



材料承认书

Material acceptance

厂 商:

深圳市尚远科技有限公司

Manufacturer

Shenzhen Shangyuan Technology Co., Ltd

品 名:

Name of a part

Z1A PCB Antenna

料 号:

1306000335

Part Number

物 料 规 格:

Material specification WIFI-BT Antenna, SZ24155IB98. Wire diameter 0.81.

Black line length 220mm, Red line length 257mm, Z1A WIFI-5G Antenna

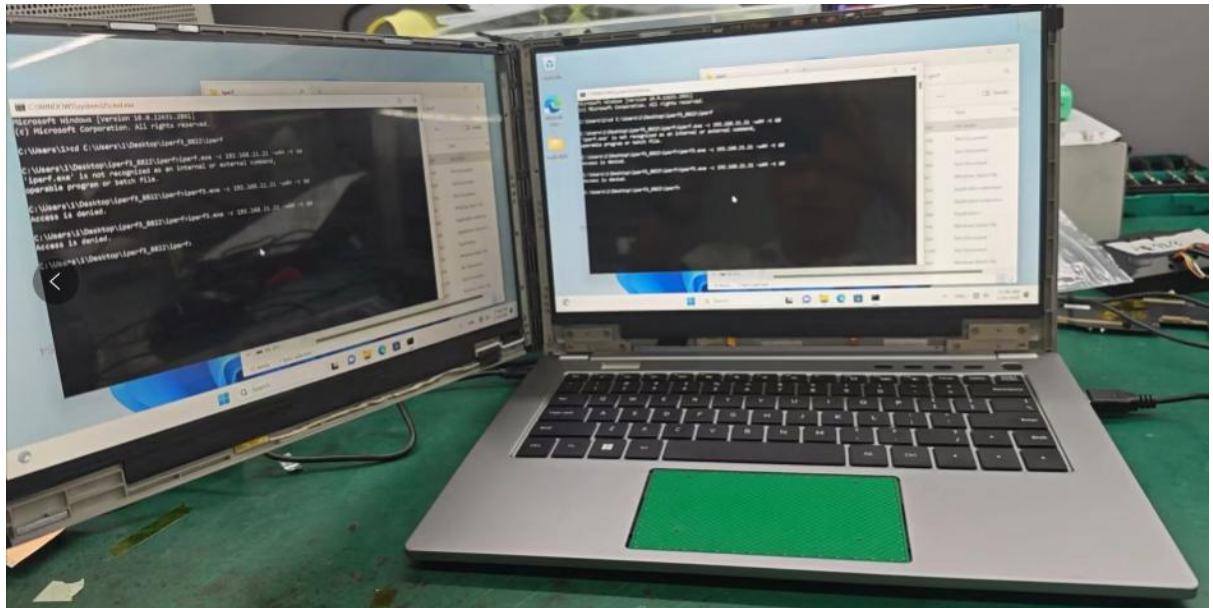
承 认 日 期:

