

Shanghai Sunnyway Communication Technology Limited Company

Temporary antenna specification

Customer: GUANGYI		The project: FH09
Operating frequency band: BT/WIFI		
Motherboard version:		
Shangyuan material specifications		
Specifications and models	Shangyuan material number	Customer part number
antenna 2	SH22098IB87-1	
antenna 2	SH22098IB87-2	

The record of project changes			
Date of preparation/change	Changes	Change of person	version

Sunnyway counter-signature bar				
Research and development	ME:	Auditor:	QE:	Approver:
	RF:	Auditor:		
Client Counter-signature bar				
EE	PM		RF	QE

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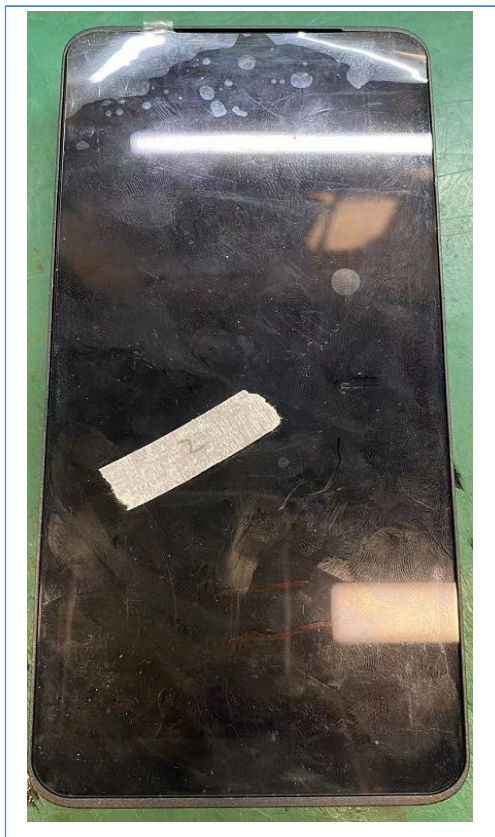
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1. Project information

Machine information



Antenna information

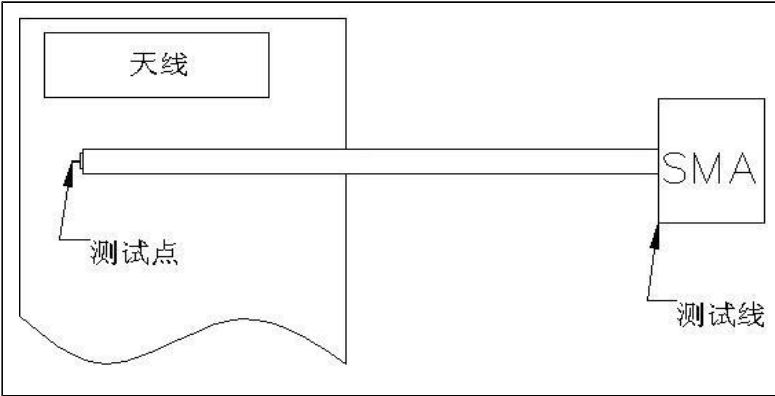
	版本
ANT2	
ANT3	

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.

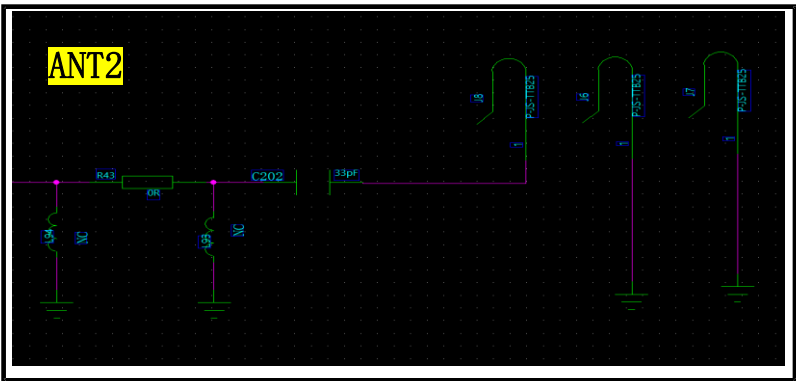
2. Test fixtures

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

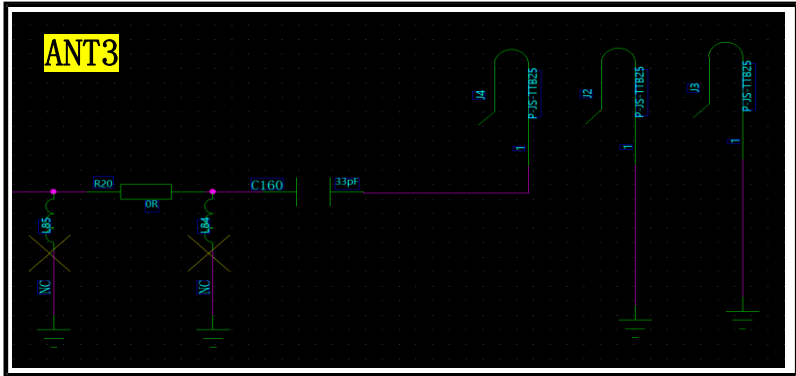
How to make: The prototyping mechanism is made of a 50 ohm coaxial cable, one end is connected to the test point at the back of the matching circuit of the prototype motherboard (the front of the RF test hole), and the other end is connected to the SMA connector. The schematic diagram is as follows:



