

Shanghai Sunnyway Communication Technology Limited Company

Temporary antenna specification

Customer: SUNMI		The project: K2S MINI
Operating frequency band: WIFI B/G/N/A		
Motherboard version: MC509_MB_V1.0_PCB		
Shangyuan material specifications		
Specifications and models	Shangyuan material number	Customer part number
WIFI0	SH23175IB77-1	
WIFI1	SH23175IB77-2	

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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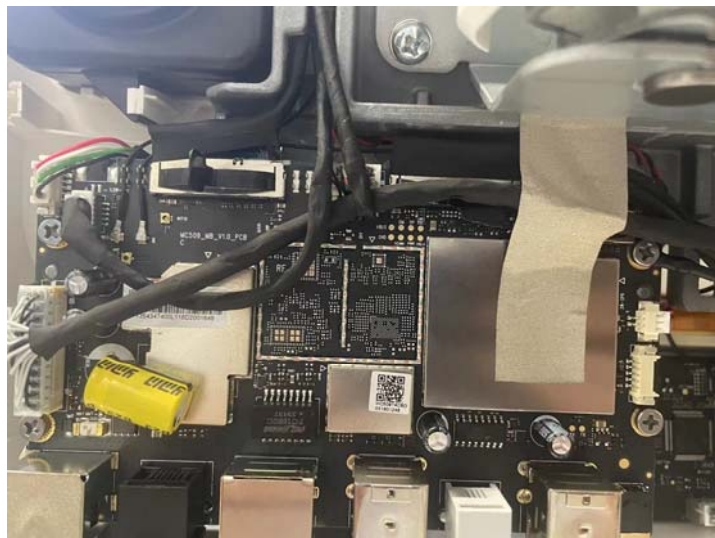
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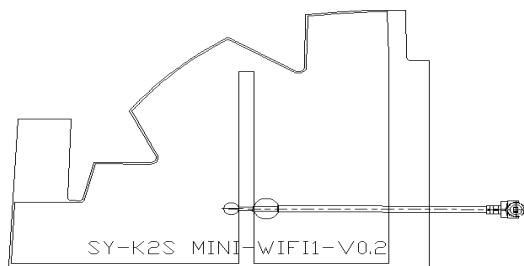
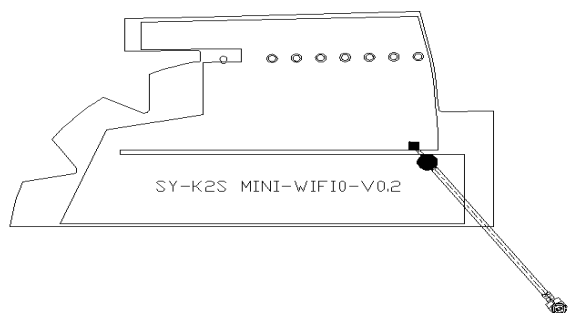
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1. Project information

Machine information



Antenna information



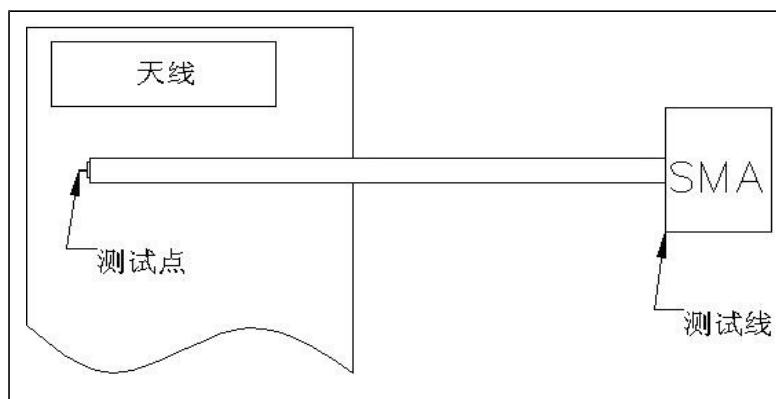
	Version
WIFI-0	SY-K2S MINI-WIFI0-V0.2
WIFI-1	SY-K2S MINI-WIFI1-V0.2
Motherboard version	MC509_MB_V1.0_PCB

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.

