



福州中天迅通信技术有限公司

Fuzhou ZHONGTIANXUN Communication Technology Co., Ltd

项目名称 (Project Name): DX4000 (LOB) -WIFI/BT/GPS

天线型号 (Antenna model): ZTX-DX4000-W/B/G

A

物料编码 (Item number): E. 03. 00781

MPN 码 (MPN) : B0680322D

日期 (Date) : 2022-12-1

设计公司: 福州中天迅通信技术有限公司

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|---------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A1 | 2022-8-23 | 规格书制定。 First issue. |
| A2 | 2022-12-1 | 性能优化；FPC 线路更新； 丝印第一行去掉“-ANT”离型纸及背胶更新。 Performance optimization; The FPC is updated; Remove the “-ANT” release paper from the first line of silk screen and update the adhesive. |





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1 名词解释 (Explanation of Nouns)

| | |
|-------|-----------------------------------------|
| dBi | Decibel relative isotropic antenna |
| Tx | Transmit frequency |
| Rx | Receive frequency |
| TRP | Total Radiated Power |
| TIS | Total Isotropic Sensitivity |
| VSWR | Voltage Standing Wave Ratio |
| GSM | Global Service for Mobile communication |
| DCS | Digital Communication System |
| CDMA | Code Division Multiple Access |
| WCDMA | Wideband Code Division Multiple Access |

2 测试设备 (Test equipment)

矢量网络分析仪 (Vector network analyzer) 安捷伦 8753E (Agilent 8753E)
 频谱分析仪 (Frequency analyzer)
 综合测试仪 (General-purpose tester) 安捷伦 8960 E5515C
 标准高性能无反射屏蔽暗室 (High performance no-reflection shielding darkroom) ETS
 8m*4m*4m

3 适用频段 (Applied frequency band)

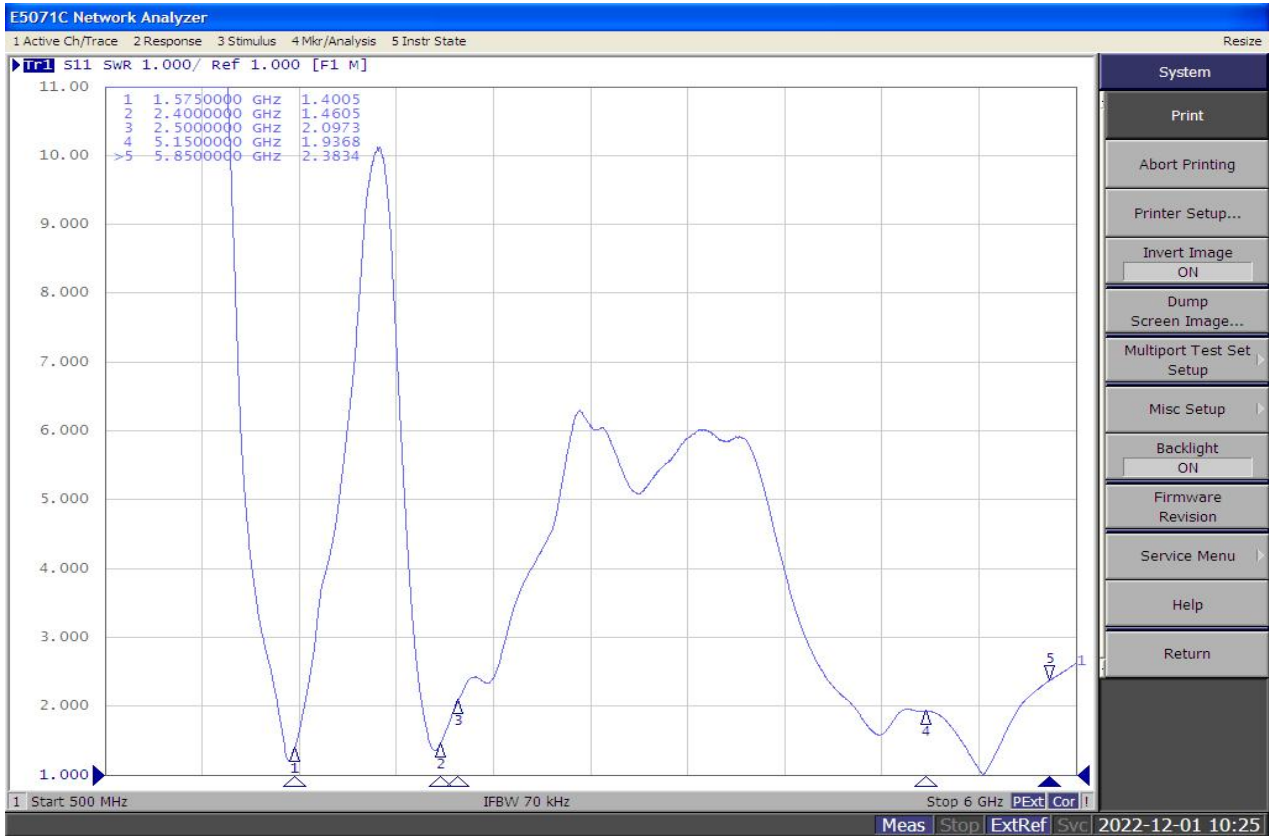
| 频段 | 频率 |
|----------------|--------------------------------------|
| Frequency Band | Frequency |
| WIFI/BT/GPS | 1575MHz; 2400-2500MHz, 5150-5850MHz。 |





