

Soward Antenna Commissioning Report

Customer name:Yipuda

Project name: ES306-10.95 "metal
shell - Biota W863 motherboard -MT8183V main
control

Date:2023.04.20

Soward Antenna Commissioning Report

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Project Description

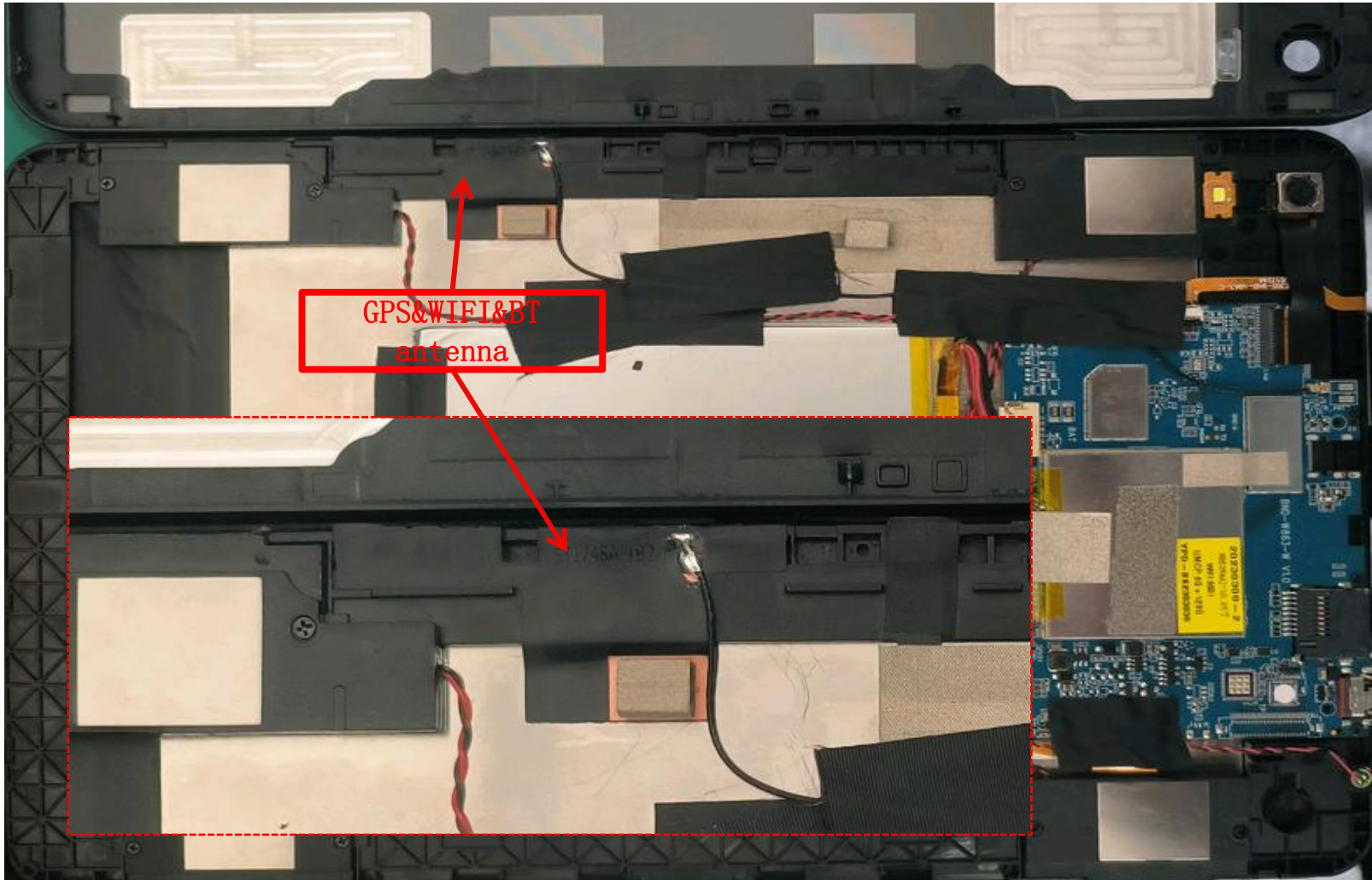
1. Project Overview

Project Antenna Number	Machine type
1	Three-in-one plate
Shell material: 10.95 "metal shell (plastic parts at both ends)	

