

开发案号 Project: Y230901473

日期 Date.: 2024.06.27

版本 Ver.: A5

承认书

Antenna SPEC

客户名称 Customer name: 国光

调试项目 Customer project: Vega Mini

客户料号 Customer P/N: EAN00364

博安通料号 B&T P/N: 74220244

规格描述.: VZPT-内置天线-2.4G-灰色 1.13 锡锡线-1 代端子
-L=73mm-FPC-26×22.5mm

Spec.: VZPT-built-in antenna-2.4G-grey 1.13 tin wire-first
generation terminal-L=73mm-FPC-26×22.5mm

出厂签章 Sealed by corporation:

| | | |
|--------------------|--------------|-----------------|
| 编写 compilation | 审核 verify | 批准 approval |
| 邱翠萍 Qiucui ping | 吕杰 LvJie | 刘立华 Liulihua |

客户承认签章 Sealed by customer:

| | | |
|-------------|--------------|----------------|
| 检查 check | 审核 verify | 批准 approval |
| | | |

博安通联系方式 Contact information of B&T:

| | | |
|--|--------------------|--------------------------------|
| 业务联系人: 龙明国 Contact person for sales: Longmingguo | 手机 MB: 18576042661 | 邮箱 E-mail: longmg@tech-now.com |
| 技术联系人: 吕杰 Contact person for technical: LvJie | 手机 MB: 13530413724 | 邮箱 E-mail: lvj@tech-now.com |
| 品质联系人: 曾康 Contact person for Quality: Zeng Kang | 手机 MB: 18188400229 | 邮箱 E-mail: zengk@tech-now.com |

型号 Model:74220244

公司名称: 四川博安通通信技术有限公司

Company Name: Sichuan B&T Technology Co., Ltd.

博安通生产地址: 四川省绵阳市经开区塘汛街道文武中路 218 号 8 幢 5 层 2、3 号

B&T Production address: No.2&3, 5/F, Building 8, No.218, Wenwu Middle Road, Tangxun Street, Economic Development Zone, Mianyang, Sichuan Province, P.R.China

文件制定/修订/废止履历表 Document making / revising / abolishing resume

| 版本 Version | 日期 Date | 制定/修订内容 Develop/revise content | 制定 Formulate | 核准 approval |
|---------------|------------|---|----------------------|---------------------------|
| A0 | 2023.09.11 | 首次制定 First formulation | 邱翠萍 Qiucui ping | 吕杰/刘立华 Lv jie/Liulihua |
| A0-0919 | 2023.09.19 | 增加拉距数据 Add pull distance data | 黄飞辉 Huang fei hui | 吕杰/刘立华 Lv jie/Liulihua |
| A1 | 2023.12.07 | 更新 FPC 公差及冲断位改手撕拉耳位 Updated FPC tolerance and thrust position instead of hand tear pull Lvg position | 黄飞辉 Huang fei hui | 吕杰/刘立华 Lv jie/Liulihua |
| A2 | 2024.04.10 | 更新增益 (客户认证用) Update gain (for customer authentication) | 邱翠萍 Qiucui ping | 吕杰/刘立华 Lv jie/Liulihua |
| A3 | 2024.04.17 | 项目名称由之前: Blaster 改成 Vega mini Project name from before: Blaste Change into Vega mini | 邱翠萍 Qiucui ping | 吕杰/刘立华 Lv jie/Liulihua |
| A4 | 2024.06.25 | 更新线长和海棉位置调整, FPC 加大焊盘 Update line length and sponge position adjustment, FPC increase pad | 邱翠萍 Qiucui ping | 吕杰/刘立华 Lv jie/Liulihua |
| A5 | 2024.06.27 | 更新 FPC 丝印:m 变成了大写 M Update FPC silk screen: m changed to capital M | 邱翠萍 Qiucui ping | 吕杰/刘立华 Lv jie/Liulihua |
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3、产品图面 Product drawing

| Version | modification date | Revised content |
|---------|-------------------|--|
| A0 | 23-9-11 | |
| A1 | 23-12-6 | Updated FPC tolerances and hand tear bits |
| A2 | 24-4-17 | Update FPC silk screen content |
| A3 | 24-6-25 | Update the line length and sponge position adjustment, and enlarge the FPC pad |
| A4 | 24-6-26 | Update FPC silk screen; in changed to capital M |

