Antenna specification for approval

Customer name	Huiwei Intelligence		
Model	TVE8402M (8-inch metal shell handheld navigation tablet/upper and lower plastic decorative parts)		
Antenna frequency	2.4GHZ&5GHz		
Antenna function	WIFI&BT&5G WiFi antenna		
Antenna material	FPC	FPC color	black
model	SF2457A-1B2-A		
Material number	SF2457A-1B2-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

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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

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catalogue

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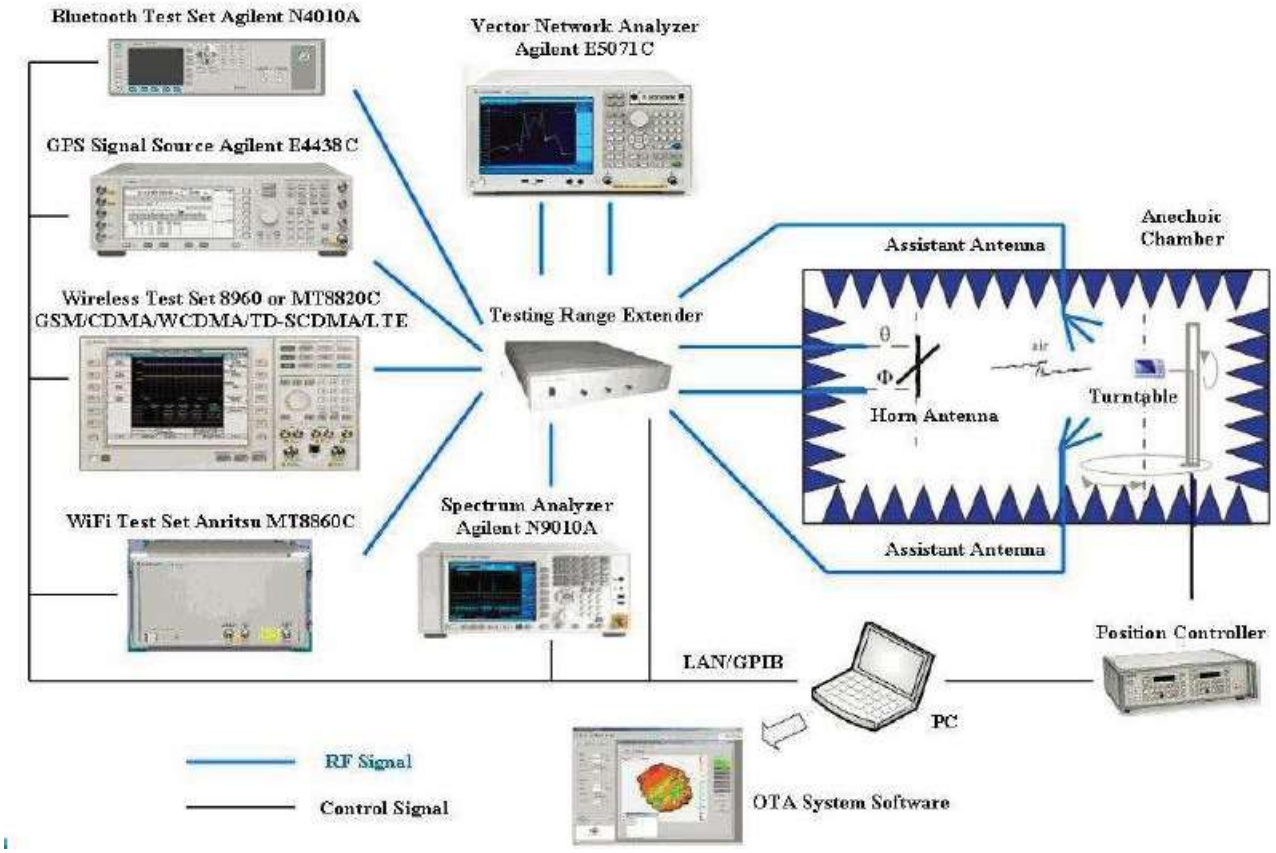
一:Device support&testable antenna types



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. FPC antennas include in this project. This report is for the performance of WIFI&BT antenna.

