

Antenna specification for approval

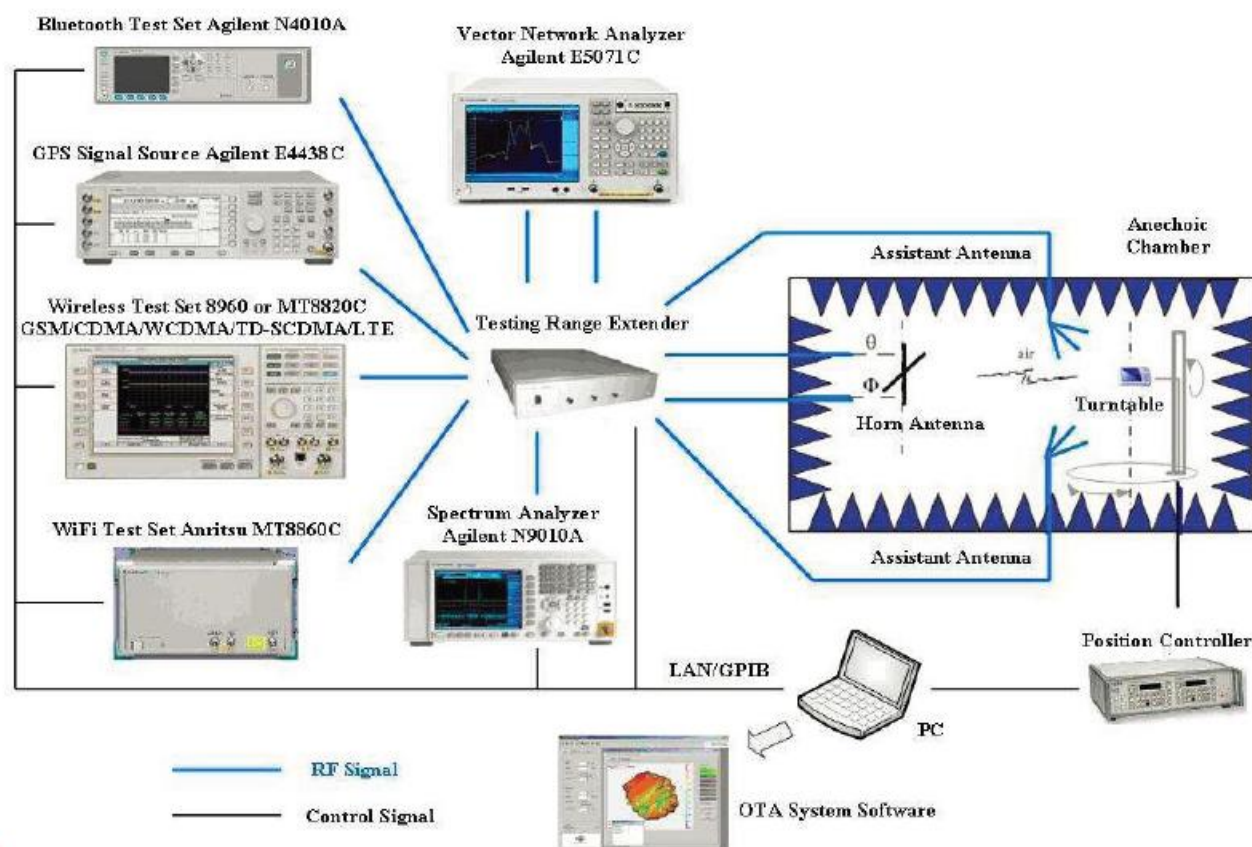
Customer name	Core image		
Model	XX01 3 "Recorder EVA22 motherboard -6221A module		
Antenna frequency	2. 4GHZ&5GHz		
Antenna function	WIFI&BT&5Gwifi antenna		
Antenna material	FPC	FPC color	black
model	SF2165A-1B2-A		
Material number	SF2165A-1D23B-085-A		
Customer Part Number			
Ward accepted the signature		Client acknowledges signature	
structure		Purchase	
Document control		structure	
radio frequency		engineering	
To examine		QC	
Responsible LTT		To examine	
date 2023. 04. 11	Seal area	date 2023. 04. 11	Seal area

