



Sample Acknowledgement



Shenzhen Sanhao Wireless Communication Co., Ltd.

client	Billion Road		
Customer Model	P1		
Material Code	YD-P1		
Three-in-one antenna coding	01.WF7.P1GPS00000A		
Edition	T:A		
Production Date	2024.09.29		
Prepare RF	Review Structure	Review Approval/	Stamp
Zhu Kun	Ye Jinqiang	Li Fulun	Zhou Wu
Customer confirmation signature:			



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1. Basic information and pictures of the project:

1.1 Basic information of the project

Machine type	Candy bar smartphone
Antenna Material	FPC
Antenna frequency band	BT&2.4G WIFI:2400~2483.5MHZ 5G WIFI:5100~5800MHZ GNSS: 1559MHz -1610MHz
Working frequency	2400~2483.5MHZ, 5100~5800MHZ,1559MHz -1610MHz

1.2 Mobile phone appearance and antenna sample pictures





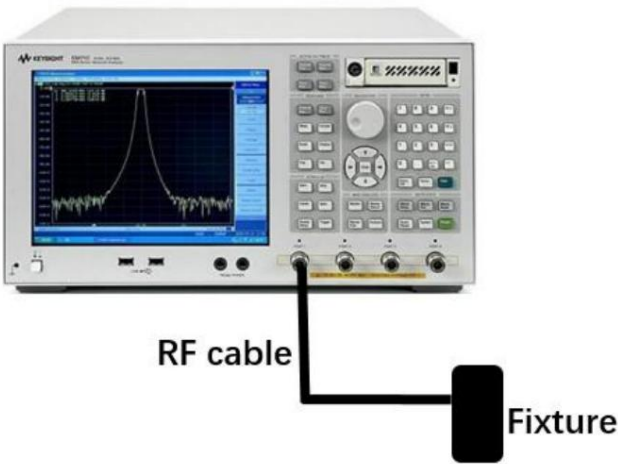
2. Electrical properties

2.1 Electrical performance items

Passive Test	S11	VSWR/R.L/Simth Chart
	S21	Isolation
	S21	Effi./Gain
Active Test	TRP	Total Radiated Power
	TIS	Total Istropic Sensitivity

