

Sovard Antenna Debugging Report

Customer Name: bmorn

Project Name: N14PY0 (14 inch
metal shell BM-NBRBP1 Raspberry Pi platform)

Date: 2025.04.29

Project Contact Information

Customer contact person:

Mobile:

Email:

Soward structure:

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mobile phone:

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Project Introduction

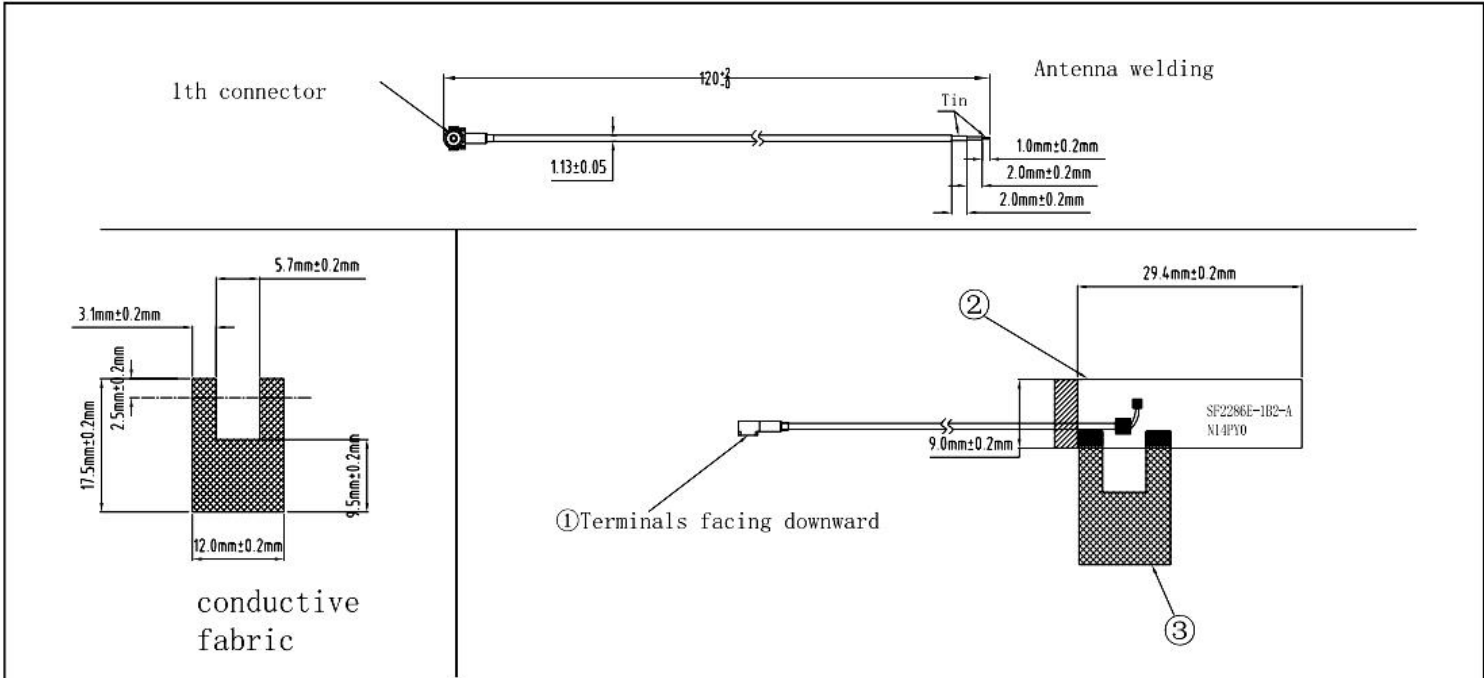
1. Project Overview

Number of project antennas	Machine type
1	WIFI notebook
Material of the whole machine shell: 14 inch metal shell (A/C/D metal shell, antenna position shaft)	

2. Antenna Overview

Antenna number	name	Working frequency band/MHz	Material/Structure
1	WIFI&BT&5Gwifi	2400MHz ~ 2500MHz & 5.8GHz	FPC

antenna manufacturer	Shenzhen SWARD Communication Technology Co., Ltd.
address	601, 6th Floor, Building B, Hexi Hangcheng Industrial Zone, 135 Qianjin Er Road, Bao'an District, Shenzhen
Antenna Specifications	Part number: SF2286E-1L1G-120-A, Antenna size: 29.40mm * 9.00mm, antenna manufacturer: 120mm, 1st generation terminal



