

Sample Confirmation Letter

supplier	Shenzhen SWARD Communication Technology Co., Ltd			Sample Quantity	1PCS		
Sample Name	WIFI main antenna			Material Code	616016002301		
Specification Description	A1600 WIFI A antenna PCB: 33 * 11 * 0.8mm, IPEX-4 generation head wire length 150mm						
Confirm the reason	☐ New material, first recognition ☐ Material change, reason for change: ☐ Supplier change, reason for change: ☐ other:						
Scope of Application	☐ General materials, specialized materials, machine models: _____						
Manufacturer's address	6th Floor, Building B, Hexi Hangcheng Industrial Zone, No. 135 Qianjin 2nd Road, Bao'an District, Shenzhen						
Manufacturer nature	☐ manufacturing enterprise ☐ agent			Contact person/phone number	Luo Zhiwei: 15989585437		
Sample Requirements							
				Test results: ☐ qualified ☐ unqualified			
				test person:			
				date:			
Document List	☐ Specification document ☐ REACHreport ☐ RoHSreport ☐ Proxy certificate ☐ Letter of Guarantee ☐ other:						
Procurement and sample delivery	Elva	structure confirm		R&D confirm		quality confirm	
date		date		date		date	

Antenna specification for approval

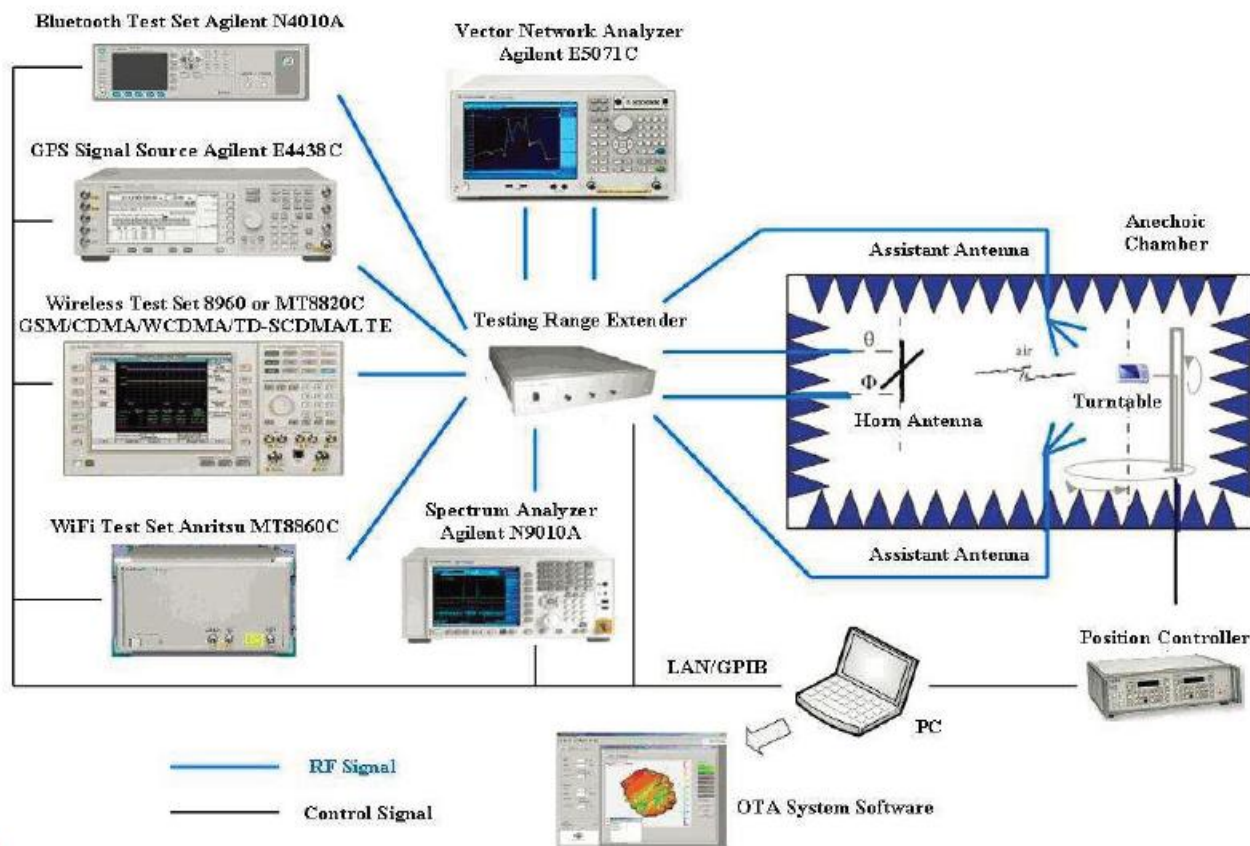
Customer name	Yi Zhong		
Model	A1600-16 inch metal shell - AX210D2W module		
Antenna frequency	2.4GHZ&5GHz		
Antenna function	WIFI&BT&5Gwifi (main) antenna		
Antenna material	PCB	PCB color	green
model	SF2625B-2B3-A		
Material number	SF2625B-2L24B-150-A		
Customer Part Number			
Ward accepted the signature		Client acknowledges signature	
structure		Purchase	
Document control		structure	
radio frequency		engineering	
To examine		QC	
Responsible LTT		To examine	
date 2026.08.08	Seal area	date 2026.08.08	Seal area