4. 测试指标和数据图表 (Test project)

4.1 驻波图 (VSWR)





4.2 无源效率 (Antenna passive test)

| chNo | Freq | Gain | Efficiency_Pcent |
|------|------|--------------|------------------|
| 1 | 1550 | 0.77848173 | 53.77802486 |
| 2 | 1555 | 0.788493411 | 54.55722409 |
| 3 | 1560 | 0.751092919 | 55.29521169 |
| 4 | 1565 | 0.68239031 | 55.37959649 |
| 5 | 1570 | 0.603778605 | 54.78775788 |
| 6 | 1575 | 0.583353014 | 53.89716541 |
| 7 | 1580 | 0.510420594 | 52.09480179 |
| 8 | 1585 | 0.580890388 | 50.57687639 |
| 9 | 1590 | 0.537485893 | 49.6661364 |
| 10 | 1595 | 0.575302907 | 49.58962995 |
| 11 | 1600 | 0.920392448 | 55.56632056 |
| 12 | 2400 | 0.696950353 | 36.49416106 |
| 13 | 2410 | 0.65107838 | 37.49165672 |
| 14 | 2420 | 0.792974128 | 38.25120401 |
| 15 | 2430 | 0.841146981 | 37.76136262 |
| 16 | 2440 | 0.627577596 | 36.05069638 |
| 17 | 2450 | 0.548366835 | 36.39402169 |
| 18 | 2460 | 0.270754346 | 34.91105411 |
| 19 | 2470 | 0.027718602 | 34.14565363 |
| 20 | 2480 | -0.313171712 | 31.97296373 |





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| | | | |
|----|------|--------------|-------------|
| 21 | 2490 | -0.6227737 | 30.35015284 |
| 22 | 2500 | -0.684236077 | 30.08217559 |
| 23 | 5150 | -2.088795546 | 17.57717446 |
| 24 | 5190 | -1.290726931 | 19.21841041 |
| 25 | 5230 | -0.802542843 | 22.25484108 |
| 26 | 5270 | -0.524163832 | 24.62564226 |
| 27 | 5310 | -0.395825963 | 25.47199442 |
| 28 | 5350 | 0.364350492 | 29.42432248 |
| 29 | 5390 | 0.562970358 | 27.48636498 |
| 30 | 5430 | -1.202442327 | 26.08482879 |
| 31 | 5470 | -0.517760022 | 29.20375866 |
| 32 | 5510 | -1.255885409 | 23.15779588 |
| 33 | 5550 | -1.628313887 | 23.12862435 |
| 34 | 5590 | -2.041342023 | 18.79581429 |
| 35 | 5630 | -3.096099273 | 15.86287193 |
| 36 | 5670 | -1.26919036 | 18.07923748 |
| 37 | 5710 | -1.667608856 | 17.88706264 |
| 38 | 5750 | -1.204460227 | 16.56846798 |
| 39 | 5790 | -1.183760639 | 16.71540815 |
| 40 | 5830 | -2.689528079 | 16.36724466 |
| 41 | 5850 | -2.604948317 | 18.8682792 |



