

SPECIFICATION

深圳市大显科技有限公司

Shenzhen Daxian Technology Co., Ltd.



通力 A45 整机 LORA2 天线组件

Tonly A45 Complete Unit LORA2 Antenna assembly

产 品 规 格 书

Product Specification

客 户 connection	通力 Tonly	频 段 frequency range	2400MHz ~ 2500MHz
项目名称 entry name	A45	版 本 edition	V03
物料编号 Material No	4J-QRA45-199	颜 色 Color	黑色+灰色 Black+Gray
客户料号 Customer Item Number	290000-019674		
环保要求 environmental requirement	☒ RoHS ☒ REACH		
R F 设计 R F Design	刘柱东 ZhuDong.Liu	结构设计 Structural Design	周锐斌 Bui Bin Zhou
品质经理 Quality Manager	李崇瑞 ChongRui.Li	技术总监 Technical Director	张 磊 Lei.Zhang
日 期 Date	2026-03-14		

客户确认:

Customer confirmation:

装配是否符合贵司要求: ☐OK ☐NGWhether the assembly meets your company's requirements: ☐OK ☐NG

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变更履历

Revision history

版本号 Version number	变更内容 Change content	变更理由 Reason for change	发起变更方 Originating Party	日期 Date	修改人 Modified by
A1.0	创建 found			2026-01-05	
A2.0	更新 modify	天线设计变更+增加天线电性能数据 Antenna Design Change + Addition of Antenna Electrical Performance Data	DX	2026-03-02	
A3.0	更新 modify	已增天线 cable 线的实测插入损耗 Measured insertion loss of the antenna cable	DX	2026-03-14	

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一 项目说明 Project Description

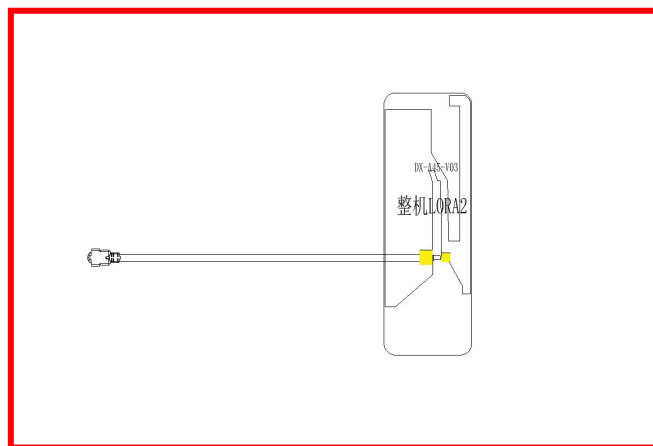
客户名: Customer Name:	通力 Tonly
整机类型: Type of complete machine:	机器人 Robot
天线频段: Antenna band:	2400MHz~ 2500MHz
天线形式: Antenna form:	FPC+同轴线 FPC + Coaxial Cable
馈电形式: Feed form:	焊接 weld
硬件版本: Hardware version:	/

二 LORA2 天线组件 Antenna assembly

1 规格 specifications

本报告主要提供 A45 项目天线的各项电气和结构性能参数的测试状况。下图为大显设计的天线图片。

This report mainly provides the testing status of various electrical and structural performance parameters of the antenna for the A45 project. The following image shows an antenna with a large display design.



天线外观图

antenna appearing diagram

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1.1 电气规格标准 Electrical specifications and standards

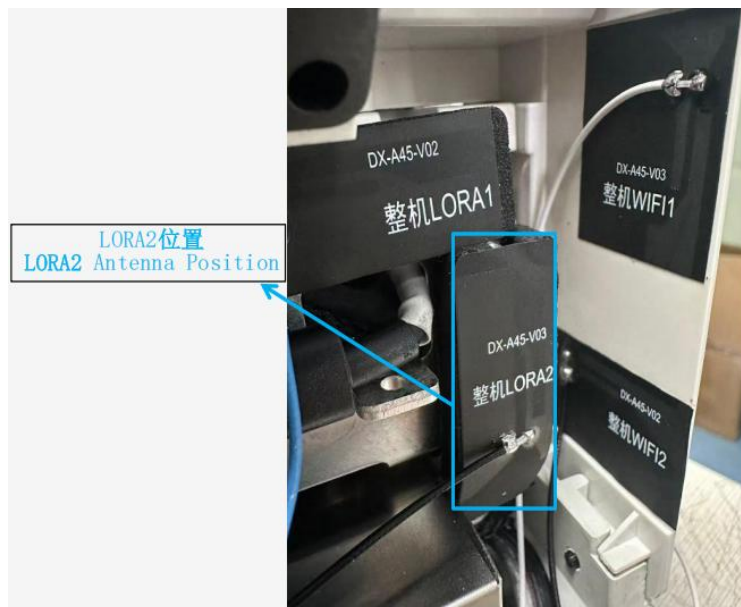
1.1.1 电性能指标 Electrical performance index

