

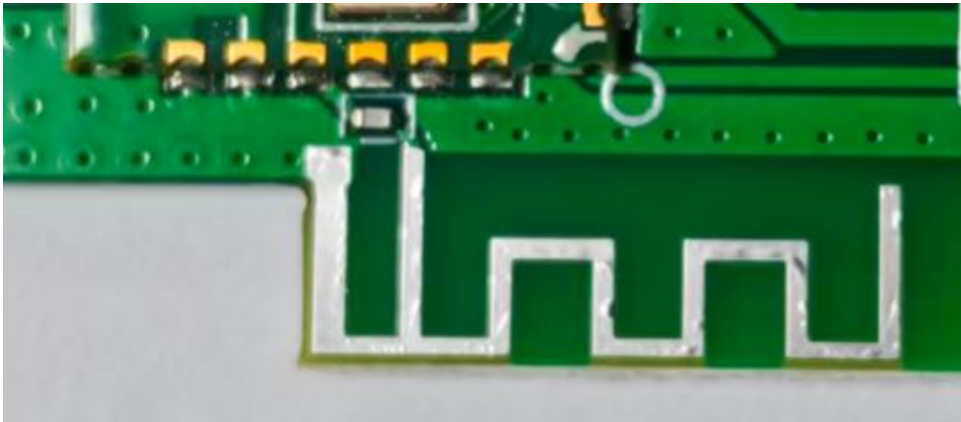
**Shenzhen Changyin Electronic Co.,Ltd**  
**2.4GInverted-F Antenna (IFA) Report**

