

Shanghai Sunnyway Communication Technology Limited Company

Skyline Acknowledgement Book

Customer: Shanghai ZoomSmart Technology Co., Ltd		The project: A8001
Operating frequency band: GSM850/ 900/1800/1900 +WCDMA1/2/5/8/+CDMA BC0/TDA/F +LTE Band 1/2/3/4/5/7/8/17/20/28/38/39/40/41		
Motherboard version: A8001_MB_V2.0		
Shangyuan material specifications		
Specifications and models	Shangyuan material number	Customer part number
A8001_MAIN_ANT	PQ002IB75-1V2.0	0101020223

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1. Project picture

Machine information

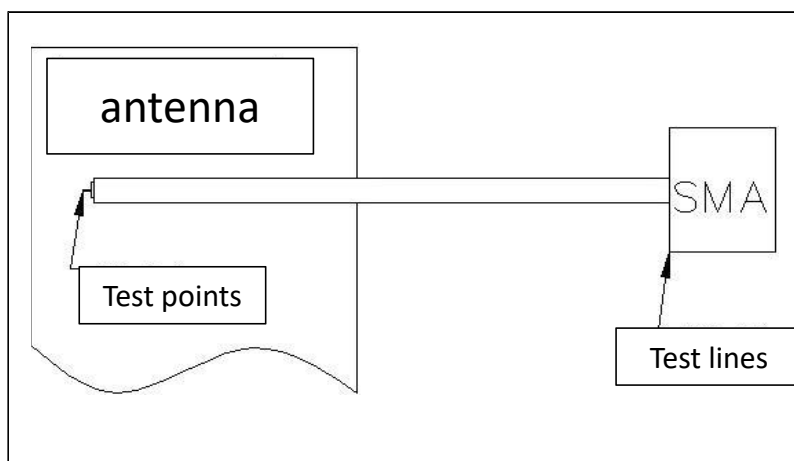


Note: The customer finally verified that the antenna performance prototype was retained in our company for at least one year, which is convenient for analysis and solution to abnormal situations in antenna mass production.
Ensure antenna shipment quality.

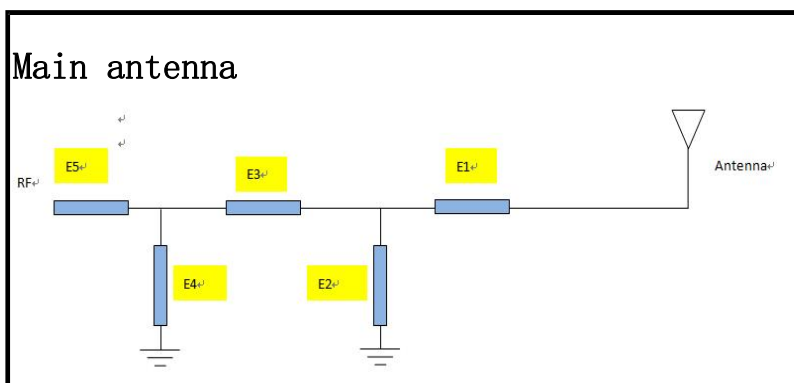
2. Test fixtures

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	specification
E1	0Ω	
E2	N/A	
E3	0Ω	
E4	N/A	
E5	0Ω	

Tuner electronic components	
RF1	4.7nH
RF2	2.7pF
RF3	15nH
RF4	0Ω

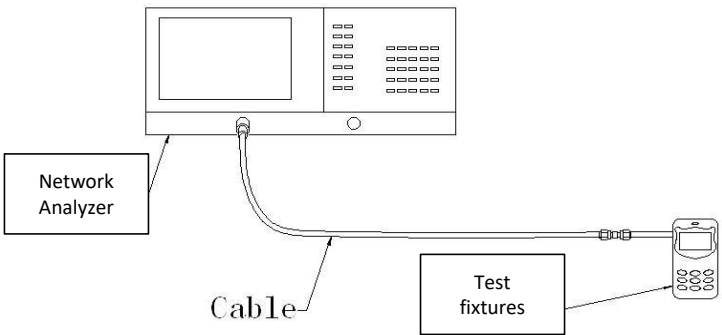
4. S11 test

4.1 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.

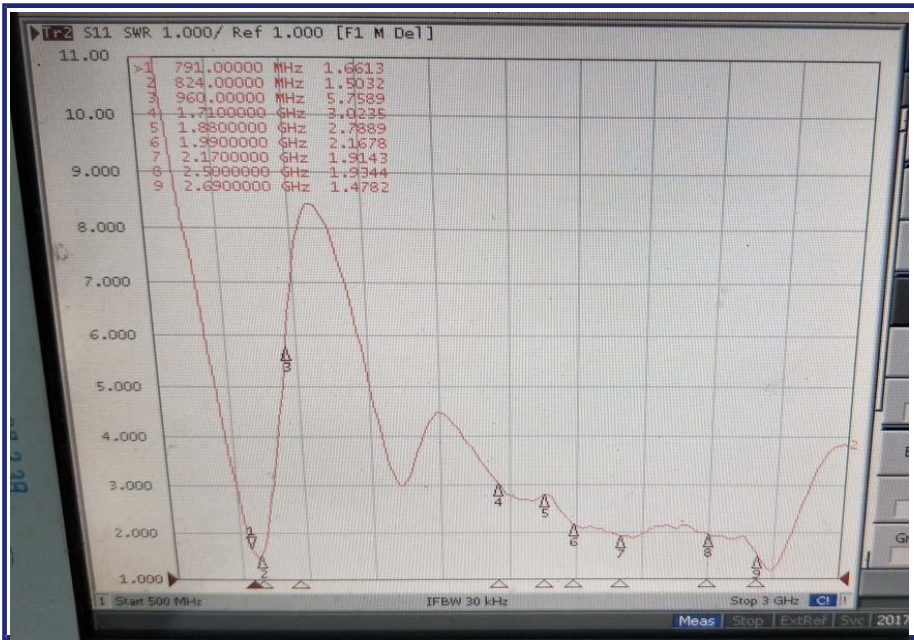
The test diagram is as follows:



Test the schematic

4.2 S11 parameter

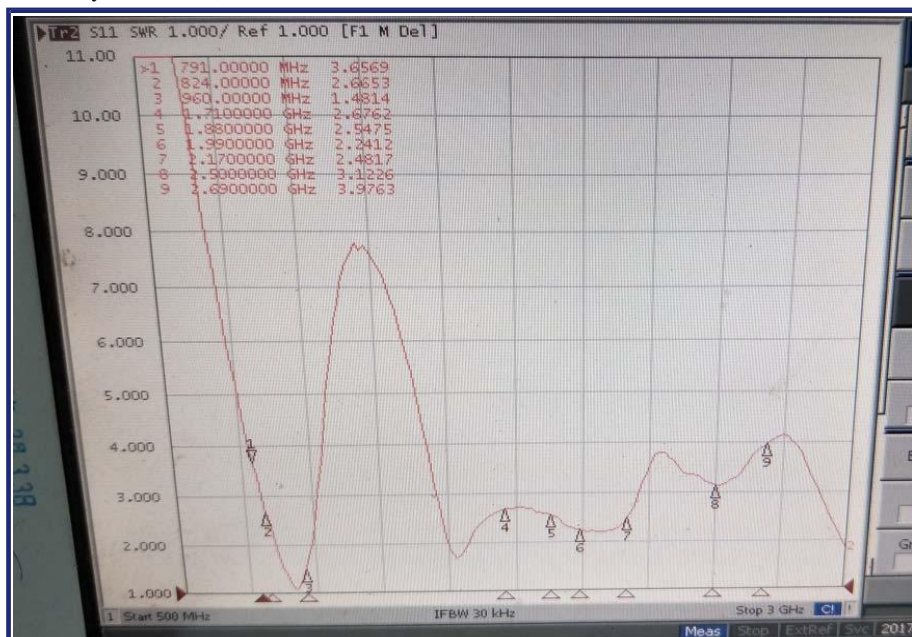
Primary antenna/RF1



	Main antenna
frequency (MHz)	VSWR
791	1.6
824	1.9
1710	3.0
2170	1.9
2690	1.4

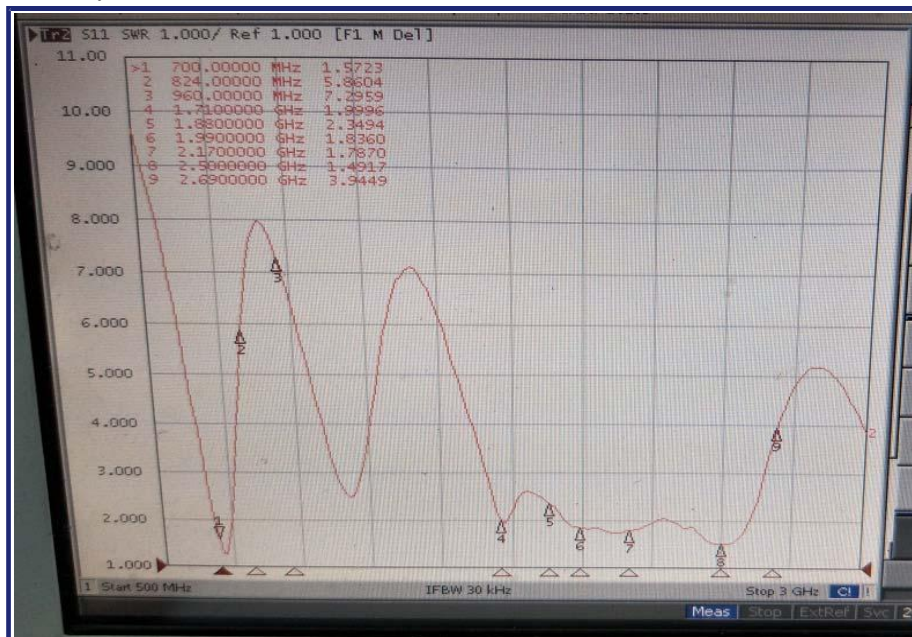
Shanghai Shangyuan Communication Technology Co., Ltd. antenna recognition