Date of recognition

2024.07.03

一、 项目信息 Products

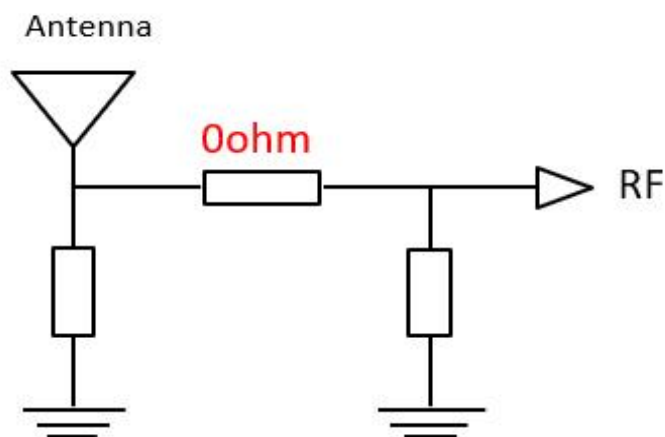
1.1 样机图 Product images



1.2 天线图 Antenna image



二、 天线匹配电路 Antenna matching circuit



三、 天线 S11 参数 Antenna S11 parameter

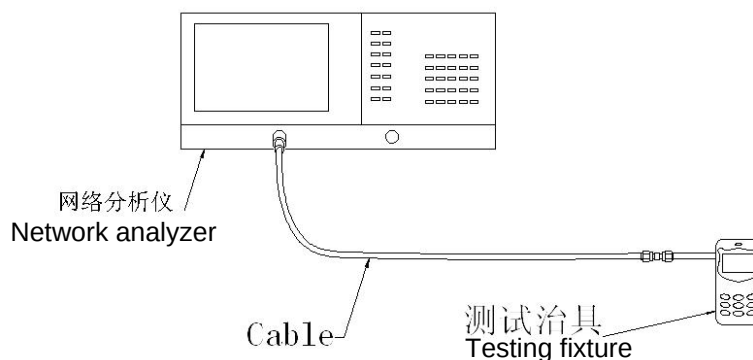
3.1 S11 测试方法说明 S11 testing method description

测试设备：网络分析仪(Agilent E5071C) Testing equipment: Network analyzer (Agilent E5071C)

测试方法：用一根 50 欧姆 CABLE 电缆从仪器测试端口导出，使用校准件校准后连接测试制具的 SMA 接头，记录相关频点对应的回波损耗和驻波比。

Testing method: Export a 50 ohm CABLE electrical system from the instrument testing port, calibrate it with a calibration piece, and connect it to the SMA connector of the testing fixture to record the echo loss and standing wave ratio corresponding to the relevant frequency points.

测试示意图如下:The testing schematic diagram is as follows:



测试示意图
Testing schematic diagram

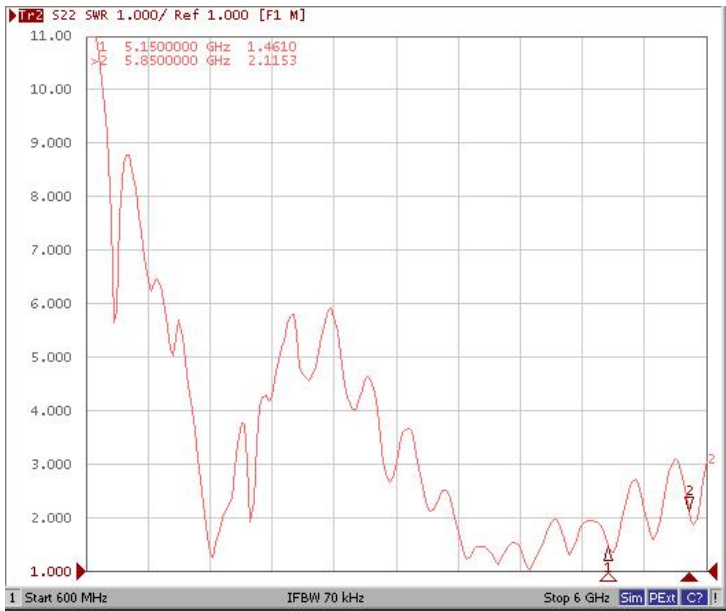
3.2 S11 测试参数 Testing Parameters

2.4G WIFI



频率 (MHz) frequency	2400	2450	2500
驻波比 Standing Wave Ratio	1.2	1.7	2.2

5.8G WIFI



频率 (MHz) frequency	5150	5850
驻波比 Standing Wave Ratio	1.4	2.1

四、 天线 OTA 测试数据 Antenna OTA test data

4.1 测试环境 Testing environment

测试系统：多探头 OTA 测量系统 (XH-IoT) Testing system: Multi probe OTA measurement system (XH- IoT)

测试环境：温度 $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$ ，湿度 $50\% \pm 15\%$ Ttesting environment temperature $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$, humidity $50\% \pm 15\%$

