



美格智能

承认书

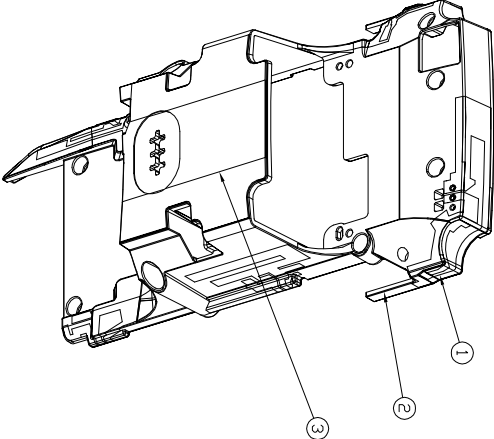
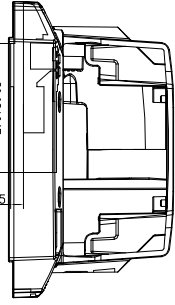
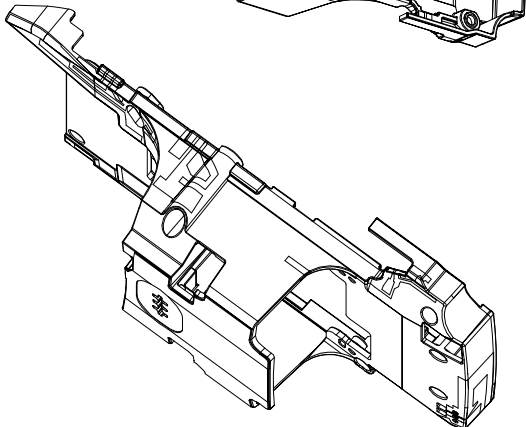
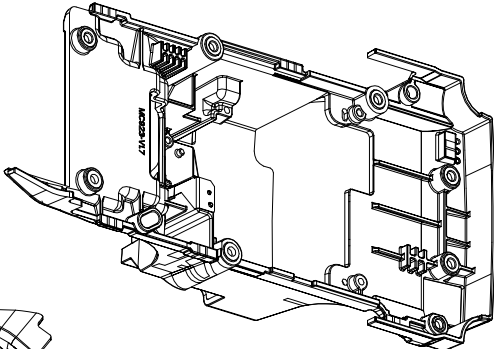
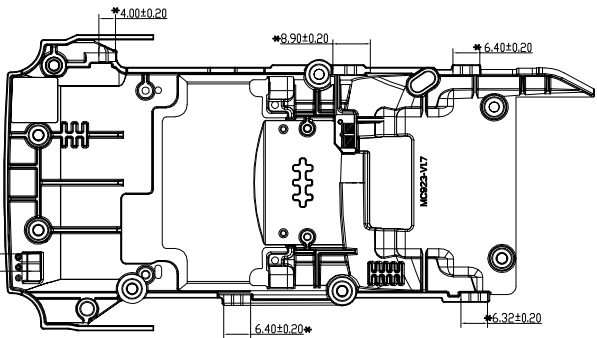
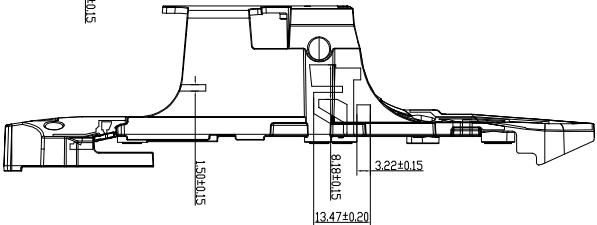
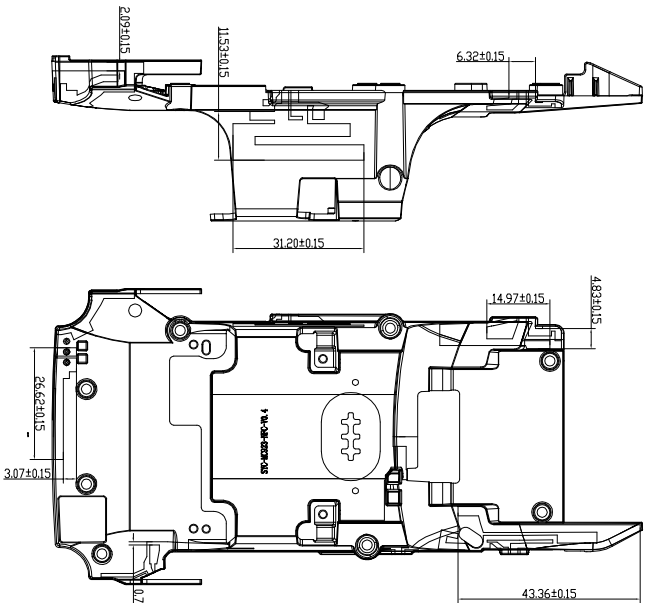
APPROVAL SHEET

编号: MGS-QR3-QA41-01 版本: V1.0

产品描述: Part Description	生产厂家: Sunnyway Technology Co.,Ltd Vendor: 物料型号: SH23252IB89 Part No. 物料代码: 3MC9230101 Part Code 是否符合ROHS标准 ☒ 是 ☐ 否 wether meet ROHS standard	承认项目: MC923 Project 物料描述: MC923-LDS antenna module Description 备注: remark			
附件: Attachments	☒ 规格书 Spec ☒ CPK 报告 Cpk Report ☐ 制程管制图 QC Flow Chart	☒ 工程图纸 Drawing ☒ FAI全尺寸报告 FAI Report ☐ 关键原材料清单 key materials	☒ 样品 Sample ☒ 可靠性测试报告 Reliability Report ☒ 包装方式 Packing Content	☒ RoHS 报告 RoHS Report ☒ ROHS限用物质成分调查表 RoHS Questionnaire ☐ 安规报告 Safety Report	☒ 外观标准 Appearance Standard
供应商承认 : Vendor Approval	拟制: Design	审核: Check	批准: Approval:		
美格承认: Meig Approval	研发承认: RD Department				
	采购承认: Purchasing Department				
	质量承认: Quality Department				

△	記 事	日 付
①	改図	23.06.27
②	凸形状追加	23.08.04
③	R寸法変更	23.08.08
④	形状変更 4箇所	23.10.19
△		





- Technical requirement
1. Shipping and packaging requirements: (pallet packaging and shipping)
 2. LDS surface has no sensitive scratch, leakage and overflow plating. (Due to plating process antenna surface will appear non-inductive scratches);
 3. With * as the key size, the unmarked tolerance size is plus or minus 0.15MM;
 4. LDS antenna plated with copper and nickel;
 5. Electroplating material: copper-nickel
 6. Coating thickness: CU:8-12UM NI:3-5UM
 7. According to the general requirements
 8. The products meet the requirements of ROHS2.0/REACH/HF.

serial number	name of parts	P/N	materials	color	numble
③	NFC	SH232521B03	NFC	black	1
②	bracket	SH232521B02	3720	black	1
①	LDS	SH232521B04		natural color	1

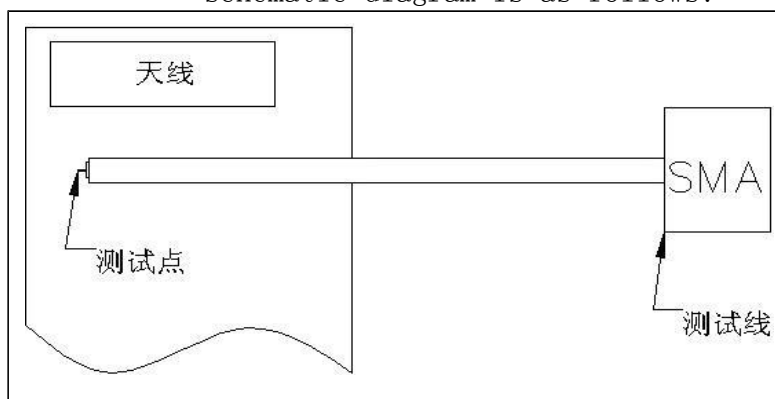
Sunnyway Technology Co., Ltd

TOLERANCE X.X ±0.25 .XX ±0.20 .XXX ±0.05 ANGULAR ≤±0.5°		PART NAME: LDS天线 KC923		DATE: 2024.5.6	
RF: chenzhenchan		PART NO.: SH232521B89		DRAWN: yujiang	
PM: maronglai		FINISHING:		Tel: 15060997118	
MATERIAL:		APPROVED:		Tel: 15921558333	
COLOUR:		SCALE:1:1		REV:TEST:A	

1. Test fixtures

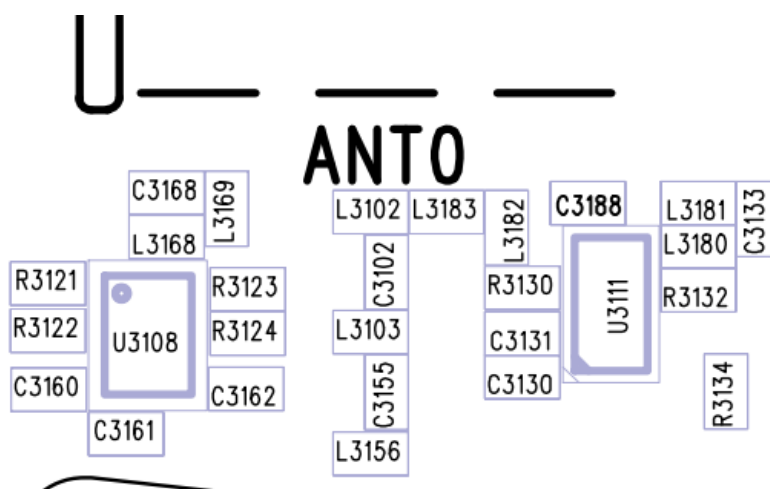
Purpose: To test the passive parameters of the antenna as accurately as possible.

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:



2. Matching circuits

ANT 0		开关		
位号	Value	R3121	0欧姆	880-960MHz 1710-2690MHz
		R3122	7.5nH	791-894MHz
L3102	N/A	R3123	22nH	700-800MHz
C3102	100pF	R3124	N/A	600-700MHz
		L3169	N/A	
L3103	18nH	L3168	27nH	



Note: There are no changes to the matching circuit.

ANT 3		开关		
位号	Value	R3115	0欧姆	880-960MHz 1710-2690MHz
L3111	10nH	R3316	18nH	791-894MHz
C3118	0欧姆	R3117	33nH	700-800MHz
L3112	N/A	R3118	N/A	600-700MHz
C3119	0欧姆			

ANT3109

ANT3111

ANT3110

FID1

L3111

C3118

L3112

C3119

L3157

R3115

R3316

C3159

C3158

C3157

C3156

L3158

R3117

R3118

U3107

Note: There are changes to the matching circuit.