Serial number	Certification number	Material type	Date of issue	Remarks
1	A2260126383102001E	Tinned copper wire	2026-03-05	a year
2	SHAEC25032493503	halogen	2025-12-12	a year
3	SHAEC25032493501	Adhesive	2025-12-12	a year
4	A2260280297102001E	FEP sheath	2026-04-21	a year
5	SHAEC26004093123	FEP insulation	2026-02-14	a year
6	SZXEC26003529502	Tin wire	2026-06-09	a year
7	SZXEC26003529506	Tin	2026-06-09	a year
8	ETR26403059M01	Printing ink	2026-05-12	a year
9	A2260137534101001E	Substrate	2026-03-04	a year
10	A226033075810100201	EVA foam	2026-05-06	a year
11	A2250475186101001	Conductive cloth	2025-07-09	a year
12	A2260449180101001E	Gold plating	2026-06-06	a year

Catalogue

一:Device support&testable antenna types.....	1
二:Overview.....	2
三:Match circuit diagrams, machine images, and antenna images.....	3
四:Antenna Standing Wave Ratio&Antenna Efficiency (VSWR).....	4
五:Throughput test.....	5
六:Signal Measurement.....	6
七:Environmental treatment.....	7
八:3D pattern.....	8
九:structural drawings.....	9
十:Fourth generation terminal.....	10
十一:Wire Specifications.....	11
十二:PCB specifications.....	12

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 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:

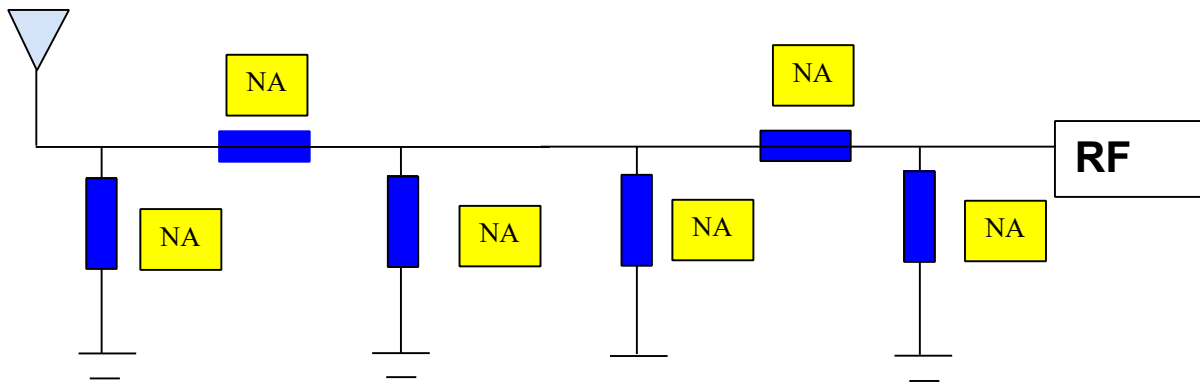
Description	2.4GHz~5GHz	Units
VSWR	≤ 2.0	
Average Antenna Gain	≥ -4.5	dB
Feed Impedance	50 ohms	
Operating Temperature	-40 to +85 deg C	
Polarization / Azimuth	Linear / Omni-directional	

(2)Mechanical Information

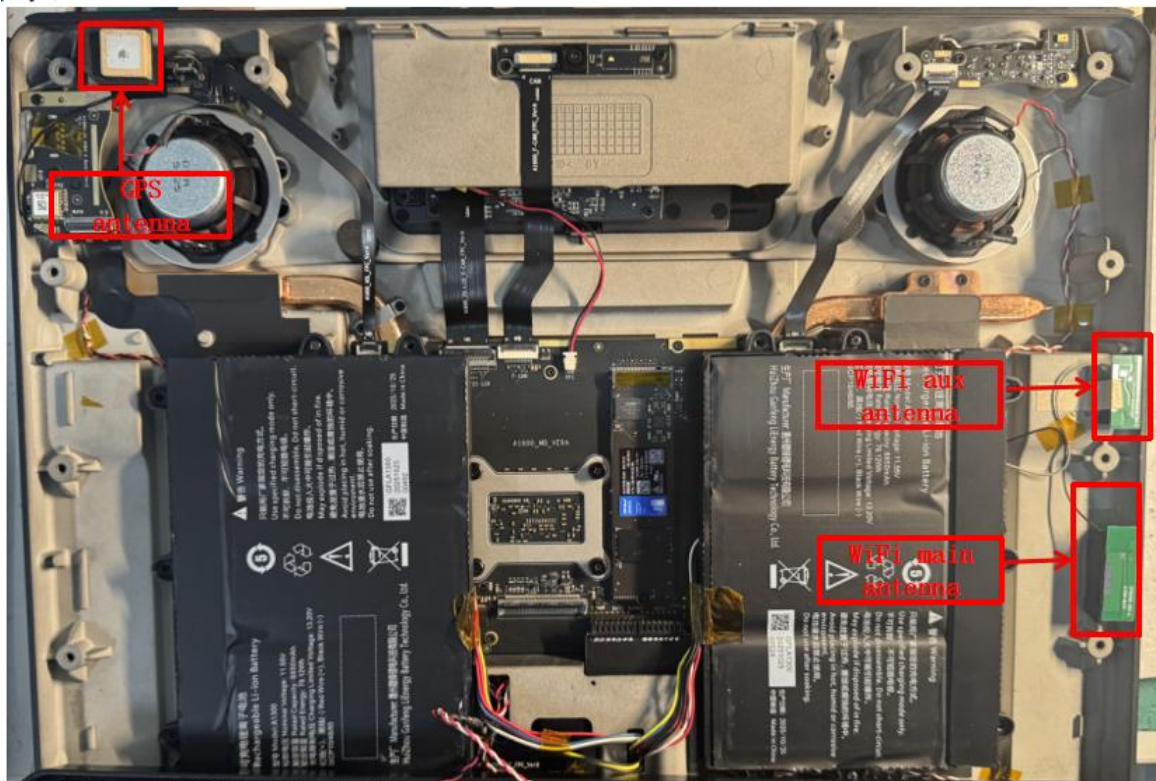
Mechanical Dimension	
Cable Length	150mm/black
Description	WIFI&BT antenna
Material	PCB
Coaxial Cable	50Ω / 0. D. 0. 81mm
Environmental	
Operation Temperature	-40 to +85 deg C
Storage Temperature	-40 to +85 deg C

