

索沃德天线调试报告

客户名称：蓝晨

项目名称：N15EPG-亿道主板-6252模块

日期：2024. 09. 19

项目联系方式

客户联系人：
手 机：
邮 箱：

索沃德结构：

手 机：

电 话：0755-29985185

邮 箱：yangwende@szsward.com

索沃德射频：杨文德

手 机：176 7457 9060

电 话：0755-29985185

邮 箱：yangwende@szsward.com

项目简介

1. 项目简述

项目天线数目	机子类型
2	笔记本
整机外壳材质：15寸塑胶壳	

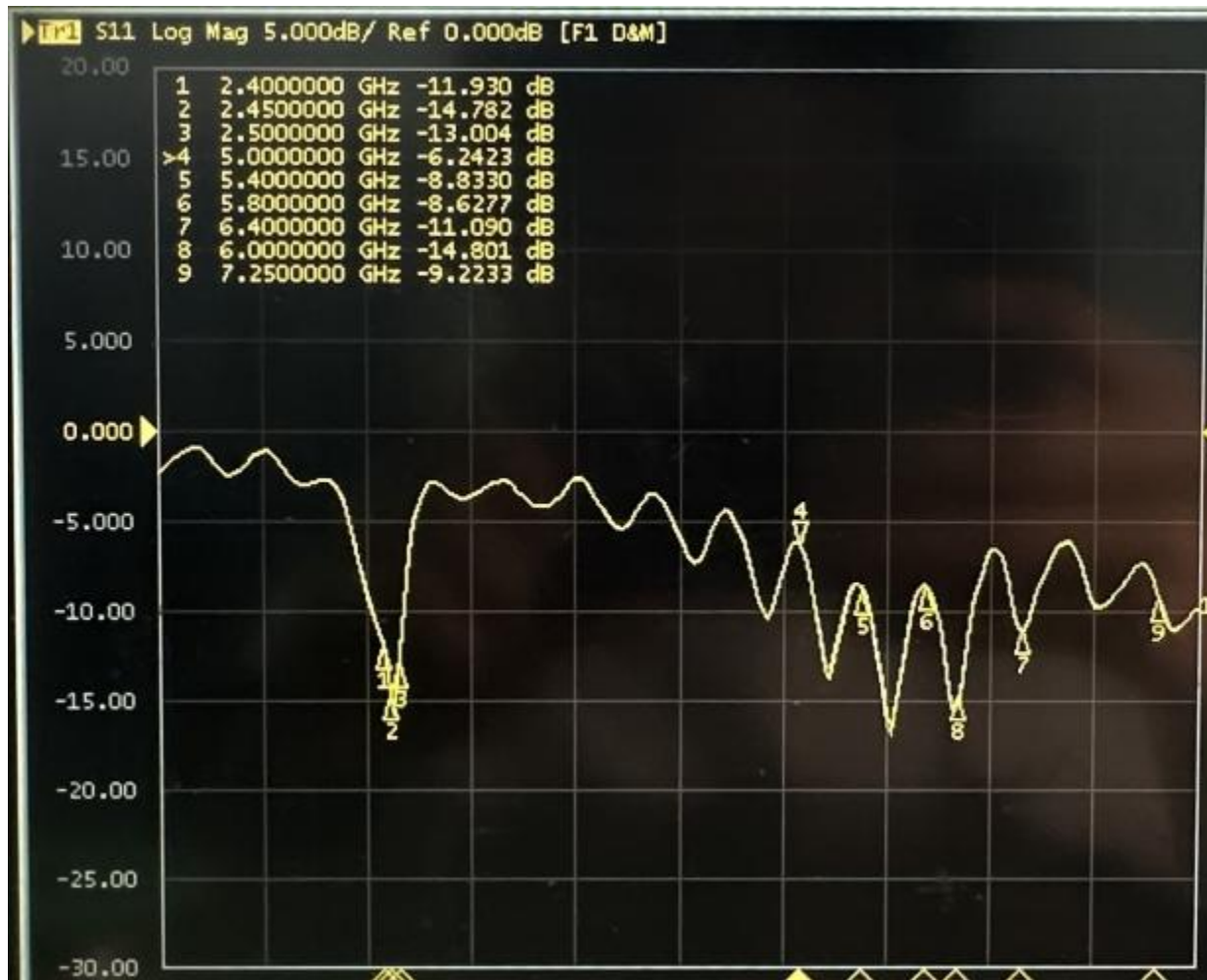
2. 天线简述

天线编号	名称	工作频段/MHZ	材质/结构
1	WIFI&BT&5Gwifi	2400MHz/2500MHz&5.8GHz	FPC
1	WIFI&BT&5Gwifi	2400MHz/2500MHz&5.8GHz	FPC

