



深圳创盈芯实业有限公司

Shenzhen Chuangyingxin technology co., Ltd

材料承认书

Material acceptance

厂 商: _____
Manufacturer Shenzhen Shangyuan Technology Co., LTD
品 名: _____
Name of a part D5N AUX antenna
料 号: _____
Part Number _____
物 料 规 格: _____
Material specification FPC welding wire, white coaxial line, line diameter 0.81 line
承 认 日 期: length 100mm, four generations of Koxin terminal,
Date of recognition 2024.09.09

制作 Fabrication	审核 Examine and verify	批准 Ratify

Tel:0755-23596969

Company web site:<http://www.cyxtech.com/>

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Industrial Park, Longhua District,

Shenzhen

Shenzhen Shangyuan Technology Co., LTD

Tenline acceptance letter

Customer name: Chuangying Core		Project name: D5N	
Working band :WIFI (2400-2500MHz; 5150-5850MHz)			
Hardware version:			
Still far material specifications			
Specification and model		Still far material number	Customer part number
AUX antenna		SZ24460IB77-2	

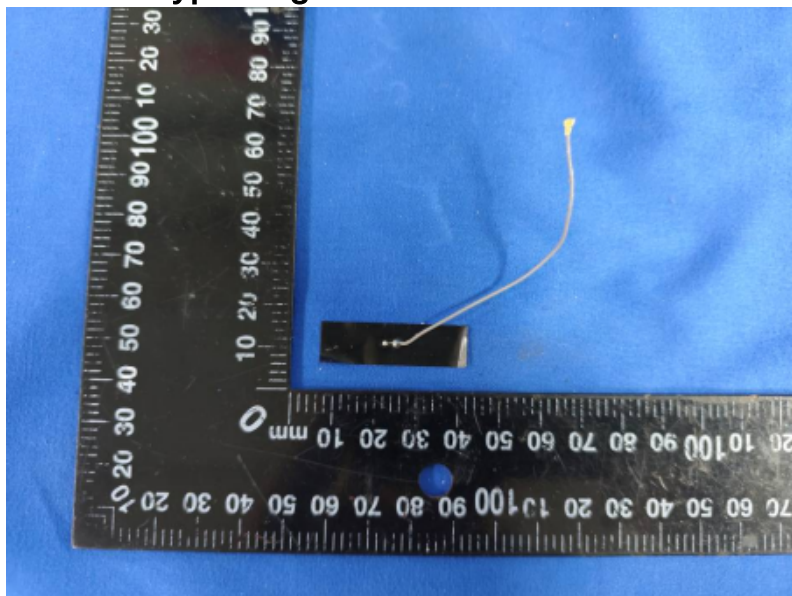
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2024.09.09	New edition issue	Xu Wei	A

Still far will sign the column				
exploit	Structure:	ReView:	Quality Engineer:	Approved:
	Radio frequency:	Review:		

The client will sign the column			
Electronic engineer	Project manager	Structural engineer	Quality engineer

1. Project information

1.1 Prototype diagram



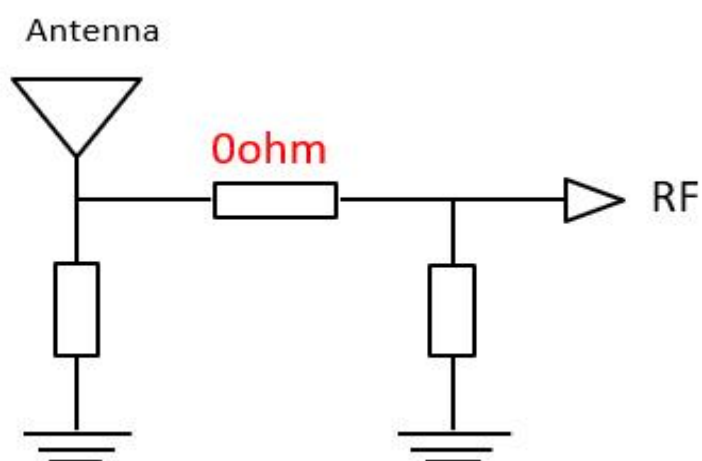
2. electrical performance

Antenna type	WLAN-AUX-ANT
Frequency range (MHz)	2400-2500MHz;5150-5850MHz
Peak gain (dBi)	3.8dBi
Voltage standing wave ratio	< 2.0)
Return loss	< -10dB)
Efficiency (%)	40%-50%
Polarization mode	Linear polarization
Radiation field pattern	omnidirectional
Output impedance (Ω)	50
Maximum input power (W)	25