2. Antenna shape size: Meet the requirement of MID

3. Antenna band: 2.4GHz~5GHz

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:

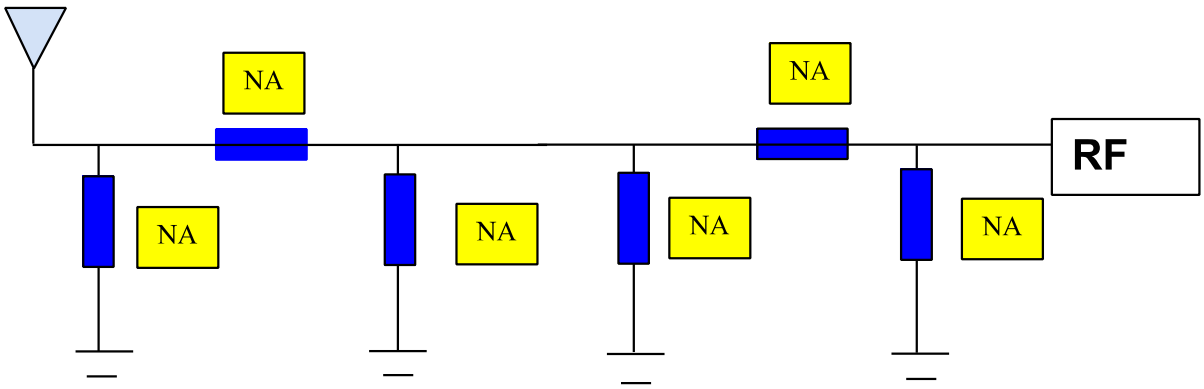
Description	2.4GHz~5GHz	Units
VSWR	≤2.0	
Average Antenna Gain	≥-4.5	dB
Feed Impedance	50 ohms	
Operating Temperature	-40 to +85 deg C	
Polarization / Azimuth	Linear / Omni-directional	

(2)Mechanical Information

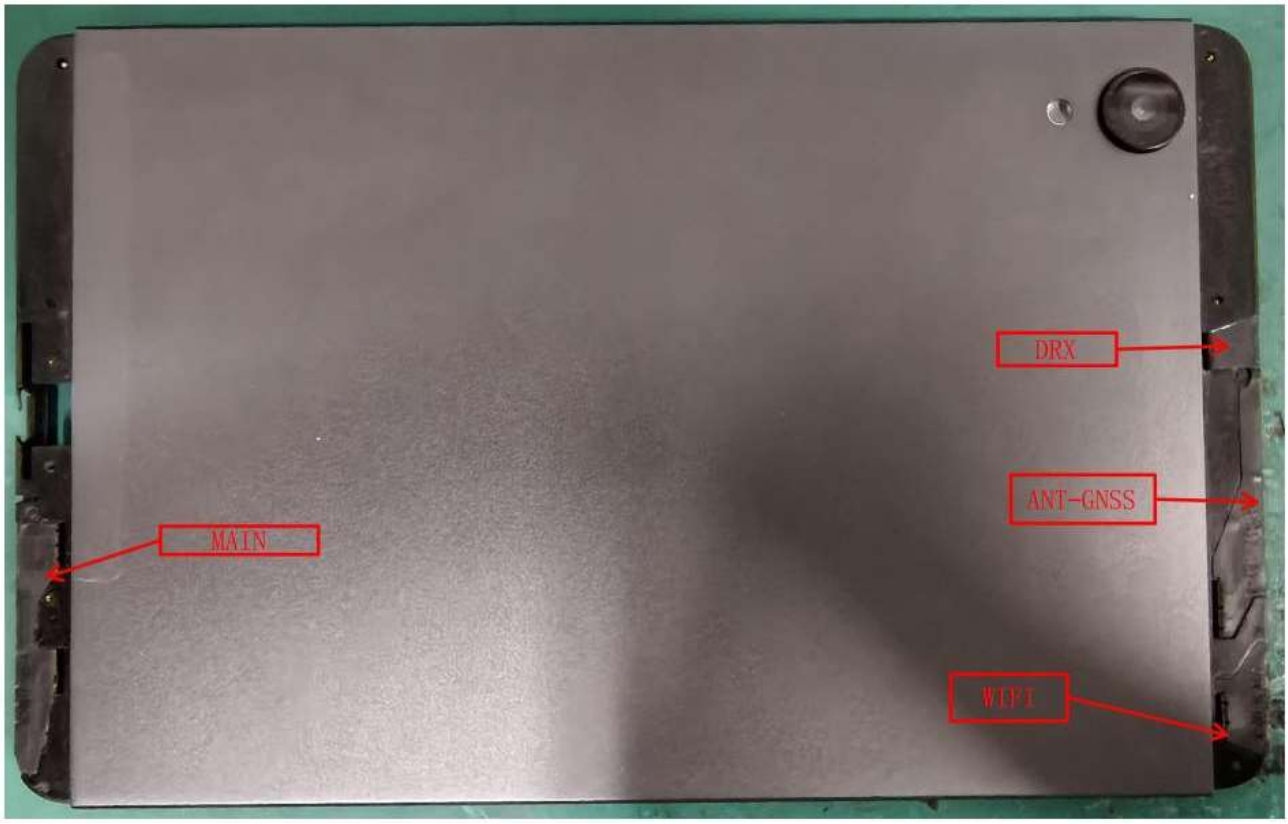
Mechanical Dimension	
Cable Length	NA
Description	WIFI&BT antenna
Material	FPC
Coaxial Cable	NA
Environmental	
Operation Temperature	-40 to +85 deg C
Storage Temperature	-40 to +85 deg C