天线布局



WIFI&BT主天线S11



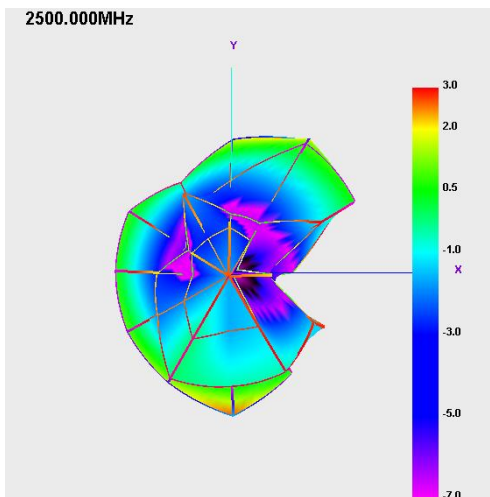
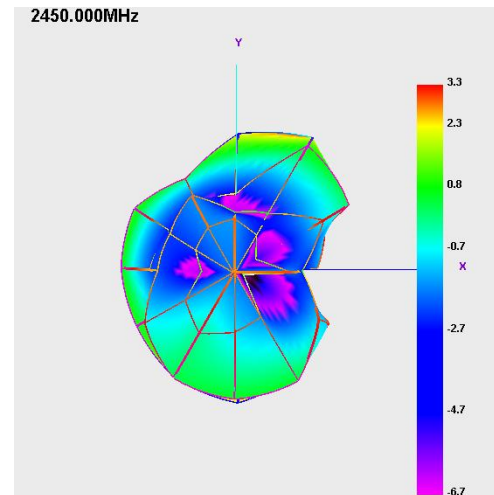
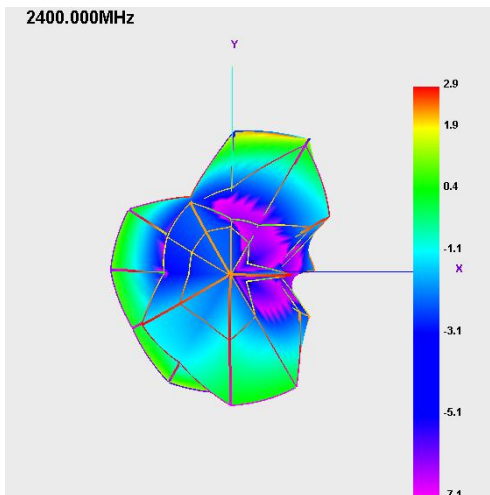
深圳市宝安区前进二路135号河西航城工业区B栋6楼

Building B, Hexi Hangcheng Industrial Zone, No. 135 Qianjin No. 2 Road, Baoan District, Shenzhen

WIFI&BT主天线效率

Passive Test For 2.4G

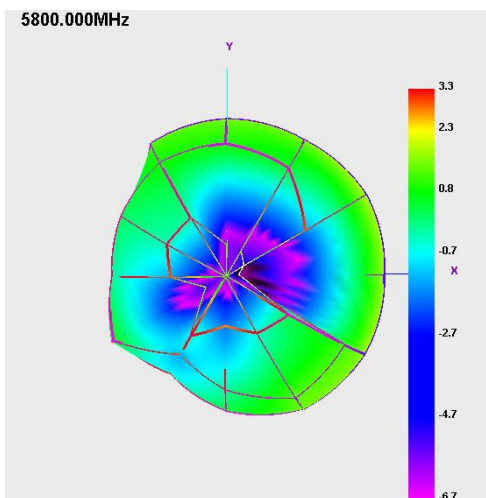
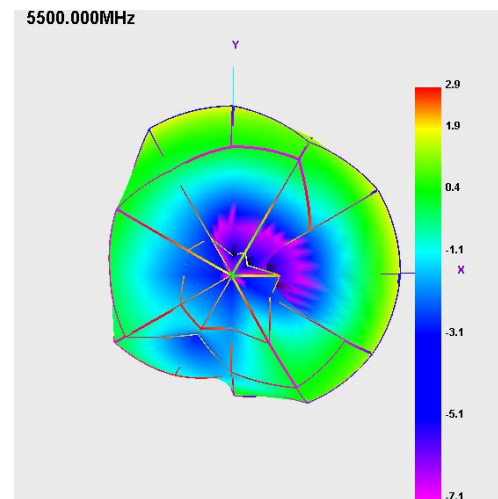
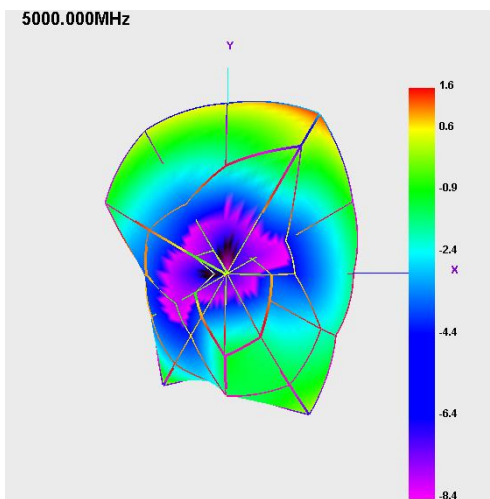
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2400	40.05	-3.97	2.9
2410	40.88	-3.89	3.02
2420	43.07	-3.66	3.25
2430	47.08	-3.27	3.63
2440	48.14	-3.18	3.58
2450	43.39	-3.63	3.33
2460	42.51	-3.71	3.33
2470	37.16	-4.3	2.56
2480	39.21	-4.07	2.68
2490	41.58	-3.81	2.84
2500	45.88	-3.38	3.02



