

深圳市艾特诺通讯设备有限公司  
SHENZHEN ATN COMMUNICATION TECHNOLOGY CO., LTD.  
规 格 书  
SPECIFICATION FOR APPROVL

客 户:  
CUSTOMER: 宏祥

客 户 项 目 :  
CUSTOMER PRJ: L3

客 户 料 号:  
CUSTOMER P/N:

本 厂 项 目:  
OUR PRJ: ATN64007

规 格:  
SPECIFICATIONS: 2.4-2.48GHz

样 品 数:  
Q' TY: 1 PCS

日 期:  
DATE: 2025.3.26

| 深圳市艾特诺通讯设备有限公司<br>A T N |               |                | 客 户<br>CUSTOMER |                   |                |
|-------------------------|---------------|----------------|-----------------|-------------------|----------------|
| 制作<br>make              | 审核<br>examine | 核准<br>Approver | 结构<br>Structure | 电子<br>Electronics | 核准<br>Approver |
|                         |               |                |                 |                   |                |

地址：深圳市宝安区新安街道留仙二路美生创谷科技园夏谷 504-505 室

Address: 504-505, XiaGu, Wonderful life creative valley, Xinan, Baoan, ShenZhen.

Tel（电话）：0755-29308863

Fax（传真）：0755-29308861

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### 发行/变更记录

| 日期        | 版本 | 内容   | 备注 |
|-----------|----|------|----|
| 2025.3.26 | A0 | 初版发行 |    |
|           |    |      |    |
|           |    |      |    |

## 1、测试设备 Test Equipment&Conditions

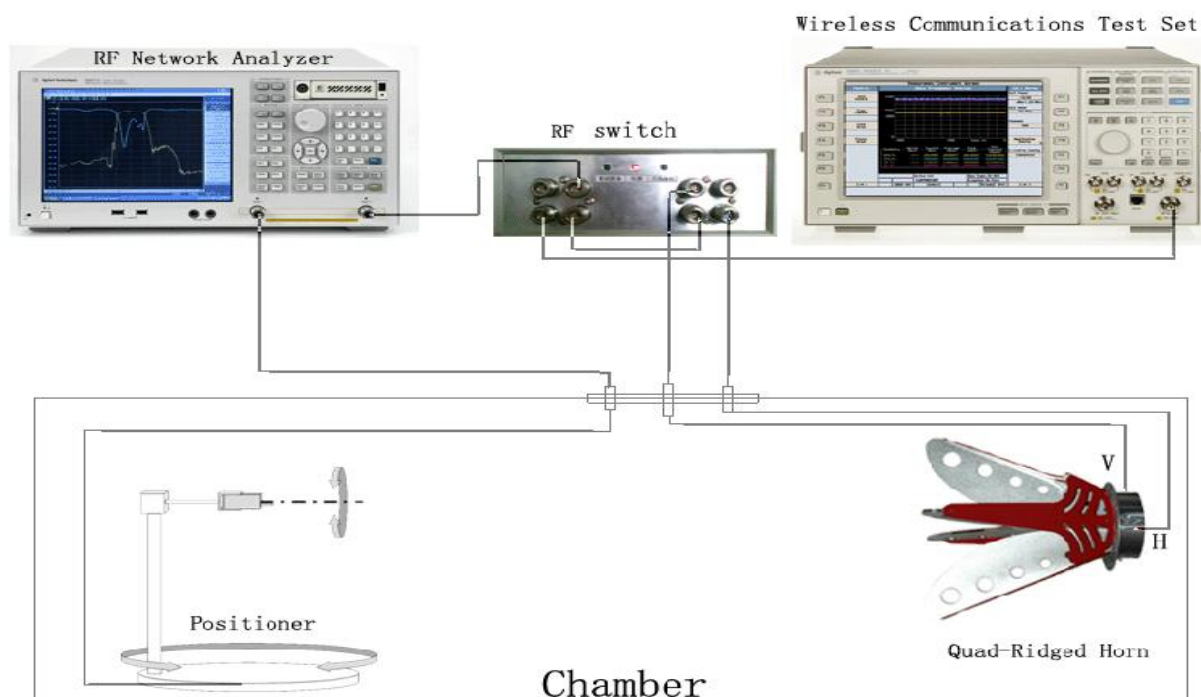
### 1.1 网络分析仪 (Network Analyzers)

