远德电子（深圳）有限公司

Yuande Electronics (Shenzhen) Co. LTD

样 品 承 认 书

SAMPLE APPROVAL SHEET

部品信息：Part Information

客户（Customer）	中山市悦辰电子实业有限公司 Zhong Shan City Richsound Electronic Industrial Ltd.
部品名称（Material Description）	YD5210A2450-FPM521A
客户料号（Customer's Part number）	
部品规格（Specifications）	
远德料号（Supplier's Part number）	123-FPM521-10A
送样日期（Date）	2023-3-7

远德签核： Yuande Sign Off

拟 制 Prepared By	审 核 Checked By	批 准 Approved By
张登桥	李岳鹏	张相亭

客户签核： Customer Sign Off

承 认 Accepted By	审 核 Checked By	批 准 Approved By
承认结果： Acknowledge the result ☐完全接受（Full Approval） ☐条件接受（Conditional Approval） ☐不合格（Unqualified） ☐其它（Others）：		

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目录 Catalogue

1 规格 Specifications

本报告主要提供天线 K1 天线 各项电气和结构性能参数的测试状况。
This report mainly provides the test status of various electrical and structural performance parameters of antenna K1 Antenna.

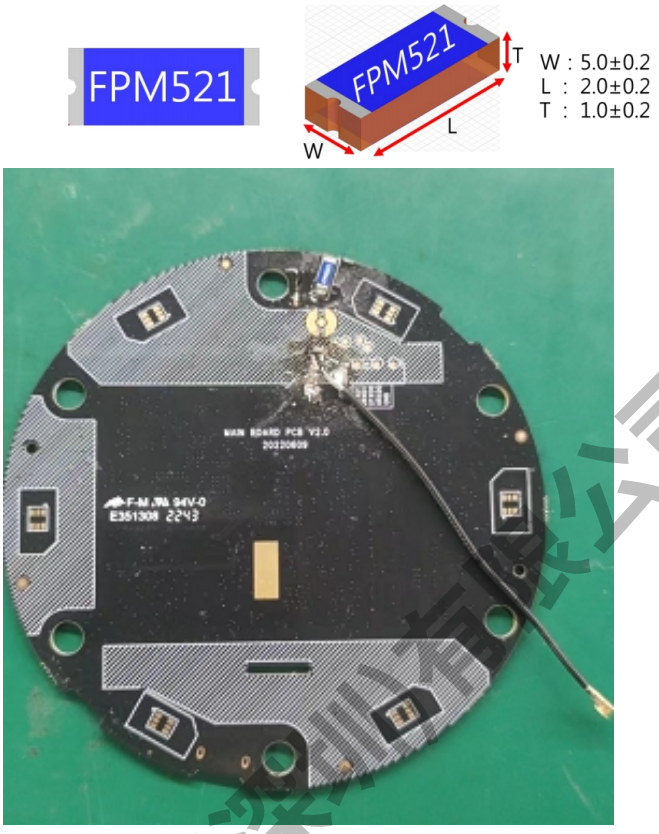


图 1 天线 Antenna

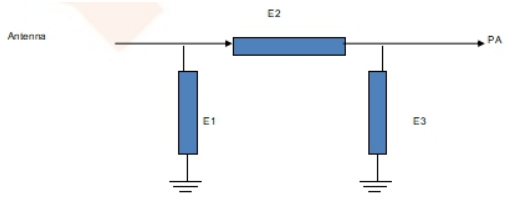
1.1 电气规格标准 Electrical specification standard

1.1.1 电性能指标 Electrical performance index

天线工作频段在 2400-2480MHz 。下表是我司设计天线的电性能的指标.
The frequency band of the antenna is 2400-2480MHz. The following table is the electrical performance index of the antenna designed by our company.