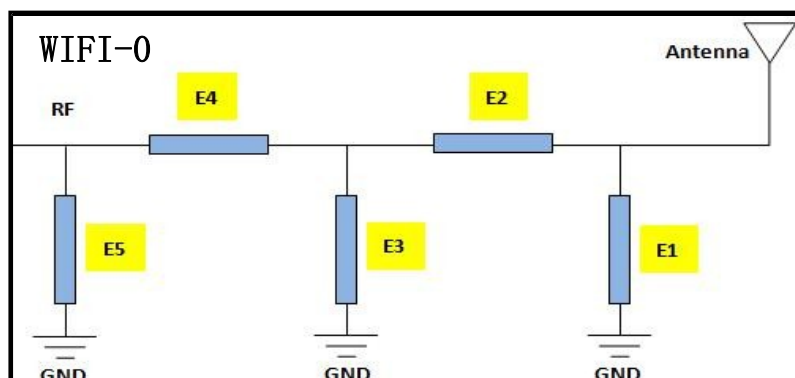
2. Test fixtures

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

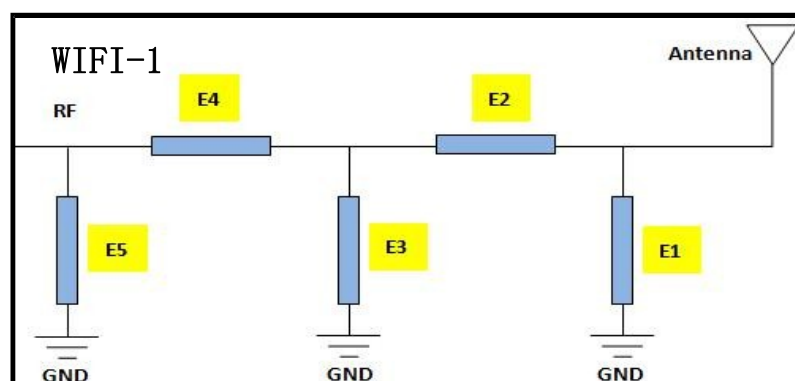
How to make: The prototyping mechanism is made of a 50 ohm coaxial cable, one end is connected to the test point at the back of the matching circuit of the prototype motherboard (the front of the RF test hole), and the other end is connected to the SMA connector. The schematic diagram is as follows:



3. Matching circuits



Element	Value	Specification
E1	N/A	
E2	0 ohm	
E3	N/A	
E4	0 ohm	
E5	N/A	



Element	Value	Specification
E1	N/A	
E2	0 ohm	
E3	N/A	
E4	0 ohm	
E5	N/A	

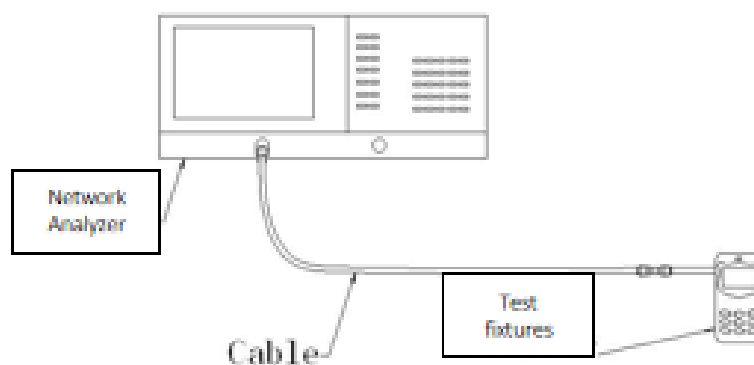
4. S11 test

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.

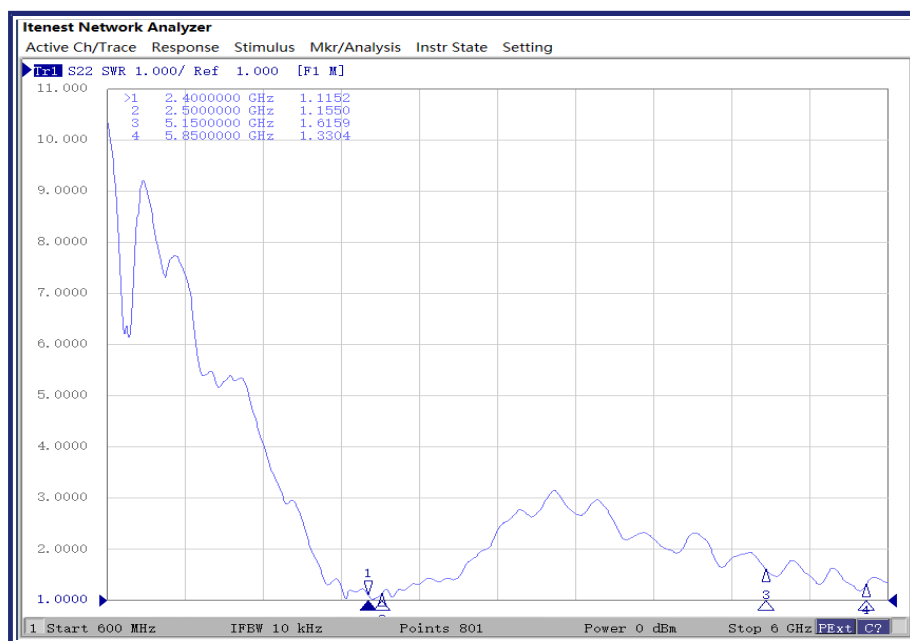
The test diagram is as follows:



Test the schematic

4.2 S11 parameter

WIFI-0



	main
frequency (MHz)	SWR
2400	1.1
2500	1.1
5150	1.6
5850	1.3

WIFI-1



Main Antenna	
Frequency (MHz)	VSWR
2400	2.2
2500	1.8
5150	1.1
5850	1.8

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

5.1 Passive test data

Passive efficiency of WIFI-0 antenna

frequency (MHz)	Efficiency (dB)	Efficiency (%)	frequency (MHz)	Efficiency (dB)	Efficiency (%)
2400	-3.41	45.6	5150	-3.61	43.6
2410	-3.27	47.1	5200	-3.38	45.94
2420	-3.05	49.55	5250	-3.46	45.06
2430	-2.98	50.35	5300	-3.4	45.7
2440	-2.96	50.58	5350	-3.36	46.13
2450	-2.95	50.7	5400	-3.29	46.85
2460	-3.21	47.75	5450	-3.44	45.29
2470	-3.18	48.08	5500	-3.63	43.33
2480	-3.28	46.99	5550	-3.73	42.34
2490	-3.52	44.46	5600	-3.61	43.6
2500	-3.46	45.08	5650	-3.53	44.38
			5700	-3.52	44.49
			5750	-3.8	41.72
			5800	-3.74	42.23
			5850	-3.8	41.72

Passive efficiency of WIFI-1 antenna

frequency (MHz)	Efficiency (dB)	Efficiency (%)	frequency (MHz)	Efficiency (dB)	Efficiency (%)
2400	-2.93	50.89	5150	-3.77	41.93
2410	-2.84	51.94	5200	-3.68	42.88
2420	-2.6	54.95	5250	-3.43	45.41
2430	-2.68	53.98	5300	-3.48	44.92
2440	-2.61	54.81	5350	-3.73	42.38
2450	-2.57	55.37	5400	-3.63	43.39
2460	-2.87	51.68	5450	-3.66	43.03
2470	-2.67	54.12	5500	-3.61	43.59
2480	-2.62	54.67	5550	-3.78	41.89
2490	-2.84	51.94	5600	-3.75	42.18
2500	-2.98	50.37	5650	-3.73	42.33
			5700	-3.83	41.37
			5750	-3.87	41.03
			5800	-3.58	43.84
			5850	-3.8	41.64

5.2 Active test data

Main antenna active testdate (Free space, screen off)

Technology	Mode	Channel		Frequency		Requirement		Conducted Data		Test Data	
		uplink	downlink	uplink	downlink	Free Space		Free Space		Free Space	
						TRP	TIS	TRP	TIS	TRP	TIS
WiFi	802.11b (11Mbps)	1	1	2412	2412	12	-83	15.7		12.67	-85.16
		6	6	2437	2437	12	-83	16.3		13.88	-84.72
		11	11	2462	2462	12	-83	15.5		13.02	-84.52
	802.11g (54Mbps)	1	1	2412	2412	10	-70	16		12.33	-71.85
		6	6	2437	2437	10	-70	17.2		13	-72.03
		11	11	2462	2462	10	-70	16.04		12.28	-71.7
	802.11n (MCS7-65Mbps)	1	1	2412	2412	8	-68	15.9		12.36	-70.63
		6	6	2437	2437	8	-68	16.2		14.92	-70.82
		11	11	2462	2462	8	-68	15.6		12.3	-70.59
	802.11a (54Mbps)	36	36	5180	5180	9	-70	14.91		12.61	-72.19
		149	149	5745	5745	9	-70	14.7		12.17	-72.28
		165	165	5825	5825	9	-70	14.23		11.85	-72.21