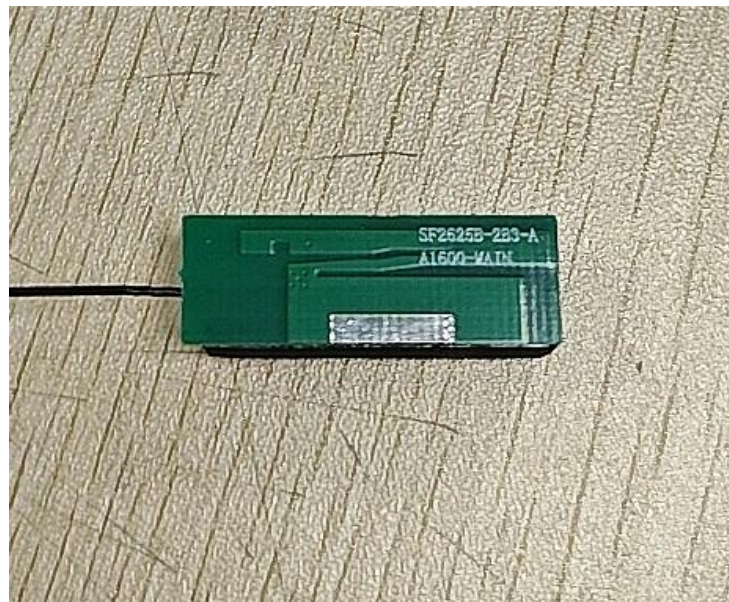
三: Match circuit diagrams, machine images, and antenna images

(1) Matching circuit



(2) Machine images&antenna images





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

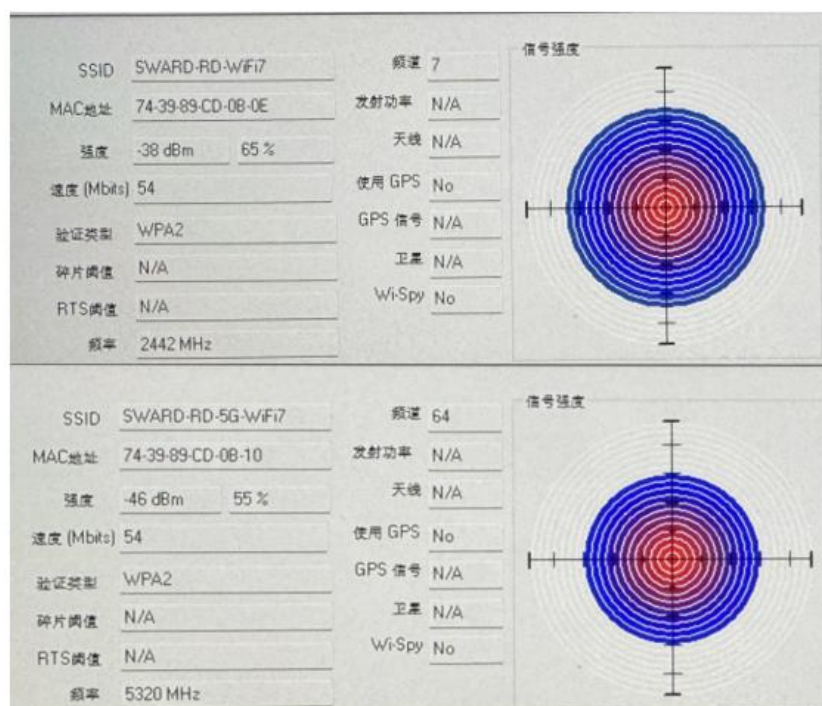


Passive Test For 2.4G				Passive Test For 5G-WIFI			
Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)
2400	19.61	-7.07	-0.24	5000	16.31	-7.88	-2.31
2410	21.36	-6.7	0	5100	18.48	-7.33	-0.46
2420	22.32	-6.51	0.09	5200	18.37	-7.36	-0.25
2430	23.34	-6.32	0.22	5300	20.03	-6.98	-0.27
2440	23.83	-6.23	0.34	5400	19.73	-7.05	-0.41
2450	25.52	-5.93	0.56	5500	23.21	-6.34	-1.27
2460	26.95	-5.69	0.53	5600	22.66	-6.45	-0.67
2470	26.2	-5.82	-0.07	5700	20.04	-6.98	0.06
2480	25.47	-5.94	-0.26	5800	24.64	-6.08	1.03
2490	25.72	-5.9	-0.48	5900	22.88	-6.41	1.46
2500	25.89	-5.87	-1.05	6000	24.56	-6.1	2

