

Customer name: Haoqin

Project name: N10-10.1 inch
Rongliang plastic case - Emdoor T7818
motherboard - MT8766 master

DATE : 2022. 09. 27

Thorward Structure:

Tel: 0755-29985185

Email: yangwende@szsward.com

Thorward RF: Xiao Chunyan

Tel: 0755-29985185

Email: swd005@szsward.com

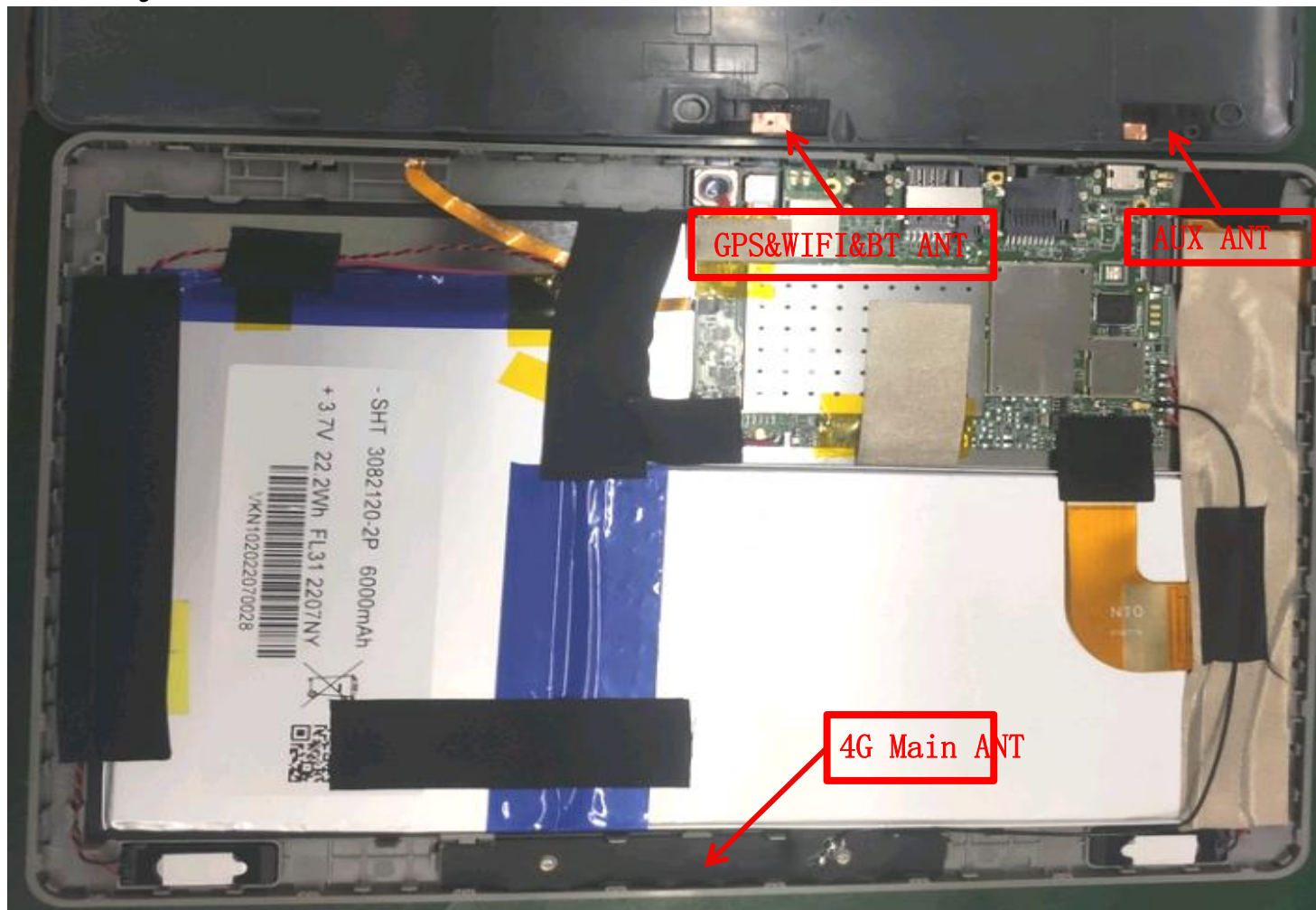
1. Project Overview

Project Antenna Number	Machine type
3	4G tablet
Machine shell material: 10.1 inch Rongliang plastic shell	