Front view

Hand tear ear position

screen printing font is bright white

1:1

Page 1 1 in total

Technical requirements

- The antenna welding part is firm and the cable size is accurate (the holding force of the connector is $\geq 1\text{kgf}$).
- The silk screen color is the original color of the substrate, and the font is clear and not easy to fall off.
- "*" indicates the dimensions that are key to IQC inspection.
- The packaging and quality standards refer to the Boantong Packaging Specifications and B&T Quality Standards respectively.
- The materials comply with RoHS, REACH, VOC, California 65, PAHs, and TSCA.
- The connector port identification direction

| Number | Part Name | remarks | Design | Tang hailin | weight | quantity | proportion | Company |
|--------|-------------------|-----------------------|------------|-------------|--------|----------|------------|---------|
| ① | 1st connector | | to examine | | | | | |
| ② | Coaxial line | | approval | | | | | |
| ③ | Shockproof sponge | Manual fold and stick | 1 X | ± 0.05 | | | 1:1 | mm |
| ④ | FPC | | 1~9.99 | ± 0.10 | | | | |
| | | | 10~19.99 | ± 0.15 | | | | |
| | | | 20~39.99 | ± 0.20 | | | | |
| | | | 40~ | ± 0.30 | | | | |

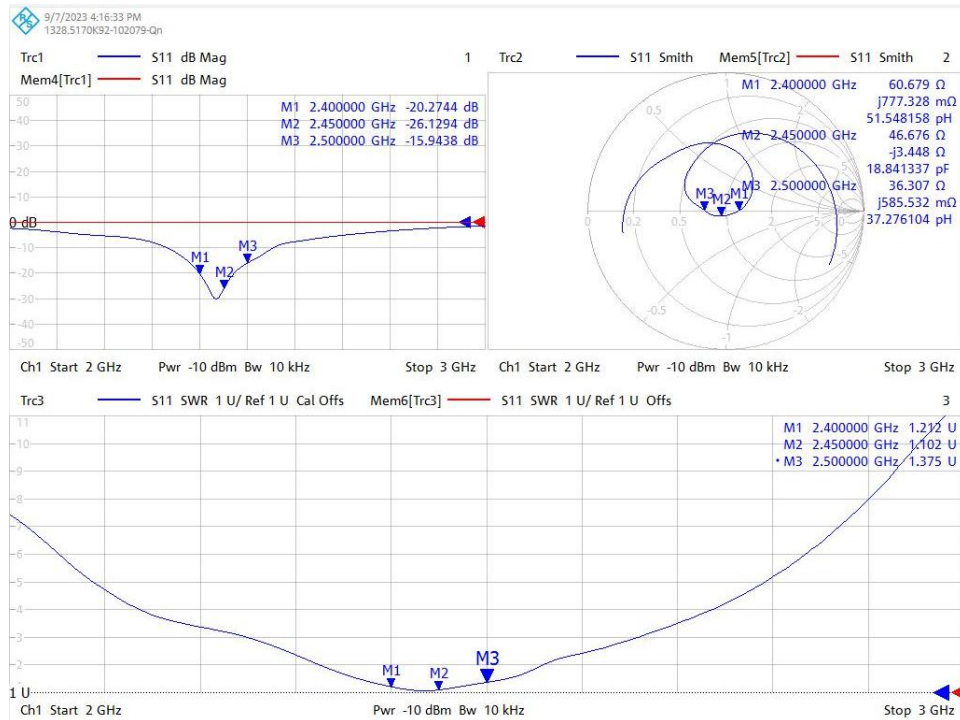
| name | Project number | Part number |
|--|----------------|-------------|
| VZPT-built-in antenna-2.4G-grey 1.13 tin wire-first generation terminal-L=73mm-FPC-26x22.5mm | Y230901473 | 74220244 |

