

## Specification For Approval

client's name: jing hua

Adapted models: A102D (10.1-inch plastic shell - Yidao motherboard -6221C module)

Antenna type: WIFI&BT&5Gwifi (main) antenna

Workingfrequency: 2.4GHz&5GHz

Part No: SF2325A-1R24B-160-A

Certification information (SGS report)

Serial number	Certification number	Material type	Date of issue	Remarks
1	A2230173541101001E	Tinned copper wire	2023-04-24	One year
2	CANEC2227657305	halogen	2023-05-30	One year
3	CANEC2227657306	Adhesive	2023-05-30	One year
4	SHAEC23021984701	FEP sheath	2024-01-04	One year
5	SHAEC23020095573	FEP insulation	2023-12-12	One year
6	SZXEC23001647204	Tin wire	2023-07-28	One year
7	SZXEC23001647208	Tin	2023-07-28	One year
8	ETR23701480	Printing ink	2023-07-13	One year
9	A2230173918101001E	Substrate	2023-04-18	One year
10	CANEC23017402018	EVA foam	2024-01-03	One year
11	A2230383826101003	Conductive cloth	2023-08-04	One year

**(Customer)**

	<b>purchase</b>	<b>R&amp;D/Engineering</b>	<b>quality</b>

**(Supplier)**

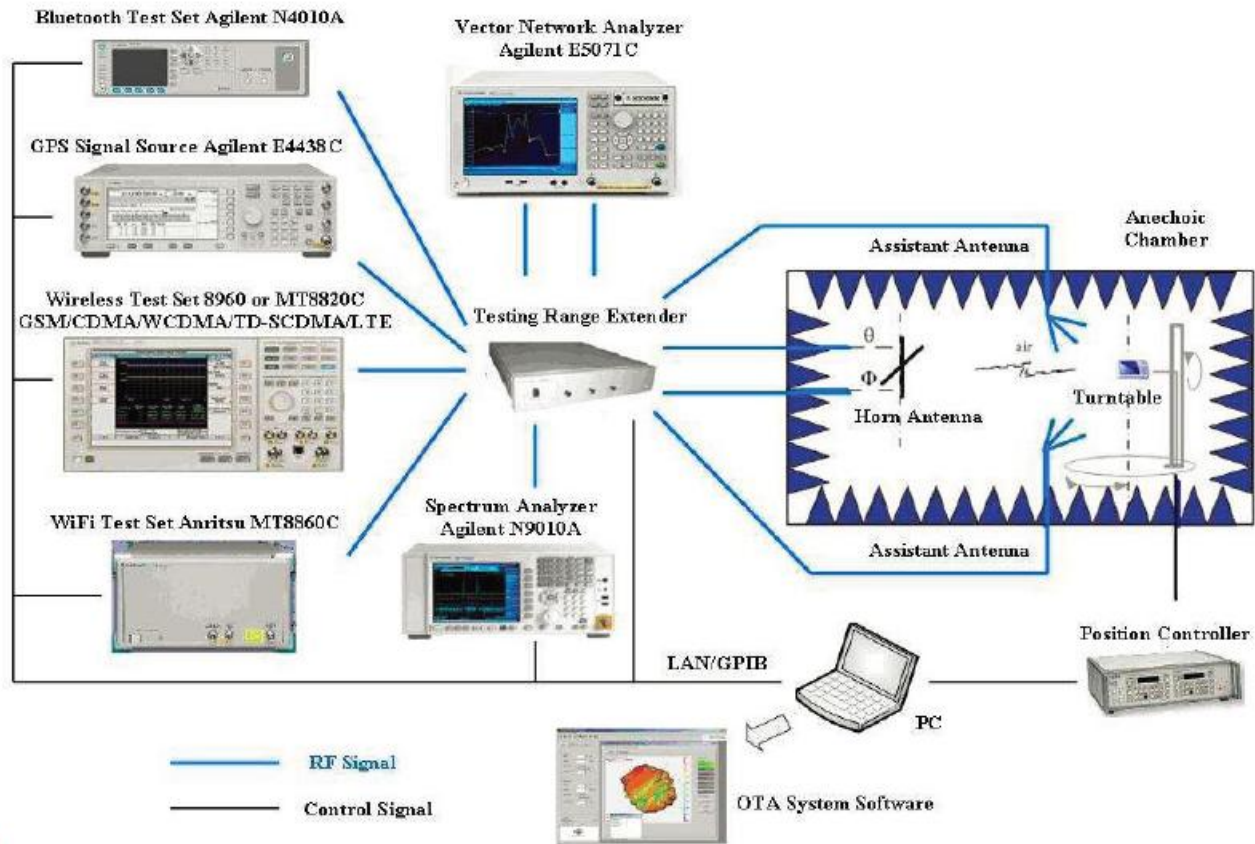
	<b>Engineering production</b>	<b>Engineering audit</b>	<b>business</b>
	LTT		