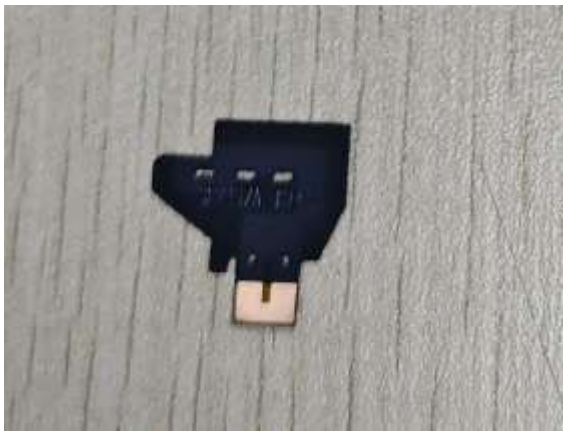
三:Match circuit diagrams, machine images, and antenna images

(1)matching circuit

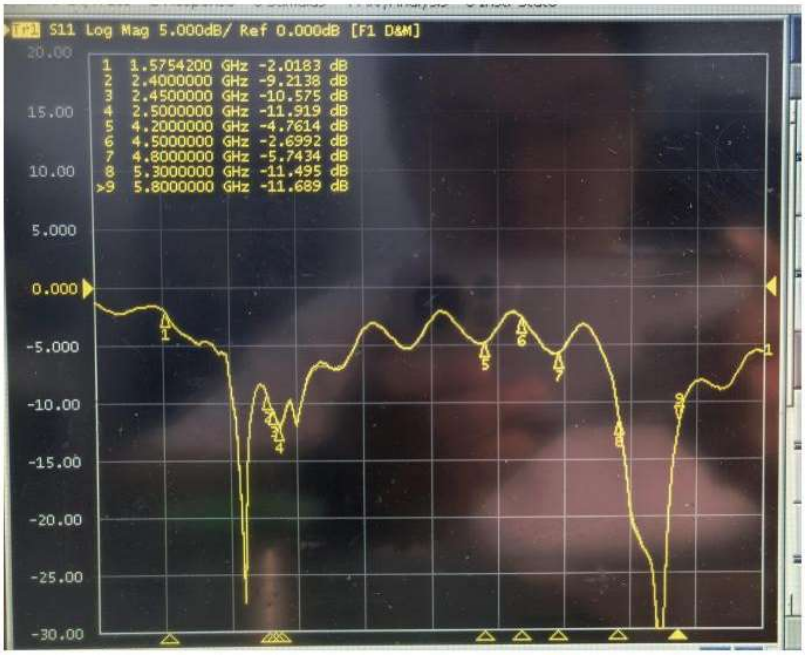


(2) Machine images&antenna images





四 :Antenna Standing Wave Ratio&Antenna Efficiency (VSWR)