2. Antenna Brief

Antenna number	name	Working frequency/MHZ	Material/Structure
1	WIFI&BT&5Gwifi	2400MHz/2500MHz&5. 8GHz	FPC

Antenna layout



WIFI&BT antenna S11



WIFI Antenna active data

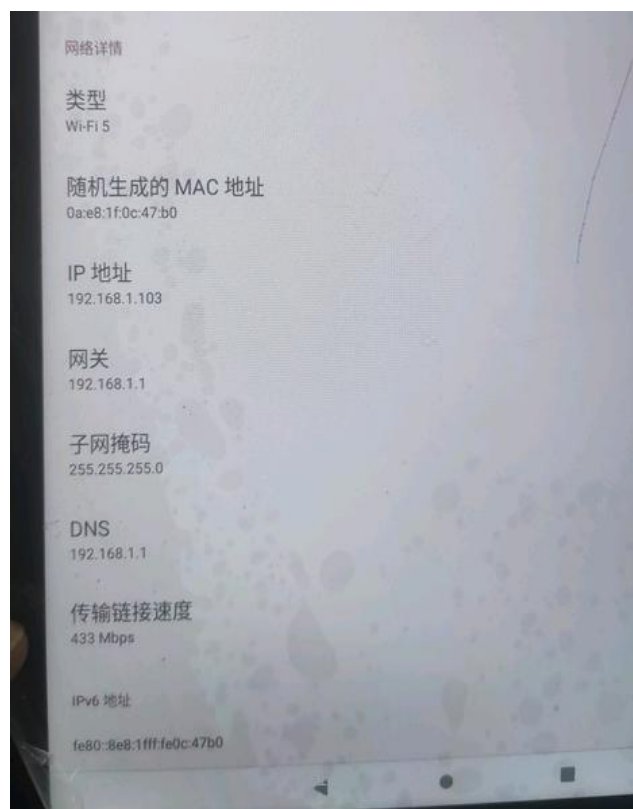
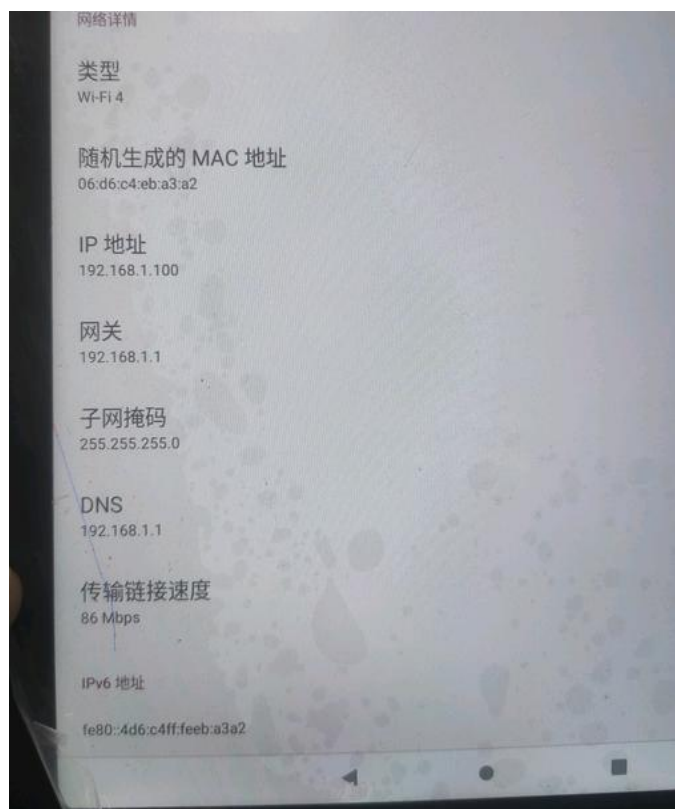
Model number	channel	b mode (11MHz)		g mode (54MHz)		n mode (MCS0/7)		a mode (54MHz)	
		TRP	TIS	TRP	TIS	TRP	TIS	TRP	TIS
1	1	9.7	-80.89	8.7	-68.88	9.2	-64.58	NA	NA
	6	9.45	-81.69	8.42	-69.47	9.47	-64.97	NA	NA
	11	10.52	-82.45	8.62	-69.9	9.72	-65.43	NA	NA
	36	NA	NA	NA	NA	5.53	-63.29	5.94	-67.54
	100	NA	NA	NA	NA	7.99	-65.36	8.37	-69.68
	161	NA	NA	NA	NA	10.7	-66.38	10.65	-69.66