Agilent Technologies E5071B

### 1.2 综合测试仪 (Communications Test Set)

CMW500

### 1.3 3D 暗室测试系统 ( Test System)



## 2、产品规格 Product Specification

### 2.1、Material&Mechanical Characteristics

|                   |      |
|-------------------|------|
| 材质 Material       | FPC  |
| 天线类型 Antenna type | 单极天线 |

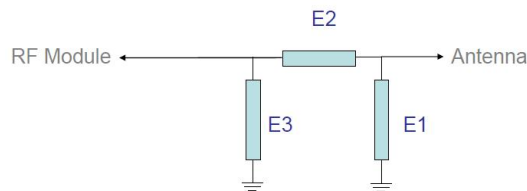
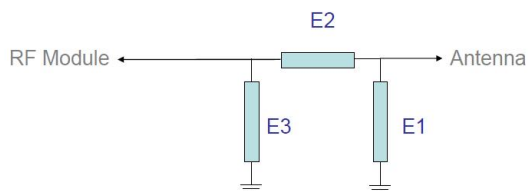
### 2.2、储存条件 Storage conditions

|                          |        |
|--------------------------|--------|
| 储存温度 Storage Temperature | 22℃±5℃ |
| 相对湿度 relative humidity   | 35-65% |
| 储存期限 Storage life        | 360 天  |

## 3、匹配电路 Matching circuit

、天线匹配电路 (L)

、天线匹配电路 (R)

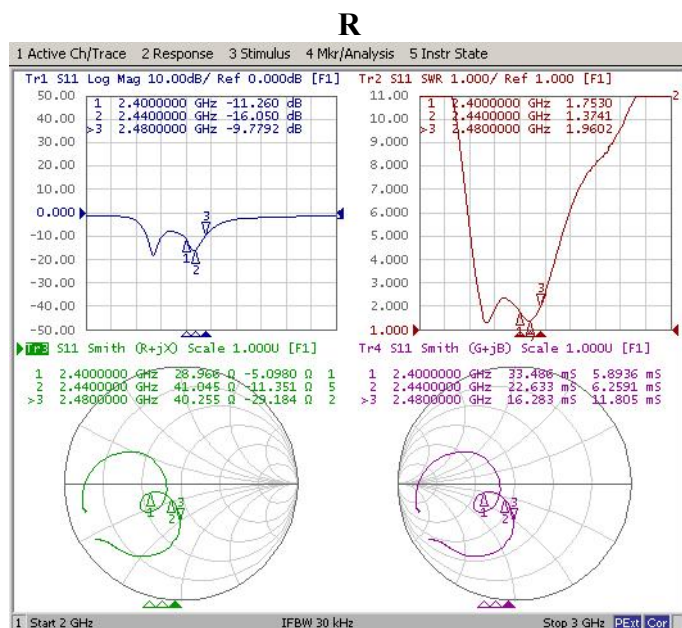
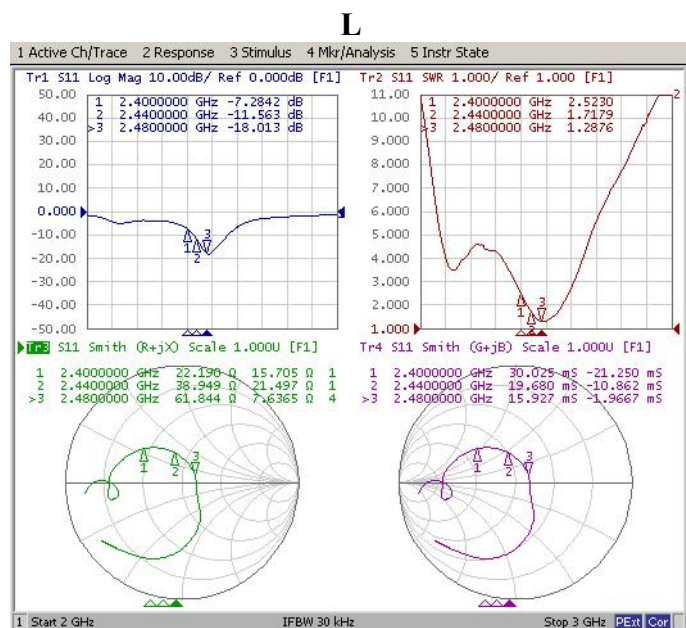


