

天线规格书

Antenna Sample Confirmation Form

供应商名称 Vendor Name	深圳市艾汇科技有限公司 ShenZhen Aihui Technology Co., Ltd				
客户名称 Customer Name					
样品名称 Sample Name	514K WiFi天线				
产品型号 Part Number	线长: 190mm 1.13线径 黑色 双头焊线				
样品规格 Specification	丝印: 514K-AH				
检验项目 Inspection Item	性能测试 Performance	外观检查 Total Appearance	结构 structure	其它 Others	检验结果 Inspection Result
备注 Remark					
品质审核 QA Audit		工程审核 Engineer Audit	曹杨	业务确认 Sales Confirm	
以下由客户填写 The following are filled by Customer					
客户意见 Customer Evaluation					
客户签字/盖章 Signation/ Chapter by Customer	日期/date: 2025. 02. 24				

Antenna Test Report

测试单位: 深圳市艾汇科技有限公司 Test by : ShenZhen Aihui Technology Co., Ltd			
材料 Material	FPC+同轴线		
天线类型 Antenna Type	MonopoleType	极化方式 Polarization mode	Linear
应用场景 Application			
工作频段 Band	5GWIFI	VSWR	≤2
功率 Power	Max : 2W	阻抗 Impedance	50Ω
增益 dBi	≥5.79dBi		
测试设备 Test Equipment	HPE5071C、Shielding Room、3D automatic turntable		
Antenna Description: : 1. Grounding processing and picture description: no 2. Need to change the motherboard to match: no <ul style="list-style-type: none">● Test voltage: 3.6V, check the antenna contact is good before testing.● The RF cable of the integrated tester is kept in a natural state and can not be curled. Specification:test the specified power level, all indicators must conform to the specifications.			

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1、项目图片 1. Project images

1.1 目的 objective

对于深圳市艾汇科技有限公司出品的移动通信终端天线产品规格、测试方法进行规范，避免因测试条件，方法的不同引起误差。

Standardize the specifications and testing methods of mobile communication terminal antenna products produced by Shenzhen Aihui Technology Co., Ltd. to avoid errors caused by different testing conditions and methods.

1.2 产品类别和产品型号概述 Overview of Product Categories and Models

产品型号概述 Product Model Overview

这份报告主要概述的是 FPC 项目所设计的天线的电气结果。此天线设计频段为：2.4G/5.8G 双频WIFI 段。

This report mainly outlines the electrical results of the antenna designed for the FPC project. The frequency band for this antenna design is: 2.4G/5.8G dual band WIFI band.

1.3 基本参数和实验设备说明 Basic parameters and experimental equipment description

基本参数 Basic parameters

产品电气性能指标 Product electrical performance indicators	
工作频率范围 Operating frequency range	5150-5850MHz
驻波比 Standing-wave ratio	5150-5850 MHz: < 1.5
天线增益 Antenna gain	5.79dBi
辐射效率辐射效率 Radiation efficiency	5150-5850 MHz: > 50%
阻抗 impedance	50 ohm
产品材料说明 Product Material Description	
FPC	电解铜+PI Electrolytic copper+PI
同轴线 coaxial cable	编织线 Weaving thread
产品环境说明 Product Environment Description	
工作温度 operation temperature	- 30°C ~ + 85 °C
储藏温度 Storage temperature	- 30°C ~ + 85 °C

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实验设备说明 Experimental Equipment Description

List	Testing project	Equipment
1. S Parameters	1. Return loss 2. VSWR at	Network analyzer: Agilent 8753ES
2. Coupling power test	1. Transmission power 2. Receiving sensitivity	Comprehensive tester: Agilent 8960 E5515C
3. Radiation pattern and gain	1. Radiation pattern 2. Antenna gain	1. Darkroom: 7x4x3 m (3D) 2. Network analyzer : Agilent 8753ES

说明：客户最终验证天线性能样机保留在我司至少一年时间，便于分析解决天线量产中异常情况，确保天线出货品质

Explanation: The customer's final verified antenna performance prototype will be kept in our company for at least one year to facilitate analysis and resolution of abnormal situations during antenna mass production,