3. mechanical properties

Installation mode	IPEX-1
Connection mode	IPEX-1
Antenna size (mm)	24.15*9.2*5.5mm
material	FPC
Operating temperature (°C)	- 40 °C ~ + 85 °C
Storage temperature (°C)	- 40 °C ~ + 85 °C

4. antenna matching circuit



5. Test data of the whole machine

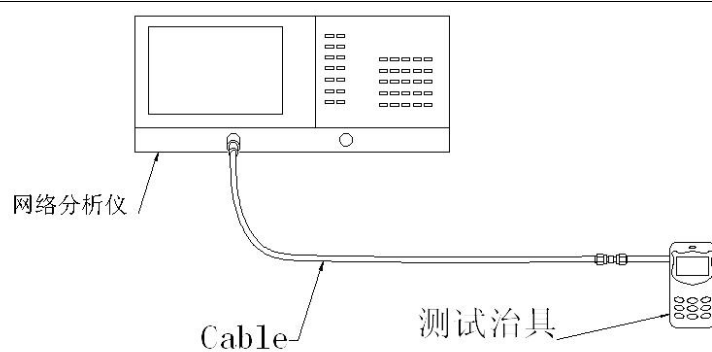
5.1 S11 Test Method Description

Test equipment: Network Analyzer (Agilent E5071C)

Test method: A 50 ohm CABLE is exported from the instrument test port, and the SMA connector of the test tool is connected after calibration with the calibration piece.

Record the return loss and standing wave ratio corresponding to the relevant frequency points.

The test diagram is as follows:



Test diagram

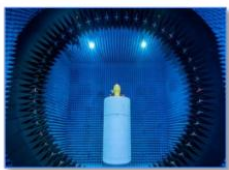
5.2 Test Environment

Test System: MPS6450 Multi-probe OTA Measurement System (XH-IoT)

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 R&S ZND/Agilent E5071C to test active data, use the integrated tester Agilent 8960 /CMW500/SP9500E/SP8315

