

# 承 认 书

## SPECIFICATION FOR APPROVAL

客 户 名 称

CUSTOMER NAME: 江苏富联通讯技术股份有限公司

客 户 料 号

CUSTOMER P/N:

产 品 料 号

PRODUCT P/N: FL-DC-2-75

产 品 名 称

PRODUCT NAME: BT/WIFI antenna

规格描述: Built-in FPC antenna / 1.13 black wire L=70mm,

Description: domestic 4th generation IPEX

版本

REV: A V 1.0

出厂签章

|                  |                    |                   |              |
|------------------|--------------------|-------------------|--------------|
| S<br>I<br>G<br>N | 核 准<br>APPROVED BY | 审 核<br>CHECKED BY | 制 作<br>DRAMN |
|                  |                    |                   |              |

客户签章

|                  |           |            |           |
|------------------|-----------|------------|-----------|
| S<br>I<br>G<br>N | 品 质<br>QE | 开 发<br>R&D | 工 程<br>PE |
|                  |           |            |           |

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### 1、版本履历表（Revision History）：

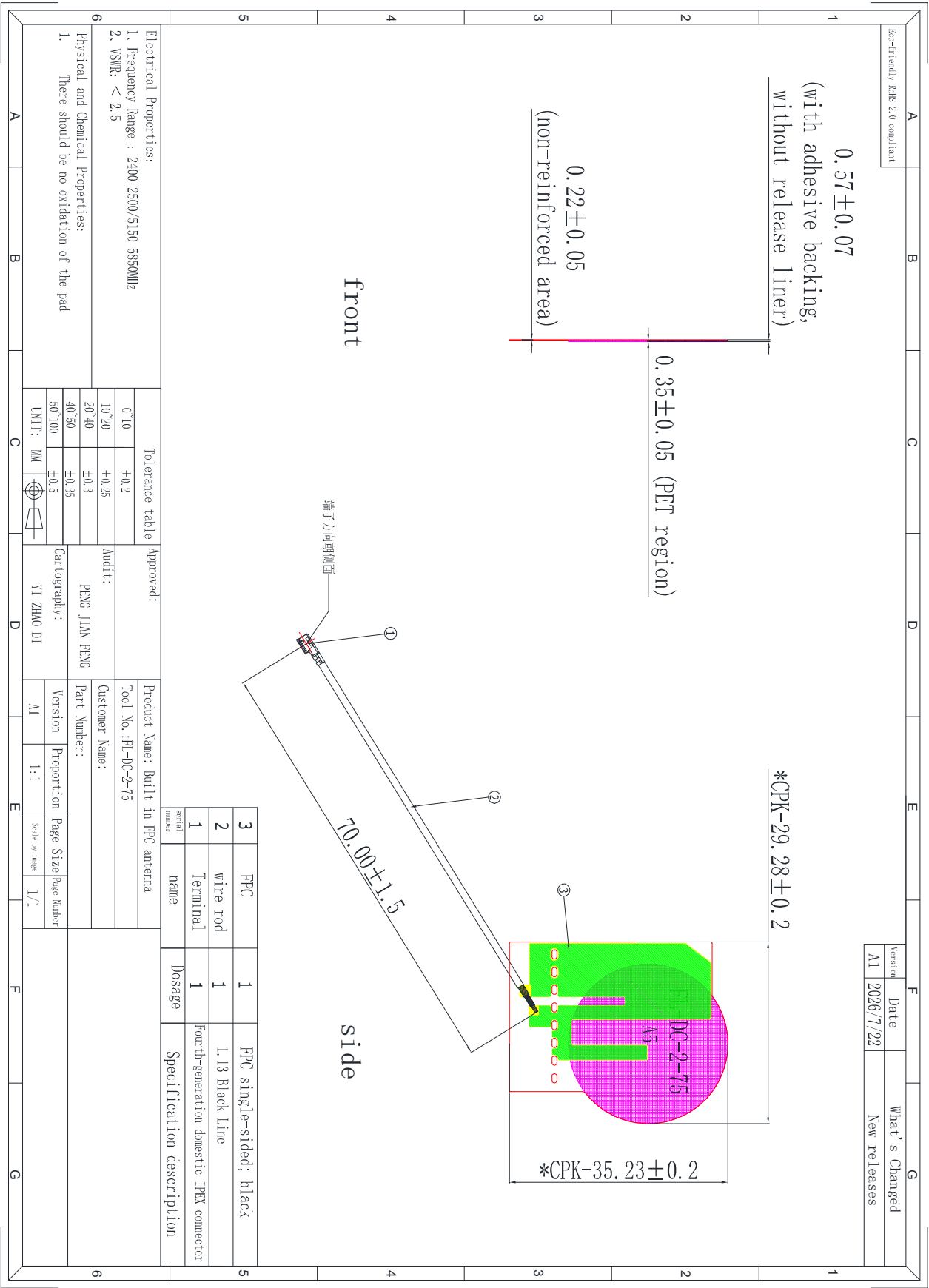
[illegible]

