

# 深圳市飞敏科技有限公司

ShenZhen FeiMin Technology CO.,LTD.

## 产品承认书

SPECIFICATION FOR APPROVED

客户

CUSTOMER:

产品名称

PRODUCTS:

客户料号

PART NO:

产品型号

Spec.:

日期

Data:

321610—X6 贴片天线

X6

2021.12.14

| 供应商               |                  |                   |
|-------------------|------------------|-------------------|
| SUPPLIER          |                  |                   |
| 拟制<br>PREPARED BY | 审核<br>CHECKED BY | 批准<br>APPROVED BY |
| 杨轩                | 夏兴喜              | 马冬冬               |

| 客户                |                  |                   |
|-------------------|------------------|-------------------|
| CUSTOMER          |                  |                   |
| 承认<br>ACCEPTED BY | 审核<br>CHECKED BY | 批准<br>APPROVED BY |
|                   |                  |                   |

备注：承认盖章后请回复一份承认书（或复印件）给我司，其余由贵公司存档

REMARK:Please send us one(or copy)of this approval with stamp after accepting,other copies filed by the customer.

地址：深圳市宝安区西乡街道固戍社区恒南一路C栋厂房303室

ADD:Room 303,Building C,Hengnan one Road,Gushu community,Xixiang Street,Bao' an District,Shenzhen City

电话 Tel: 0755-23035723

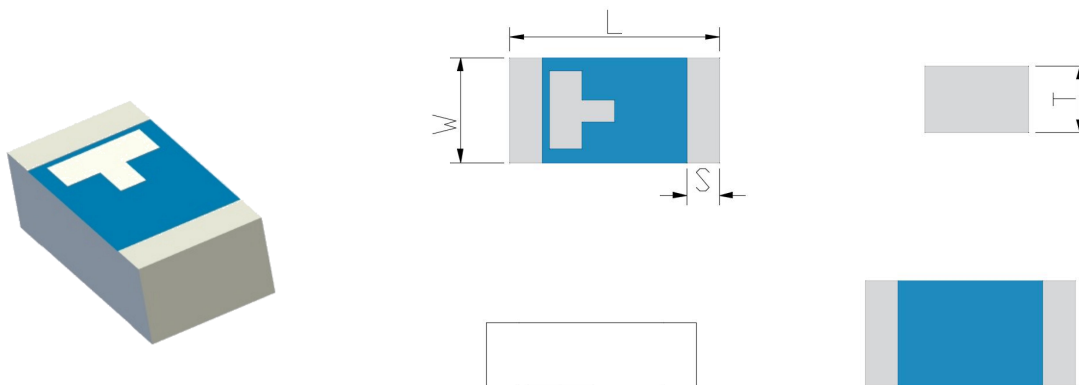
邮箱 E-mail: ant001@fmant.cn

传真 Fax: 0755-23036702

网址 HTTP:[www.fmant.cn](http://www.fmant.cn)

## 1. 项目信息 Project Information

### 1.1. 外观尺寸 Appearance and Dimensions

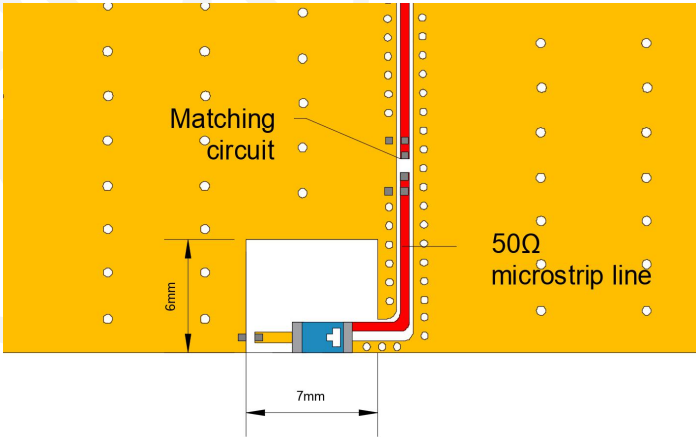


| Symbol   | Dimension (mm) |
|----------|----------------|
| L (长度)   | $3.2 \pm 0.20$ |
| W (宽度)   | $1.6 \pm 0.20$ |
| T (厚度)   | $1.0 \pm 0.20$ |
| S (电极宽度) | $0.4 \pm 0.20$ |