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## 一: Device Support & Testable Antenna Type



Antenna function	Frequency Range	test instrument	test method	standard test
2G antenna (GSM)	824MHz-960MHz, 1710MHz-1990MHz	5071B、8960 OTA darkroom	Active test, passive test	Soward standards, customer requirements
3G antenna (WCDMA/TDSCDMA/CDMA-EVDO/2000)	824MHz-960MHz, 1710MHz-2170MHz	5071B、8960 OTA darkroom	Active test, passive test	Soward standards, customer requirements
4G antenna (LTE-FDD/LTE-TDD)		5071B、CMW500、 SP8011、OTA darkroom	Active test, passive test	Soward standards, customer requirements
WiFi antenna	2.4GHz-2.48GHz, 5.15GHz-5.35GHz, 5.725GHz-5.825GHz	5071B、CMW500、OTA darkroom、router、 PC	Active test, passive test, APK actual test, throughput test	Soward standards, customer requirements
BT antenna	2.4GHz-2.48GHz,	5071B、OTA darkroom 、Bluetooth Speaker	Passive test, actual test	Soward standards, customer requirements
Positioning antenna (GPS, GLONASS, Beidou, Galileo)	1.575.42MHz±10MHz 1602MHz+0.5625MHz 1561MHz+2.046MHz	5071B、OTA darkroom 、APK	Passive test, actual test	Soward standards, customer requirements
NFC antenna	13.56MHz	5071B、Dedicated test fixture、OTA darkroom、APK	Passive test, actual test	Soward standards, customer requirements
Remote control antenna	433MHz	5071B、OTA darkroom	Passive test, actual test	Soward standards, customer requirements

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## 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:

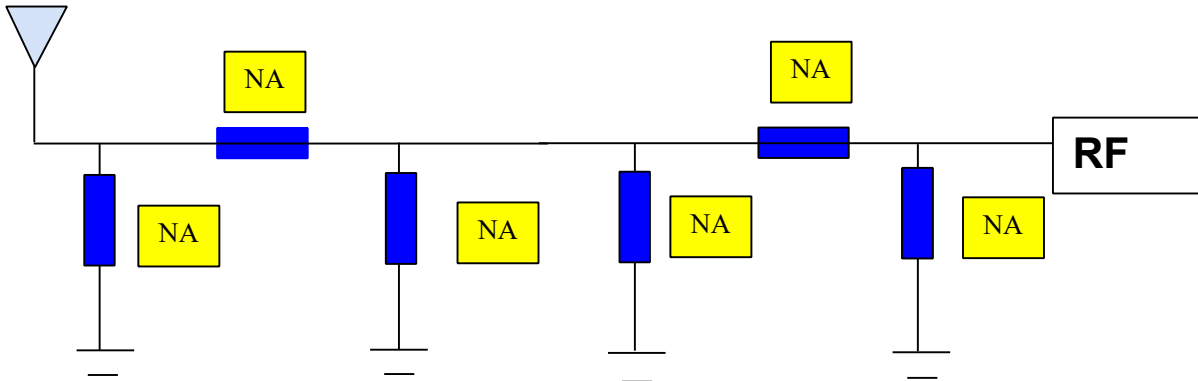
Description	2.4GHz~5GHz	Units
VSWR	$\leq 2.0$	
Average Antenna Gain	$\geq -4.5$	dB
Feed Impedance	50 ohms	
Operating Temperature	-40 to +85 deg C	
Polarization / Azimuth	Linear / Omni-directional	