Serial number	Certification number	Material type	Date of issue	Remarks
1	A2220186128101ER1	Tinned copper wire	2022-05-17	One year
2	CANEC2227657302	halogen	2022-12-28	One year
3	CANEC2227657303	Adhesive	2022-12-28	One year
4	SHAEC23000346911	FEP sheath	2023-01-13	One year
5	SHAEC22004639301	FEP insulation	2022-12-15	One year
6	SZXEC2203054804	Tin wire	2022-09-19	One year
7	SZXEC2203054808	Tin	2022-09-19	One year
8	ETR22300684	Printing ink	2022-08-09	One year
9	EKR22501369	Substrate	2022-05-27	One year
10	CANEC2227574118	EVA foam	2023-01-03	One year
11	SZXEC2202709609	Conductive cloth	2022-08-16	One year
12	CANEC2218227002	Gold plating	2022-08-30	One year

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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

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:

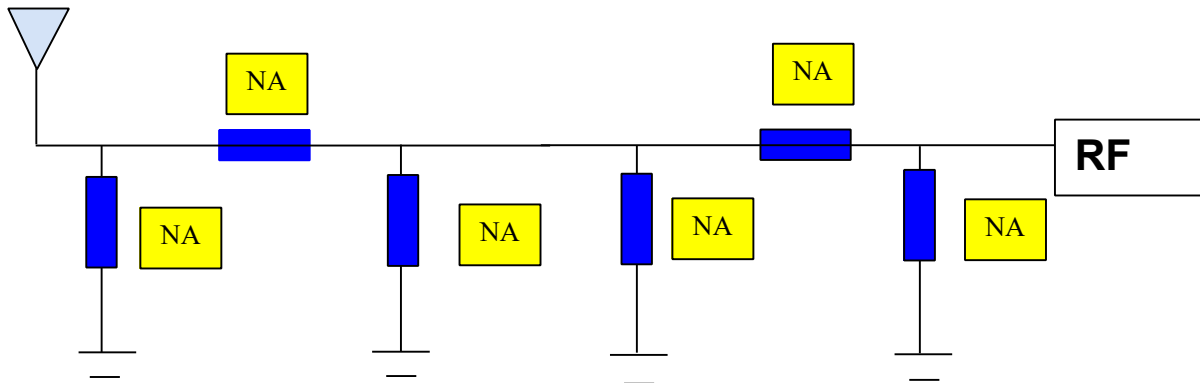
Description	2.4GHz~5GHz	Units
VSWR	≤ 2.0	
Average Antenna Gain	≥ -4.5	dB
Antenna Efficiency	≥ 40	%
Feed Impedance	50 ohms	
Operating Temperature	-40 to +85 deg C	
Polarization / Azimuth	Linear / Omni-directional	

(2) Mechanical Information

Mechanical Dimension	
Cable Length	085mm/BLACK
Description	WIFI&BT antenna
Material	FPC
Coaxial Cable	500hm/0. D. 0. 81mm
Environmental	
Operation Temperature	-40 to +85 deg C
Storage Temperature	-40 to +85 deg C

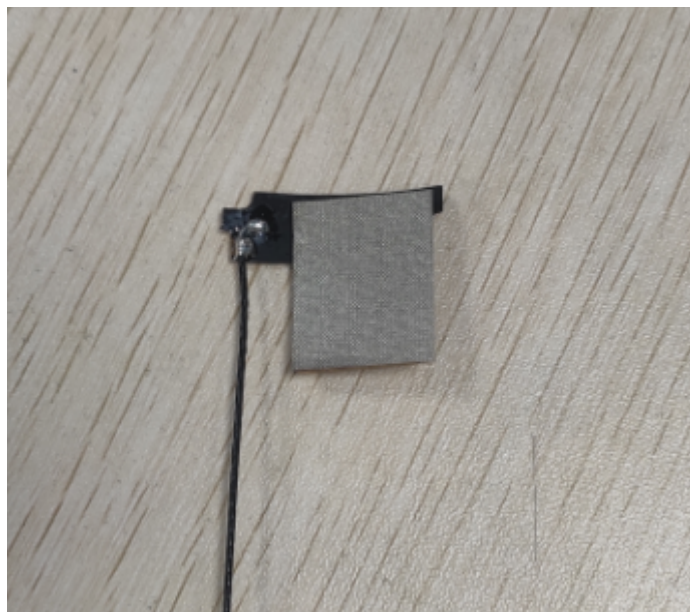
三: Matching circuit diagram & machine picture & antenna picture