4、性能参数 Properties ¶meter

| 电气参数 Electrical parameter | |
|----------------------------------|--|
| 频率范围 Freq Range | 2400~2500MHz |
| 输入阻抗 Characteristic Impedance | 50 Ω |
| 驻波比 VSWR | <2.0 |
| 增益 Gain | ≥1.5dBi, ≤2.5dBi |
| 功率容量 The Max input power | <10w |
| 极化方式 Polarization mode | 线极化 Linear polarization |
| 辐射方向 Radiation direction | 全向 omnidirectional |
| 接头型号 Joint type | 端子 IPEX connector |
| 机械参数 Mechanical parameter | |
| 总长 Length | 73±3mm |
| 端子维持力 Maintain the force | ≥1kgf |
| 同轴电缆 Coaxial cable | 灰色 1.13 锡锡线 Grey 1.13 tin tin cable |
| 盐雾测试 Salt spray test | 24H |
| 环境参数 Environment parameter | |
| 工作温度 Operating Temp | -30℃~65℃ |

5、电气性能测试报告 Electrical test report (整机 complete machine test)

➤ 天线 S11 参数图 Antenna S11 parameter diagram



➤ 驻波比数据 VSWR

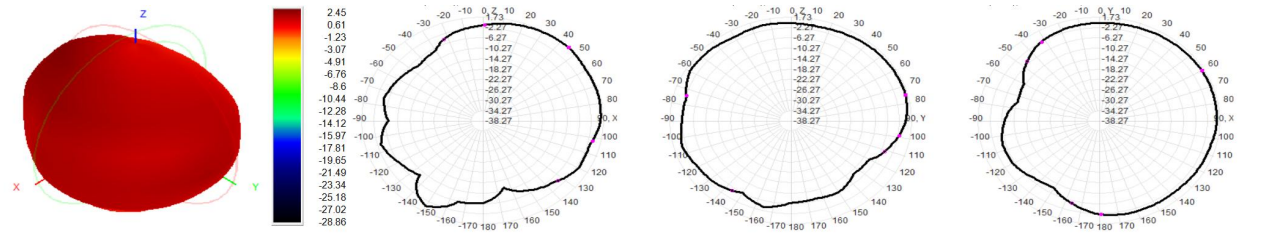
| | | | |
|----------|---------|---------|---------|
| Freq/MHz | 2400MHz | 2450MHz | 2500MHz |
| VSWR | 1.21 | 1.10 | 1.37 |

➤ 天线暗室测试数据 Antenna darkroom test data

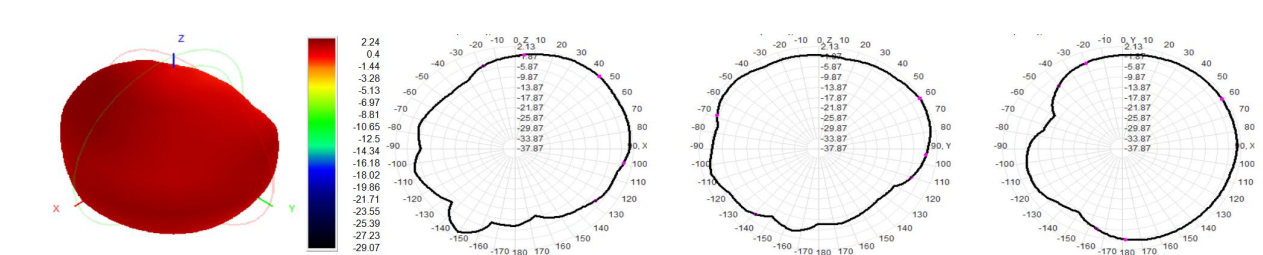
| Frequency (MHz) | Efficiency (dBi) | Gain (dBi) | Efficiency (%) |
|-----------------|------------------|------------|----------------|
| 2400 | -2.22 | 2.24 | 60.00 |
| 2410 | -2.28 | 2.16 | 59.15 |
| 2420 | -2.33 | 2.22 | 58.49 |
| 2430 | -2.39 | 2.26 | 57.69 |
| 2440 | -2.30 | 2.45 | 58.89 |
| 2450 | -2.34 | 2.44 | 58.34 |
| 2460 | -2.37 | 2.41 | 57.96 |
| 2470 | -2.43 | 2.31 | 57.13 |
| 2480 | -2.50 | 2.19 | 56.20 |
| 2490 | -2.49 | 2.08 | 56.31 |
| 2500 | -2.65 | 1.96 | 54.29 |