### (2) Mechanical Information

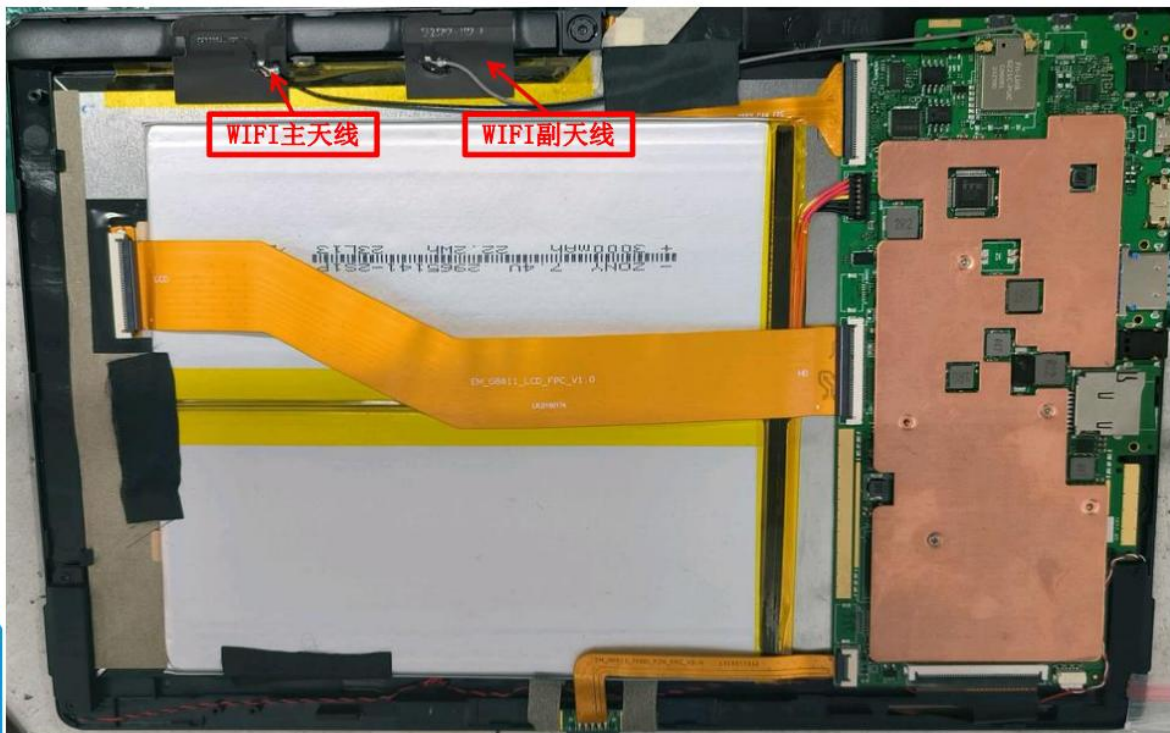
Mechanical Dimension	
Cable Length	160mm/BLACK
Description	WIFI&BT antenna
Material	FPC
Coaxial Cable	50Ω/O. D. 0.81mm
Environmental	
Operation Temperature	-40 to +85 deg C
Storage Temperature	-40 to +85 deg C

