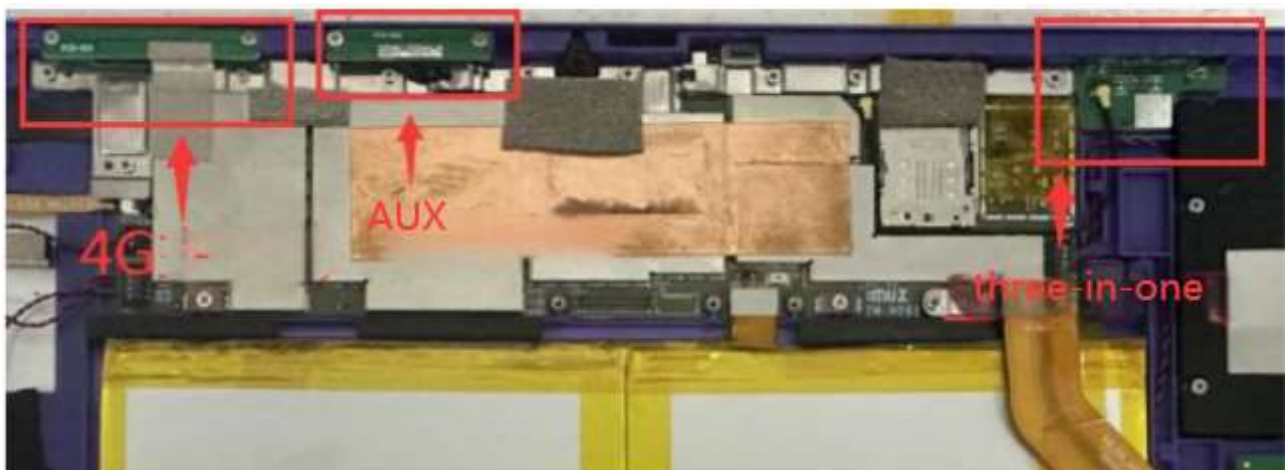
Mechanical Dimension	
Cable Length	NA
Description	GPS&WIFI&BT antenna
Material	PCB
Coaxial Cable	NA
Environmental	
Operation Temperature	-40 to +85 deg C
Storage Temperature	-40 to +85 deg C