OTA实验室



综测仪器



SP9500-CTS-5G



CMW500



SP8315 NB-IoT /eMTC

其他设备



OTA head hand



OTA ear hand

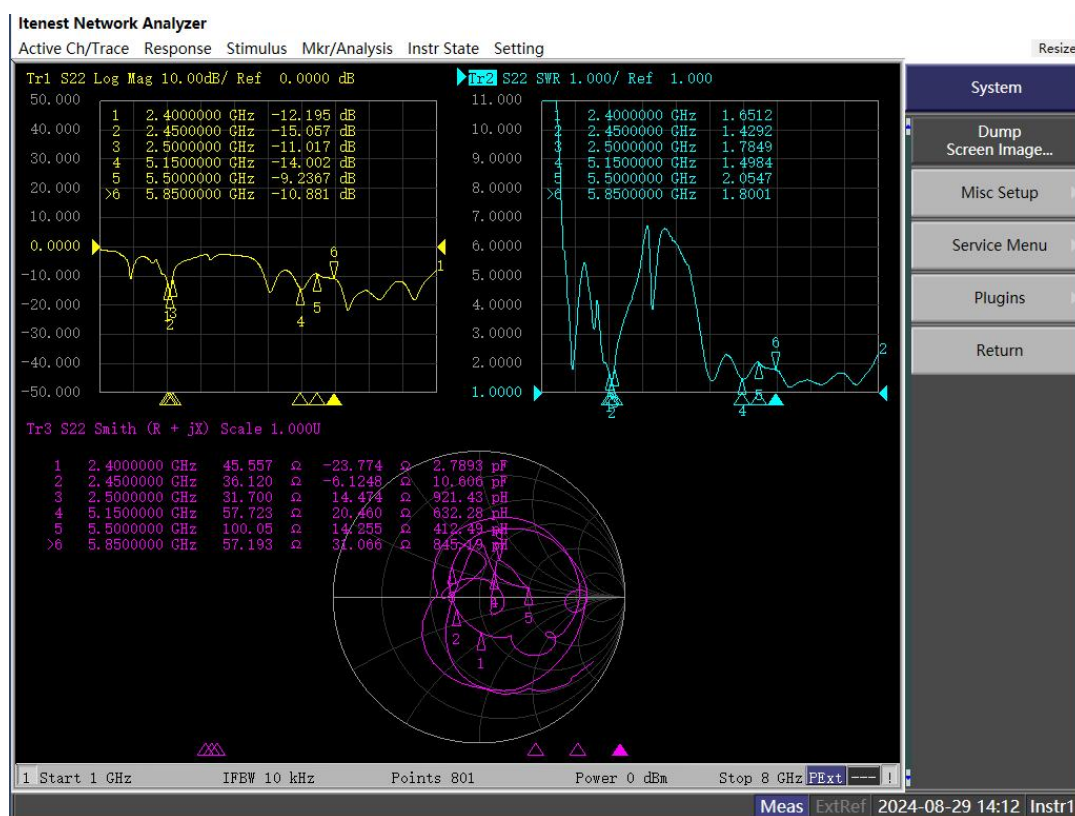


OTA arm hand

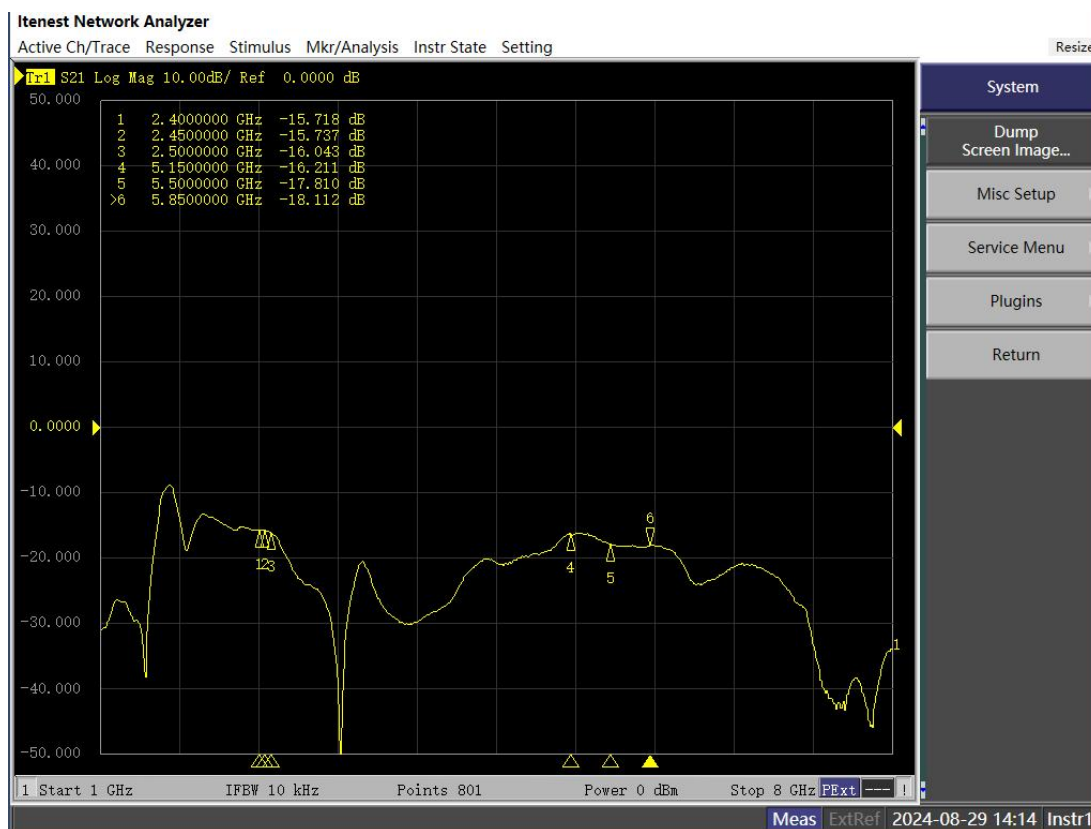
5.3 S11 Test Parameters

频率 (Freq.) MHz	2400	2450	2500	5150	5500	5850
驻波比 VSWR	1.6	1.4	1.7	1.4	2.0	1.8
回波损耗 Return Loss	-12.1	15	-11	-14	-9.2	-10.8

驻波比 VSWR & 回波损耗 Return Loss & Smith 圆图



Isolation between antennas



5.4 Antenna efficiency and gain

Frequency/Mhz	Efficiency / %	MaxGain/dBi	Frequency/Mhz	Efficiency / %	MaxGain/dBi
2400	40.83	1.27	5150	57.02	3.59
2410	40.18	1.31	5170	56.49	3.79
2420	40.55	1.14	5190	55.72	3.87
2430	40.09	1.36	5210	53.58	3.81
2440	40.74	1.21	5230	52.12	3.76
2450	40.83	1.32	5250	51.76	3.81
2460	40.93	1.12	5270	50.47	3.81
2470	41.21	1.33	5290	49.09	3.74
2480	41.78	1.23	5310	46.88	3.53
