

SPECIFICATION



深圳市大显科技有限公司

Shenzhen Daxian Technology Co., Ltd.

通力 Charge 6 -TL BT 天线组件

Tonly Charge 6-TL BT Antenna assembly

产品规格书

Product Specification

客户 connection	通力 Tonly	频段 frequency range	2400 ~ 2500MHz
项目名称 entry name	Charge 6-TL	版本 edition	V1.3
物料编号 Material No	1C-HARGE6-049	颜色 Color	黑色 Black
客户料号 Customer Item Number	290000-019569		
R F 设计 R F Design	沈川 Chuan.Shen	结构设计 Structural Design	周锐斌 Rui Bin Zhou
品质经理 Quality Manager	杨进 Jin.Yang	技术总监 Technical Director	张磊 Lei Zhang
日期 Date	2024-8-13		

客户确认:

Customer confirmation:

装配是否符合贵司要求: OK NG

Whether the assembly meets your company's requirements: OK NG

深圳市大显科技有限公司

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一 项目说明 Project Description

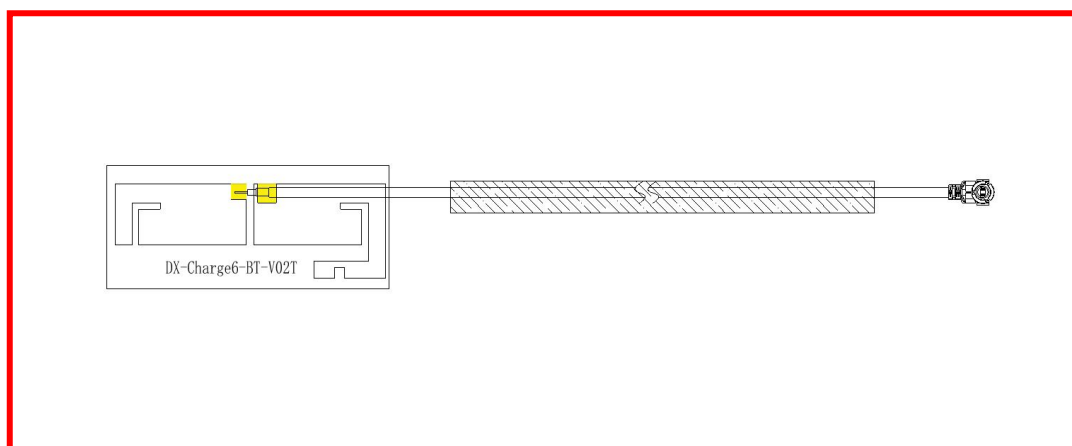
客户名: Customer Name:	通力 Tonly
整机类型: Type of complete machine:	音箱 loudspeaker box
天线频段: Antenna band:	2400 ~ 2500MHz
天线形式: Antenna form:	FPC+同轴线+EVA FPC+coaxial line+EVA
馈电形式: Feed form:	焊接 weld
硬件版本: Hardware version:	/

二 BT 天线组件 Antenna assembly

1 规格 specifications

本报告主要提供 Charge 6 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 Charge 6 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

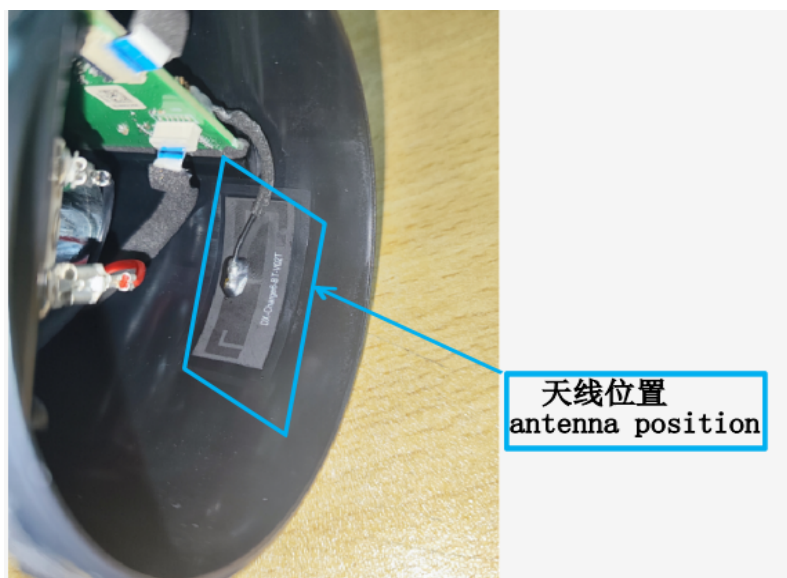
1.1.1 电性能指标 Electrical performance index