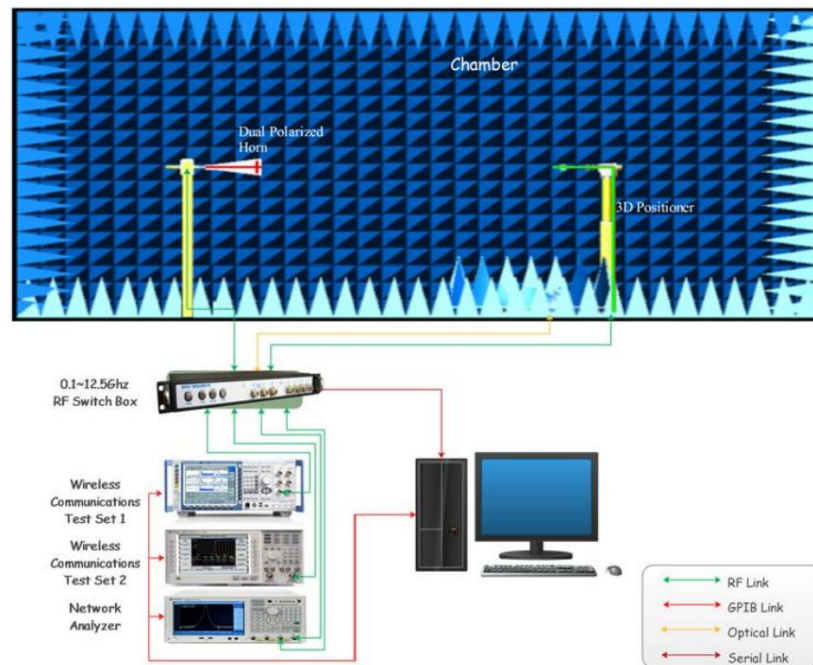
2.2 Test methods and test equipment

2.2.1 S11 test

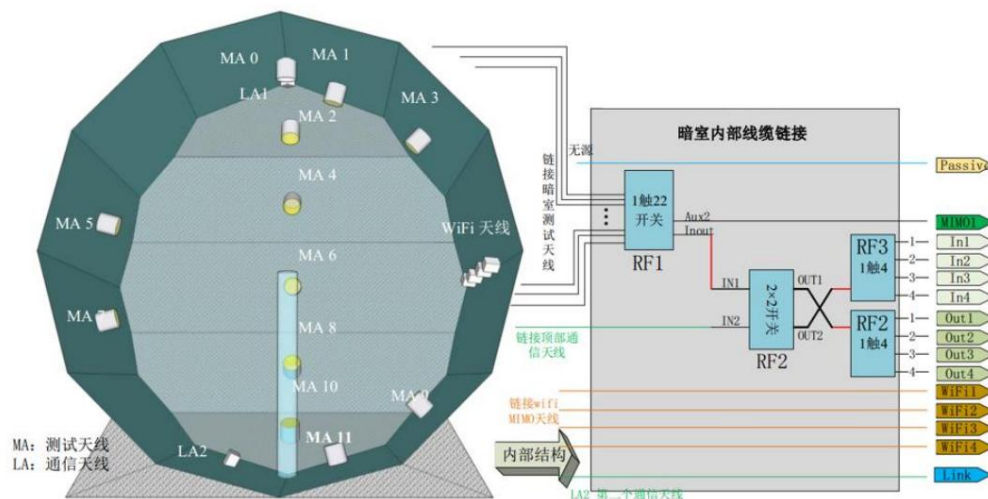




2.2.2 Gain/Efficiency (Effi./Gain) & Active (Trp/Tis)



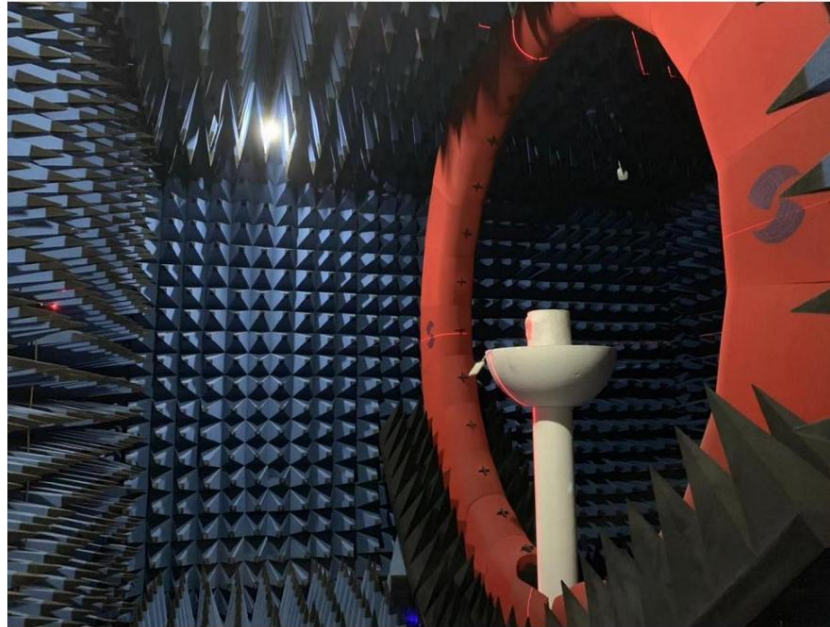
Single probe measurement system