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	conductive fabric		Gray	1	12*17.5mm		Signature	Date		Signature	Date	
2	FPC		Black	1	SF2286E-1B2-A	RD	JYX	2026.1.14	QC			
1	coaxial cable	1th connector	Gray	1	φ=1.13mm	RF						
Serial	NAME	Materials	Colour	Count	Description	Process			Approval			

SWARD

ShenZhen SWARD
Communication Technology Co.Ltd

SF2286E-1L11G-120-A

ROHS

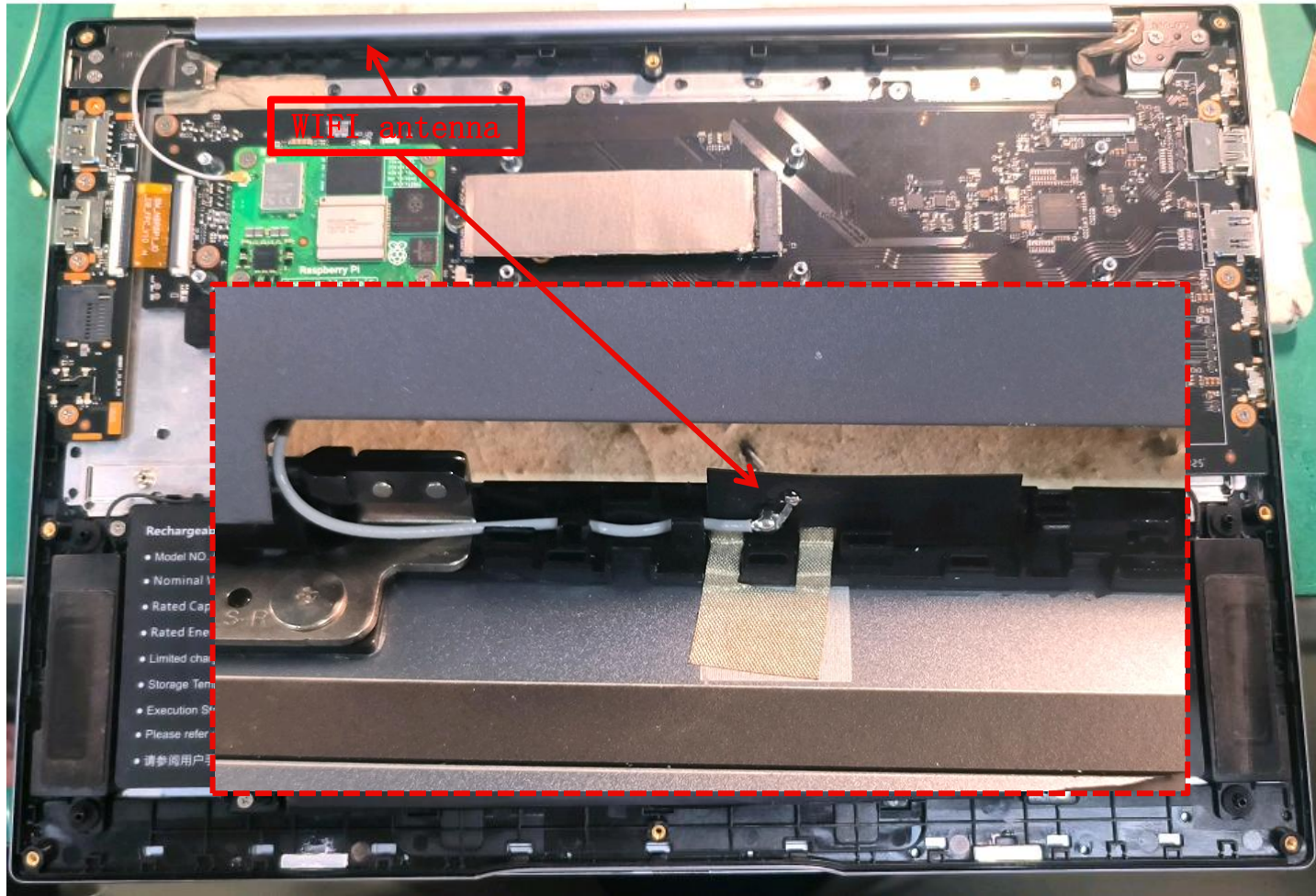
Stage marker

Organization

Ratio

Total: 1Number pages:1 Page

Antenna layout



WIFI antenna S11



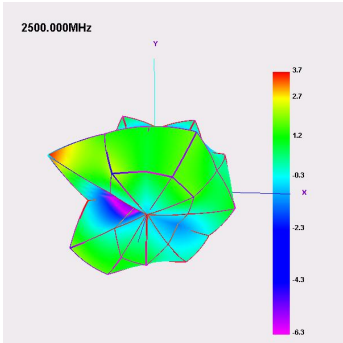
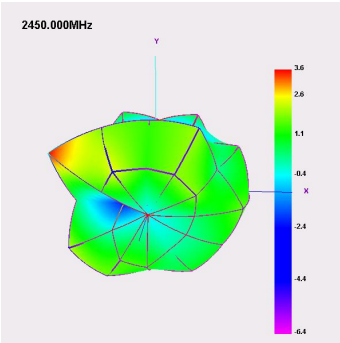
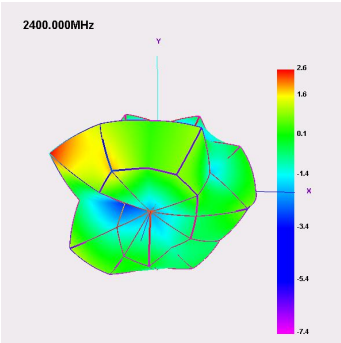
BT antenna measured distance

Actual test effect	
Model number	1
test environment	Soward R&D Center
test equipment	Huawei AM08
test distance	—

Bluetooth can establish a connection, but the audio source cannot be switched and has not been tested;