➤ 天线方向图 Antenna pattern

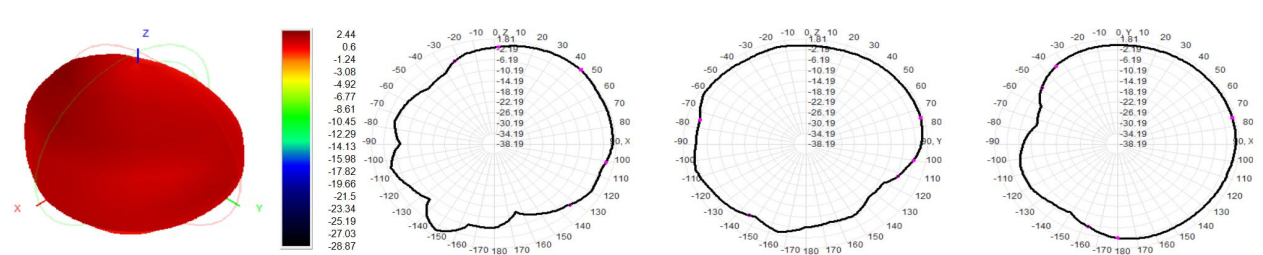
2440M 3D-E1-E2-H



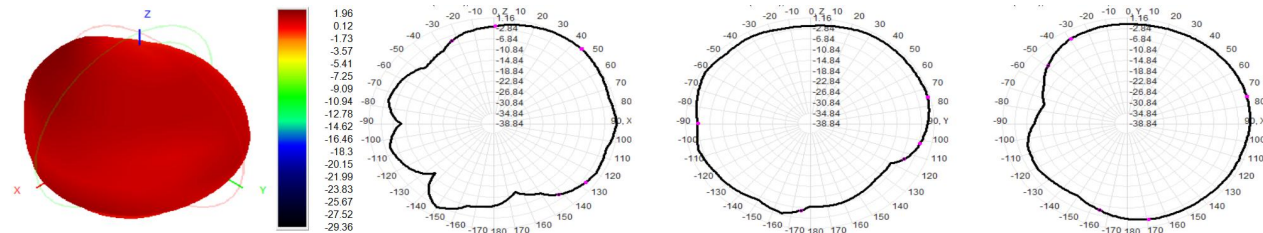
2400M 3D-E1-E2-H



2450M 3D-E1-E2-H



2500M 3D-E1-E2-H



➤ 有源 OTA 测试数据 OTA test data

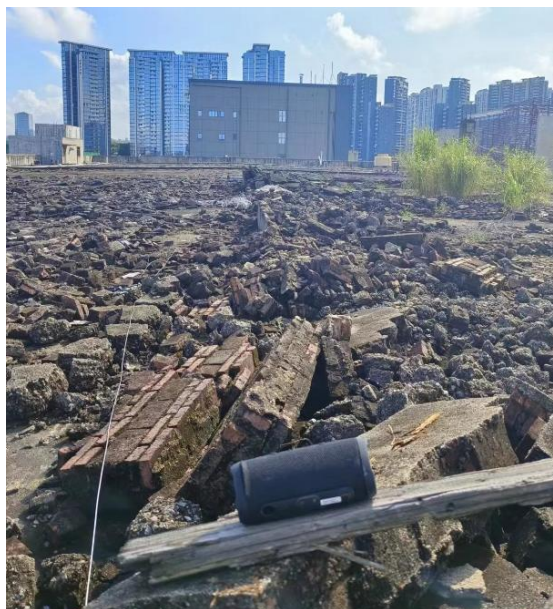
| DUT | Equipment | trust typ | Packet Type | Test Item | Channel | Frequency (MHz) | 测试值 (dBm) | 传导值 | 效率 |
|---------|-----------|-----------|-------------|-----------|---------|-----------------|-----------|------|-------|
| Blaster | CMW270 | asic Rat | DH5 | TRP | 0 | 2402 | 4.38 | 7.54 | -3.16 |
| | | | | | 39 | 2441 | 4.62 | 7.48 | -2.86 |
| | | | | | 78 | 2480 | 4.03 | 7.12 | -3.09 |
| | | | | TIS | 0 | 2402 | -89.15 | -92 | -2.85 |
| | | | | | 39 | 2441 | -89.46 | -92 | -2.54 |
| | | | | | 78 | 2480 | -89.39 | -92 | -2.61 |