| Element  | Value |
|----------|-------|
| E1(0201) | NC    |
| E2(0201) | 2.2nH |
| E3(0201) | 2.7pF |

| Element  | Value |
|----------|-------|
| E1(0201) | NC    |
| E2(0201) | 0Ω    |
| E3(0201) | 2.7pF |

## 4、测试数据报告 Test Data Report

### 4.1 S11 Parameter



## 4.2 增益和效率 Gain & Efficiency

**L**

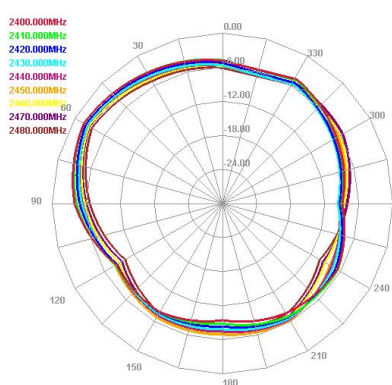
| Freq<br>(MHz) | Effi<br>(%) | Effi<br>(dB) | Gain<br>(dBi) |
|---------------|-------------|--------------|---------------|
| 2400          | 27.2        | -5.65        | -1.28         |
| 2410          | 26.45       | -5.78        | -1.57         |
| 2420          | 24.06       | -6.19        | -2.2          |
| 2430          | 22.75       | -6.43        | -2.48         |
| 2440          | 23.17       | -6.35        | -2.36         |
| 2450          | 24.52       | -6.11        | -2.17         |
| 2460          | 23.2        | -6.34        | -1.88         |
| 2470          | 23.03       | -6.38        | -1.96         |
| 2480          | 21.1        | -6.76        | -2.18         |

**R**

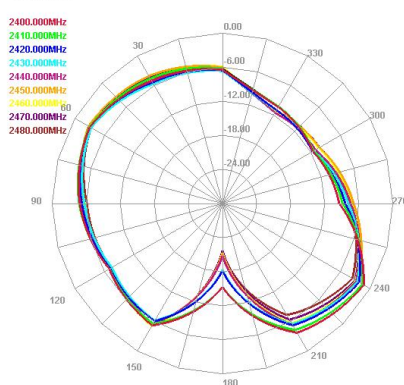
| Freq<br>(MHz) | Effi<br>(%) | Effi<br>(dB) | Gain<br>(dBi) |
|---------------|-------------|--------------|---------------|
| 2400          | 39.27       | -4.06        | 0.18          |
| 2410          | 38.67       | -4.13        | 0.15          |
| 2420          | 37.87       | -4.22        | -0.09         |
| 2430          | 35.46       | -4.5         | -0.43         |
| 2440          | 32.68       | -4.86        | -0.97         |
| 2450          | 32.12       | -4.93        | -1.1          |
| 2460          | 29.39       | -5.32        | -1.48         |
| 2470          | 29.72       | -5.27        | -1.55         |
| 2480          | 28.12       | -5.51        | -2.04         |