WIFI&BT antenna efficiency

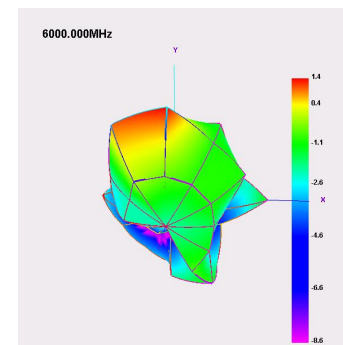
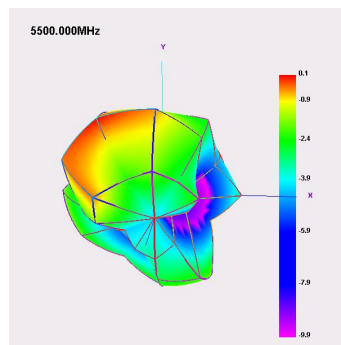
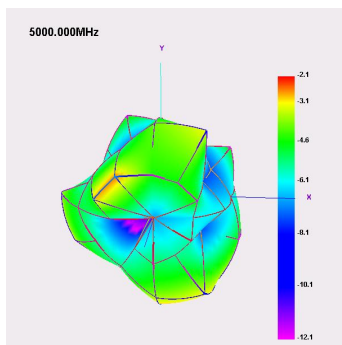
Passive Test For 2.4Gwifi								
Freq	Effi	Effi	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
2400	35.75	-4.47	2.57	0.42	25.008	10.746	2.57	-20.49
2410	34.93	-4.57	2.56	0.41	24.502	10.424	2.56	-22.33
2420	43.48	-3.62	3.64	1.49	30.456	13.019	3.64	-24.99
2430	46.01	-3.37	4.01	1.86	32.191	13.823	4.01	-26.89
2440	51.03	-2.92	4.46	2.31	35.471	15.561	4.46	-23.69
2450	42.68	-3.7	3.61	1.46	29.609	13.073	3.61	-20.98
2460	43.17	-3.65	3.51	1.36	29.8	13.37	3.51	-18.82
2470	38.53	-4.14	2.81	0.66	26.57	11.96	2.81	-17.69
2480	41.85	-3.78	3.08	0.93	28.686	13.16	3.08	-16.52
2490	44.48	-3.52	3.3	1.15	30.453	14.025	3.3	-15.52
2500	49.74	-3.03	3.69	1.54	33.611	16.128	3.69	-14.15