五:Throughput test

Iperf throughput test						
model		Module		software version		
Model number	channel	distance	Test Angle	Test data (TX) 1-minute mean	Test data (RX) 1-minute mean	Remarks (number of packet drops)
2.4GWIFI		15 meters	0°	62.3M/S	106M/S	0
			90°	60.4M/S	108M/S	
			180°	66.2M/S	110M/S	
			270°	62.8M/S	109M/S	
5GWIFI		15 meters	0°	410M/S	506M/S	0
			90°	424M/S	501M/S	
			180°	418M/S	510M/S	
			270°	425M/S	507M/S	

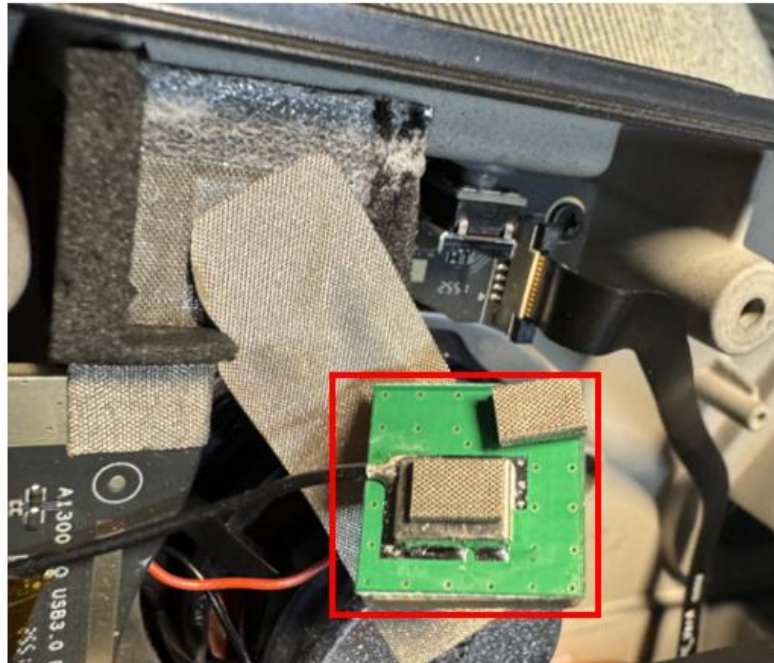
六:Signal Measurement



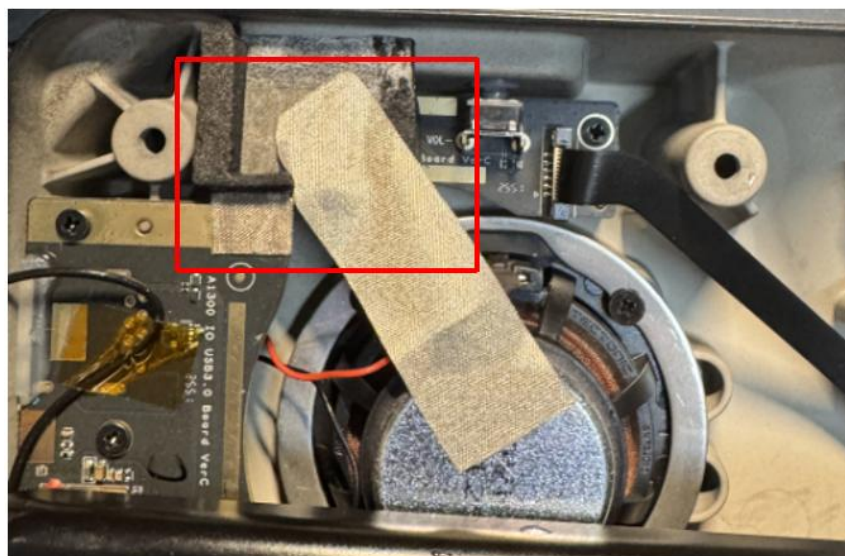
Test location: Our R&D office
 Test time: 14:00-14:30
 Test distance: 10-15 meters
 Signal strength: -48dBm to -39dBm

Actual test effect	
Model number	1
test environment	SWARD R&D Center
test equipment	Huawei AM08
test distance	10m➤