三: Match circuit diagrams, machine images, and antenna images

(1) matching circuit



(2) Machine images&antenna images





四:Antenna VSWR&Efficiency&WIFI Active Data



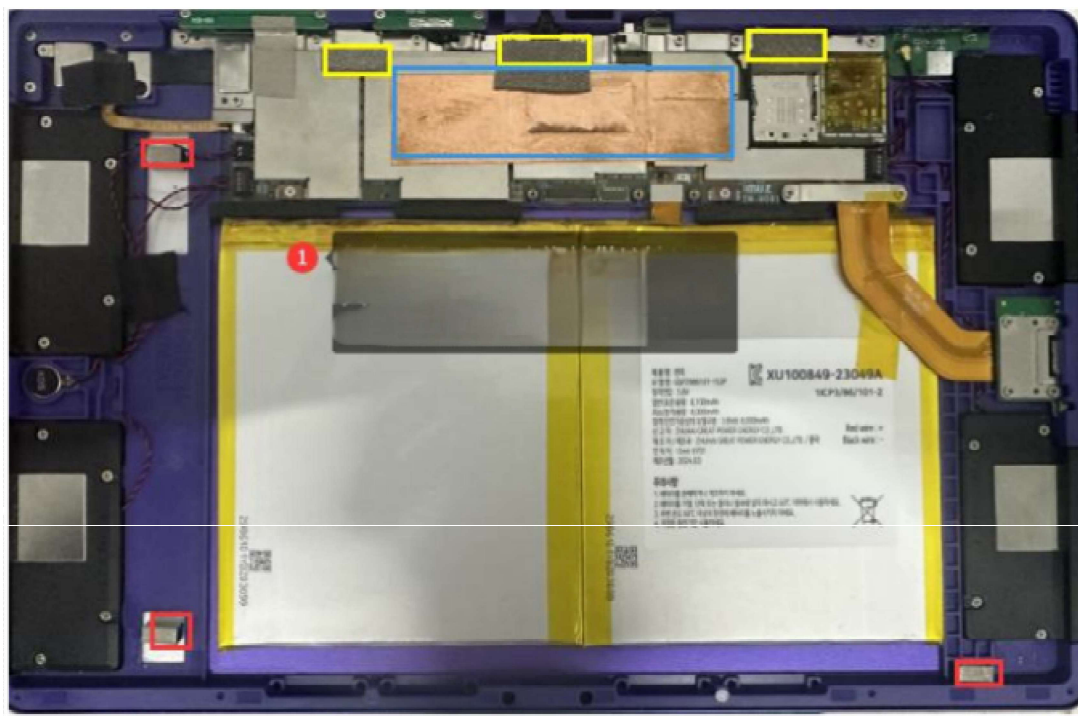
Passive Test For 2.4G				Passive Test For 5G-WIFI			
Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)
2400	22.48	-6.48	0.09	5000	17.74	-7.51	-1.12
2410	22.98	-6.39	0.19	5100	11.87	-9.26	-3.56
2420	24.7	-6.07	0.47	5200	18.35	-7.36	0.42
2430	29.46	-5.31	1.27	5300	29.31	-5.33	2.79
2440	33.06	-4.81	1.8	5400	35.87	-4.45	4.13
2450	35.05	-4.55	2.02	5500	30.62	-5.14	4.13
2460	36.52	-4.37	2.25	5600	26.12	-5.83	2.44
2470	32.83	-4.84	1.82	5700	25.91	-5.87	0.9
2480	33.69	-4.73	1.77	5800	26.88	-5.71	0.68
2490	36.73	-4.35	2.06	5900	18.99	-7.22	-1.21
2500	39.61	-4.02	2.26	6000	26.61	-5.75	-0.2

Passive Test For GPS			
Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
1570	26.48	-5.77	-1.71
1571	26.66	-5.74	-1.82
1572	26.89	-5.7	-1.7
1573	27.18	-5.66	-1.73
1574	27.37	-5.63	-1.65
1575	27.76	-5.57	-1.44
1576	27.72	-5.57	-1.55
1577	27.78	-5.56	-1.53
1578	27.68	-5.58	-1.51
1579	27.57	-5.6	-1.59
1580	27.25	-5.65	-1.53

WIFI active data

Test Result	802.11a : 54Mbps 20M		
	36	100	165
Frequency (MHz)	5180	5500	5825
TRP(dBm)	8.51	9.06	8.68
TIS(dBm)	-70.11	-70.47	-68.62
Test Result	802.11b : 11Mbps 20M		
	1	7	13
Frequency (MHz)	2412	2442	2472
TRP(dBm)	12.55	12.79	12.34
TIS(dBm)	-80.1	-82.33	-81.14
Test Result	802.11g : 54Mbps 20M		
	1	7	13
Frequency (MHz)	2412	2442	2472
TRP(dBm)	10.25	10.33	10.74
TIS(dBm)	-70.39	-70.6	-70.04
Test Result	802.11n : MCS7 20M		
	1	7	13
Frequency (MHz)	2412	2442	2472
TRP(dBm)	10.26	10.37	10.71
TIS(dBm)	-65.39	-66.14	-65.97