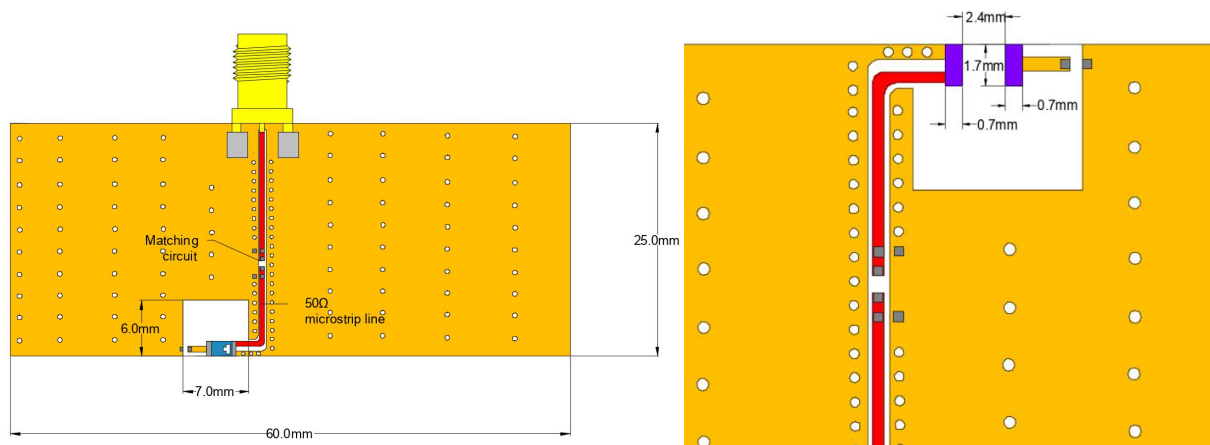
## 1.2. 天线净空区面积 antenna Clearance area

在设计天线时，应远离金属部件和不相关的部件，如电池、振荡器、防护罩、摄像头等，为天线留出干净的空间。这个间隔简称为净空区。以下是我们建议预留的净空区面积大小。

When designing the antenna, it should be far away from metal components and irrelevant components such as batteries, oscillators, shields, cameras, etc. to leave a clean space for the antenna. This interval is called clearance area. The following is the size of clearance area we recommend to reserve.

| 天线型号 (Model)          | 天线尺寸 (size)        | 净空区面积<br>Clearance area<br><b>L*W(mm)</b> |  |
|-----------------------|--------------------|-------------------------------------------|-------------------------------------------------------------------------------------|
| A1 (2.4G 单极)          | 5.5*1.2*1.2        | 9.1*5.6                                   |                                                                                     |
| X5 (2.4G 单极)          | 5.2*2.2*1.0        | 8.7*6.5                                   |                                                                                     |
| <b>X6 (2.4G pifa)</b> | <b>3.2*1.6*1.0</b> | <b>7.0*6.0</b>                            |                                                                                     |
| D1 (2.4G 单极)          | 5.2*2.2*1.0        | 8.7*6.5                                   |                                                                                     |
| D2 (2.4G 单极)          | 5.2*2.2*1.0        | 8.7*6.5                                   |                                                                                     |
| D3 (2.4G 单极)          | 3.4*1.7*1.2        | 7.2*6.5                                   |                                                                                     |
| F01 (2.4G pifa)       | 3.2*1.6*0.4        | 7.0*6.0                                   |                                                                                     |
| S2 (2.4/5.8G 双频)      | 7.0*3.0*2.0        | 9.0*7.0                                   |                                                                                     |
| U1 (UHF 单极)           | 15.0*3.0*1.0       | 19.0*8.0                                  |                                                                                     |
| G2 (GPS 单极)           | 8.5*3.0*1.0        | 13.5*7.5                                  |                                                                                     |