Primary antenna/RF2



	Main antenna
frequency (MHz)	VSWR
824	2.6
960	1.4
1710	2.6
2170	2.4
2690	3.9

Primary antenna/RF3

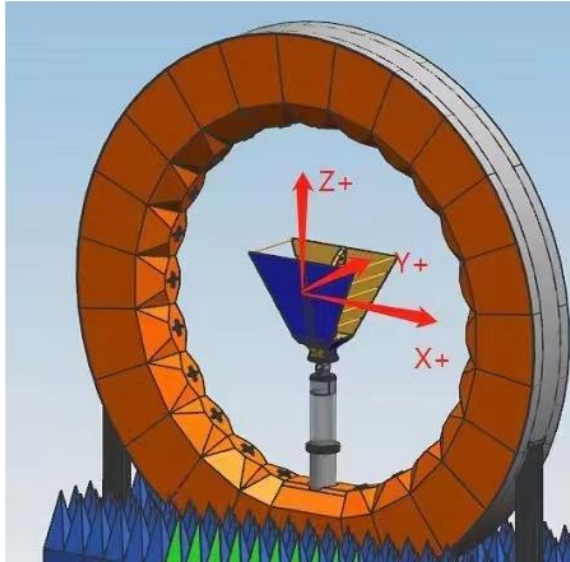


	Main antenna
frequency (MHz)	VSWR
700	1.5
1710	1.9
2170	1.7
2690	3.9

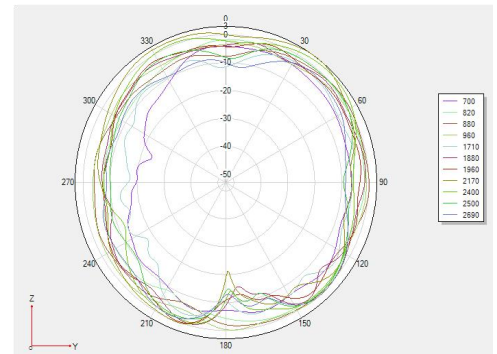
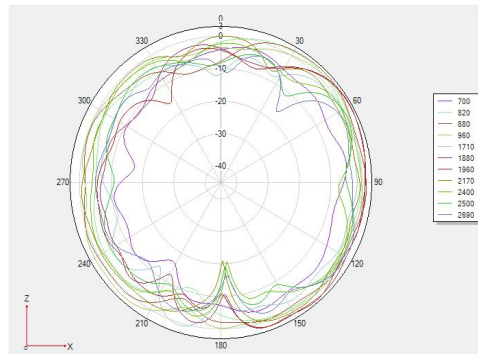
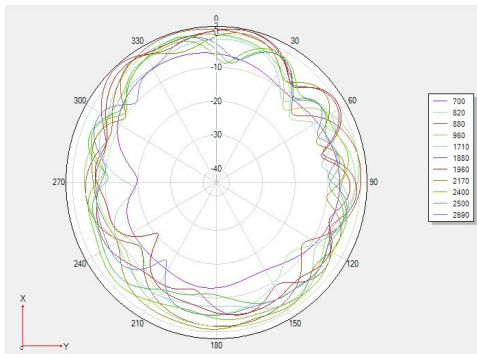
5.Darkroom test data

5.1 Radiation Pattern

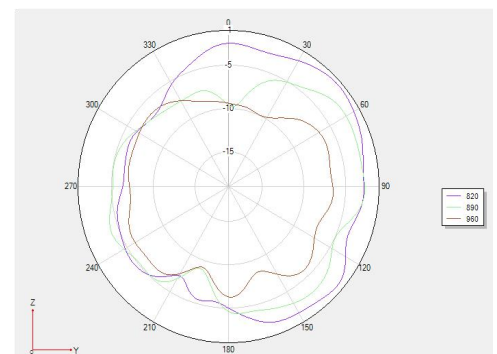
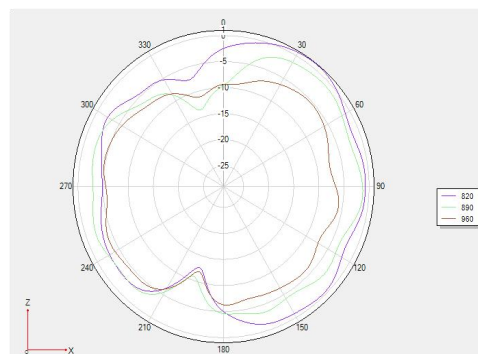
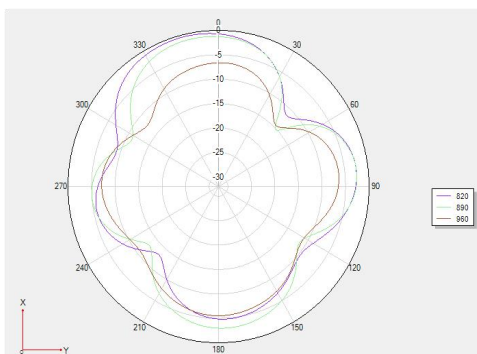
Definition of darkroom axis:



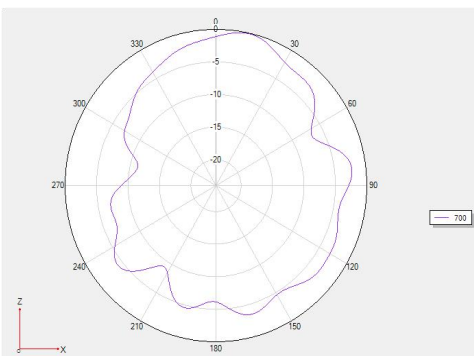
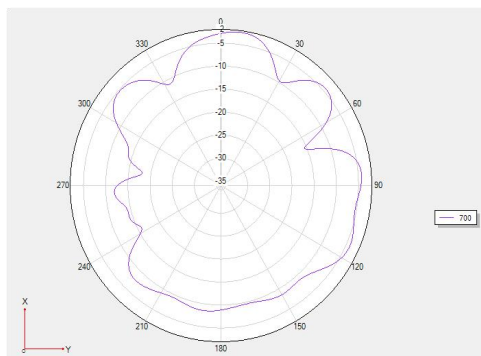
Primary antenna/RF1