Passive Test For 2.4G					Passive Test For 5G-WIFI				
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)
2400	34.61	-4.61	1.77	-0.38	5000	11.25	-9.49	-5.1	-7.25
2410	34.05	-4.68	1.61	-0.54	5100	14.5	-8.39	-4.15	-6.3
2420	34.61	-4.61	1.74	-0.41	5200	16.68	-7.78	-1.59	-3.74
2430	34.65	-4.6	1.75	-0.4	5300	24.3	-6.14	-0.71	-2.86
2440	34.11	-4.67	1.58	-0.57	5400	40.41	-3.93	2.02	-0.13
2450	32.13	-4.93	1.13	-1.02	5500	41.32	-3.84	1.81	-0.34
2460	32.58	-4.87	0.93	-1.22	5600	35.7	-4.47	1.07	-1.08
2470	31.51	-5.02	0.54	-1.61	5700	36.32	-4.4	1.23	-0.92
2480	31.08	-5.08	0.24	-1.91	5800	38.98	-4.09	0.88	-1.27
2490	30.64	-5.14	0.17	-1.98	5900	33.07	-4.81	-0.12	-2.27
2500	28.78	-5.41	-0.16	-2.31	6000	27.61	-5.59	-0.2	-2.35

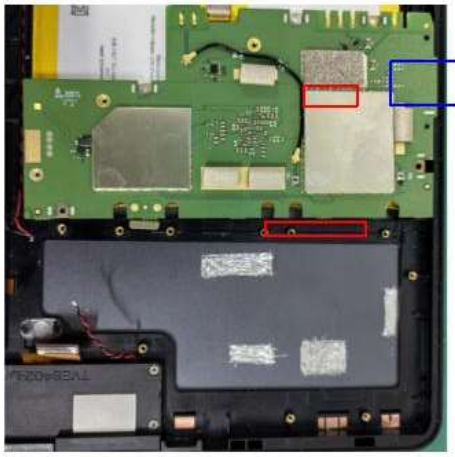
五:Active data

802.11b : 11MBps 20M		
1	7	13
2412	2442	2472
14.11	15.26	14.03
-83.08	-84.06	-82.09

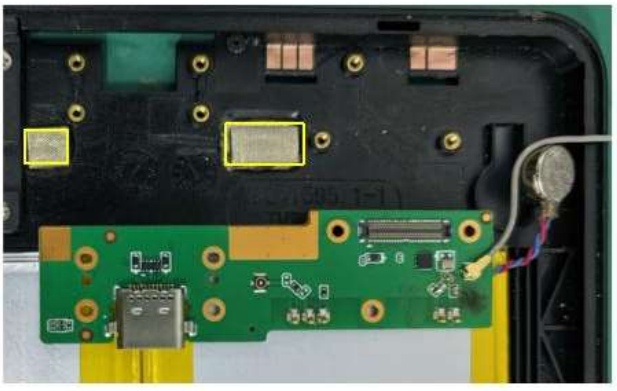
802.11g : 54MBps 20M			802.11a : 54MBps 20M		
1	7	13	36	64	165
2412	2442	2472	5180	5320	5825
13.08	13.95	11.59	7.44	9.17	12.8
-72.88	-72.9	-70.04	-69.07	-68.89	-72.55
802.11n : MCS7 20M			802.11n : MCS7 20M		
1	7	13	36	64	165
2412	2442	2472	5180	5320	5825
12.1	12.79	11.53	7.57	8.61	12.73
-69.31	-69.63	-67.84	-66.29	-65.54	-69.35

六:environmental treatment

1. The metal shell at the red box position has undergone laser engraving treatment。



2. Stick conductive foam at the red box position to ensure sufficient grounding between the motherboard and the metal bottom shell (the conductive foam height of the debugging prototype is about 4mm).
3. Attach a conductive sponge at the blue box position, with a height of 0.5mm, and perform grounding treatment with the metal bottom shell.



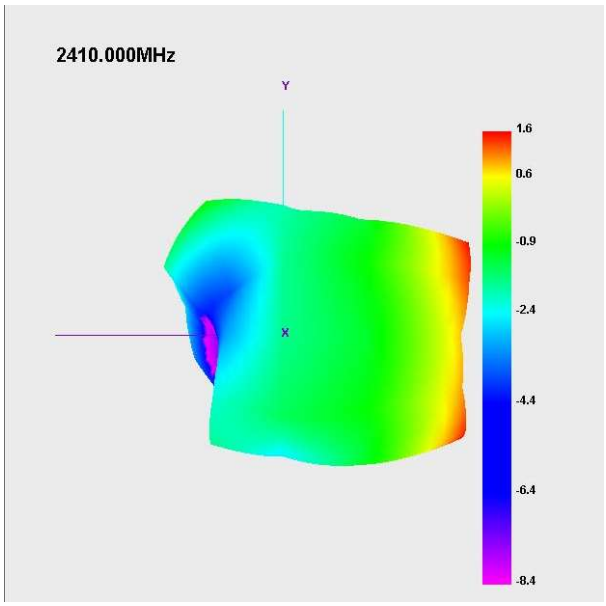
4. Stick conductive foam at the yellow box position and ground it to the small board. (Important, significant impact on 4G)

