



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 MAIN antenna

料 号:

Part Number

物 料 规 格:

Material specification

FPC welding wire, black coaxial line, line diameter 0.81 line
length 100mm, four generations of Koxin terminal,

承 认 日 期:

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/>

3rd Floor, Building C, Colant Low-carbon

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
MAIN antenna	SZ24460IB77-1	

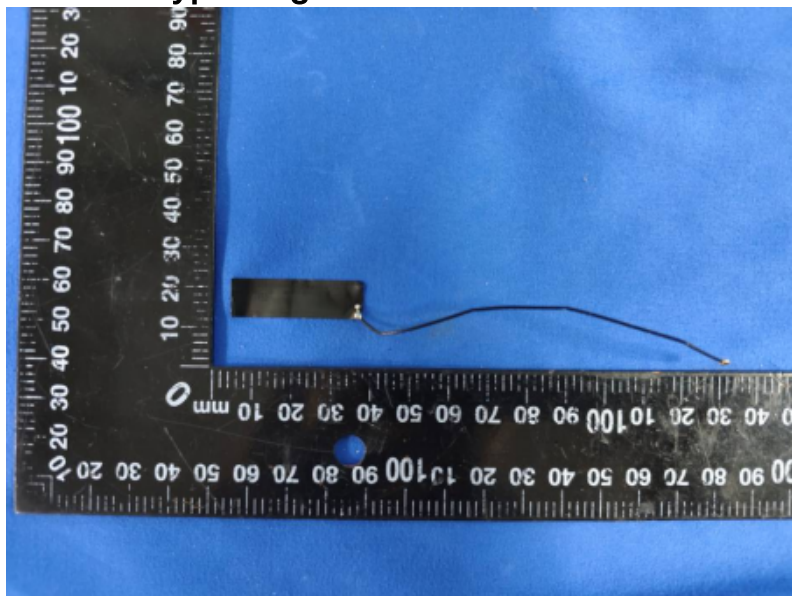
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2024.09.09	New edition issue	Xu Wei	A

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



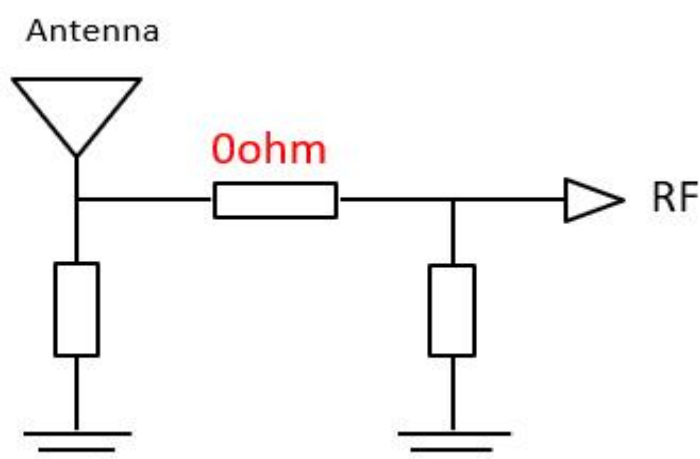
2. electrical performance

Antenna type	WLAN-MAIN-ANT
Frequency range (MHz)	2400-2500MHz;5150-5850MHz
Peak gain (dBi)	3dBi
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