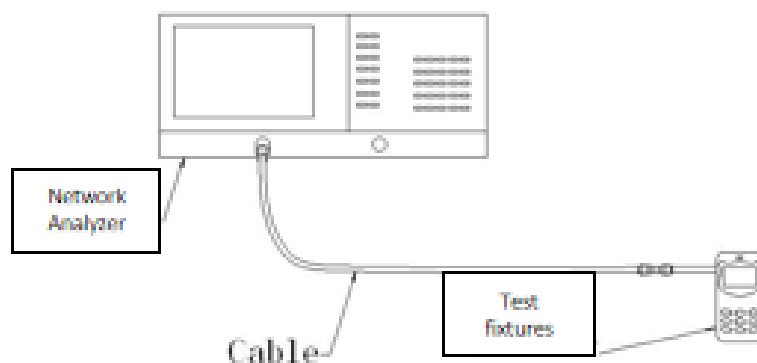
3. S11 test

3.1 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.

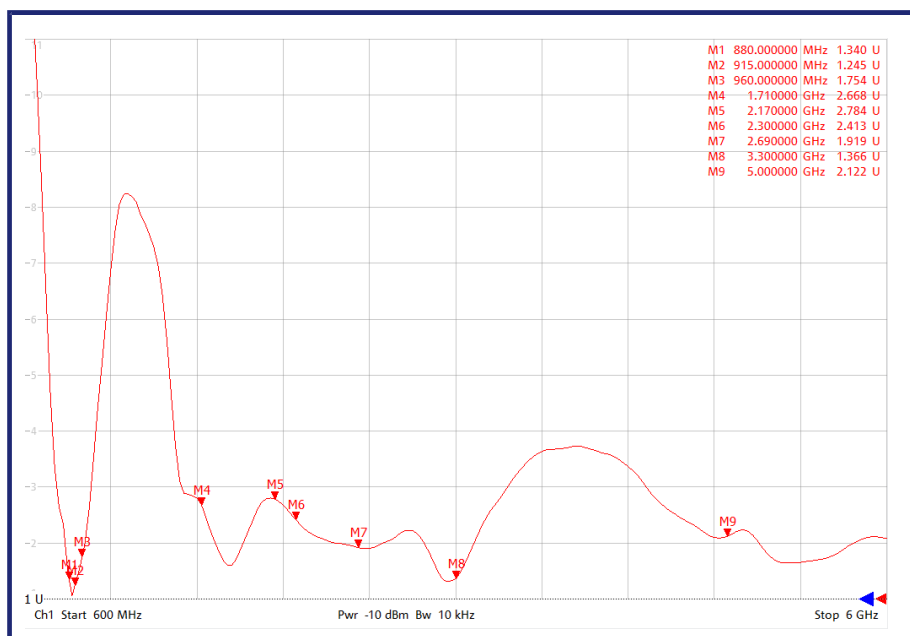
The test diagram is as follows:



Test the schematic

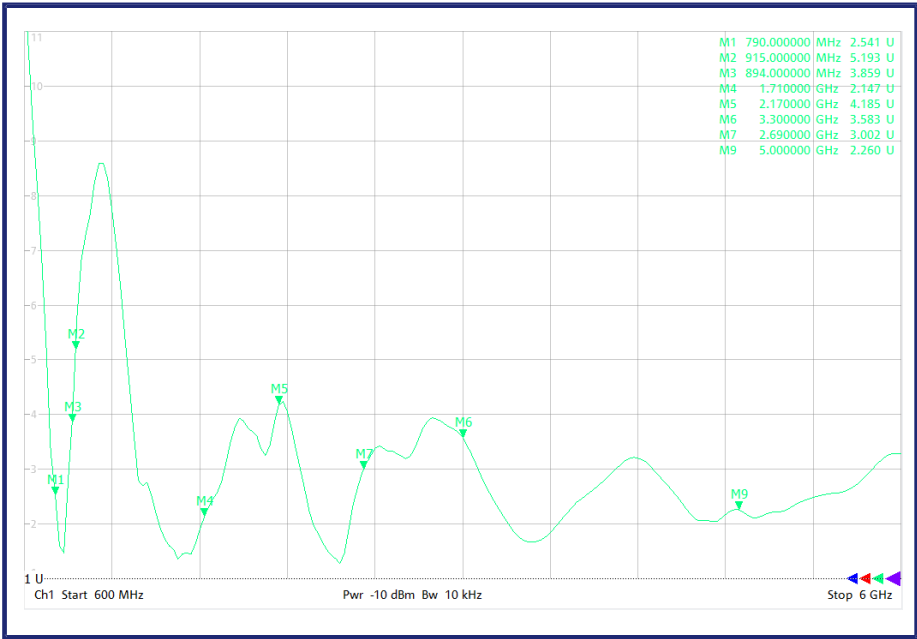
3.2 S11 parameter

ANTO RF1



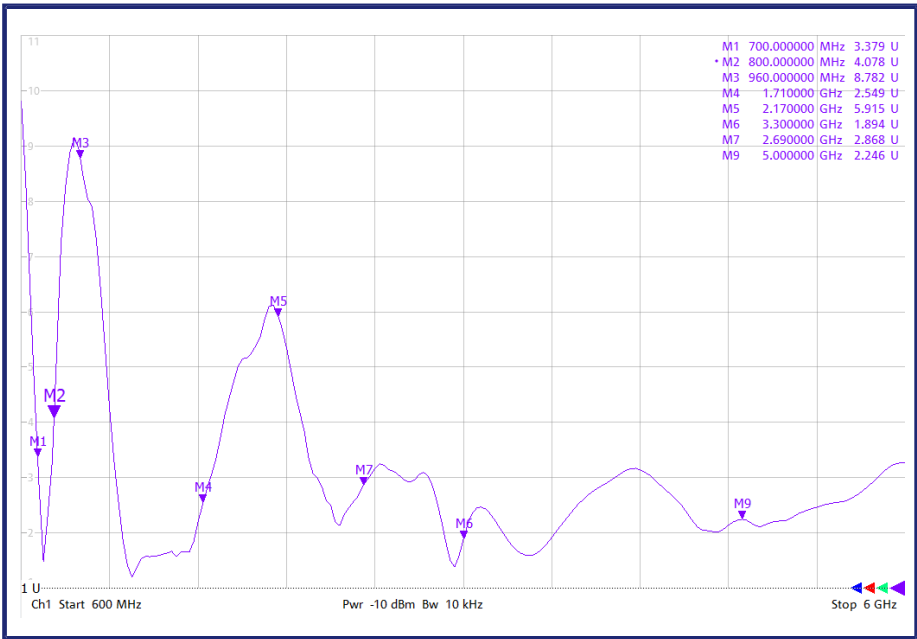
	Main antenna
frequency (MHz)	SWR
880	1.3
915	1.2
960	1.7
1710	2.6
2170	2.7
2300	2.4
2690	1.9
3300	1.3
5000	2.1

ANT0 RF2



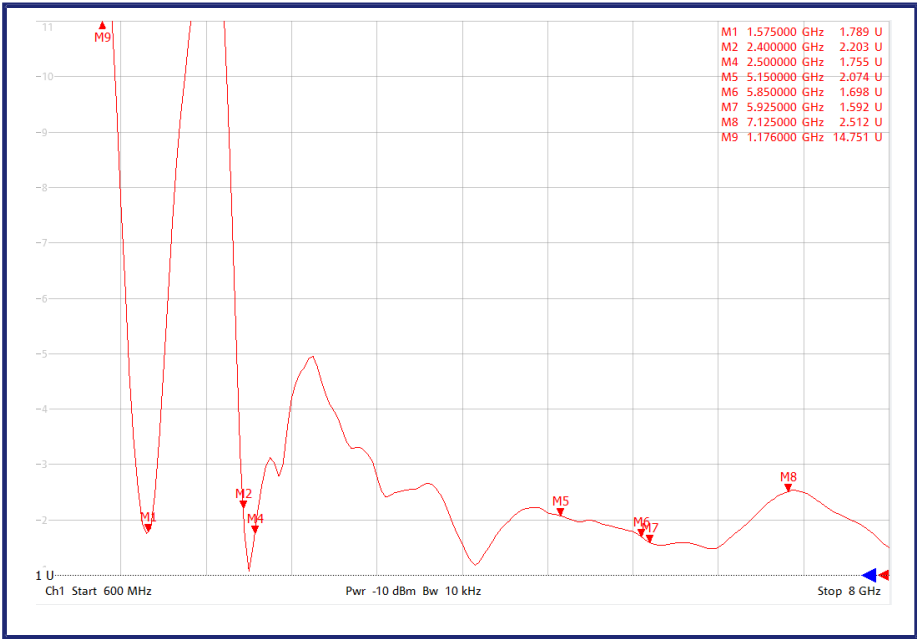
	Main antenna
frequency (MHz)	SWR
790	2.5
894	5.1

ANT0 RF3



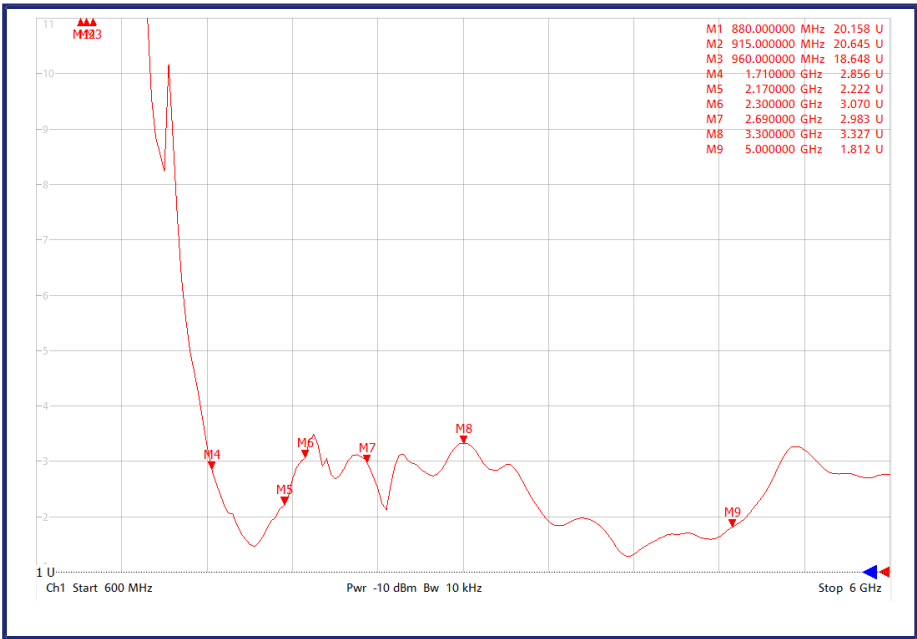
	Main antenna
frequency (MHz)	SWR
700	3.2
800	4.0