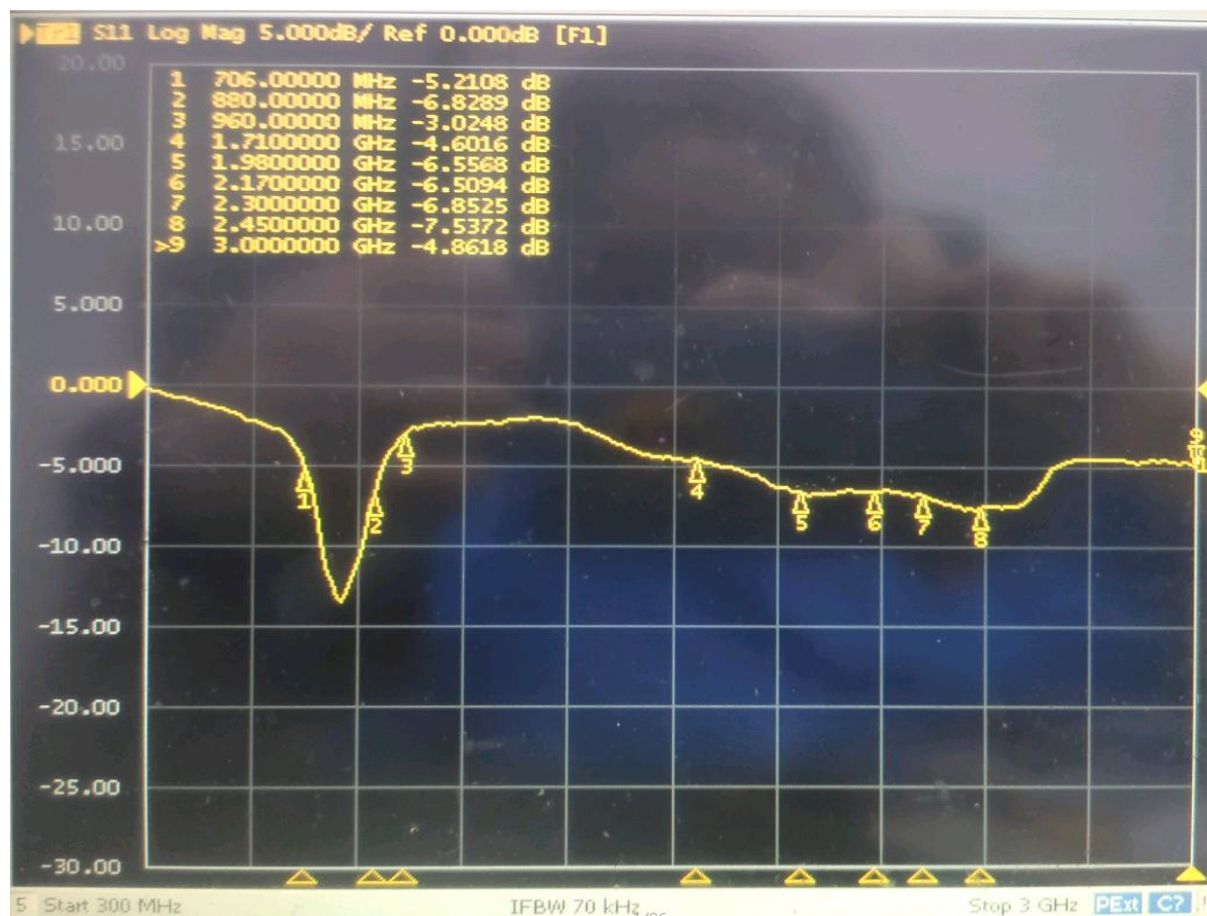
2. Antenna Brief

Antenna number	name	Working frequency/MHZ	Material/Structure
1	4G Main	GSM 850/900/1800/1900 WCDMA 2100 / 900 LTE - B1/3/5/28A/40/41	PIFA
2	AUX	LTE-B1/3/5/28A/40/41	PIFA
3	WIFI&GPS&BT&5Gwifi	2400MHz/2500MHz&1575MHz&5. 8GHz	PIFA