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

The operating frequency band of the antenna is between **2400 and 2500 MHz**. The following table shows the electrical performance indicators of large display design and mass production antennas.

Frequency Range	Frequency (MHz)	VSWR
BT	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+EVA**组成。

The antenna is mainly composed of FPC+coaxial line+EVA.

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2. 测试设备 The Equipment of Active Test

Satimo 3D Chamber 6×4×4(m)

Agilent 8960 E5515c

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 测试装置依次的连接为: 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、Agilent8960 E5515C、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 bel

OTA 有源测试 OTA active testing

BAND	CH	TRP (dBm)	TIS (dBm)
BT	0	5.45	-90.39
	39	5.71	-90.51
	78	5.28	-90.43

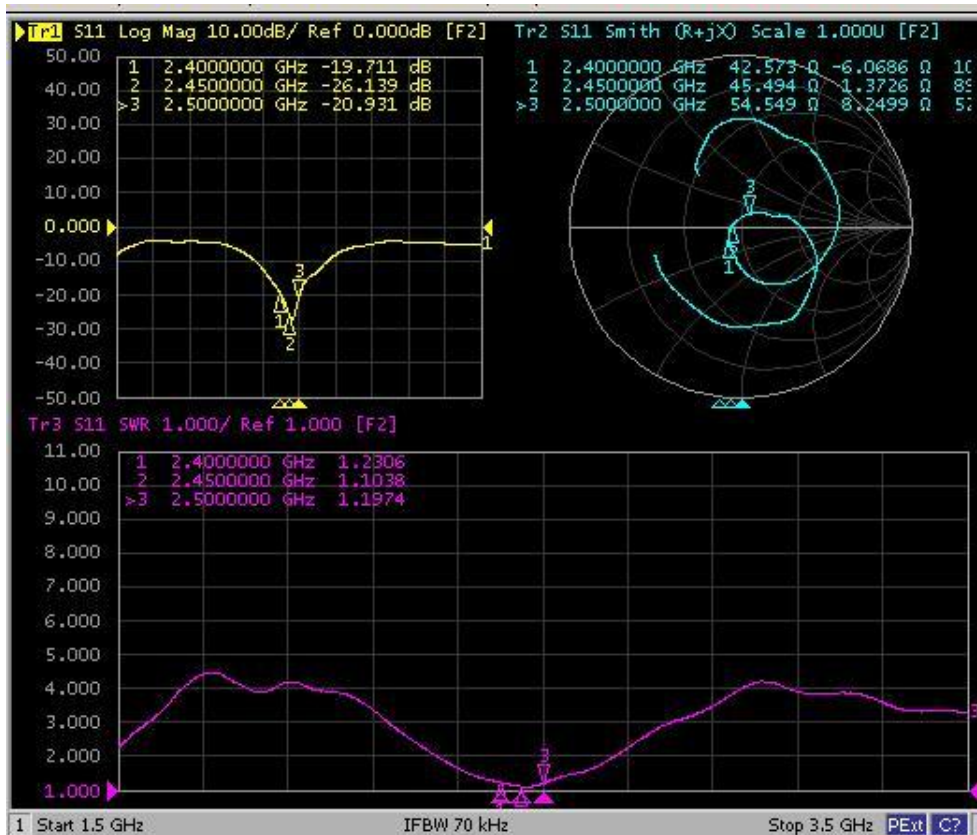
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无源效率&增益 Passive efficiency&gain:

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2400	51.93	-2.85	1.74
2410	52.38	-2.81	1.97
2420	52.94	-2.76	2.01
2430	52.84	-2.77	2.03
2440	53.52	-2.71	1.96
2450	53.25	-2.74	2.06
2460	53.26	-2.74	1.87
2470	52.77	-2.78	1.69
2480	52.48	-2.80	1.71
2490	52.05	-2.84	1.88
2500	51.89	-2.85	1.91

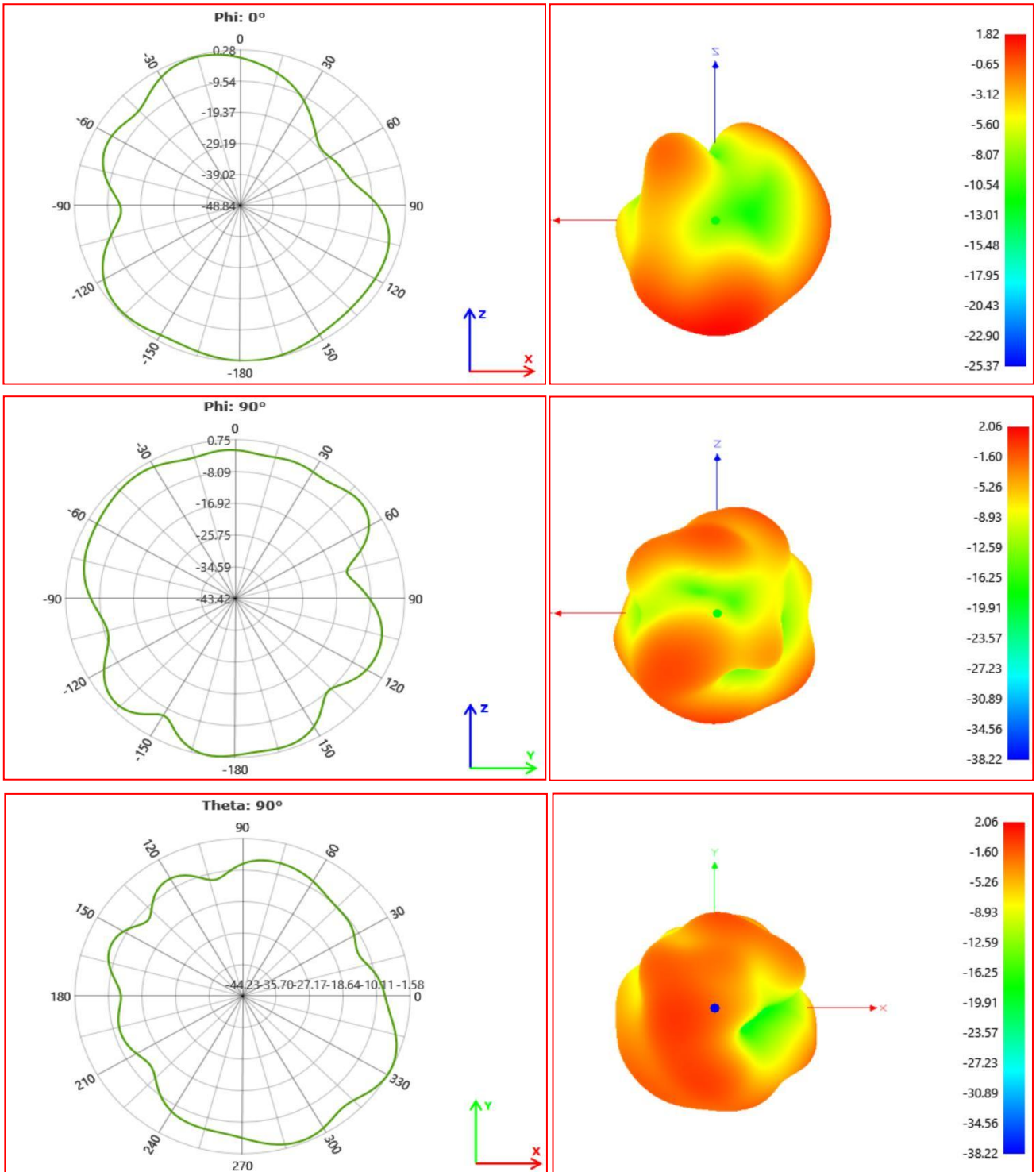
4、VSWR 参数图 VSWR parameter diagram



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5、无源场型图 Passive Field Pattern Diagram