ANT1



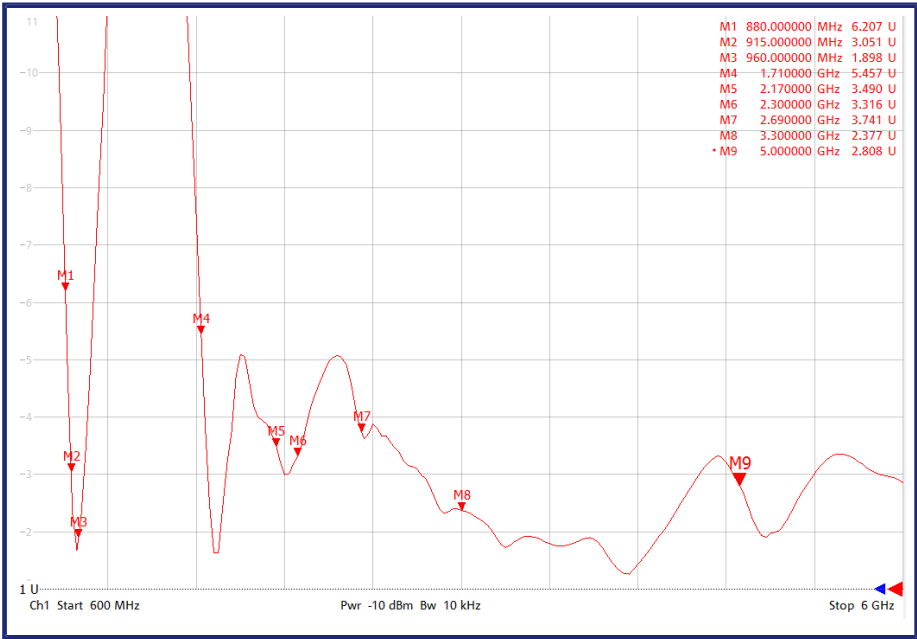
	Main antenna
frequency (MHz)	SWR
1575	1.7
2400	2.2
2500	1.7
5150	2.0
5850	1.6
5950	1.5
7125	2.5

ANT2



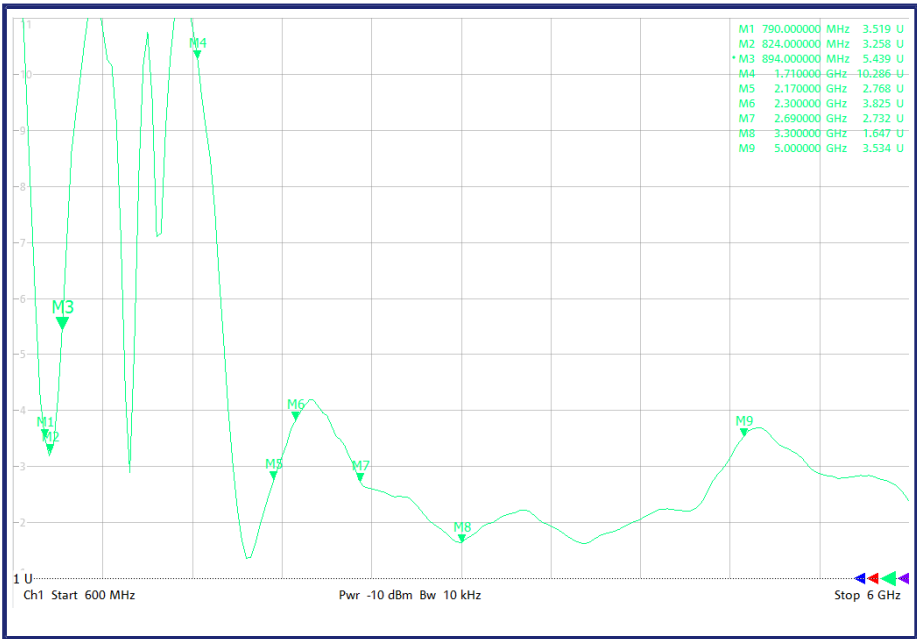
	Main antenna
frequency (MHz)	SWR
1710	2.8
2170	2.2
2300	3.0
2690	2.9
3300	3.3
5000	1.8

ANT3 RF1



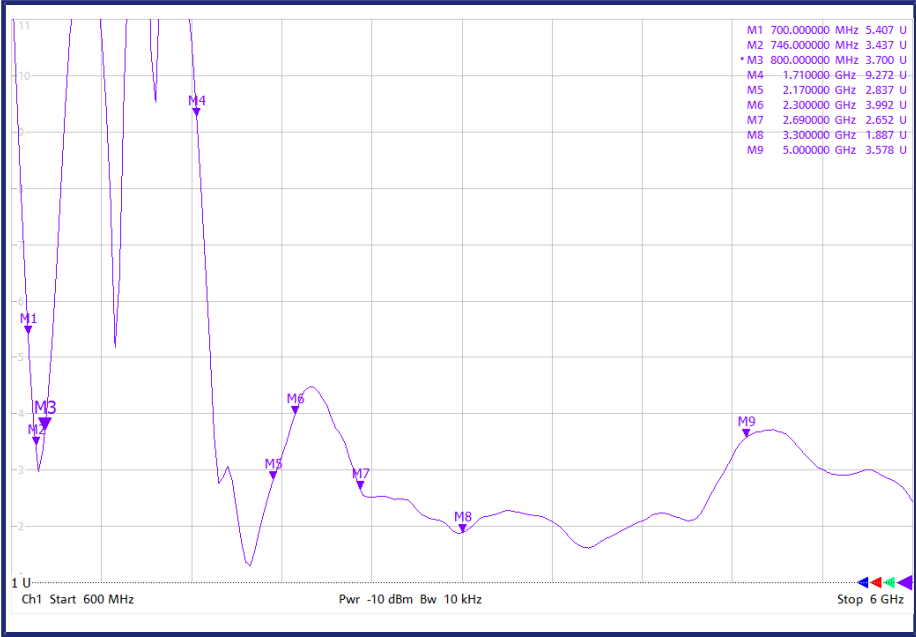
	Main antenna
frequency (MHz)	SWR
880	6.2
915	3.0
960	1.8
1710	5.4
2170	3.4
2300	3.3
2690	3.7
3300	2.3
5000	2.8

ANT3 RF2



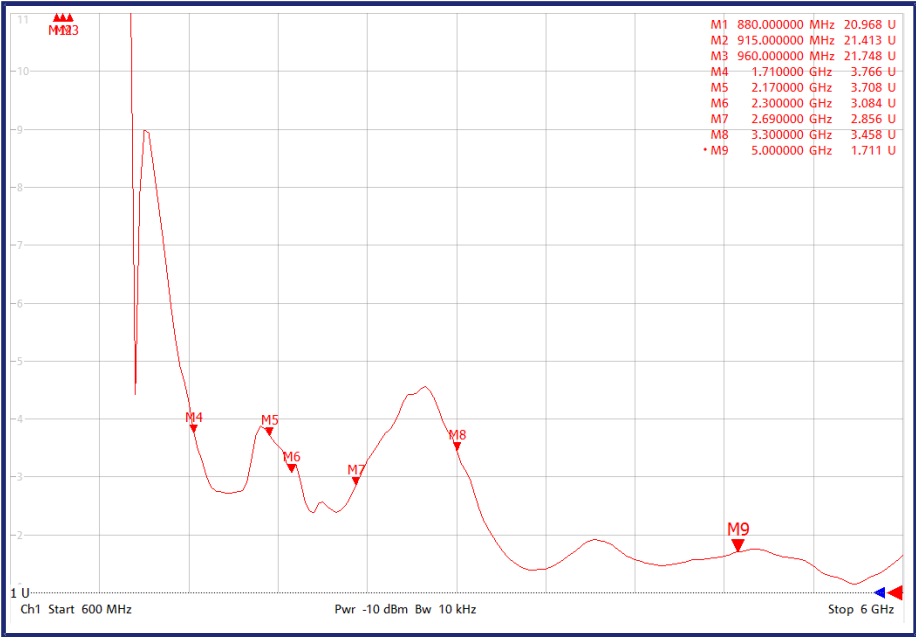
	Main antenna
frequency (MHz)	SWR
790	3.5
894	5.4

ANT3 RF3



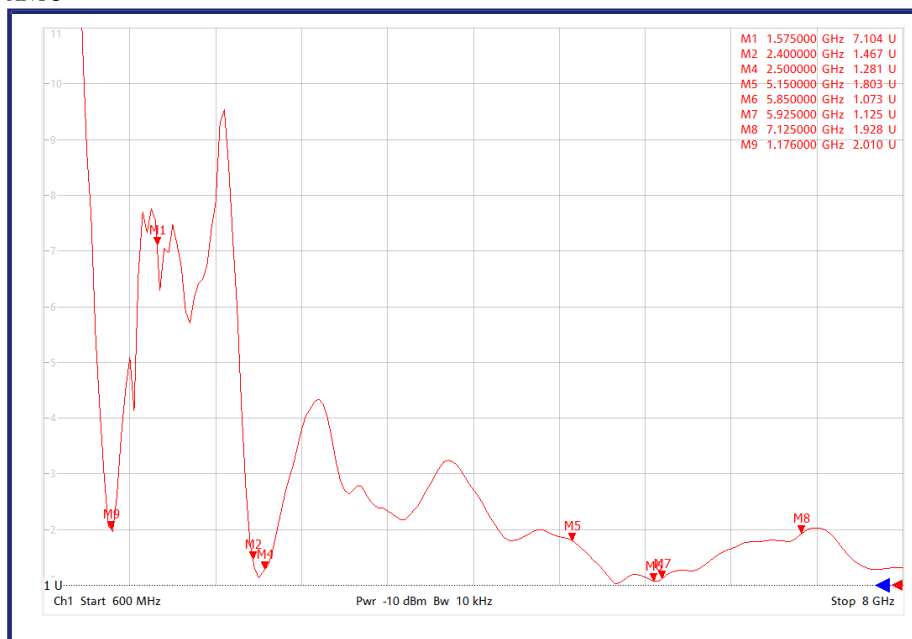
	Main antenna
frequency (MHz)	SWR
700	5.4
800	3.7