Antenna layout



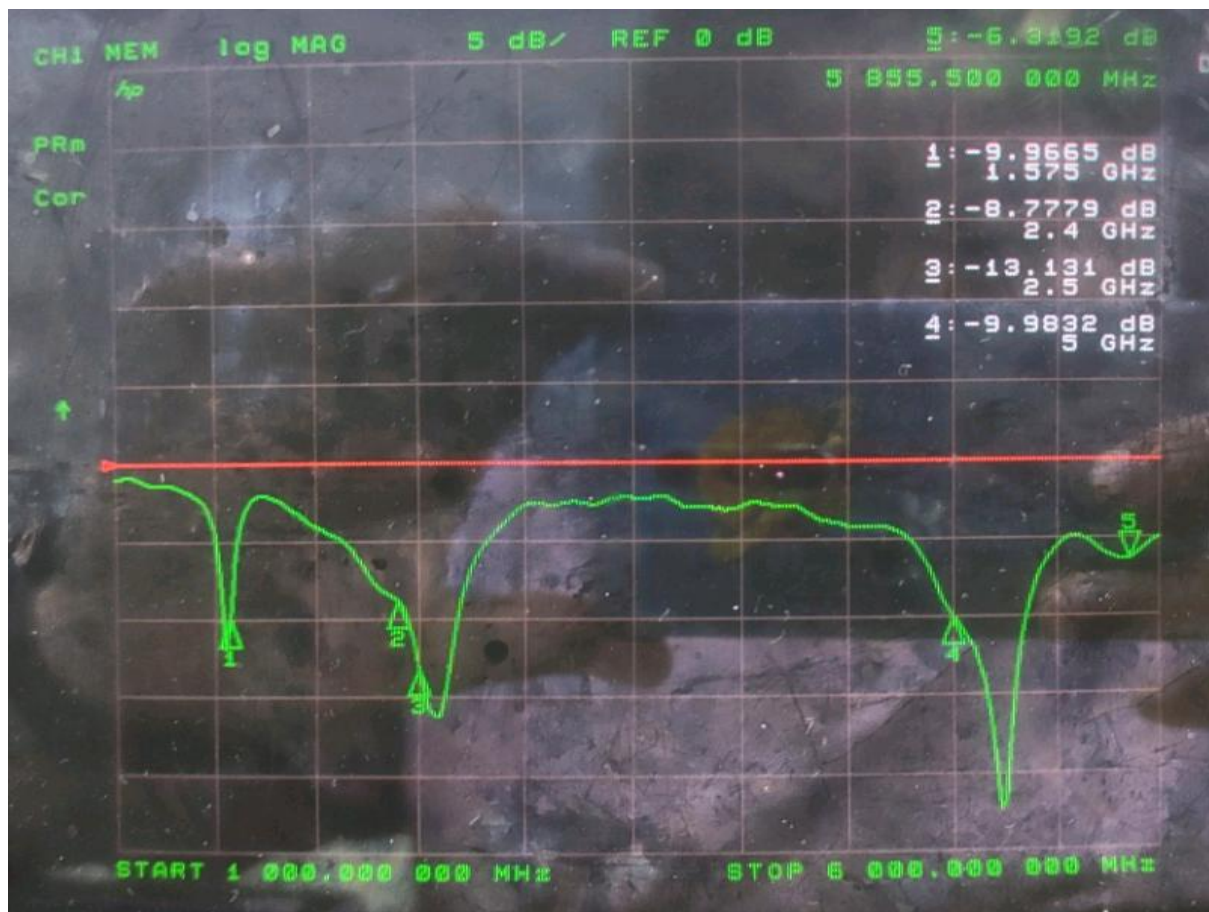
2G&3G&4G ANT S11



2G&3G&4G Antenna Active Data

frequency band	2G			frequency band	3G/4G			frequency band	4G		
	CH	TRP	TIS		CH	TRP	TIS		CH	TRP	TIS
GSM850	128	27.08		WCDMA -2100	10562	18.32		LTE-B1	18050	18.93	
	190	27.04			10700	18.87			18300	18.22	
	251	26.43	-100.78		10838	18.32	-103.63		18550	17.01	-92.55
	Avg				Avg				Avg		
GSM900	1	26.2		WCDMA -900	2937	15.5		LTE-B3	19250	15.12	
	62	26.08			3013	15.58			19575	15.32	
	124	25.18	-101.92		3088	15.58	-102.34		19900	16.9	-92.28
	Avg				Avg				Avg		
GSM1800	512	23.93		LTE-B40	38750	17.19		LTE-B5	20450	18.46	
	698	24.75			39150	18.04			20525	18.35	
	885	27.08	-103.23		39550	19.51	-86.47		20600	17.26	-91.25
	Avg				Avg				Avg		
GSM1900	512	27.92		LTE-B41	40340	14.27		LTE-B28A	27260	17.12	
	661	27.16			40620	14.53			27430	17.14	
	810	25.87	-101.26		41140	15.95	-86.07		27510	17.26	-92.75
	Avg				Avg						

WIFI&GPS&BT ANT S11





WIFI Antenna Active Data

Model number	channel	b（11MHz）		g（54MHz）		n（MCS7）		a（54MHz）	