WIFI-1 antenna active test data (free space, off screen)

Technology	Mode	Channel		Frequency		Requirement		Conducted Data		Test Data	
		uplink	downlink	uplink	downlink	Free Space		Free Space		Free Space	
						TRP	TIS	TRP	TIS	TRP	TIS
WiFi	802.11b (11Mbps)	1	1	2412	2412	12	-83	15.28		12.05	-84.05
		6	6	2437	2437	12	-83	15.33		12.1	-83.59
		11	11	2462	2462	12	-83	15.38		12.53	-83.08
	802.11g (54Mbps)	1	1	2412	2412	10	-70	14.81		12.26	-71.11
		6	6	2437	2437	10	-70	14.52		12.39	-70.87
		11	11	2462	2462	10	-70	14.32		11.01	-70.77
	802.11n (MCS7-65Mbps)	1	1	2412	2412	8	-68	15.68		11.41	-68.72
		6	6	2437	2437	8	-68	15.55		13.09	-68.53
		11	11	2462	2462	8	-68	16		12.01	-67.33
	802.11a (54Mbps)	36	36	5180	5180	9	-70	13.82		12.24	-72.19
		149	149	5745	5745	9	-70	13.17		11.75	-72.33
		165	165	5825	5825	9	-70	13.52		11.78	-72.28

5.2 Active test data

WIFI Combined Antenna Active Test Data (Free Space, Off Screen)

Technology	Mode	Channel		Frequency		Requirement		Test Data	
						Free Space		Free Space	
		uplink	downlink	uplink	downlink	TRP	TIS	TRP	TIS
WiFi	802.11b (11Mbps)	1	1	2412	2412	12	-83	15.91	-87.33
		6	6	2437	2437	12	-83	16.92	-86.74
		11	11	2462	2462	12	-83	15.78	-86.32
	802.11g (54Mbps)	1	1	2412	2412	10	-70	15.04	-75.36
		6	6	2437	2437	10	-70	15.52	-74.68
		11	11	2462	2462	10	-70	15.48	-74.13
	802.11n (MCS7-65Mbps)	1	1	2412	2412	8	-68	15.19	-72.05
		6	6	2437	2437	8	-68	16.62	-71.49
		11	11	2462	2462	8	-68	15.99	-70.4
	802.11a (54Mbps)	36	36	5180	5180	9	-70	16.27	-75.33
		149	149	5745	5745	9	-70	15.17	-75.42
		165	165	5825	5825	9	-70	14.72	-75.25

WIFI-0 antenna gain data

	Mode	Gain(dBi)
WiFi	802.11b (11Mbps)	2.45
	802.11g (54Mbps)	2.45
	802.11n (MCS7-65Mbps)	2.45
	802.11a (54Mbps)	2.71

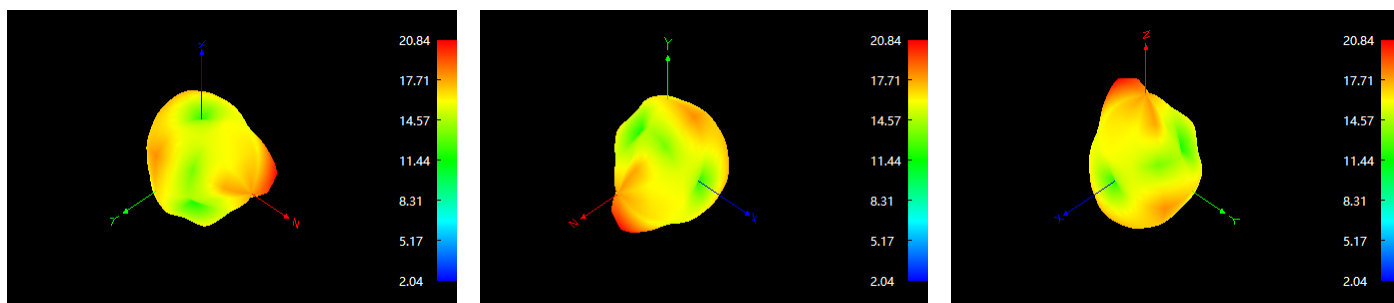
WIFI-1 antenna gain data

	Mode	Gain(dBi)
WiFi	802.11b (11Mbps)	2.45
	802.11g (54Mbps)	2.45
	802.11n (MCS7-65Mbps)	2.45
	802.11a (54Mbps)	2.19