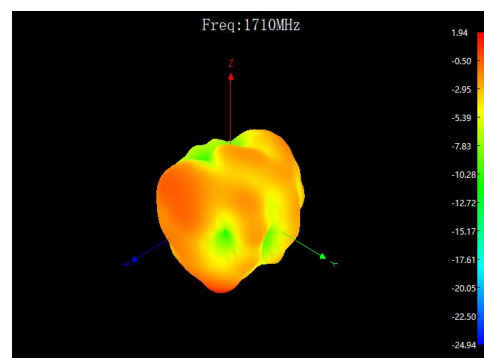
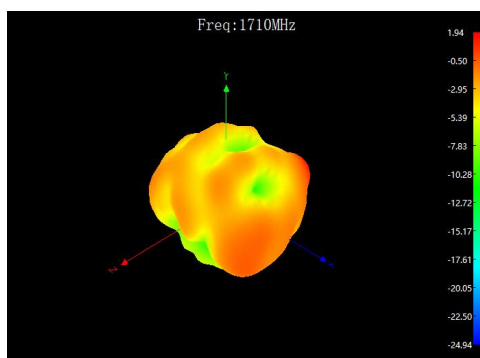
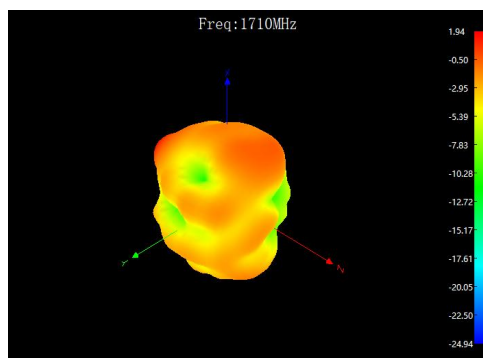
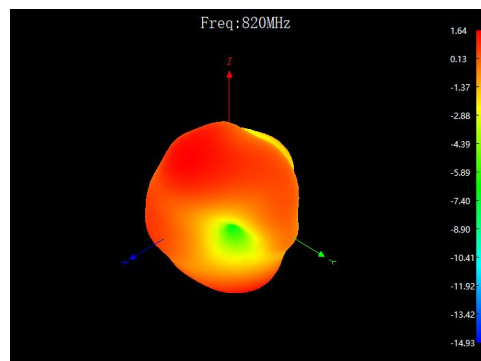
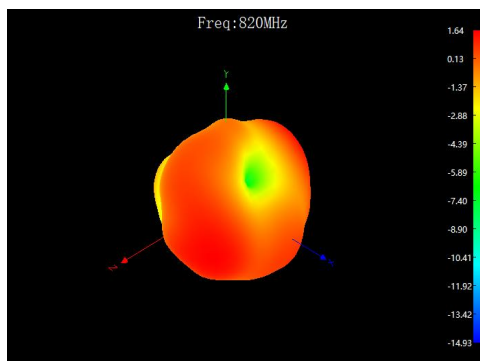
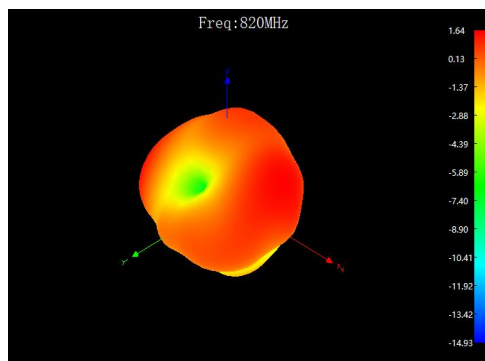
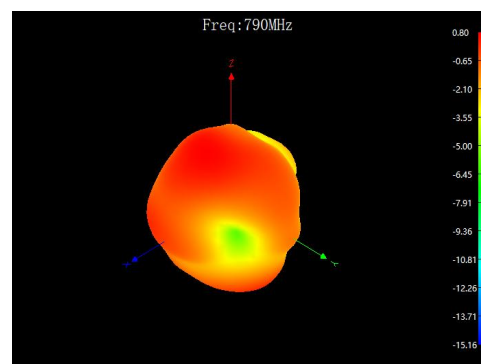
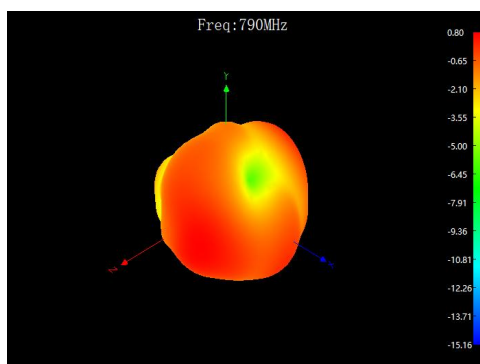
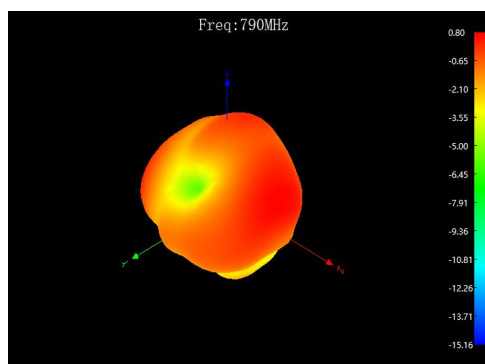
Primary antenna/RF2