3. Matching circuits



Element	Value	Specificatio n
C202	0Ω	
L93	1PF	村田
R43	0Ω	
L94	NC	



Element	Value	规格
C160	0Ω	
L84	NC	
R20	0Ω	
L85	NC	

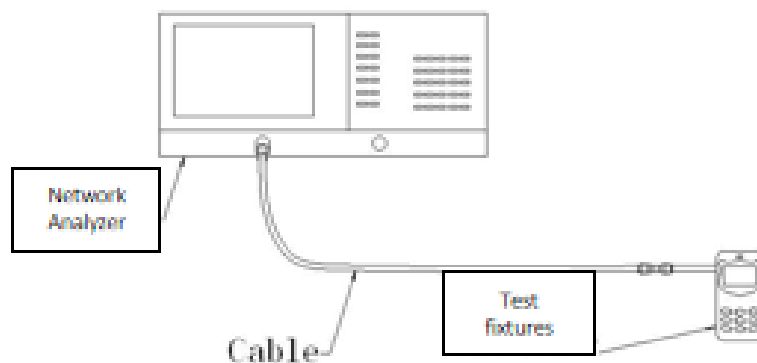
4. S11 test

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.

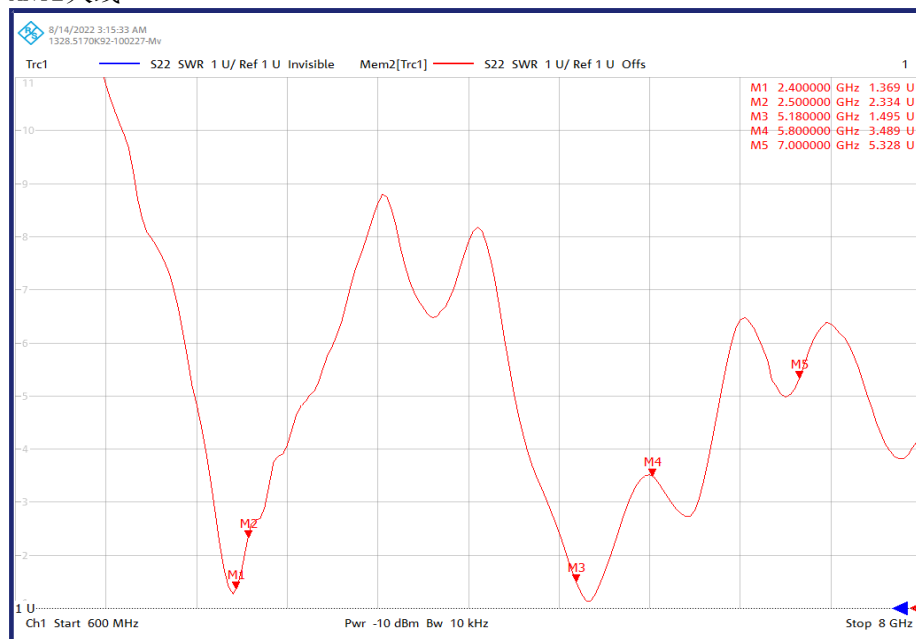
The test diagram is as follows:



Test the schematic

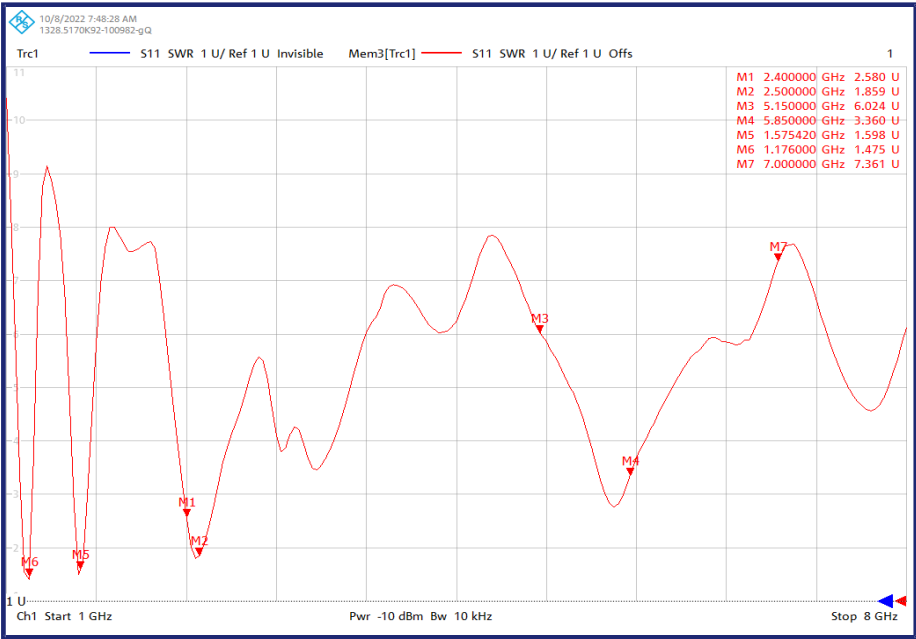
4.2 S11 parameter

ANT2天线



	main
frequency (MHz)	SWR
2400	1.3
2500	2.3
5180	1.4
5800	3.4
7000	5.32

ANT3天线



	main
frequency (MHz)	SWR
1176	1.4
1575.42	1.5
2400	2.5
2500	1.8
5150	6
5850	3.3
7000	3.3

5 Darkroom test data

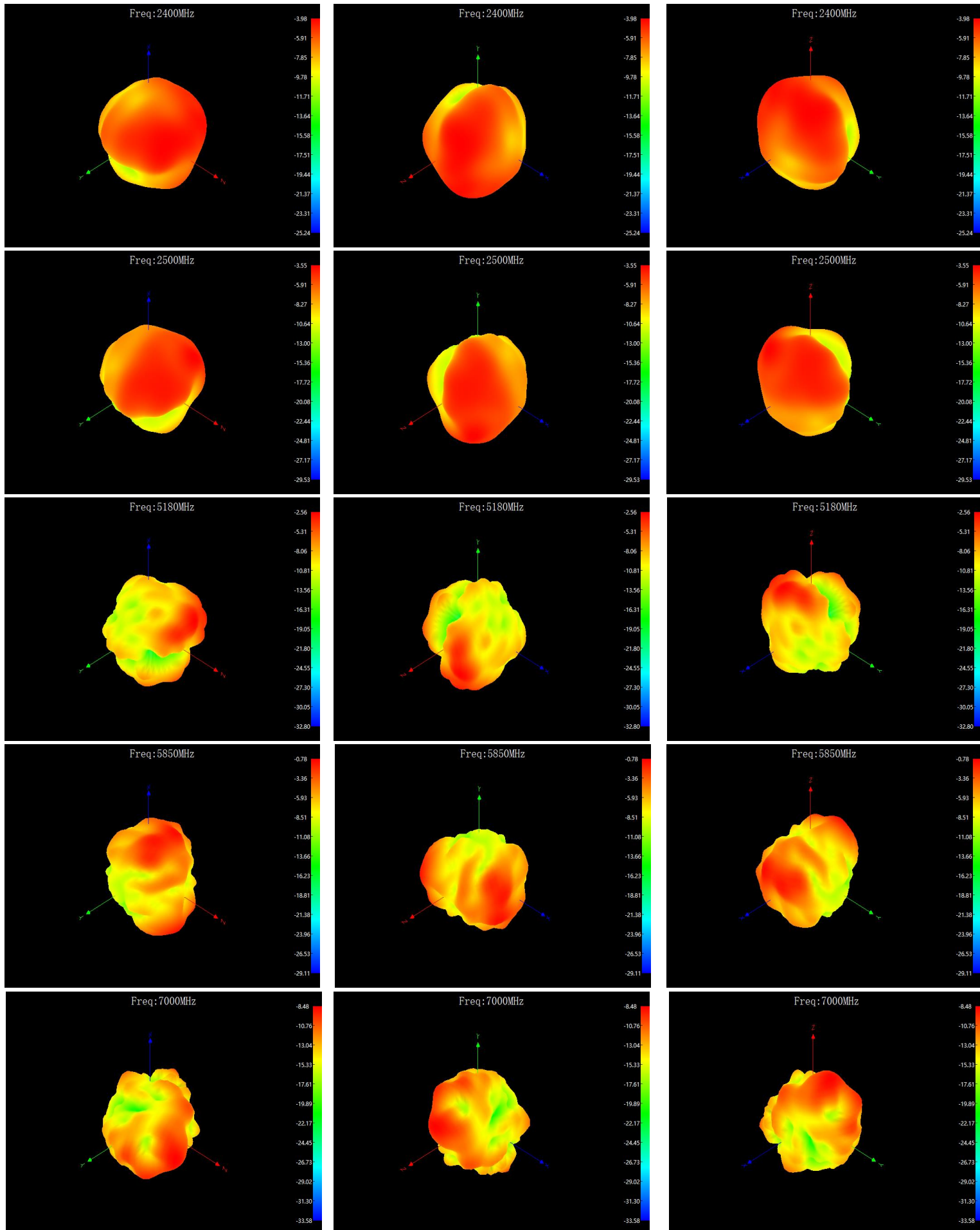
Test system: Shielded darkroom
Test environment: temperature 22°C±3°C, humidity 50%±15%
Test equipment: When testing passive data, use the Network Analyzer Agilent E5062C When testing active data, the Comprehensive Tester Agilent 8960 /CMW500/E4438C is used