ANT4



	Main antenna
frequency (MHz)	SWR
1710	3.7
2170	3.7
2300	3.0
2690	2.8
3300	3.4
5000	1.7

ANT5



	Main antenna
frequency (MHz)	SWR
1176	2.0
2400	1.4
2500	1.2
5150	1.8
5850	1.0
5900	1.1
7125	1.9

4 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

ANT0 antenna passive efficiency

Frequency/Mhz	MaxGain/dBi	Efficiency / %	Frequency/Mhz	MaxGain/dBi	Efficiency / %	Frequency/Mhz	MaxGain/dBi	Efficiency / %	Frequency/Mhz	MaxGain/dBi	Efficiency / %
RF3			1710	1.16	35.1	2300	1.69	39.72	3300	1.8	42.17
700	-1.56	19.42	1720	1.22	35.74	2310	1.65	35.89	3350	2.11	40.74
710	-1.78	19.38	1730	1.32	36.9	2320	1.47	33.65	3400	2.4	34.99
720	-1.83	19.37	1740	1.32	37.66	2330	1.32	33.81	3450	2.72	34.2
730	-1.98	18.51	1750	1.36	38.03	2340	1.44	35.97	3500	2.69	30.2
740	-2.06	18.48	1760	1.36	38.28	2350	1.45	36.06	3550	1.95	35.23
750	-2.17	17.84	1770	1.44	38.84	2360	1.48	37.33	3600	2.37	36.18
760	-2.65	17.71	1780	1.45	39.5	2370	1.47	39.9	3650	1.69	34.38
770	-3.06	17.03	1790	1.59	40.18	2380	1.38	41.78	3700	1.52	39.45
780	-3.39	16.48	1800	1.78	41.23	2390	1.81	39.54	3750	1.21	39.54
790	-3.46	15.66	1810	1.39	42.44	2400	1.96	37.76	3800	2.41	38.16
800	-3.52	15.36	1820	1.41	43.88	2410	2.07	40.09	3850	2.62	36.14
RF2			1830	1.44	35.7	2420	2.07	42.27	3900	2.24	35.28
790	-1.03	25.16	1840	1.77	38.18	2430	2.13	40.55	3950	1.42	32.91
800	-1.13	23.18	1850	1.75	35.48	2440	2.24	39.54	4000	0.84	30.72
810	-1.17	24.58	1860	1.83	34.83	2450	2.16	39.99	4050	0.62	30.74
820	-1.18	26.82	1870	1.85	38.46	2460	2.23	36.73	4100	0.89	30.81
830	-1.2	26.86	1880	2.54	37.76	2470	2.46	36.98	4150	1.67	31.64
840	-1.79	26.19	1890	2.87	41.03	2480	2.46	37.41	4200	1.93	31.86
850	-1.44	25.32	1900	2.14	42.97	2490	2.53	37.93	4250	1.01	31.04
860	-1.34	23.75	1910	2.1	44.66	2500	2.42	39.54	4300	1.93	31.46
870	-1.64	22.21	1920	2.03	46.29	2510	2.32	38.73	4350	2.36	32.53
880	-1.89	21.52	1930	2	46.52	2520	2.55	39.17	4400	2.54	31.97
890	-2.43	20.77	1940	1.92	46.29	2530	2.71	39.45	4450	3.46	33.06
RF1			1950	1.59	47.6	2540	2.24	38.64	4500	2.51	34.29
880	-1.13	32.69	1960	1.44	48.7	2550	1.98	36.31	4550	1.5	33.49
890	-0.65	33.67	1970	2.35	48.58	2560	1.81	36.31	4600	1.34	33.77
900	-0.52	33.36	1980	2.27	48.09	2570	1.75	35.08	4650	1.99	34.66
910	-0.57	35.5	1990	2.19	49.08	2580	1.83	34.59	4700	1.64	35.24
920	-0.51	34.87	2000	2.03	48.21	2590	1.8	33.11	4750	2.24	37.54
930	-0.49	35.17	2010	2.01	43.19	2600	1.52	32.28	4800	2.56	38.79
940	-0.35	36.23	2020	2.22	42.75	2610	1.45	32.21	4850	1.96	37.78
950	-0.3	35.09	2030	2.16	41.56	2620	1.74	31.62	4900	2.21	40.04
960	-0.17	35.08	2040	2.17	40.5	2630	1.75	31.26	4950	0.97	38.41
			2050	2.18	39.46	2640	1.76	31.26	5000	1.06	36.94
			2060	2.19	39.26	2650	1.45	31.7			
			2070	2.58	40.08	2660	1.36	31.7			
			2080	2.39	41.56	2670	1.08	32.66			
			2090	2.3	41.13	2680	1.03	31.77			
			2100	2.9	42.97	2690	1.02	32.89			
			2110	2.89	42.1						
			2120	2.68	40.71						
			2130	2.7	37.27						
			2140	2.44	37.17						
			2150	2.47	37.07						
			2160	2.27	39.36						
			2170	1.35	37.07						

ANT1 antenna passive efficiency

Frequency/Mhz	MaxGain/dBi	Efficiency / %	Frequency/Mhz	MaxGain/dBi	Efficiency / %
1550	1.87	38.35	5900	1.33	43.35
1555	2.04	39.06	5950	1.67	43.85
1560	2.03	40.05	6000	1.12	40.55
1565	1.93	41.07	6050	1.77	41.11
1570	2.06	42.55	6100	2.46	44.16
1575	2.08	42.75	6150	2.29	41.98
1580	1.93	41.35	6200	2.32	41.59
1585	1.98	40.77	6250	2.85	44.67
1590	1.54	39.5	6300	2.43	42.76
1595	1.27	39.19	6350	2.19	41.88
1600	1.09	39.36	6400	1.75	42.17
2400	1.57	33.5	6450	1.42	41.4
2410	1.58	35.99	6500	1.34	40.74
2420	1.69	36.05	6550	1.11	40.46
2430	1.52	37.11	6600	1.78	44.57
2440	1.5	36.27	6650	1.38	43.9
2450	1.47	34.28	6700	1.15	38.5
2460	1.46	32.9	6750	2.48	43.9
2470	1.46	33.05	6800	2.15	41.39
2480	1.39	33.48	6850	1.88	39.99
2490	1.35	33.99	6900	0.51	36.18
2500	1.35	35.04	6950	0.93	41.62
5150	2.59	37.5	7000	0.55	36.98
5200	2.62	40.83	7050	-0.4	31.09
5250	1.72	37.41	7100	1.28	38.77
5300	1.68	34.43	7150	0.89	33.82
5350	1.14	35.4			
5400	1.62	37.84			
5450	1.47	37.76			
5500	1.11	36.98			
5550	0.81	34.12			
5600	1.35	34.99			
5650	1.43	35.89			
5700	0.75	33.42			
5750	0.88	37.24			
5800	0.88	40.55			
5850	0.7	41.4			

ANT2 antenna passive efficiency

Frequency/Mh z	MaxGain/d Bi	Efficiency / %	Frequency/Mh z	MaxGain/d Bi	Efficiency / %	Frequency/Mh z	MaxGain/dBi	Efficiency / %
1710	2.24	36.03	2300	1.81	44.67	3300	1	34.1
1720	2.44	37.75	2310	1.9	40.64	3350	0.99	32.65
1730	2.52	40.23	2320	1.85	37.93	3400	0.65	32.34
1740	2.54	41.17	2330	1.84	38.37	3450	0.93	34.32
1750	2.61	40.93	2340	1.52	40.83	3500	1.31	35.18
1760	2.63	41.05	2350	1.3	40.18	3550	1.62	33.33
1770	2.63	41.05	2360	1.4	39.81	3600	1.54	33.55
1780	2.68	40.58	2370	1.45	40.18	3650	1.29	33.39
1790	2.73	39.89	2380	1.58	40.09	3700	1.3	36.58
1800	2.75	39.55	2390	1.59	36.98	3750	1.4	36.53
1810	2.73	39.2	2400	1.7	33.65	3800	1.3	34.82
1820	2.86	37.97	2410	1.39	33.96	3850	1.22	33.2
1830	2.87	37.1	2420	1.3	34.59	3900	1.32	33.41
1840	2.7	37.42	2430	0.49	33.27	3950	1.68	32.3
1850	2.66	38.08	2440	0.49	33.88	4000	1.69	30.74
1860	2.65	38.64	2450	0.5	36.64	4050	1.81	33.58
1870	2.73	34.32	2460	0.51	35.08	4100	1.82	33.6
1880	2.55	35.47	2470	0.74	35.73	4150	1.91	39.92
1890	2.29	36.29	2480	1.14	36.73	4200	1.75	36.14
1900	2.38	37	2490	1.27	37.41	4250	1.62	33.55
1910	2.46	39.08	2500	1.33	38.64	4300	1.57	36.11
1920	2.61	42.15	2510	1.54	38.02	4350	1.52	39.98
1930	2.78	44.57	2520	1.57	37.58	4400	1.46	38.65
1940	2.84	45.67	2530	1.78	37.84	4450	1.43	37.56
1950	2.86	46.94	2540	1.77	37.33	4500	1.4	39.77
1960	2.54	46.24	2550	1.55	35.24	4550	1.71	38.45
1970	2.1	44.43	2560	1.33	35.73	4600	1.74	36.5
1980	1.78	43.08	2570	1.17	35.48	4650	2.13	37.27
1990	1.71	43.61	2580	1.03	35.97	4700	2.05	39.87
2000	1.56	42.94	2590	1.06	36.06	4750	1.85	41.03
2010	0.95	40.34	2600	1.06	37.15	4800	1.76	42.42
2020	0.89	42.02	2610	1.09	38.02	4850	1.66	39.98
2030	1.2	43.75	2620	1.12	37.5	4900	1.56	38.95
2040	1.81	45.26	2630	1.19	37.24	4950	1.33	36.21
2050	2.14	45.53	2640	1.23	36.81	5000	1.28	35.18
2060	2.54	45.39	2650	1.1	36.39			
2070	2.38	45.12	2660	0.98	36.22			
2080	2.32	43.21	2670	0.91	36.64			
2090	1.99	39.45	2680	0.83	35.97			
2100	2.2	40.46	2690	0.63	36.9			
2110	2.19	40.46						
2120	1.9	40.34						
2130	1.83	38.46						
2140	1.94	39.83						
2150	2.55	41.1						
2160	2.22	44.08						
2170	1.56	41.88						