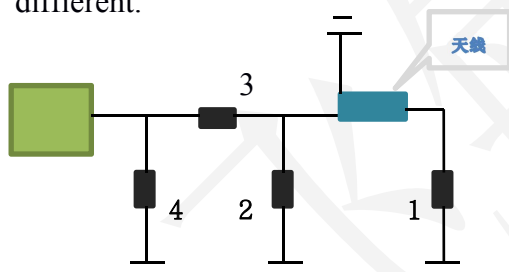
### 1.3. 天线 Demo 测试板 Demo Test Board with Antenna(Unit:mm)



### 1.4. 匹配电路 Matching Circuit

使用以下推荐的匹配和调谐元件值，在我们的标准 25\*60 mm 评估板上，中心频率约为 2440mhz。然而，这些是典型的参考值，当电路板或零件供应商不同时，可能需要更改。

With the following recommended values of matching and tuning components, the center frequencies will be about 2440 MHz at our standard 25\*60 mm evaluation board. However, these are typical reference values which may need to be changed when circuit boards or part vendors are different.



| 系统匹配电路元件(村田)                               |               |           |
|--------------------------------------------|---------------|-----------|
| System Matching Circuit Component (Murata) |               |           |
| Location                                   | Description   | Tolerance |
| 1                                          | 0.75pF (0402) | ± 0.1pF   |
| 2                                          | NC            | /         |
| 3                                          | 1.0pF (0402)  | ± 0.1pF   |
| 4                                          | NC            | /         |

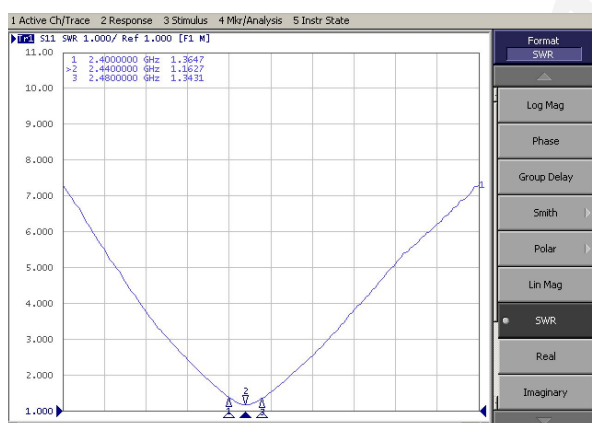
## 2. 电特性 Electrical Characteristics(25\*60mm ground plane)

### 2.1.电子表格 Electrical Table

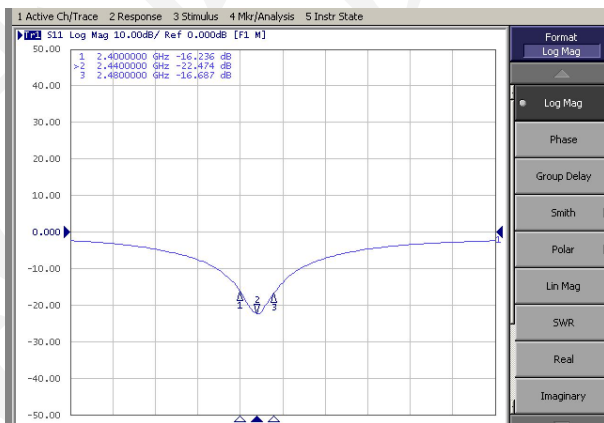
| 特征 Characteristics      |               | 规范 Specifications | 单位 Unit  |
|-------------------------|---------------|-------------------|----------|
| 轮廓尺寸 Outline Dimensions |               | 3.2*1.6*1.0       | mm       |
| 工作频率 Working Frequency  |               | 2400-2500         | MHz      |
| 电压驻波比 VSWR              |               | <2                | /        |
| 阻抗 Impedance            |               | 50                | $\Omega$ |
| 极化 Polarization         |               | 线极化               | /        |
| 增益 Gain                 | 峰值 Peak       | 2                 | dBi      |
|                         | 效率 Efficiency | 50                | %        |