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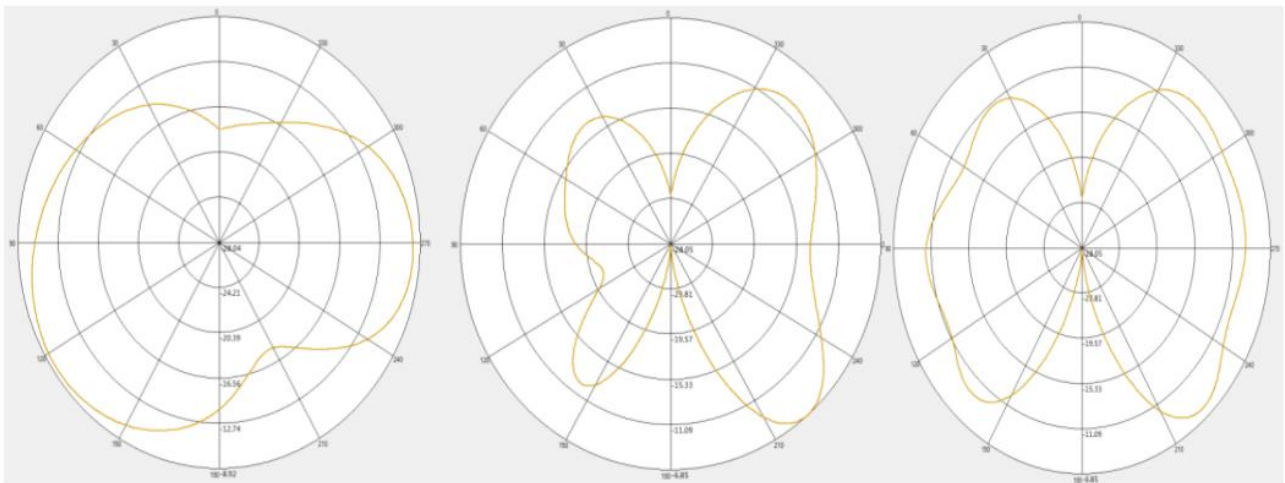
4.3 2D 方向图 (2D directional diagram)