七:Environmental treatment



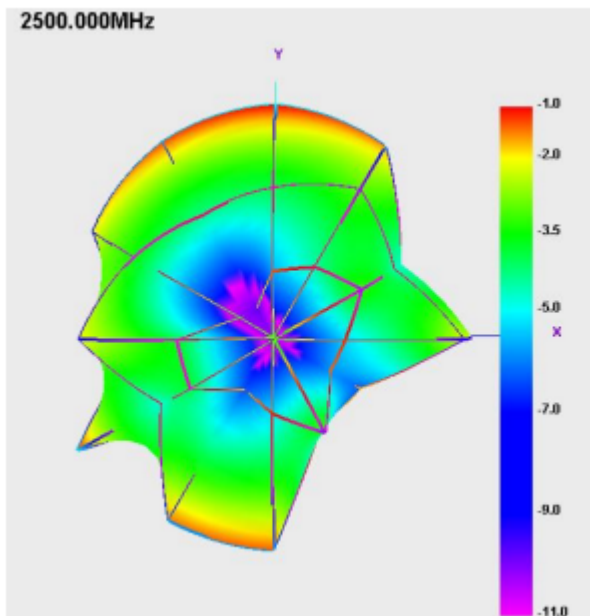
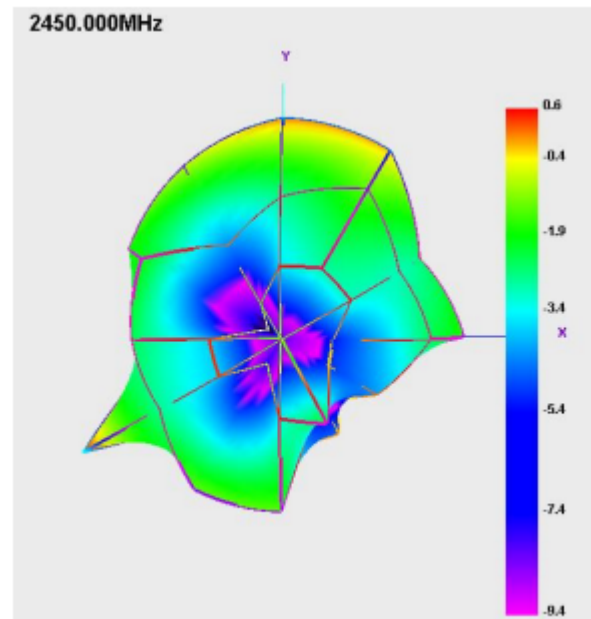
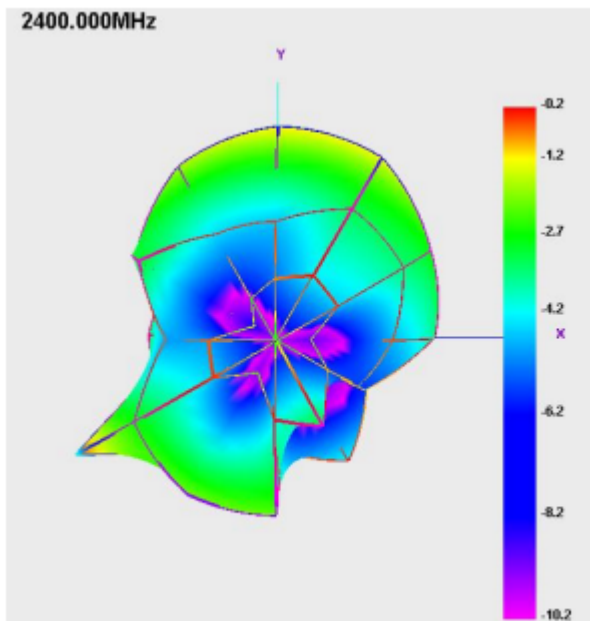
1. Use double-sided conductive foam to ground GPS and the conductive cloth below the red box mark