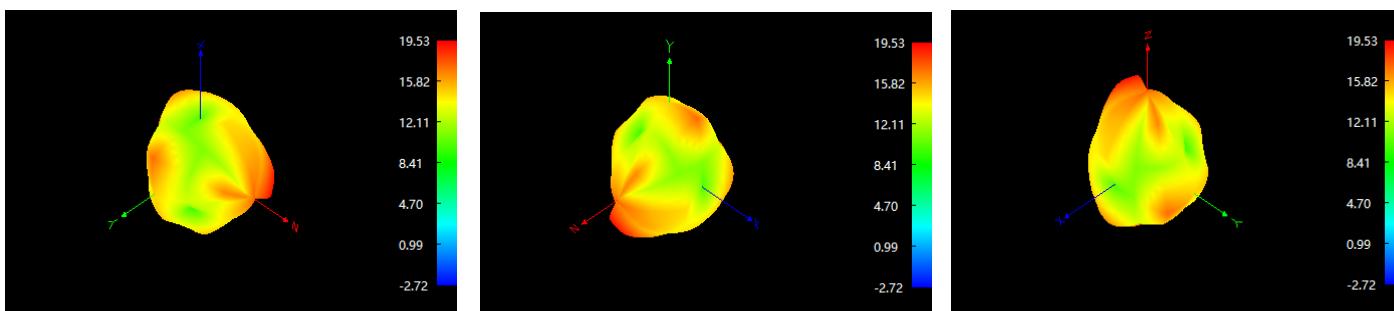
5.2 Active test data

WIFI-0 antenna active 3D field pattern diagram

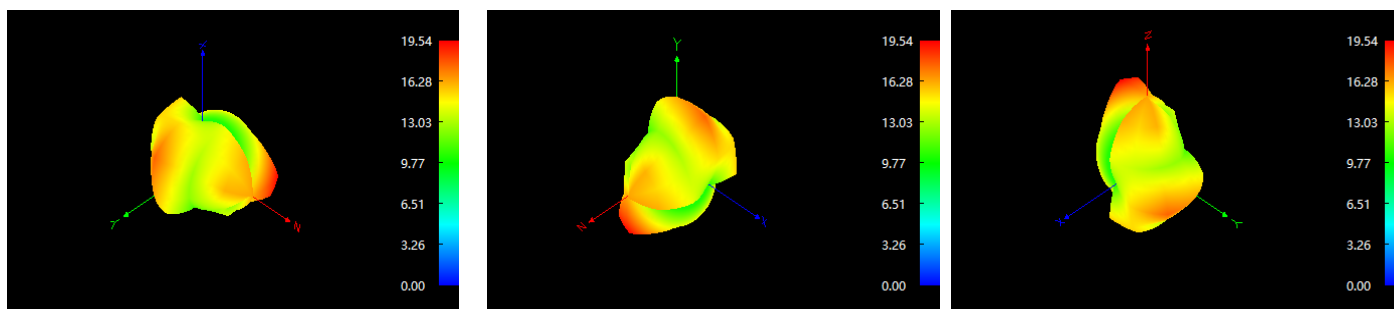
802.11b (11Mbps)



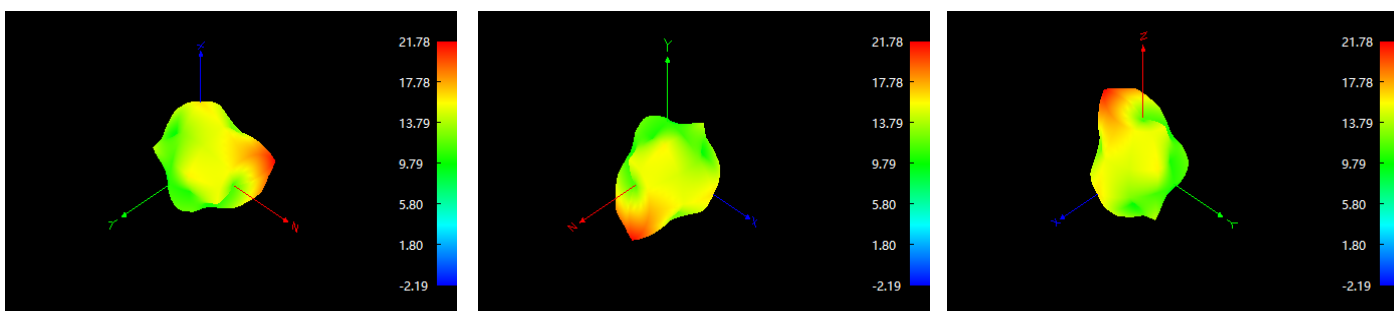
802.11g (54Mbps)