		TRP	TIS	TRP	TIS	TRP	TIS	TRP	TIS
1	1	11.45	-79.21	9.74	-68.56	10.06	-63.18	NA	NA
	6	11.38	-79.67	10.07	-69.73	10.15	-64.94	NA	NA
	11	12.66	-81.4	10.8	-69.63	11.11	-66.77	NA	NA
	36	NA	NA	NA	NA	8.39	-68.04	8.48	-66.36
	149	NA	NA	NA	NA	11.23	-69.06	10.49	-69.35
	161	NA	NA	NA	NA	10.44	-67.54	10.91	-68.54

WiFi Throughput

Iperf Throughput test						
model	N10 -Emdoor T7818 Motherboard	module	MT8766 master	Software version	Magic_Iperf	
Model number	frequency band	distance	test angle	test data (TX) 1min	test data (RX) 1min	Remarks (number of dropped packages)
1	2.4G	2.4G WIFI (R & D environment15m)	0°	26.5 Mbps	57.3 Mbps	0
			90°	25.1 Mbps	55.1 Mbps	0
			180°	26.5 Mbps	55.2 Mbps	0
			270°	35.0 Mbps	57.4 Mbps	0
	5G	5F WIFI (R & D environment15m)	0°	183 Mbps	344 Mbps	0
			90°	213 Mbps	344 Mbps	0
			180°	176 Mbps	338 Mbps	0
			270°	188 Mbps	330 Mbps	0

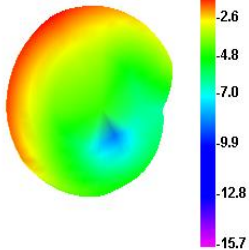
BT Antenna measured distance

Measured effect	
Model number	1
test environment	Thorward R&D Center
Test Equipment	HUAWEI AM08
test distance	> 10 m