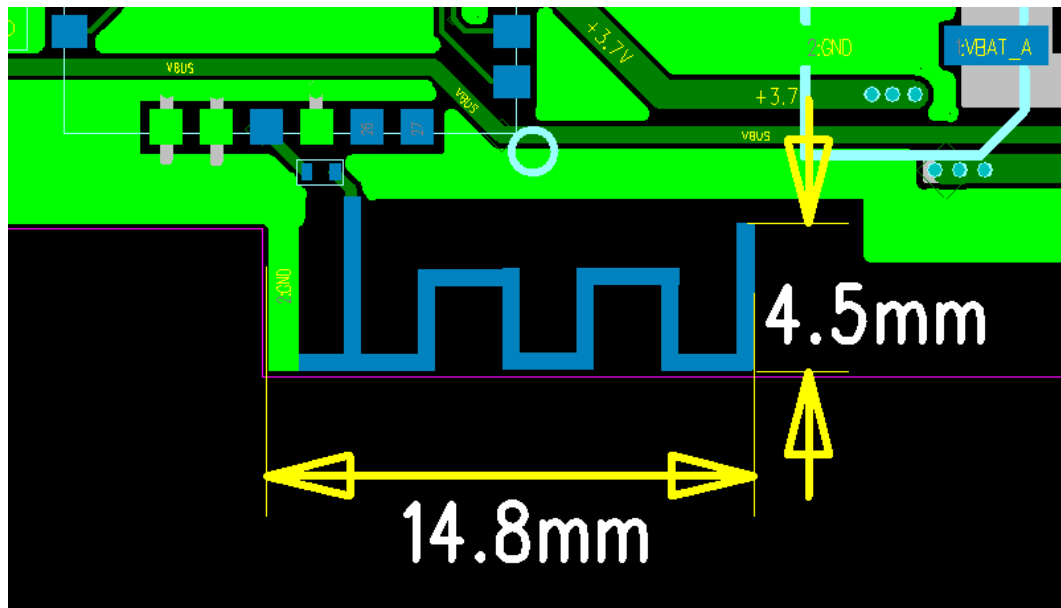
**1, product information**

|                           |                                                                                                      |
|---------------------------|------------------------------------------------------------------------------------------------------|
| Item                      | Details                                                                                              |
| Product Name              | 2.4GHz Inverted-F PCB Antenna (IFA)                                                                  |
| Model No.                 | CY-ANT-2400-PCB                                                                                      |
| Applicable Frequency Band | 2.400GHz~2.4835GHz (ISM band, including Wi-Fi 802.11b/g/n/ax, Bluetooth BLE, Zigbee, etc.)           |
| Design Type               | Inverted-F Antenna (IFA) PCB Integrated Antenna                                                      |
| Substrate                 | FR-4 (Dielectric constant $\epsilon_r=4.4$ , loss tangent $\tan\delta=0.02$ , board thickness 1.6mm) |
| Copper Foil Thickness     | 1oz (35 $\mu\text{m}$ )                                                                              |
| Manufacturer:             | Shenzhen Changyin Electronics Co., Ltd.                                                              |

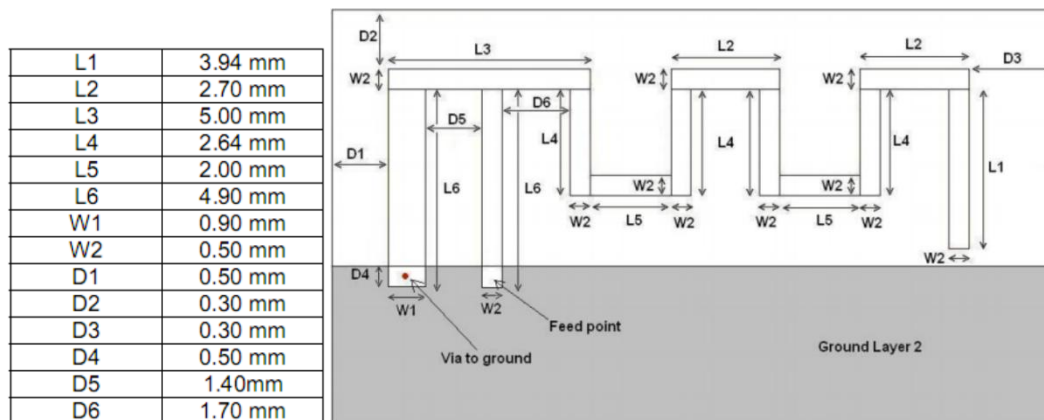
**2. Antenna Structure and Dimensions (Corresponding PCB Components)**

**2.1 Detailed Dimensional Parameters (Corresponding PCB Components)**





2.2 Dimensional diagram (corresponding to the actual PCB)



### 3. Radiation pattern (center frequency 2.44 GHz)

# 射频性能测量报告

## RF Performance Test Report

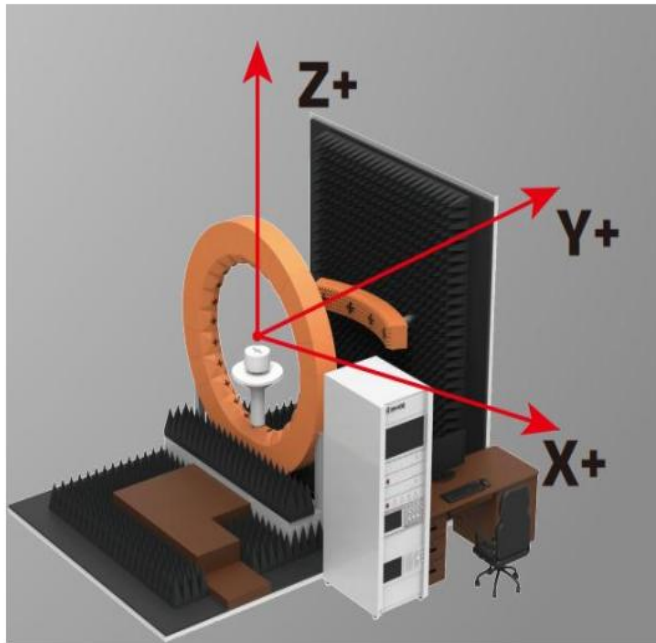
|                       |              |                      |           |                      |                   |
|-----------------------|--------------|----------------------|-----------|----------------------|-------------------|
| 客户名称<br>Customer Name | 深圳市长音电子有限公司  | 项目名称<br>Project Name |           | 合立讯料号<br>Helixun P/N | HLX0028-A0-T24-V1 |
| 频段<br>Band            | 2400-2500MHz | 测试日期<br>Test Date    | 2023-4-13 | 测试人<br>Inspector     | 黄亚飞               |