1575MHz

XOY面

XOZ面

YOZ面

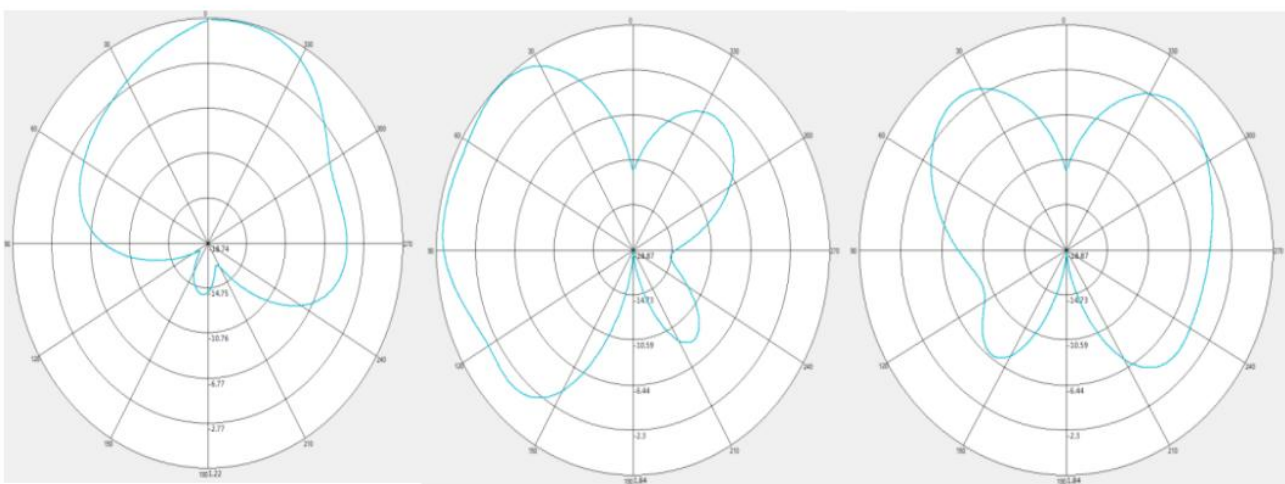


2450MHz

XOY面

XOZ面

YOZ面



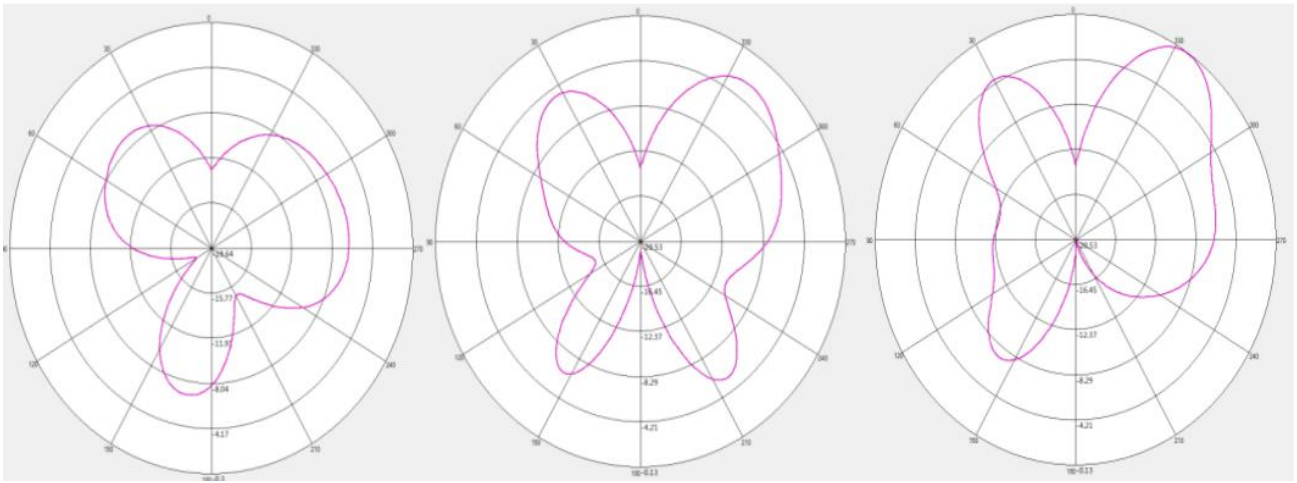


5510MHz

XOY面

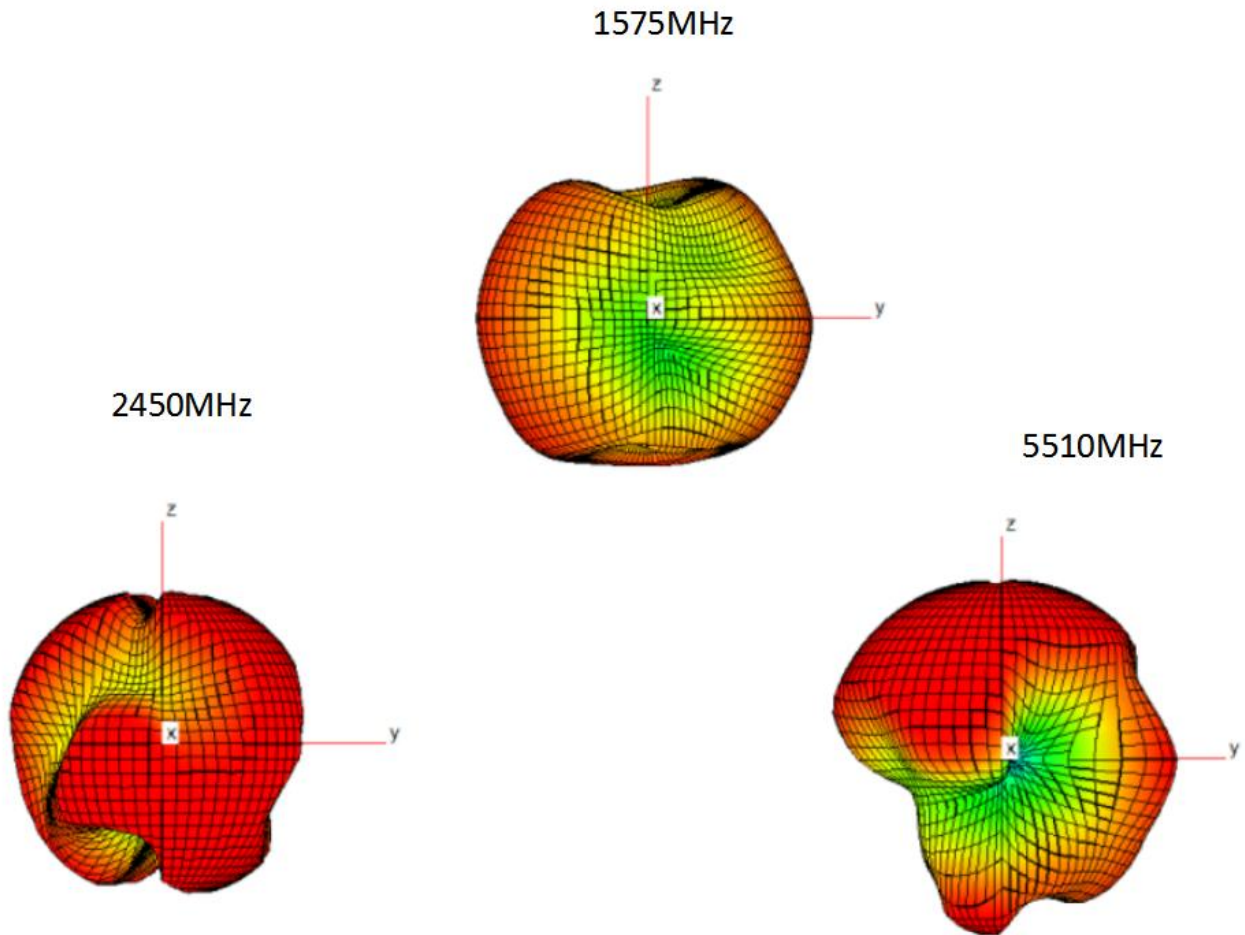
XOZ面

YOZ面





4.4 3D 方向图 (3D directional diagram)





4.5 有源数据 (Active test data)

| 频段 | 参数\信道 | 1 | 6 | 11 |
|-----------|-------|--------|--------|--------|
| WIFI-11B | TRP | 12.57 | 11.40 | 12.62 |