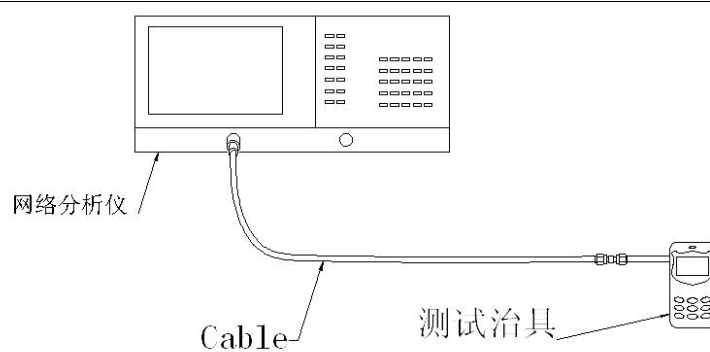
5.1 S11 Test Method Description

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

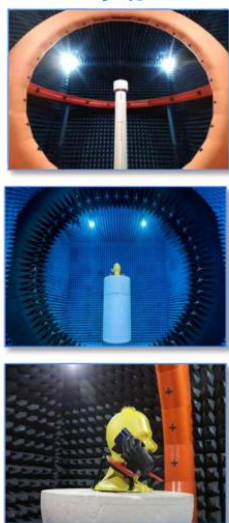
5.2 Test Environment

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

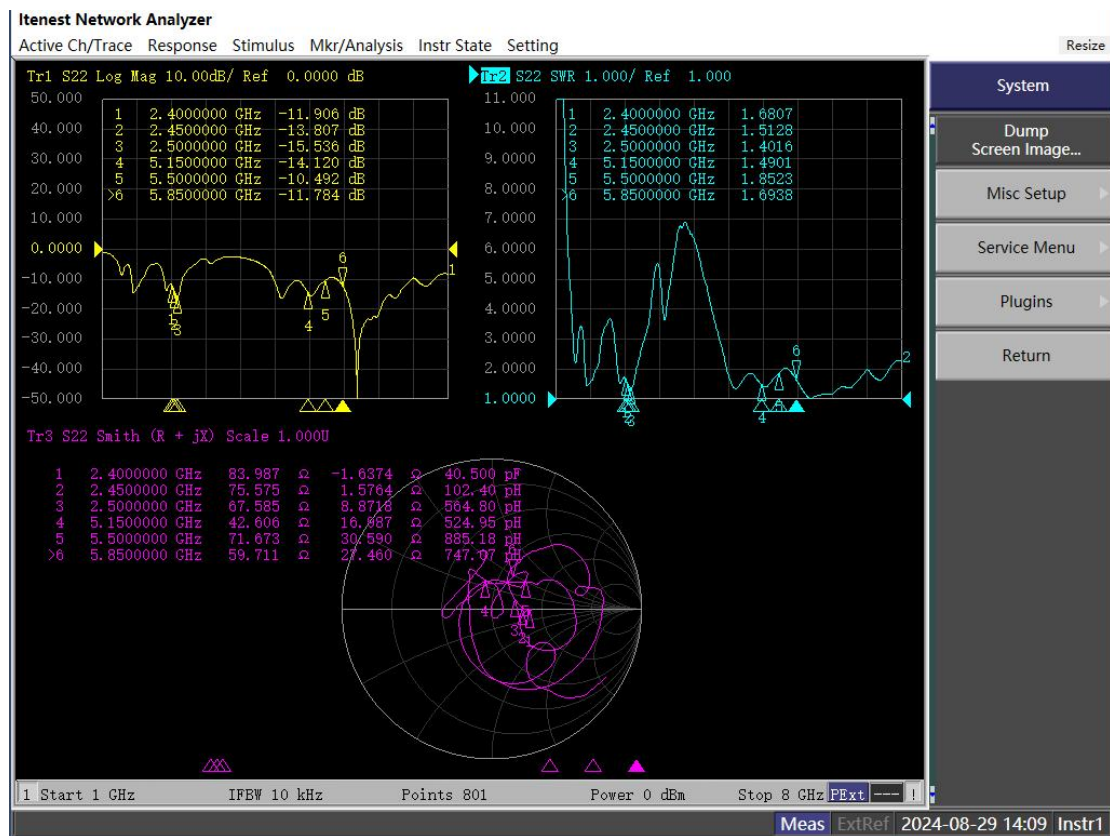


OTA arm hand

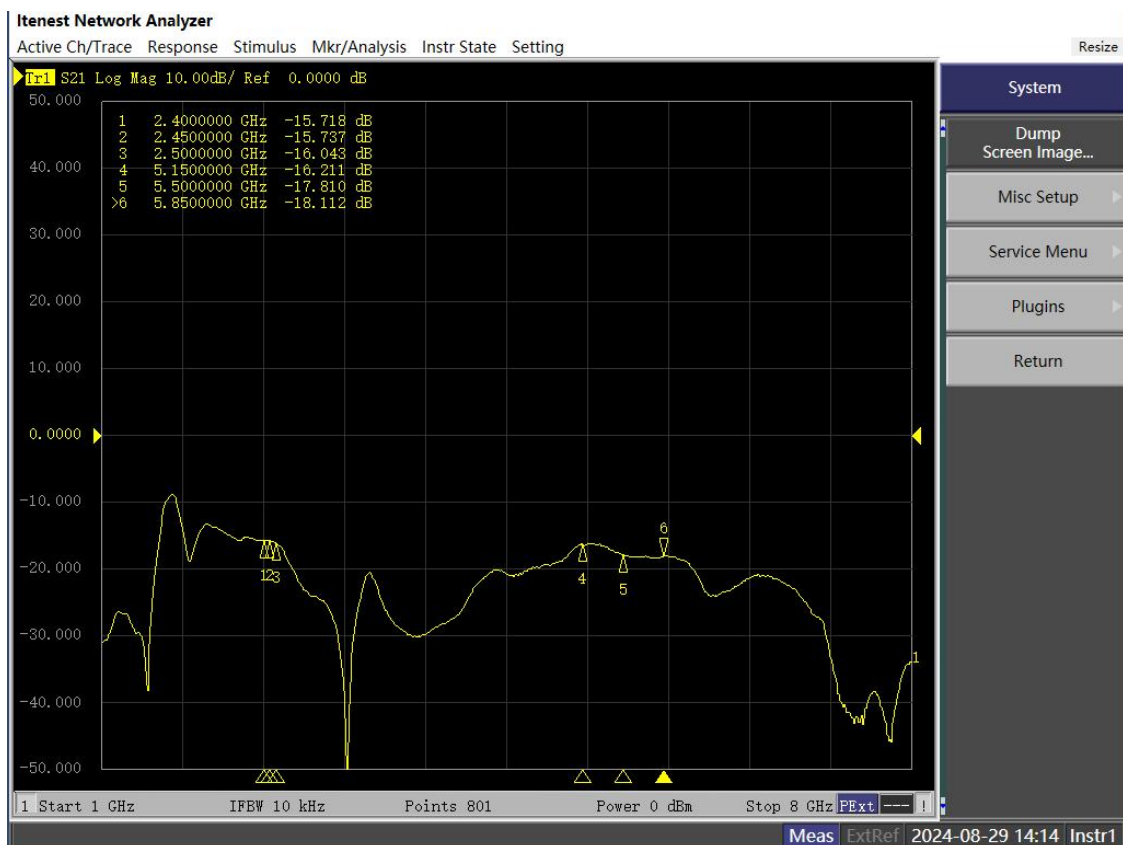
5.3 S11 Test Parameters

频率 (Freq.) MHz	2400	2450	2500	5150	5500	5850
驻波比 VSWR	1.6	1.5	1.4	1.4	1.8	1.6
回波损耗 Return Loss	-11.9	-13.8	-15.5	-14.1	-10.5	-11.7

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	37.58	2.62	5150	54.33	3.1
2410	37.07	2.67	5170	53.7	3.07
2420	38.19	2.65	5190	53.33	3
2430	38.55	2.9	5210	51.17	2.76
2440	39.08	2.66	5230	49.32	2.47
2450	40.09	2.85	5250	48.87	2.32
2460	40.83	2.71	5270	47.1	2.35
2470	41.21	2.96	5290	45.71	2.2
2480	42.17	2.78	5310	43.55	1.96
2490	41.98	2.84	5330	42.07	1.67
2500	41.5	2.58	5350	42.07	1.8
			5370	39.99	1.91
			5390	39.26	2.1
			5410	40.93	2.44
			5430	41.11	2.46
			5450	40.55	2.56
			5470	40.36	2.69
			5490	40.55	2.89
			5510	40.36	2.83
			5530	40.36	2.71
			5550	39.9	2.58
			5570	39.63	2.55
			5590	40.46	2.54
			5610	40.18	2.45
			5630	41.69	2.51
			5650	43.35	2.52
			5670	42.85	2.35
			5690	42.27	2.22
			5710	42.66	2.12
			5730	42.56	1.95
			5750	42.46	1.8
			5770	43.15	1.71
			5790	44.77	1.69
			5810	45.08	1.53
			5830	46.45	1.45
			5850	46.34	1.46