2490	41.11	1.35	5330	45.92	3.42
2500	40.74	1.42	5350	45.81	3.38
			5370	43.65	3.17
			5390	43.45	3.08
			5410	44.98	3.09
			5430	44.26	2.76
			5450	43.95	2.54
			5470	43.75	2.34
			5490	44.16	2.19
			5510	44.67	1.92
			5530	44.87	1.92
			5550	45.08	1.99
			5570	45.92	2.14
			5590	47.1	2.11
			5610	47.32	2.01
			5630	50.23	2.22
			5650	51.64	2.42
			5670	50.7	2.43
			5690	50.35	2.5
			5710	50.35	2.62
			5730	49.77	2.64
			5750	49.66	2.7
			5770	50	2.87
			5790	51.17	3.1
			5810	50.93	3.2
			5830	51.88	3.41
			5850	51.29	3.55

5.5 Active Test data

Module 1:



Item	Measurement	Band	Channel	Total
1	TRP	WIFI_B (1M)	1	16.14
2	TRP	WIFI_B (1M)	6	15.57
3	TRP	WIFI_B (1M)	11	15.5
4	TIS(EIRP)	WIFI_B (11M)	11	-75.66
5	TRP	WIFI_A (6M)	36	15.06
6	TRP	WIFI_A (6M)	149	16.91
7	TRP	WIFI_A (6M)	165	16.86
8	TIS(EIRP)	WIFI_A (54M)	165	-72.31

Throughput test:

2.4G

```

[ 4] 49.00-50.00 sec 12.5 MBytes 105 Mbits/sec
[ 4] 50.00-51.00 sec 12.8 MBytes 107 Mbits/sec
[ 4] 51.00-52.00 sec 13.0 MBytes 109 Mbits/sec
[ 4] 52.00-53.00 sec 13.0 MBytes 109 Mbits/sec
[ 4] 53.00-54.01 sec 11.8 MBytes 98.0 Mbits/sec
[ 4] 54.01-55.00 sec 9.12 MBytes 77.0 Mbits/sec
[ 4] 55.00-56.00 sec 11.9 MBytes 99.6 Mbits/sec
[ 4] 56.00-57.01 sec 12.8 MBytes 106 Mbits/sec
[ 4] 57.01-58.01 sec 12.6 MBytes 107 Mbits/sec
[ 4] 58.01-59.00 sec 13.0 MBytes 110 Mbits/sec
[ 4] 59.00-60.00 sec 12.6 MBytes 106 Mbits/sec
-----
[ ID] Interval          Transfer    Bandwidth
[ 4]  0.00-60.00 sec    750 MBytes 105 Mbits/sec
[ 4]  0.00-60.00 sec    747 MBytes 104 Mbits/sec
iperf Done.

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5G

[4]	54.00-55.00	sec	59.1 MBytes	496 Mbits/sec	
[4]	55.00-56.00	sec	62.0 MBytes	520 Mbits/sec	
[4]	56.00-57.00	sec	60.9 MBytes	511 Mbits/sec	
[4]	57.00-58.00	sec	67.5 MBytes	564 Mbits/sec	
[4]	58.00-59.00	sec	61.5 MBytes	516 Mbits/sec	
[4]	59.00-60.00	sec	59.9 MBytes	504 Mbits/sec	

[ID]	Interval		Transfer	Bandwidth	
[4]	0.00-60.00	sec	3.61 GBytes	516 Mbits/sec	sender
[4]	0.00-60.00	sec	3.60 GBytes	516 Mbits/sec	receiver

Module 2:



Item	Measurement	Band	Channel	Total
1	TRP	WIFI_B (1M)	1	14.66
2	TRP	WIFI_B (1M)	6	15.53
3	TRP	WIFI_B (1M)	11	15.83
4	TIS(EIRP)	WIFI_B (11M)	11	-77.64
5	TRP	WIFI_A (6M)	36	15.58
6	TRP	WIFI_A (6M)	149	16.08
7	TRP	WIFI_A (6M)	165	15.81
8	TIS(EIRP)	WIFI_A (54M)	165	-73.89

Throughput test: 2.4G