### 天线测试设备简介

#### Antenna Test Equipment Introduction

测试天线输入特性使用 Agilent E5071C and Agilent 5071C 矢量网络分析仪；辐射特性利用 ETS 三维近场暗室进行测试，并分别使用 CMW500 和 Agilent 5071C 进行了分析。暗房的测试坐标如下：

Test of antenna input characteristics using Agilent E5071C and Agilent 5071C vector network analyzer; The radiation pattern of the antenna are tested using the ETS starlab 3D near field Anechoic Chamber, and the instrument is used to agilent8960 E5515 and Agilent E4438C. The test coordinates of the darkroom are as follows:



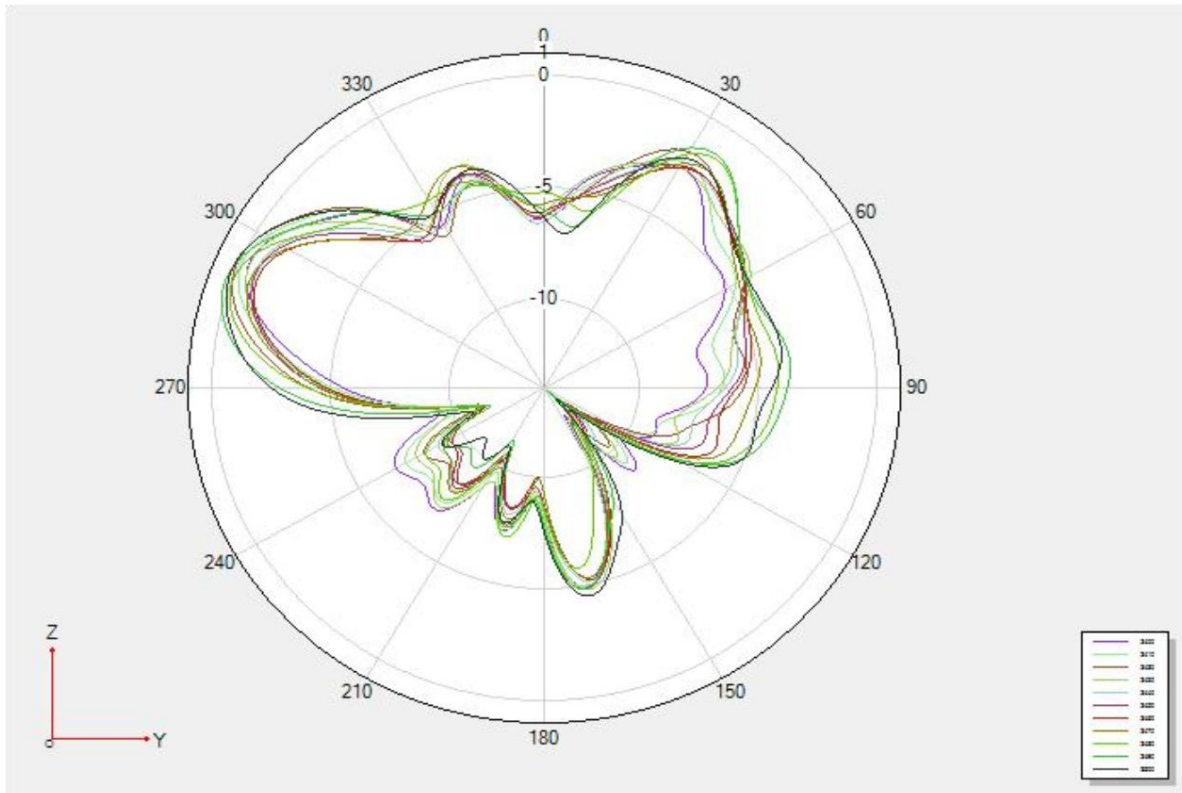
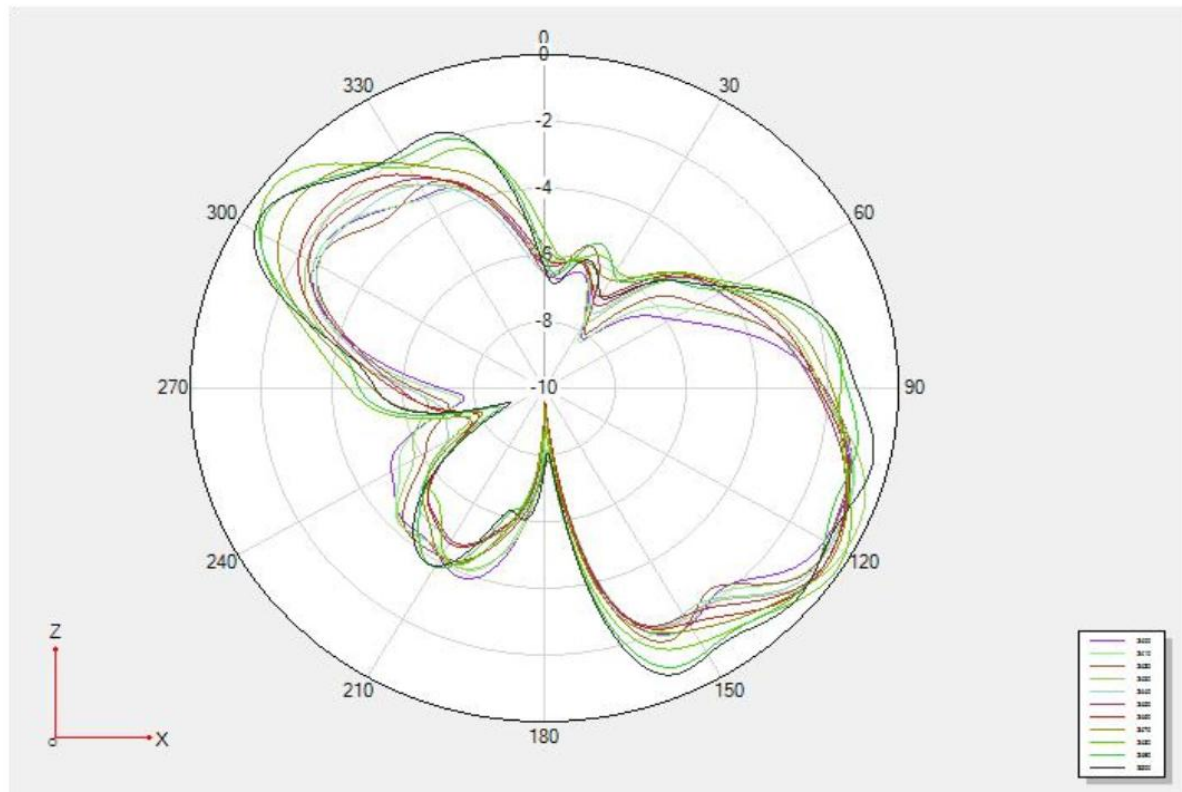
深圳市长音电子有限公司 Shenzhen Changyin Electronic Co.,Ltd