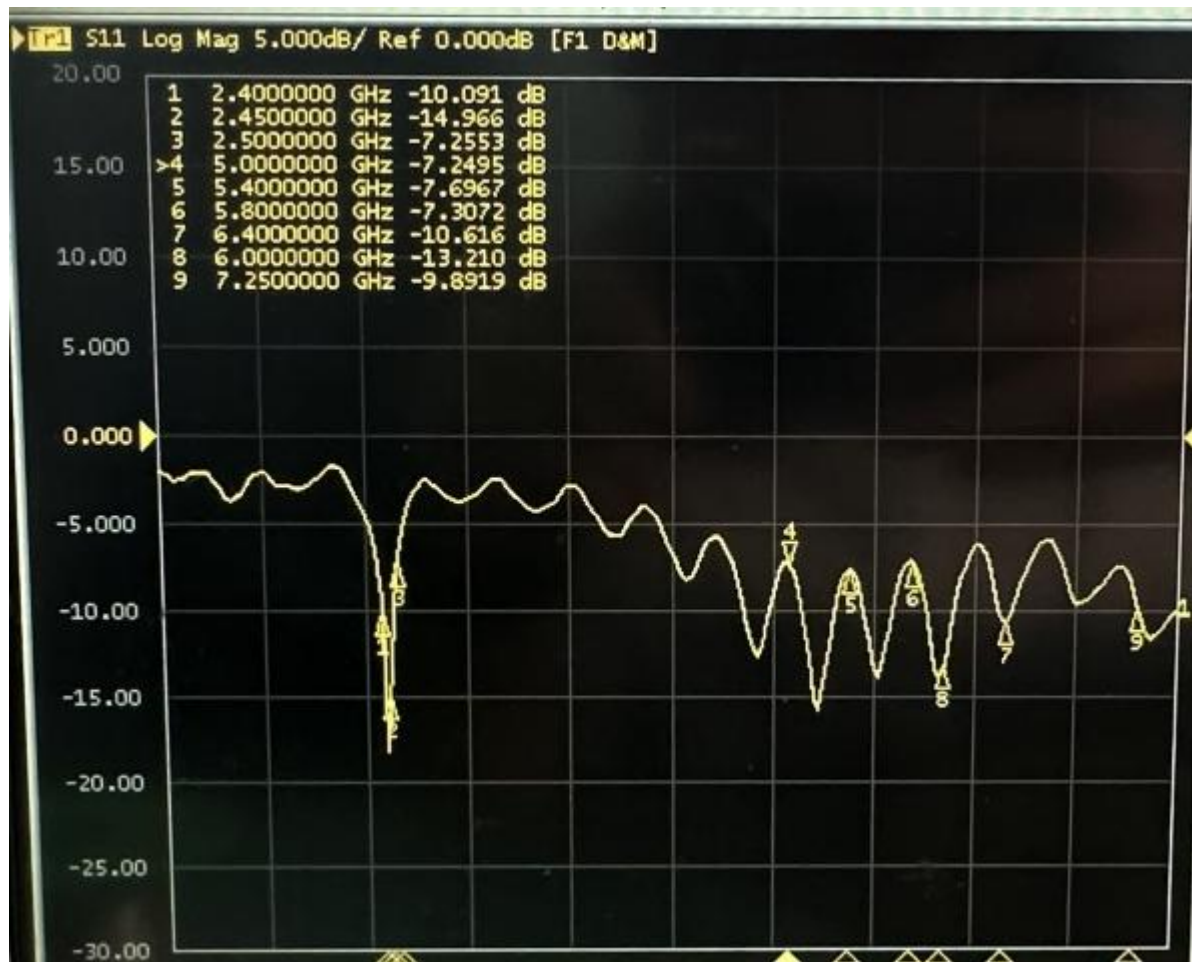
5GWIFI主天线效率

Passive Test For 5G-WIFI

Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
5000	37.91	-4.21	1.56
5100	40.61	-3.91	2.22
5200	38.78	-4.11	2.3
5300	42.11	-3.76	1.37
5400	50.91	-2.93	2.68
5500	43.82	-3.58	2.87
5600	45.54	-3.42	3.08
5700	46.51	-3.32	2.11
5800	57.71	-2.39	3.25
5900	41.71	-3.8	1.98
6000	50.22	-2.99	1.63