## 三: Matching circuit diagram & machine picture & antenna picture

### (1) matching circuit



### (2) Machine images&antenna images





**四:Antenna standing wave ratio & Antenna Efficiency**





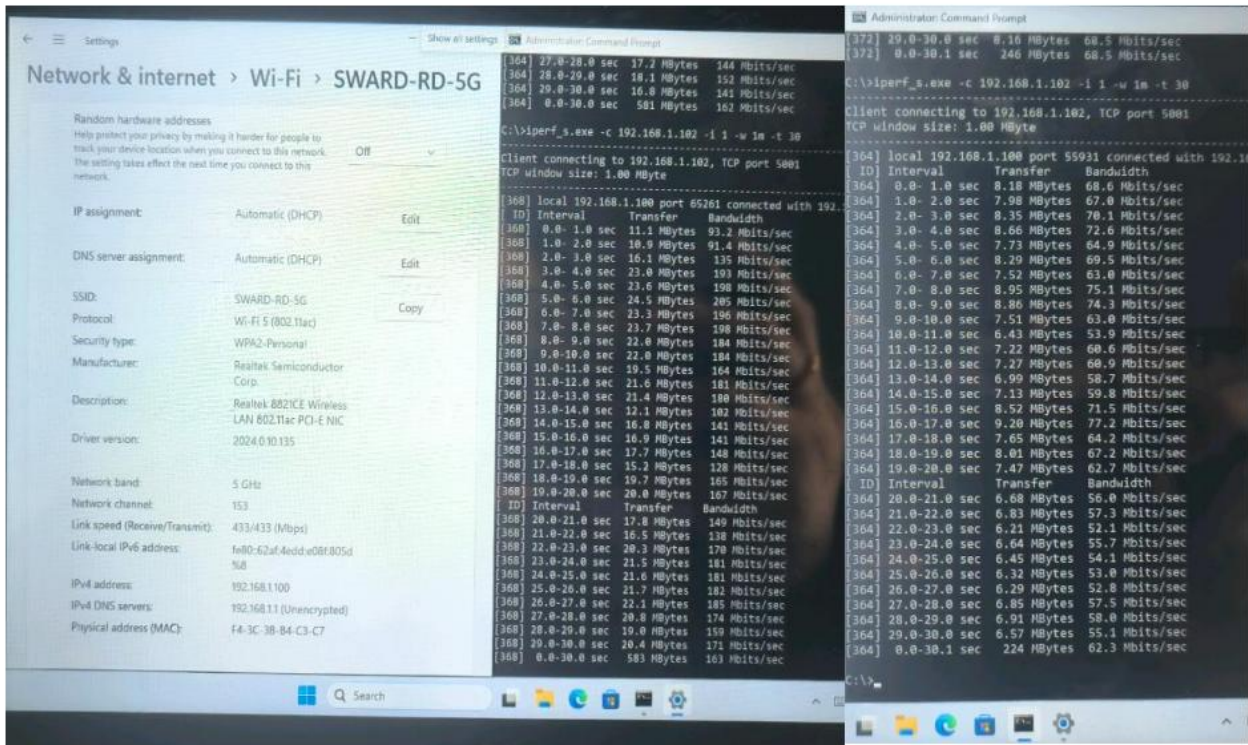
Passive Test For 2.4Gwifi								
Freq	Effi	Effi	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
2400	41.25	-3.85	-0.36	-2.51	25.519	15.734	-0.36	-11.36
2410	40.93	-3.88	-0.46	-2.61	24.732	16.198	-0.46	-11.57
2420	44.28	-3.54	-0.17	-2.32	26.113	18.17	-0.17	-10.95
2430	42.62	-3.7	-0.38	-2.53	24.451	18.17	-0.38	-10.45
2440	43.85	-3.58	-0.26	-2.41	24.436	19.419	-0.26	-10.27
2450	38.48	-4.15	-0.87	-3.02	20.814	17.662	-0.87	-10.57
2460	38.26	-4.17	-1	-3.15	19.921	18.341	-1	-10.84
2470	37.53	-4.26	-0.94	-3.09	18.902	18.626	-0.94	-11.04
2480	40.7	-3.9	-0.51	-2.66	19.94	20.759	-0.51	-10.61
2490	42.53	-3.71	-0.36	-2.51	20.435	22.099	-0.36	-10.13
2500	43.79	-3.59	-0.38	-2.53	20.69	23.097	-0.38	-9.89

Passive Test For 5Gwifi								
Freq	Effi	Effi	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
5000	35.4	-4.51	-1.33	-3.48	16.741	18.664	-1.33	-18.17
5100	35.61	-4.48	-0.88	-3.03	17.02	18.588	-0.88	-16.16
5200	35.88	-4.45	-0.66	-2.81	16.048	19.832	-0.66	-17.61
5300	33.6	-4.74	-1.02	-3.17	14.908	18.694	-1.02	-18.38
5400	34.24	-4.65	-0.78	-2.93	15.673	18.566	-0.78	-19.31
5500	34.79	-4.59	-0.41	-2.56	17.258	17.532	-0.41	-13.83
5600	28.64	-5.43	-0.97	-3.12	14.765	13.878	-0.97	-14.25
5700	30.75	-5.12	-1.68	-3.83	15.451	15.298	-1.68	-14.11
5800	28.16	-5.5	-2.56	-4.71	13.169	14.99	-2.56	-13.87
5900	24.81	-6.05	-3.21	-5.36	11.593	13.219	-3.21	-14.9
6000	25.87	-5.87	-2.85	-5	12.75	13.122	-2.85	-13.04