## 4.3 方向图 Radiation pattern

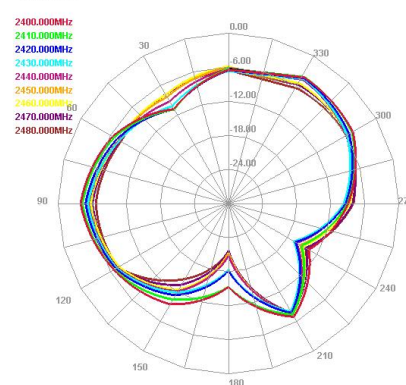
**Horizontal**



**E1 Face**

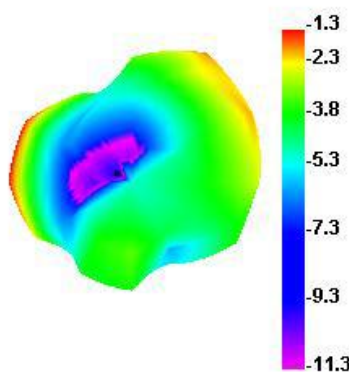


**E2 Face**

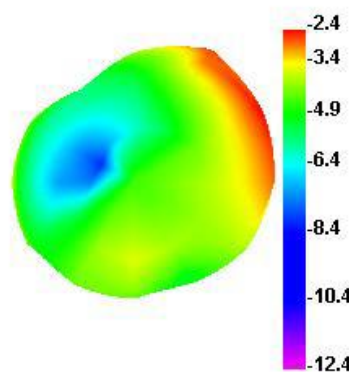


**L**

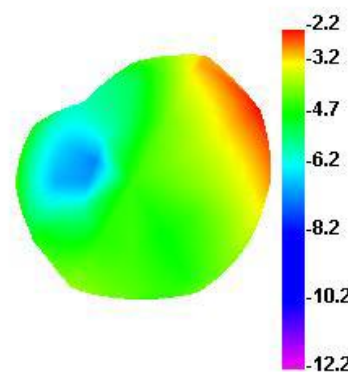
**2400.000MHz**

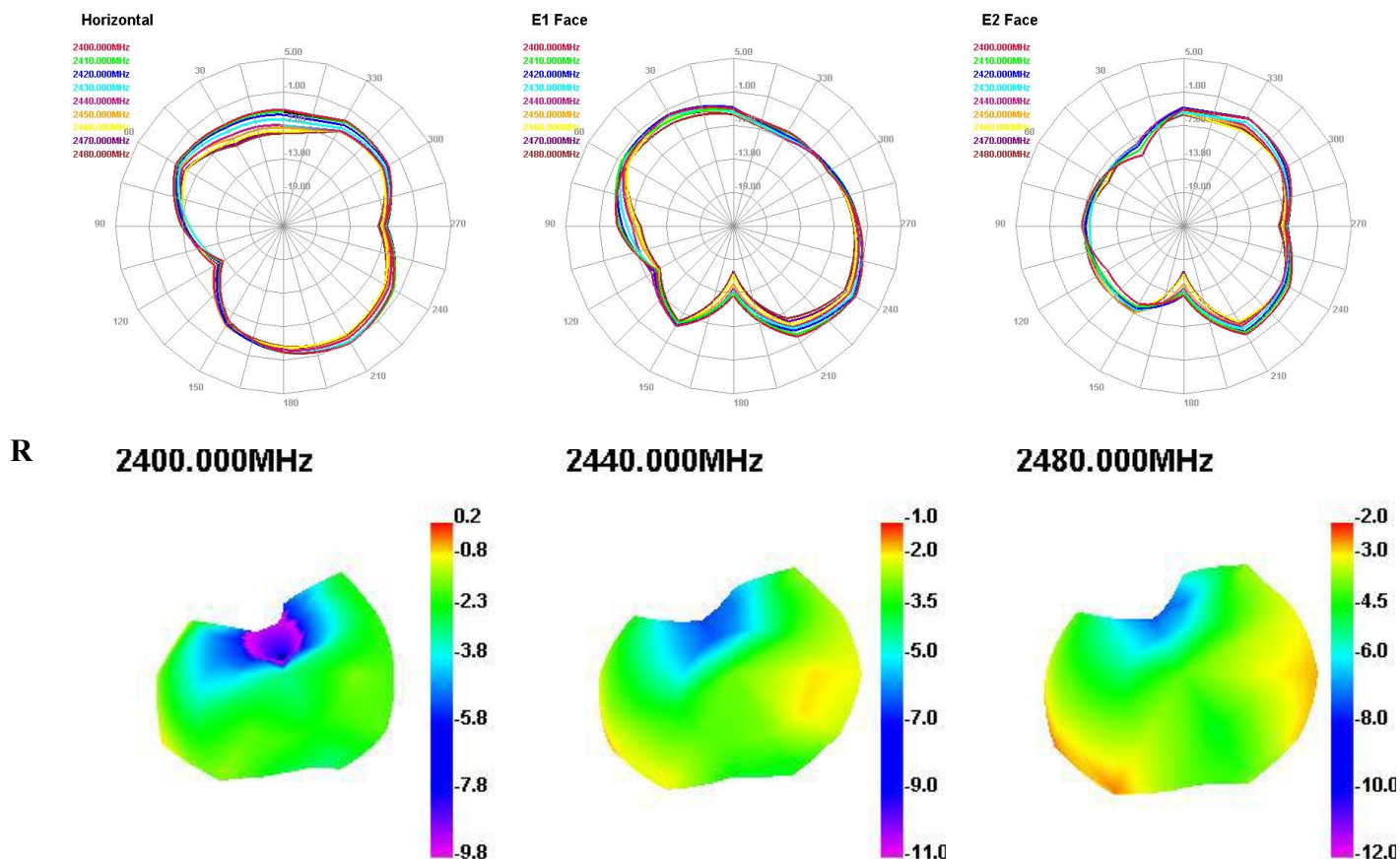


**2440.000MHz**



**2480.000MHz**





#### 4.4 OTA 测试数据 OTA Test Data

| band                   | channel | TRP (dBm) | TIS (dBm) |
|------------------------|---------|-----------|-----------|
| Bluetooth BR (L)<br>头模 | 0       | -6.7      | -78.2     |