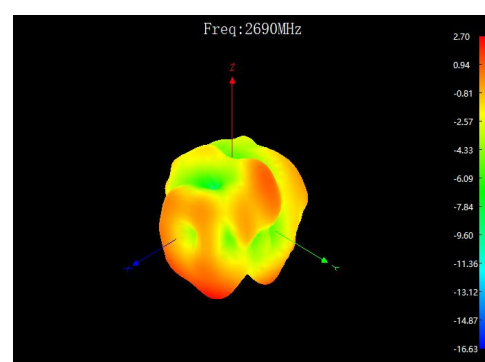
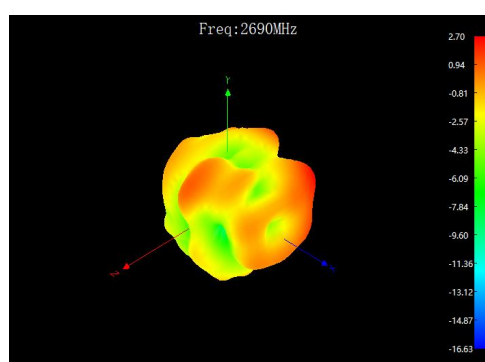
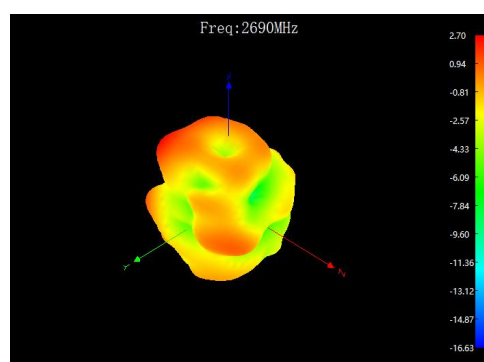
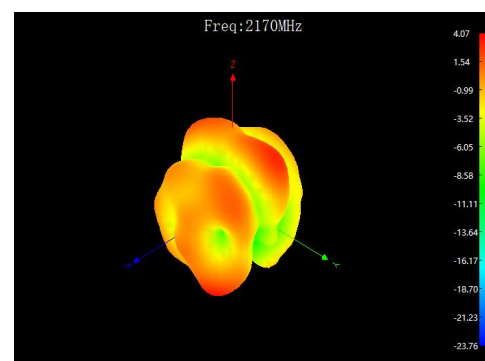
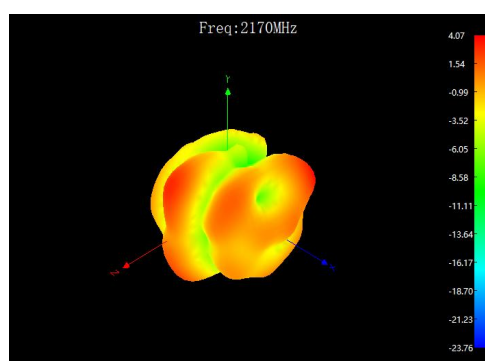
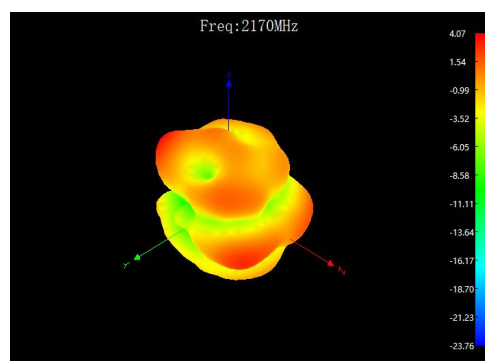


Primary antenna/RF3

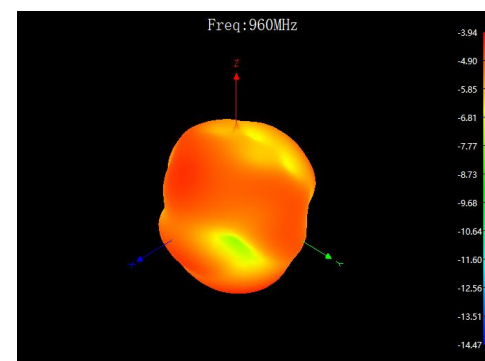
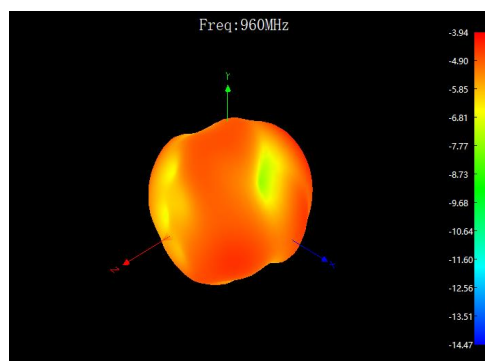
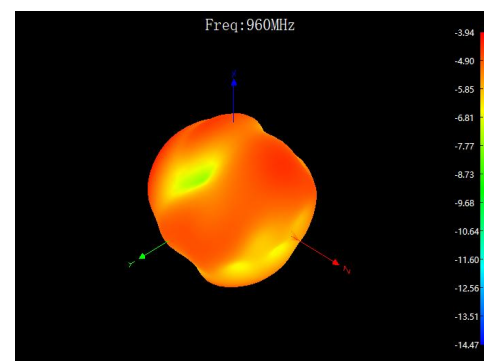
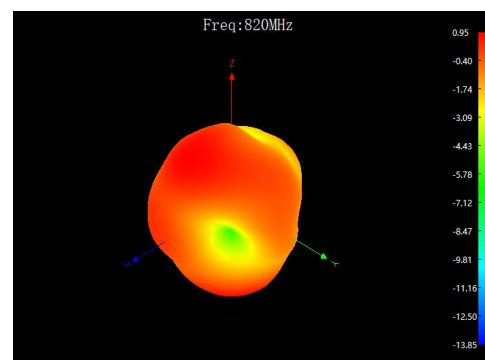
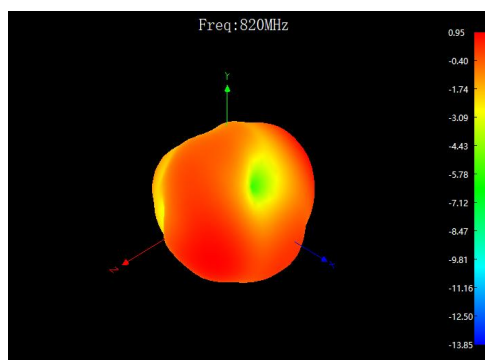
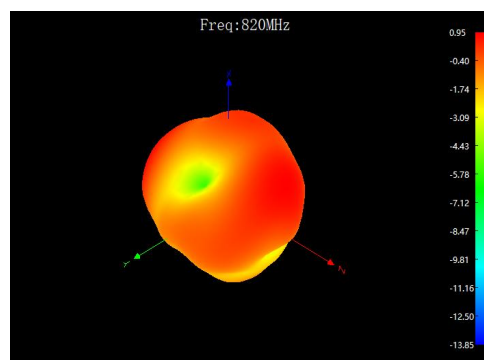


