



Sample acknowledgement

样品承认书

Project name项目名称:	P1316
Product name产品名称:	P1316_MAIN_ANT
Material number物料料号:	K5310000289LA
Material Description 物料描述:	FPC thickness 0.12mm, main antenna, black Shangyuan P1316_ main antenna FPC
Supplier Product Model 供应产品型号:	P1316_MAIN_ANT
TP FW mass production version TP FW量产版本	
Reminders提醒注意事项:	Each of the above information needs to be complete and accurate, and it needs to be consistent with the material information in the order BOM. 以上每项信息需要填写完整准确无误, 需要与下单BOM中的物料信息保持一致性。

Supplier signature (with company seal)

供应商签署 (加盖公司章)

☒ ROHS material ROHS物料		☐ Non-ROHS materials非ROHS物料		
Department 部门	☐ Producer制作人	☐ Engineering Department 工程部	☐ Design Department 设计部	☐ Quality department质量部
Signatory 签署者				
Signing date 签署日期				
Supplier information 供应商信息				
Supplier name供应商名称:	Sunnyway Technology Co., Ltd			
Supplier address供应商地址:	Building 4, No. 99, Lane 215, Gaoguang Road, Qingpu District, Shanghai			
Supplier to contact 供应商收件人-联系方式	Ma Ronglai-15921558333			
Recipient email address 收件人邮箱地址:	maronglai@sunnyway-iot.com			
Note注意: 1. Supplier information must be filled in correctly 供应商信息填写必须正确 2. Company seal required 必须加盖公司印章				

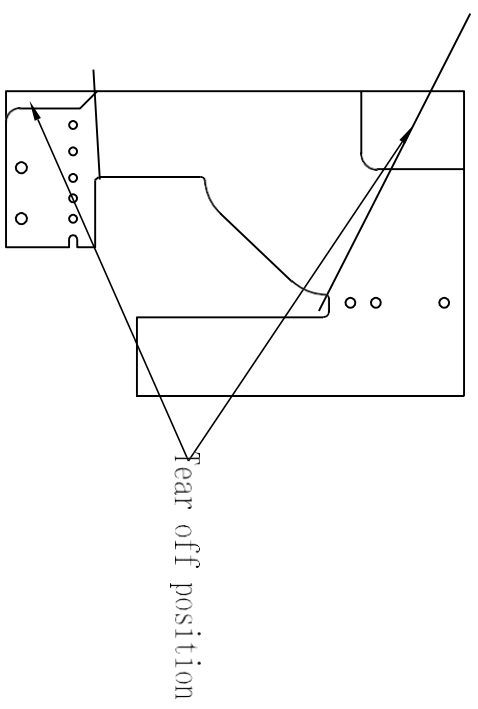
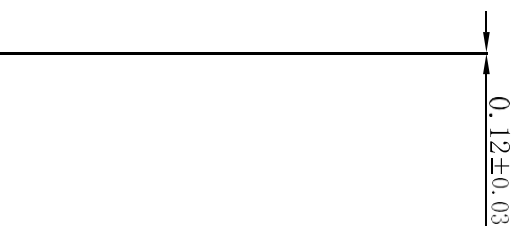
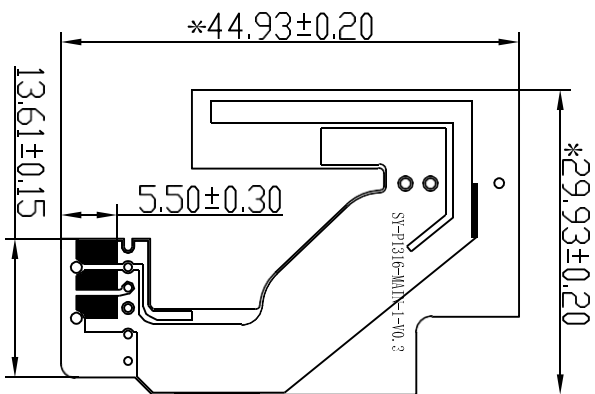
Customer review and signature 客户审核签署

Recognition state 承认状态	☐ Official recognition 正式承认		☐ Conditional recognition 条件承认		☐ Provisional limited recognition 临时限量承认					
	☐ Conditional recognition 条件承认 Conditions to be met需满足条件: _____									
	☐ Provisional limited recognition临时限量承认 Limited Procurement限量采购_____K									
Reviewed and signed by the Department (with the seal of recognition) 部门审核签署 (加盖承认章)										
Department 部门	☐ ID	☐ MD	☐ HW	☐ HWtest	☐ Packing	☐ NPI	☐ PM	☐ SPM	☐ PQM	☐ SQE
Signatory 签署者										
Signing date 签署日期										
Check item 检查项	Appearance / Workmanship 外观/工艺	Material / size / specification 材质/尺寸/规格		Specification/el ectrical performance 规格/电性能	Material / size / specification 材质/尺寸/规格	Process assembly/produ ction yield 工艺装配/生产 良率	Specificatio ns/customer needs 规格/客需	FW Version FW版本	Appearance / reliability 外观/可靠性	Appearance/man ufacturer yield/drawing specification 外观/厂商良率/ 图纸规范
Note注意: Before signing, the material information description, specification, drawing, dimension report, electrical performance test report, reliability test report, packaging specification and other information shall be carefully reviewed 签署前需要认真审核物料信息描述、规格书、图纸、尺寸报告、电性能测试报告、可靠性测试报告、包装规范等信息										