|                        | 39      | -6.7      | -79.0     |
|                        | 78      | -7.7      | -78.1     |
| band                   | channel | TRP (dBm) | TIS (dBm) |
| Bluetooth BR (R)<br>头模 | 0       | -6.9      | -78.9     |
|                        | 39      | -5.0      | -81.0     |
|                        | 78      | -3.8      | -81.6     |

#### 4.5 实测数据 Measured data

测试地点：美生创谷南门隆昌路

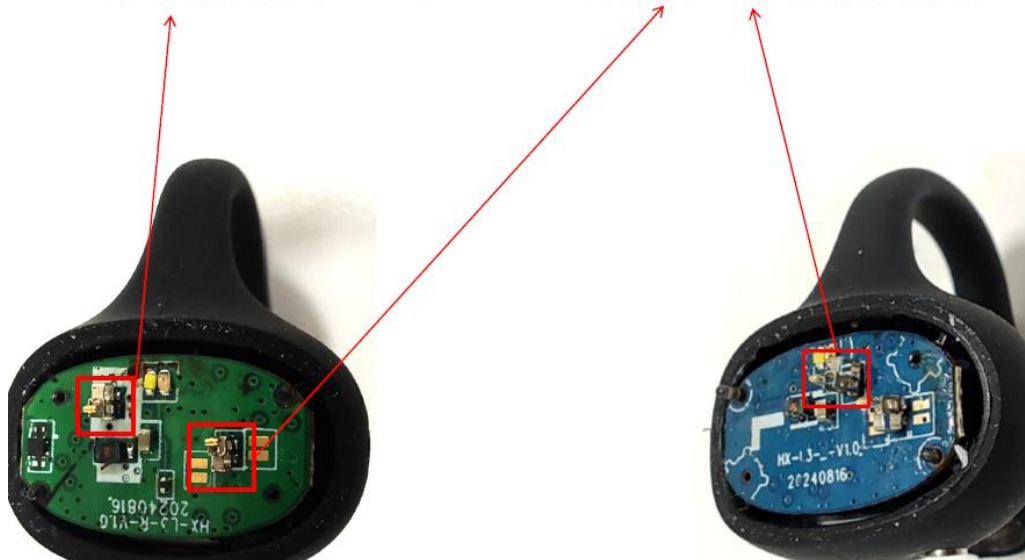
|           |      |
|-----------|------|
| 测试手机      | 三星S8 |
| 听音乐全向 (m) | 12   |