Ensure the quality of antenna shipments

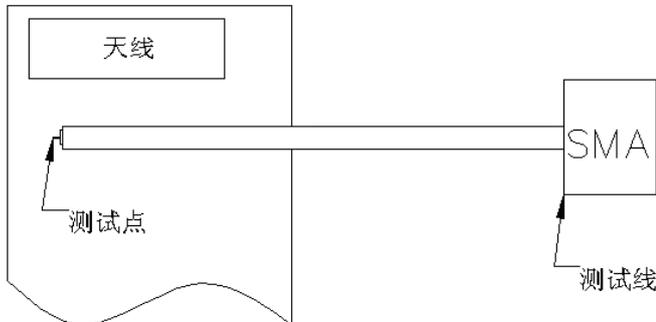
2、测试制具 Testing equipment

目的：尽可能准确地测试天线的无源参数。

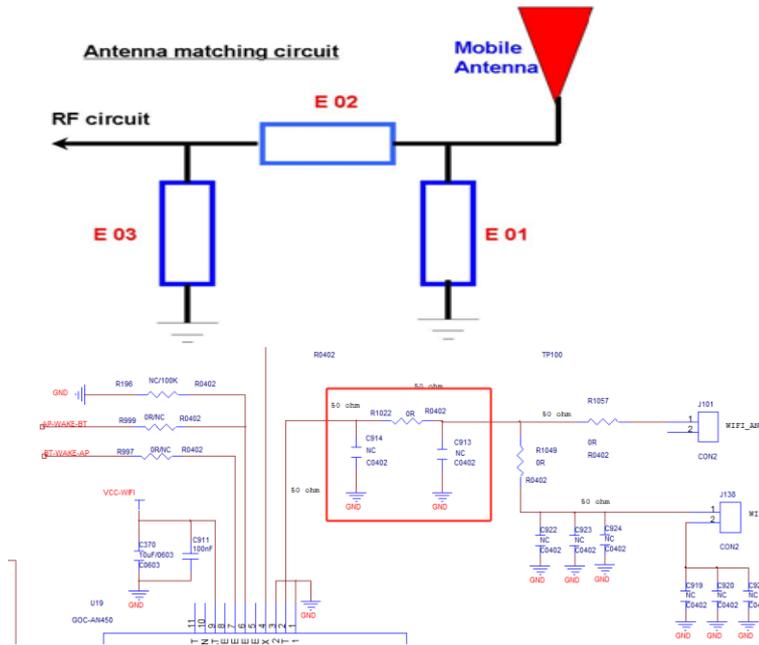
制作方法：手机制具是用一根 50 欧姆的同轴电缆，一端连在手机主板的匹配电路后端（射频测试孔前端）的测试点上，另一端连接 SMA 接头。示意图如下：

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

Production method: The mobile phone tool is made by using a 50 ohm coaxial cable, with one end connected to the testing point at the back end of the matching circuit (front end of the RF test hole) of the mobile phone motherboard, and the other end connected to an SMA connector. The schematic diagram is as follows:



3、天线匹配电路 Antenna matching circuit



修改点/Modify

E01	E02	E03
No	No	No

备注：匹配无修改。

Note: No modifications have been made to the match.

4. S11 测试 S11 test

4.0 S11 测试方法说明 S11 Test Method Description

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

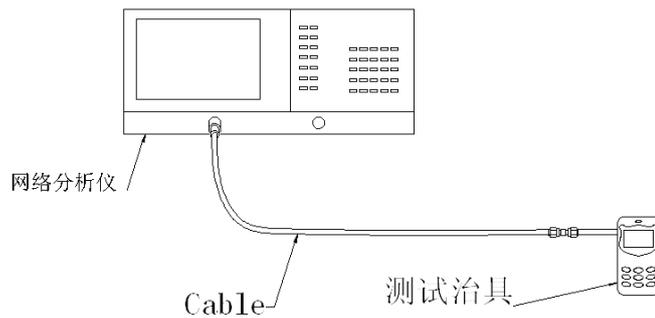
测试方法：用一根 50 欧姆 CABLE 电缆从仪器测试端口导出，使用校准件校准后连接手机制具的 SMA 接头，记录相关频点对应的回波损耗和驻波比。

测试示意图如下：

Test method: Use a 50 ohm CABLE cable to export from the instrument test port, calibrate with a calibration component, and connect

Record the return loss and standing wave ratio corresponding to the relevant frequency points of the SMA connector for mobile phone equipment.

The test schematic diagram is as follows:



测试示意图

5、暗室测试设备和数据 Darkroom testing equipment and data

5.0 测试设备 Test equipment

测试系统: 屏蔽暗室

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

测试设备: 测试无源数据时, 使用网络分析仪 AgilentE5071C

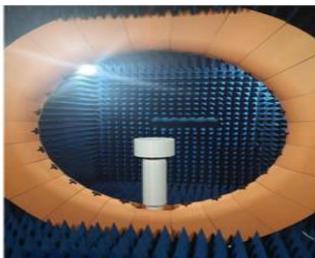
测试有源数据时, 使用综测仪 CMW500

Test system: Shielded darkroom

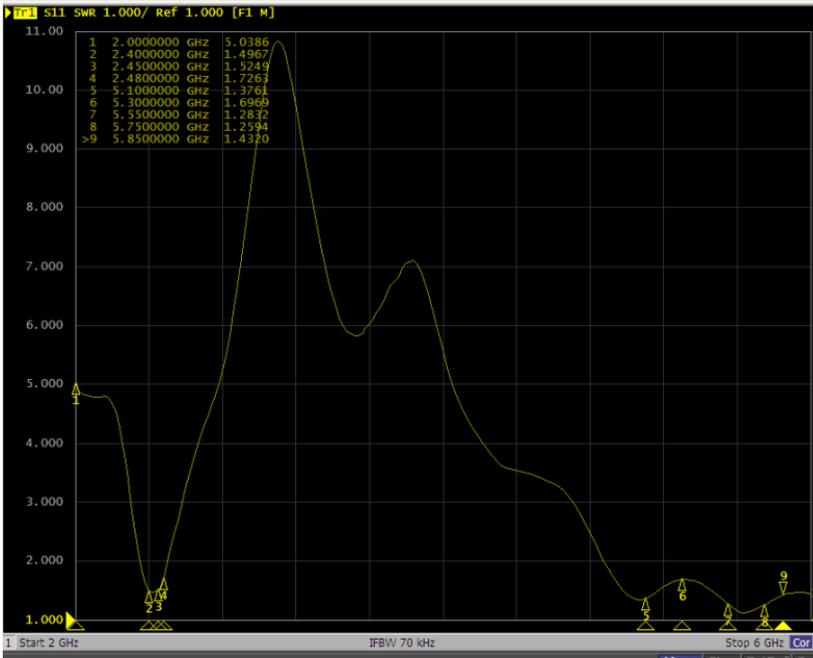
Test environment: temperature $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$, humidity $50\% \pm 15\%$

Testing equipment: When testing passive data, use the Agilent E5071C network analyzer

When testing active data, use the comprehensive testing instrument CMW500



5.1 天线无源驻波比 Passive standing wave ratio of antenna

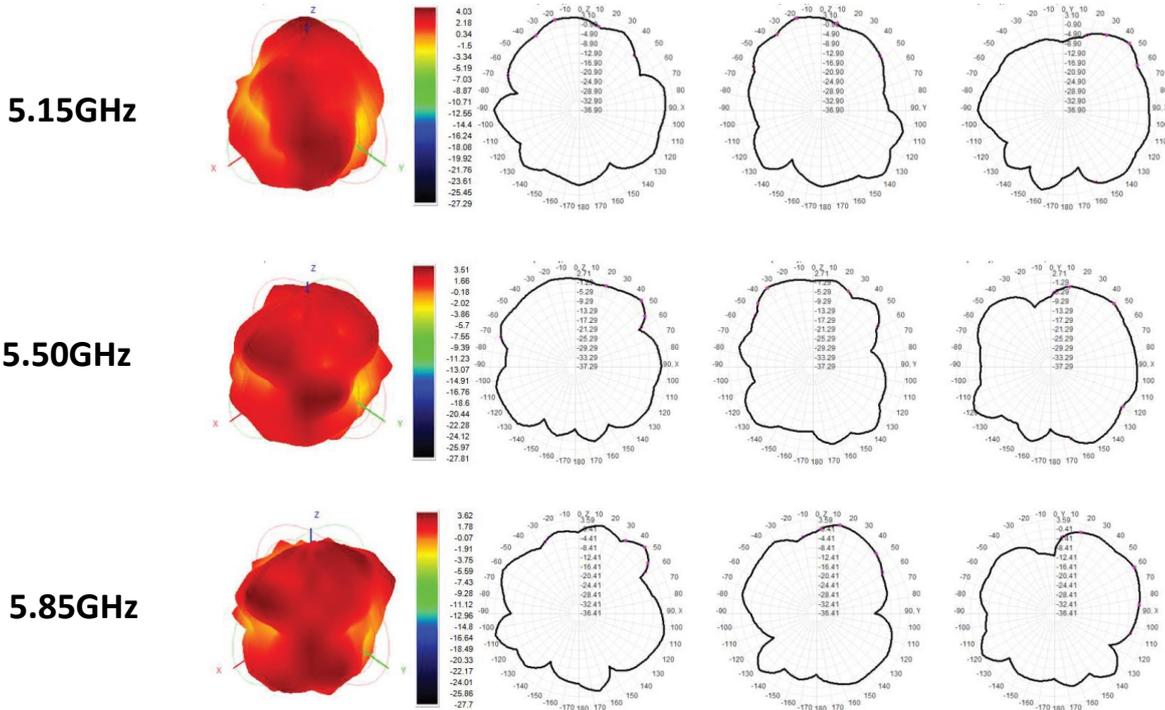


5.2 天线暗室测试数据 Antenna darkroom test data

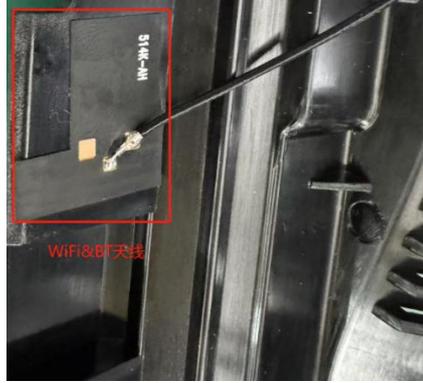
WIFI 测试数据: WIFI test data:

频率 frequency (MHZ)	efficiency 效率 (%)	gain (dbi)
5150	63.37	4.03
5250	63.84	3.91
5350	64.56	3.98
5450	66.80	3.21
5550	65.78	3.51
5650	63.15	3.29
5750	63.94	3.25
5850	65.39	3.62

5.3 天线方向图测试 Antenna direction test



6. 天线装配示意图 Antenna assembly diagram



7、天线环境处理 7. ANTENNA ENVIRONMENT PROCESSING

1) 恒定温湿度测试 (Constant temperature and humidity test)

- **测试条件:** 高温 70°C、湿度 80% RH 持续 24 小时; 低温 -40°C 持续 24 小时, 总时长 48 小时。
- **判定标准:** 测试前后外观要求, 金属表面涂层无剥落、裂纹、褶皱、分离等; 非金属部件不变色、无裂纹、变形、脱胶等缺陷; 电气性能测试符合标准要求。
- **Test conditions:** high temperature of 70 ° C, humidity of 80% RH for 24 hours; Low temperature of -40 ° C lasts for 24 hours, with a total duration of 48 hours.
- **Judgment criteria:** Appearance requirements before and after testing, with no peeling, cracks, wrinkles, separation, etc. on the metal surface coating; Non metallic components do not change color, have no cracks, deformations, delamination or other defects; The electrical performance test meets the standard requirements.

2) 高低温热冲击测试 (High and low temperature thermal shock test)

- **测试条件:** 70°C 2 小时, -40°C 2 小时, 循环 6 次, 共 24 小时。
- **判定标准:** 同恒定温湿度测试的判定标准, 即金属表面涂层和非金属部件外观无缺陷, 电气性能符合标准。
- **Test conditions:** 70 ° C for 2 hours- 40 ° C for 2 hours, cycled 6 times for a total of 24 hours.
- **Judgment criteria:** The judgment criteria for constant temperature and humidity testing are that the metal surface coating and non-metallic components have no defects in appearance, and the electrical performance meets the standards.

3) 盐雾测试 (Salt spray test)

- **测试条件:** 准备浓度 (5±1)% 的氯化钠 (NACL) 溶液, 保证盐溶液 pH 值在 6.5 - 7.2 中性范围; 压力桶温度 47±1°C, 喷雾压力维持在 1.00±0.1kgf/cm², 喷雾量 1.0 - 2.0ml/80cm²/h, 测试时间 24 小时。
- **判定标准:** 产品表面暴露区域无氧化或生锈; 其他区域盐雾测试后氧化 / 生锈面积 < 1.0% 。

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- **Test conditions:** Prepare a solution of sodium chloride (NaCl) with a concentration of $(5 \pm 1)\%$, ensuring that the pH value of the salt solution is in the neutral range of 6.5-7.2; The pressure barrel temperature is $47 \pm 1^\circ\text{C}$, the spray pressure is maintained at $1.00 \pm 0.1\text{kgf/cm}^2$, the spray volume is 1.0-2.0ml/80cm²/h, and the test time is 24 hours.
- **Judgment criteria:** There is no oxidation or rust on the exposed area of the product surface; After salt spray testing in other areas, the oxidation/rusting area is less than 1.0%.

4) 天线焊接到 PCB 良好 (The soldering of the antenna to the PCB test)

- **测试条件:** 采用电气测试方法验证连接的电气性能良好, 且 WiFi 天线与 PCB 集成后功能正常
- **判定标准:** 目视检查连接点周围是否形成正确的焊角。不应有过焊或欠焊迹象。天线应在 PCB 上牢固且正确定位, 并验证电气连通性。

Test conditions: Use electrical testing methods to verify that the electrical performance of the connection is good, and that the WiFi antenna functions normally after integration with the PCB

- **Judgment criteria:** visually inspect whether the correct welding angle is formed around the connection point. There should be no signs of over welding or under welding. The antenna should be securely and correctly positioned on the PCB, and electrical connectivity should be verified.

8、天线量产指标 8. Antenna mass production indicators

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	量产标准
5150-5850MHZ	VSWR (量产性能) < VSWR(承认性能)+0.5

9. 结构图纸 9. Structural drawings

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