Multi-probe measurement system



2.2.3 Test darkroom pictures



Internal diagram of multi-probe microwave darkroom system



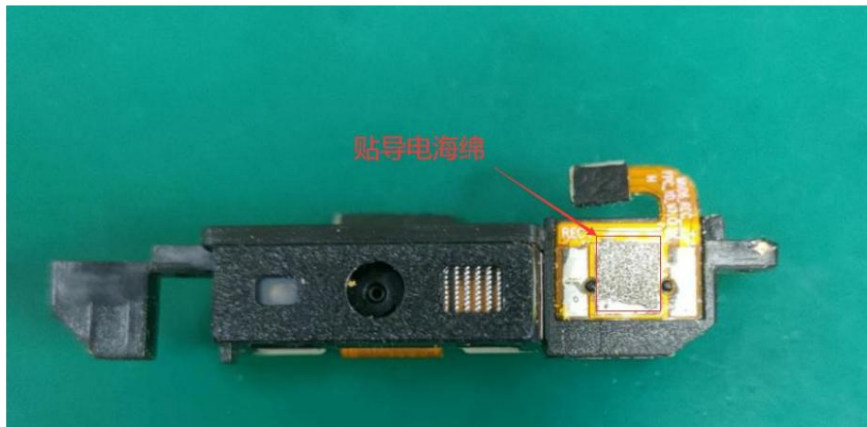
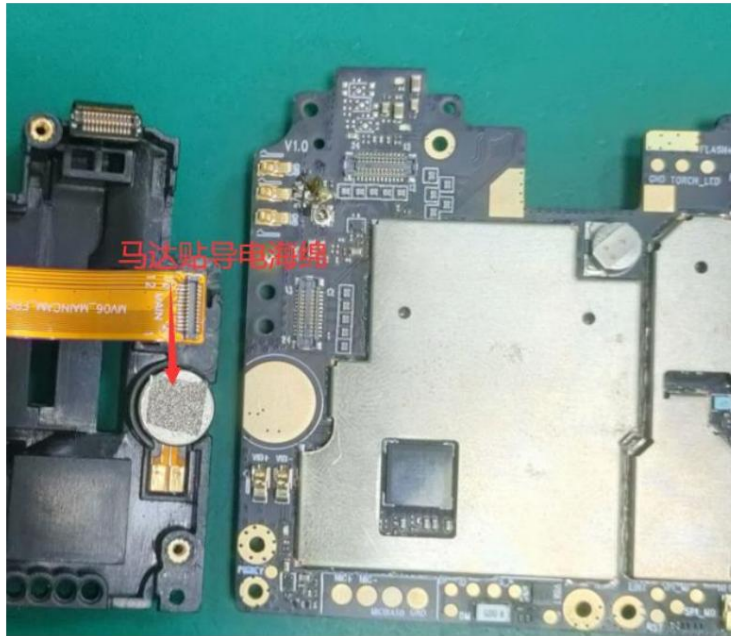
External view of microwave darkroom (darkroom + cabinet equipment)