ANT3 antenna passive efficiency

Frequency/M hz	MaxGain/d Bi	Efficiency / %	Frequency/M hz	MaxGain/d Bi	Efficiency / %	Frequency/M hz	MaxGain/d Bi	Efficiency / %	Frequency/M hz	MaxGain/d Bi	Efficiency / %
RF3			1710	-4.17	11.89	2300	0.26	30.95	3300	0.61	24.17
700	-4.32	11.23	1720	-3.42	15.07	2310	-0.71	30.08	3350	0.37	23.37
710	-4.01	11.74	1730	-2.59	18.84	2320	-1.06	31.64	3400	0.03	23.28
720	-3.8	12.3	1740	-2.23	22.28	2330	-1.1	31.31	3450	1.78	28.95
730	-3.23	13.08	1750	-1.73	24.89	2340	-1.01	32.15	3500	1.8	31.56
740	-3.1	13.56	1760	-1.15	27.67	2350	-1.25	30.48	3550	1.34	28.95
750	-3.09	13.69	1770	-0.51	30.27	2360	-1.24	29.2	3600	1.49	31.24
760	-2.91	14	1780	0.06	31.92	2370	-1.48	28.57	3650	1.58	31.03
770	-2.89	14.12	1790	0.59	32.81	2380	-1.75	27.58	3700	1.73	28.05
780	-2.69	14.52	1800	0.04	32.73	2390	-1.72	24.44	3750	1.81	32.42
790	-5.61	14.89	1810	-0.94	31.62	2400	-2.31	26.42	3800	1.35	32.64
800	-2.59	15.39	1820	-1.19	31.48	2410	-2.61	26.67	3850	1.11	30.5
RF2			1830	-1.18	29.85	2420	-2.45	26.98	3900	1.1	30.08
790	-2.04	18.31	1840	-0.98	27.61	2430	-2.16	24.89	3950	1.32	26.4
800	-2.22	17.91	1850	-0.77	25.47	2440	-2.51	23.82	4000	1.41	20.81
810	-2.81	17.64	1860	0.14	26.67	2450	-2.12	24.21	4050	1.34	19.99
820	-2.98	17.03	1870	1.14	26.24	2460	-2.31	22.23	4100	0.68	21.06
830	-3.31	16.89	1880	1.38	24.95	2470	-2.48	21.98	4150	1.23	24.9
840	-3.42	16.54	1890	0.59	22.08	2480	-1.77	21.98	4200	1.51	30.19
850	-3.49	16.11	1900	0.23	22.03	2490	-2.16	22.08	4250	-0.89	32.86
860	-3.79	16.02	1910	-0.37	21.48	2500	-1.58	22.8	4300	-0.77	31.13
870	-4.11	15.84	1920	-1.13	19.63	2510	-1.71	21.93	4350	1	34.09
880	-4.14	15.62	1930	-2.08	17.66	2520	-2.21	21.18	4400	1.98	31.67
890	-4.22	15.31	1940	-3.19	15.7	2530	-2.36	20.56	4450	1.61	27.85
RF1			1950	-4.2	14.45	2540	-2.62	22.59	4500	1.39	28.45
880	-2.74	18.57	1960	-4.96	13.52	2550	-3.42	20.95	4550	0.31	25.93
890	-2.36	18.66	1970	-4.94	13.09	2560	-2.8	20.91	4600	0.28	28.73
900	-2.09	19.3	1980	-4.42	13.24	2570	-2.75	20.7	4650	0.88	27.58
910	-1.89	20.74	1990	-3.64	14.66	2580	-2.7	20.74	4700	0.36	25.9
920	-1.55	20.97	2000	-2.9	16.56	2590	-2.52	20.58	4750	-0.07	24.51
930	-1.29	21.18	2010	-2.63	18.37	2600	-2.22	20.95	4800	0.17	25.83
940	-1.21	21.61	2020	-2.05	21.33	2610	-2.09	22.01	4850	-0.3	22.35
950	-1.18	22.58	2030	-0.95	23.93	2620	-1.89	22.86	4900	0.74	22.86
960	-1.09	23.48	2040	-0.63	25.76	2630	-1.71	20.8	4950	0.7	24.92
			2050	-0.23	26.67	2640	-1.43	21.98	5000	0.89	24.38
			2060	-0.09	27.29	2650	-1.25	23.07			
			2070	-0.49	28.12	2660	-0.98	24.32			
			2080	-0.59	28.31	2670	-0.69	25.29			
			2090	-0.58	27.48	2680	-1.08	24.83			
			2100	-0.11	27.73	2690	-0.47	25.53			
			2110	-0.21	26.79						
			2120	0.02	26.61						
			2130	0.12	26.92						
			2140	-0.14	28.18						
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			2170	-0.66	30.13						

ANT4 antenna passive efficiency

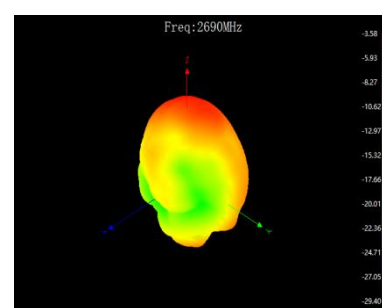
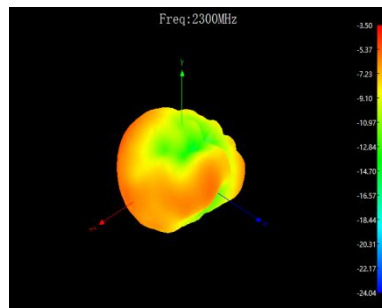
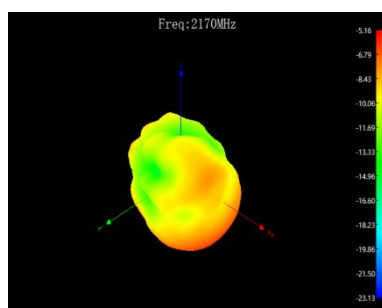
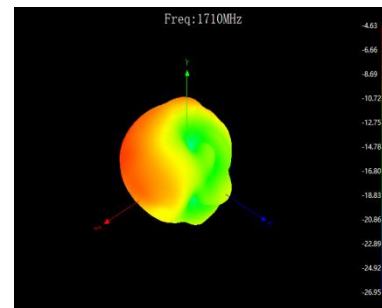
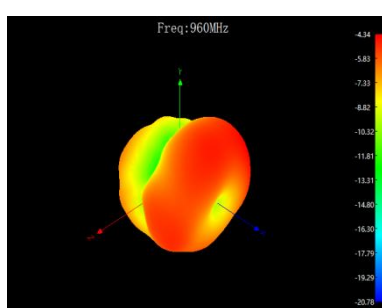
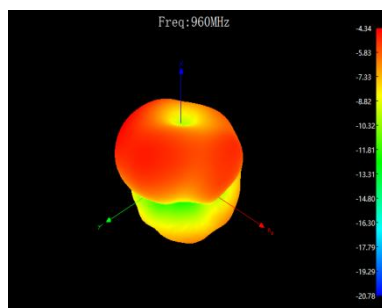
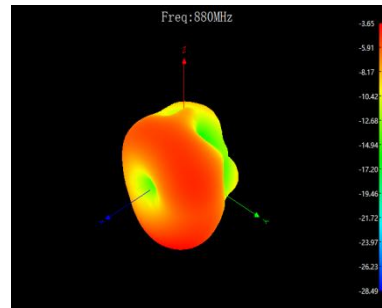
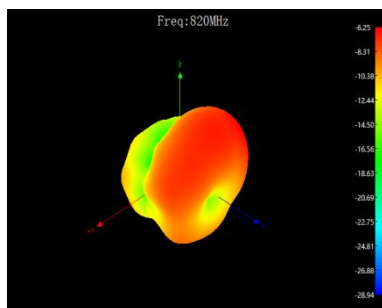
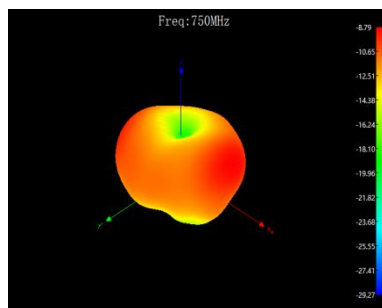
Frequency/Mh z	MaxGain/d Bi	Efficiency / %	Frequency/Mh z	MaxGain/d Bi	Efficiency / %	Frequency/Mh z	MaxGain/d Bi	Efficiency / %
1710	-0.3	26.49	2300	-0.74	33.5	3300	-0.41	31.05
1720	-0.33	27.73	2310	0.88	31.33	3350	-0.27	31.41
1730	-0.3	29.51	2320	0.85	29.17	3400	1.02	30.27
1740	-0.82	30.69	2330	0.93	28.25	3450	1.42	33.34
1750	-0.78	31.41	2340	0.68	28.05	3500	1.26	33.81
1760	-0.58	32.14	2350	0.05	26.24	3550	0.48	32.43
1770	-0.48	33.04	2360	0.13	25.59	3600	2.23	30.93
1780	-0.23	33.57	2370	0.33	26.61	3650	2.54	36.77
1790	0.13	33.73	2380	0.16	28.05	3700	1.73	35.81
1800	-0.22	34.28	2390	1	27.73	3750	1.82	39.32
1810	-0.92	34.91	2400	1.15	27.04	3800	1.72	38.98
1820	-1.05	35.56	2410	0.93	30.34	3850	2.62	36.56
1830	-0.87	36.31	2420	1.92	33.81	3900	2.39	36.88
1840	-0.58	37.41	2430	2.16	33.34	3950	2.34	33.75
1850	0.01	39.17	2440	1.94	33.96	4000	1.4	29.9
1860	0.66	40.83	2450	1.91	36.06	4050	0.88	33.05
1870	1.62	42.66	2460	2.24	33.73	4100	1.15	36.67
1880	2.05	45.19	2470	1.89	32.66	4150	1.24	37.86
1890	1.92	46.67	2480	1.89	31.26	4200	1.55	37.53
1900	1.96	47.21	2490	1.65	29.85	4250	1.35	39.43
1910	2.13	47.53	2500	1.62	30.13	4300	2.09	39.09
1920	2.3	47.64	2510	2.03	28.64	4350	2.2	39.43
1930	2.2	46.13	2520	2.01	28.77	4400	2.44	41.52
1940	1.76	43.75	2530	1.97	29.72	4450	2.48	38.75
1950	1.21	42.46	2540	1.98	30.48	4500	2.43	39.77
1960	0.43	41.11	2550	1.73	30.48	4550	2.23	43.46
1970	-0.25	39.99	2560	1.72	32.58	4600	2.17	38.53
1980	-0.68	39.17	2570	1.71	33.34	4650	1.79	37.42
1990	-0.91	39.9	2580	2.18	34.75	4700	1.59	41.4
2000	-1.13	39.99	2590	2.32	34.67	4750	1.78	40.93
2010	-1.47	38.19	2600	2.21	35.24	4800	2.21	43.21
2020	-1.58	38.64	2610	2.15	35.81	4850	2	41.64
2030	-1.65	38.37	2620	1.78	35.08	4900	2.4	42.24
2040	-1.39	37.58	2630	1.61	35.16	4950	2.06	42.48
2050	-1.22	36.14	2640	1.53	34.59	5000	2.35	39.2
2060	-0.64	35.24	2650	1.7	33.88			
2070	-0.76	35.16	2660	1.71	33.27			
2080	-0.87	34.67	2670	1.63	33.04			
2090	-0.99	32.43	2680	1.29	31.48			
2100	-0.55	31.77	2690	1.21	31.55			
2110	-0.55	30.83						
2120	-0.73	30.48						
2130	-0.74	29.24						
2140	-0.81	30.34						
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2170	-1.13	30.41						