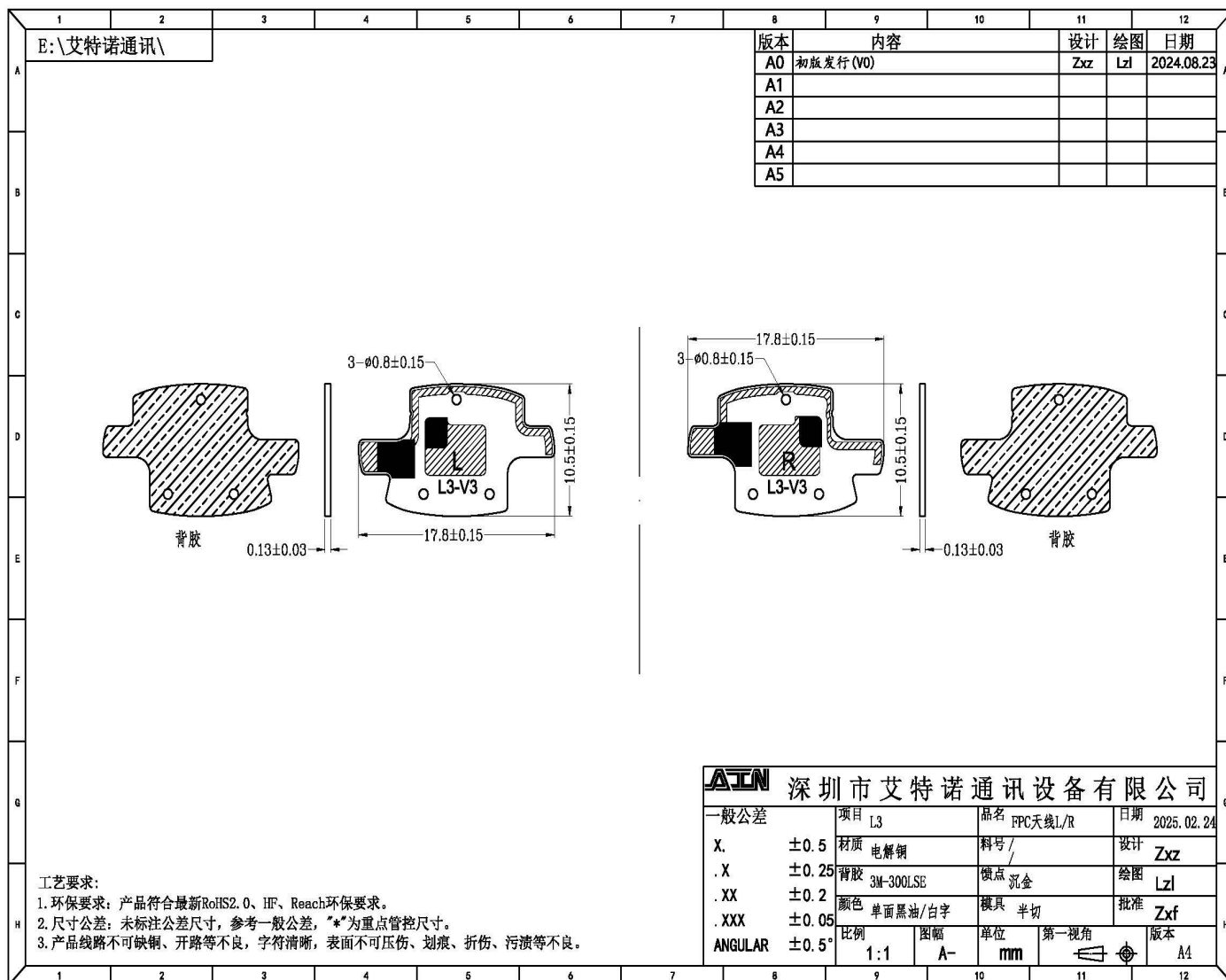
## 5、装配要求 Assembly requirements

(1)、弹片高度更换为**3.2mm**； (2)、触摸、天线弹片方向如图所示。

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## 6、工程图纸 Product Drawing





艾特诺通讯

深圳市艾特诺通讯设备有限公司

SHENZHEN ATN COMMUNICATION TECHNOLOGY CO., LTD.

## 7、尺寸检测报告 Size test report

## 尺寸检验报告 Dimension test report

|                                          |     |           |                                                                                                                                                             |       |       |                    |       |                |
|------------------------------------------|-----|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|--------------------|-------|----------------|
| 项目 project: L3                           |     |           | 品名 Product Name: FPC 天线 L/R                                                                                                                                 |       |       |                    |       |                |
| 类别 category: FPC                         |     |           | 数量 Quantity: 5 pcs                                                                                                                                          |       |       | 日期 Date: 2025.3.26 |       |                |
| 检验依据标准: Inspection basis and standard    |     |           | <input checked="" type="checkbox"/> 工程图纸 Engineering drawings<br><input type="checkbox"/> 标准样板 Standard template<br><input type="checkbox"/> 其它 Other _____ |       |       |                    |       |                |
| 测量设备&精度 Measurement equipment & accuracy |     |           | 卡尺 Vernier caliper & 0.02mm                                                                                                                                 |       |       |                    |       |                |
| 检验项目 Inspection items                    |     |           | 样品测验值 test value                                                                                                                                            |       |       |                    |       | 判定结果 determine |
|                                          |     |           | 1                                                                                                                                                           | 2     | 3     | 4                  | 5     |                |
| 尺寸检验<br>Dimensional inspection           | 1.  | L         |                                                                                                                                                             |       |       |                    |       |                |
|                                          | 2.  | 0.13±0.03 | 0.12                                                                                                                                                        | 0.12  | 0.12  | 0.12               | 0.12  | OK             |