| | TIS | -78.33 | -76.06 | -74.96 |
| 频段 | 参数\信道 | 1 | 6 | 11 |
| WIFI-11G | TRP | 12.73 | 11.71 | 12.46 |
| | TIS | -66.19 | -65.71 | -63.92 |
| 频段 | 参数\信道 | 1 | 6 | 11 |
| WIFI-11GN | TRP | 11.38 | 10.8 | 10.94 |
| | TIS | -63.00 | -62.03 | -61.88 |



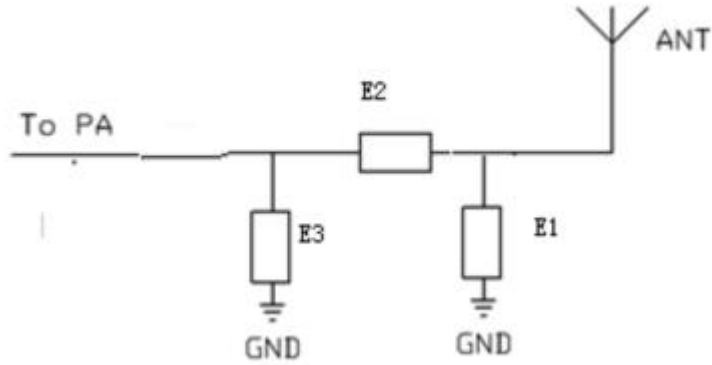


4.6 装配图 (Environment treatment)





5. 匹配说明 (Matching circuit)