### 2.2.电压驻波比与 Smith 圆图 VSWR & Smith

VSWR

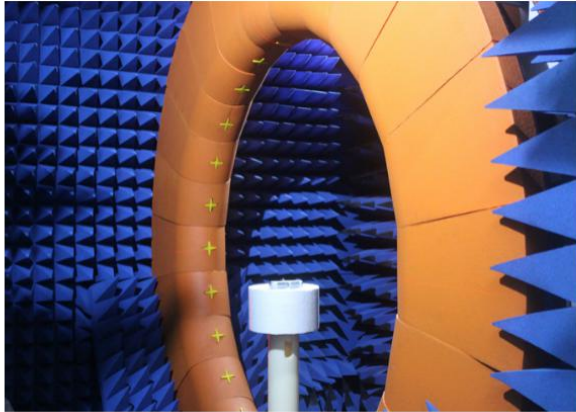


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### 2.3.天线增益与效率 Gain and Efficiency

测试系统 Test system



24 探头微波暗室

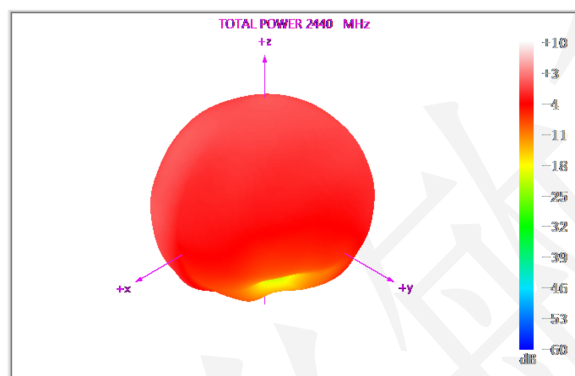
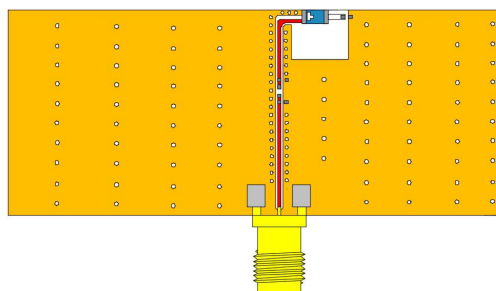
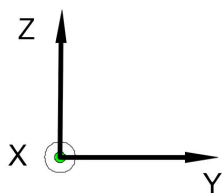
频率：0.4GHz至6GHz

#### 主要测试指标

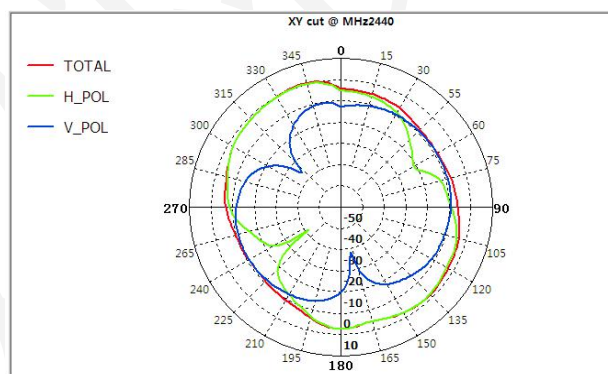
- ◆ 无源指标
- ◆ 增益
- ◆ 效率
- ◆ 3D方向图
- 有源指标
- TRP总辐射功率
- TIS总接收灵敏度