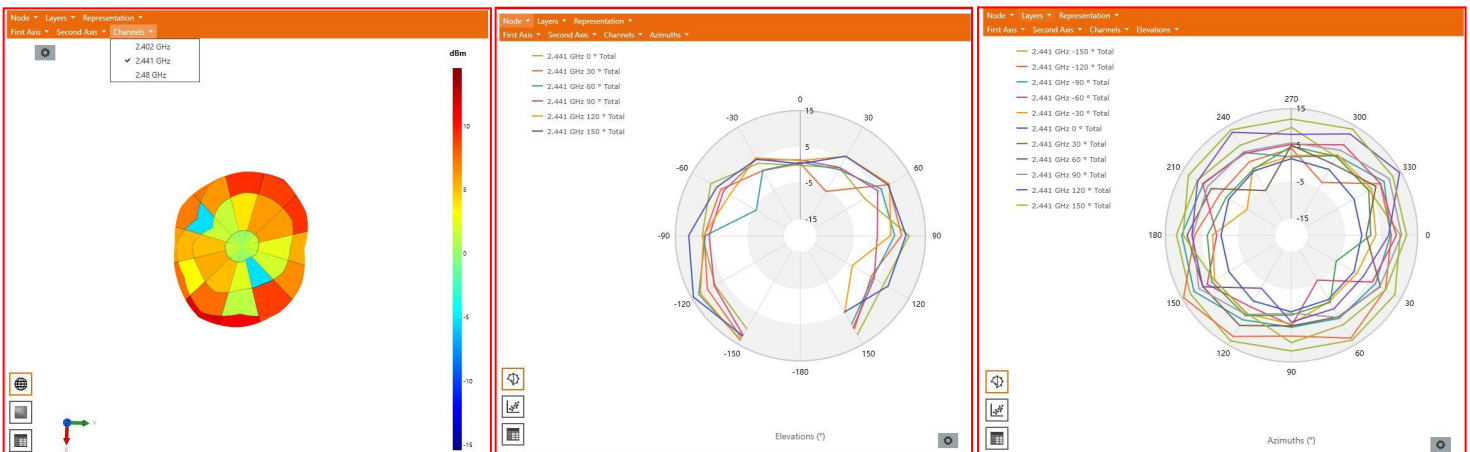
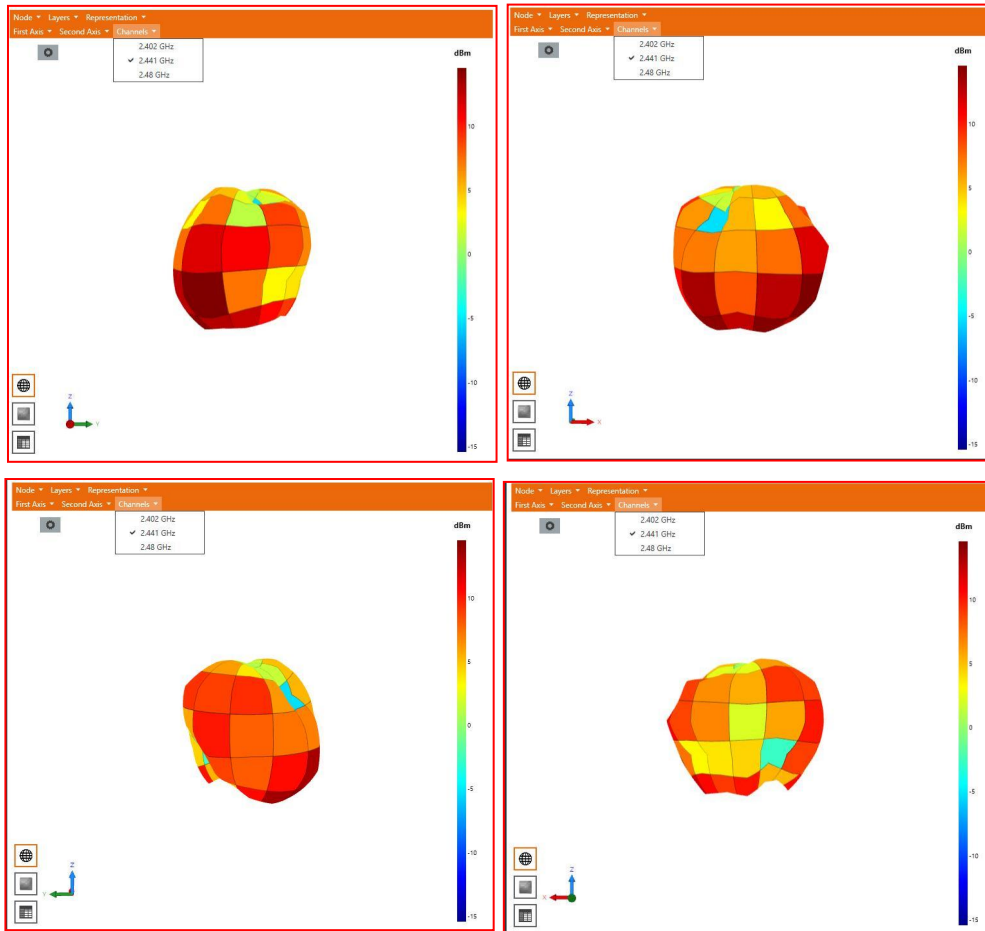