2、规格表（Specification Table）：

产品主要技术参数  
(Product main technical parameters)

| 主要技术指标        |                        | Main technical specifications |                        |
|---------------|------------------------|-------------------------------|------------------------|
| 频率范围<br>(MHZ) | 2400-2500<br>5150-5850 | Frequency Range<br>(MHZ)      | 2400-2500<br>5150-5850 |
| 特性阻抗(Ω)       | 50                     | Impedance(Ω)                  | 50                     |
| 峰值增益(dBi)     | ≤3.2                   | Peak Gain(dBi)                | ≤3.2                   |
| 输出电压<br>驻波比   | ≤2.5                   | VSWR                          | ≤2.5                   |
| 回波损耗          | ≤-8                    | Return Loss                   | ≤-8                    |
| 极化方式          | 线极化                    | Polarization                  | Linear                 |
| 方向性           | 全向性                    | Radiation                     | Omni-directional       |
| 连接方式          | Cable+IPEX             | Connector Type                | Cable+IPEX             |
| 物理性能          |                        | Physical Properties           |                        |
| 天线材料          | FPC                    | Antenna cover                 | FPC                    |
| 工作温度          | -20℃~+70℃              | Operating Temp                | -20℃~+70℃              |
| 保存温度          | -20℃~+60℃              | Storage Temp                  | -20℃~+60℃              |

3、成品图（Product drawing）：



#### 4、包装规范（Packaging specifications）：

|              |  |         |  |           |  |                |  |
|--------------|--|---------|--|-----------|--|----------------|--|
| 符合环保RoHS 2.0 |  | Version |  | Date      |  | What's Changed |  |
|              |  | A1      |  | 2026/7/22 |  | New Releases   |  |

Individual products

Small Inner Pouch Packing Instructions:

1. Each bag is packed with 200pcs products.

Small PE bag

Large Inner Bag Packing Instructions:

1. Each big bag is packed with 10 small bags/a total of 2000PCS products.

2. Each large bag needs to be labeled with the corresponding inner bag

Large PE bag

The bottom / top layer of the carton needs to be placed with 1PCS flat cards each

Outer carton packing instructions:

1. The bottom / top layer of the carton needs to put 1PCS flat card each.

2. The outer box needs to be labeled with 1PCS outer box label in the position shown in the figure.

3. 10 big bags per carton/total 2000PCS products.

(This quantity can be adjusted within the range of heavy and transshipment)

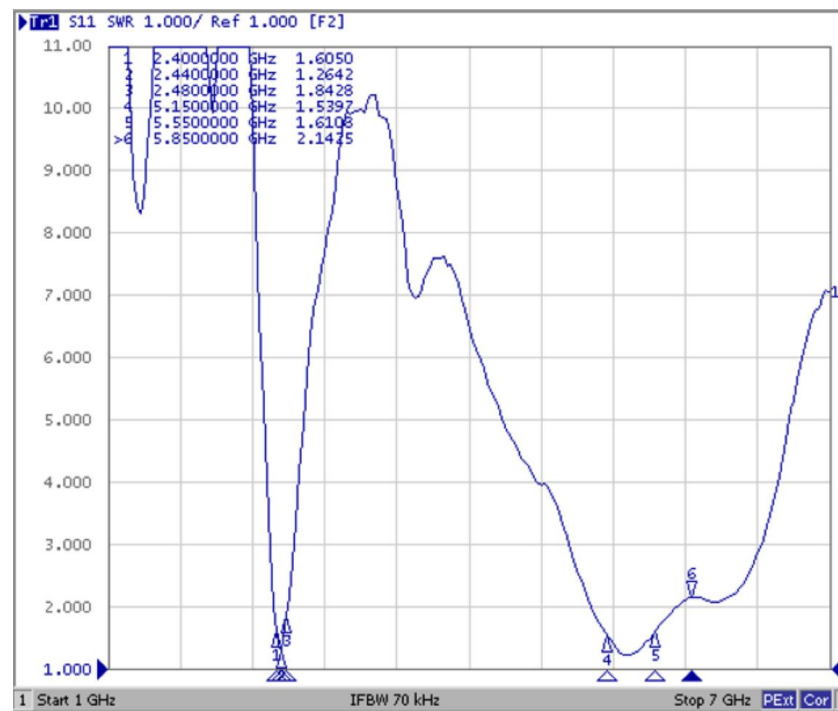
Note: This packaging method is an estimate