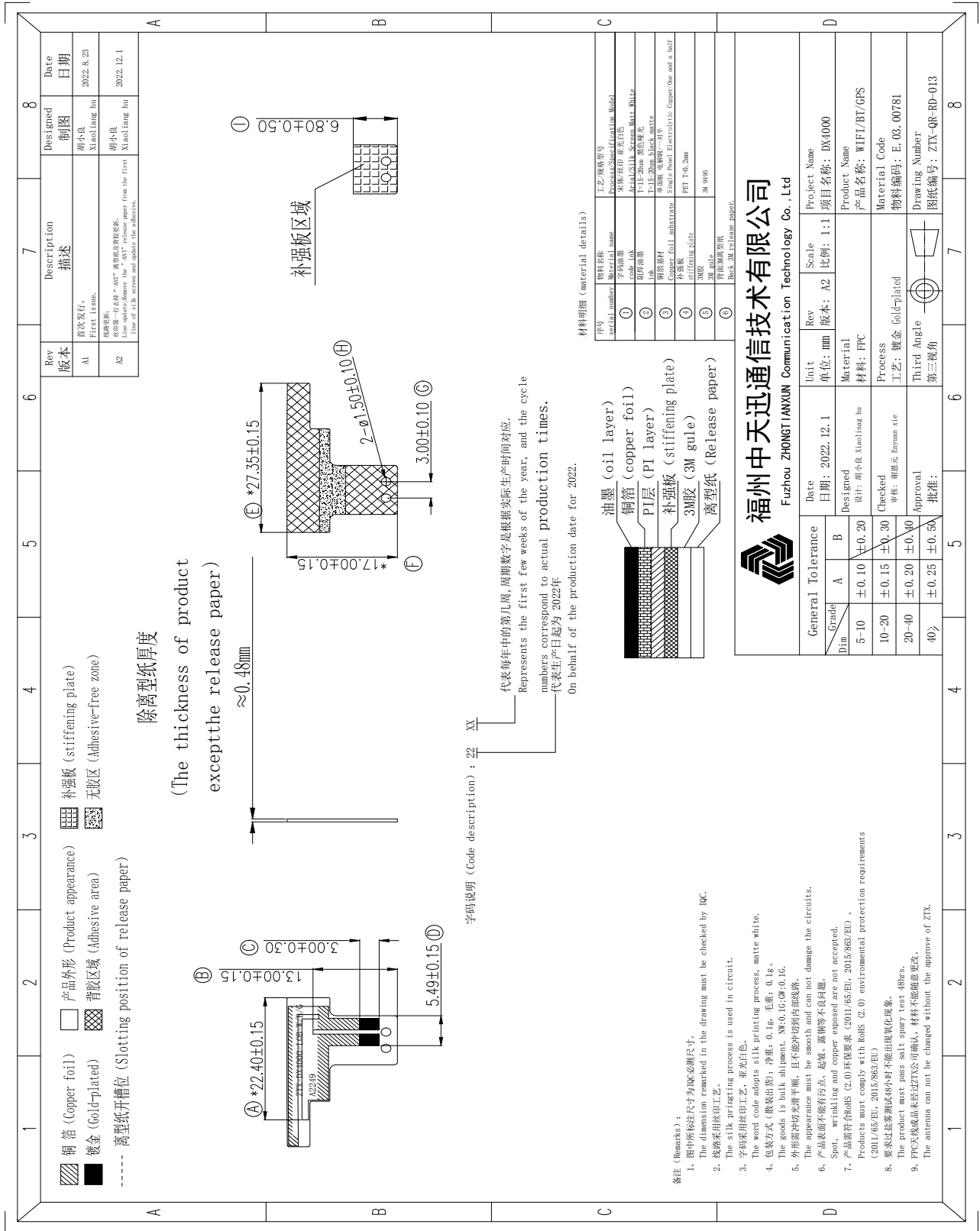


| Matching description | WIFI/BT/GPS |
|----------------------|-------------|
| E1 | NC |
| E2 | 0 Ω |
| E3 | NC |



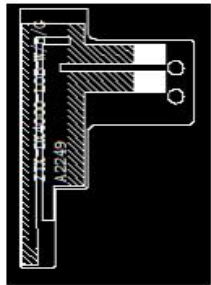





6. 天线外形图 (Mechanical Specification)





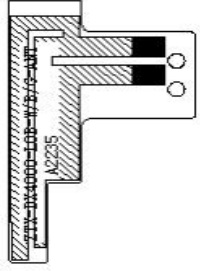


7. 包装作业指导 (The packing way)