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6、有源场型图 Active Field Pattern Diagram

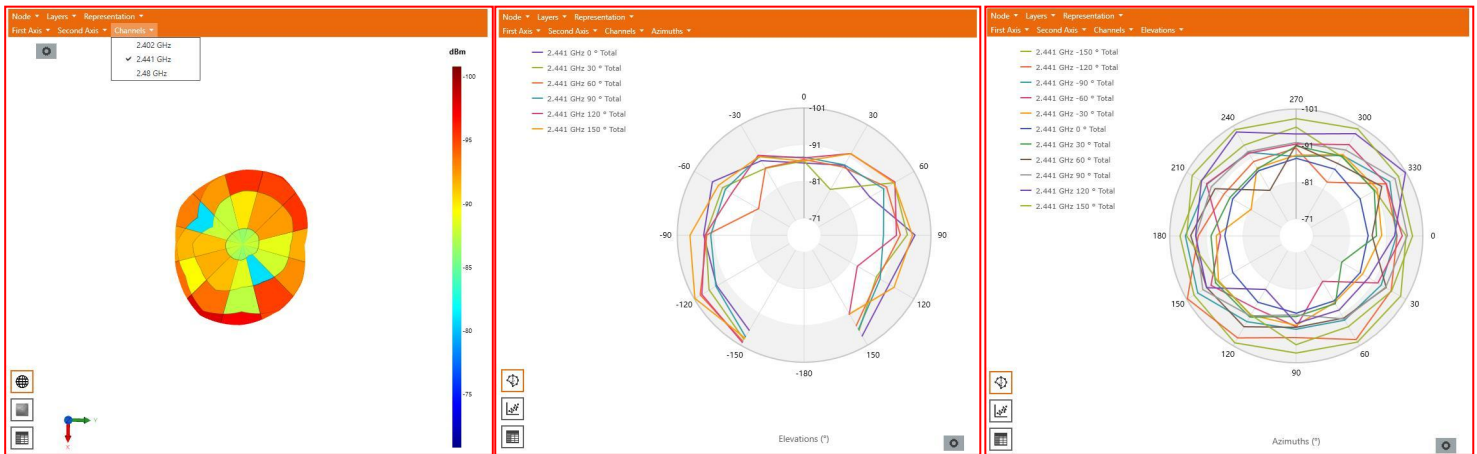
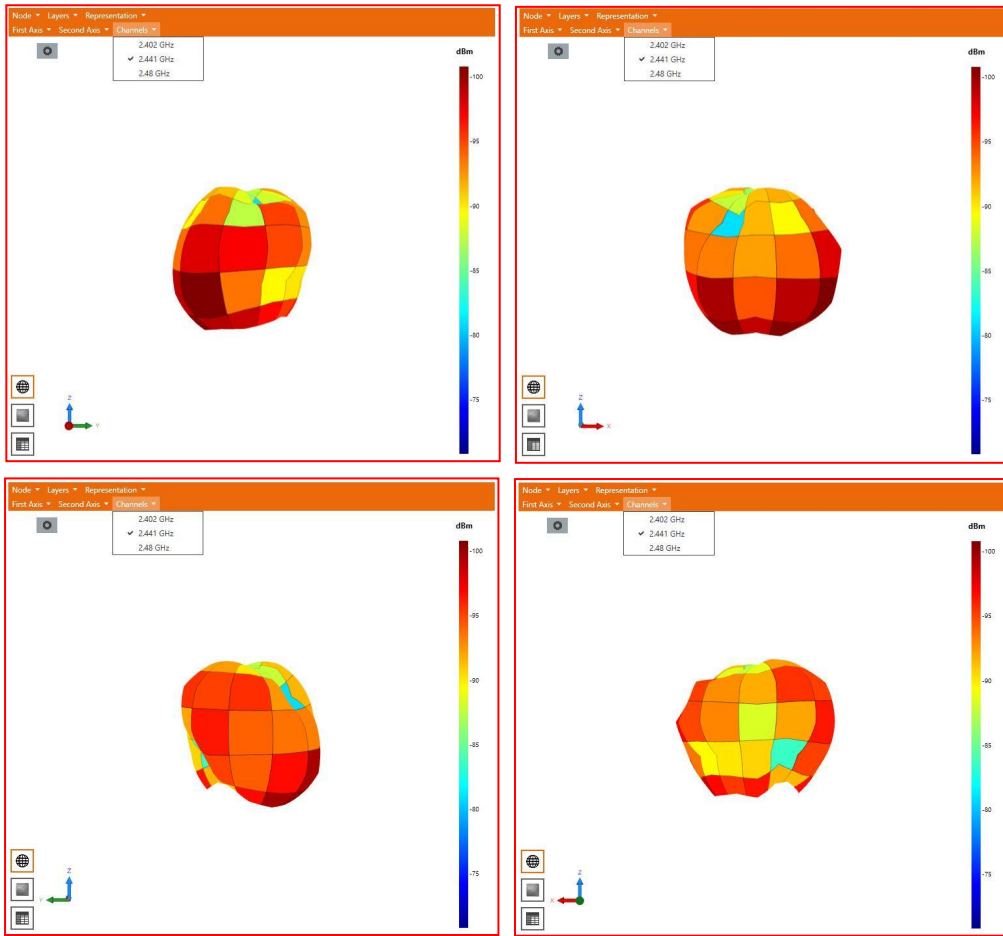
TRP:



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TIS:



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7、拉距测试 Pull distance test

测试时间 (Testing time) : 2024/06/17

测试场地 (test site) : 深圳烟草公司附近 (Near Shenzhen Tobacco Company)

测试手机 (Test Cell Phones) : Iphone 14 Pro



测试方向 Test direction	前 ahead	后 empress	左 left	右 right
	测试距离Test Distance			
BT	100M	100M	100M	100M