表单编码: QR-PQM-04-02

版本: C

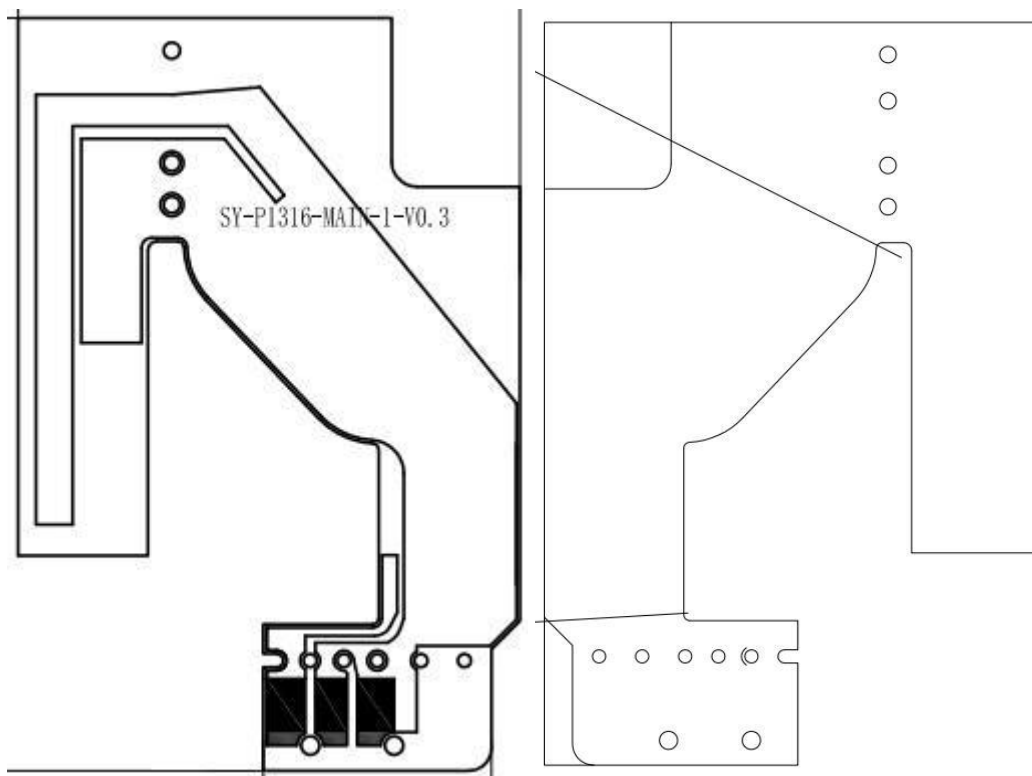
修订日期: 2023年10月16日



Technical Requirements

- Shipping packaging requirements: (Micro mucosal packaging)
- The copper surface is coated with black matte finish; Ink should be uniform;
- Gold plating thickness of 0.5u ", salt spray tested for 24 hours;
- Sizes marked with " " are the key dimensions;
- Use 3M9471LSE for backing adhesive;
- The substrate uses PI T=0.5mil;
- Copper foil thickness of 0.5oz;
- The unmarked rounded corners are all 0.2, and the process edge is 0.2mm;
- For unmarked tolerances, follow the general tolerance table;
- The product meets the requirements of RoHS 2.0 and REACH standards.

Sunnyway Technology (China) Co., Ltd.				
	PART NAME: MAIN P1316		DATE:	2025.7.18
	PART NO: SH251701B75-1S3		DRAWN:	Yujiang
	RF:		Tel:	
	PM:		Tel:	
	MATERIAL:		CHECKED:	
FINISHING:		APPROVED:		
TOLERANCE X.X ±0.25 .XX ±0.25 .XXX ±0.05 ANGULAR ∠ ±0.5°				
UNIT:mm	COLOUR: black	SCALE:1:1	REV:RA	