(1) Matching circuit

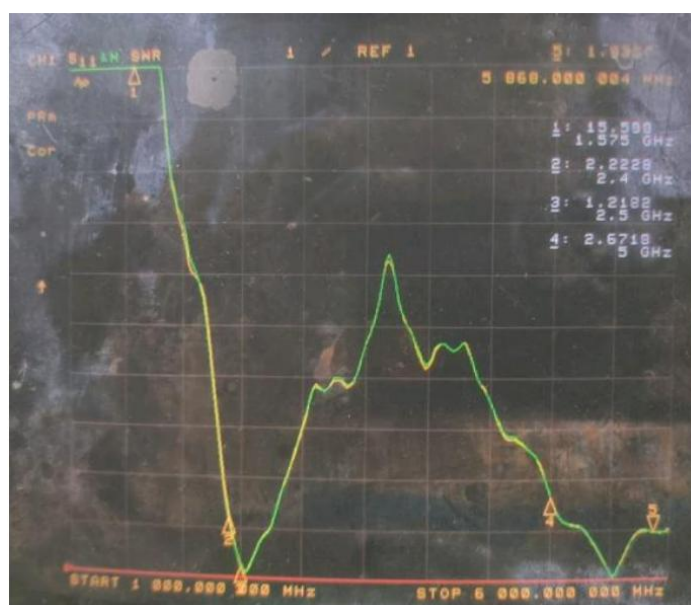


(2) Machine picture & antenna picture





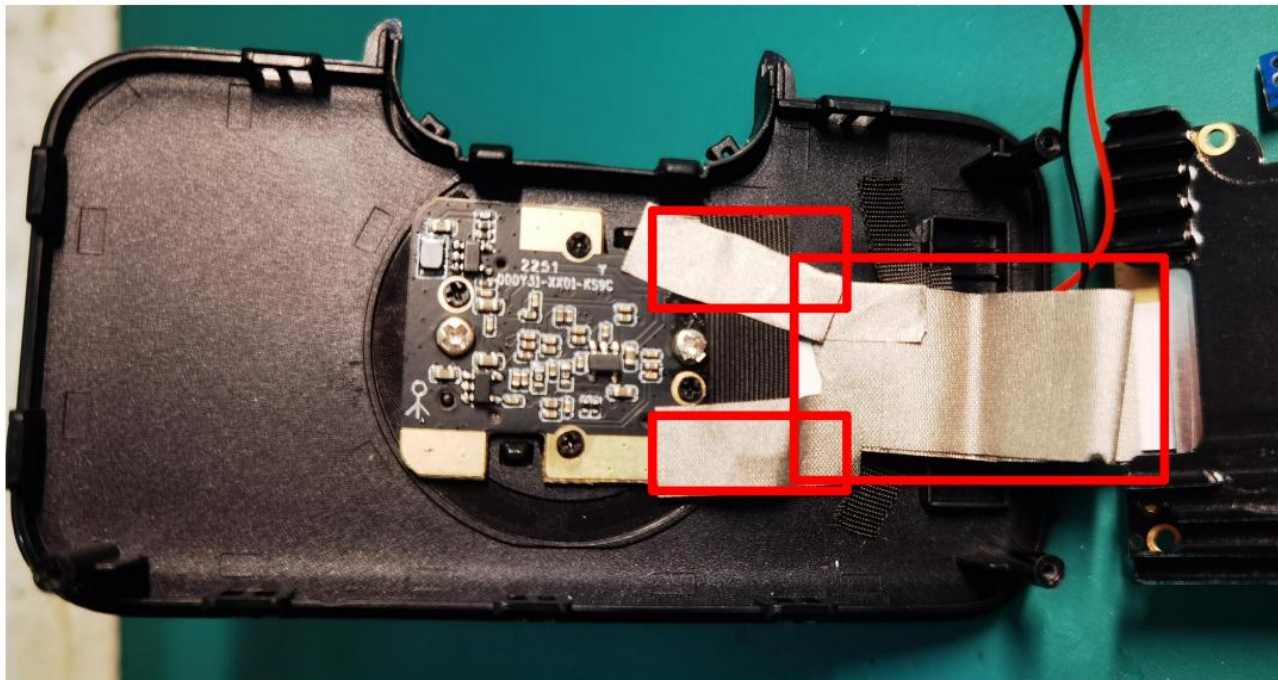
四:Antenna standing wave ratio & Antenna Efficiency