| 福州中天迅通信技术有限公司 Fuzhou ZHONGTIANXUN Communication Technology Co., Ltd | | | | 作业指导书 | | | |
|---------------------------------------------------------------------------------------------------------|------------|---------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|--|
| 产品名称 | 产品型号 | 文件编号 | 版本 | 工序号/名称 | 工序工时 | 日产量 | |
| 三合一 | DX4000-LOB | ZTX-QD-WI-024 | A1 | 包装 | / | / | |
|  图1: 确认数量 | | | | 作业方法 (自检验工序作业合格后, 方能流入下一道工序) 1. 产品采用单PCS出货, 每 (100pcs) 产品用90*130mmPE封口膜 2. 每个160*240mmPE开口胶袋装10小袋 (1000PCS), 尾数除外; 3. 外箱上除标签贴外, 不能有任何丝印 (即空白纸箱) 出货; 4. 将包装好的产品装入纸箱, 每箱数量根据订单数量要求进行数量确认, 保证每箱装入的数量正确。 5. 在装好产品的箱子上将外箱标签及物料追溯码, RoHS贴于外箱的右上角, 打印标签内容包括 (生产产家, 型号, 产品名称, 客户编码, 数量, 订单号, 日期, QA检验,) | | | |
|  图2: 每10小袋用大PE袋包装 | | | | 注意事项: 1. 发现重量有超出公差范围时, 须对数量进行清点 2. 外箱只允许有1个物料标签, 其余如有多余标签时须将其清理干净。 3. 条码标签在贴于外箱时, 应尽量平整, 避免应起皱影响客户入库。 4. 条码需清晰可扫描 | | | |
|  图3: 小标签及追溯码 | | | | 物料名称及规格 纸箱 (45*32.5*21) cm PE封口袋 (90*130) mm PE开口袋 (160*240) mm 工/夹装治具 电子称 封口机 | | | |
|  图4: 贴外箱标签, 封箱 | | | | 物料编号 用量 1 200 20 | | | |
| 版本 | | | | 修订内容 修订日期 修订人 张武民 | | | |
| 制订 胡小良 | | | | 审核 易爱玲 | | | |
| 品质确认 胡春梅 | | | | 批准 张武民 | | | |





SOP

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|-------------|---------------------------------|--------|-----------------------|--|------------------------|---|------------------|--|--------------------------|-----|--------|--|----------------------------|----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--------------------|--|---------------|------------|--|--|--|--|
| product name | product model | File Number | version | Process number/name | process man-ho | Daily output | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| WIFI/BT/GPS | DX4000 (LOB) | ZTX-QD-WI-024 | A1 | package | / | / | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | <p>Packaging process</p> <ol style="list-style-type: none"> 1. The products are shipped in a single PCS, and each (100pcs) product is packed in a 90*130mm PE sealing plastic bag. 2. Each 160*240mm PE open plastic bag is packed in 10 sachets (100PCS), except the mantissa. 3. Except for the label, the outer box cannot be shipped with any silk screen (ie blank carton): 4. Put the packaged products into cartons, and confirm the quantity of each box according to the order quantity requirements to ensure that the quantity of each box is correct. 5. Put the outer box label and material traceability code, RoHS on the upper right corner of the outer box on the box with the product, and the printed label content includes (manufacturer, model, product name, customer code, quantity, order number, date , QA inspection,) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  <p>Picture 2: Every 10 sachets are packed in large PE bags</p> | | | | <p>Precautions</p> <ol style="list-style-type: none"> 1. When it is found that the weight is out of the tolerance range, the quantity must be counted 2. Only 1 material label is allowed in the outer box. If there are extra labels, they must be cleaned up. 3. When the bar code label is attached to the outer box, it should be as flat as possible to avoid wrinkling that affects the customer's storage. 4. The barcode must be clear and scannable | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  <p>Picture 4: Attach the outer box label and seal the box</p> | | | | <table border="1"> <tr> <td>Item number</td> <td>Material name and specification</td> <td>Dosage</td> <td>Work/Clamping Fixture</td> </tr> <tr> <td></td> <td>Carton (45*32.5*21) cm</td> <td>1</td> <td>Electronic scale</td> </tr> <tr> <td></td> <td>PE sealed bag (90*130)mm</td> <td>200</td> <td>Sealer</td> </tr> <tr> <td></td> <td>PE open pocket (160*240)mm</td> <td>20</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="2">modify the content</td> <td>Revision date</td> <td>Revised by</td> </tr> <tr> <td colspan="2"></td> <td></td> <td></td> </tr> </table> | | | Item number | Material name and specification | Dosage | Work/Clamping Fixture | | Carton (45*32.5*21) cm | 1 | Electronic scale | | PE sealed bag (90*130)mm | 200 | Sealer | | PE open pocket (160*240)mm | 20 | | | | | | | | | | | | | | | | | | | | | | modify the content | | Revision date | Revised by | | | | |
| Item number | Material name and specification | Dosage | Work/Clamping Fixture | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Carton (45*32.5*21) cm | 1 | Electronic scale | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | PE sealed bag (90*130)mm | 200 | Sealer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | PE open pocket (160*240)mm | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| modify the content | | Revision date | Revised by | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| version | Ailing yi | | Quality confirmation | | Chunmei hu | Wumin zhang | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Formulate | Xiaoliang hu | Review | Approval | Approve | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