| Frequency (MHz) | Gain (dBi) | Efficiency (%) |
|-----------------|------------|----------------|
| 2400 MHz        | 1.43       | 50.15          |
| 2410 MHz        | 1.38       | 50.78          |
| 2420 MHz        | 1.49       | 50.49          |
| 2430 MHz        | 1.34       | 50.43          |
| 2440 MHz        | 1.30       | 50.04          |
| 2450 MHz        | 1.57       | 52.50          |
| 2460 MHz        | 1.76       | 56.12          |
| 2470 MHz        | 1.89       | 57.29          |
| 2480 MHz        | 2.05       | 58.23          |
| 2490 MHz        | 2.06       | 55.99          |
| 2500 MHz        | 2.06       | 53.66          |

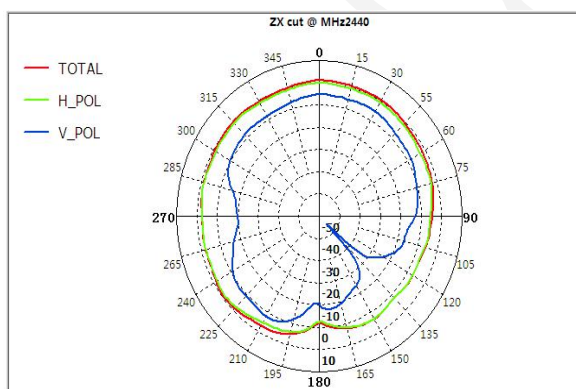
## 2.4. 天线辐射方向图 Antenna radiation pattern