天线 Antenna	K1 天线 K1 Antenna
频段 Frequency band	2400-2480MHz
驻波比 Standing wave ratio	< 2.5
效率 Efficiency	28~37%
阻抗 Impedance	50 ohm
极化方式 Polarization mode	线极化 Linear polarization

1.1.2 匹配电路图 Antenna Matching Network



Element	Value
E1(0402)	10NH
E2(0402)	1PF
E3(0402)	NA

2 测试 Test

天线用客户提供的样机进行调试及测试。The antenna is debugged and tested with the prototype provided by the customer。

2.1 无源 S11 的测试 Test of passive S11

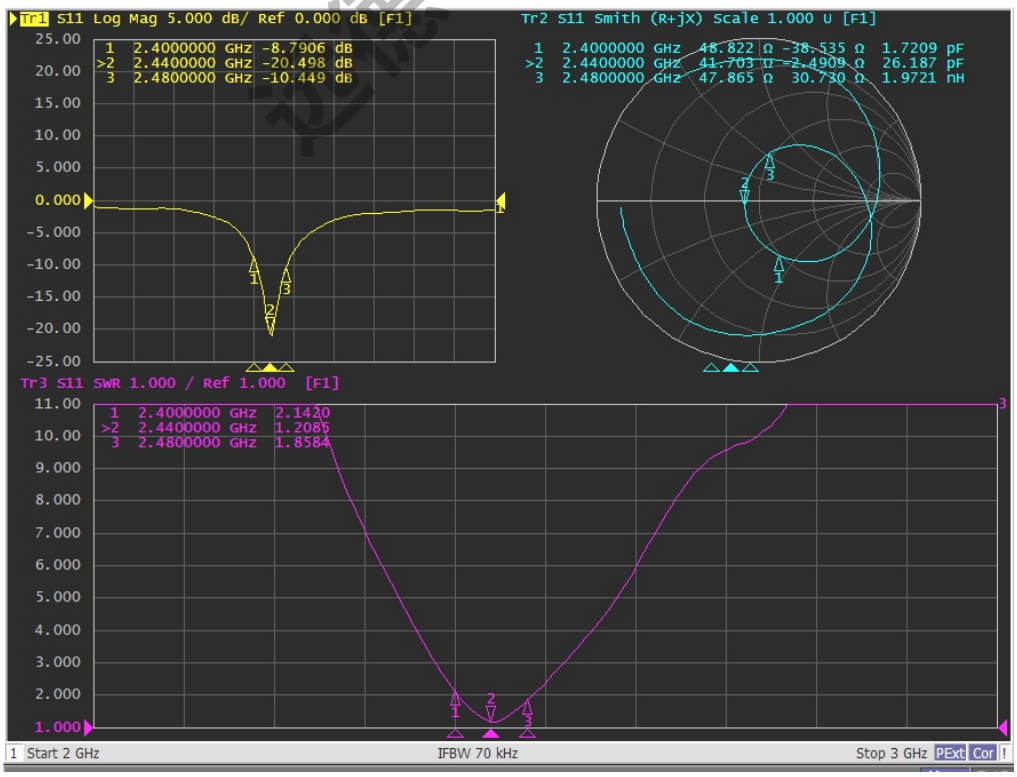
2.1.1 测试连接 Test connection

无源 S11 测试装置依次的连接为：网络分析仪→测试线→测试治具。
The passive S11 test device is connected as follows: Network analyzer → Test line → Test fixture.

2.1.2 无源 S11 Passive S11

下表所示为天线工作频段边缘频点的驻波比数值。测试所得的 Return Loss, VSWR 相关波形图如下图所示。
The figure below shows the VSWR values of the edge frequency points of the antenna operating band The waveform of return loss and VSWR is shown in the figure.

频率(MHz) Frequency	2400	2440	2480
VSWR	2. 14	1. 20	1. 85
Return Loss	-8. 79	-20. 49	-10. 44



2.2 增益及效率的测试 Test of gain and efficiency

2.2.1 测试的场地 Test Position

远德微波暗室 ：测试频率范围为 400MHz—6GHz。 Yuande microwave anechoic chamber: the test frequency range is 4000MHz-6GHz.