[4]	53.01-54.01	sec	5.88 MBytes	48.8 Mbits/sec	
[4]	54.01-55.00	sec	5.62 MBytes	47.6 Mbits/sec	
[4]	55.00-56.00	sec	5.88 MBytes	49.3 Mbits/sec	
[4]	56.00-57.00	sec	6.00 MBytes	50.2 Mbits/sec	
[4]	57.00-58.00	sec	5.38 MBytes	45.3 Mbits/sec	
[4]	58.00-59.01	sec	5.62 MBytes	46.5 Mbits/sec	
[4]	59.01-60.00	sec	6.25 MBytes	53.1 Mbits/sec	

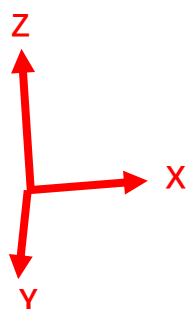
[ID]	Interval		Transfer	Bandwidth	
[4]	0.00-60.00	sec	348 MBytes	48.6 Mbits/sec	sender
[4]	0.00-60.00	sec	344 MBytes	48.1 Mbits/sec	receiver
iperf Done.					

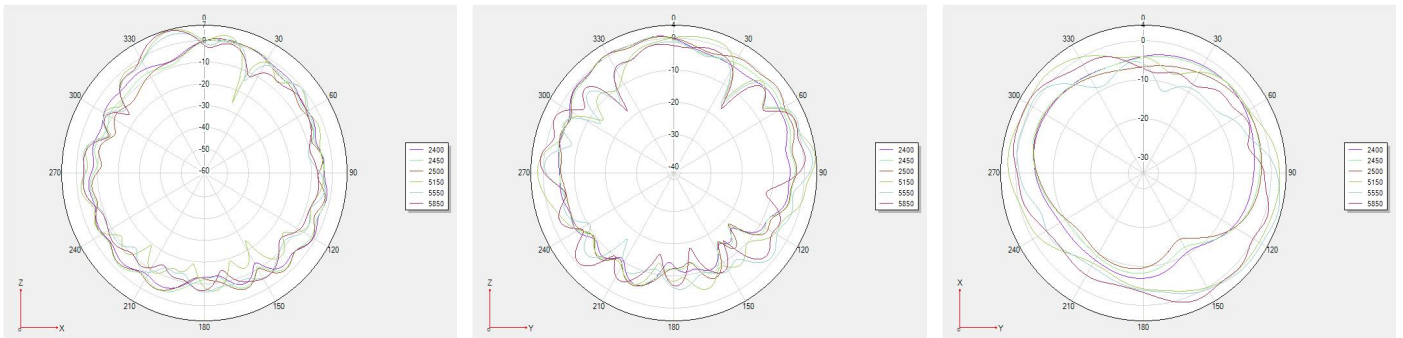
5G

[4]	56.01-57.01	sec	36.4 MBytes	305 Mbits/sec	
[4]	57.01-58.00	sec	36.9 MBytes	310 Mbits/sec	
[4]	58.00-59.00	sec	35.6 MBytes	300 Mbits/sec	
[4]	59.00-60.00	sec	38.6 MBytes	323 Mbits/sec	

[ID]	Interval		Transfer	Bandwidth	
[4]	0.00-60.00	sec	2.06 GBytes	296 Mbits/sec	sender
[4]	0.00-60.00	sec	2.06 GBytes	295 Mbits/sec	receiver
iperf Done.					

5.6 Radiation direction diagram

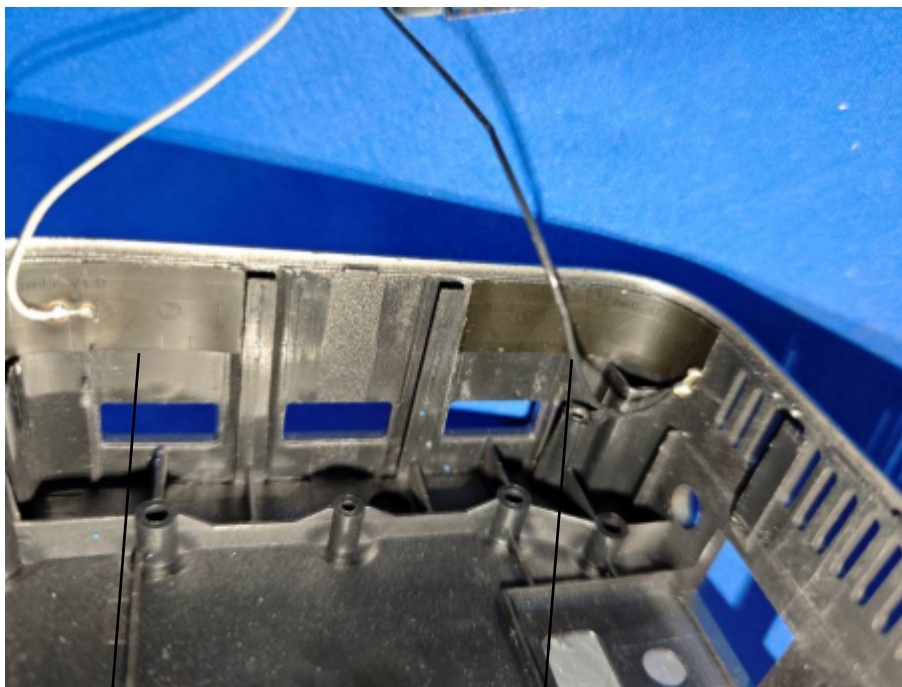




6. prototype environmental treatment

Antenna environment processing is not added

7. antenna installation position



WLAN-AUX ANT

WLAN-MAIN ANT

8. mass production antenna index

In the mass production of antenna, the standing wave ratio is used as the test standard.

According to the differences of the project itself, the following criteria are given:

Frequency (MHz)	Mass production standard
2400MHz-2500MHz	VSWR (量产性能) <VSWR(承认性能) ± 0.5
5150MHz-5850MHz	VSWR (量产性能) <VSWR(承认性能) ± 0.5