| Frequency (MHz) | Efficiency (dBi) | Gain (dBi) | Efficiency (%) |
|-----------------|------------------|------------|----------------|
| 2400 | -2.22 | 2.24 | 60.00 |
| 2410 | -2.28 | 2.16 | 59.15 |
| 2420 | -2.33 | 2.22 | 58.49 |
| 2430 | -2.39 | 2.26 | 57.69 |
| 2440 | -2.30 | 2.45 | 58.89 |
| 2450 | -2.34 | 2.44 | 58.34 |
| 2460 | -2.37 | 2.41 | 57.96 |
| 2470 | -2.43 | 2.31 | 57.13 |
| 2480 | -2.50 | 2.19 | 56.20 |
| 2490 | -2.49 | 2.08 | 56.31 |
| 2500 | -2.65 | 1.96 | 54.29 |

➤ 拉距测试 Pull distance test

测试环境：空旷楼顶，无任何干扰源。

Test environment: empty roof, no source of interference.



测试环境示意

Test environment signal

测试方法：将设备放于高平台上，使用手机连接设备进行音乐播放，同时在音乐正常播放无卡顿、断续时远离设备，当音乐出现卡顿、断续时往回靠近设备，直至音乐恢复正常，按照以上方法找出领界值，记录方向和直线距离。本次测试使用手机为 VIVO X90。

Test method: put the device on the high level platform, use the mobile phone to connect the device to play music. At the same time, stay away from the device when the music is playing normally or intermittent. When the music is intermittent, approach the device until the music returns to normal, find out the boundary value according to the above method, record the direction and straight line distance. The mobile phone used in this test is the VIVO X90.

设备方向示意：



测试结果：

test result:

| 测试方向 Test direction | A 面 A face | B 面 B face | C 面 C face | D 面 D face | E (底部) E(bottom) |
|---|---------------|---------------|---------------|---------------|---------------------|
| 距离 (设备置于木板上) Distance (equipment placed on wooden board) | 70m | 70m | 70m | 70m | 85m |
| 距离 (设备置于水泥上) Distance (equipment placed on cement) | 55m | 55m | 55m | 55m | 85m |

6、材料成分及有害物质表 List of Material Composition and Hazardous Substances

| 项次 Item | 规格 Specification | 材质 Texture of material | RoHS 检验结果 (PPM) ROHS Test Results (PPM) | | | | | | ICP 检测编号 ICP test number | 检测时间 Test time |
|------------|---------------------|---------------------------|--|------|----|------|-----|------|-----------------------------|-------------------|
| | | | Cd | Pb | Hg | Cr+6 | PBB | PBDE | | |
| 1 | 线 wire | FEP | ND | ND | ND | ND | ND | ND | NGBPC24000131241 | 2024/1/16 |
| | | 镀锡铜线 Tinned wire | ND | ND | ND | ND | ND | ND | CANEC23005577501 | 2023/7/7 |
| 2 | 端子 Terminal | PBT | ND | 3.76 | ND | ND | ND | ND | ETR23705930 | 2023/8/4 |
| | | 磷青铜 Phosphor Bronze | ND | 6 | ND | ND | ND | ND | CANEC24000977301 | 2024/1/22 |
| 3 | FPC | PI | ND | ND | ND | ND | ND | ND | SHAEC24000428805 | 2024/1/12 |
| | | 背胶 Tape | ND | ND | ND | ND | ND | ND | SHAEC23021627701 | 2023/12/27 |
| 4 | 海绵 Sponge | PU 泡棉 PU Sponge | ND | ND | ND | ND | ND | ND | A2230532385101004E | 2023/10/21 |
| | | 背胶 Tape | ND | ND | ND | ND | ND | ND | A2230621001101001 | 2023/11/30 |

表单编号 Form number: B&T-QR-EN-002 版本 version: B3

产品包装规范

PACKING CRITERION

产品料号 P/N: 74220244

产品规格: VZPT-内置天线-2.4G-灰色 1.13 锡锡线-1 代端子-L=73mm-FPC-26×22.5mm
 Spec : VZPT-built-in antenna-2.4G-grey 1.13 tin wire-first generation terminal-L=73mm-FPC-26×22.5mm

一、标签要求（根据客户名称参考对应的成品标签制作要求，无要求即按普通标签要求）
 contents of label(according to the customer's name, refer to the corresponding finished product label production requirements. If there is no requirement, it will follow the ordinary label requirements.)