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Antenna ANT2 passive efficiency

5.1 Passive test data

Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)
2400	17.85	-7.48	-3.98	5390	12.62	-8.99	-4.7	5740	13.22	-8.79	-2.43	6230	11.34	-9.45	-2.01	6580	9.75	-10.11	-7.75	6930	7.94	-11	-7.63
2410	18.4	-7.35	-4.1	5400	12.62	-8.99	-4.94	5750	13.25	-8.78	-2.49	6240	11.23	-9.5	-2.68	6590	9.38	-10.28	-7.82	6940	7.9	-11.02	-7.82
2420	19.22	-7.16	-3.55	5410	12.82	-8.92	-4.5	5760	13.3	-8.76	-2.45	6250	11.6	-9.36	-2.48	6600	9.58	-10.19	-7.99	6950	7.87	-11.04	-8.04
2430	18.96	-7.22	-2.1	5420	12.84	-8.91	-4.75	5770	14	-8.54	-2.42	6260	11.73	-9.31	-2.5	6610	9.41	-10.26	-7.64	6960	7.64	-11.17	-8.36
2440	19.29	-7.15	-3.54	5430	12.64	-8.98	-4.63	5780	15.11	-8.21	-2.56	6270	11.29	-9.47	-2.43	6620	9.61	-10.17	-7.38	6970	7.72	-11.12	-8.15
2450	19.76	-7.04	-3.37	5440	11.38	-9.44	-4.96	5790	14.68	-8.33	-2.62	6280	12.66	-8.98	-2.76	6630	9.57	-10.19	-7.91	6980	7.74	-11.11	-8.24
2460	18.84	-7.25	-2.94	5450	11.05	-9.57	-5.31	5800	14.68	-8.33	-2.75	6290	12.39	-9.07	-2.72	6640	9.46	-10.24	-8.05	6990	7.77	-11.1	-8.14
2470	19.72	-7.05	-3.35	5460	10.91	-9.62	-5.13	5810	13.28	-8.77	-2.98	6300	11.67	-9.33	-3.18	6650	9.2	-10.36	-8.05	7000	7.77	-11.1	-8.48
2480	20.24	-6.94	-3.34	5470	11.17	-9.52	-4.83	5820	14.09	-8.51	-2.81	6310	11.26	-9.48	-3.39	6660	8.85	-10.53	-8.5				
2490	19.72	-7.05	-2.9	5480	11.3	-9.47	-4.88	5830	15.08	-8.22	-2.48	6320	11.55	-9.37	-3.64	6670	8.64	-10.63	-8.64				
2500	20.81	-6.82	-3.55	5490	11.78	-9.29	-4.94	5840	14.45	-8.4	-2.49	6330	11.44	-9.42	-3.67	6680	8.51	-10.7	-8.47				
5150	15.96	-7.97	-3.17	5500	11.5	-9.39	-5.21	5850	16.18	-7.91	-2.78	6340	10.81	-9.66	-4.13	6690	8.73	-10.59	-8.13				
5160	16.37	-7.86	-3.1	5510	11.43	-9.42	-5.42	6000	18.03	-7.44	-1.6	6350	10.32	-9.86	-4.7	6700	8.71	-10.6	-8.32				
5170	16.6	-7.8	-2.9	5520	11.35	-9.45	-5.5	6010	17.7	-7.52	-1.9	6360	9.93	-10.03	-4.83	6710	8.62	-10.64	-8.21				
5180	17.78	-7.5	-2.56	5530	11.6	-9.36	-5.38	6020	17.82	-7.49	-1.71	6370	10.17	-9.93	-4.53	6720	8.72	-10.59	-8.44				
5190	16.98	-7.7	-2.91	5540	11.66	-9.33	-5.38	6030	17.95	-7.46	-1.64	6380	10.78	-9.67	-4.7	6730	8.83	-10.54	-7.87				
5200	16.26	-7.89	-3.16	5550	11.73	-9.31	-5.47	6040	16.98	-7.7	-1.83	6390	11.3	-9.47	-4.47	6740	8.91	-10.5	-7.85				
5210	15.14	-8.2	-3.38	5560	11.4	-9.43	-5.55	6050	15.78	-8.02	-2.09	6400	11.32	-9.46	-4.53	6750	9.02	-10.45	-7.54				
5220	15.49	-8.1	-3.45	5570	11.35	-9.45	-5.5	6060	15.7	-8.04	-1.99	6410	10.76	-9.68	-5.22	6760	8.92	-10.5	-7.36				
5230	16.03	-7.95	-3.39	5580	11.76	-9.3	-5.24	6070	15.21	-8.18	-1.96	6420	10.39	-9.83	-5.29	6770	8.66	-10.62	-7.4				
5240	16.29	-7.88	-3.32	5590	12.1	-9.17	-5.07	6080	15.7	-8.04	-1.88	6430	10.12	-9.95	-5.44	6780	8.43	-10.74	-7.73				
5250	15.85	-8	-3.39	5600	12.86	-8.91	-4.53	6090	15.81	-8.01	-1.79	6440	9.97	-10.01	-5.62	6790	8.37	-10.77	-7.21				
5260	14.69	-8.33	-3.67	5610	13.23	-8.78	-4.44	6100	14.96	-8.25	-1.96	6450	10.18	-9.92	-5.66	6800	8.11	-10.91	-7.32				
5270	14.62	-8.35	-3.87	5620	12.61	-8.99	-4.65	6110	13.03	-8.85	-2.23	6460	10.08	-9.97	-5.77	6810	8.19	-10.87	-7.27				
5280	14.86	-8.28	-4.1	5630	12.41	-9.06	-4.73	6120	12.33	-9.09	-2.54	6470	8.96	-10.48	-6.79	6820	8.11	-10.91	-6.71				
5290	15.52	-8.09	-3.79	5640	12.3	-9.1	-4.58	6130	12.33	-9.09	-2.82	6480	8.72	-10.59	-6.92	6830	8.18	-10.87	-7				
5300	15.96	-7.97	-3.65	5650	12.82	-8.92	-4.14	6140	12.53	-9.02	-2.34	6490	8.75	-10.58	-7.22	6840	8.01	-10.96	-7.47				
5310	15.35	-8.14	-3.81	5660	13.17	-8.8	-3.72	6150	13.34	-8.75	-2.53	6500	9.03	-10.44	-7.19	6850	8.09	-10.92	-7.09				
5320	14.35	-8.43	-4.04	5670	13.35	-8.75	-3.59	6160	11.75	-9.3	-2.81	6510	8.9	-10.51	-7.15	6860	8.03	-10.95	-7.37				
5330	13	-8.86	-4.34	5680	13.11	-8.82	-3.68	6170	11.78	-9.29	-2.88	6520	8.92	-10.5	-7.23	6870	8.11	-10.91	-6.95				
5340	12.79	-8.93	-4.34	5690	12.91	-8.89	-3.84	6180	9.93	-10.03	-3.24	6530	8.3	-10.81	-7.53	6880	8.06	-10.94	-7.04				
5350	12.85	-8.91	-4.12	5700	13.29	-8.76	-3.51	6190	10.38	-9.84	-3.25	6540	9.75	-10.11	-7.87	6890	8	-10.97	-7.23				
5360	12.82	-8.92	-3.86	5710	12.66	-8.98	-3.07	6200	10.94	-9.61	-3	6550	9.47	-10.24	-7.73	6900	7.7	-11.14	-7.7				
5370	12.08	-9.18	-4.07	5720	12.26	-9.12	-2.84	6210	10.94	-9.61	-3.2	6560	9.81	-10.08	-7.57	6910	7.75	-11.11	-7.54				
5380	12.67	-8.97	-4.32	5730	13.58	-8.67	-2.3	6220	10.09	-9.96	-3.19	6570	10	-10	-7.39	6920	7.69	-11.14	-8.02				