|                                          | 3.  | φ0.8±0.15 | 0.76                                                                                                                                                        | 0.74  | 0.76  | 0.76               | 0.72  | OK             |
|                                          | 4.  | 17.8±0.15 | 17.78                                                                                                                                                       | 17.86 | 17.84 | 17.88              | 17.84 | OK             |
|                                          | 5.  | 10.5±0.15 | 10.56                                                                                                                                                       | 10.52 | 10.50 | 10.56              | 10.54 | OK             |
|                                          | 6.  | R         |                                                                                                                                                             |       |       |                    |       |                |
|                                          | 7.  | 17.8±0.15 | 17.82                                                                                                                                                       | 17.88 | 17.86 | 17.84              | 17.84 | OK             |
|                                          | 8.  | φ0.8±0.15 | 0.78                                                                                                                                                        | 0.74  | 0.76  | 0.76               | 0.74  | OK             |
|                                          | 9.  | 10.5±0.15 | 10.56                                                                                                                                                       | 10.48 | 10.52 | 10.50              | 10.54 | OK             |
|                                          | 10. | 0.13±0.03 | 0.12                                                                                                                                                        | 0.12  | 0.12  | 0.12               | 0.12  | OK             |
|                                          | 11. | /         |                                                                                                                                                             |       |       |                    |       |                |
|                                          | 12. | /         |                                                                                                                                                             |       |       |                    |       |                |