天线工作频段在 2400MHz~2500MHz。下表是大显设计和量产天线的电性能的指标。

The operating frequency band of the antenna is between 2400and2500MHz. The following table shows the electrical performance indicators of large display design and mass production antennas.

Frequency Range	Frequency (MHz)	VSWR
LORA2Antenna	2400~ 2500	≤ 2

1.1.2 天线位置图片 Antenna position picture



2 结构规格标准 Structural specifications and standards

1.2.1 天线组成 Antenna composition

天线主要是由 FPC+同轴线 组成。

The antenna is mainly composed of FPC + Coaxial Cable .

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2、测试设备 The Equipment of Active Test

Satimo 3D Chamber $4 \times 4 \times 4$ (m)

CMW500 E5071C

Network analyzer-R&S ZVL

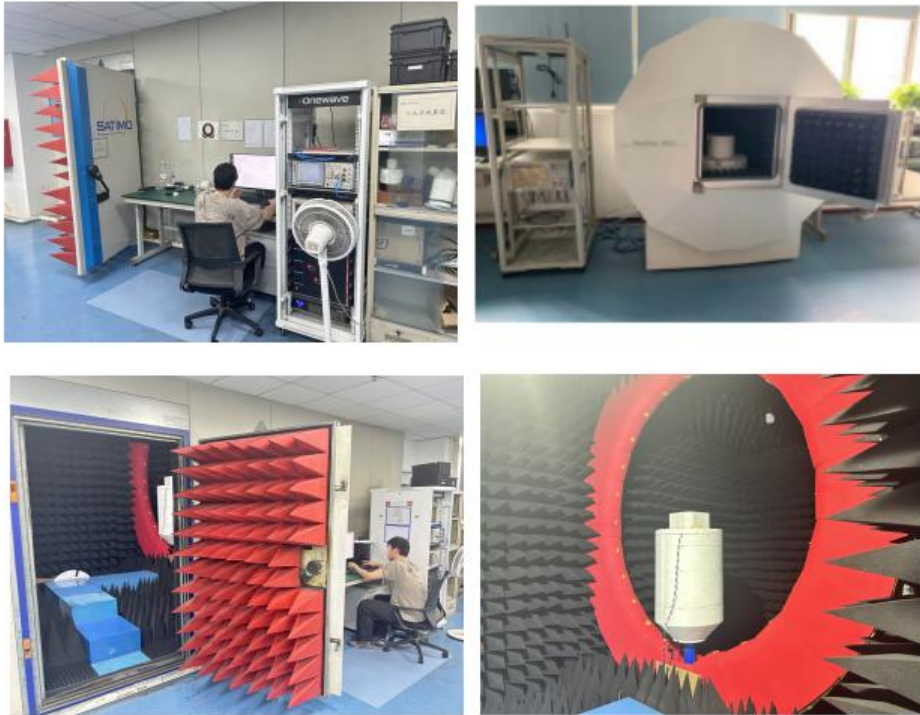


图 2

Figure 2

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3 测试 test

3.1 驻波(VSWR)的测试 Test of standing wave (VSWR)

3.1.1 测试连接: VSWR 测试装置依次连接为: R&S ZVL 网络分析仪 → 测试线 → 测试治

Test connection: The VSWR test device is sequentially connected as follows: R&S ZVL network analyzer → test line → test fixture

实测(附图)Actual measurement (attached drawing)

3.2 增益及效率、功率 (TRP)、灵敏度 (TIS) 的测试

Gain and efficiency, power (TRP), sensitivity (TIS) testing

3.2.1 测试的场地 Test site:

大显微波暗室。测试频率范围为 400MHz—6GHz, 静区范围为 50cm 圆周, 反射率小于 -50 dB。

Large display microwave anechoic chamber. The test frequency range is 400MHz - 6GHz, the static zone range is 50cm circumferential, and the reflectivity is less than - 50dB.