ANT5 antenna passive efficiency

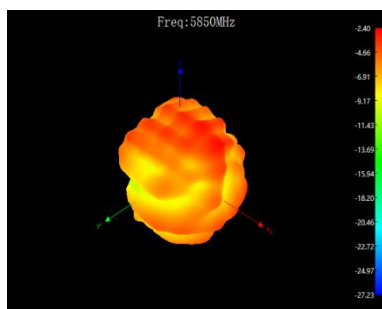
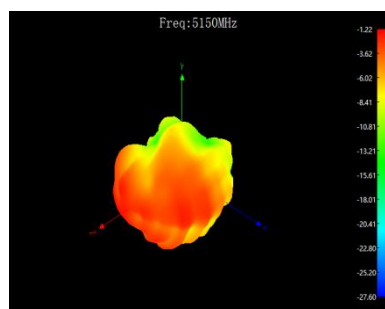
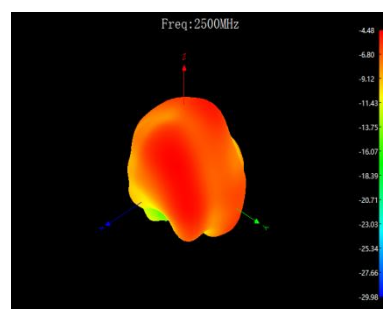
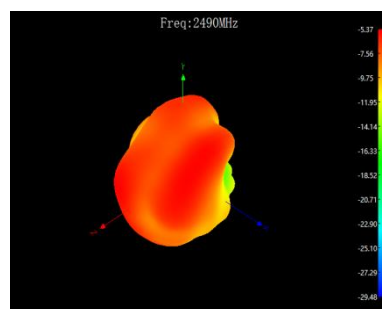
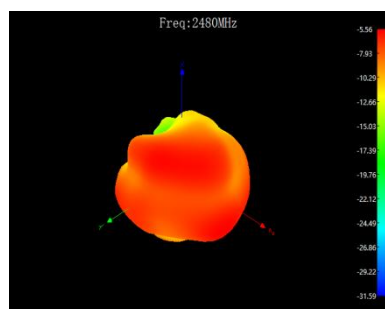
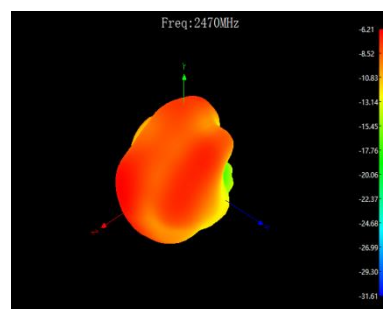
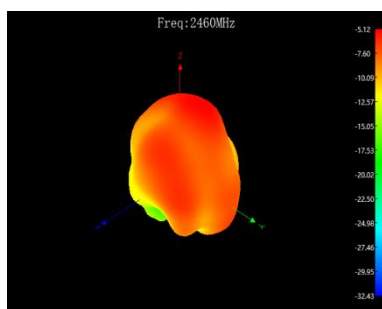
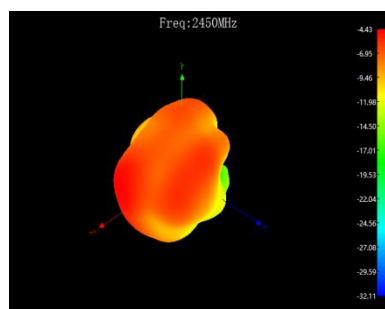
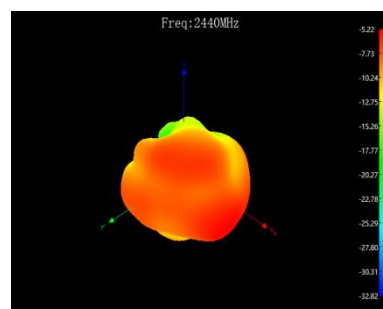
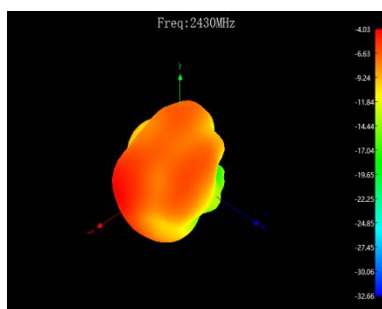
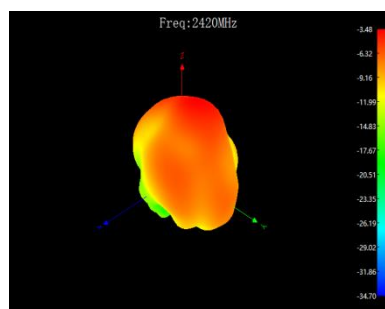
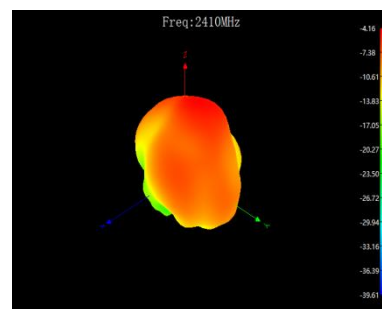
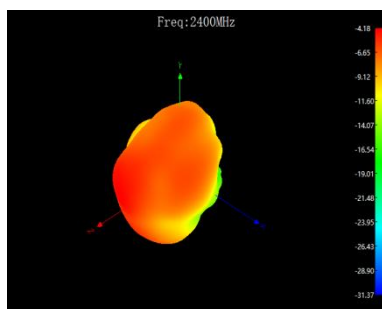
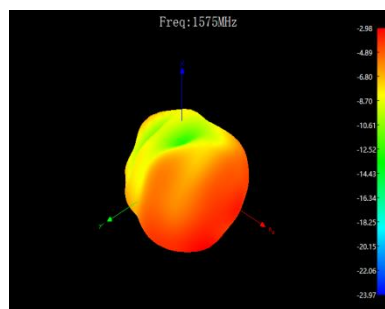
Frequency/Mhz	MaxGain/dBi	Efficiency / %	Frequency/Mhz	MaxGain/dBi	Efficiency / %
1170	1.76	46.29	5900	2.09	37.9
1171	1.8	46.4	5950	2.41	39.02
1172	1.81	46.17	6000	1.77	39.88
1173	1.76	45.58	6050	1.52	40.46
1174	1.63	44.55	6100	2.19	40.97
1175	1.46	43.64	6150	2.86	41.31
1176	1.27	42.86	6200	2.63	41.53
1177	1.13	42.64	6250	2.92	45
1178	1.09	42.97	6300	2.84	42.09
1179	1.15	43.53	6350	2.53	40.32
1180	1.25	44.09	6400	2.26	40.75
2400	1.05	39.13	6450	1.87	40.92
2410	1.18	39.12	6500	1.23	37.76
2420	1.77	40.28	6550	1.15	38.45
2430	1.98	40.98	6600	1.55	42.97
2440	1.84	40.02	6650	0.77	41.59
2450	1.75	39.26	6700	0.91	38.82
2460	1.74	39.1	6750	2.19	45.92
2470	1.55	38.85	6800	1.9	43.65
2480	1.5	37.54	6850	2.07	38.82
2490	1.64	36.81	6900	1.38	35.81
2500	1.53	36.8	6950	1.66	42.27
5150	0.83	33.57	7000	1.1	39.36
5200	1.84	38.55	7050	0.55	37.81
5250	1.48	35.73	7100	2.01	37.46
5300	1.04	38.02	7150	1.58	36.81
5350	1.18	37.67			
5400	0.84	39.36			
5450	1.42	42.66			
5500	1.09	39.81			
5550	1.32	37.15			
5600	1.64	38.11			
5650	1.64	37.5			
5700	1.02	34.43			
5750	1.31	36.9			
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Antenna pattern