## 8、盐雾测试报告 Salt spray test report

|                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                  |                                          |            |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------|------------|--|--|
| 项目 project                                                                                                                                                                                                                                                                                                                                                                                                                 | L3                                                                                               | 品名 Product Name:                         | FPC 天线 L/R |  |  |
| 试样情况<br>Sample information                                                                                                                                                                                                                                                                                                                                                                                                 | 试样数量 quantity: 5PCS                                                                              |                                          |            |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            | 材质 material quality: 电解铜 Electrolytic copper                                                     | 镀层 Coating: 镀金 Gold plating              |            |  |  |
| 试验条件<br>Test conditions                                                                                                                                                                                                                                                                                                                                                                                                    | 盐溶液 Salt solution: 5%                                                                            | PH:7.0                                   |            |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            | 试验温度 Test temperature: 35°C                                                                      | 相对湿度 relative humidity: 5%               |            |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            | 喷雾方式 Spray mode: <input checked="" type="checkbox"/> 连续 <input type="checkbox"/> 间歇              | 压缩空气压力 air pressure: 1kg/cm <sup>2</sup> |            |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            | 盐雾沉降率 Salt spray settling rate:                                                                  | 雾液收集 Mist collection: PH7.0nac           |            |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            | 试验周期 Test cycle: __1__                                                                           | 喷雾时间 Spray time: 24 h                    |            |  |  |
| 试验结果 test result                                                                                                                                                                                                                                                                                                                                                                                                           | 试验后的外观: 外观完整无损, 无明显变化。<br>Appearance after test: the appearance is intact without obvious change |                                          |            |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            | 镀层: 无剥落、无锈蚀<br>Coating: no peeling and corrosion                                                 |                                          |            |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            | 表面喷涂、丝印: 无脱落、无气泡。<br>Surface spraying and silk screen printing: no falling off and bubble        |                                          |            |  |  |
| 试验判定 Test judgment                                                                                                                                                                                                                                                                                                                                                                                                         | OK                                                                                               |                                          |            |  |  |
| 说明 Notes:<br>1、盐雾试验作业标准依照中华人民共和国国家标准 GB/T2423.17-2008 执行。<br>The operation standard of salt spray test shall be in accordance with the national standard of the people's Republic of China GB / t2423 17-2008 implementation.<br>2、试件结果判定标准依照中华人民共和国国家标准 GB/T6461-02 执行。<br>The judgment standard of test piece results shall be in accordance with the national standard of the people's Republic of China GB / t6461-02. |                                                                                                  |                                          |            |  |  |

## 9、包装信息 Manner of packing

**深圳市艾特诺通讯设备有限公司**

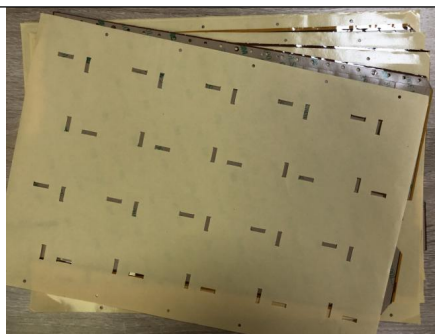
**SHENZHEN ATN COMMUNICATION EQUIPMENT CO.LTD**

**产品包装 Product packaging**

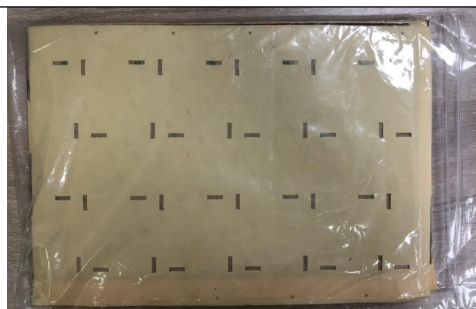
版本 edition: : A0

页码 Page: 1/1

1. 离型纸隔层摆放保护天线  
Barrier paper protection products



2. 密封袋封装效果  
Sealing bag packaging effect



3. 纸箱封箱效果 (贴出货标签和 ROHS 标签) Carton sealing effect