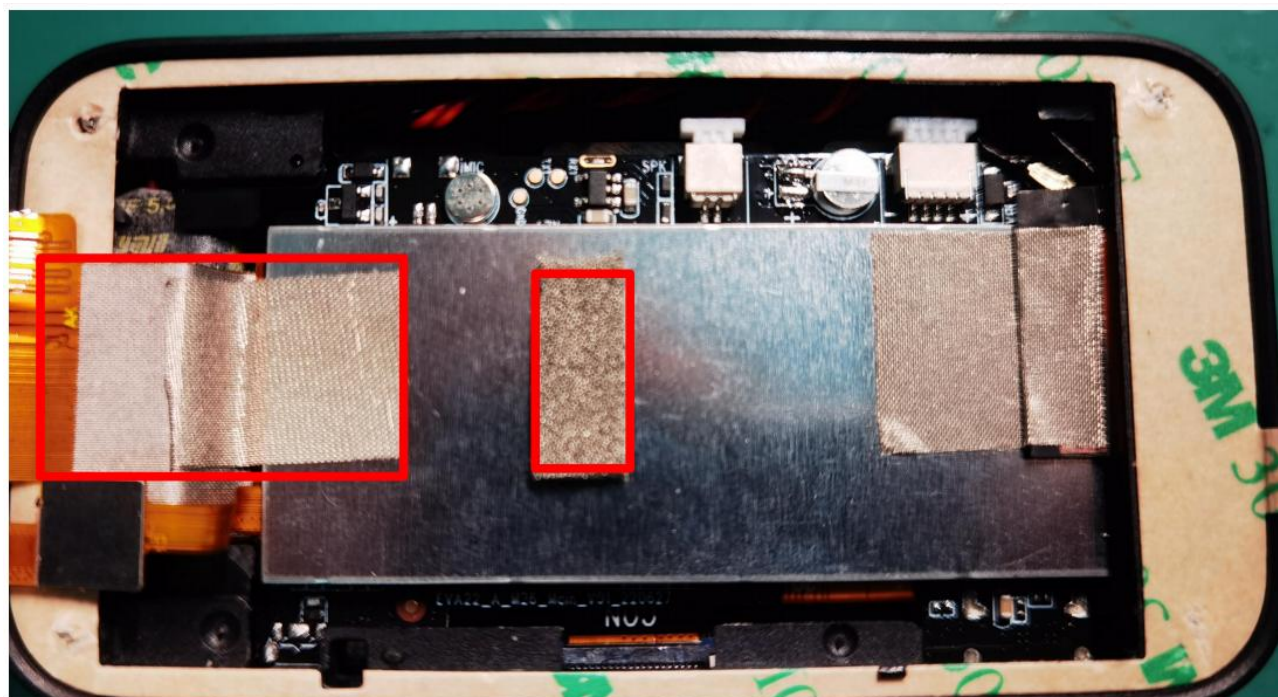
Passive Test For 2.4G												
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)	Directivity (dBi)	Beamwidth (3dB)	AttH (dB)	AttV (dB)
2400	41.55	-3.81	3.43	1.28	17.022	24.533	3.43	-10.59	7.24	0	46.77	47.04
2410	38.81	-4.11	3.11	0.96	16.035	22.772	3.11	-10.49	7.22	0	46.94	47.16
2420	44.71	-3.5	3.71	1.56	18.702	26.007	3.71	-9.69	7.21	0	47.02	47.39
2430	48.84	-3.11	4.08	1.93	20.771	28.065	4.08	-9.12	7.2	0	47.31	47.67
2440	52.82	-2.77	4.38	2.23	22.949	29.87	4.38	-9.31	7.15	0	47.68	47.91
2450	56.37	-2.49	4.66	2.51	24.737	31.636	4.66	-9.31	7.15	0	47.98	48.27
2460	51.93	-2.85	4.4	2.25	22.892	29.042	4.4	-9.95	7.25	0	47.79	48.02
2470	47.24	-3.26	4.04	1.89	20.819	26.424	4.04	-10.28	7.3	0	47.6	47.7
2480	46.52	-3.32	3.94	1.79	20.566	25.959	3.94	-10.14	7.26	0	47.93	48.05
2490	52.22	-2.82	4.36	2.21	23.231	28.985	4.36	-8.93	7.18	0	48.1	47.95
2500	56.2	-2.5	4.59	2.44	25.034	31.163	4.59	-8.8	7.09	0	48.13	48.09