测试设备：测试无源数据时，使用网络分析仪 R&S ZND/ Agilent E5071C

Testing equipment: When testing passive data, use the network analyzer R&SZND/Agilent E5071C

测试有源数据时，使用综测仪 Agilent 8960 /CMW500/SP9500E/SP8315

When test active data, use the comprehensive tester Agilent 8960/cMW500/SP9500E/SP8315

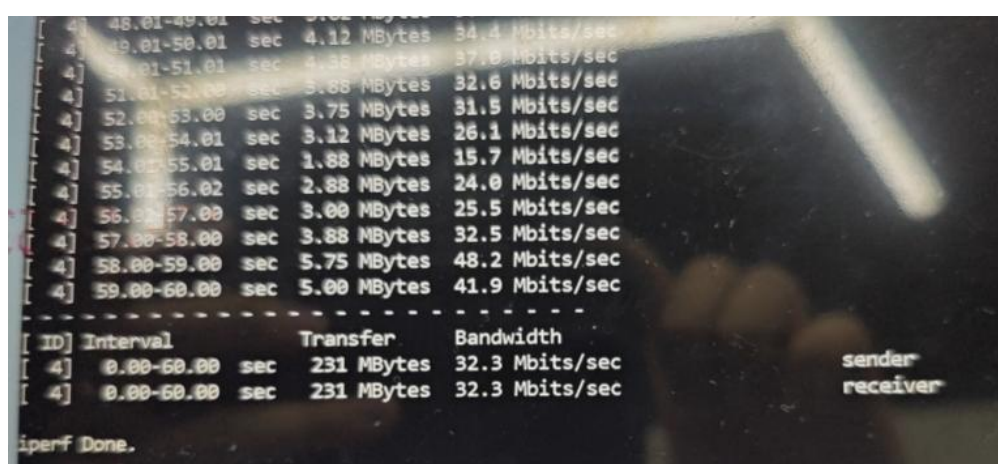


4.2 有源测试数据 Active test data

Measurement	Band	Channel	Total
TRP	WIFI_B (11M)	1	9.18
TRP	WIFI_B (11M)	6	9.49
TRP	WIFI_B (11M)	11	10.32
TIS(EIRP)	WIFI_B (11M)	11	-70.47
TRP	WIFI_G (54M)	1	8.85
TRP	WIFI_G (54M)	6	8.51
TRP	WIFI_G (54M)	11	9.63
TIS(EIRP)	WIFI_G (54M)	11	-58.04
TRP	WIFI_N_ISM (65M)	1	7.4
TRP	WIFI_N_ISM (65M)	6	7.63
TRP	WIFI_N_ISM (65M)	11	8.64

TIS(EIRP)	WIFI_N_ISM (65M)	11	-55.86
TRP	WIFI_A (54M)	36	10.3
TRP	WIFI_A (54M)	149	10.89
TRP	WIFI_A (54M)	165	10.95
TIS(EIRP)	WIFI_A (54M)	165	-65.33
TRP	WIFI_N_UNII (65M)	36	9.25
TRP	WIFI_N_UNII (65M)	149	9.39
TRP	WIFI_N_UNII (65M)	165	9.03
TIS(EIRP)	WIFI_N_UNII (65M)	165	-60.31