WiFi throughput

Iperf throughput test						
Machine type	ES306-Biota W863 motherboard	module	MT8183V master control	Software version	Magic_Iperf	
Model number	Frequency band	distance	Test Angle	Test data (TX) 1min mean value	Mean value of test data (RX) in 1min	Remarks (times of switching)
1	2.4G	2.4G WIFI (Research and development environment 15m)	0°	34.6 Mbps	66.9 Mbps	0
			90°	34.4 Mbps	56.9 Mbps	0
			180°	37.3 Mbps	56.9 Mbps	0
			270°	37.4 Mbps	60.1 Mbps	0
	5G					
		5F WIFI (Research and development environment 15m)	0°	225 Mbps	297 Mbps	0
			90°	236 Mbps	293 Mbps	0
			180°	268 Mbps	293 Mbps	0
			270°	278 Mbps	292 Mbps	0

WIFI antenna throughput test (test picture)

Test data 2.4G/5G wifi upload/download (corresponding connection rate is 86/433Mbps)



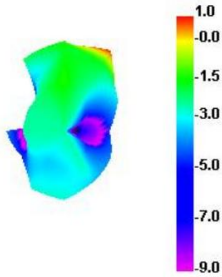
Measured distance of BT antenna

Measured effect	
Model number	1
Test environment	Soward Research and Development Center
Test equipment	Huawei AM08
Test distance	10 m ≥

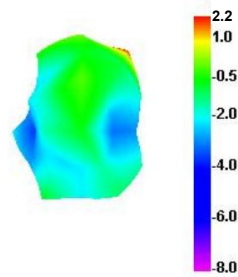
WIFI&BT Antenna Efficiency

Passive Test For 2.4G wifi								
Freq	Effie	Effie	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
2400	21.62	-6.65	0.96	-1.19	10.589	11.026	0.96	-16.36
2410	21.68	-6.64	1.04	-1.11	10.573	11.108	1.04	-17.79
2420	21.76	-6.62	1.34	-0.81	10.304	11.457	1.34	-19.47
2430	21.07	-6.76	1.16	-0.99	9.825	11.244	1.16	-21.09
2440	23.79	-6.24	1.85	-0.3	10.863	12.923	1.85	-21.53
2450	25.41	-5.95	2.02	-0.13	11.557	13.855	2.02	-20.42
2460	24.67	-6.08	1.97	-0.18	11.221	13.453	1.97	-19.5
2470	23.46	-6.3	1.5	-0.65	10.825	12.64	1.5	-18.37
2480	23.14	-6.36	1.36	-0.79	10.745	12.397	1.36	-17.31
2490	21.36	-6.7	0.77	-1.38	9.941	11.416	0.77	-17.04
2500	20.38	-6.91	0.37	-1.78	9.55	10.83	0.37	-16.95