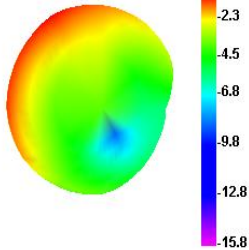
WIFI&BT Antenna efficiency

Passive Test For 2.4Gwifi								
Freq	Effi	Effi	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
2400	27.77	-5.56	-1.13	-3.28	19.99	7.779	-1.13	-15.72
2410	29.46	-5.31	-0.86	-3.01	21.261	8.196	-0.86	-15.23
2420	30.5	-5.16	-0.79	-2.94	22.185	8.314	-0.79	-14.76
2430	30.51	-5.16	-0.66	-2.81	22.413	8.101	-0.66	-15.26
2440	30.17	-5.2	-0.77	-2.92	22.256	7.914	-0.77	-15
2450	28.79	-5.41	1.23	-0.91	21.334	7.457	-0.78	-15.76
2460	30.89	-5.1	-0.43	-2.58	22.881	8.008	-0.43	-15.25
2470	31.34	-5.04	-0.41	-2.56	23.315	8.023	-0.41	-15.61
2480	30.95	-5.09	-0.51	-2.66	23	7.952	-0.51	-15.7
2490	29.87	-5.25	-0.84	-2.99	22.245	7.622	-0.84	-16.95
2500	30.66	-5.13	-0.87	-3.02	22.822	7.843	-0.87	-16.83

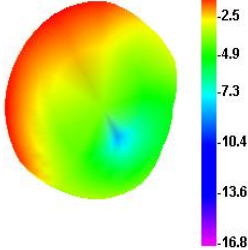
2400.000MHz



2450.000MHz



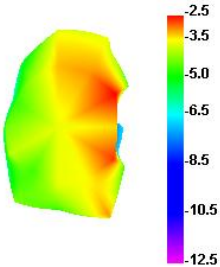
2500.000MHz



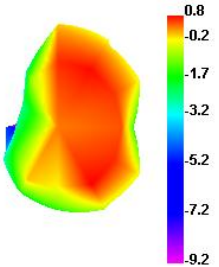
5GWIFI Antenna efficiency

Passive Test For 5Gwifi								
Freq	Effi	Effi	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
5000	18.12	-7.42	-2.51	-4.66	12.589	5.531	-2.51	-17.87
5100	17.8	-7.5	-2.34	-4.49	12.734	5.064	-2.34	-20.54
5200	26.67	-5.74	1.13	-1.01	19.304	7.366	-0.53	-21.91
5300	29.78	-5.26	0.07	-2.08	21.618	8.158	0.07	-16.46
5400	41.45	-3.82	1.01	-1.13	29.845	11.609	1.61	-16.83
5500	35.9	-4.45	0.75	-1.4	25.387	10.517	0.75	-17.47
5600	32.27	-4.91	0.25	-1.9	22.715	9.552	0.25	-18.62
5700	28.76	-5.41	-0.38	-2.53	20.191	8.574	-0.38	-20.59
5800	29.43	-5.31	1.13	-1.01	20.643	8.784	0.31	-23.49
5900	20.67	-6.85	-0.44	-2.59	14.466	6.204	-0.44	-16.44
6000	22.28	-6.52	0.48	-1.67	15.445	6.836	0.48	-19.44

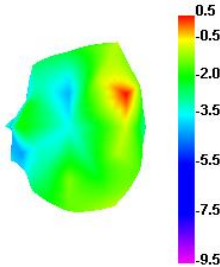
5000.000MHz



5500.000MHz



6000.000MHz



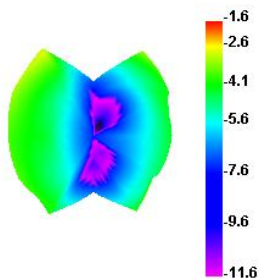
WIFI Antenna signal strength measured picture (data)