Primary antenna/RF1

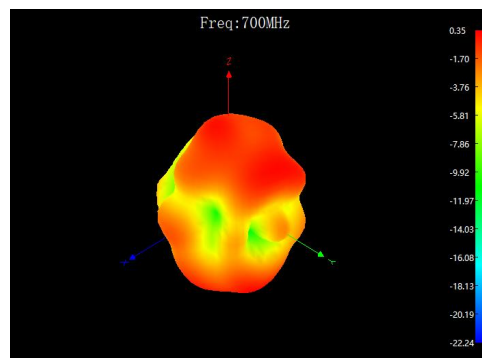
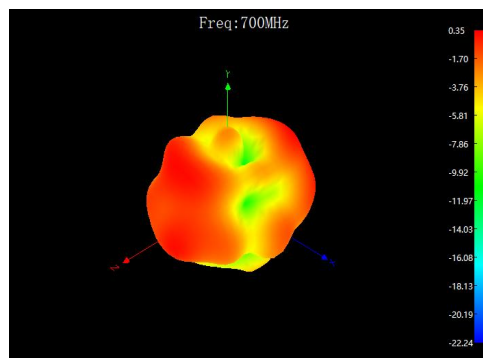
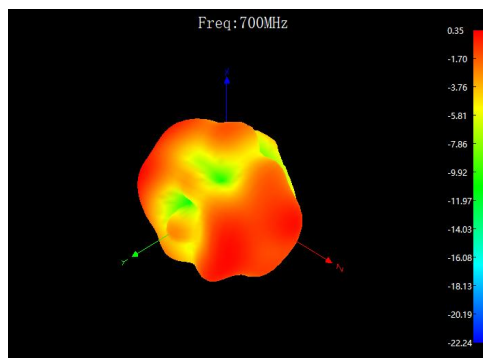




Primary antenna/RF2



Primary antenna/RF3



5.2 Active test data

Main antenna active test data (free space, bright screen)

Band	channel	frequency (MHz)	OTA (dB)		Band	channel	frequency (MHz)	OTA (dB)	
			TRP	TIS				TRP	TIS
GSM_850	128	824.2	27.54		FDD_B4 (10M)	20000	1715	18.85	
	190	836.6	26.60			20175	1732.5	18.94	
	251	848.8	26.42	-102.30		20350	1750	19.06	-93.51
GSM_900	1	880.2	27.58		FDD_B5 (10M)	20450	829	18.66	
	38	897.6	27.46			20525	836.5	18.74	
	124	914.8	27.63	-102.10		20600	844	18.84	-90.59
GSM_1800	512	1710.2	25.69		FDD_B7 (10M)	2505	16.73	18.48	
	698	1747.6	25.31			2535	17.15	18.58	
	885	1784.8	25.00	-103.23		2565	17.03	18.96	-90.61
GSM_1900	512	1850.2	24.07		FDD_B8 (10M)	23060	885.0	18.88	
	661	1880	24.59			23095	897.5	18.95	
	810	1909.8	25.19	-103.14		23130	910.0	18.99	-90.68
WCDMA_B1	9612	1922.4	18.62		FDD_B17 (10M)	23780	709.0	16.65	
	9750	1950	18.81			23790	710.0	17.04	
	9888	1977.6	18.98	-105.63		23800	711.0	17.23	-92.85
WCDMA_B2	9262	1852.4	17.06		FDD_B20 (10M)	24200	837.0	18.21	
	9400	1880	17.14			24300	847.0	18.09	
	9538	1907.6	17.85	-104.2		24400	857.0	18.59	-89.8
WCDMA_B5	4132	826.4	18.57		FDD_B28 (10M)	27260	708.0	16.7	
	4183	836.6	18.70			27435	725.0	17.66	
	4233	846.6	18.82	-105.20		27610	743.0	18.48	-89.98
WCDMA_B8	2712	882.4	18.62		FDD_B38 (10M)	37850	2570	18.21	
	2787	897.4	18.72			38000	2595	17.62	
	2863	912.6	18.93	-105.71		38150	2620	17.53	-89.8
FDD_B1 (10M)	18050	1925	18.33		FDD_B39 (10M)	38350	1880	18.43	
	18300	1950	18.88			38450	1900	18.03	
	18550	1975	18.91	-94.08		38550	1920	18.55	-90.89
FDD_B2 (10M)	18650	1855	17.48		FDD_B40 (10M)	38750	2300	18.49	
	18900	1880	17.38			39150	2350	18.89	
	19150	1905	18.25	-93.49		39550	2400	18.69	-89.89
FDD_B3 (10M)	19250	1715	18.69		FDD_B41 (10M)	40340	2496	18.98	
	19575	1747.5	18.94			40740	2590	18.16	
	19900	1780	17.85	-91.87		41140	2690	17.69	-88.73