2.2.2 测试的仪表 Test equipment

网络分析仪、标准喇叭天线、多探头近场天线测试系统、测试电脑等。Network analyzer, standard horn antenna, multi probe near-field antenna test system, test computer, etc.

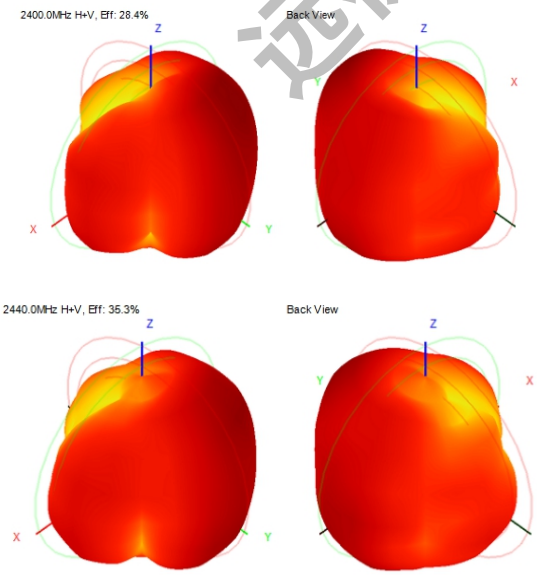
2.2.3 测试结果 Results Summary

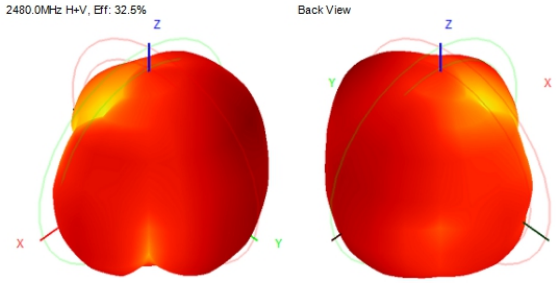
在微波暗室中，测试的与效率及增益相关的数值如下表所示。

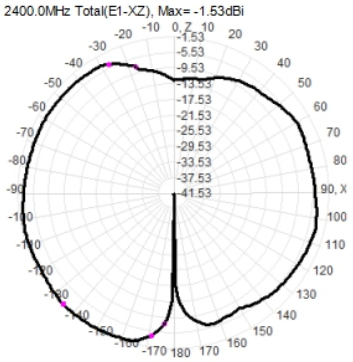
In the microwave anechoic chamber, the measured values related to efficiency and gain are shown in the table below.

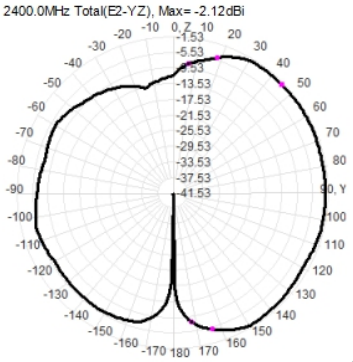
Frequency(MHz)	Gain(dBi)	Efficency(%)
2400	-0.93	28.37
2410	-0.71	29.40
2420	-0.05	33.93
2430	0.05	34.55
2440	0.02	35.27
2450	0.18	37.50
2460	-0.30	34.83
2470	-0.27	35.65
2480	-0.59	32.45
2490	-0.77	30.92
2500	-0.99	29.61