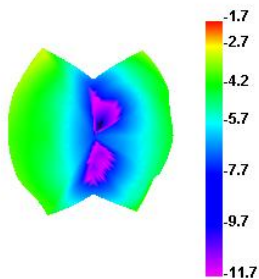
GPS Antenna efficiency

Passive Test For GPS2								
Freq	Effi	Effi	Gain	Gain	UHS	DHS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
1570	23.87	-6.22	-1.57	-3.72	10.65	13.222	-1.57	-16.37
1571	23.69	-6.25	-1.62	-3.77	10.538	13.153	-1.62	-16.45
1572	23.5	-6.29	-1.67	-3.82	10.425	13.079	-1.67	-16.6
1573	23.34	-6.32	-1.7	-3.85	10.336	13.002	-1.7	-16.65
1574	23.24	-6.34	-1.74	-3.89	10.283	12.959	-1.74	-16.79
1575	23.28	-6.33	-1.75	-3.9	10.291	12.992	-1.75	-16.82
1576	23.4	-6.31	-1.73	-3.88	10.329	13.076	-1.73	-16.91
1577	23.65	-6.26	-1.69	-3.84	10.424	13.222	-1.69	-17.04
1578	24	-6.2	-1.64	-3.79	10.589	13.415	-1.64	-17.05
1579	24.36	-6.13	-1.59	-3.74	10.744	13.62	-1.59	-17.09
1580	24.78	-6.06	-1.52	-3.67	10.927	13.853	-1.52	-17.06