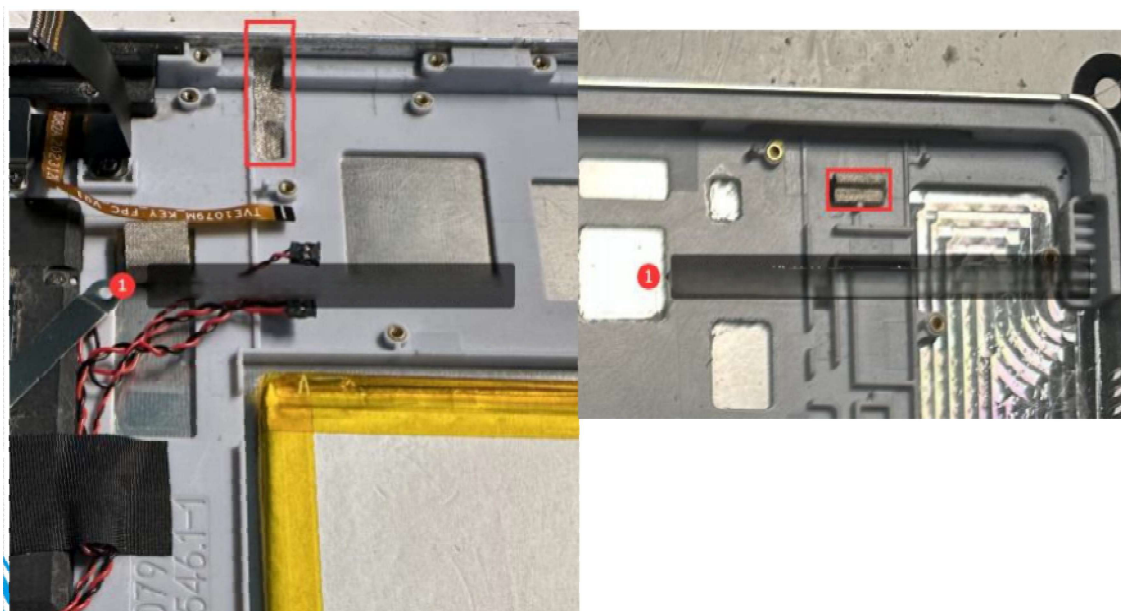
五:environmental treatment



The red box is grounded using conductive foam

The yellow box is grounded using conductive sponge

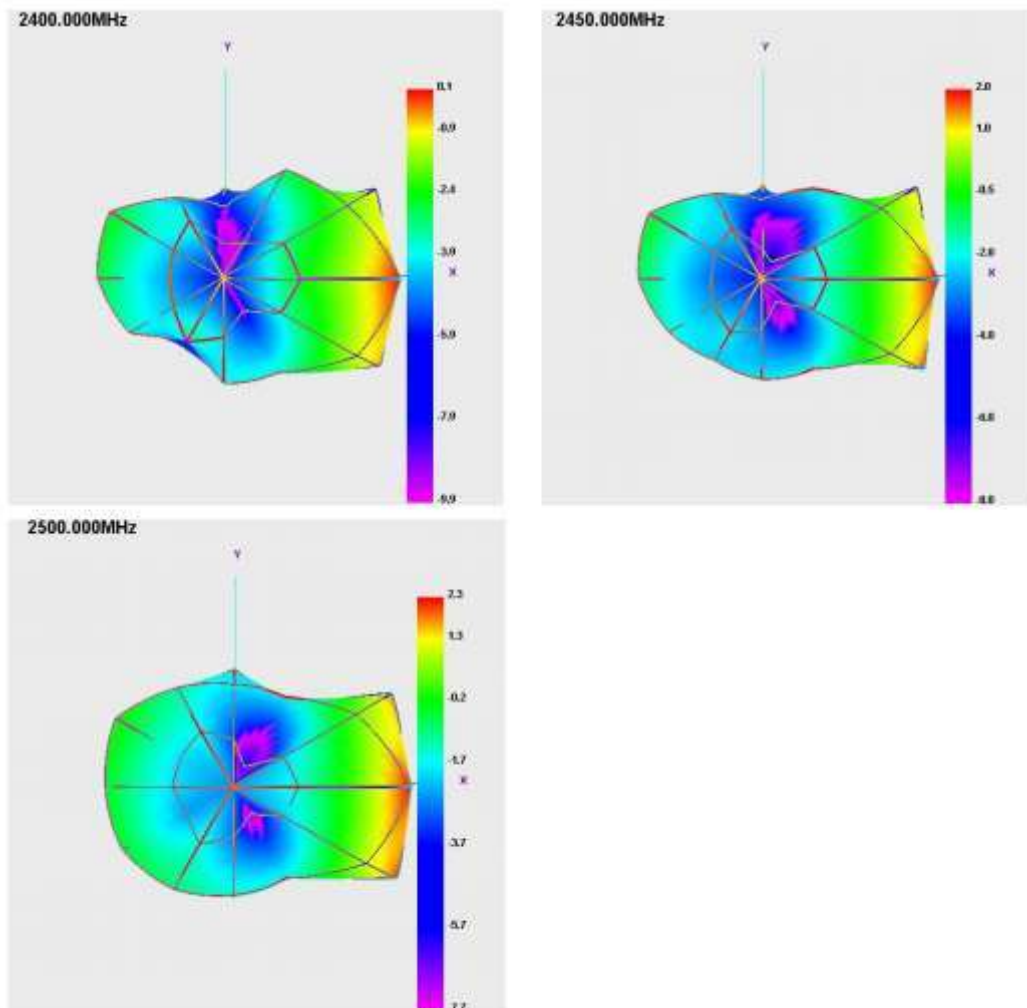
The blue box is grounded using copper foil