5G WIFI antenna efficiency

Passive Test For 5Gwifi

Freq	Effi	Effi	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
5000	16.48	-7.83	-2.11	-4.26	8.343	8.134	-2.11	-24.57
5100	17.57	-7.55	-2.51	-4.66	9.037	8.529	-2.51	-22.88
5200	18.61	-7.3	-2.46	-4.61	10.212	8.401	-2.46	-16.43
5300	32.21	-4.92	0.81	-1.34	19.799	12.412	0.81	-18.6
5400	26.48	-5.77	-0.1	-2.25	17.111	9.366	-0.1	-18.81
5500	27.85	-5.55	0.15	-2	17.42	10.432	0.15	-17.61
5600	27.37	-5.63	0.38	-1.77	17.055	10.319	0.38	-15.18
5700	30.49	-5.16	-0.28	-2.43	19.174	11.319	-0.28	-15.64
5800	28.92	-5.39	0.16	-1.99	18.351	10.574	0.16	-16.92
5900	32.8	-4.84	0.96	-1.19	20.914	11.884	0.96	-14.05
6000	31.34	-5.04	1.41	-0.74	20.896	10.442	1.41	-14.89



WIFI antenna signal strength measurement picture (data)

```

pi@raspberrypi ~$ sudo iwconfig
lo        no wireless extensions.

eth0      no wireless extensions.

wlan0     IEEE 802.11 ESSID:"SWARD-RD"
Mode:Managed Frequency:2.462 GHz Access Point: F4:6D:2F:AD:A1:E3
Bit Rate=11 Mb/s   Tx-Power=31 dBm
Retry short limit:7 RTS thr:off   Fragment thr:off
Encryption key:off
Power Management:on
Link Quality=66/70 Signal level=-44 dBm
Rx invalid mvid:0 Rx invalid crypt:0 Rx invalid frag:0
Tx excessive retries:0 Invalid misc:0 Missed beacon:0

pi@raspberrypi ~$ sudo iwconfig
lo        no wireless extensions.

eth0      no wireless extensions.

wlan0     IEEE 802.11 ESSID:"SWARD-RD"
Mode:Managed Frequency:2.462 GHz Access Point: F4:6D:2F:AD:A1:E3
Bit Rate=11 Mb/s   Tx-Power=31 dBm
Retry short limit:7 RTS thr:off   Fragment thr:off
Encryption key:off
Power Management:on
Link Quality=70/70 Signal level=-35 dBm
Rx invalid mvid:0 Rx invalid crypt:0 Rx invalid frag:0
Tx excessive retries:0 Invalid misc:0 Missed beacon:0

pi@raspberrypi ~$ sudo iwconfig
lo        no wireless extensions.

eth0      no wireless extensions.

wlan0     IEEE 802.11 ESSID:"SWARD-RD"
Mode:Managed Frequency:2.462 GHz Access Point: F4:6D:2F:AD:A1:E3
Bit Rate=11 Mb/s   Tx-Power=31 dBm
Retry short limit:7 RTS thr:off   Fragment thr:off
Encryption key:off
Power Management:on
Link Quality=70/70 Signal level=-28 dBm
Rx invalid mvid:0 Rx invalid crypt:0 Rx invalid frag:0
Tx excessive retries:0 Invalid misc:0 Missed beacon:0