The actual situation shall prevail at the time of shipment

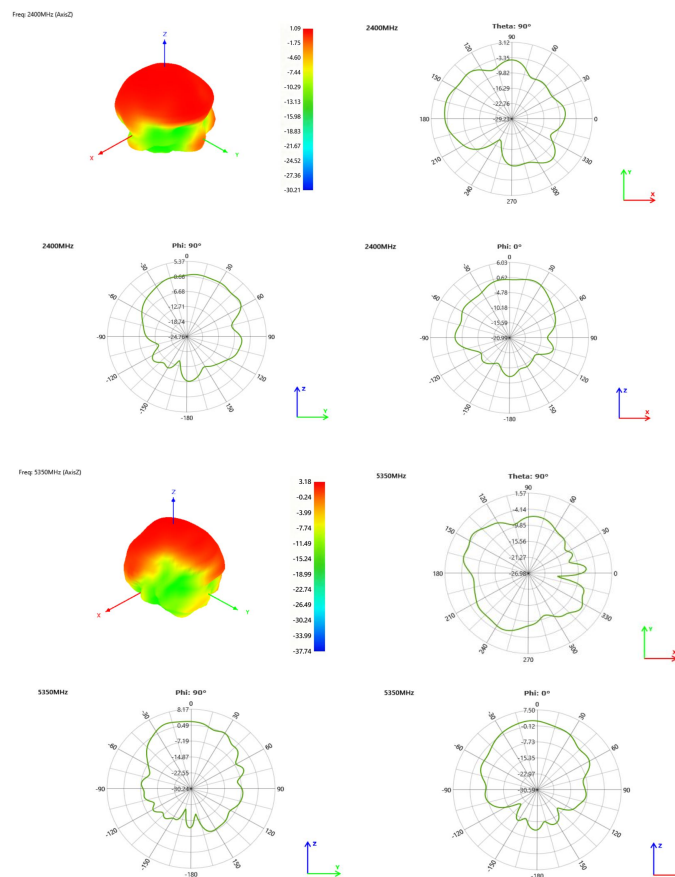
|                |                                    |
|----------------|------------------------------------|
| Approved:      | Product Name: Built-in PPC antenna |
| Audit:         | Tool No.: FL-DC-2-75               |
| PENG JIAN FENG | Customer Name:                     |
| Cartography:   | Part Number:                       |
| YI ZHAO D1     | Version proportion                 |
| A1             | Page size                          |
| 1:1            | page number                        |
| Scale by image | 1/1                                |

## 5、测试报告（Test report）：

### 5.1: S11-VSWR



### 5.2: 2D、3DRaditation Pattern



5.3: Antenna gain and efficiency

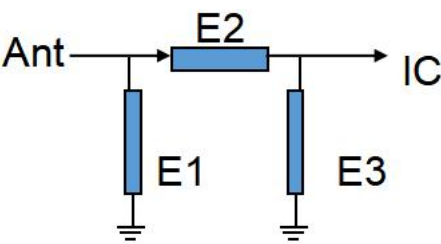
| 频点 MHz | Peak Gain(dBi) | Average Gain(dB ) | Efficiency (%) |
|--------|----------------|-------------------|----------------|
| 2400   | 1.09           | -2.19             | 60.35          |
| 2410   | 1.05           | -2.28             | 59.17          |
| 2420   | 1.02           | -2.23             | 59.89          |
| 2430   | 1              | -2.34             | 58.36          |
| 2440   | 0.98           | -2.34             | 58.41          |
| 2450   | 0.91           | -2.37             | 57.89          |
| 2460   | 0.88           | -2.43             | 57.18          |
| 2470   | 0.75           | -2.45             | 56.82          |
| 2480   | 0.63           | -2.61             | 54.88          |
| 2490   | 0.52           | -2.70             | 53.69          |
| 2500   | 0.48           | -2.83             | 52.14          |
| 平均值    | 0.92           | -2.36             | 58.11          |