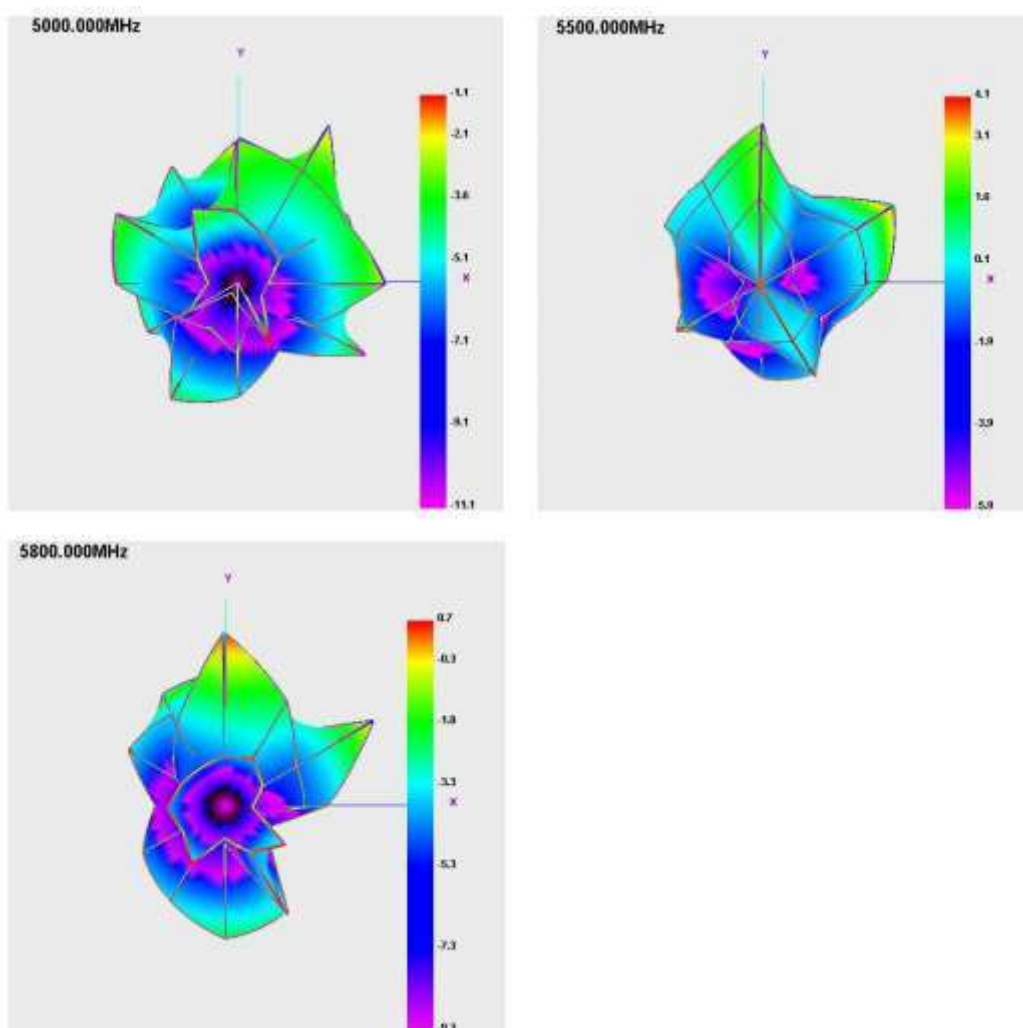


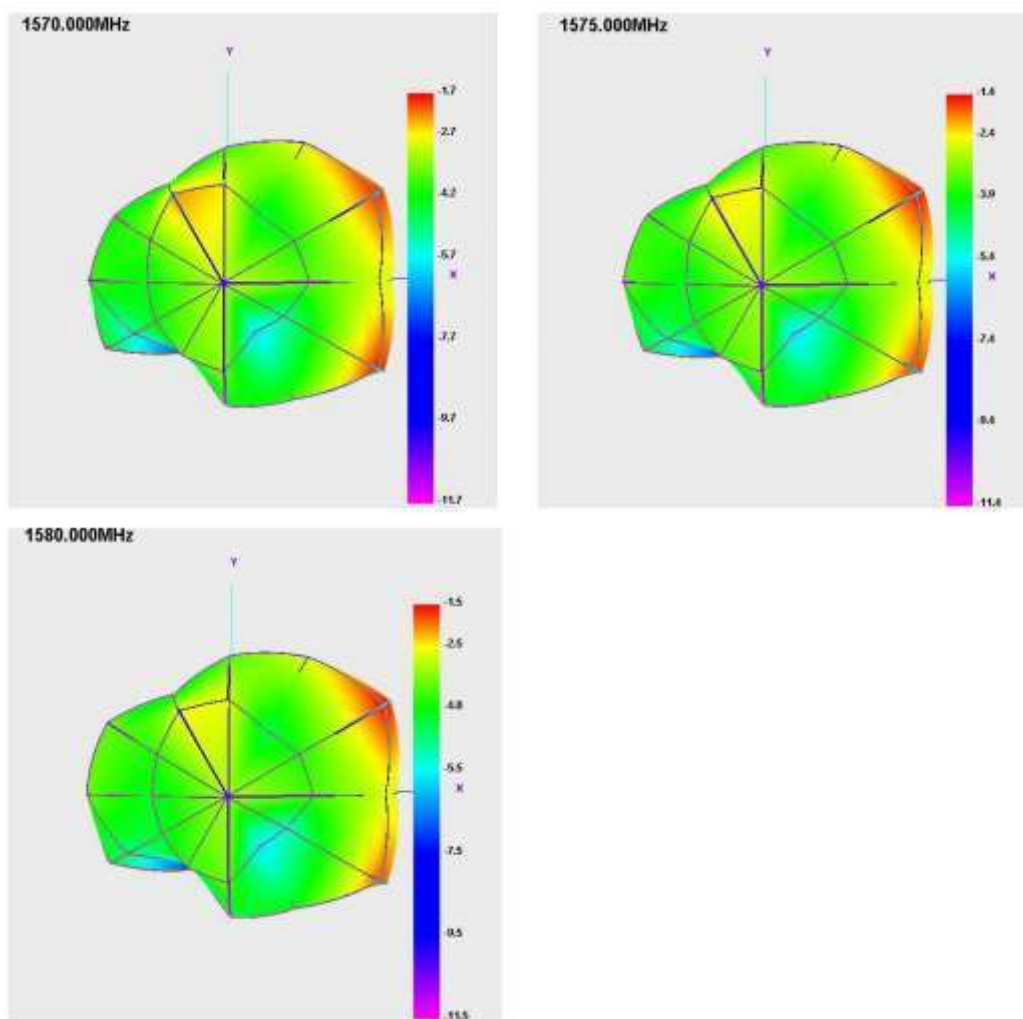
Use conductive cloth for grounding treatment at the broken edge of 4G antenna

It is recommended to use 4mm high conductive foam for grounding treatment at the red box mark