3.2.2 测试的仪表 Tested Instruments:

R&S ZVL 网络分析仪、CMW500 E5071C、标准喇叭天线、法国 SATIMO-SG24SYSTEM 系统、打印机等。

R&S ZVL network analyzer, Agilent 8960 E5515C, standard horn antenna, French SATIMO-SG24SYSTEM system, printer, etc.

3.2.3 测试数据: 在微波暗室中, 测试的功率和灵敏度相关的数值如下表

Test data: In a microwave anechoic chamber, the values related to the power and sensitivity tested are shown in the table below

无源效率&增益 Passive efficiency&gain:

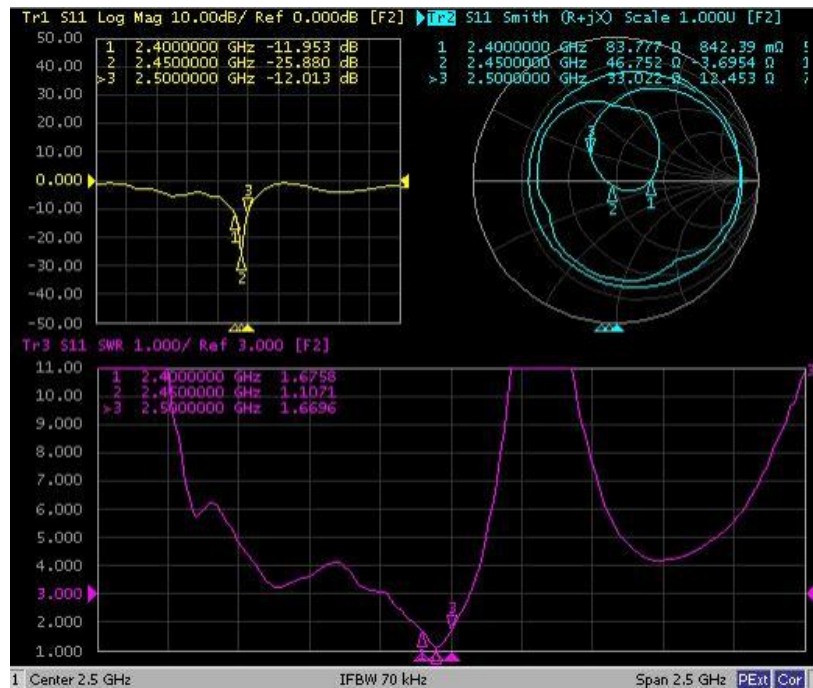
Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2400	40.92	-3.88	1.77
2410	42.81	-3.68	1.83
2420	43.29	-3.64	1.9
2430	44.65	-3.50	2
2440	44.7	-3.50	2.07
2450	45.16	-3.45	2.25
2460	44.62	-3.50	2.11
2470	44.2	-3.55	2.05
2480	43.57	-3.61	1.91
2490	42.09	-3.76	1.85
2500	41.38	-3.83	1.77