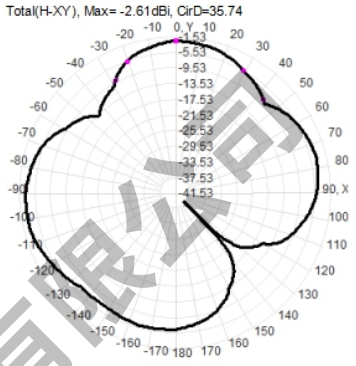
2.2.4 无源辐射方向图 Passive radiation pattern

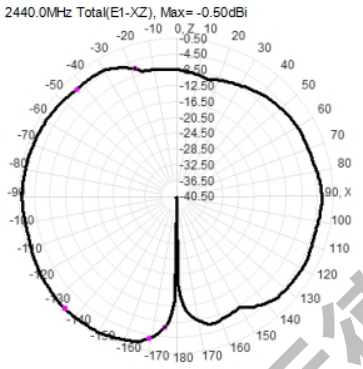


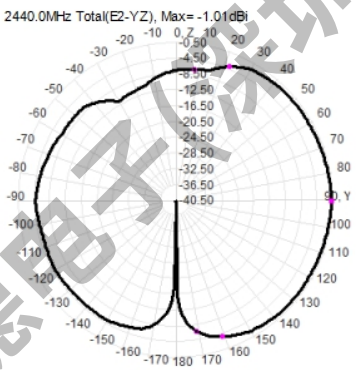

2480.0MHz H+V, Eff: 32.5%
Back View
Z
X
Y

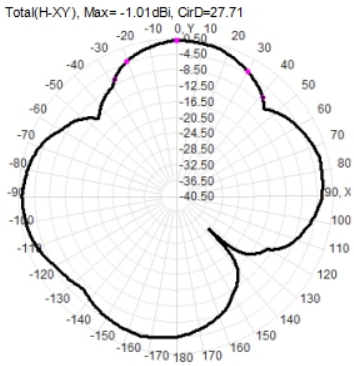

2400.0MHz Total(E1-XZ), Max= -1.53dBi

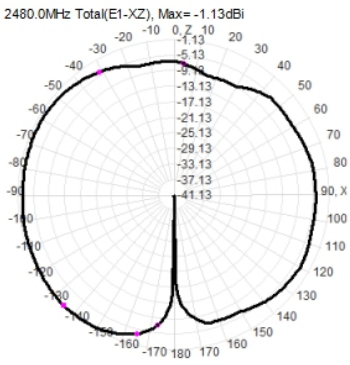

2400.0MHz Total(E2-YZ), Max= -2.12dBi

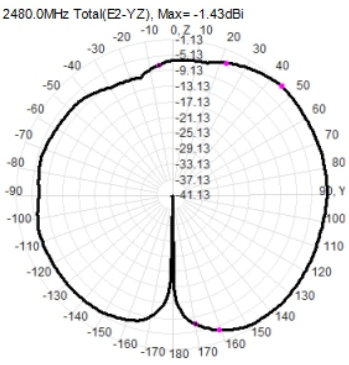

Total(H-XY), Max= -2.61dBi, CirD=35.74

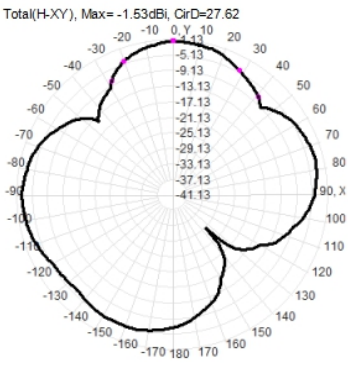

2440.0MHz Total(E1-XZ), Max= -0.50dBi


2440.0MHz Total(E2-YZ), Max= -1.01dBi


Total(H-XY), Max= -1.01dBi, CirD=27.71


2480.0MHz Total(E1-XZ), Max= -1.13dBi


2480.0MHz Total(E2-YZ), Max= -1.43dBi


Total(H-XY), Max= -1.53dBi, CirD=27.62

3、结论 Conclusion

此天线是在客户提供样机基础上设计，上述电性能参数基于测试样机环境处理条件下测试，电参数和结构性能已达到技术要求，请确认！

This antenna is designed on the basis of the prototype provided by the customer. The above electrical performance parameters are tested under the environmental treatment conditions of the test prototype. The electrical parameters and structural performance have met the technical requirements. Please confirm!