802.11n (MCS7-65Mbps)



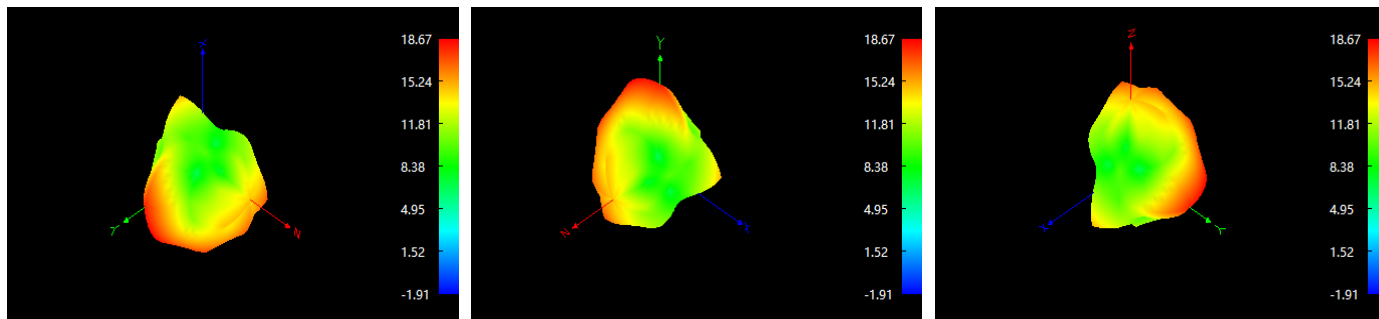
802.11a (54Mbps)



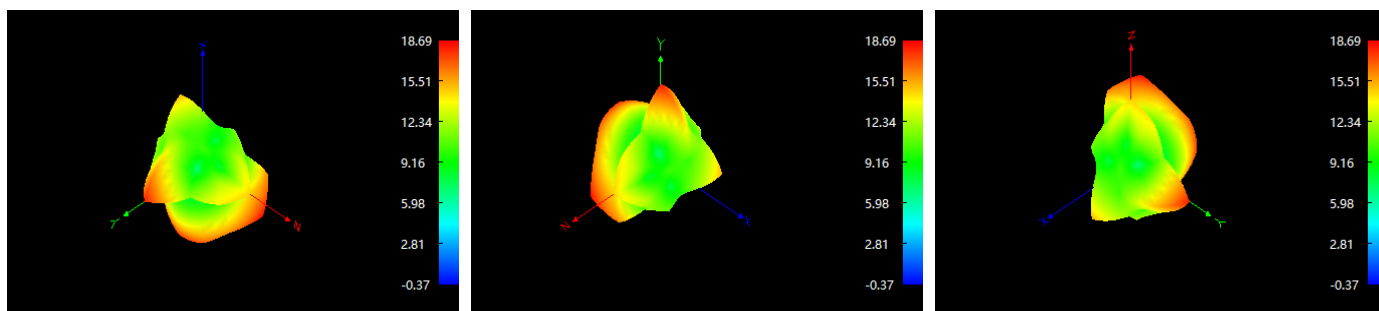
5.2 Active test data

WIFI-1 antenna active 3D field pattern diagram

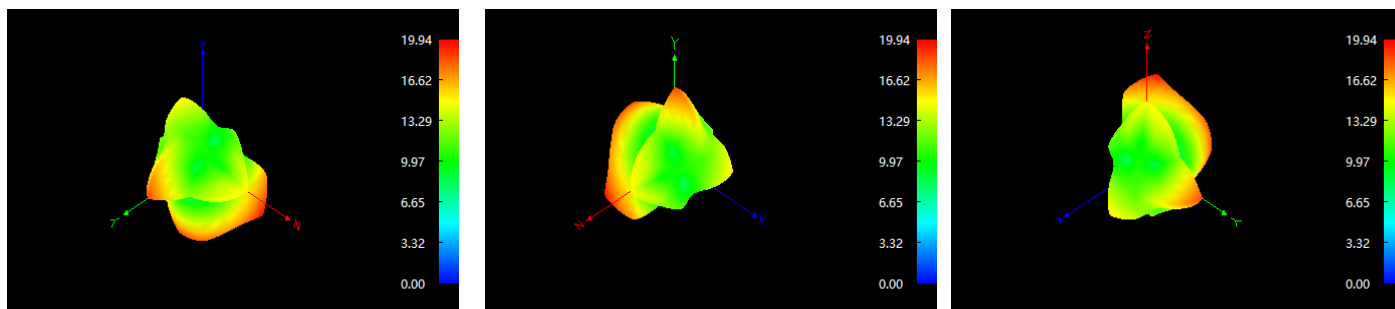
802.11b (11Mbps)