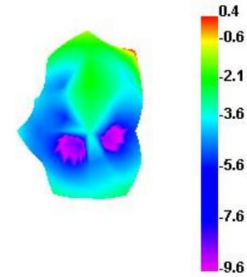
2400.000MHz



2450.000MHz



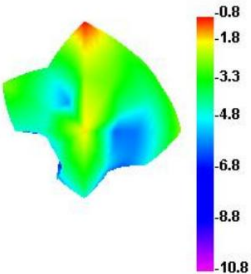
2500.000MHz



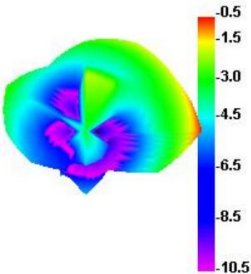
5GWIFI Antenna Efficiency

Passive Test For 5G wifi								
Freq	Effie	Effie	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
5000	15.82	-8.01	-0.83	-2.98	8.833	6.984	-0.83	-22.03
5100	20.01	-6.99	0.82	-1.33	12.021	7.985	0.82	-17.83
5200	14.76	-8.31	-1.06	-3.21	9.074	5.688	-1.06	-21.89
5300	18.97	-7.22	-0.84	-2.99	10.782	8.184	-0.84	-21.25
5400	15.45	-8.11	-1.59	-3.74	7.99	7.455	-1.59	-19.27
5500	18.4	-7.35	-0.53	-2.68	9.322	9.081	-0.53	-17.92
5600	18.24	-7.39	0.47	-1.68	9.585	8.659	0.47	-17.16
5700	22.9	-6.4	0.4	-1.75	12.784	10.117	0.4	-19.52
5800	37.57	-4.25	1.56	-0.59	22.207	15.366	1.56	-20.37
5900	38.68	-4.12	1.31	-0.84	24.28	14.404	1.31	-19.09
6000	34.08	-4.68	0.44	-1.71	21.187	12.89	0.44	-16.19

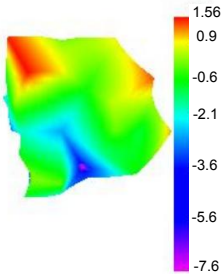
5000.000MHz



5500.000MHz



5800.000MHz



WIFI antenna signal intensity measured picture (data)



Test location: R&D office of our company

Test time: 16:00-1630

Test distance: 10-15 meters

Signal strength: -49dBm to -38dBm

Building B, Hexi Hangcheng Industrial Zone, No. 135 Qianjin No. 2 Road, Baoan District, Shenzhen

GPS measured pictures (data)



Test location: the roof of our company

Test time: 17:45 to 17:15

Test direction: East, South, west and North

Cold start positioning time: < 60sec

Building B, Hexi Hangcheng Industrial Zone, No. 135 Qianjin No. 2 Road, Baoan District, Shenzhen

The 3 generation terminals

175⁺²₋₀

0.81±0.05

Motherboard welding

1.00±0.2

1.50±0.2

2.00±0.2

10.00±0.2

6.00±0.2

Conductive foam

56.21±0.2

26.26±0.2

ST1748A-1B2-A

②

③

①Terminal facing inward

technical requirements:

1.* for critical dimensions;

2.Size conform to the requirements of the drawings;

3.No virtual welding point, false welding. Require full welding points.

4.Network test pass.

5.No marked tolerance according to SJ/T 10628 1995 6 classes;

name	color	quantity	specifications	audits	approval
Conductive foam	gray	1	10*6*6mm		
FPC	black	1	ST1748A-1B2-A	RD	YWD 2023.06.12 Q C
coaxial line	black	1	Ø=0.81MM	RF	