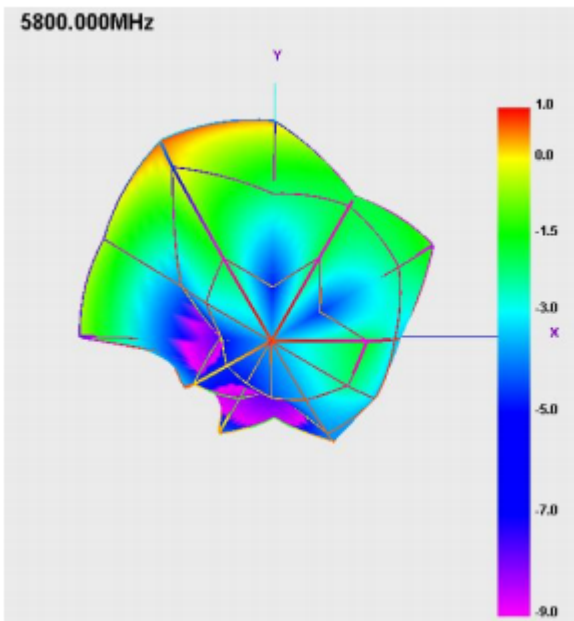
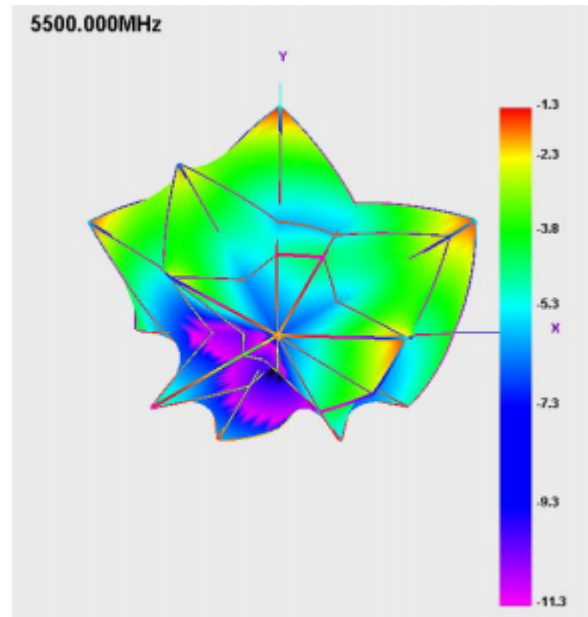
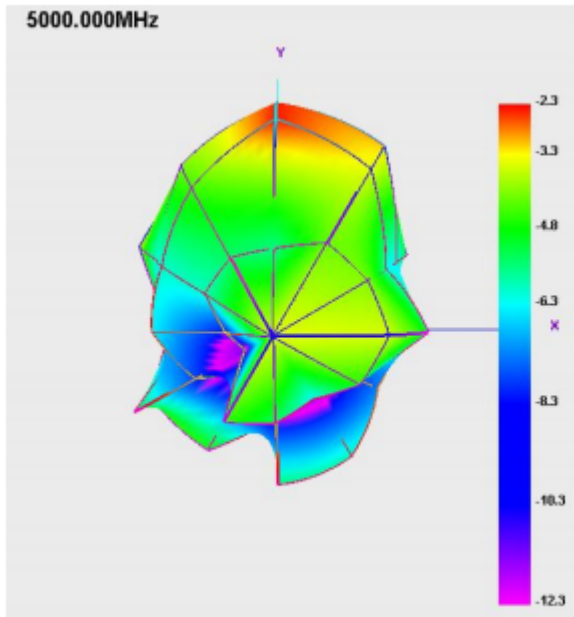


1. Use conductive cloth to ground the GPS, PCB board, and speaker at the red box mark

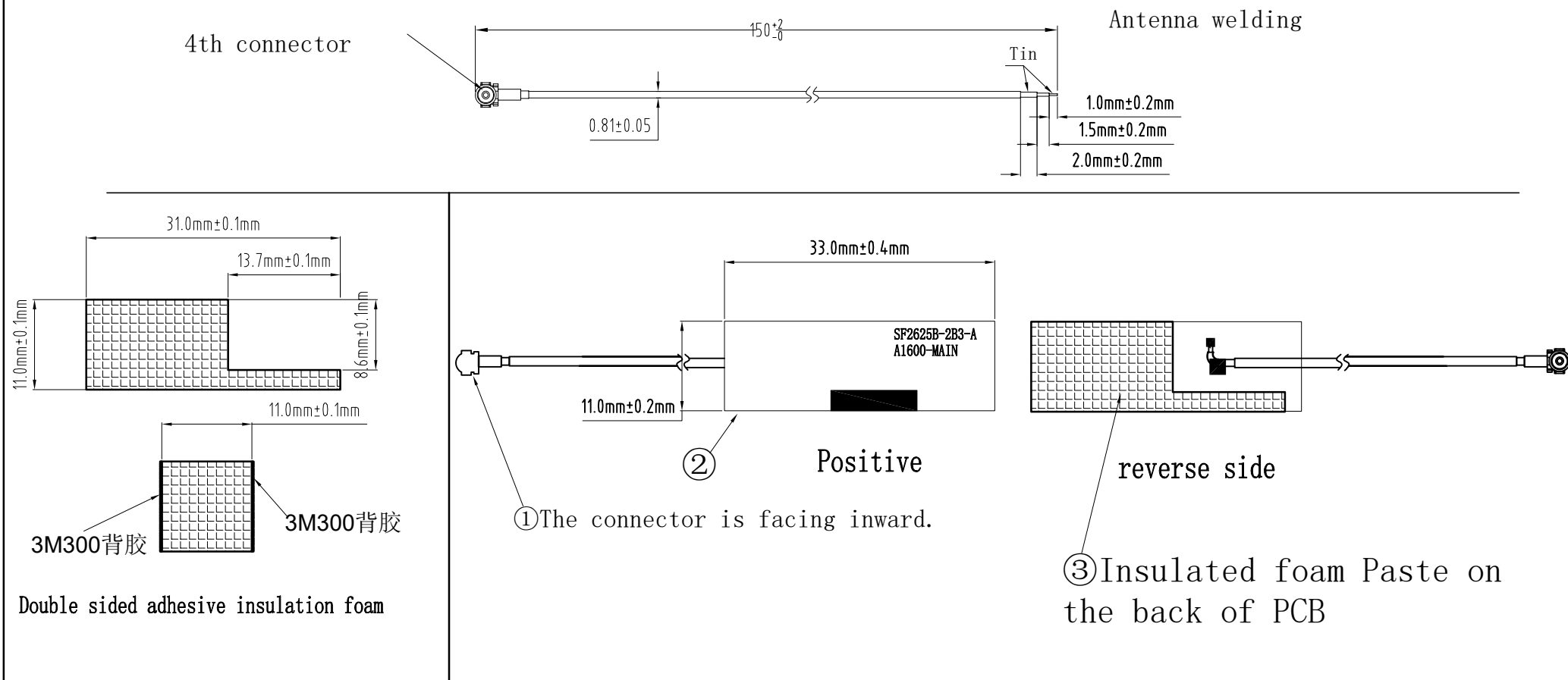
Note: Please optimize the specific environmental treatment methods according to the test report