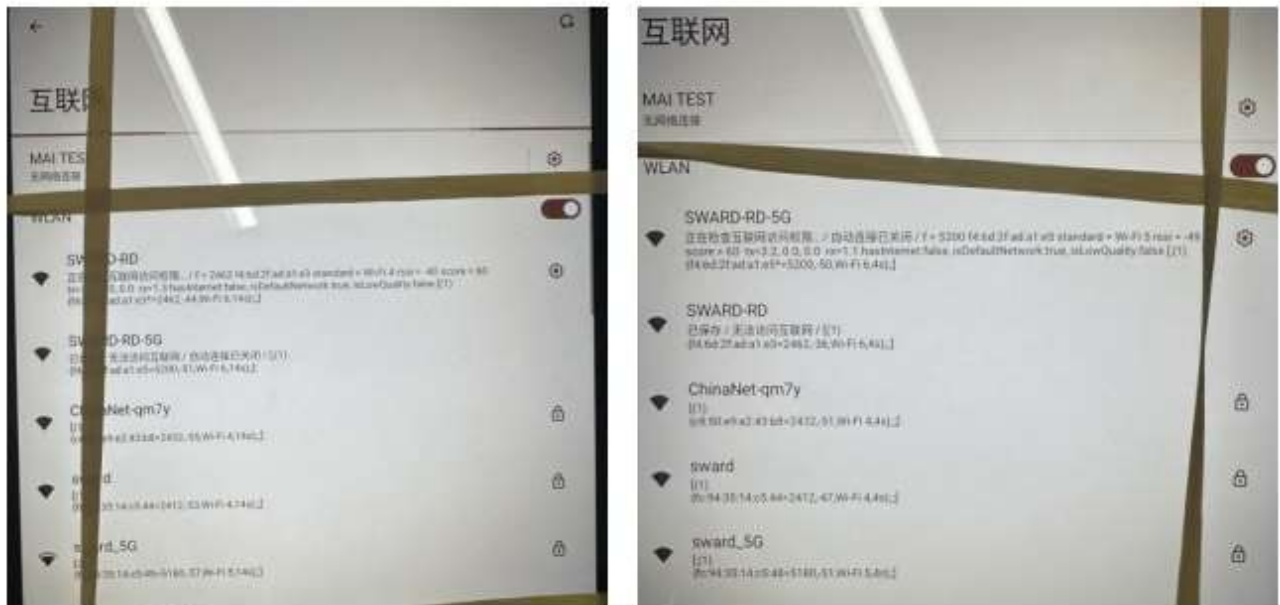
六:3D pattern





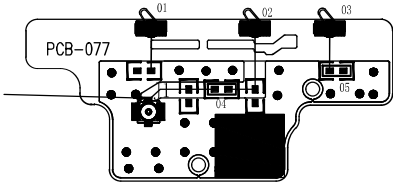


七:Antenna measurement diagram

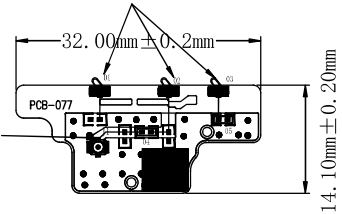


八:structural drawings

Position of the 4th connector signal points

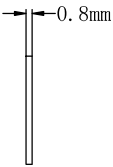


Here is the DZ-T-01-2.4 type horizontal footrest * 3

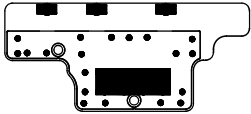


Position of the 4th connector signal points

Front side



The reverse side



Technical Requirements:

- Please use 0.8mm PCB substrate, RF4.
- The yellow areas are the trace sections. Please cover them with green solder mask and use matte white for the text silk screen.
- The yellow shaded areas are exposed soldering points. The process requirement is to apply tin plating.
- All materials must comply with the environmental protection ROHS standard.
- The dimensions marked with "*" are key dimensions, with a tolerance of ±0.03.

5	capacitance	0402 30pf	GRAY	1	Posted at position U5
4	resistor	0402 0 Ω	GRAY	1	Posted at position U4
3	connector	4代	GOLDEN	1	AX005A-151202-A Posted at position J1
2	horizontal		SILVER	3	DZ-T-01-2.4 Posted at position 01/02/03
1	PCB		GREEN	1	PCB-077-2B3-2
serial	NAME	Materials	Colour	Count	Description

Process requirements:

- The PCS plate should have a process margin.
- There should be a gap of no less than 1.5mm between each antenna.

	Signature	Date		Signature	Date
RD	ZYA	2024.5.23			
RF					
			Approval		

SWARD

ShenZhen SWARD Communication Technology Co.Ltd

PCBA-077-2B3-A

Stage marker	Organization	Ratio
123AmmN/A		
Total: 1Number pages:1 Page		

ROHS