3. Whole machine environment processing and antenna matching circuit

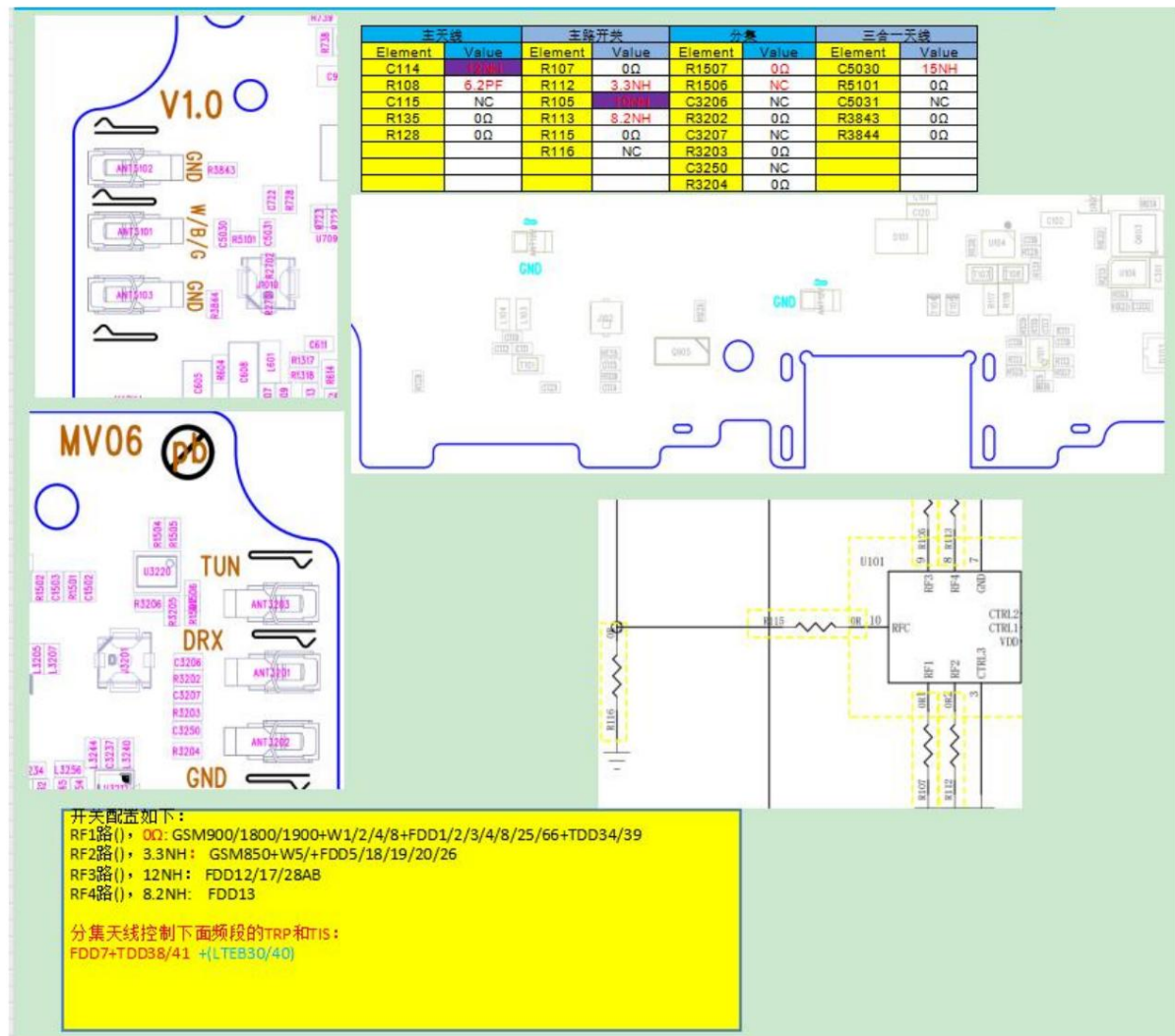
3.1 Machine environment processing







3.2 Antenna Matching Circuit



4. Test Data

4.1 Passive test

4.1.1 S11(VSWR/RL/Simth Chart) test data

NC

4.1.2 S21γEffi./Gainγtest data

NC



4.2 Active test data (trp/tis)

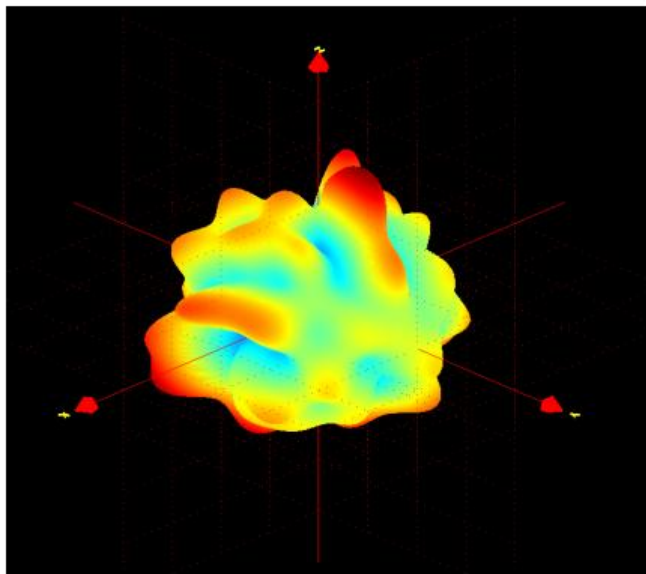
NC

4.3 GPS/WIFI/BT test

Frequency(MHz)	Efficiency . dB		Frequency (MHz)	Gain (dBi)
5100	-7.491402385		5100	1.27
5136	-7.243405681		5136	1.33
5172	-7.456556337		5172	1.27
5208	-7.294260555		5208	1.50
5244	-7.800618683		5244	0.28
5280	-7.769771704		5280	0.11
5316	-7.726981794		5316	0.61
5352	-7.373494267		5352	1.28
5388	-6.610428119		5388	2.00
5424	-5.857195881		5424	2.71
5460	-5.315158596		5460	3.25
5496	-5.275393982		5496	2.89
5532	-5.333135619		5532	2.61
5568	-5.561738838		5568	1.88
5604	-6.248203671		5604	0.92
5640	-6.568087974		5640	0.34
5676	-7.124576875		5676	0.61
5712	-7.561680546		5712	1.50
5748	-7.645428006		5748	1.21
5784	-7.726626588		5784	1.50
5850	-8.099582725		5850	1.28