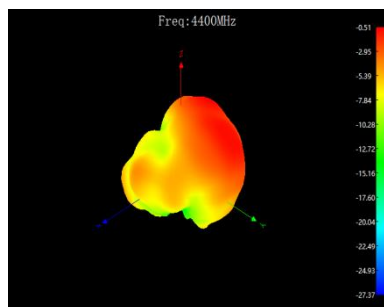
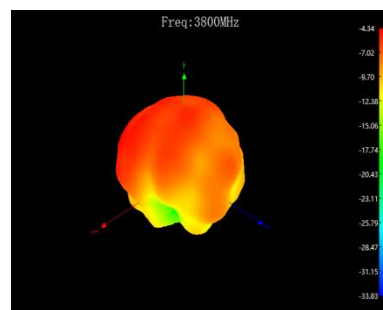
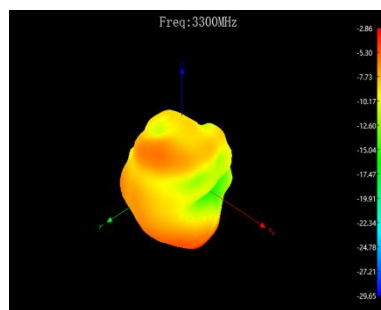
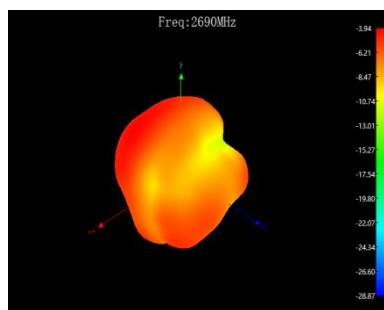
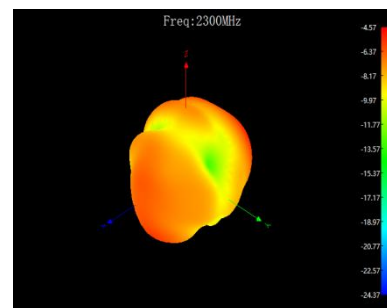
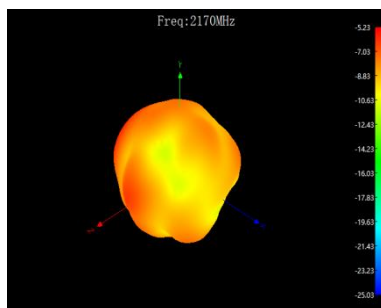
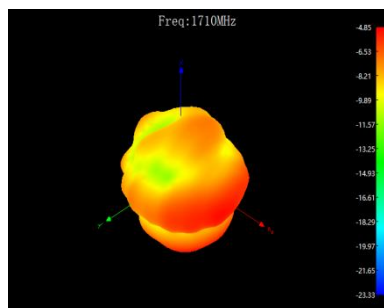
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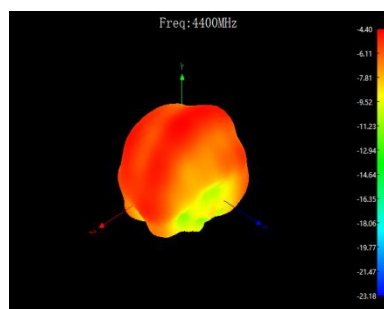
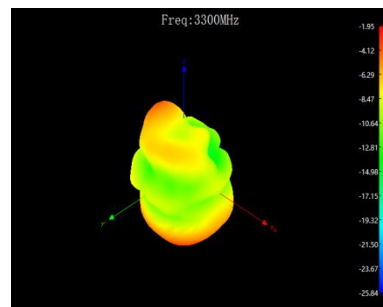
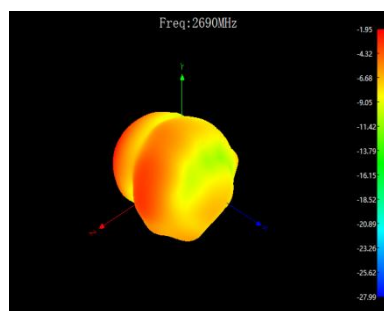
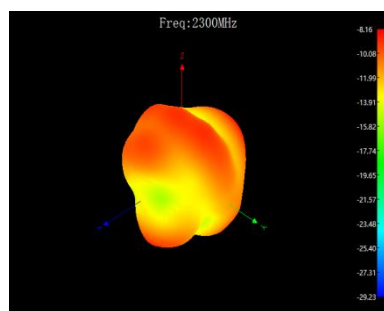
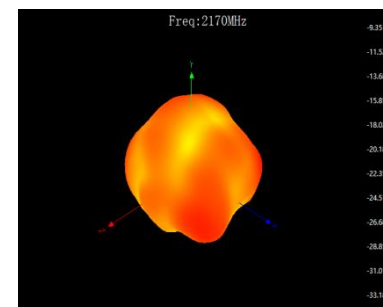
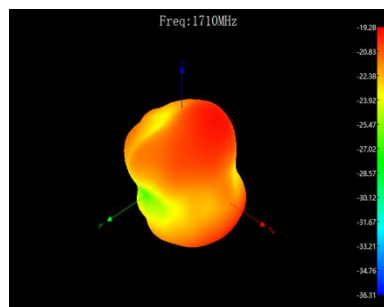
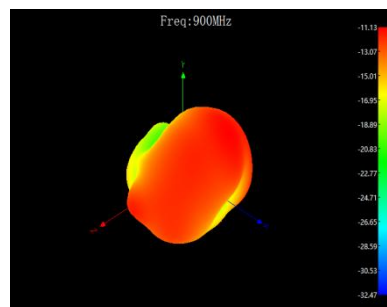
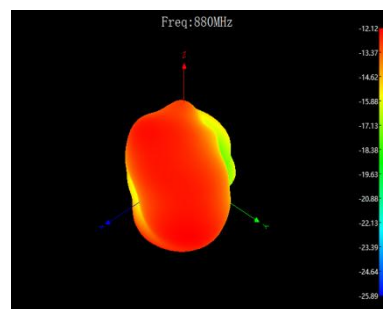
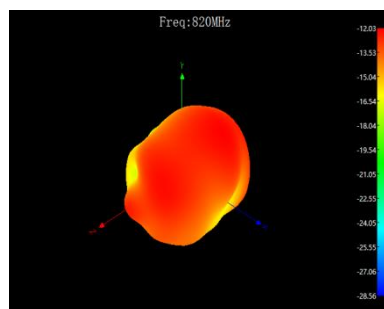
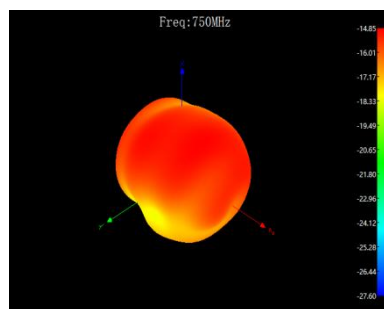
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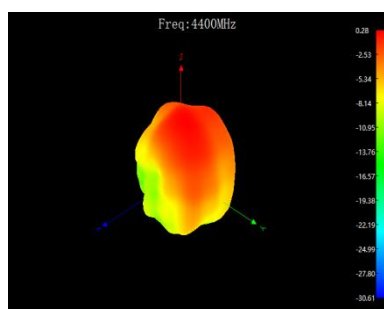
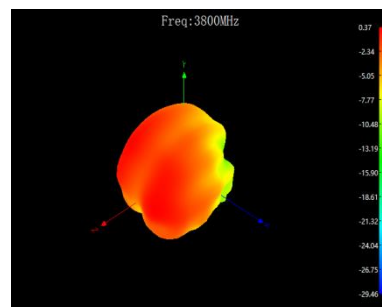
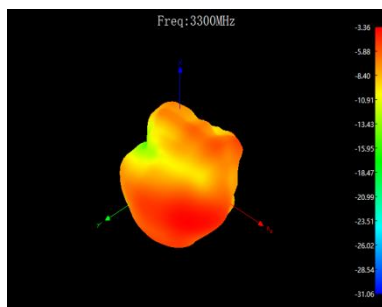
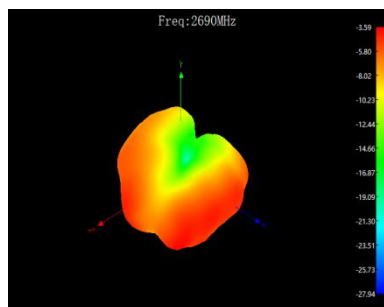
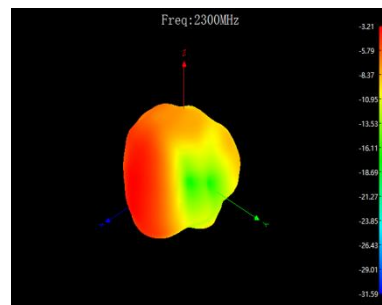
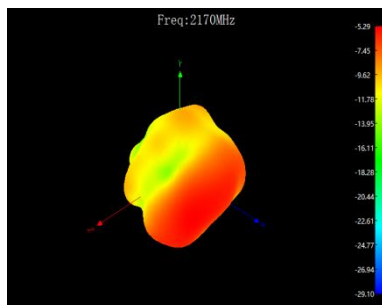
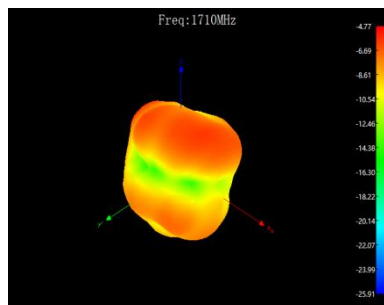
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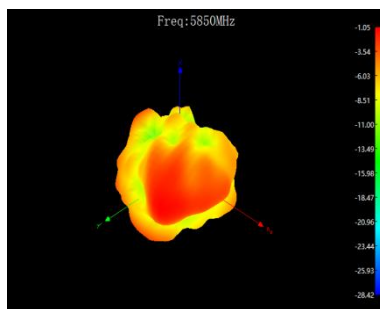
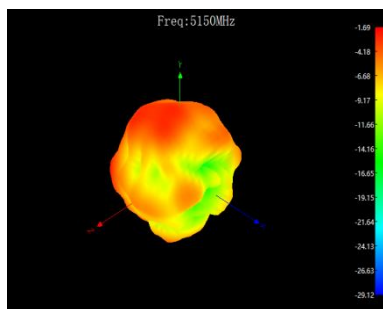
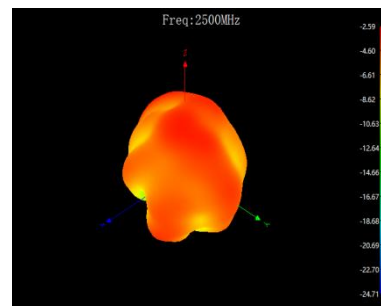
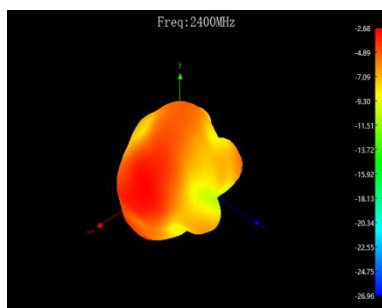
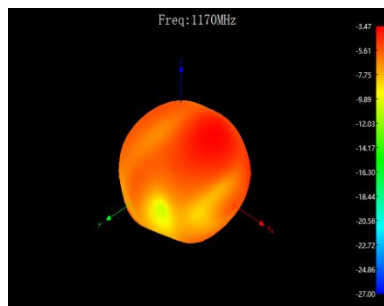
ANT3



ANT4



ANT5



5.2 Active test data

Antenna OTA test data

GE Version

Band	Channel	FREQ (MHz)	SPEC (dBm)		OTA (dBm)		GAP	
			TRP	TIS	TRP	TIS	TRP	TIS
GSM_850	128	824.2	25	-103	25.74		0.74	
	190	836.6			26.64		1.64	
	251	848.8			26.19	-103.1	1.19	0.1
E-GSM 900	975	880.2	25	-103	26.17		1.17	
	38	897.4			26.13		1.13	
	124	914.8			25.69	-103.02	0.69	0.02
DCS 1800	512	1710.2	25	-103	25.02		0.02	
	698	1747.4			25.22		0.22	
	885	1784.8			25.37	-103.34	0.37	0.34
PCS 1900	512	1850.2	25	-103	25.09		0.09	
	661	1880			25.6		0.6	
	810	1909.8			25.04	-105.05	0.04	2.05
WCDMA_B1	9612	1922.4	19	-103	19.17		0.17	
	9750	1950			19.07		0.07	
	9888	1977.6			19.04	-105.67	0.04	2.67
WCDMA_B5	4132	826.4	17	-103	17.04		0.04	
	4183	836.6			17.17		0.17	
	4233	846.6			17.13	-103.58	0.13	0.58
WCDMA_B8	2712	882.4	17	-103	17.32		0.32	
	2787	897.4			17.16		0.16	
	2863	912.6			17.04	-103.61	0.04	0.61