4.3 吞吐量测试数据 Throughput test data



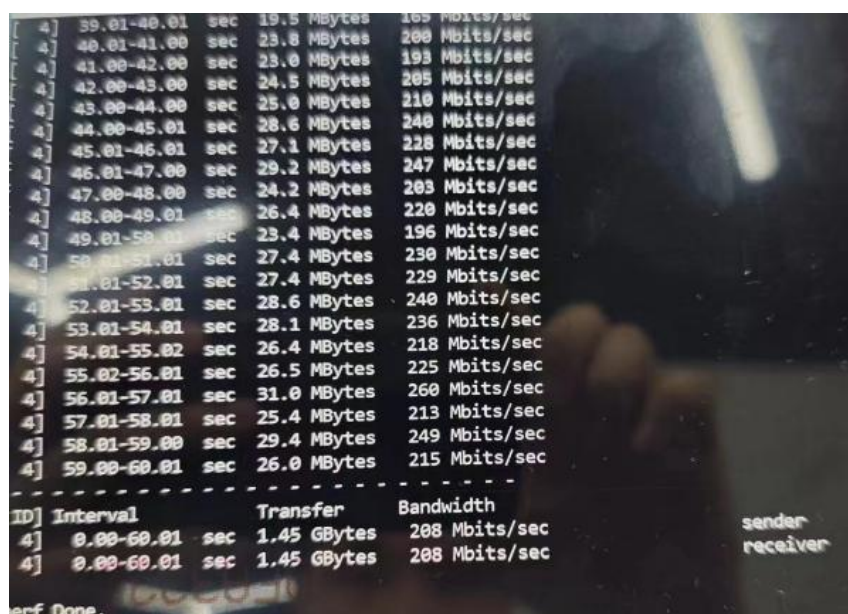
[4]	48.01-49.01	sec	3.62 MBytes	34.4 Mbits/sec
[4]	49.01-50.01	sec	4.12 MBytes	37.8 Mbits/sec
[4]	50.01-51.01	sec	4.35 MBytes	37.0 Mbits/sec
[4]	51.01-52.00	sec	3.68 MBytes	32.6 Mbits/sec
[4]	52.00-53.00	sec	3.75 MBytes	31.5 Mbits/sec
[4]	53.00-54.01	sec	3.12 MBytes	26.1 Mbits/sec
[4]	54.01-55.01	sec	1.88 MBytes	15.7 Mbits/sec
[4]	55.01-56.02	sec	2.88 MBytes	24.0 Mbits/sec
[4]	56.02-57.00	sec	3.00 MBytes	25.5 Mbits/sec
[4]	57.00-58.00	sec	3.88 MBytes	32.5 Mbits/sec
[4]	58.00-59.00	sec	5.75 MBytes	48.2 Mbits/sec
[4]	59.00-60.00	sec	5.00 MBytes	41.9 Mbits/sec

[ID]	Interval		Transfer	Bandwidth
[4]	0.00-60.00	sec	231 MBytes	32.3 Mbits/sec
[4]	0.00-60.00	sec	231 MBytes	32.3 Mbits/sec

iperf Done.

sender receiver

2.4G WiFi



[4]	39.01-40.01	sec	19.5 MBytes	165 Mbits/sec
[4]	40.01-41.00	sec	23.8 MBytes	200 Mbits/sec
[4]	41.00-42.00	sec	23.0 MBytes	193 Mbits/sec
[4]	42.00-43.00	sec	24.5 MBytes	205 Mbits/sec
[4]	43.00-44.00	sec	25.0 MBytes	210 Mbits/sec
[4]	44.00-45.01	sec	28.6 MBytes	240 Mbits/sec
[4]	45.01-46.01	sec	27.1 MBytes	228 Mbits/sec
[4]	46.01-47.00	sec	29.2 MBytes	247 Mbits/sec
[4]	47.00-48.00	sec	24.2 MBytes	203 Mbits/sec
[4]	48.00-49.01	sec	26.4 MBytes	220 Mbits/sec
[4]	49.01-50.01	sec	23.4 MBytes	196 Mbits/sec
[4]	50.01-51.01	sec	27.4 MBytes	230 Mbits/sec
[4]	51.01-52.01	sec	27.4 MBytes	229 Mbits/sec
[4]	52.01-53.01	sec	28.6 MBytes	240 Mbits/sec
[4]	53.01-54.01	sec	28.1 MBytes	236 Mbits/sec
[4]	54.01-55.02	sec	26.4 MBytes	218 Mbits/sec
[4]	55.02-56.01	sec	26.5 MBytes	225 Mbits/sec
[4]	56.01-57.01	sec	31.0 MBytes	260 Mbits/sec
[4]	57.01-58.01	sec	25.4 MBytes	213 Mbits/sec
[4]	58.01-59.00	sec	29.4 MBytes	249 Mbits/sec
[4]	59.00-60.01	sec	26.0 MBytes	215 Mbits/sec