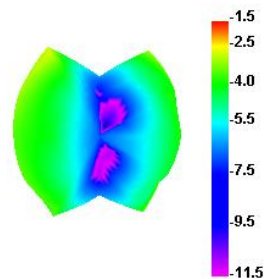
1570.000MHz



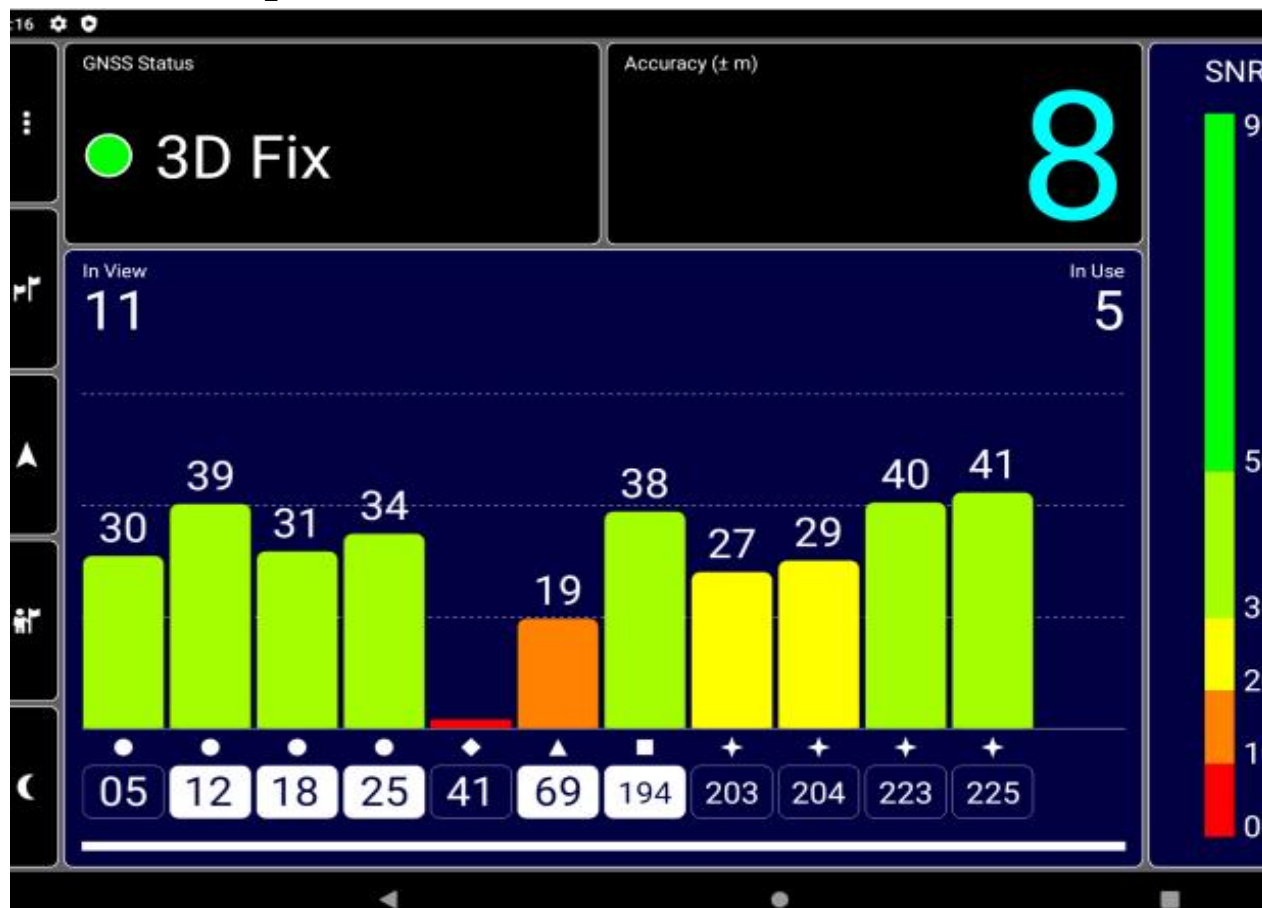
1575.000MHz



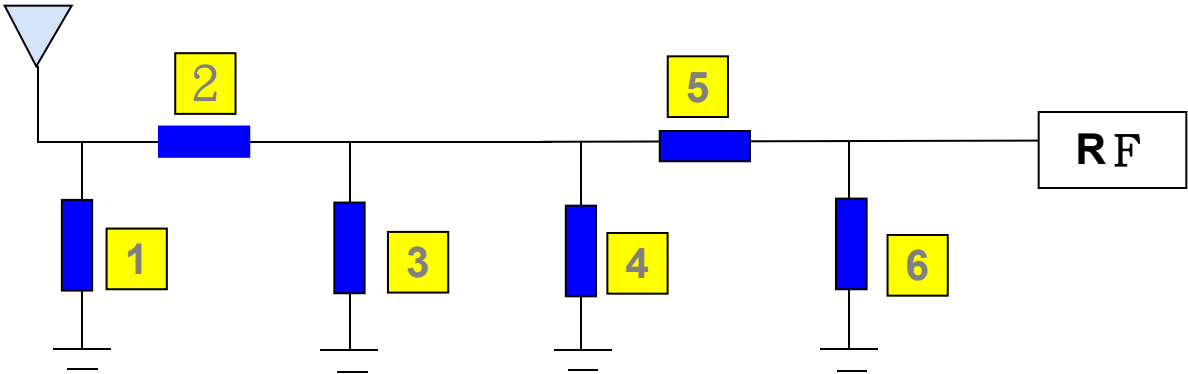
1580.000MHz



GPS Measured pictures (DATA)