|      |      |       |       |
|------|------|-------|-------|
| 5150 | 2.94 | -2.35 | 58.2  |
| 5250 | 3.07 | -2.20 | 60.28 |
| 5350 | 3.18 | -2.19 | 60.34 |
| 5450 | 3.16 | -2.31 | 58.79 |
| 5550 | 3.12 | -2.32 | 58.63 |
| 5650 | 3.14 | -2.82 | 52.18 |
| 5750 | 3.05 | -2.97 | 50.48 |
| 5850 | 2.75 | -2.98 | 50.34 |
| 平均值  | 3.09 | -2.45 | 56.99 |

5.4: Active test data

| Active Test For WiFi Antenna |          |           |           |
|------------------------------|----------|-----------|-----------|
| Band                         | Channel  | TRP (dBm) | TIS (dBm) |
| 11G<br>(6M/54M)              | 1/2412   | 12.74     | -76.22    |
|                              | 6/2437   | 12.99     | -76.45    |
|                              | 13/2472  | 12.27     | -75.83    |
| 11A<br>(6M/54M)              | 36/5180  | 13.37     | -75.66    |
|                              | 100/5500 | 13.28     | -75.14    |
|                              | 165/5825 | 13.12     | -75.32    |
| 11B<br>(11M/11M)             | 1/2412   | 12.60     | -88.49    |
|                              | 6/2437   | 12.79     | -88.25    |
|                              | 13/2472  | 12.68     | -88.30    |
| 11N<br>(MCSOMSC7)            | 1/2412   | 12.6      | -73.65    |
|                              | 6/2437   | 12.58     | -73.82    |
|                              | 13/2472  | 12.43     | -73.33    |
| 11N<br>(MSCOMMSC7)           | 36/5180  | 12.08     | -65.88    |
|                              | 100/5500 | 12.19     | -67.63    |
|                              | 165/5825 | 13.05     | -65.96    |

5.5: Matching circuit



| Element | Value |
|---------|-------|
| E1      | N/C   |
| E2      | 0Ω    |
| E3      | N/C   |

6、全尺寸报告（Full-size report）：

| 全尺寸测量报告    |               |                                                              |        |        |            |        |        |        |                  |        |        |        |             |             |
|------------|---------------|--------------------------------------------------------------|--------|--------|------------|--------|--------|--------|------------------|--------|--------|--------|-------------|-------------|
|            | 编码            | FL-DC-2-75                                                   |        | 零件名称   | FPC 天线     |        |        | 规 格    | 35.23*29.28*0.57 |        |        |        | 材 料         | 一对半电解铜+黑色油墨 |
|            | 供应商           | 鸿基                                                           |        | 测量工具   | 二次元、千分尺、钢尺 |        |        | 测量单位   | MM               |        |        |        | 测量日期        | 2026/7/2    |
| NO.        | 尺寸<br>DIMENSI | 上限                                                           | + TOL. | - TOL. | 下限         | 实测 1   | 实测 2   | 实测 3   | 实测 4             | 实测 5   | 实测 6   | 实测 7   | UPPER≤100%  | LOWER≤100%  |
| 1          | 35.23         | 35.43                                                        | 0.20   | 0.20   | 35.03      | 35.245 | 35.233 | 35.211 | 35.256           | 35.207 | 35.198 | 35.216 | 13%         | 16%         |
| 2          | 29.28         | 29.48                                                        | 0.20   | 0.20   | 29.08      | 29.289 | 29.295 | 29.311 | 29.271           | 29.268 | 29.273 | 29.277 | 15%         | 6%          |
| 3          | 0.57          | 0.64                                                         | 0.07   | 0.07   | 0.50       | 0.571  | 0.570  | 0.572  | 0.569            | 0.569  | 0.570  | 0.568  | 3%          | 3%          |
| 4          | 0.35          | 0.40                                                         | 0.05   | 0.05   | 0.30       | 0.351  | 0.350  | 0.349  | 0.350            | 0.351  | 0.349  | 0.350  | 2%          | 2%          |
| 5          | 0.22          | 0.27                                                         | 0.05   | 0.05   | 0.17       | 0.221  | 0.220  | 0.219  | 0.220            | 0.219  | 0.220  | 0.221  | 2%          | 2%          |
| 6          | 70.00         | 71.50                                                        | 1.50   | 1.50   | 68.50      | 70.190 | 70.230 | 69.980 | 69.950           | 69.870 | 70.130 | 70.160 | 15%         | 9%          |
| 备注 Remarks |               | CPK详情见附件（一） The CPK details are listed at the attachment （一） |        |        |            |        |        |        |                  |        |        |        |             |             |
|            | 拟制：易兆迪        |                                                              |        |        |            |        |        | 审核：李富伦 |                  |        |        |        | 日期：2026/7/2 |             |