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.

```

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	

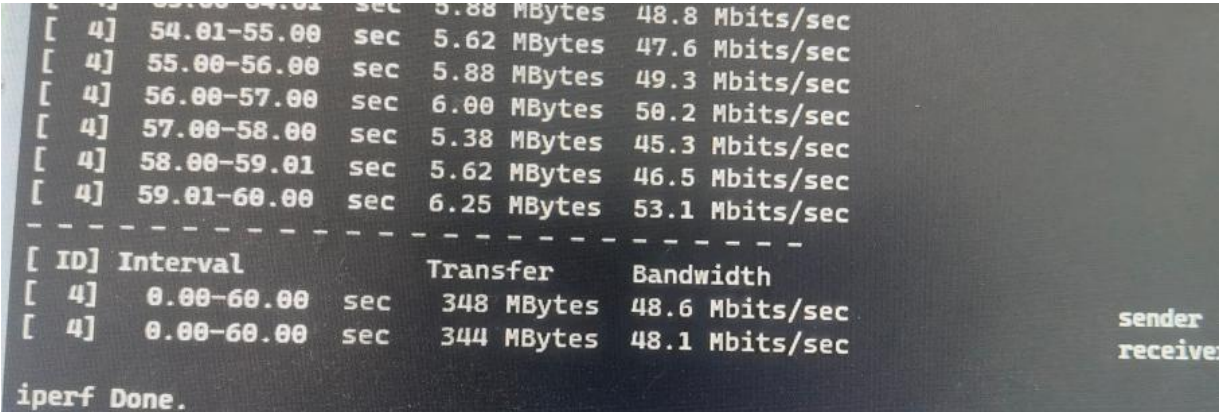
[ID]	Interval		Transfer	Bandwidth	
[4]	0.00-60.00	sec	3.61 GBytes	516 Mbits/sec	sender
[4]	0.00-60.00	sec	3.60 GBytes	516 Mbits/sec	receiver

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

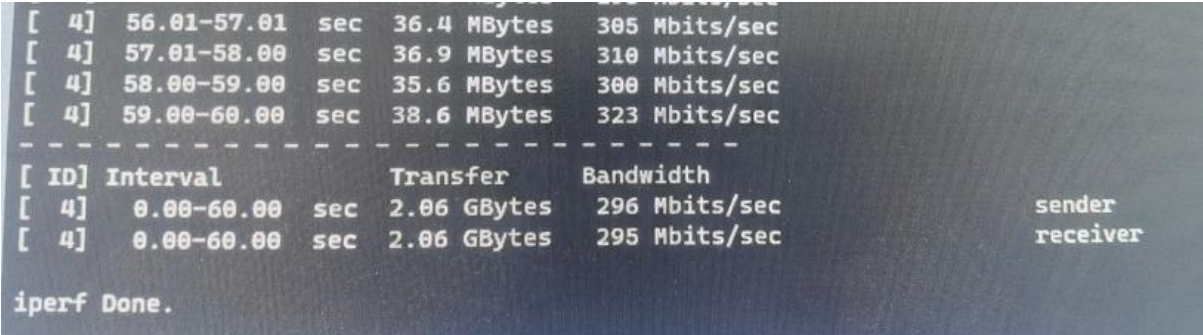
Throughput test: 2.4G



[4]	53.00-54.00	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.					

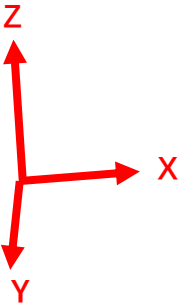
5G

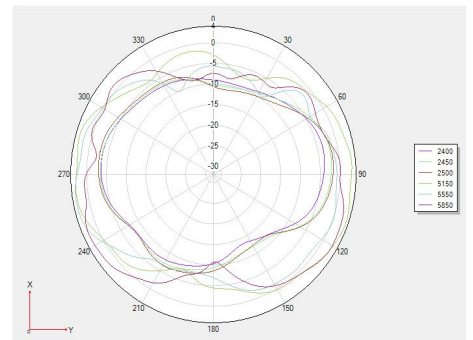
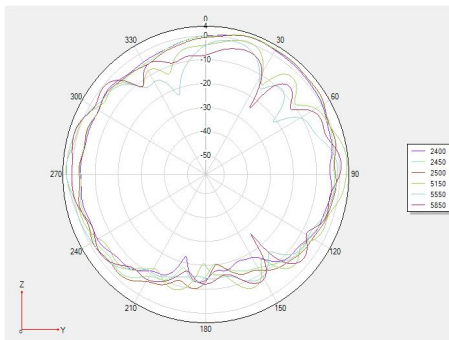
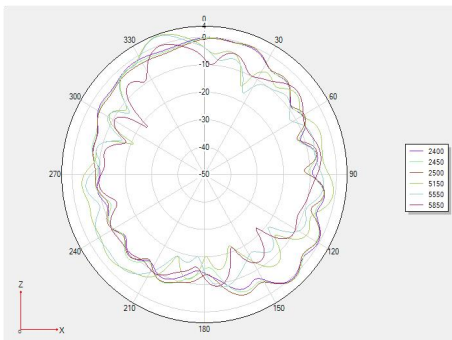


[4]	56.01-57.01	sec	36.4 MBytes	305 Mbits/sec	
[4]	57.01-58.00	sec	36.9 MBytes	310 Mbits/sec	
[4]	58.00-59.00	sec	35.6 MBytes	300 Mbits/sec	
[4]	59.00-60.00	sec	38.6 MBytes	323 Mbits/sec	

[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.					

3.6 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
2450MHz-2500MHz	VSWR(Mass production performance) < VSWR(accepted performance) $\pm$ 0.5
5150MHz-5850MHz	VSWR(Mass production performance) < VSWR(accepted performance) $\pm$ 0.5