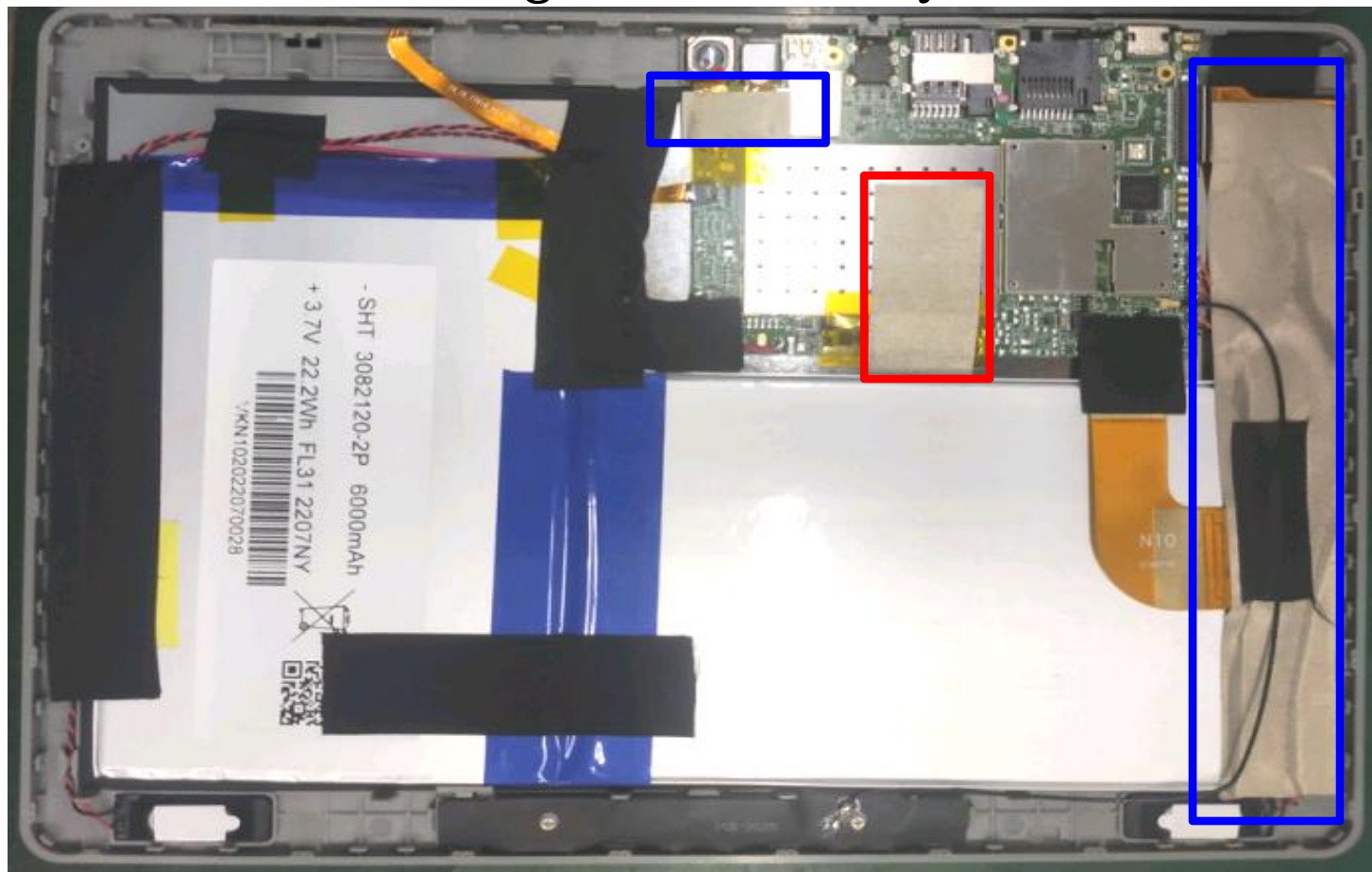
Antenna matching



Antenna matching has not been changed.

Main ANT	1	2	3	4	5	6	Remark
original match							
change match							

Environmental Handling and Assembly Instructions



2. At the blue frame, the cable position is grounded with conductive cloth (the component position is insulated first and then shielded);
3. On the red frame on the front of the main board, paste conductive cloth to ground the shielding cover and the screen.

Suggest:

1、The mainboard 5G (802.11n / 802.11a) has low conduction and low external signal strength.

Conduction try to arrange calibration

When the 5G transmit power is low, the 5G signal strength under the intuitive data is correspondingly low;

Note: 1. This report is based on the actual debugging and testing of the debugging prototype, and the environmental processing, 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 identification 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.)