Antenna OTA test data

GE Version

Band	Channel	FREQ (MHz)	SPEC (dBm)		OTA (dBm)		GAP	
			TRP	TIS	TRP	TIS	TRP	TIS
FDD-B1 (10M)	10850	1925	19	-91	19.37		0.37	
	18300	1950			19.54		0.54	
	18550	1975			19.51	-95.86	0.51	4.86
FDD-B3 (10M)	19250	1715	17	-88	17.16		0.16	
	19575	1747.5			17.7		0.7	
	19900	1780			18.65	-93.95	1.65	5.95
FDD-B5 (10M)	20450	829	17	-91	17.05		0.05	
	20525	836.5			17.4		0.4	
	20600	844			17.3	-91.22	0.3	0.22
FDD-B7 (10M)	20800	2505	19	-91	18.69		-0.31	
	21100	2535			19.11		0.11	
	21400	2565			19.23	-95.05	0.23	4.05
FDD-B8 (10M)	21500	885	17	-91	17.23		0.23	
	21625	897.5			17.33		0.33	
	21750	910			17.32	-92.36	0.32	1.36
FDD-B20 (10M)	24200	837	16	-90	16.28		0.28	
	24300	847			16.07		0.07	
	24400	857			16.09	-90.11	0.09	0.11
FDD-B28 (10M)	27260	708	16	-91	16.1		0.1	
	27435	725.5			16.32		0.32	
	27610	743			16.13	-91.04	0.13	0.04
FDD-B38 (20M)	37850	2580	19	-91	19.41		0.41	
	38000	2595			19.03		0.03	
	38150	2610			19.01	-94.02	0.01	3.02
FDD-B40 (20M)	38750	2310	19	-91	19.23		0.23	
	39150	2350			19.09		0.09	
	39550	2390			19.01	-91.07	0.01	0.07
FDD-B41 (20M)	40340	2565	19	-91	19.06		0.06	
	40740	2605			19.11		0.11	
	41140	2645			19.05	-92.1	0.05	1.1

Antenna OTA test data

GE Version

Band	Channel	Test BW	SPEC (dBm)		OTA (dBm)		GAP	
			TRP	TIS	TRP	TIS	TRP	TIS
NR Band 1	L	10MHz	17	-91	19.23		2.23	
	M	10MHz			19.19		2.19	
	H	10MHz			19.06	-93.41	2.06	2.41
NR Band 3	L	10MHz	17	-91	17.21		0.21	
	M	10MHz			17.46		0.46	
	H	10MHz			17.23	-93.42	0.23	2.42
NR Band 28	L	10MHz	15	-89	15.54		0.54	
	M	10MHz			15.63		0.63	
	H	10MHz			15.81	-90.25	0.81	1.25
NR Band 41	L	100MHz	17	-83	18.14		1.14	
	M	100MHz			18.24		1.24	
	H	100MHz			18.18	-86.24	1.18	3.24
NR Band 77	L	100MHz	14	-80	18.29		4.29	
	M	100MHz			16.51		2.51	
	H	100MHz			17.63	-86.14	3.63	6.14
NR Band 78	L	100MHz	14	-80	18.14		4.14	
	M	100MHz			17.26		3.26	
	H	100MHz			17.25	-85.32	3.25	5.32
NR Band 79	L	100MHz	14	-80	18.24		4.24	
	M	100MHz			17.21		3.21	
	H	100MHz			16.15	-86.41	2.15	6.41

Antenna OTA test data

GE Version

Band	Channel	OTA (dBm)	
		new antenna	
		TRP	TIS
802.11b (11Mbps)	1	13.95	
	6	13.17	
	11	13.28	-83.19
802.11a (54Mbps)	36	10.25	
	64	10.78	
	165	10.58	-70.23
802.11ac (20Mbps)	36	7.31	
	100	7.41	
	161	7.28	-62.51
GPS (多星追踪)	-145.36		

Antenna OTA test data

GA Version

Band	Channel	FREQ (MHz)	SPEC (dBm)		OTA (dBm)		GAP	
			TRP	TIS	TRP	TIS	TRP	TIS
GSM_850	128	824.2	25	-103	25.87		0.87	
	190	836.6			27.06		2.06	
	251	848.8			26.73	-103.02	1.73	0.73
E-GSM 900	975	880.2	25	-103	26.3		1.3	
	38	897.4			26.84		1.84	
	124	914.8			26.62	-103.45	1.62	0.45
DCS 1800	512	1710.2	25	-103	25.21		0.21	
	698	1747.4			25.09		0.09	
	885	1784.8			25.87	-103.54	0.87	0.54
PCS 1900	512	1850.2	26	-103	26.56		0.56	
	661	1880			26.14		0.14	
	810	1909.8			26.49	-105.64	0.49	2.64
WCDMA_B2	9262	1852.4	19	-105	19.43		0.43	
	9400	1880			19.58		-0.58	
	9538	1907.6			19.63	-105.82	-0.63	0.82
WCDMA_B4	1312	1712.4	19	-105	19.27		-0.27	
	1412	1732.4			19.36		-0.36	
	1513	1752.6			19.18	-105.53	-0.18	2.53
WCDMA_B5	4132	826.4	17	-105	17.95		-0.95	
	4183	836.6			17.39		0.39	
	4233	846.6			17.17	-105.49	0.17	0.49

Antenna OTA test data

GA Version

Band	Channel	FREQ (MHz)	SPEC (dBm)		OTA (dBm)		GAP	
			TRP	TIS	TRP	TIS	TRP	TIS
FDD-B2 (10M)	18650	1855	19	-91	19.37		0.37	
	18900	1880			19.71		0.71	
	19150	1905			19.19	-94.73	0.19	3.73
FDD-B25 (10M)	26090	1855	19	-91	19.97		0.97	
	26365	1882.5			19.25		0.25	
	26640	1910			19.23	-94.71	0.23	3.71
FDD-B4 (10M)	20000	1715	19	-91	19.97		0.97	
	20175	1732.5			19.25		-0.25	
	20350	1750			19.23	-95.31	-0.23	4.31
FDD-B66 (10M)	132022	1715	19	-91	19.05		1.05	
	132322	1745			18.7		0.7	
	132622	1775			19.01	-94.6	1.01	3.6
FDD-B5 (10M)	20450	829	17	-91	17.91		0.91	
	20525	836.5			17.49		0.49	
	20600	844			17.28	-91.98	0.28	0.98
FDD-B7 (10M)	20800	2505	19	-91	18.27		0.73	
	21100	2535			19.2		0.8	
	21400	2565			19.69	-95.04	0.31	4.04
FDD-B12 (10M)	23060	704	16	-91	16.68		0.69	
	23095	707.5			16.23		0.23	
	23130	711			16.34	-91.94	0.34	0.94
FDD-B13 (20M)			16	-90				
	23230	782			16.33	-90.8	0.33	0.8
FDD-B14 (20M)			16	-90				
	23330	793			16.26	-90.08	0.26	0.08
FDD-B17 (20M)	23780	709	16	-90	16.42		0.42	
	23790	710			16.26		0.26	
	23800	711			16.41	-90.23	0.41	0.23
FDD-B28 (20M)	27260	708	16	-90	16.53		0.53	
	27435	725.5			16.67		0.67	
	27610	743			16.15	-90.31	0.15	0.31
TDD-B38 (20M)	37850	2580	19	-91	19.17		0.17	
	38000	2595			19.2		0.2	
	38150	2610			19.62	-92.26	0.62	1.26
TDD-B41 (20M)	40340	2565	19	-91	19.35		0.35	
	40740	2605			19.74		0.74	
	41140	2645			19.55	-92.1	0.55	1.1
FDD-B71 (10M)	133172	668	16	-88	16.21		0.21	
	133297	680.5			16.15		0.15	
	133422	693			16.03	-88.11	0.03	0.11

Antenna OTA test data

GA Version

Band	Channel	Test BW	SPEC (dBm)		OTA (dBm)		GAP	
			TRP	TIS	TRP	TIS	TRP	TIS
NR Band 2	L	10MHz	17	-91	17.9		0.9	
	M	10MHz			18.62		1.62	
	H	10MHz			18.37	-94.23	1.37	3.23
NR Band 25	L	10MHz	17	-91	17.45		0.45	
	M	10MHz			18.42		1.42	
	H	10MHz			18.26	-94.13	1.26	3.13
NR Band 5	L	10MHz	15	-89	15.04		0.04	
	M	10MHz			15.15		0.15	
	H	10MHz			15.31	-89.72	0.31	0.72
NR Band 12	L	10MHz	15	-83	15.15		0.15	
	M	10MHz			15.49		0.49	
	H	10MHz			15.23	-87.88	0.23	4.88
NR Band 38	L	20MHz	17	-80	18.19		1.19	
	M	20MHz			18.09		1.09	
	H	20MHz			18.04	-90.32	1.04	10.32
NR Band 41	L	100MHz	17	-80	17.15		0.15	
	M	100MHz			17.25		0.25	
	H	100MHz			17.03	-85.5	0.03	5.5
NR Band66	L	10MHz	17	-89	17.5		0.5	
	M	10MHz			17.77		0.77	
	H	10MHz			18.08	-90.16	1.08	1.16
NR Band77	L	100MHz	15	-80	18.02		3.02	
	M	100MHz			15.52		0.52	
	H	100MHz			17.18	-85.77	2.18	5.77
NR Band78	L	100MHz	15	-80	18.84		3.84	
	M	100MHz			17.88		2.88	
	H	100MHz			15.62	-86.63	0.62	6.63
NR Band71	L	10MHz	15	-82	15.14		0.14	
	M	10MHz			15.21		0.21	
	H	10MHz			15.03	-85.24	0.03	3.24

Antenna OTA test data

GA Version

Band	Channel	OTA (dBm)	
		new antenna	
		TRP	TIS
802.11b (11Mbps)	1	13.28	
	6	13.33	
	11	13.41	-83.07
802.11a (54Mbps)	36	10.88	
	64	11.04	
	165	10.91	-70.29
802.11ac (20Mbps)	36	7.77	
	100	7.51	
	161	7.45	-62.33
GPS (多星追踪)	-145.43		