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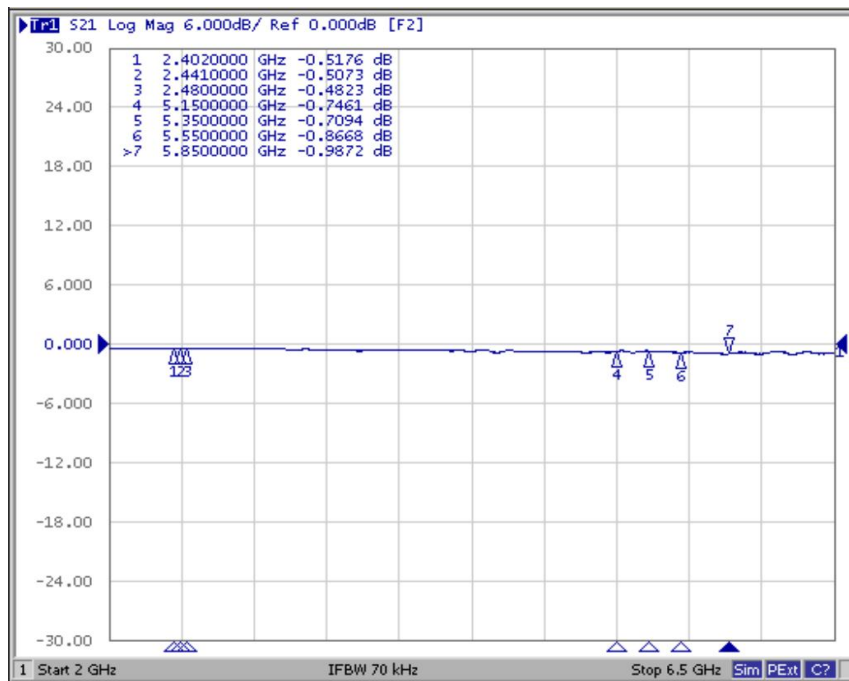
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4、VSWR 参数图 VSWR parameter diagram



天线 cable 线的实测插入损耗 Measured insertion loss of antenna cables



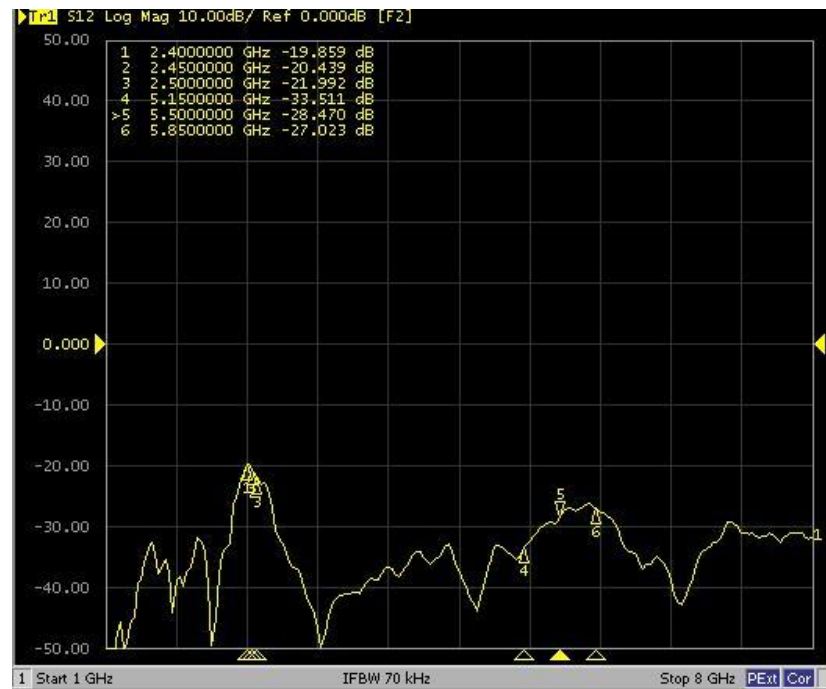
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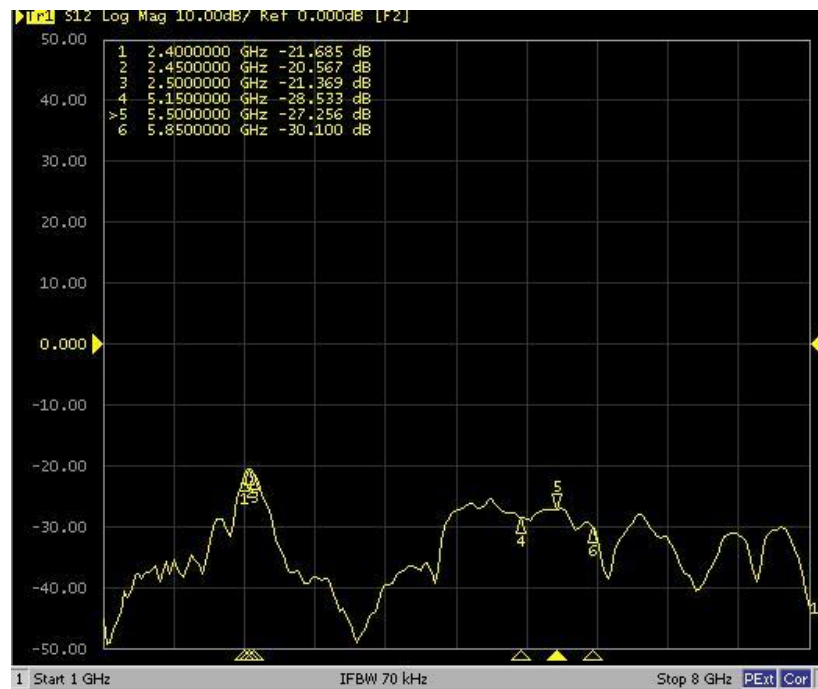
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天线隔离度 Antenna isolation degree