7、CPK 报告（Full-size report）：

CPK 报告

CPK Report

|                          |             |        |  |  |                   |  |                |  |  |  |
|--------------------------|-------------|--------|--|--|-------------------|--|----------------|--|--|--|
| Project name(项目)         | FL-DC-2-75  |        |  |  | Customer(客户)      |  | 江苏富联通讯技术股份有限公司 |  |  |  |
| Part Number(零件料号)        | FL-DC-2-75  |        |  |  |                   |  |                |  |  |  |
| Material(材质)             | 一对半电解铜+黑色油墨 |        |  |  | Inches/MM (英寸/毫米) |  | mm             |  |  |  |
| Revision(版本)             | A4          |        |  |  | Date(日期)          |  | 2026/7/2       |  |  |  |
| Dim. Designator (尺寸序号)   | ①           | ②      |  |  |                   |  |                |  |  |  |
| Normal dimensions (标准尺寸) | 35.23       | 29.28  |  |  |                   |  |                |  |  |  |
| Upper Limit (规格上限)       | 35.43       | 29.48  |  |  |                   |  |                |  |  |  |
| Lower Limit (规格下限)       | 35.03       | 29.08  |  |  |                   |  |                |  |  |  |
| 1                        | 35.142      | 29.193 |  |  |                   |  |                |  |  |  |
| 2                        | 35.155      | 29.205 |  |  |                   |  |                |  |  |  |
| 3                        | 35.166      | 29.216 |  |  |                   |  |                |  |  |  |
| 4                        | 35.178      | 29.228 |  |  |                   |  |                |  |  |  |
| 5                        | 35.189      | 29.239 |  |  |                   |  |                |  |  |  |
| 6                        | 35.201      | 29.251 |  |  |                   |  |                |  |  |  |
| 7                        | 35.212      | 29.262 |  |  |                   |  |                |  |  |  |
| 8                        | 35.224      | 29.274 |  |  |                   |  |                |  |  |  |
| 9                        | 35.235      | 29.285 |  |  |                   |  |                |  |  |  |
| 10                       | 35.247      | 29.297 |  |  |                   |  |                |  |  |  |
| 11                       | 35.258      | 29.308 |  |  |                   |  |                |  |  |  |
| 12                       | 35.271      | 29.321 |  |  |                   |  |                |  |  |  |
| 13                       | 35.137      | 29.188 |  |  |                   |  |                |  |  |  |
| 14                       | 35.149      | 29.203 |  |  |                   |  |                |  |  |  |
| 15                       | 35.161      | 29.211 |  |  |                   |  |                |  |  |  |
| 16                       | 35.172      | 29.223 |  |  |                   |  |                |  |  |  |
| 17                       | 35.184      | 29.234 |  |  |                   |  |                |  |  |  |
| 18                       | 35.195      | 29.246 |  |  |                   |  |                |  |  |  |
| 19                       | 35.207      | 29.257 |  |  |                   |  |                |  |  |  |
| 20                       | 35.218      | 29.269 |  |  |                   |  |                |  |  |  |
| 21                       | 35.232      | 29.281 |  |  |                   |  |                |  |  |  |
| 22                       | 35.241      | 29.292 |  |  |                   |  |                |  |  |  |
| 23                       | 35.253      | 29.303 |  |  |                   |  |                |  |  |  |
| 24                       | 35.264      | 29.315 |  |  |                   |  |                |  |  |  |
| 25                       | 35.147      | 29.198 |  |  |                   |  |                |  |  |  |
| 26                       | 35.159      | 29.213 |  |  |                   |  |                |  |  |  |
| 27                       | 35.171      | 29.221 |  |  |                   |  |                |  |  |  |
| 28                       | 35.182      | 29.233 |  |  |                   |  |                |  |  |  |
| 29                       | 35.193      | 29.244 |  |  |                   |  |                |  |  |  |
| 30                       | 35.205      | 29.256 |  |  |                   |  |                |  |  |  |
| 31                       | 35.203      | 29.282 |  |  |                   |  |                |  |  |  |
| 32                       | 35.267      | 29.317 |  |  |                   |  |                |  |  |  |
| MAX.                     | 35.27       | 29.32  |  |  |                   |  |                |  |  |  |
| MIN.                     | 35.14       | 29.19  |  |  |                   |  |                |  |  |  |
| AVERAGE                  | 35.20       | 29.25  |  |  |                   |  |                |  |  |  |
| STDEV                    | 0.04        | 0.04   |  |  |                   |  |                |  |  |  |
| CP                       | 1.68        | 1.68   |  |  |                   |  |                |  |  |  |
| Cpk                      | 1.43        | 1.44   |  |  |                   |  |                |  |  |  |
| TOOLING(测量工具)            | 二次元         | 二次元    |  |  |                   |  |                |  |  |  |