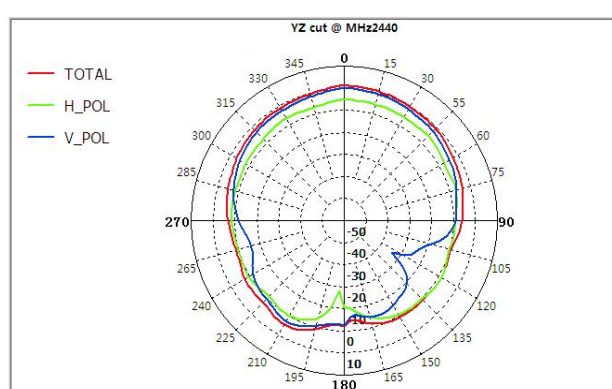
3D-plane@2.44GHz



2D-plane XOY @2.44GHz



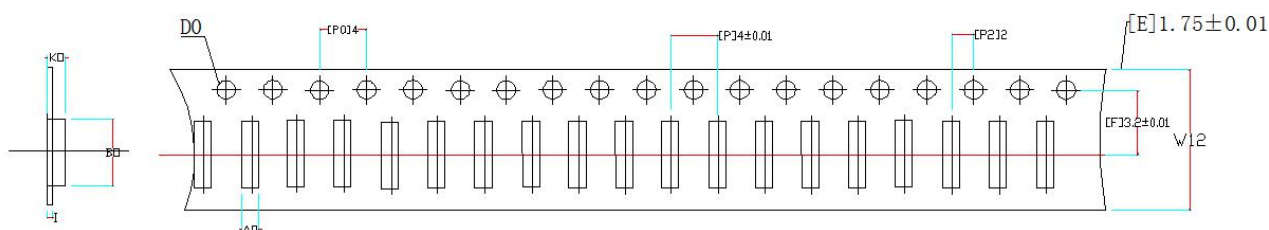
2D-plane XOZ@2.44GHz



2D-plane YOZ @2.44GHz

### 3.包装信息 Packaging Information

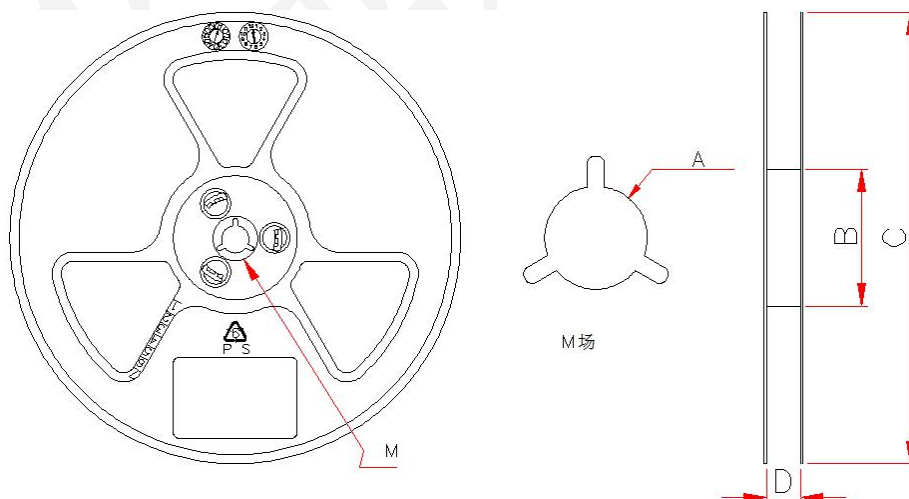
#### 3.1. 胶带规范 Tape specification



| 指数 Index            | A0            | B0            | K0            | P0            | P             | P2            | φ D0         | W              | E             | F             | T              |
|---------------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|----------------|---------------|---------------|----------------|
| 尺寸<br>Dimension(mm) | 1.85<br>± 0.1 | 3.50<br>± 0.1 | 1.30<br>± 0.1 | 4.00<br>± 0.1 | 4.00<br>± 0.1 | 2.00<br>± 0.1 | 1.50<br>+0.1 | 12.00<br>± 0.3 | 1.75<br>± 0.1 | 3.20<br>± 0.1 | 0.30<br>± 0.05 |

- 10 链轮孔距累积公差±0.20。10 sprocket hole pitch cumulative tolerance ±0.20.
- 在 250 毫米中，载体的拱度在 1 毫米以内。Carrier camber is within 1 mm in 250 mm.
- 所有尺寸符合 EIA-481-C 要求。All dimensions meet EIA-481-C requirements.
- 材料:透明 PS。Material :Transparent PS.
- 包装长度每 7"卷:12.5 米。Packing length per 7" reel :12.5Meters.
- 组件加载/ 7"卷:3000 个。Component load per 7" reel : 3000 pcs.(前后共预留 120pcs)

#### 3.2.卷规范 Reel specification



| Index         | A          | B         | C         | D          |
|---------------|------------|-----------|-----------|------------|
| Dimension(mm) | 13.3 ± 0.3 | 100 ± 0.3 | 330 ± 0.3 | 24.5 ± 0.3 |

## 4.注意事项 Notes

- 1) 产品应小心处理，以避免汗水和皮肤油脂损坏或污染。  
Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
- 2) 对于单个部件，强烈建议使用镊子或真空拾取。  
The use of tweezers or vacuum pick up is strongly recommended for individual components.

## 5.储存条件 Storage Conditions

- 1) 推荐产品从交货之日起 6 个月内使用。  
Recommended products should be used within 6 months form the time of delivery.
- 2) 存储环境条件  
Storage environment condition
  - 温湿度条件:-10~40℃, 30~70%RH。  
Temperature and humidity conditions:-10~40℃ and 30~70%RH.
  - 包装材料应保存在空气中不含氯或硫的地方。  
The packaging material should be kept where no chlorine or sulfur exists in the air.
  - 产品应储存在仓库内，无热震、振动、阳光直射等。  
Products should be storage in the warehouse without heat shock,vibration,direct sunlight and so on.