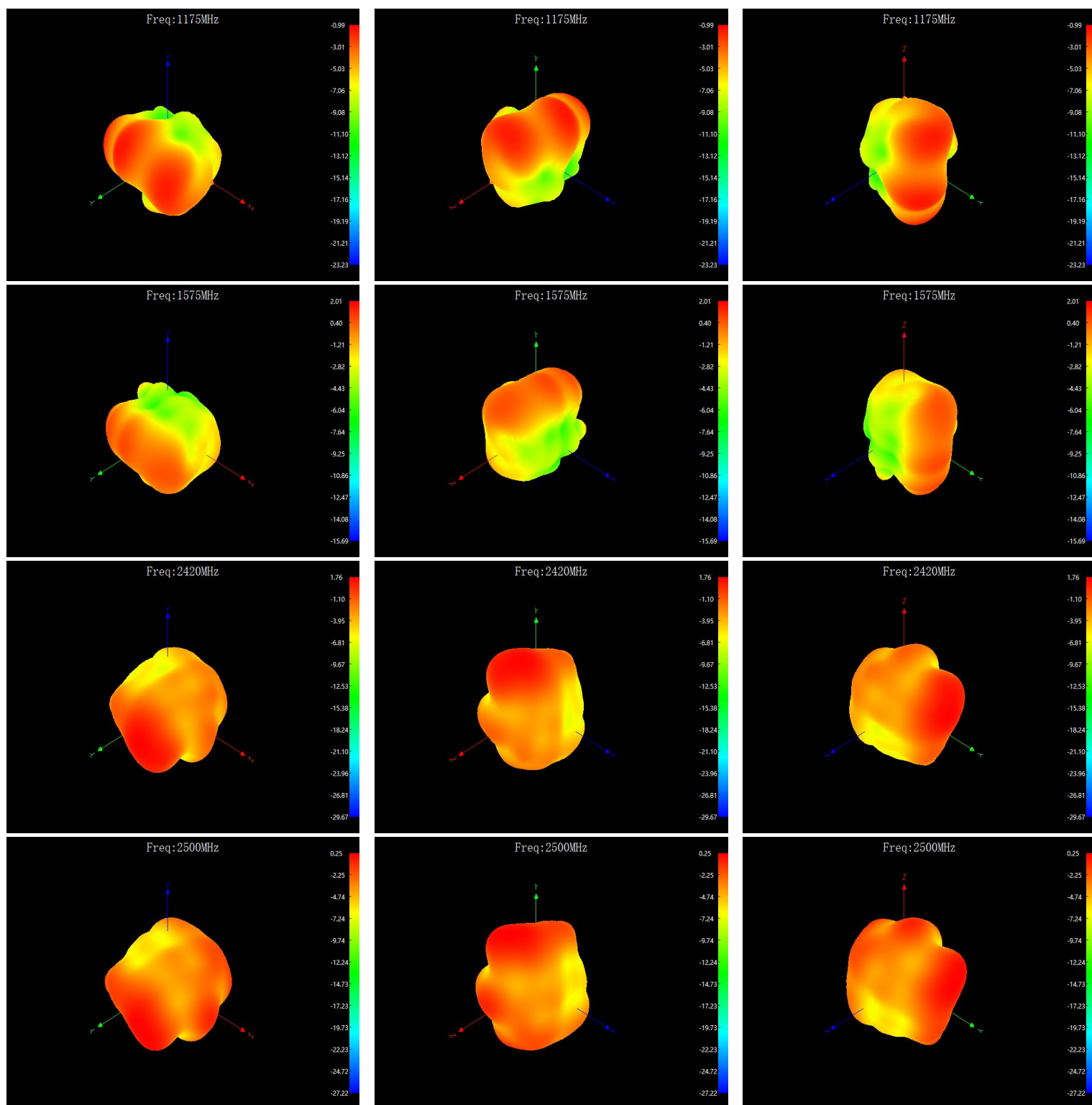
Shanghai Shangyuan Communication Technology Co., Ltd. antenna recognition
ANT2antenna pattern