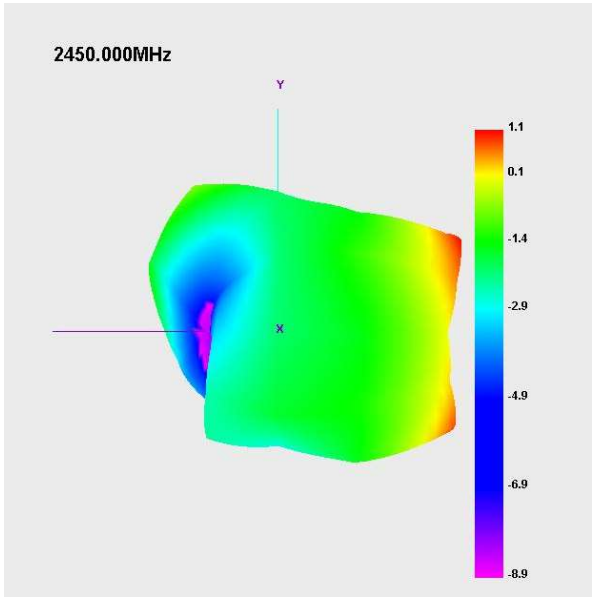
5.Stick conductive foam at the red box position, top to the screen. The ink on the prototype motherboard has not been removed, and these two conductive foam pads are mainly used to interrupt the internal interference path

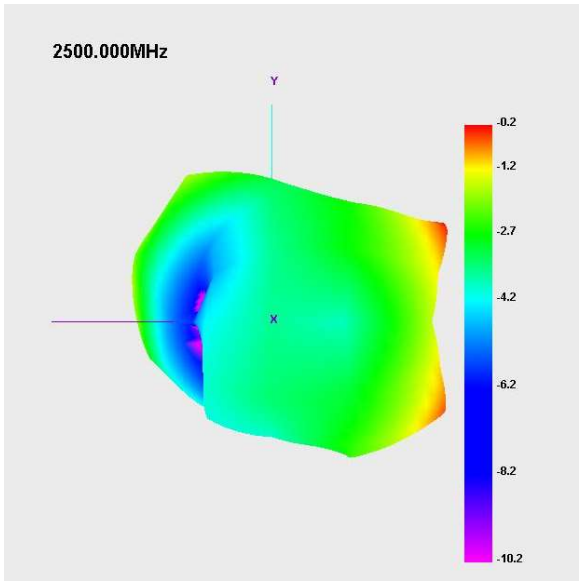
6. Stick conductive cloth at the red box position to shield the screen.
Remove the black plastic from the yellow box position.

Note: Please optimize the specific environmental treatment methods according to the test report