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pi@raspberrypi ~$ sudo iwconfig
lo        no wireless extensions.

eth0      no wireless extensions.

wlan0     IEEE 802.11 ESSID:"SWARD-RD-5G"
Mode:Managed Frequency:5.2 GHz Access Point: F4:6D:2F:AD:A1:E5
Bit Rate=300 Mb/s   Tx-Power=31 dBm
Retry short limit:7 RTS thr:off   Fragment thr:off
Encryption key:off
Power Management:on
Link Quality=70/70 Signal level=-40 dBm
Rx invalid mvid:0 Rx invalid crypt:0 Rx invalid frag:0
Tx excessive retries:0 Invalid misc:0 Missed beacon:0

pi@raspberrypi ~$ sudo iwconfig
lo        no wireless extensions.

eth0      no wireless extensions.

wlan0     IEEE 802.11 ESSID:"SWARD-RD-5G"
Mode:Managed Frequency:5.2 GHz Access Point: F4:6D:2F:AD:A1:E5
Bit Rate=433.3 Mb/s   Tx-Power=31 dBm
Retry short limit:7 RTS thr:off   Fragment thr:off
Encryption key:off
Power Management:on
Link Quality=68/70 Signal level=-42 dBm
Rx invalid mvid:0 Rx invalid crypt:0 Rx invalid frag:0
Tx excessive retries:0 Invalid misc:0 Missed beacon:0

pi@raspberrypi ~$ sudo iwconfig
lo        no wireless extensions.

eth0      no wireless extensions.

wlan0     IEEE 802.11 ESSID:"SWARD-RD-5G"
Mode:Managed Frequency:5.2 GHz Access Point: F4:6D:2F:AD:A1:E5
Bit Rate=24 Mb/s   Tx-Power=31 dBm
Retry short limit:7 RTS thr:off   Fragment thr:off
Encryption key:off
Power Management:on
Link Quality=65/70 Signal level=-45 dBm
Rx invalid mvid:0 Rx invalid crypt:0 Rx invalid frag:0
Tx excessive retries:0 Invalid misc:0 Missed beacon:0

pi@raspberrypi ~$ sudo iwconfig
lo        no wireless extensions.

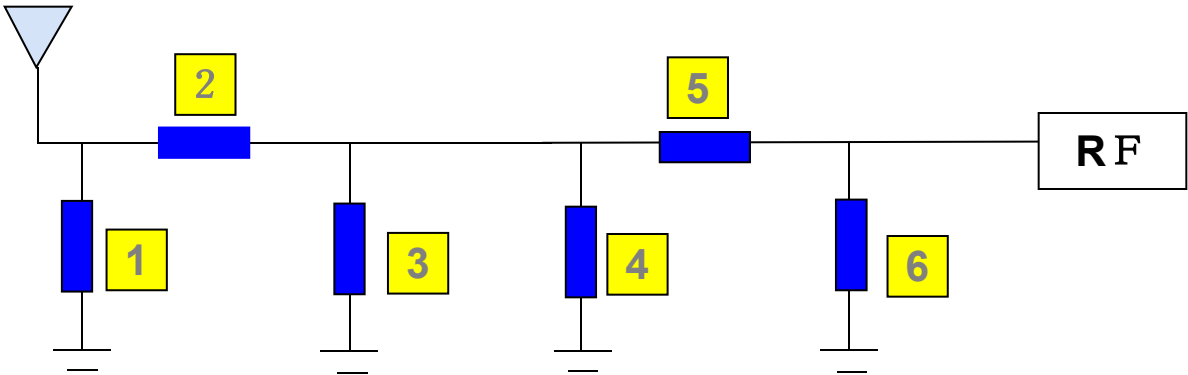
eth0      no wireless extensions.

wlan0     IEEE 802.11 ESSID:"SWARD-RD-5G"
Mode:Managed Frequency:5.2 GHz Access Point: F4:6D:2F:AD:A1:E5
Bit Rate=433.3 Mb/s   Tx-Power=31 dBm
Retry short limit:7 RTS thr:off   Fragment thr:off
Encryption key:off
Power Management:on
Link Quality=57/70 Signal level=-53 dBm
Rx invalid mvid:0 Rx invalid crypt:0 Rx invalid frag:0
Tx excessive retries:0 Invalid misc:0 Missed beacon:0

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test location	Our R&D office					
	2.4G/5G-Distance of 15 meters		2.4G/5G-Distance of 10 meters		2.4G/5G-Distance of 5 meters	