LORA2&WIFI1



LORA2&WIFI2

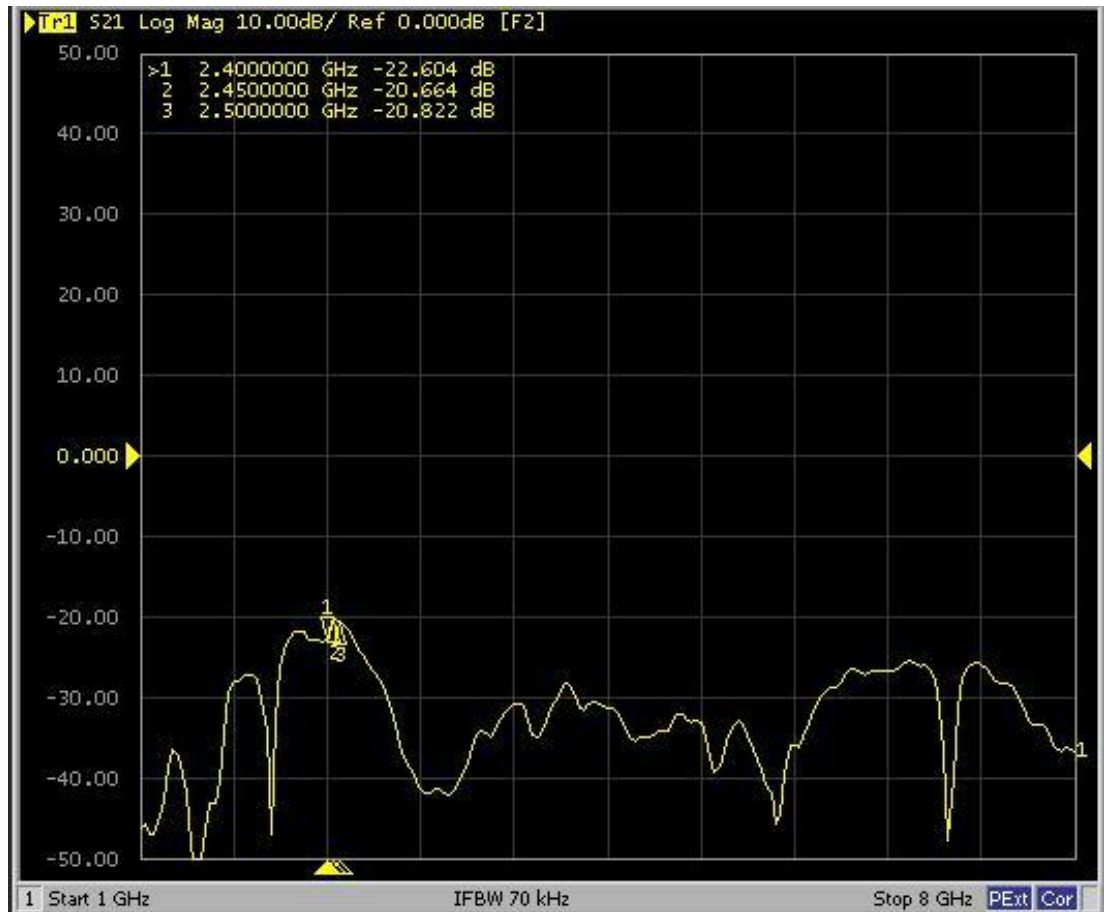


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LORA1&LORA2

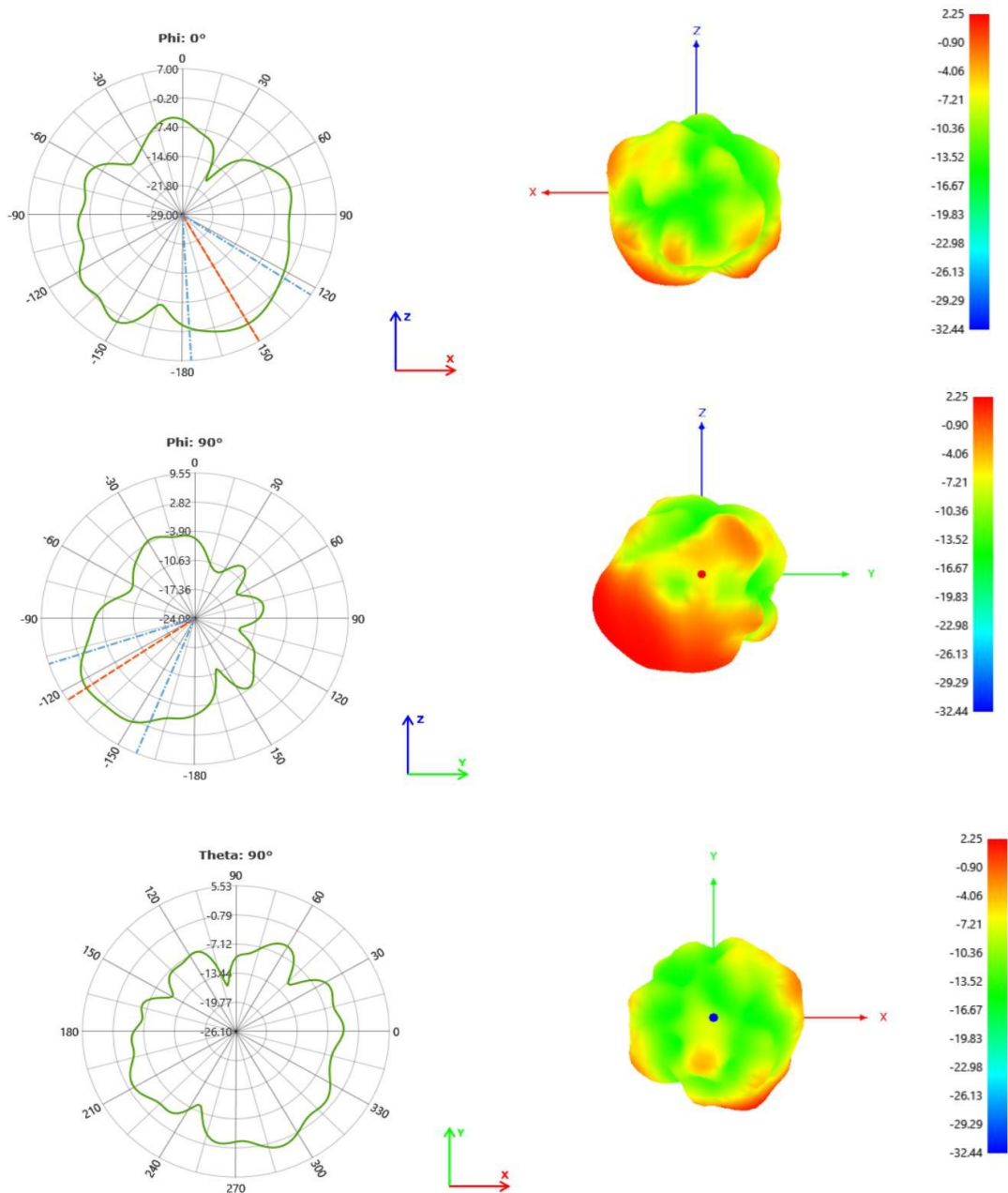


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5、无源场型图 Passive Field Pattern Diagram

2450MHz



6、结论 conclusion

此天线是在客户提供样机基础上设计，电参数和结构性能已达到技术要求，请确认！

This antenna is designed based on the prototype provided by the customer. The electrical parameters and structural performance have met the technical requirements, please confirm!

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