[ID]	Interval		Transfer	Bandwidth
[4]	0.00-60.01	sec	1.45 GBytes	208 Mbits/sec
[4]	0.00-60.01	sec	1.45 GBytes	208 Mbits/sec

iperf Done.

sender receiver

5G WiFi

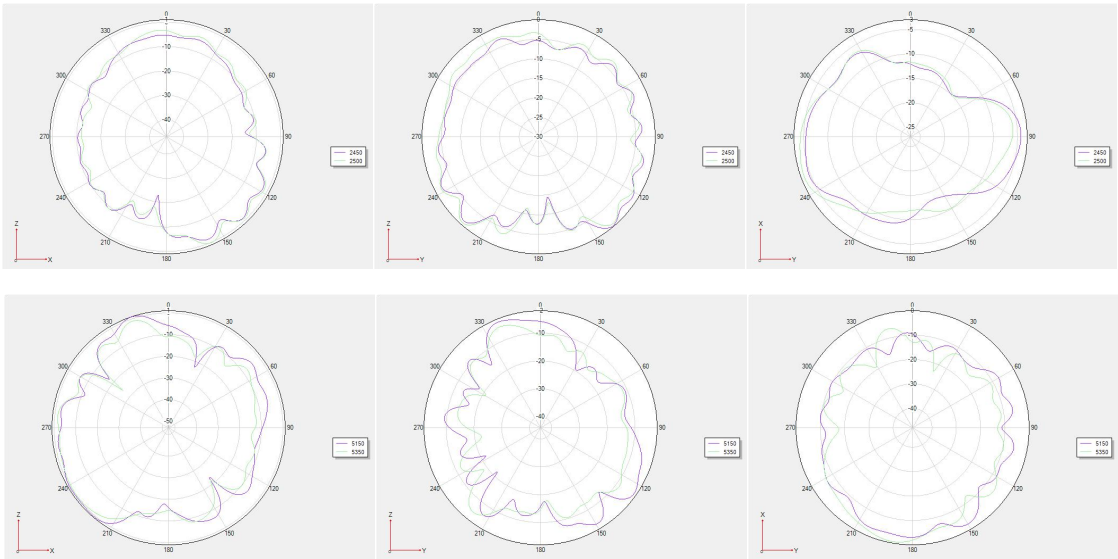
4.3 效率与增益 Efficiency and gain

Frequency/Mhz	MaxGain/dBi	Efficiency / %
2400	1.2	37.88
2410	1.4	37.93
2420	1.34	37.07
2430	1.93	37.71
2440	1.91	38.83
2450	1.57	39.76
2460	1.56	37.35
2470	2.03	37.54
2480	2.05	37.24
2490	2.51	38.06
2500	2.36	38.55