八:3D pattern





九:structural drawings



Technical Requirements:

1. Mark * for critical dimensions;
2. Dimensions must comply with the drawing requirements;
3. No incomplete or false soldering at the joints. The joints should be smooth and full.
4. The network test is passed (with the specified waveform).
5. The dimensional tolerances not specified are at level 6 of SJ/T 10628 1995, and the tolerance values are calculated by averaging the upper and lower deviations.



5											
4											
3	Double sided adhesive insulation foam		Black	1	31*11*11mm		Signature	Date		Signature	Date
2	PCB		Green	1	SF2625B-2B3-A	RD	WYT	2026. 8. 8	QC		
1	coaxial cable	4th connector	Black	1	φ=0.81mm	RF					
Serial	NAME	Materials	Colour	Count	Description	Process			Approval		

SWARD

ShenZhen SWARD
Communication Technology Co.Ltd

SF2625B-2L24B-150-A

Stage marker

Organization

Ratio

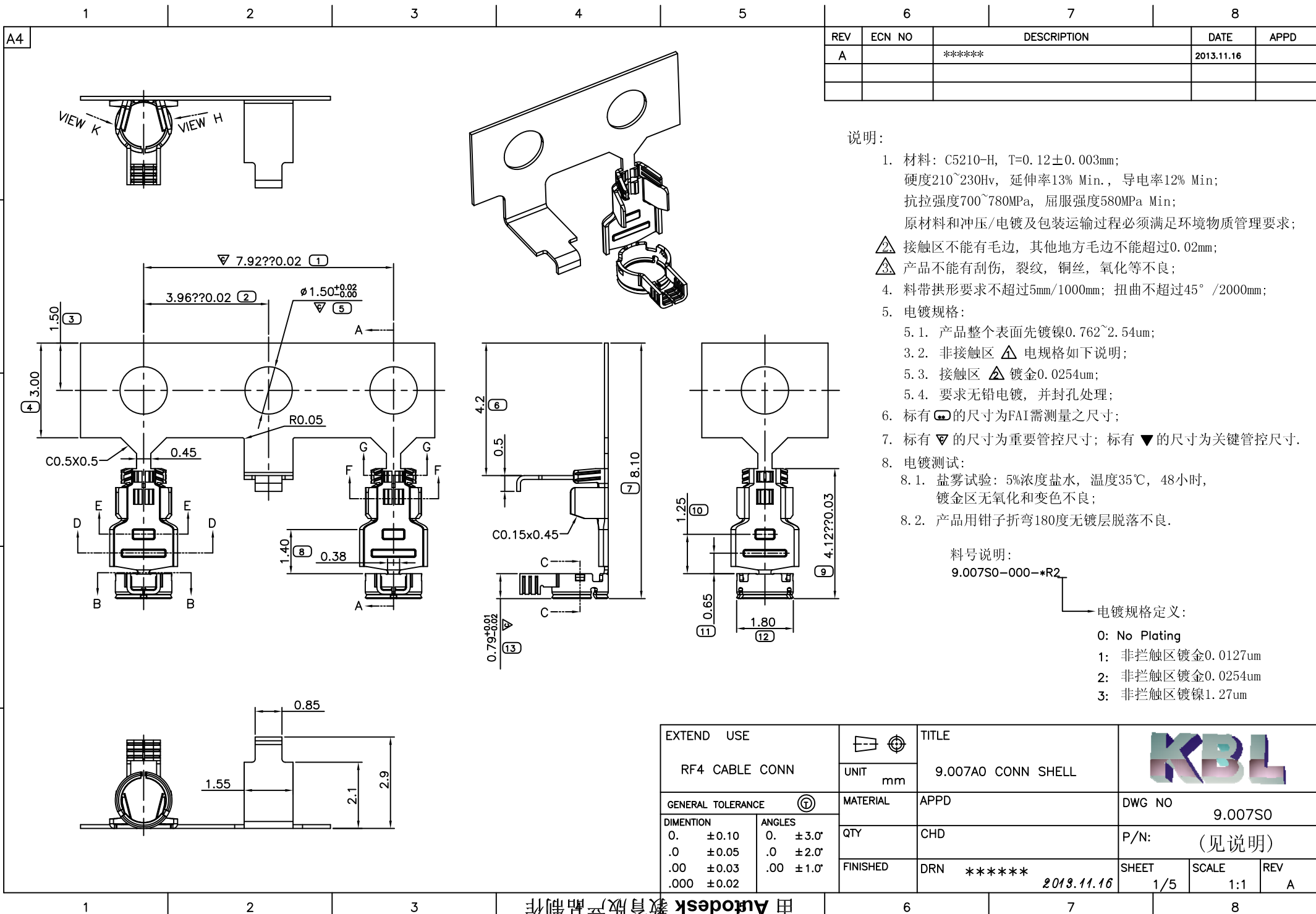
A

mm

N/A

Total: 1Number pages:1 Page

ROHS



Type	RF-0.81/50	P/N	SY081/50-003(Black)	
Structure drawing				
Structure characteristics				
Structure	Item		Standard value	
① Inner conductor	Material		Silverplated copper wire	
	Makeup:total / O.D. of every wire(mm)		7/0.05	
	(Intertwist)NOM.O.D.(mm)		0.15±0.01	
② Insulation	Material		FEP	
	Color		Clarity	
	NOM.O.D.(mm)		0.41±0.02	
③ Outer conductor	Material		Tinned copper wire	
	Makeup:total / O.D. of every wire(mm)		5/0.05	
	NOM.O.D.(mm)		0.6±0.05	
	Coverage ratio(%)		90±5	
④ Jacket	Material		FEP	
	Color		Black	
	NOM.O.D.(mm)		0.81±0.05	
Electrical characteristics				
Item	Standard value	Item	Frequency	Standard value Unit:dB/m
Capacitance(pF/m)	98	Attenuation	1GHz	≤3.1
Velocity(%)	70		2GHz	≤4.7
Impedance(Ω)	50±2		3GHz	≤5.8
Standing wave ratio	≤1.3@0~6GHz		4GHz	≤6.9
Max.operating voltage(V)	1000		5GHz	≤7.8
Max.operating frequency(GHz)	6		6GHz	≤8.5
Dependability				
Item		Unit	Standard value	
Min.bending radius static		mm	4	
Min.bending radius repeated		mm	—	
Operating temperature		℃	-55~+200	
Packing				
Item		Unit	Standard value	
Packing mode		/	Papery plate	
The length of each plate		m	1000	
Each connector plate number		/	≤5	
The shortest length of each root		m	≥10	
Use tips				
Storage environment		temperature: 30℃以下: humidity: 20%~65%		