内外标签 长 10cm 宽 6cm 左右

The inner and outer labels are about 10cm long and 6cm wid

| | | | |
|----------------------------|---|------------------------|----------|
| 需方 buyer | ***** | | |
| 供方 vender | 四川博安通通信技术有限公司 Sichuan B&T Technology Co., Ltd. | | |
| 物料编码 Purchase No | ***** | | |
| 生产单号 Material No. | ***** | | |
| 品名规格 Name specification | ***** | 检验员 QC | ** |
| 数量/单位 Q' ty/Unit | ***** | 日期 Manufacture date | ****.*** |
| 追溯码 Trace code | ***** | 流水号 Serial number | ** |

二、装箱要求 Packing requirement

作业说明 Operating description:

1. 内包装 inner packing:

产品 50 PCS/小袋/small bag

 200 PCS/大袋 big bag

2. 外包装 outer packing:

根据实际包装定数量 Quantity according to actual packing/箱 carton

注意事项 Notice:

1. 是否要增设隔板、珍珠棉 Whether to add partitions, pearl cotton;
2. 标签的贴附，如 ROHS 等 Labeling, such as ROHS;

GGEC I 条形码打印规则

EAN00364P1406230711DA000A001

GGEC物料编号：具体可以固定在规格书里面

供应商代码(6或5位,具体可以固定在规格书里面)

物料生产日期：6位数，年、月、日用数字表示

供方的生产班次-1位：日班用“D”；夜班用“N”表示

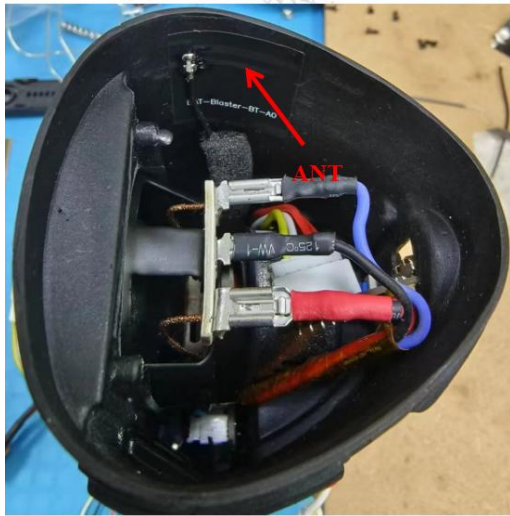
供方的生产场地-1位：总厂用“A”表示，分厂用“B”表示，多个分厂按字母顺序排列。

交物流水号-3位:表示当天的交货的批次数

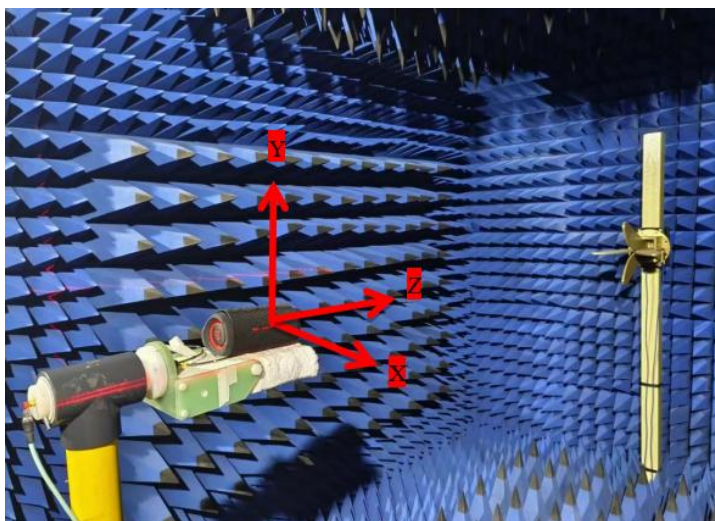
字母位:
 -正常物料用“A”表示
 -返工物料用“F”表示
 -改善物料用“G”表示
 -变更物料用“E”表示