1. Project information

Machine information



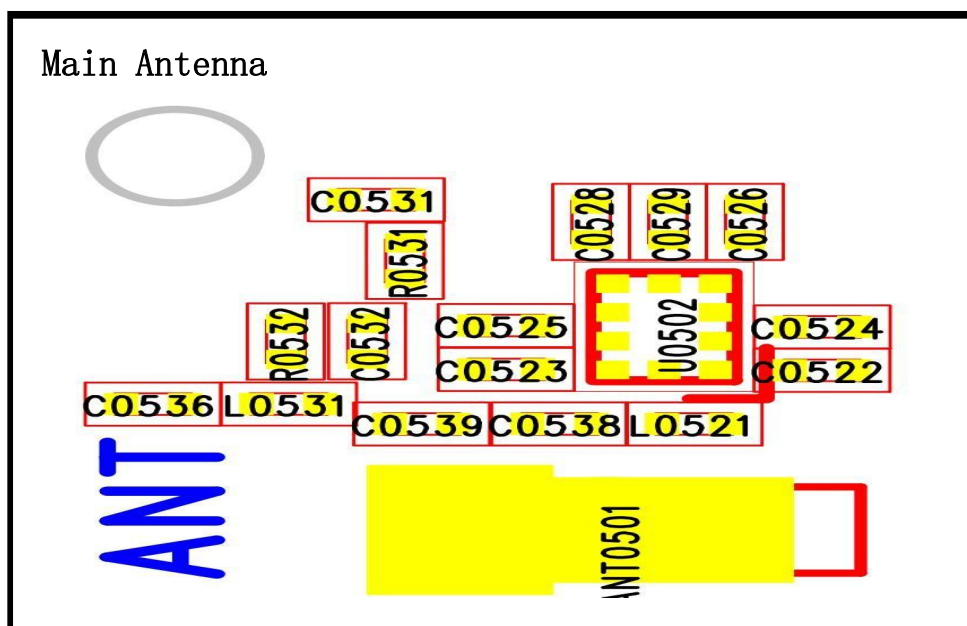
Note: The customer finally verified that the antenna performance prototype was retained in our company for at least one year, which is convenient for analysis and solution to abnormal situations in antenna mass production.
Ensure antenna shipment quality.

2. Test fixtures

Purpose: To test the passive parameters of the antenna as accurately as possible.

How to make: The prototyping mechanism is made of a 50 ohm coaxial cable, one end is connected to the test point at the back of the matching circuit of the prototype motherboard (the front of the RF test hole), and the other end is connected to the SMA connector. The schematic diagram is as follows:

3. Matching circuits



Element	Value
C0536	56pF
L0531	100nH
R0532	NC
C0532	15nH
R0531	0Ω
C0531	NC
L0521	100nH

Main Antenna-Switch		
C0522	0 Ω	B1/2/3/4/7/8/38/41 W1/2/4/8 GSM 900 1800 1900
C0524	3. 9nH	B5/20 W5 GSM850
C0523	12nH	B28
C0525	NC	

Note:No correction for the matching circuit.

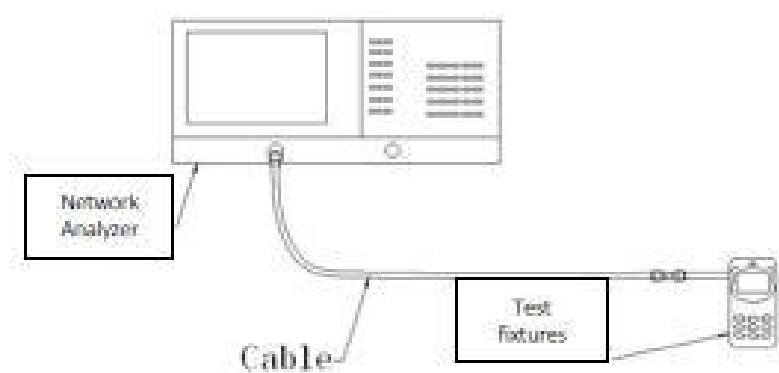
4. S11 test

1. S11 Test Method Description

Test Equipment: Network Analyzer (E5071C)

Test method: A 50 ohm CABLE cable is derived from the instrument test port, and the SMA connector of the prototype is connected after calibration using the calibrator to record the return loss and standing wave ratio corresponding to the relevant frequency point.

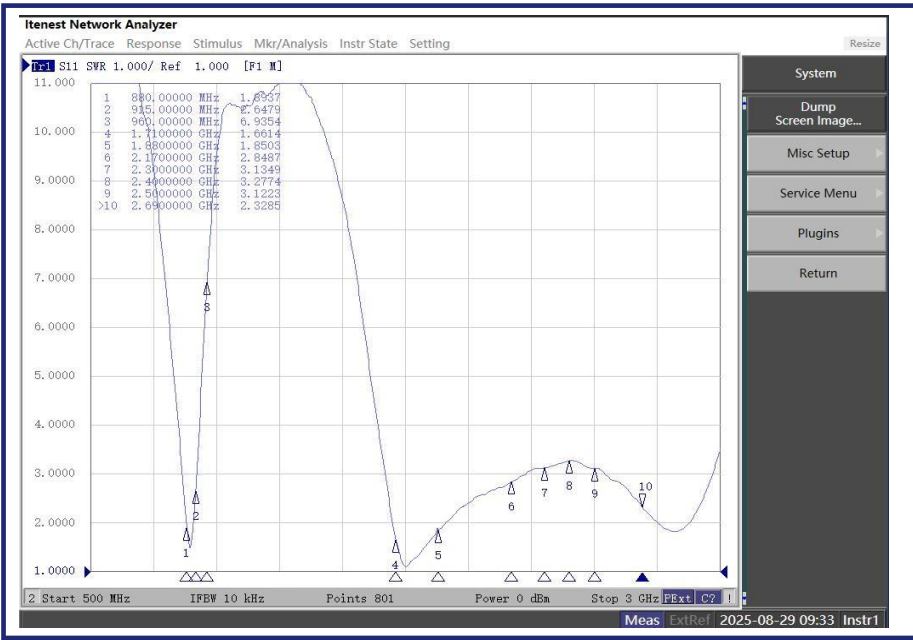
The test diagram is as follows:



Test the schematic

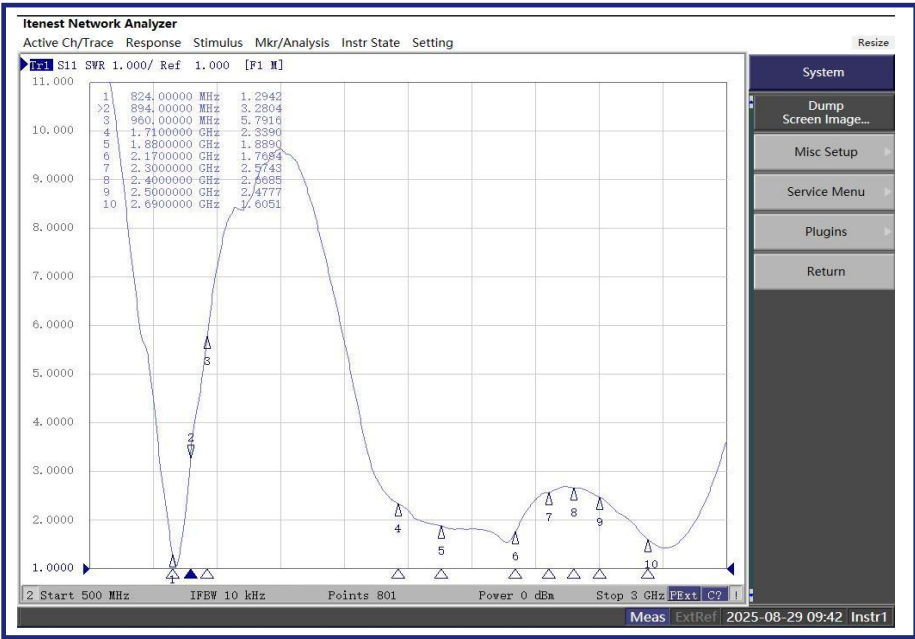
4.2 S11 parameter

Main antenna-RF1 S11



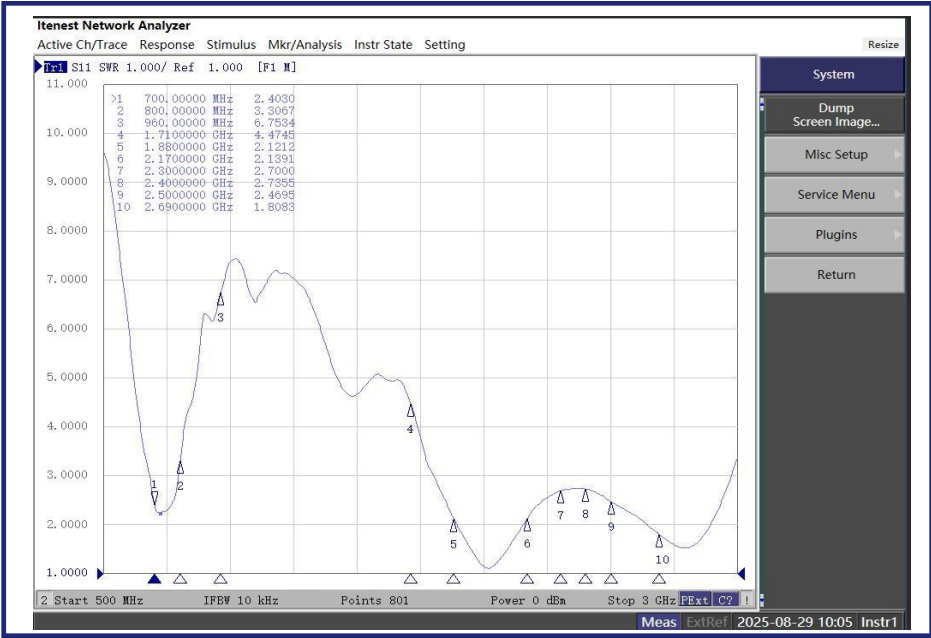
	main
frequency (MHz)	SWR
880	1.8
960	6.9
1710	1.6
1880	1.8
2170	2.8
2300	3.1
2400	3.2
2500	3.1
2690	2.3