The best save cycle		2 months; After more than 2 months, the workability decreases, and the soldering effect deteriorates, but the electrical performance is not affected. It is necessary to circulate as soon as possible after peeling in the high temperature and high humidity environment in summer		
Processing temperature		Under the extreme condition of 260 ℃, it can withstand for a short period of time; Molecules above 300 ℃ typically have equi terminal groups that will decompose; Significant thermal decomposition occurs above 400 ℃		
Teflon Shrink		Inherent material properties. Insulation: below 0.2mm; Sheath: below 0.3mm		
Jacket traverse		Processing length (residual length of sheath) less than 5cm is prone to occur		
Other				
Special processing technology, please consult with the supplier before use				

P/N		Customer P/N	SF2625B-2L24B-150-A	Customer	Soward	
QTY Shipped		QTY Sampled	10 PCS	(AQL Level II)		
Item	Description		Requirement	Actual	Result	
					ACC	REJ
1) lamineate	Material type		☒ FR4 ☐ Other	FR-4	ACC	
	supplier		Shengying ☒ KB ☐ LIANMAO	KB	ACC	
	Color		☒ yellow ☐ WHITE ☐ GREEN	YELLOW	ACC	
	Finished thickness		0.8±10% mm	0.9-1.1mm	ACC	
2) plating thickness	Copper(PTH)		☐ 20um ☐ 25um	22UM	ACC	
	Inner copper		☐ H/H ☐ 2/2/2/2 ☐ 2/2 ☐ 3/3 ☐ 4/4	/	ACC	
	Copper(overall)		>35um	35um	ACC	
	Tin/lead		/	/	ACC	
	Nickel		3UM	3.05UM	/	
	Gold		1U"	1U"	/	
	Tape test		No peel off	No peel off	ACC	
3) solder mask	Color		☒ GREEN ☐ MATT ☐ BLACK ☐ BLUE ☐ RED ☐ YELLOW ☐ WHITE	GREEN	ACC	
	Single/both sides		☒ Single sides ☐ both sides	both sides	ACC	
	S/M thickness		☒ ≥10um ☐ ≥15um	13um	ACC	
	Tape test		No peel off	No peel off	ACC	
4) component mark	Color		☐ BLACK ☐ BLUE	WHITE	ACC	
			☐ YELLOW ☒ WHITE	WHITE		
	C/M location		☒ C/S ☒ S/S	C/S	ACC	
	Tape test		3M TAPE (No peel off)	No peel off	ACC	
5) circuit	Trace width		0.120± 15% mm	0.1-0.15mm	ACC	
	Spacing		0.1± 15% mm	0.1-0.13mm	ACC	
6) identification	Company logo		/	/	/	
	Date code		☐ WWYY ☐ YYWW	/	/	
	Mark location		☐ Component sideC/S ☐ Welding surfaceS/S	/	/	
7) reliability tests	Thermal Shock Test		288±5℃ 10sec,3cycles	PASS	ACC	
	Solderability test		245±5℃ 3sec Wetting area least95%	PASS	ACC	
8) appearance	Visual inspection		100%	100%PCBPASS	ACC	
	Warp and twist		☒ < 0.75%	0.36%	ACC	
9) others	V-cutting		0.25± 0.1mm	0.25± 0.1mm	ACC	
	Chamfer Angle		/	/	/	