拟制：易兆迪

审核：李富伦

核准：李鹿鑫

## 8、环保报告（Environmental Report）：

| 环境管理物质部件展开表                                          |        |                    |                              |                                      |                                 |                           |    |    |      |     |      |          |      |      |     |      |      |                                                                                       |                                                                                       |                                                                                     |  |  |
|------------------------------------------------------|--------|--------------------|------------------------------|--------------------------------------|---------------------------------|---------------------------|----|----|------|-----|------|----------|------|------|-----|------|------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|--|
| The Parts List of Enviromental Management Substances |        |                    |                              |                                      |                                 |                           |    |    |      |     |      |          |      |      |     |      |      |                                                                                       |                                                                                       |                                                                                     |  |  |
| 产品信息 Product Information                             |        |                    |                              | 供应商讯息 Supplier Contact Information   |                                 |                           |    |    |      |     |      | 报告类型     |      |      |     | 确认结果 |      |                                                                                       |                                                                                       |                                                                                     |  |  |
| 零件名称<br>Part name                                    |        | FPC天线              |                              | 公司名称<br>Compony Name                 |                                 | 鸿基无线通信（深圳）有限公司            |    |    |      | ○   |      | RoHS 2.0 |      | ○    |     |      |      |                                                                                       |                                                                                       |                                                                                     |  |  |
| 物料编号<br>Risuntek P/N                                 |        | FL-DC-2-75-001     |                              | 填表人/职称<br>Contact Name/Title         |                                 | 方凤仪                       |    |    |      | ○   |      | HF       |      | ○    |     |      |      |                                                                                       |                                                                                       |                                                                                     |  |  |
| 供应商物料编号<br>Supplier's P/N                            |        |                    |                              | 填表日期<br>Date:YY/MM/DD                |                                 | 2026/7/1                  |    |    |      | →   |      | CP65     |      | /    |     |      |      |                                                                                       |                                                                                       |                                                                                     |  |  |
| 制造地点<br>Manufacturing site                           |        | 深圳                 |                              | 电子邮件<br>E-mail address               |                                 | /                         |    |    |      | ○   |      | REACH    |      | /    |     |      |      |                                                                                       |                                                                                       |                                                                                     |  |  |
| 总重量<br>Total weight (g)                              |        | /                  |                              | 电话<br>Tel. No.                       |                                 | 18312864988               |    |    |      | →   |      | 其它（ ）    |      | /    |     |      |      |                                                                                       |                                                                                       |                                                                                     |  |  |
|                                                      |        |                    |                              |                                      |                                 |                           |    |    |      |     |      | ○        | MSDS |      | ○   |      |      |                                                                                       |                                                                                       |                                                                                     |  |  |