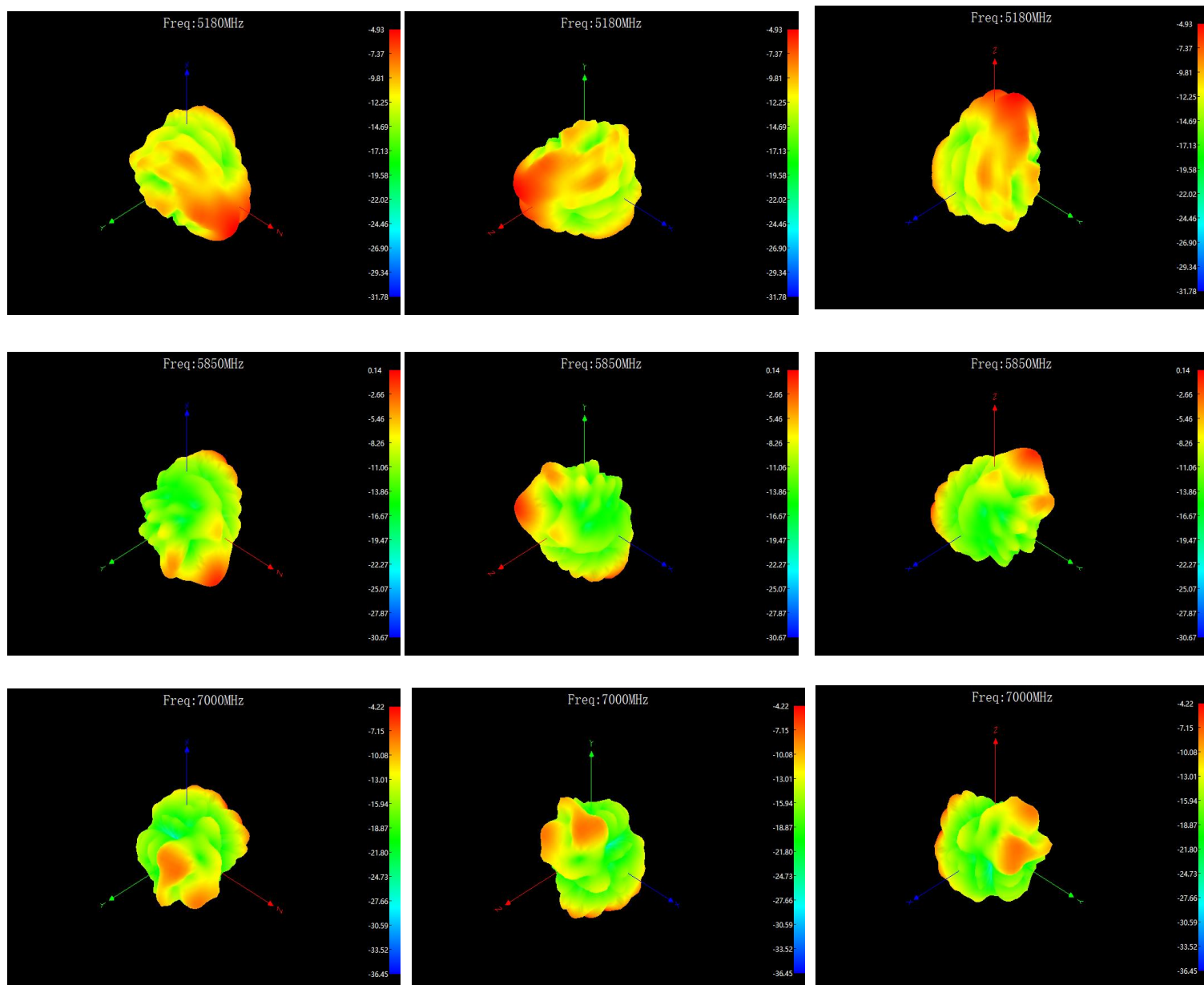
Shanghai Shangyuan Communication Technology Co., Ltd. antenna recognition
Antenna ANT3 passive efficiency

Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain	Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)	(MHz)	(%)	(dB)	(dBi)
1175	23.56	-6.28	-1.17	5370	16.78	-7.75	-2.27	5720	19.13	-7.18	-0.88	6210	8.98	-10.47	-5.01	6560	7.31	-11.36	-7.3	6910	5.92	-12.28	-3.92
1575	40.28	-3.95	0	5380	15.84	-8	-2.58	5730	19.66	-7.06	-0.53	6220	8.6	-10.66	-5.23	6570	7.33	-11.35	-7.21	6920	5.88	-12.31	-4.19
2400	37.43	-4.27	-1.72	5390	15.23	-8.17	-2.85	5740	18.21	-7.4	-0.88	6230	8.37	-10.77	-5.69	6580	7.19	-11.43	-7.52	6930	6.18	-12.09	-4.34
2410	39.56	-4.03	-1.85	5400	15.59	-8.07	-2.72	5750	17.11	-7.67	-1.27	6240	7.88	-11.03	-6.75	6590	7.09	-11.49	-7.94	6940	6.28	-12.02	-4.01
2420	40.63	-3.91	-1.83	5410	16.35	-7.86	-2.36	5760	16.3	-7.88	-1.4	6250	7.91	-11.02	-6.63	6600	7.24	-11.4	-8.27	6950	6.37	-11.96	-3.93
2430	40.18	-3.96	-1.81	5420	16.83	-7.74	-2.55	5770	16.46	-7.84	-1.33	6260	7.88	-11.03	-7.12	6610	7.24	-11.4	-7.96	6960	6.17	-12.1	-4.58
2440	42.36	-3.73	-1.63	5430	16.8	-7.75	-2.43	5780	17.02	-7.69	-1.03	6270	8.08	-10.93	-7.01	6620	7.51	-11.24	-7.72	6970	6.39	-11.94	-4.31
2450	44.16	-3.55	-1.16	5440	15.72	-8.04	-2.77	5790	16.25	-7.89	-1.3	6280	7.88	-11.03	-7.33	6630	7.61	-11.19	-7.56	6980	6.6	-11.8	-4.01
2460	40.36	-3.94	-0.86	5450	15.64	-8.06	-3.13	5800	16.02	-7.95	-1.05	6290	7.84	-11.06	-7.48	6640	7.61	-11.19	-7.58	6990	6.68	-11.75	-4.25
2470	42.07	-3.76	-1.23	5460	15.76	-8.02	-2.88	5810	14.55	-8.37	-1.69	6300	7.72	-11.12	-7.52	6650	7.65	-11.16	-7.58	7000	6.76	-11.7	-4.22
2480	42.07	-3.76	-1.22	5470	16.72	-7.77	-2.34	5820	15.07	-8.22	-1.21	6310	7.7	-11.14	-7.44	6660	7.56	-11.21	-7.98				
2490	39.89	-3.99	-1.2	5480	17.5	-7.57	-2.35	5830	15.59	-8.07	-0.92	6320	7.88	-11.03	-6.94	6670	7.6	-11.19	-7.67				
2500	39.72	-4.01	0.02	5490	17.19	-7.65	-2.33	5840	15.86	-8	-0.46	6330	7.77	-11.1	-7.11	6680	7.59	-11.2	-7.65				
5150	11.21	-9.5	-5.48	5500	17.3	-7.62	-2.15	5850	16.94	-7.71	0.6	6340	7.67	-11.15	-7	6690	7.81	-11.07	-7.11				
5160	11.46	-9.41	-5.44	5510	16.89	-7.72	-2.15	6000	13.53	-8.69	-1	6350	7.53	-11.23	-7.61	6700	7.91	-11.02	-6.5				
5170	11.82	-9.27	-5.1	5520	16.99	-7.7	-2.18	6010	13.15	-8.81	-2.69	6360	7.43	-11.29	-7.74	6710	7.82	-11.07	-7.24				
5180	12.35	-9.08	-4.93	5530	17.62	-7.54	-1.84	6020	13	-8.86	-2.85	6370	7.51	-11.24	-7.5	6720	7.93	-11.01	-6.72				
5190	12.21	-9.13	-5.17	5540	17.91	-7.47	-1.73	6030	12.73	-8.95	-2.85	6380	7.62	-11.18	-7.31	6730	8.03	-10.95	-7.2				
5200	12.01	-9.2	-5.25	5550	18.09	-7.43	-1.72	6040	12.13	-9.16	-3.25	6390	7.81	-11.07	-6.83	6740	8.21	-10.86	-6.9				