Passive Test For 5G-WIFI												
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)	UHS (%)	DHS (%)	Max (dB)	Min (dB)	Directivity (dBi)	Beamwidth (3dB)	AttH (dB)	AttV (dB)
5000	32.03	-4.94	0.19	-1.96	13.124	18.91	0.19	-16.23	5.13	0	57.34	57.35
5100	39.76	-4.01	1.22	-0.93	17.246	22.514	1.22	-16.65	5.22	0	57.81	57.76
5200	37.3	-4.28	1.09	-1.06	15.775	21.529	1.09	-30.16	5.37	0	56.99	56.81
5300	48.35	-3.16	2.44	0.29	19.644	28.709	2.44	-16.05	5.6	0	56.76	56.86
5400	35.9	-4.45	1.13	-1.02	15.052	20.851	1.13	-16.36	5.57	0	56.69	56.95
5500	37.87	-4.22	2.15	0	15.221	22.648	2.15	-15.39	6.36	0	57.35	58.31
5600	35.08	-4.55	1.49	-0.66	13.592	21.485	1.49	-18.75	6.04	0	58.6	59.56
5700	42.51	-3.71	2.32	0.17	16.736	25.777	2.32	-22.74	6.04	0	59.11	59.81
5800	44.52	-3.51	2.56	0.41	18.117	26.402	2.56	-16.47	6.07	0	59.62	60.26
5900	42.91	-3.67	2.06	-0.09	18.198	24.711	2.06	-11.91	5.73	0	60.04	61.12
6000	54.41	-2.64	2.55	0.4	24.598	29.814	2.55	-8.48	5.19	0	61.72	62.72

五:Environmental treatment



1. The camera cable should be wrapped with conductive cloth and grounded with the camera module; Can improve the spirit Sensitive)



2. The screen bar is wrapped with conductive cloth and grounded with the motherboard shield cover;
3. The motherboard shield cover pasted conductive sponge and screen grounding treatment;
4. Capacitance line and horn line made into twisted pair, reduce coupling interference;



5. The grounding mode of the conductive cloth of the wifi antenna is shown in the figure. Fold the FPC marking position in half and then guide the antenna up
The electric cloth is attached to the shield cover, so that the antenna is directly connected with the main board;

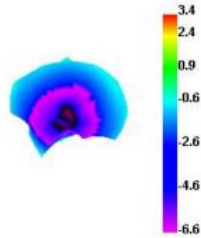
Note: Please optimize the specific environment treatment according to the test report

六:Signal strength

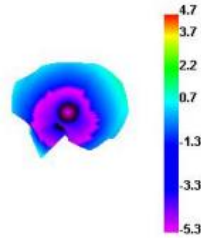


七:3D pattern

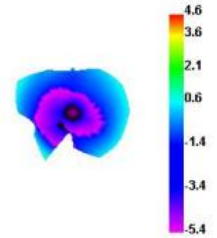
2400.000MHz



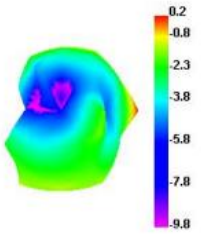
2450.000MHz



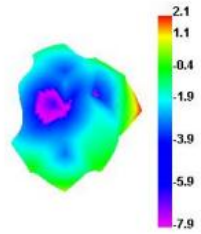
2500.000MHz



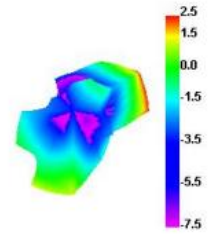
5000.000MHz



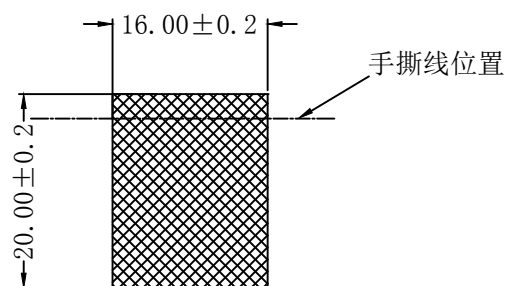
5500.000MHz



6000.000MHz



八:Structural drawing



Technical drawing of a cable assembly. The drawing shows a side view of a cable with a connector at the top and a cross-section view of the cable body. The cross-section is a square with a diagonal hatching pattern. Dimensions are indicated with arrows and text:

- A horizontal dimension of 25.27 ± 0.2 is shown at the top, spanning from the center of the connector to the right edge of the cross-section.
- A vertical dimension of 21.84 ± 0.2 is shown on the right, spanning the height of the cross-section.
- A circled number 2 with an arrow points to the connector assembly.

- ③The conductive cloth is placed in the reverse center at the copper leakage position of the FPC

①Terminal
facing inward

- 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;

5											SWARD						Technology Co., Ltd.
4																	SF2165A-1D23B-085-A
3	Conductive cloth	gray	1	16*20mm		signatures	date	mass	signatures	date	time markup				percentage		
2	FPC	black	1	SF2165A-1B2-A		RD	YWD	2023. 04. 11	Q C								
1	coaxial line	black	1	ø=0.81	RF						1			A		1 : 1	
	name	color	quantity	specifications	audits				approval								