七:3D pattern







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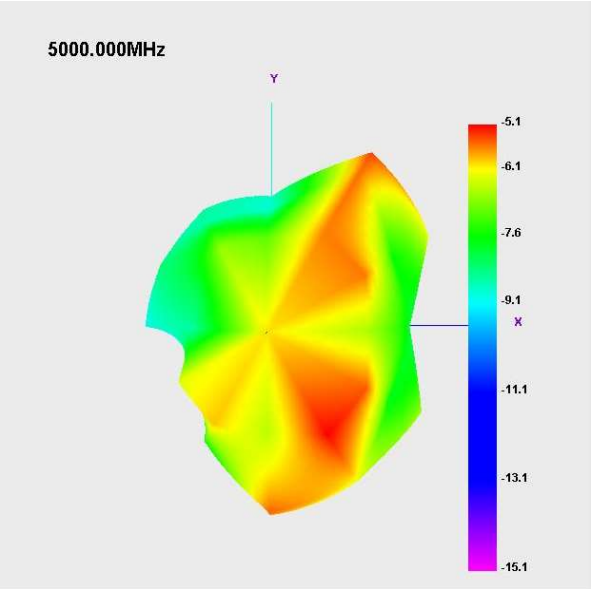
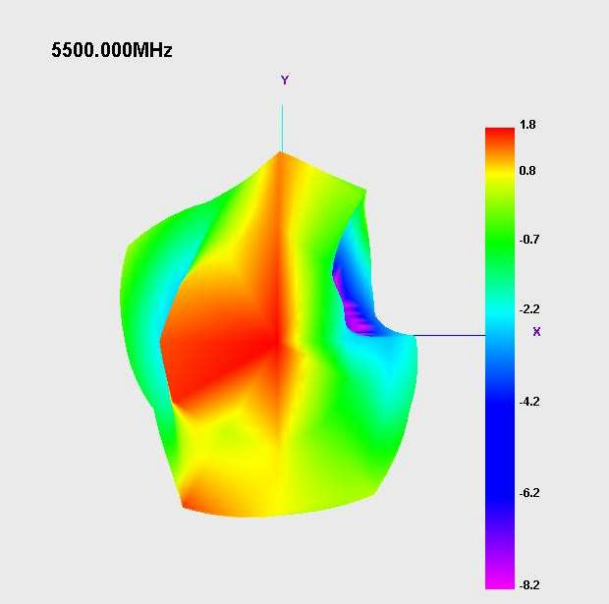
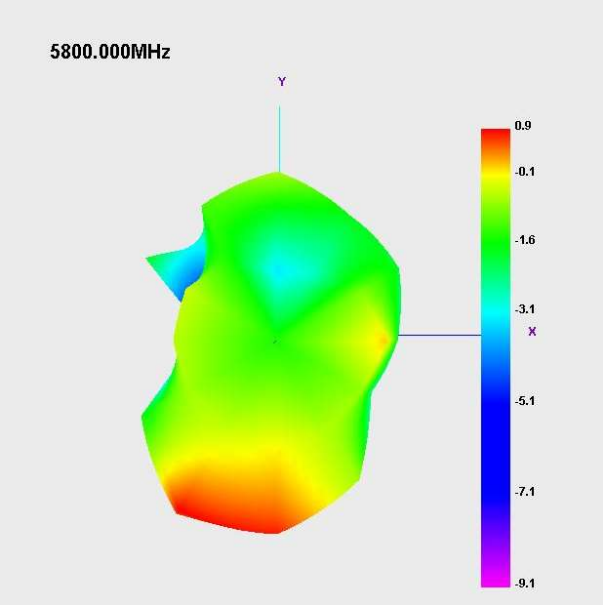
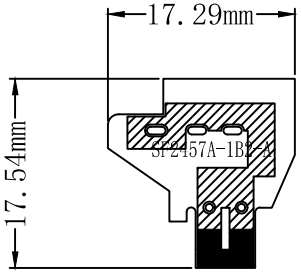




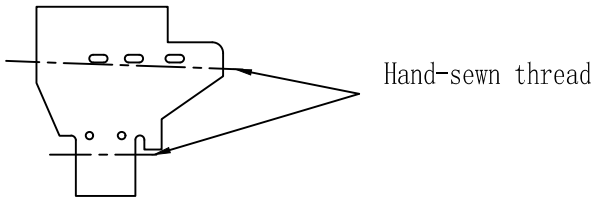


八:structural drawings



Front side

Adhesive 3M-9495



The reverse side

Technical Requirements:

1. Please use a 50/50 PI substrate with electrolytic copper.
2. The yellow areas are the trace sections, with a matte black oil spray on the surface and bright black printing for the text.
3. The yellow shaded areas are exposed soldering points, which require gold plating treatment.
4. All materials must comply with the environmental protection ROHS standard.
5. The dimensions marked with "*" are key dimensions, with a tolerance of ±0.03.

Inspection standards:

1. The external dimensions and circuit dimensions are consistent with the drawings and within the controllable tolerance range.
2. There are no wrong or broken lines in the antenna circuit. Perform a 180° bending test on the FPC bending area. If there is no breakage after more than 5 times, it is considered PASS.
3. The silk screen is clear and there are no misprints.

Packaging requirements:

1. PE sealed bag packaging
2. 100 pieces per bag.

	Signature	Date		Signature	Date
RD	ZYA	2024.12.5			
RF					
Process			Approval		

Stage marker				Organization	Ratio
1	2	3	A	mm	N/A

Total: 1Number pages:1 Page

SWARD

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ROHS