| 编号<br>No.                                            | 部件名称   | 原材料供应商             | 均质材料<br>Homogeneous material | 测试报告编号<br>Test Report No.            | 测试日期<br>Test Date<br>(YY/MM/DD) | 测试结果<br>Test result (ppm) |    |    |      |     |      |          |      |      |     |      |      | 测试报告<br>Test report                                                                   | MSDS                                                                                  |                                                                                     |  |  |
|                                                      |        |                    |                              |                                      |                                 | Pb                        | Cd | Hg | Cr6+ | PBB | PBDE | Cl       | Br   | DEHP | DBP | BBP  | DIBP |                                                                                       |                                                                                       |                                                                                     |  |  |
| 1                                                    | FPC    | 富邦                 | 基材                           | A2260058847101004E                   | 2026/2/4                        | ND                        | ND | ND | ND   | ND  | ND   | 95       | ND   | ND   | ND  | ND   | ND   |    |    |                                                                                     |  |  |
|                                                      |        | 3M                 | 3M 9448A                     | SHAEC25034046201<br>SHAEC25034046203 | 2025/12/31                      | ND                        | ND | ND | ND   | ND  | ND   | ND       | ND   | ND   | ND  | ND   | ND   |    |    |                                                                                     |  |  |
|                                                      |        | 优立                 | 黑色组焊油墨<br>PSM-800            | ETR26403059M01<br>ETR26403060        | 2026/5/12<br>2026/4/24          | ND                        | ND | ND | ND   | ND  | ND   | 427      | ND   | ND   | ND  | ND   | ND   |    |    |                                                                                     |  |  |
|                                                      |        | 川裕                 | ZSR-150白色文<br>字油墨            | ETR25901252M01<br>ETR25901254M01     | 2025/9/11                       | 4.78                      | ND | ND | ND   | ND  | ND   | 625      | ND   | ND   | ND  | ND   | ND   |    |    |                                                                                     |  |  |
|                                                      |        | 江苏裕兴薄膜科技<br>股份有限公司 | 补强<br>聚酯薄膜                   | A2260141483101005C                   | 2026/3/7                        | ND                        | ND | ND | ND   | ND  | ND   | ND       | ND   | ND   | ND  | ND   | ND   | ND                                                                                    |    |  |  |  |
| 2                                                    | 端子     | 福建紫金同业             | 端子铜                          | CANEC25027363005                     | 2025/11/13                      | 4                         | ND | ND | ND   | ND  | ND   | ND       | ND   | ND   | ND  | ND   | ND   |   |   |                                                                                     |  |  |
|                                                      |        | 长春人造树脂厂股份有限公司      | 端子胶芯黑色                       | ETR25C01675                          | 2025/12/16                      | 4.71                      | ND | ND | ND   | ND  | ND   | ND       | ND   | ND   | ND  | ND   | ND   |  |  |                                                                                     |  |  |
|                                                      |        | 余姚市爱迪升电镀<br>科技有限公司 | 端子镀金                         | A2250930053101001E                   | 2025/12/23                      | ND                        | ND | ND | ND   | ND  | ND   | NA       | NA   | ND   | ND  | ND   | ND   |  |  |                                                                                     |  |  |
|                                                      |        | 余姚市爱迪升电镀<br>科技有限公司 | 端子镀镍                         | A2250930053101007E                   | 2025/12/23                      | ND                        | ND | ND | ND   | ND  | ND   | NA       | NA   | ND   | ND  | ND   | ND   |  |  |                                                                                     |  |  |
| 3                                                    | 锡      | 深圳市宝达锡业有限公司        | 锡线                           | CANEC26011689704                     | 2026/5/14                       | 25                        | ND | ND | ND   | ND  | ND   | NA       | NA   | ND   | ND  | ND   | ND   |  |  |                                                                                     |  |  |
| 4                                                    | RF同轴电缆 | 深圳市天迈通信技术有限公司      | /                            | CANEC25018034404                     | 2025/7/30                       | ND                        | ND | ND | ND   | ND  | ND   | /        | /    | ND   | ND  | ND   | ND   |  |  |                                                                                     |  |  |