物料模穴/产线-3位
 模穴:
 a. 1*1穴,用001表示;1*2穴,用001&002表示,
 b. 多模多穴: 以 001为开始表示直接顺序号。
 规则2-线别:
 同一产品分开两条线生产, 1线为001,2线为002按顺序排列.....
 注意: 同款产品只有一天产线或一套模穴, 默认为“000”

8、天线整机安装示意图 Antenna installation position Diagram



9、天线测试暗室摆放位置 Antenna test darkroom placement



10、可靠性测试要求 Reliability test requirements

| 序号 No. | 可靠性试验名称 Reliability Test Name | 试验条件 Test Conditions | 判定标准 Evaluation Criteria |
|-----------|--|---|---|
| 1 | 恒温恒湿试验 Constant Temperature and Humidity Test | 高温:70°C, 湿度:80%RH 24H; 低温 -40°C 24H;共持续 48H; High temperature: 70° C, Humidity: 80%RH for 24 hours; Low temperature: -40° C for 24 hours; Total duration 48 hours; | 试验前后外观要求: 金属表面镀层应无剥 落, 裂痕起皱, 分离等。非金属部分不应 变色, 发生开裂, 变形, 脱胶等不良; 电 气性能测试符合标准要求; Before and after the test, the appearance requirements: The metal surface plating should have no peeling, cracks, wrinkling, separation, etc. Non-metal parts should not change color, have cracks, deformation, glue detachment, and other defects; Electrical performance tests should meet the standard requirements; |
| 2 | 高低温冷热冲击试验 High and Low Temperature Shock Test | 70°C持续 2H、-40°C持续 2H, 6 次循环, 共 24 小时; 70° C for 2 hours, -40° C for 2 hours, 6 cycles, total 24 hours; | 试验前后外观要求: 金属表面镀层应无剥 落, 裂痕起皱, 分离等。非金属部分不应 变色, 发生开裂, 变形, 脱胶等不良; 电气性能测试符合标准要求; Before and after the test, the appearance requirements: The metal surface plating should have no peeling, cracks, wrinkling, separation, etc. Non-metal parts should not change color, have cracks, deformation, glue detachment, and other defects; Electrical performance tests should meet the standard requirements; |

| | | | |
|---|---|--|---|
| 3 | <p>盐雾试验 Salt Spray Test</p> | <p>配制浓度 (5±1) %NaCl 溶液, 确保盐溶液的 pH 值为中性 (6.5~7.2); 压力桶温度 47±1°C, 喷雾压力保持在 1.00±0.1kgf/cm², 喷雾量 1.0~2.0ml;/80cm²/h; 试验时间 24H; Prepare a 5±1% NaCl solution, ensure the pH value of the salt solution is neutral (6.5~7.2); Pressure pot temperature 47±1° C, spray pressure maintained at 1.00±0.1kgf/cm², spray rate 1.0~2.0ml;/80cm²/h; Test duration 24 hours;</p> | <p>产品表面外露区域不可有氧化、锈蚀现象; 其它区域盐雾试验后的氧化/生锈面积 < 1.0% The exposed area of the product surface should not have oxidation or rusting; Other areas after the salt spray test, the oxidation/rust area should be less than 1.0%;</p> |
| 4 | <p>端子维持力试验 Terminal Retention Force Test</p> | <p>常温常湿; 试验维持力要求: ≥1.0 kgf; Ambient temperature and humidity; Test retention force requirement: ≥10 kgf;</p> | <p>端子与线缆无脱落、松动等; 测试后电气性能测试符合标准要求; Terminals and cables should not fall off or loosen; After the test, the electrical performance should meet the standard requirements;</p> |
| 5 | <p>端子插拔力试验 Terminal Insertion and Withdrawal Force Test</p> | <p>常温常湿; 端子与座子正常连接, 插入力/拔出力≥1.0 kgf Ambient temperature and humidity; Terminals and sockets are normally connected, insertion force/withdrawal force ≥1.0 kgf;</p> | <p>端子与线缆无脱落、松动等; 测试后电气性能测试符合标准要求; Insertion force/withdrawal force should meet the requirements, and the terminals should not fall off or be damaged;</p> |