5460MHz

3.25dBi

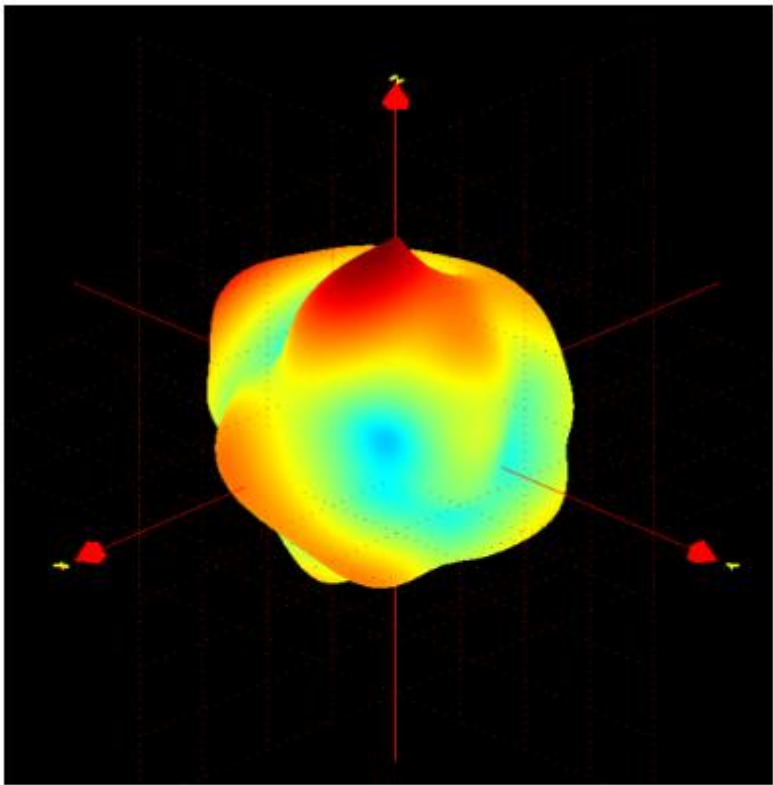




2400-2500MHz			
Frequency (MHz)	Efficiency . dB		Frequency Gain (dBi)
2400	-7.80623629		2400 0.87
2410	-7.785247357		2410 0.81
2420	-7.593033048		2420 0.74
2430	-7.488028176		2430 1.15
2440	-7.650054999		2440 1.09
2450	-7.720129881		2450 1.08
2460	-7.483839034		2460 1.04
2470	-7.102068483		2470 1.21
2480	-6.916954417		2480 0.94
2490	-6.660810501		2490 0.55
2500	-6.319124936		2500 1.50

2500MHz

1.5 dBi

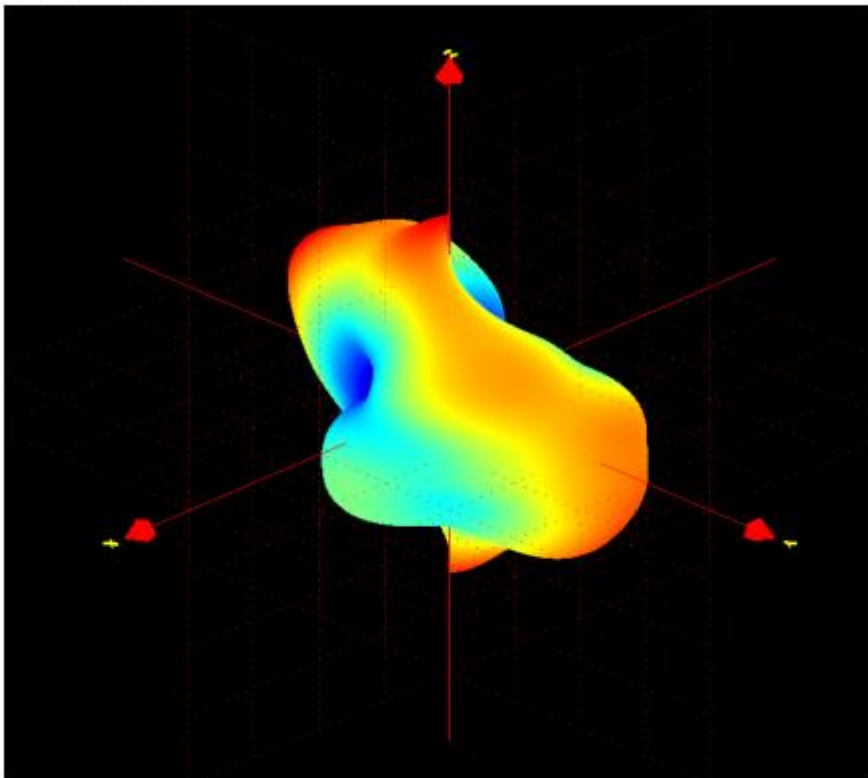




1570-1650MHz				
Frequency (MHz)	Efficiency . dB		Frequency (MHz)	Gain (dBi)
1570	-6.834487204		1570	-2.70
1571	-6.850859644		1571	-2.72
1572	-6.872767981		1572	-2.72
1573	-6.898313584		1573	-2.71
1574	-6.91822569		1574	-2.70
1575	-6.930609693		1575	-2.68
1576	-6.928650075		1576	-2.68
1577	-6.91978138		1577	-2.68
1578	-6.907813954		1578	-2.69
1579	-6.905556769		1579	-2.71
1650	-6.919276132		1650	-2.75

1575MHz

-2.68dBi



4.4 Test Conclusion

GPS/WIFI/BT Actual test performance is OK

Note: This antenna is only suitable for debugging prototypes. Any changes in the motherboard version or RF materials, or changes in mobile

phone accessories (such as microphones, screens, speakers, motors, etc.) must be tested and verified by our company before use.



5. Engineering drawings

5.1 Three-in-one antenna