Main antenna-RF2 S11



	main
frequency (MHz)	SWR
824	1. 2
894	3. 2

Main antenna-RF3 S11



	main
frequency (MHz)	SWR
700	2. 4
800	3. 3

5 Darkroom test data

Test system: Shielded darkroom

Test environment: temperature $22^{\circ}\text{C}\pm 3^{\circ}\text{C}$, humidity
 $50\%\pm 15\%$

Test equipment: When testing passive data, use the
Network Analyzer Agilent E5062C When testing
active data, the Comprehensive Tester Agilent 8960
/CMW500/E4438C is used

5.1 Passive test data

Main antenna-RF1 efficiency

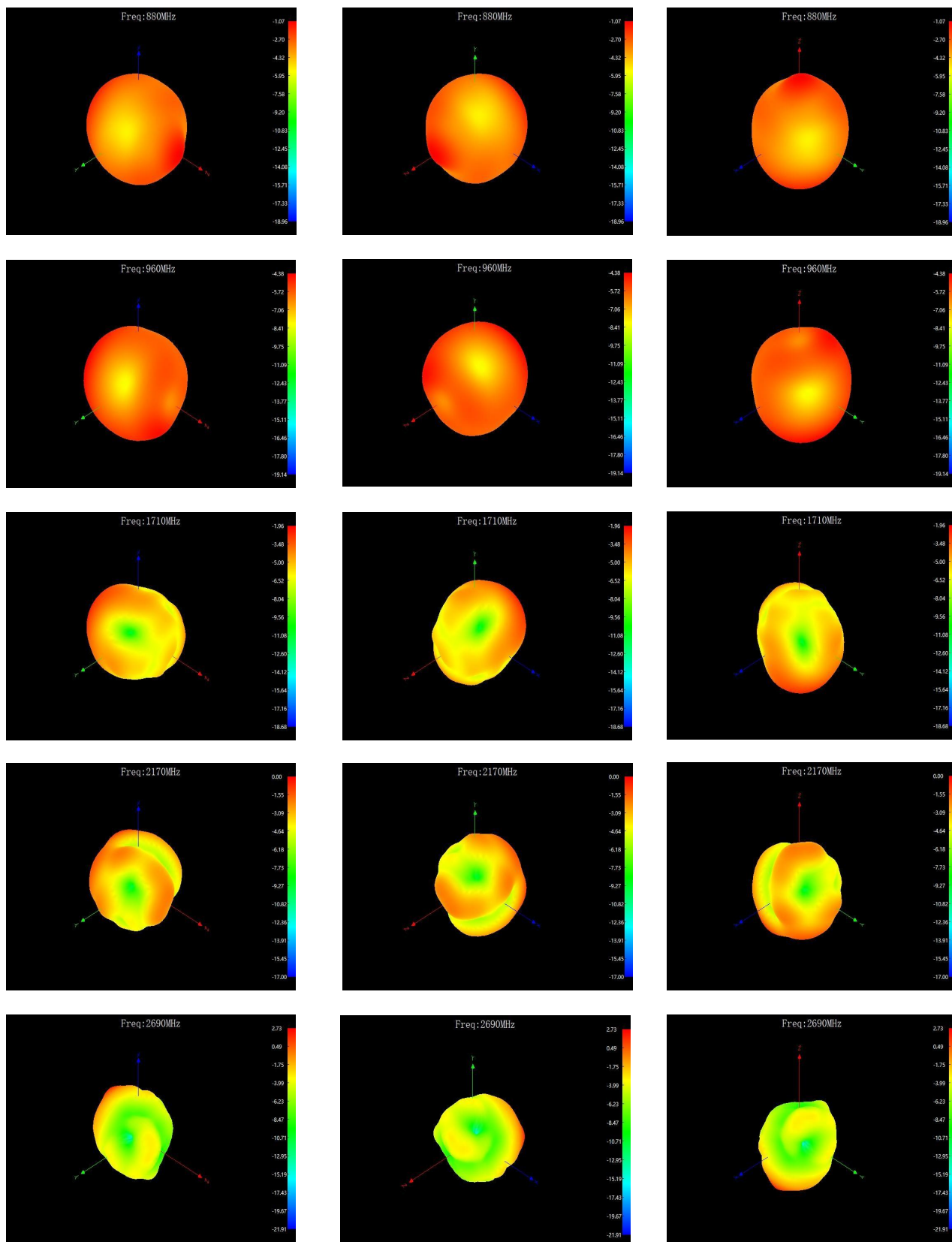
frequency(MHz)	Gain (dBi)	Efficiency(dB)	Efficiency(%)	frequency(MHz)	Gain (dBi)	Efficiency(dB)	Efficiency(%)
880	-1.07	-5.73	26.73	1990	0.07	-4.87	32.58
890	-0.37	-5.05	31.26	2000	-0.03	-4.75	33.5
900	-0.69	-4.77	33.34	2010	-0.09	-4.65	34.28
910	-0.55	-4.81	33.04	2020	-0.4	-4.86	32.66
920	-1.18	-5.3	29.51	2030	-0.7	-5.01	31.55
930	-1.7	-5.91	25.64	2040	-0.34	-4.7	33.88
940	-2.31	-6.53	22.23	2050	-0.3	-4.58	34.83
950	-3.27	-7.18	19.14	2060	-0.63	-4.86	32.66
960	-4.38	-7.96	16	2070	-0.44	-4.56	34.99
1710	-1.96	-6.91	20.37	2080	0.08	-4.13	38.64
1720	-1.83	-6.68	21.48	2090	0	-4.22	37.84
1730	-2.04	-6.66	21.58	2100	-0.27	-4.68	34.04
1740	-2.09	-6.34	23.23	2110	-0.26	-4.61	34.59
1750	-2.18	-6.32	23.33	2120	0	-4.3	37.15
1760	-2.71	-7.11	19.45	2130	-0.27	-4.45	35.89
1770	-2.97	-7.64	17.22	2140	-0.3	-4.79	33.19
1780	-2.28	-7.25	18.84	2150	-0.28	-4.8	33.11
1790	-2.1	-7.16	19.23	2160	0.15	-4.54	35.16
1800	-2.79	-7.82	16.52	2170	0	-4.65	34.28
1810	-3.3	-8.23	15.03	2180	-0.24	-4.85	32.73
1820	-2.96	-7.77	16.71	2190	-0.26	-4.77	33.34
1830	-3.34	-7.99	15.89	2200	-0.2	-4.57	34.91
1840	-3.75	-8.25	14.96	2210	-0.41	-4.72	33.73
1850	-3.24	-7.69	17.02	2220	-0.55	-4.96	31.92
1860	-2.37	-6.82	20.8	2230	-0.27	-4.74	33.57
1870	-2.75	-7.19	19.1	2240	-0.02	-4.49	35.56
1880	-2.76	-7.29	18.66	2250	0.04	-4.58	34.83
1890	-1.89	-6.51	22.34	2260	0.03	-4.56	34.99
1900	-1.4	-6.05	24.83	2270	0.36	-4.31	37.07
1910	-1.69	-6.26	23.66	2280	0.24	-4.34	36.81
1920	-1.67	-6.16	24.21	2290	0.04	-4.58	34.83
1930	-0.92	-5.41	28.77	2300	-0.04	-4.68	34.04
1940	-0.56	-5.13	30.69	2310	0.42	-4.59	34.75
1950	-0.82	-5.54	27.93	2320	0.64	-4.58	34.83
1960	-0.29	-5.3	29.51	2330	0.88	-4.67	34.12
1970	0.5	-4.69	33.96	2340	1.19	-4.63	34.43
1980	0.6	-4.61	34.59	2350	1.47	-4.65	34.28