## 五: Throughput testing

IperfThroughput testing						
model	A102D -Yidao motherboard	module	6221C module module block	Software version	Windows_Iperf	
Model number	Frequency band	distance	Testing angle	test data (TX) 1minmean value	Test Data (RX) 1-minute mean	Remarks (Number of Swaps)
1	2.4G	2.4G WIFI (R&D testing15m)	0°	60.2 Mbps	67.8 Mbps	0
			90°	68.3 Mbps	67.0 Mbps	0
			180°	54.1 Mbps	68.5 Mbps	0
			270°	59.6 Mbps	62.3 Mbps	0
	5G	5F WIFI (R&D testing15m)	0°	163 Mbps	209 Mbps	0
			90°	155 Mbps	209 Mbps	0
			180°	163 Mbps	225 Mbps	0
			270°	145 Mbps	231 Mbps	0
			0°			
			90°			
			180°			
			270°			

Test data 2.4Gwifi/5.8Gwifi (corresponding to connection speed of 72/433Mbps)





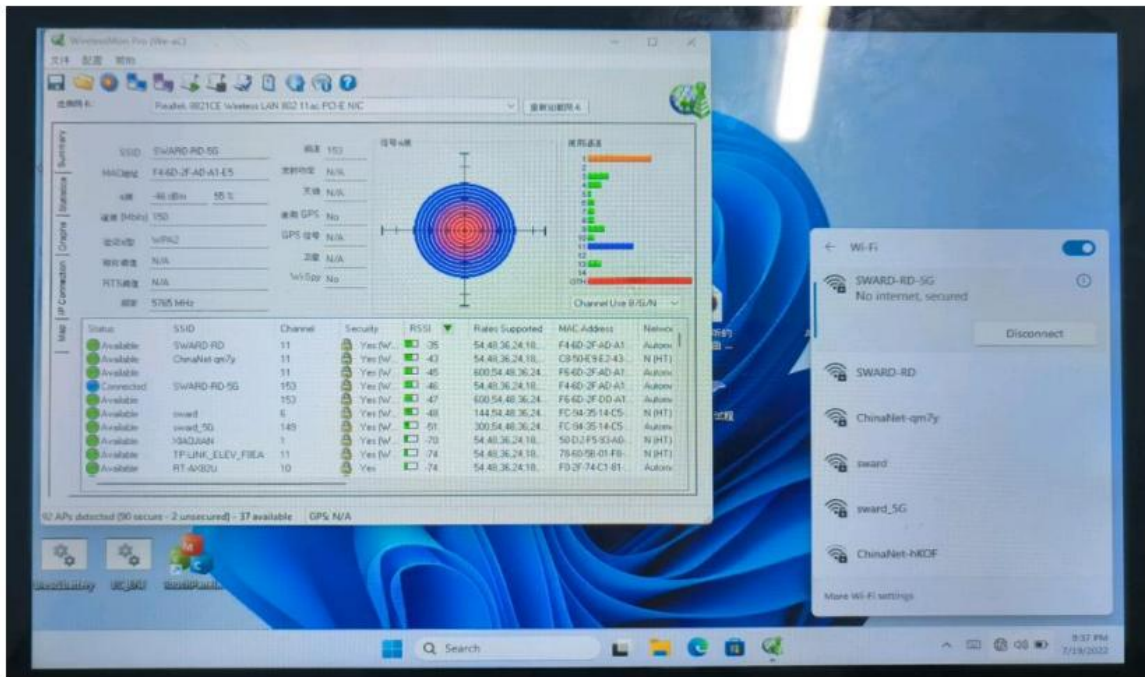
六:Signal measurement

Actual measurement effect	
Model number	1
testing environment	SWARD R&D Center
Test equipment	Huawei AM08
test distance	》 10m