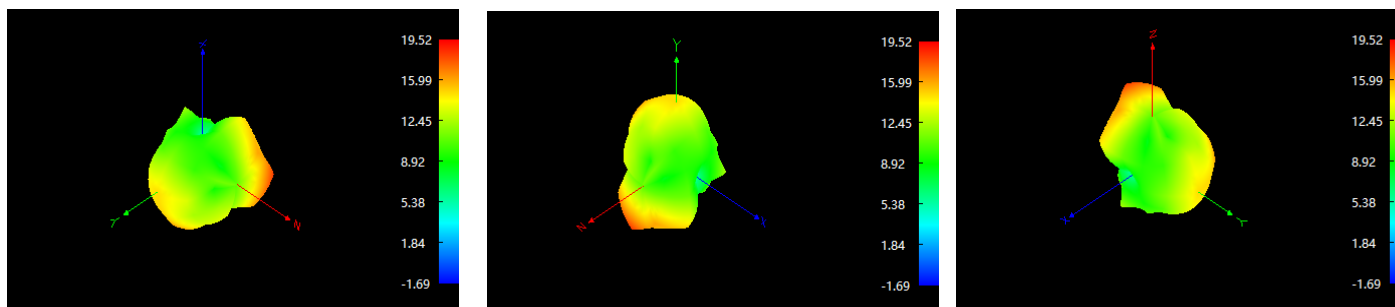
802.11g (54Mbps)



802.11n (MCS7-65Mbps)



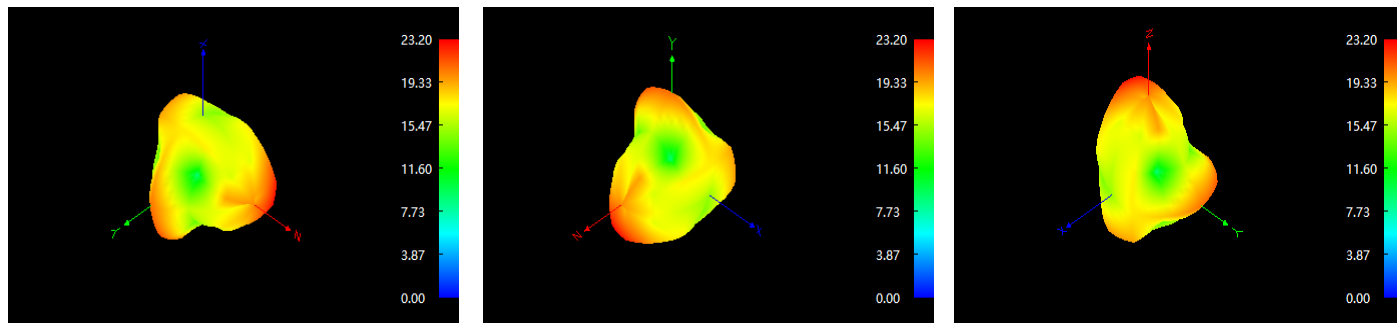
802.11a (54Mbps)