5.1 Passive test data

Main antenna-RF1 efficiency

frequency (MHz)	Gain (dBi)	Efficiency (dB)	Efficiency (%)
2360	1.34	-4.84	32.81
2370	1.19	-5.04	31.33
2380	1.25	-5.08	31.05
2390	1.33	-4.96	31.92
2400	1.17	-5.11	30.83
2410	1	-5.2	30.2
2420	1.21	-5.01	31.55
2430	0.94	-5.08	31.05
2440	0.77	-5.31	29.44
2450	0.8	-5.46	28.44
2460	1.38	-5.11	30.83
2470	1.45	-5.06	31.19
2480	1.3	-5.1	30.9
2490	1.08	-5.32	29.38
2500	1.53	-5.12	30.76
2510	1.69	-5.15	30.55
2520	1.78	-5.28	29.65
2530	1.88	-5.33	29.31
2540	2.07	-5.19	30.27
2550	2	-5.19	30.27
2560	1.73	-5.34	29.24
2570	1.77	-5.36	29.11
2580	2.07	-5.18	30.34
2590	2.41	-5.18	30.34
2600	2.42	-5.41	28.77
2610	2.68	-5.19	30.27
2620	2.84	-4.98	31.77
2630	2.73	-5.07	31.12
2640	2.81	-5.09	30.97
2650	3.06	-4.92	32.21
2660	3.1	-4.82	32.96
2670	2.78	-4.94	32.06
2680	2.55	-5.02	31.48
2690	2.73	-4.82	32.96