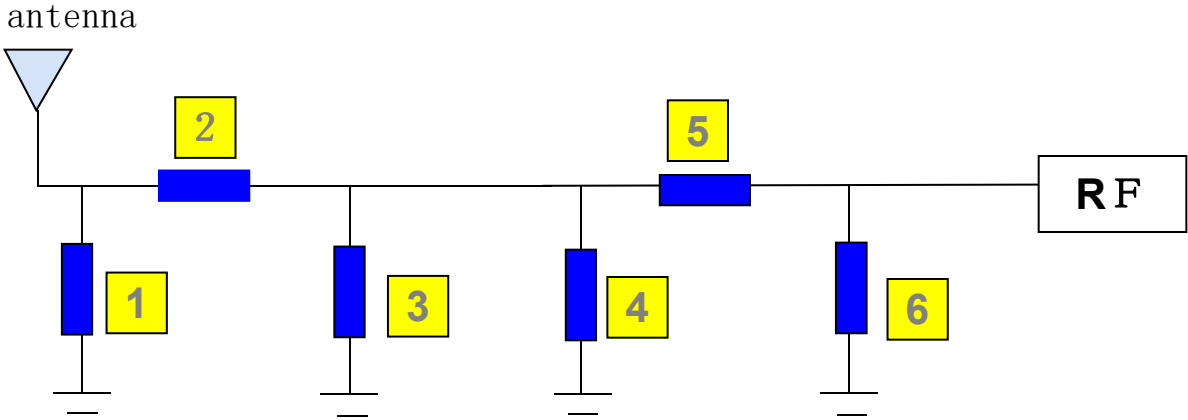
signatures date mass signatures date

time markup percentage

1 A 1:1

RoHS

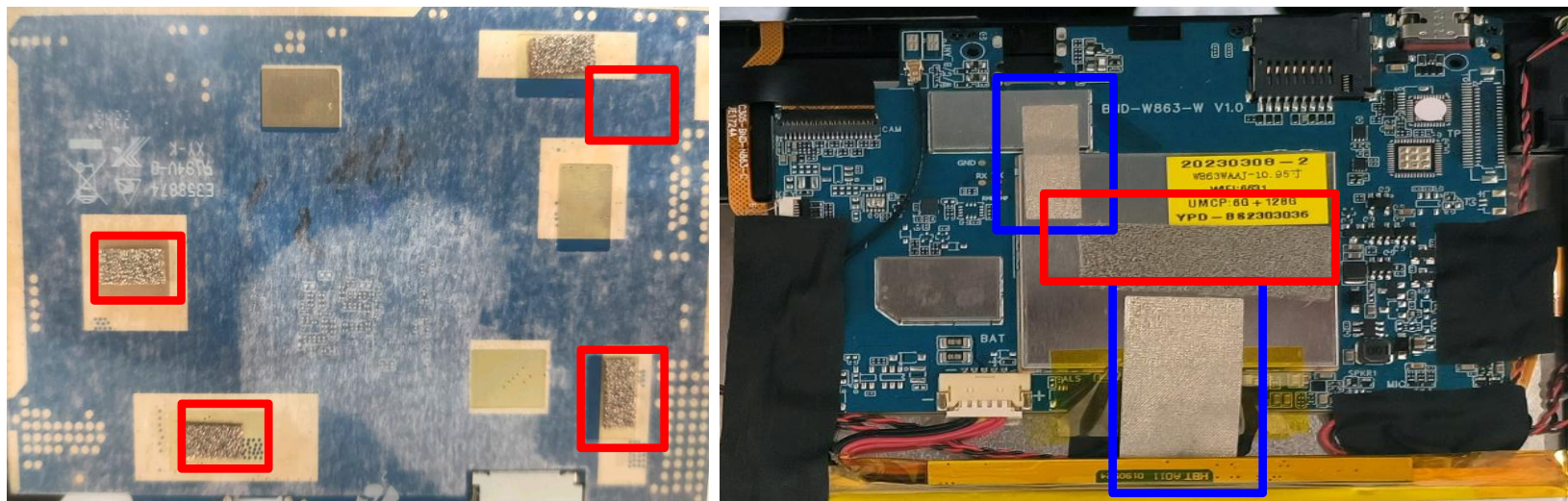
Antenna matching



Antenna matching has not changed.