WIFI&BT副天线S11

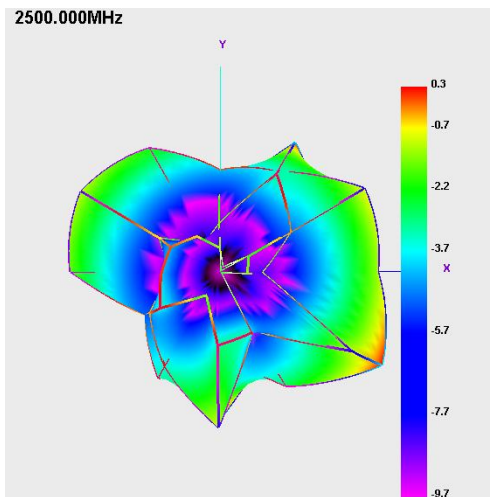
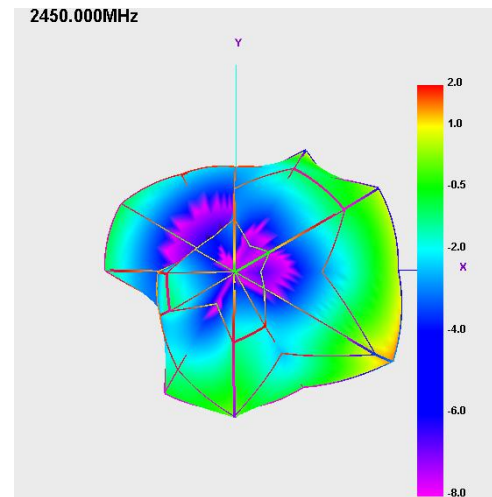
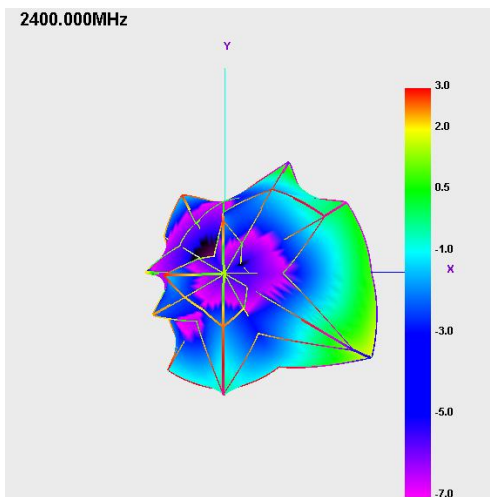


深圳市宝安区前进二路135号河西航城工业区B栋6楼

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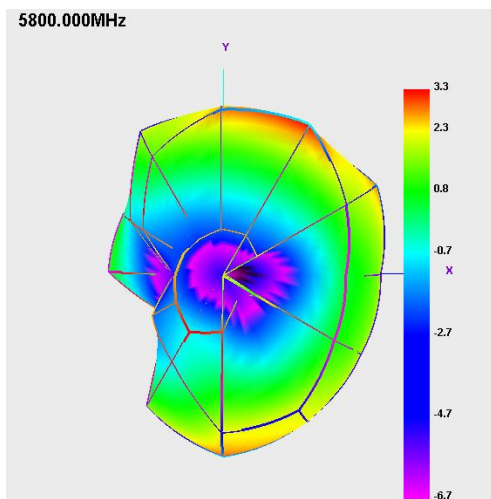
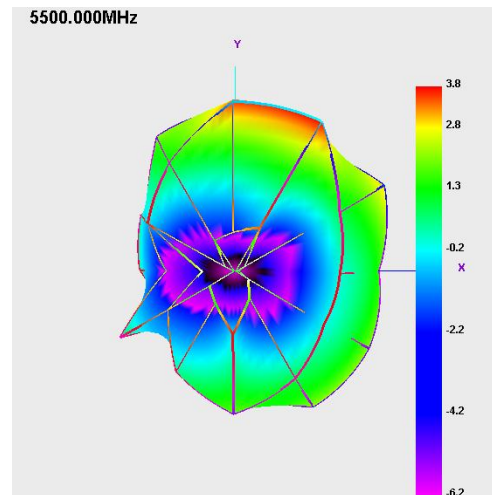
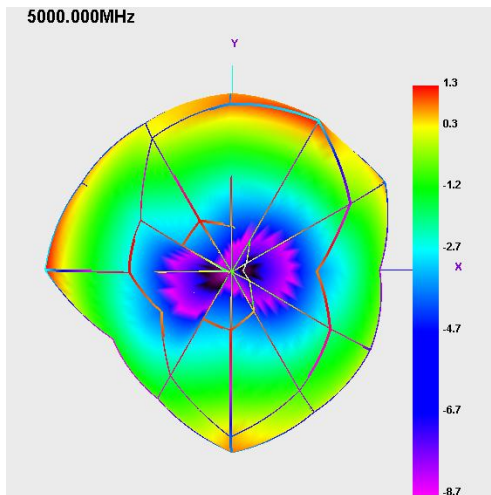
WIFI&BT副天线效率（修改后）

Passive Test For 2.4G			
Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
2400	36.42	-4.39	2.88
2410	37.95	-4.21	2.93
2420	38.2	-4.18	2.7
2430	39.87	-3.99	2.62
2440	39.94	-3.99	2.2
2450	43.05	-3.66	2
2460	44.45	-3.52	1.51
2470	41.39	-3.83	0.99
2480	38.74	-4.12	0.57
2490	39.2	-4.07	0.36
2500	41.65	-3.8	0.32