MAIN ANT-RF1 3D Pattern

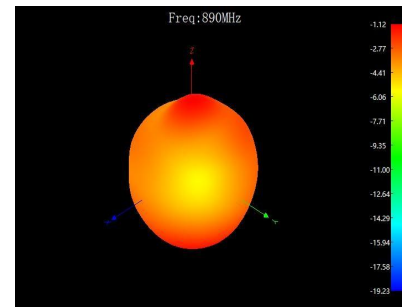
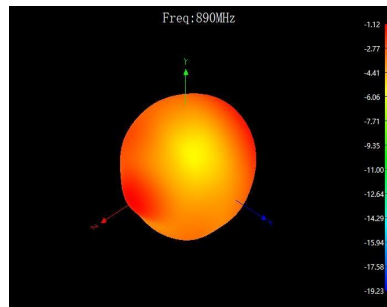
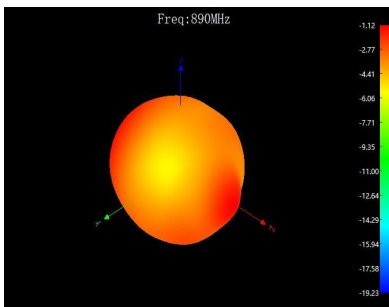
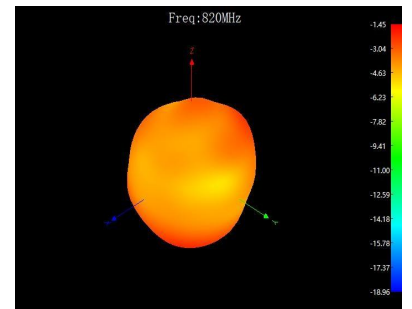
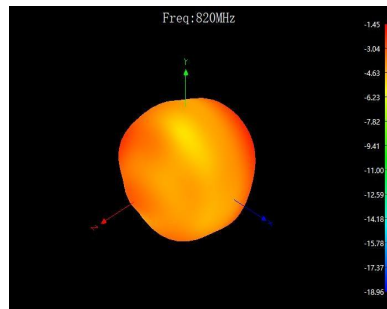
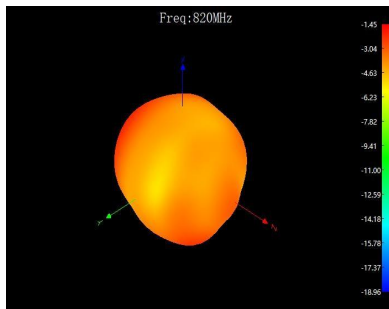


5.1 Passive test data

Main antenna-RF2 efficiency

frequency (MHz)	Gain (dBi)	Efficiency (dB)	Efficiency (%)
820	-1.45	-6.05	24.83
830	-0.51	-5.27	29.72
840	-0.43	-4.87	32.58
850	-0.32	-4.67	34.12
860	-0.53	-4.71	33.81
870	-0.87	-4.82	32.96
880	-0.84	-5.33	29.31
890	-1.12	-5.7	26.92

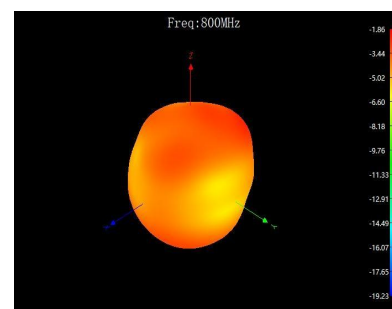
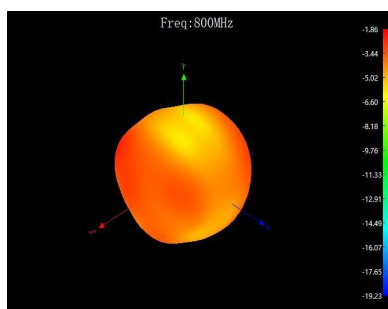
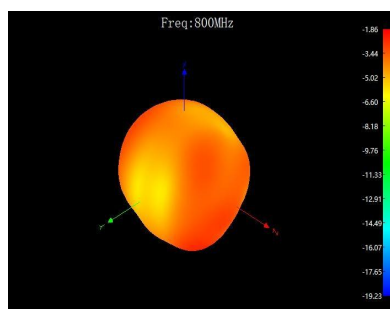
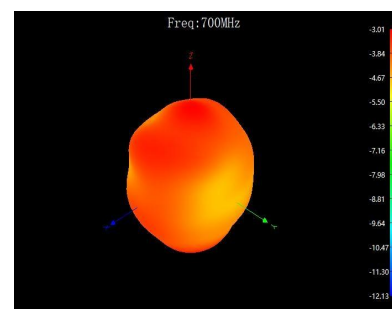
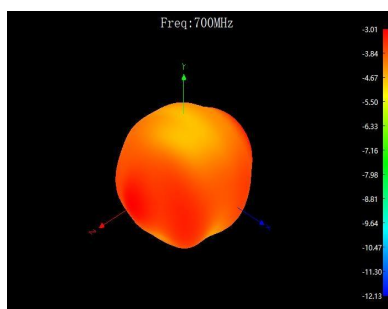
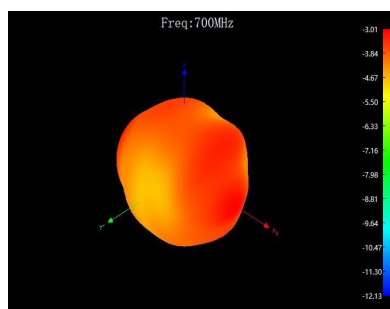
MAIN ANT-RF2 3D Pattern