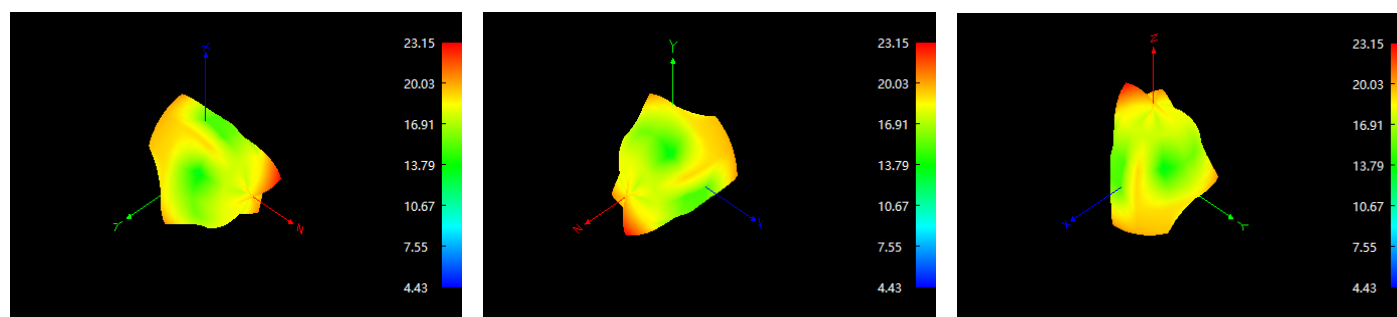
5.2 Active test data

WIFI combiner antenna active 3D field pattern diagram

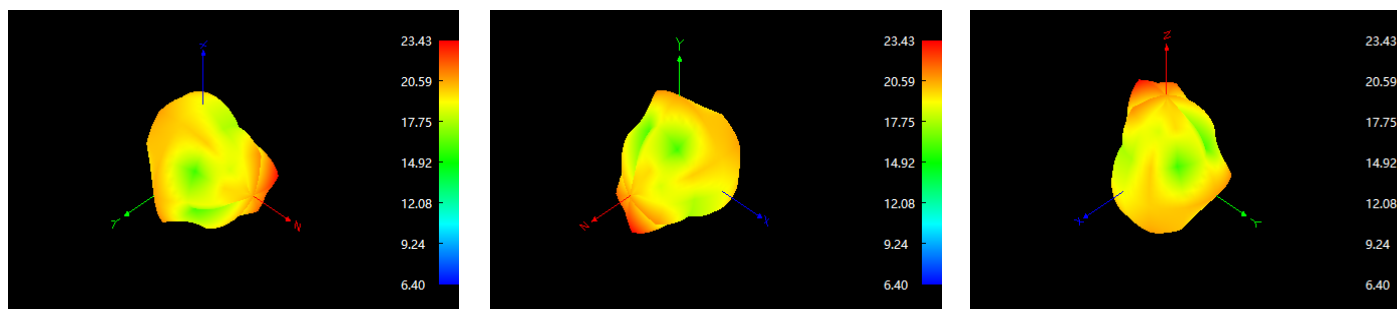
802.11b (11Mbps)



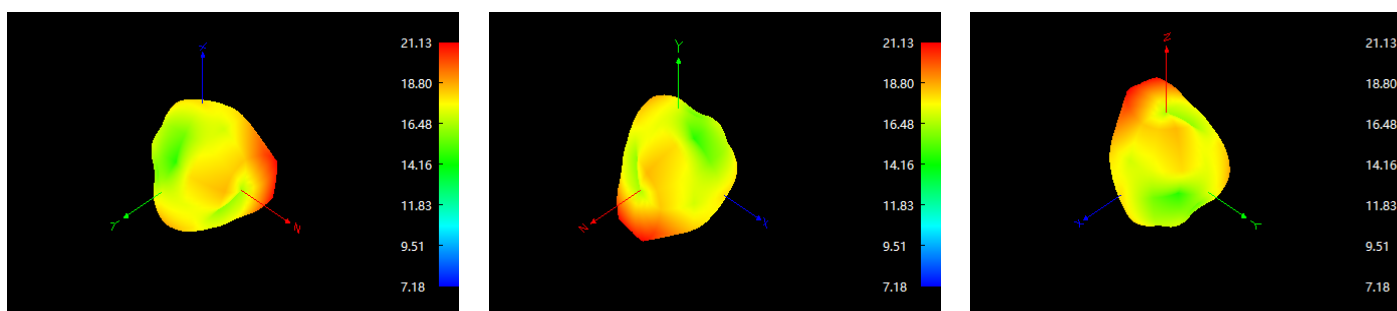
802.11g (54Mbps)



802.11n (MCS7-65Mbps)



802.11a (54Mbps)



6.Environmental treatment

Our company did not modify the environment and assembled according to the trial production machine

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)	standard
WIFI-0 2400--2500	VSWR (Mass production performance) <VSWR(Acknowledge performance)+1
WIFI-1 2400--2500	VSWR (Mass production performance) <VSWR(Acknowledge performance)+1

8 Drawings