5GWIFI副天线效率（修改后）

Passive Test For 5G-WIFI			
Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
5000	50.33	-2.98	1.33
5100	53.6	-2.71	2.04
5200	51.51	-2.88	1.61
5300	60.02	-2.22	2.68
5400	57.86	-2.38	3.59
5500	59.95	-2.22	3.77
5600	47.41	-3.24	2.76
5700	54.46	-2.64	3.31
5800	55.35	-2.57	3.35
5900	51.42	-2.89	2.52
6000	48.18	-3.17	1.76



BT天线实测距离

实测效果	
机型编号	1
测试环境	索沃德研发中心
测试设备	华为AM08
测试距离	10米≥

WIFI天线吞吐量测试 (测试图片)

测试数据2. 4Gwifi上传/下载

```
C:\WINDOWS\system32\cmd.exe - iperf_s.exe -c 192.168.1.101
```

[ID]	Interval	Transfer	Bandwidth
[372]	18.0-19.0 sec	8.41 MBytes	70.6 Mbits/sec
[372]	19.0-20.0 sec	6.66 MBytes	55.8 Mbits/sec
[372]	20.0-21.0 sec	7.52 MBytes	63.0 Mbits/sec
[372]	21.0-22.0 sec	7.98 MBytes	67.0 Mbits/sec
[372]	22.0-23.0 sec	6.03 MBytes	50.6 Mbits/sec
[372]	23.0-24.0 sec	8.05 MBytes	67.6 Mbits/sec
[372]	24.0-25.0 sec	5.74 MBytes	48.2 Mbits/sec
[372]	25.0-26.0 sec	6.99 MBytes	58.7 Mbits/sec
[372]	26.0-27.0 sec	7.19 MBytes	60.3 Mbits/sec
[372]	27.0-28.0 sec	6.24 MBytes	52.4 Mbits/sec
[372]	28.0-29.0 sec	5.93 MBytes	49.7 Mbits/sec
[372]	29.0-30.0 sec	7.81 MBytes	65.5 Mbits/sec
[372]	30.0-31.0 sec	6.32 MBytes	53.0 Mbits/sec
[372]	31.0-32.0 sec	7.10 MBytes	59.6 Mbits/sec
[372]	32.0-33.0 sec	5.77 MBytes	48.4 Mbits/sec
[372]	33.0-34.0 sec	6.03 MBytes	50.6 Mbits/sec
[372]	34.0-35.0 sec	7.28 MBytes	61.1 Mbits/sec
[372]	35.0-36.0 sec	6.80 MBytes	57.0 Mbits/sec
[372]	36.0-37.0 sec	7.12 MBytes	59.7 Mbits/sec
[372]	37.0-38.0 sec	7.81 MBytes	65.5 Mbits/sec
[372]	38.0-39.0 sec	8.22 MBytes	68.9 Mbits/sec
[372]	39.0-40.0 sec	7.09 MBytes	59.5 Mbits/sec
[ID]	Interval	Transfer	Bandwidth
[372]	40.0-41.0 sec	6.63 MBytes	55.6 Mbits/sec
[372]	41.0-42.0 sec	8.76 MBytes	73.5 Mbits/sec
[372]	42.0-43.0 sec	6.47 MBytes	54.3 Mbits/sec
[372]	43.0-44.0 sec	6.68 MBytes	56.0 Mbits/sec
[372]	44.0-45.0 sec	7.69 MBytes	64.5 Mbits/sec

```
C:\>iperf_s.exe -c 192.168.1.101 -i 5 -w 1m -t 30
```

Client connecting to 192.168.1.101, TCP port 5001
TCP window size: 1.00 MByte

[ID]	Interval	Transfer	Bandwidth
[364]	0.0- 5.0 sec	59.9 MBytes	100 Mbits/sec
[364]	5.0-10.0 sec	55.5 MBytes	93.1 Mbits/sec
[364]	10.0-15.0 sec	52.5 MBytes	88.1 Mbits/sec
[364]	15.0-20.0 sec	52.9 MBytes	88.7 Mbits/sec
[364]	20.0-25.0 sec	36.3 MBytes	60.9 Mbits/sec
[364]	25.0-30.0 sec	49.9 MBytes	83.7 Mbits/sec
[364]	0.0-30.1 sec	307 MBytes	85.5 Mbits/sec

```
C:\>iperf_s.exe -c 192.168.1.101 -i 5 -w 1m -t 30
```

Client connecting to 192.168.1.101, TCP port 5001
TCP window size: 1.00 MByte

[ID]	Interval	Transfer	Bandwidth
[364]	0.0- 5.0 sec	68.4 MBytes	115 Mbits/sec
[364]	5.0-10.0 sec	53.7 MBytes	90.1 Mbits/sec
[364]	10.0-15.0 sec	51.5 MBytes	86.5 Mbits/sec
[364]	15.0-20.0 sec	61.7 MBytes	103 Mbits/sec
[364]	20.0-25.0 sec	54.6 MBytes	91.7 Mbits/sec
[364]	25.0-30.0 sec	61.6 MBytes	103 Mbits/sec
[364]	0.0-30.0 sec	352 MBytes	98.1 Mbits/sec