Main antenna-RF3 efficiency

frequency(MHz)	Gain (dBi)	Efficiency(dB)	Efficiency(%)
700	-3.01	-7.04	19.75
710	-2.68	-6.86	20.62
720	-2.57	-6.71	21.32
730	-2.88	-7.04	19.75
740	-2.97	-7.13	19.37
750	-3.14	-7.01	19.9
760	-3.14	-6.74	21.2
770	-3.32	-6.33	23.28
780	-3.43	-6.35	23.17
790	-2.74	-6.03	24.95
800	-1.86	-6.06	24.77

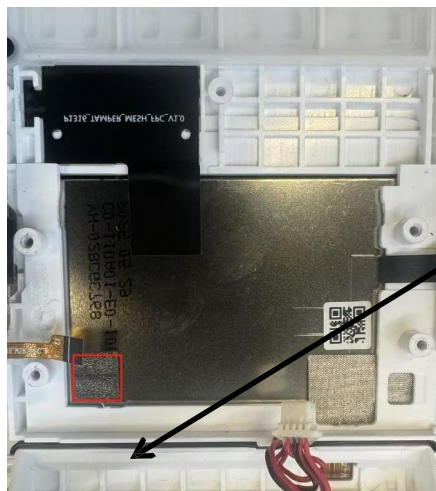
MAIN ANT-RF3 3D Pattern



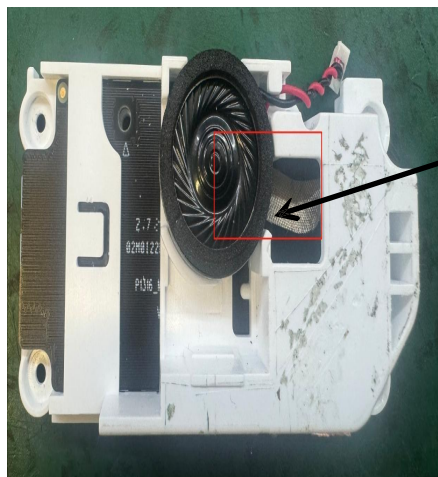
5.1 Active test data

frequency (MHz)	channel	frequency (MHz)	OTA(dB) (A configure)		frequency (MHz)	channel	frequency (MHz)	OTA(dB) (A configure)	
			TRP	TIS				TRP	TIS
GSM_850	128	824.2	26.41		FDD_B2 (10M)	18650	1850	18.11	
	190	836.6	27.08			18900	1880	18.54	
	251	848.8	26.41	-103.45		19150	1910	18.85	-93.13
GSM_900	1	880.2	25.48		FDD_B3 (10M)	19250	1715	19.28	
	38	897.6	26.22			19575	1747.5	19.63	
	124	914.8	25.73	-100.86		19900	1780	19.57	-93.29
GSM_1800	512	1710.2	25.02		FDD_B4 (10M)	20000	1710	18.42	
	698	1747.6	25.77			20175	1730	18.55	
	885	1784.8	26.53	-104.69		20350	1750	18.91	-91.24
WCDMA_B 1	9612	1922.4	18.32		FDD_B5 (10M)	20450	829	18.14	
	9750	1950	18.42			20525	836.5	18.39	
	9888	1977.6	19.28	-105.9		20600	844	18.25	-91.48
WCDMA_B 2	9262	1850	18.57		FDD_B7 (10M)	20800	2505	17.5	
	9400	1880	18.53			21100	2535	19.27	
	9538	1910	18.46	-104.04		21400	2565	19.08	-91.23
WCDMA_B 4	1312	1710	18		TDD_B28 (10M)	27260	703	16.76	
	1413	1730	18.59			27435	725	16.35	
	1513	1750	19.09	-104.6		27610	748	16.29	-91.92
WCDMA_B 5	4132	826.4	16.82		TDD_B38 (20M)	37850	2580	17.75	
	4183	836.6	17.22			38000	2595	18.39	
	4233	846.6	16.79	-105.75		38150	2610	18.5	-90.85
WCDMA_B 8	2712	882.4	17.05		TDD_B41 (20M)	40340	2565	17.55	
	2787	897.4	17.35			40740	2605	18.8	
	2863	912.6	16.92	-104.62		41140	2645	19.18	-89.57
FDD_B1 (10M)	18050	1925	19.91		FDD_B8 (10M)	21500	885	18.3	
	18300	1950	19.39			21625	897.5	18.61	
	18550	1975	19.89	-92.23		21750	910	18.47	-90.27

6 Environmental treatment.



And conductive sponge and ground the motherboard



The speaker is grounded to the motherboard via conductive fabric