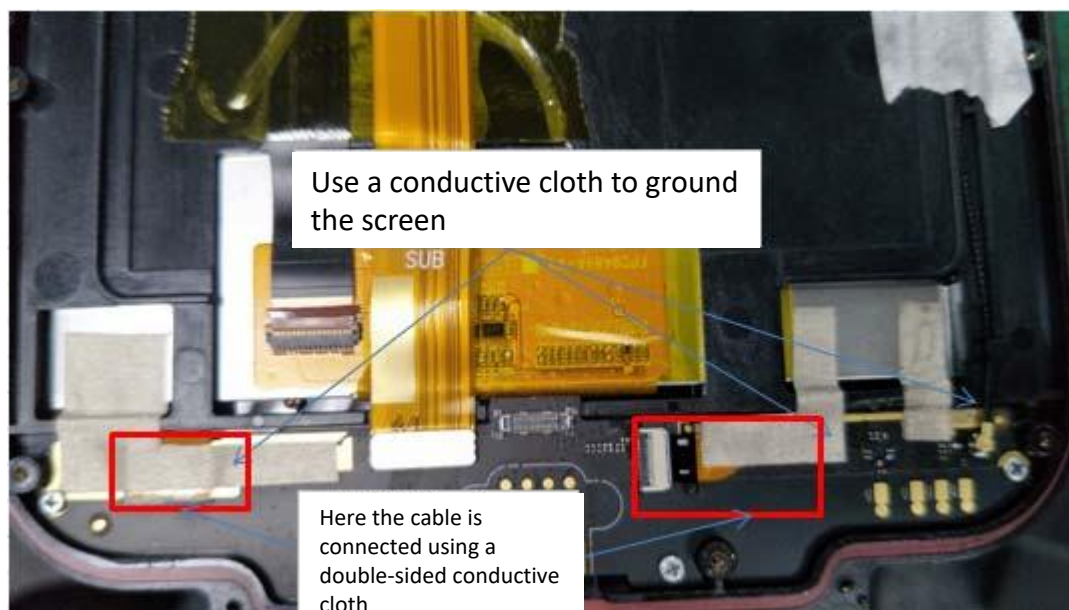
5.3 Passive test data

Main antenna passive test data (free space, bright screen measurement 100%)

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)	Gain (dBd)					
700	4.16	-13.81	-6.93	-9.08	1710	35.51	-4.5	-0.83	-2.98
710	4.47	-13.5	-6.6	-8.75	1720	36.83	-4.34	-0.12	-2.27
720	4.91	-13.09	-5.69	-7.84	1730	39.72	-4.01	0.34	-1.81
730	5.39	-12.68	-5.19	-7.34	1740	37.33	-4.28	-0.1	-2.25
740	5.9	-12.29	-4.69	-6.84	1750	39.6	-4.02	0.48	-1.67
750	6.99	-11.56	-4.07	-6.22	1760	40.03	-3.98	0.24	-1.91
760	8.25	-10.83	-3.55	-5.7	1770	41.56	-3.81	0.74	-1.41
770	9.61	-10.17	-3.28	-5.43	1780	40.46	-3.93	0.57	-1.58
780	10.79	-9.67	-3.05	-5.2	1790	40.94	-3.88	0.22	-1.93
790	13.02	-8.85	-2.33	-4.48	1800	44.27	-3.54	0.64	-1.51
800	15.7	-8.04	-1.72	-3.87	1810	45.3	-3.44	1.9	-0.25
810	18.68	-7.29	-1.35	-3.5	1820	47.52	-3.23	1.83	-0.32
820	20.19	-6.95	-1.48	-3.63	1830	48.58	-3.14	2.42	0.27
830	21.46	-6.68	-1.54	-3.69	1840	49.48	-3.06	2.9	0.75
840	21.31	-6.71	-1.72	-3.87	1850	53.97	-2.68	2.83	0.68
850	23.67	-6.26	-1.07	-3.22	1860	53.75	-2.7	2.87	0.72
860	27.7	-5.58	-0.41	-2.56	1870	54.52	-2.63	3.2	1.05
870	33.76	-4.72	0.14	-2.01	1880	58.57	-2.32	3.36	1.21
880	39.5	-4.03	0.25	-1.9	1890	53.1	-2.75	3.14	0.99
890	47.99	-3.19	0.89	-1.26	1900	57.27	-2.42	3.55	1.4
900	51.37	-2.89	1.24	-0.91	1910	59.51	-2.25	3.62	1.47
910	52.96	-2.76	1.33	-0.82	1920	53.07	-2.75	3.26	1.11
920	51.54	-2.88	1.37	-0.78	1930	49.94	-3.02	2.75	0.6
930	50.3	-2.98	1.4	-0.75	1940	49.75	-3.03	2.17	0.02
940	49.57	-3.05	1.29	-0.86	1950	55.31	-2.57	2.7	0.55
950	45.63	-3.41	0.91	-1.24	1960	59.21	-2.28	3.48	1.33
960	47.83	-3.2	1.09	-1.06	1970	58.12	-2.36	3.15	1
					1980	57.34	-2.42	3.28	1.13
					1990	57.82	-2.38	3.64	1.49
					2000	57.58	-2.4	3.18	1.03
					2010	58.83	-2.3	3.25	1.1
					2020	57.09	-2.43	2.79	0.64