WIFI天线吞吐量测试 (测试图片)

测试数据5Gwifi上传/下载

```
C:\>iperf_s.exe -c 192.168.1.101 -i 5 -w 1m -t 30
-----
Client connecting to 192.168.1.101, TCP port 5001
TCP window size: 1.00 MByte
-----
[372] local 192.168.1.112 port 56037 connected with 192.168.1.101
[ ID] Interval           Transfer     Bandwidth
[372] 0.0- 5.0 sec      139 MBytes  234 Mbits/sec
[372] 5.0-10.0 sec      142 MBytes  238 Mbits/sec
[372] 10.0-15.0 sec      137 MBytes  230 Mbits/sec
[372] 15.0-20.0 sec      136 MBytes  228 Mbits/sec
[372] 20.0-25.0 sec      135 MBytes  226 Mbits/sec
[372] 25.0-30.0 sec      138 MBytes  231 Mbits/sec
[372] 0.0-30.0 sec      827 MBytes  231 Mbits/sec
```

```
C:\>iperf_s.exe -c 192.168.1.101 -i 5 -w 1m -t 30
-----
Client connecting to 192.168.1.101, TCP port 5001
TCP window size: 1.00 MByte
-----
```

```
[380] local 192.168.1.112 port 56038 connected with 192.168.1.101
[ ID] Interval           Transfer     Bandwidth
[380] 0.0- 5.0 sec      136 MBytes  228 Mbits/sec
[380] 5.0-10.0 sec      140 MBytes  234 Mbits/sec
[380] 10.0-15.0 sec      128 MBytes  215 Mbits/sec
[380] 15.0-20.0 sec      127 MBytes  213 Mbits/sec
[380] 20.0-25.0 sec      116 MBytes  195 Mbits/sec
[380] 25.0-30.0 sec      149 MBytes  250 Mbits/sec
[380] 0.0-30.0 sec      796 MBytes  222 Mbits/sec
```

```
C:\>iperf_s.exe -c 192.168.1.101 -i 5 -w 1m -t 30
-----
Client connecting to 192.168.1.101, TCP port 5001
TCP window size: 1.00 MByte
-----
[364] local 192.168.1.112 port 50453 connected with 192.168.1.101
[ ID] Interval           Transfer     Bandwidth
[364] 0.0- 5.0 sec       9.88 MBytes  16.6 Mbits/sec
[364] 5.0-10.0 sec       139 MBytes  233 Mbits/sec
[364] 10.0-15.0 sec       255 MBytes  428 Mbits/sec
[364] 15.0-20.0 sec       260 MBytes  437 Mbits/sec
[364] 20.0-25.0 sec       263 MBytes  442 Mbits/sec
[364] 25.0-30.0 sec       260 MBytes  437 Mbits/sec
[364] 0.0-30.0 sec      1.16 GBytes  332 Mbits/sec
```

```
C:\>iperf_s.exe -c 192.168.1.101 -i 5 -w 1m -t 30
-----
Client connecting to 192.168.1.101, TCP port 5001
TCP window size: 1.00 MByte
-----
```

```
[368] local 192.168.1.112 port 50454 connected with 192.168.1.101
[ ID] Interval           Transfer     Bandwidth
[368] 0.0- 5.0 sec      155 MBytes  261 Mbits/sec
[368] 5.0-10.0 sec      251 MBytes  421 Mbits/sec
[368] 10.0-15.0 sec      266 MBytes  446 Mbits/sec
[368] 15.0-20.0 sec      262 MBytes  439 Mbits/sec
[368] 20.0-25.0 sec      255 MBytes  428 Mbits/sec
[368] 25.0-30.0 sec      262 MBytes  439 Mbits/sec
[368] 0.0-30.0 sec      1.42 GBytes  405 Mbits/sec
```

WIFI天线吞吐量测试

Iperf吞吐量测试

机型		模块		软件版本		
机型编号	信道	距离	测试角度	测试数据 (TX) 1min均值	测试数据 (RX) 1min均值	备注 (掉包次数)
2.4GWIFI		15米	0°	66.2M/S	87.9M/S	0
			90°	66.6M/S	88.5M/S	
			180°	67.7M/S	85.2M/S	
			270°	60.7M/S	86.1M/S	
5GWIFI		15米	0°	217M/S	444M/S	0
			90°	230M/S	445M/S	
			180°	211M/S	442M/S	
			270°	226M/S	444M/S	