Test group						
test frequency	2.4Gwifi	5Gwifi	2.4Gwifi	5Gwifi	2.4Gwifi	5Gwifi
signal strength	-44dBm	-53dBm	-35dBm	-45dBm	-28dBm	-40dBm

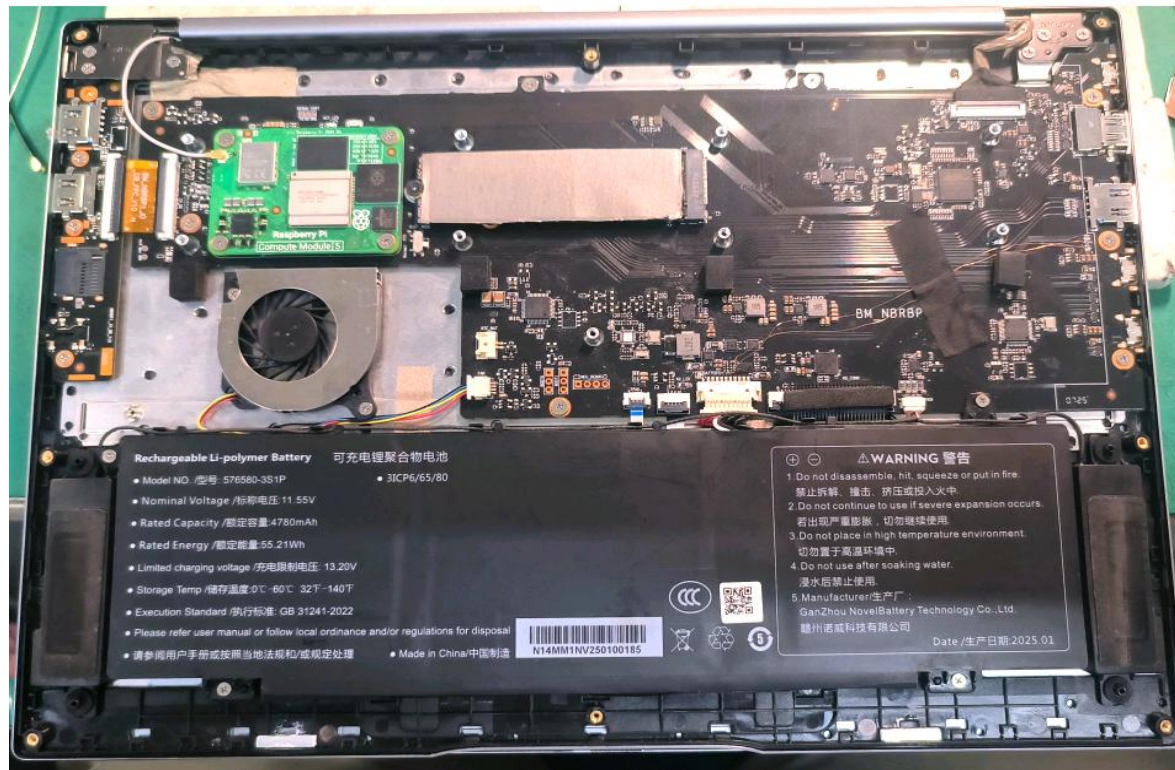
Antenna matching



No antenna matching has been changed.

main antenna	1	2	3	4	5	6	Remarks
Original Match							
Change Matching							

Environmental treatment and assembly instructions



1. Suggest adding conductive cloth to connect the rotating shaft to the metal frame;
2. Suggest adding absorbing materials to both sides of the SSD for shielding treatment.

Debugging log

1. 2025.04.19, received the machine and debugged antenna 1;
2. 2025.04.21, testing exception, received code debugging machine after communicating with the customer;
3. 2025.04.22, testing machine data abnormality, communication transmission and machine point testing;
4. 2025.04.25, antenna samples were received and the verification effect was preliminarily OK. The machine was arranged to reinstall the antenna and retest to confirm stability;
5. 2025.04.27, the retest effect is basically okay, arrange for the sample machine to be returned;

Note: 1. This report is based on the actual debugging and testing of the prototype, including environmental treatment, antenna position, and assembly position of each component

Cannot be changed arbitrarily;

If there are any changes in the materials used in the prototype, please promptly provide feedback to our company for further verification;

3. List of sensitive components:

TP (Material, Coating, Wiring, etc.)

Screen (amplifier circuit, LED, cable design, etc.)

Shell material (antenna assembly method, structural interference, shell material, antenna position height and area, etc.)

Motherboard (motherboard conduction, RF circuit matching, PA, dual power, filtering, etc.)

LNA, Power supply circuit, etc

Camera, battery, motor MIC、Fingerprint recognition module, etc

4. Due to the small number or only one sample testing machine, some probabilistic issues cannot be fully identified. It is recommended to conduct a small batch trial production before mass production to investigate the problem points (such as flashing screens, speaker noise, TP jump points, black screen crashes, signal drops, etc.)