5210	11.62	-9.35	-5.57	5560	17.47	-7.58	-1.85	6050	11.31	-9.47	-3.76	6400	7.82	-11.07	-7.03	6750	8.49	-10.71	-6.21				
5220	11.85	-9.26	-5.32	5570	17.25	-7.63	-1.83	6060	11.07	-9.56	-3.92	6410	7.59	-11.2	-7.32	6760	7.05	-11.52	-6.18				
5230	12.28	-9.11	-5	5580	17.53	-7.56	-1.81	6070	10.7	-9.71	-4.04	6420	7.44	-11.28	-7.62	6770	6.94	-11.59	-6.07				
5240	12.69	-8.97	-4.89	5590	18.12	-7.42	-1.63	6080	10.74	-9.69	-3.63	6430	7.35	-11.34	-7.63	6780	6.95	-11.58	-5.56				
5250	12.67	-8.97	-4.89	5600	19.55	-7.09	-1.16	6090	10.53	-9.78	-3.95	6440	7.32	-11.35	-7.71	6790	7.13	-11.47	-4.93				
5260	12.36	-9.08	-4.92	5610	20.14	-6.96	-0.86	6100	10.19	-9.92	-3.99	6450	7.51	-11.24	-7.3	6800	7.11	-11.48	-5.21				
5270	12.6	-9	-4.96	5620	18.84	-7.25	-1.23	6110	9.44	-10.25	-4.72	6460	7.56	-11.21	-7.05	6810	7.38	-11.32	-4.47				
5280	13.13	-8.82	-4.54	5630	18.58	-7.31	-1.22	6120	9.08	-10.42	-5.02	6470	7.16	-11.45	-7.45	6820	7.53	-11.23	-4.01				
5290	14.06	-8.52	-4.1	5640	18.52	-7.32	-1.2	6130	9.27	-10.33	-4.52	6480	7.2	-11.43	-7.7	6830	7.8	-11.08	-3.74				
5300	14.91	-8.27	-3.73	5650	19.52	-7.1	-0.84	6140	9.39	-10.27	-4.39	6490	7.33	-11.35	-7.5	6840	7.71	-11.13	-4.12				
5310	15.12	-8.2	-3.46	5660	20	-6.99	-0.77	6150	9.74	-10.11	-3.95	6500	7.47	-11.27	-7.53	6850	7.99	-10.97	-3.51				
5320	15.07	-8.22	-3.54	5670	19.96	-7	-0.62	6160	9.27	-10.33	-4.66	6510	7.51	-11.24	-7.03	6860	7.86	-11.05	-3.58				
5330	14.95	-8.25	-3.41	5680	19.26	-7.15	-0.89	6170	9.42	-10.26	-4.16	6520	7.56	-11.21	-7.87	6870	8.08	-10.93	-3.34				
5340	15.52	-8.09	-3.23	5690	18.58	-7.31	-1.05	6180	8.85	-10.53	-4.69	6530	7.31	-11.36	-7.29	6880	7.95	-11	-3.21				
5350	16.19	-7.91	-2.71	5700	18.27	-7.38	-0.96	6190	8.94	-10.49	-4.55	6540	7.26	-11.39	-7.82	6890	7.94	-11	-3.29				
5360	16.83	-7.74	-2.41	5710	19.39	-7.12	-0.82	6200	9.15	-10.39	-4.56	6550	7.08	-11.5	-7.54	6900	7.35	-11.34	-4.12				

Shanghai Shangyuan Communication Technology Co., Ltd. antenna recognition
ANT3antenna pattern



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5.2 Active test data

Triple three in one triad ternion active test data (free space, brigh __ 100%)

频段	OTA (dB)		频段	OTA (dB)	
	TRP	TIS		TRP	TIS
WiFi 2.4G 11b (11M)	14.88		WiFi 2.4G 11n (65M)	15.26	
	12.44			13.06	
	12.56	-79.49		13.28	-66.58
WiFi 2.4G 11G (54M)	15.29		WiFi 5G 11a (54M)	8.32	
	12.7			9.55	
	14.09	-70.82		9.76	-66.65

6. 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)	量产标准
ANT2	VSWR (Mass production performance) <VSWR(Acknowledge performance)+0.5
ANT3	VSWR (Mass production performance) <VSWR(Acknowledge performance)+0.5