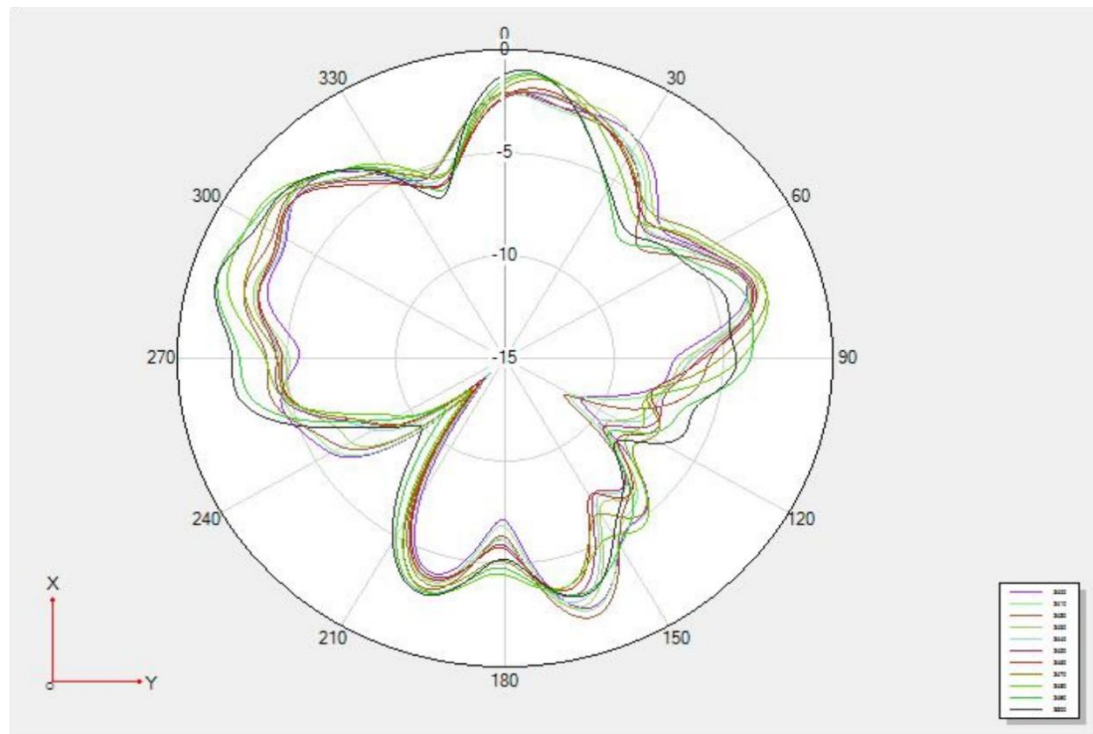
Address: 4/F, Bldg1, Guanfeng Industrial Park, Jiuwei New Village, Xixiang, Bao'an District, Shenzhen, 518126, China

| Sequence Number   | Test Item         | equipment                                            |
|-------------------|-------------------|------------------------------------------------------|
| S parameter       | VSWR              | Agilent 5071C & Agilent 5062A                        |
| OTA Test          | TRP&TIS           | Agilent 8960 E5515C& Agilent 4438C&CMW500 ETS&SATIMO |
| Gain & Efficiency | Gain & Efficiency | ETS&SATIMO                                           |
|                   |                   | Agilent 5071C                                        |



## 2D Pattern





#### 4. Electrical performance parameters (2.400GHz~2.4800GHz)



#### 4.1 Core Performance Indicators

| Frequency<br>(GHz) | Antenna gain<br>(dBi) | VSWR         | Return Loss<br>S11<br>(dB) | radiation<br>efficiency<br>(%) |
|--------------------|-----------------------|--------------|----------------------------|--------------------------------|
| 2.400              | 0.25                  | $\leq 2.1$   | $\geq -10$                 | $\geq 80$                      |
| 2.420              | 0.30                  | $\leq 1.82$  | $\geq -15$                 | $\geq 88$                      |
| 2.440              | 0.35                  | $\leq 1.50$  | $\geq -20$                 | $\geq 90$                      |
| 2.460              | 0.20                  | $\leq 1.3$   | $\geq -15$                 | $\geq 88$                      |
| 2.4800             | 0.20                  | $\leq 1.801$ | $\geq -10$                 | $\geq 85$                      |