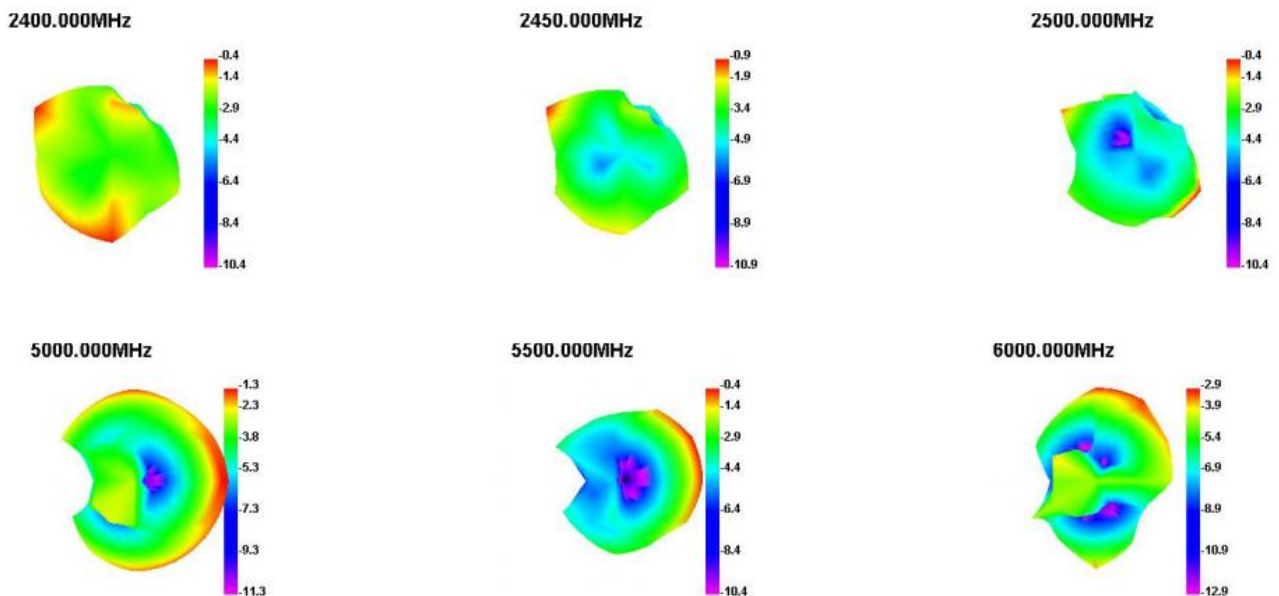


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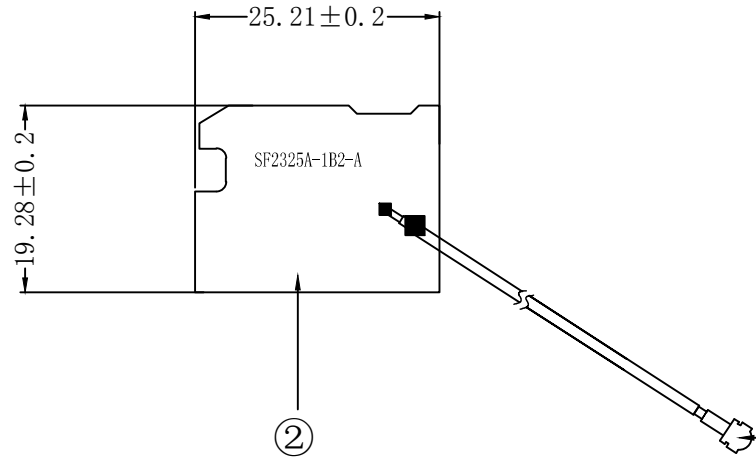
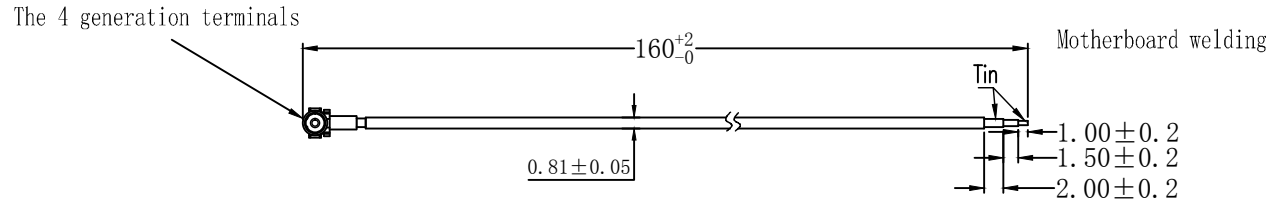


## 七:3D pattern



## 八:structural drawings

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① Terminals facing inside

technical requirements:

- 1.\* for critical dimensions;
- 2.Size conform to the requirements of the drawings;
- 3.No virtual welding welding point, false welding. Require full welding points.
- 4.Network test pass.
- 5.No marked tolerance according toSJ/T 10628 1995 6classes;

<b>SWARD</b>										ShenZhen SWARD Communication Technology Co.Ltd	
5										SF2325A-1R24B-160-A	
4											
3					signatures	date	mass	signatures	date	time markup	percentage
2	FPC	black	1	SF2325A-1B2-A	RD	LXH	2024.1.26	Q C			
1	coaxial line	black	1	φ=0.81mm	RF					1	1 : 1
	name	color	quantity	specifications	audits			approval			