(MHz)	(%)	(dB)	(dBi)	(dBd)	2320	48.95	-3.1	2.92	0.77
2020	57.09	-2.43	2.79	0.64	2330	49.24	-3.08	3.29	1.14
2030	57.55	-2.4	2.33	0.18	2340	47.85	-3.2	2.83	0.68
2040	55.73	-2.54	2.71	0.56	2350	49.45	-3.06	2.32	0.17
2050	56.14	-2.51	2.03	-0.12	2360	44.98	-3.47	2.18	0.03
2060	56.56	-2.47	1.64	-0.51	2370	41.24	-3.85	2.04	-0.11
2070	57.92	-2.37	2.56	0.41	2380	43.72	-3.59	2.07	-0.08
2080	64.66	-1.89	1.79	-0.36	2390	43.17	-3.65	2.21	0.06
2090	62.12	-2.07	1.4	-0.75	2400	43.22	-3.64	2	-0.15
2100	60.68	-2.17	1.63	-0.52	2410	40.31	-3.95	1.4	-0.75
2110	60.51	-2.18	2.14	-0.01	2420	46.17	-3.36	2.09	-0.06
2120	55.73	-2.54	1.53	-0.62	2430	44.39	-3.53	2	-0.15
2130	49.97	-3.01	1.43	-0.72	2440	47.09	-3.27	2	-0.15
2140	56.57	-2.47	2.11	-0.04	2450	49.43	-3.06	0.89	-1.26
2150	56.26	-2.5	2.09	-0.06	2460	49.64	-3.04	1.94	-0.21
2160	55.34	-2.57	2.42	0.27	2470	47.02	-3.28	0.26	-1.89
2170	53.31	-2.73	2.82	0.67	2480	50.72	-2.95	1.67	-0.48
2180	56.78	-2.46	2.47	0.32	2490	48.76	-3.12	1.5	-0.65
2190	53.55	-2.71	2.93	0.78	2500	48.07	-3.18	1.03	-1.12
2200	58.14	-2.36	3.28	1.13	2510	50.24	-2.99	1.66	-0.49
2210	55.2	-2.58	3.21	1.06	2520	55.64	-2.55	1.92	-0.23
2220	59.25	-2.27	3.89	1.74	2530	51.05	-2.92	1.92	-0.23
2230	60.11	-2.21	4.29	2.14	2540	47.05	-3.27	1.39	-0.76
2240	62.2	-2.06	4.3	2.15	2550	47.87	-3.2	1.68	-0.47
2250	60.99	-2.15	4.17	2.02	2560	46.6	-3.32	1.33	-0.82
2260	58.9	-2.3	3.82	1.67	2570	41.34	-3.84	0.9	-1.25
2270	60.78	-2.16	3.75	1.6	2580	42.27	-3.74	0.6	-1.55
2280	65.76	-1.82	4.07	1.92	2590	40.04	-3.98	0.3	-1.85
2290	63.66	-1.96	4.07	1.92	2600	38.46	-4.15	0.13	-2.02
2300	58.05	-2.36	3.58	1.43	2610	35.7	-4.47	0.38	-1.77
2310	47.17	-3.26	3	0.85	2620	35.33	-4.52	0.1	-2.05
					2630	33.1	-4.8	-0.29	-2.44
					2640	31.91	-4.96	-0.27	-2.42
					2650	30.49	-5.16	-0.75	-2.9
					2660	30.29	-5.19	-0.31	-2.46
					2670	29.11	-5.36	-1.21	-3.36
					2680	29.76	-5.26	-0.98	-3.13
					2690	32.76	-4.85	-0.1	-2.25

6. Prototype grounding



7. Mass production antenna indicators

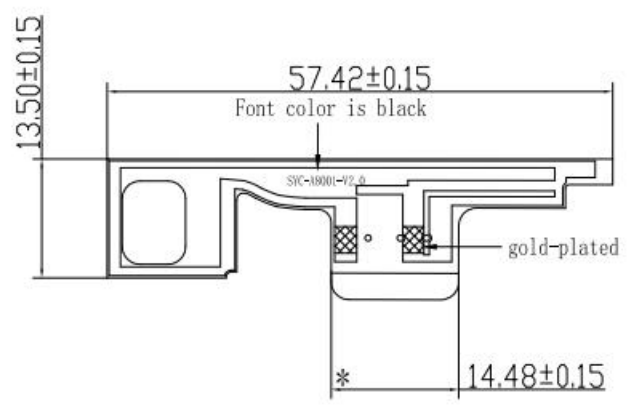
When the antenna is mass-produced, the standing wave ratio is used as the mass production test standard. According to the differences in the project itself, the following criteria are given:

frequency (MHz)	Mass production standards
Main antenna 600--960; 1710—2690	VSWR (Mass production performance) <VSWR(Acknowledge performance)+0.5
Diversity antenna 600--960; 1710--2690	VSWR (Mass production performance) <VSWR(Acknowledge performance)+0.5
Three-in-one antenna 1575.42; 2400--2500	VSWR (Mass production performance) <VSWR(Acknowledge performance)+0.5
5G WIFI antenna 5100-5850	VSWR (Mass production performance) <VSWR(Acknowledge performance)+0.5

8 Drawings

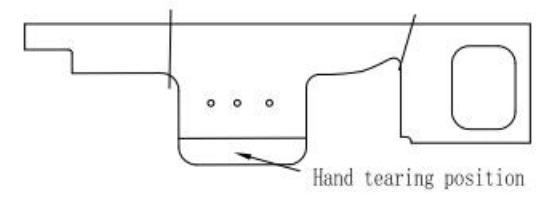
版本	修改内容	修改人	日期

positive



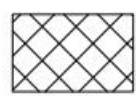
Gummed surface

0.12±0.03

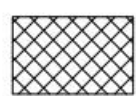


technical requirement

1. Shipping packaging requirements: (ordinary whole board shipping)
2. The copper berth surface is painted black/white matt;
3. The ink shall be uniform;
4. The dimension with "*" is the key dimension;
5. 3M467LSE for adhesive backing;
6. The base material uses PI T=1Mil;
7. Copper foil thickness 0.5oz;
8. The golden yellow thickness of the gilded area is 0.5 wheat, and the salt spray test has been conducted for 48H;
9. Undeclared fillets are 0.2, and the process edge is 0.2mm;
10. The unspecified tolerance shall be subject to the general tolerance table;
11. The product meets RoHS requirements.



Copper foil area



gold-plated



Glue area



Hand tearing position

Sunnyway Technology (China) CO LTD			
	PART NAME: MAIN(FPC) A8001	DATE:	2019.5.24
TOLERANCE	PART NO: PQ0021B75-1V2.0	DRAWN:	zhangyuanfang
X.X ±0.25	MATERIAL:	CHECKED:	
.XX ±0.20	FINISHING:	APPROVED:	
.XXX±0.05			
ANGULAR <±0.5°			
UNIT: mm	COLOUR: BLACK	SCALE: 1:1	REV: RB