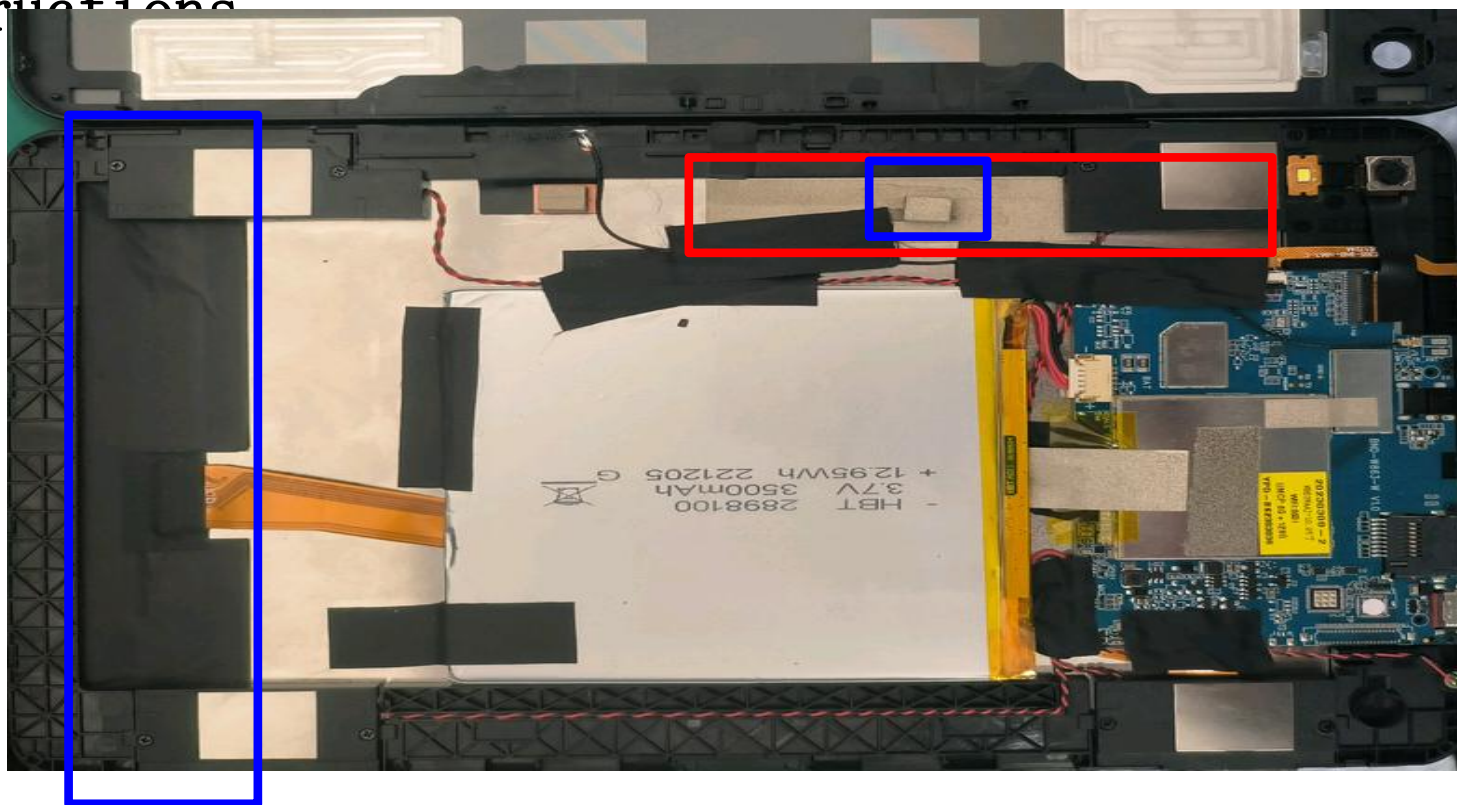
Main antenna	1	2	3	4	5	6	备注
Original matching							
Change matching							

Environmental handling and assembly instructions



1. At the red frame on the back of the motherboard, the conductive sponge is attached to make the motherboard and the screen fully grounded;
2. The front blue frame of the motherboard is connected to the screen with conductive cloth;
In the red frame, the conductive sponge is connected with the metal back shell;

Environmental handling and assembly instructions



3. On the front, the red frame is pasted with conductive cloth shielding wire to reduce wire interference;
A conductive foam is added to the blue frame to make the screen directly connected with the metal back shell,
reducing the interference of the main board to GPS signal;

4. Blue box, the position of the screen row here has its own shield, reserved

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

cannot be changed at will;

2. If there is any change in the materials used in the prototype, it is necessary to timely feedback to our company for re-verification;

3. List of sensitive components:

TP (material, coating, wiring, etc.)

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

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

Mainboard (mainboard conduction, RF circuit matching, PA, duplexer, filter, LNA, power circuit, etc.)

Camera, battery, motor, MIC, fingerprint recognition module, etc.

4. Due to the small number of debugging prototypes or only one, some probabilistic problems cannot be completely found. It is recommended to check the problem points in small batches before mass production (such as splash screen, noise from speakers, TP jump, black screen of death, signal diving, etc.)