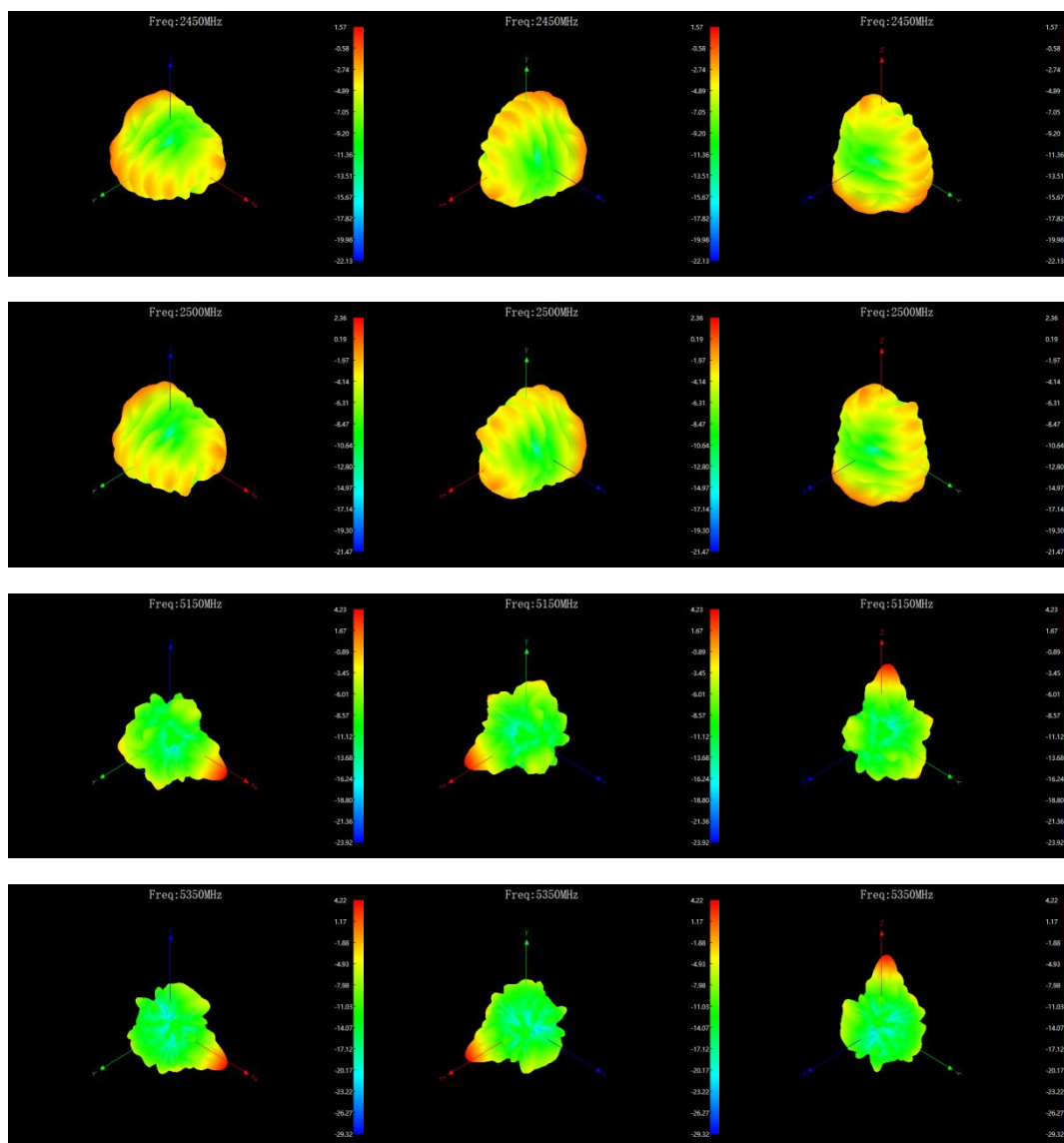
Frequency/Mhz	MaxGain/dBi	Efficiency / %
5150	4.23	34.53
5200	4.8	36.17
5250	4.78	37.83
5300	4.5	36.99
5350	4.22	38.71
5400	3.9	37.22
5450	2.86	35.03
5500	3.81	35.85
5550	3	35.22
5600	2.66	36.69
5650	2.5	37.19
5700	2.12	36.19
5750	2.61	35.38
5800	2.63	36.16
5850	2.52	33.69

4.4 方向图 Directional pattern

2D 方向图 2D directional pattern



3D 方向图 3D directional diagram



五、样机环境处理 Prototype environment processing

样机无环境改动 Prototype without environmental modifications

六、 量产天线指标 6 Mass production antenna specifications

天线量产时，以驻波比作为量产测试标准。

When producing antennas, the standing wave ratio is used as the production testing standard

根据项目本身的差异，给出如下标准：

Based on the differences in the project itself, the following standards are given

频率 (MHz)	量产标准
2400-2500 5150-5850	VSWR (量产性能) < VSWR(承认性能) ± 0.5

七、 工程图