Aura Cast 测试

Apple pho ne14 Pro							
1#为主机 2#为副机 (1# is the main unit 2# is the secondary unit)							
	主机0° Mainframe 0°		主机90° Mainframe 90°		主机180° Mainframe 180°		主机270° Mainframe 270°
副机0° Auxiliary 0	80 (M)	副机0° Auxiliary 0	80 (M)	副机0° Auxiliary 0	80 (M)	副机0° Auxiliary 0	80 (M)
副机90° Auxiliary 90°	80 (M)	副机90° Auxiliary 90°	80 (M)	副机90° Auxiliary 90°	80 (M)	副机90° Auxiliary 90°	75 (M)
副机180° Auxiliary 180°	80 (M)	副机180° Auxiliary 180°	80 (M)	副机180° Auxiliary 180°	80 (M)	副机180° Auxiliary 180°	80 (M)
副机 270° Auxiliary 270°	75 (M)	副机 270° Auxiliary 270°	75 (M)	副机 270° Auxiliary 270°	75 (M)	副机 270° Auxiliary 270°	75 (M)

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8、哈曼 RF 衰减实验室 Harman RF Attenuation Lab



哈曼 RF 衰减测试数据 Harman RF Attenuation Test Data

机器方向面 Machine Orientation Surface	BT
前ahead	28 db
左left	30db
后empress	30 db
右right	28 db

9、结论 conclusion

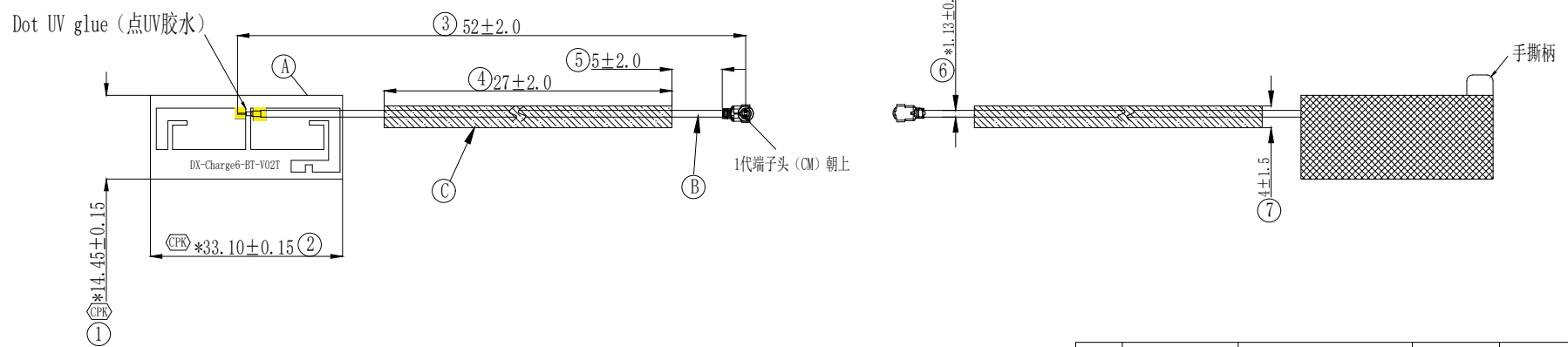
此天线是在客户提供样机基础上设计，电参数和结构性能已达到技术要求，请确认！

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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1		2		3		4		5		6	
第三视角						0~10	10~30	30~50	50~	角度	○
单位	mm	比例	1:1			0.05	0.10	0.15	0.20	1°	◎
											⊥
											∕
											0.03
											0.05



C	线材海绵	EVA	黑色	
B	端子线	Cable线	黑色	
A	FPC	电解铜 PI	黑色	
序号	零件名称	材质	颜色	备注

注：
 1. "*"为重点尺寸；
 2. 未标注尺寸请依图纸；
 3. 不可有虚焊、漏焊、短线、断线等操作不良；
 4. 符合 RoHS 要求。

深圳大显科技有限公司 Shenzhen Daxian Technology Co., Ltd.					
机 型	Charge 6-TL	产品颜色	黑色	日 期	2024/08/12
项目编码	BC-HARGE6-049	模面处理		结构设计	周锐斌
零件名称	BT天线			射频设计	沈川
零件编码	1C-HARGE6-049			审 核	周康
材 质	FPC+线材海绵+同轴线			批 准	张磊
保存路径				当前版本	A

版 本	描 述	日 期	备 注