WIFI天线信号强度实测图片（数据）



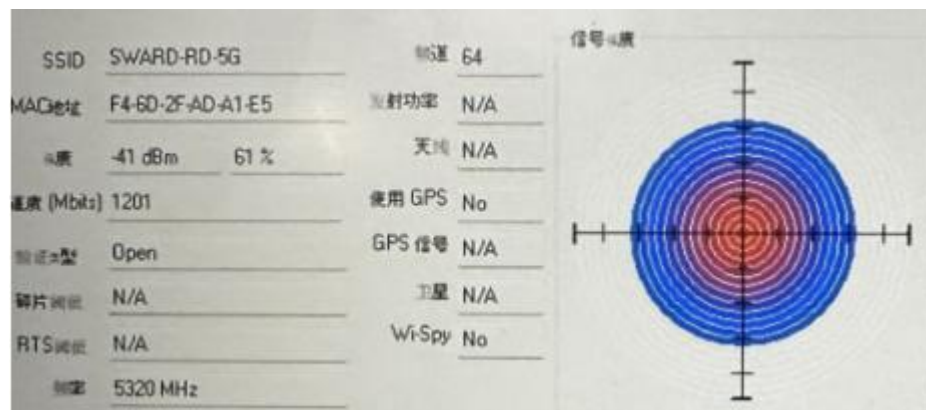
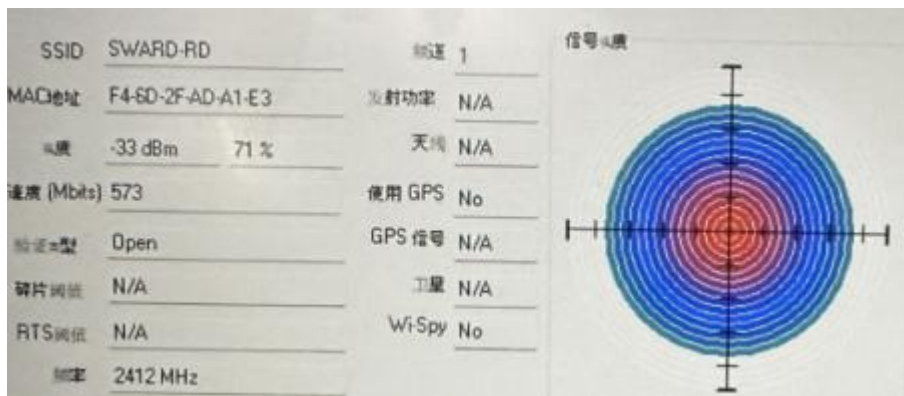
测试地点：我司研发办公室

测试时间：14点-14点30

测试距离：15米

信号强度：-47dBm至-38dBm

WIFI天线信号强度实测图片（数据）



测试地点：我司研发办公室

测试时间：14点-14点30

测试距离：10米

信号强度：-41dBm至-33dBm

WIFI天线信号强度实测图片（数据）

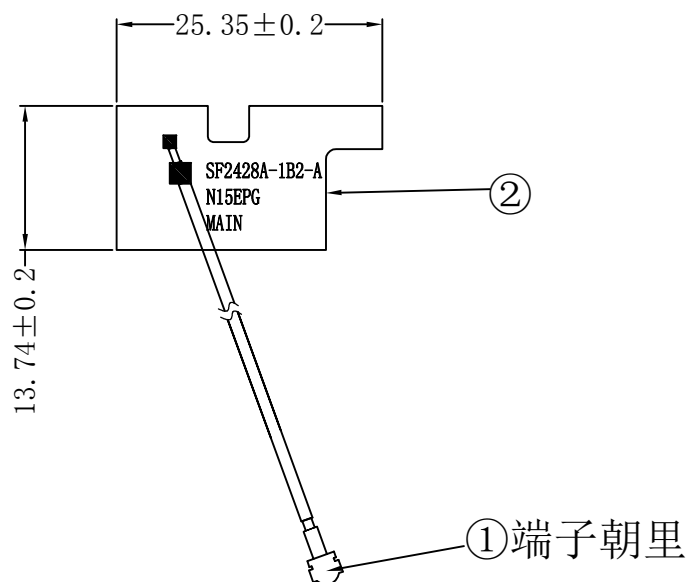
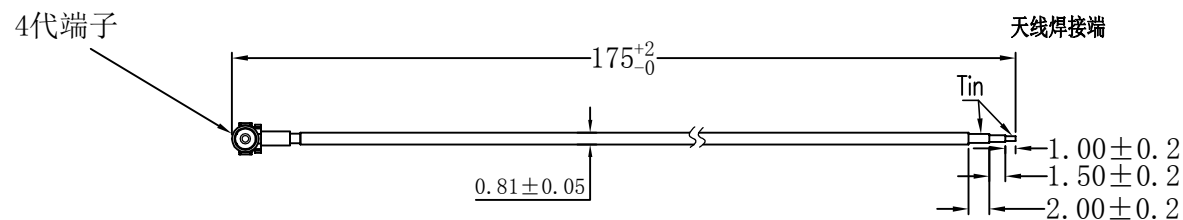


测试地点：我司研发办公室

测试时间：14点-14点30

测试距离：5米

信号强度：-32dBm至-28dBm



技术要求:

1. 打*为重点尺寸;
2. 尺寸符合图纸要求;
3. 焊点无虚焊、假焊。要求圆润、饱满。
4. 网分测试通过（出现指定波形）。
5. 线形尺寸未注公差按照SJ/T 10628 1995 6级，公差值由上下偏差均分；

5											
4											
3							签名	年月日	量产	签名	年月日
2	FPC		黑色	1	SF2428A-1B2-A	RD	ZYA	2024. 9. 19	Q C		
1	同轴线	4代端子	黑色	1	Φ=0. 81mm	RF					
序号	名称	材料	颜色	数量	描述	审核			批准		

SWARD

索沃德通讯技术有限公司

SF2428A-1R24B-175-A

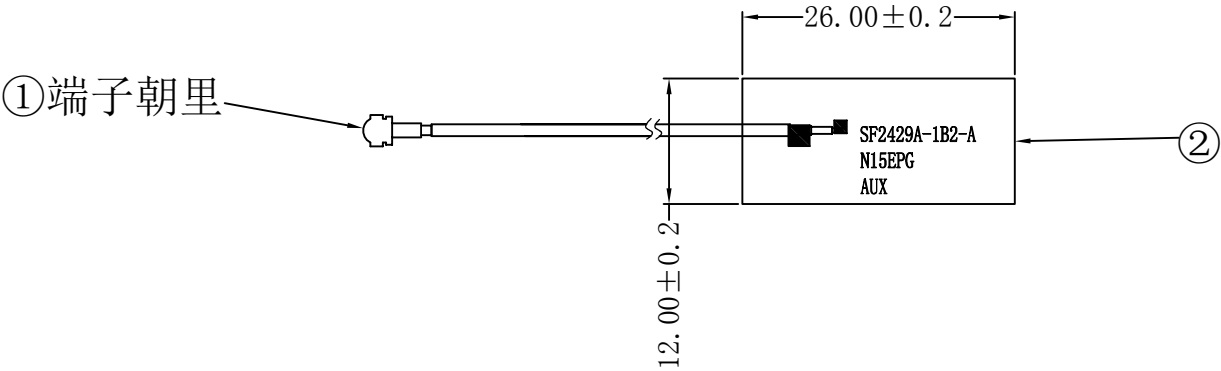
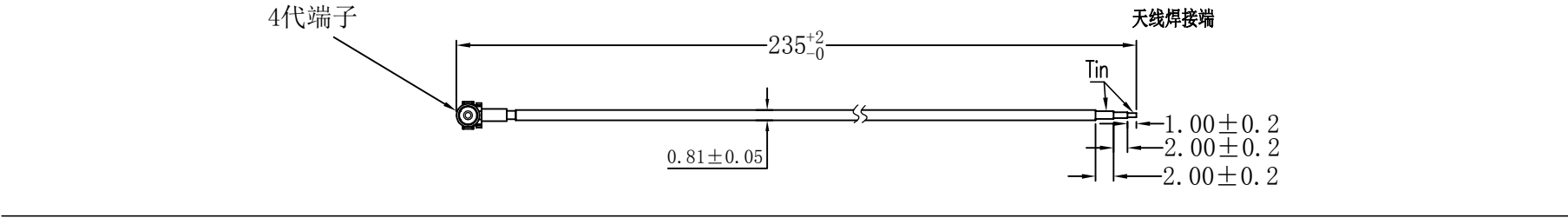
阶段标记

比例

1 A 1 : 1

共 1 张 第 1 张

ROHS



技术要求:

1. 打*为重点尺寸;
2. 尺寸符合图纸要求;
3. 焊点无虚焊、假焊。要求圆润、饱满。
4. 网分测试通过（出现指定波形）。
5. 线形尺寸未注公差按照SJ/T 10628 1995 6级，公差值由上下偏差均分；

5											
4											
3							签名	年月日	量产	签名	年月日
2	FPC		黑色	1	SF2429A-1B2-A	RD	ZYA	2024. 9. 19	Q C		
1	同轴线	4代端子	灰色	1	φ=0. 81mm	RF					
序号	名称	材料	颜色	数量	描述	审核			批准		

SWORD				索沃德通讯技术有限公司			
				SF2429A-1L24G-235-A			
阶段标记		比例		ROHS			
1		A	1 : 1				
共 1 张		第 1 张					

- 注：1. 此份报告依据调试样机实际调试及测试情况所得，其中环境处理、天线位置以及各器件装配位置不可随意更改；
2. 样机所使用物料若有变动，需及时反馈我司做再次验证；
3. 敏感器件清单：
- TP（材质，涂层，走线等）
- 屏（放大电路，LED，排线设计等）
- 壳料（天线装配方式，结构干涉，壳料材质，天线位置高度及面积等）
- 主板（主板传导，射频电路匹配、PA、双功器、滤波、LNA，电源电路等）
- 摄像头、电池、马达、MIC、指纹识别模块等
4. 因调试样机数量少或仅有一台，部分概率性问题不能完全找出，建议量产前先小批试产排查问题点（如闪屏花屏，喇叭杂音，TP跳点，黑屏死机，信号跳水等）