

## SPECIFICATION



深圳市大显科技有限公司

Shenzhen Daxian Technology Co., Ltd.

通力 Tune Buds2 右耳蓝牙天线

Tonly Tune Buds2 Right Antenna

产品规格书

Product Specification

客户 connection	通力 Tonly	频段 frequency range	2402 ~ 2480MHz
项目名称 entry name	Tune Buds 2	版本 edition	V5.0
物料编号 Material No	2B-uds-2-004	颜色 Color	黄色 Yellow
客户料号 Customer Item Number	290000-019545		
R F 设计 R F Design	胡鹏 Peng.Hu	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	2024-5-9		

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

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## 一 项目说明 Project Description

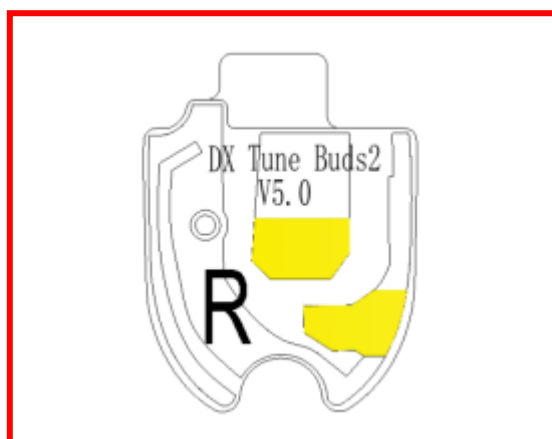
客户名: Customer Name:	通力 Tonly
整机类型: Type of complete machine:	蓝牙耳机 bluetooth headset
天线频段: Antenna band:	2400 ~ 2500MHz
天线形式: Antenna form:	FPC
馈电形式: Feed form:	顶针 Thimble
馈脚数量: Number of feed legs:	两个 Two
硬件版本: Hardware version:	主板:右耳 Mainboard:right ear

## 二 BT 天线 BT Antenna

### 1 规格 specifications

本报告主要提供 Tune Busds 2 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 Tune Busds 2 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 **2402 ~ 2480 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 **2402 and 2480 MHz**. The following table shows the electrical performance indicators of large display design and mass production antennas.

Frequency Range	Frequency (MHz)	VSWR
Right BT	2402 ~ 2480	$\leq 3$

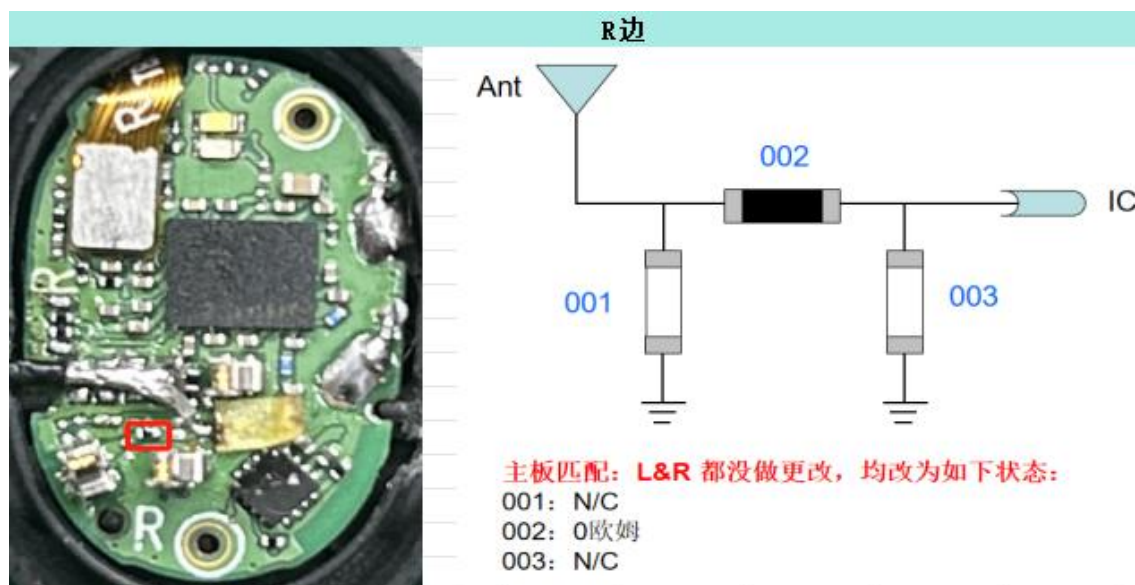
## 2 结构规格标准 Structural specifications and standards

### 1.2.1 天线组成 Antenna composition

天线主要是由 FPC 组成。

The antenna is mainly composed of FPC.

### 1.2.2 天线匹配 Antenna matching



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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 OTAAActive Test:

自由空间	R 边	
	TRP	TIS
	6.55	-88.9
	6.71	-90.11
头模	R 边	
	TRP	TIS
	1.26	-84.35
	1.11	-85.33
	0.32	-84.63

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## 无源效率&amp;增益 Passive efficiency&amp;gain:

自由空间状态				头模状态			
Frequency (MHz)	Gain (dBi)	Efficiency (dB)	Efficiency (%)	Frequency (MHz)	Gain (dBi)	Efficiency (dB)	Efficiency (%)
2350	-4.18	-8.4	14.44	2350	-7.52	-12.86	5.18
2360	-4.05	-8.19	15.18	2360	-7.26	-12.54	5.57
2370	-3.87	-7.92	16.14	2370	-7	-12.25	5.96
2380	-3.98	-7.72	16.91	2380	-6.85	-12.02	6.29
2390	-3.88	-7.61	17.36	2390	-6.69	-11.89	6.47
2400	-3.68	-7.42	18.09	2400	-6.49	-11.78	6.64
2410	-3.52	-7.29	18.66	2410	-6.33	-11.71	6.75
2420	-3.54	-7.16	19.24	2420	-6.36	-11.64	6.86
2430	-3.43	-7.04	19.75	2430	-6.37	-11.66	6.82
2440	-3.48	-6.96	20.14	2440	-6.24	-11.74	6.7
2450	-3.31	-6.8	20.89	2450	-5.99	-11.69	6.77
2460	-3.34	-6.7	21.39	2460	-6.06	-11.73	6.71
2470	-3.37	-6.72	21.28	2470	-6.19	-11.85	6.53
2480	-3.52	-6.74	21.18	2480	-6.3	-11.91	6.44
2490	-3.87	-6.74	21.2	2490	-6.4	-11.96	6.36
2500	-3.99	-6.9	20.41	2500	-6.55	-12.13	6.13
2510	-4.12	-7.03	19.81	2510	-6.65	-12.21	6.01
2520	-4.2	-7.11	19.46	2520	-6.73	-12.26	5.94
2530	-4.5	-7.37	18.33	2530	-6.99	-12.5	5.62
2540	-4.88	-7.51	17.73	2540	-7.19	-12.58	5.52
2550	-4.94	-7.63	17.28	2550	-7.2	-12.65	5.43
2560	-5.02	-7.84	16.46	2560	-7.21	-12.83	5.22
2570	-5.22	-8.04	15.72	2570	-7.25	-12.96	5.06
2580	-5.33	-8.15	15.32	2580	-7.34	-13.05	4.95
2590	-5.57	-8.37	14.54	2590	-7.61	-13.25	4.73
2600	-5.89	-8.67	13.59	2600	-8	-13.46	4.51

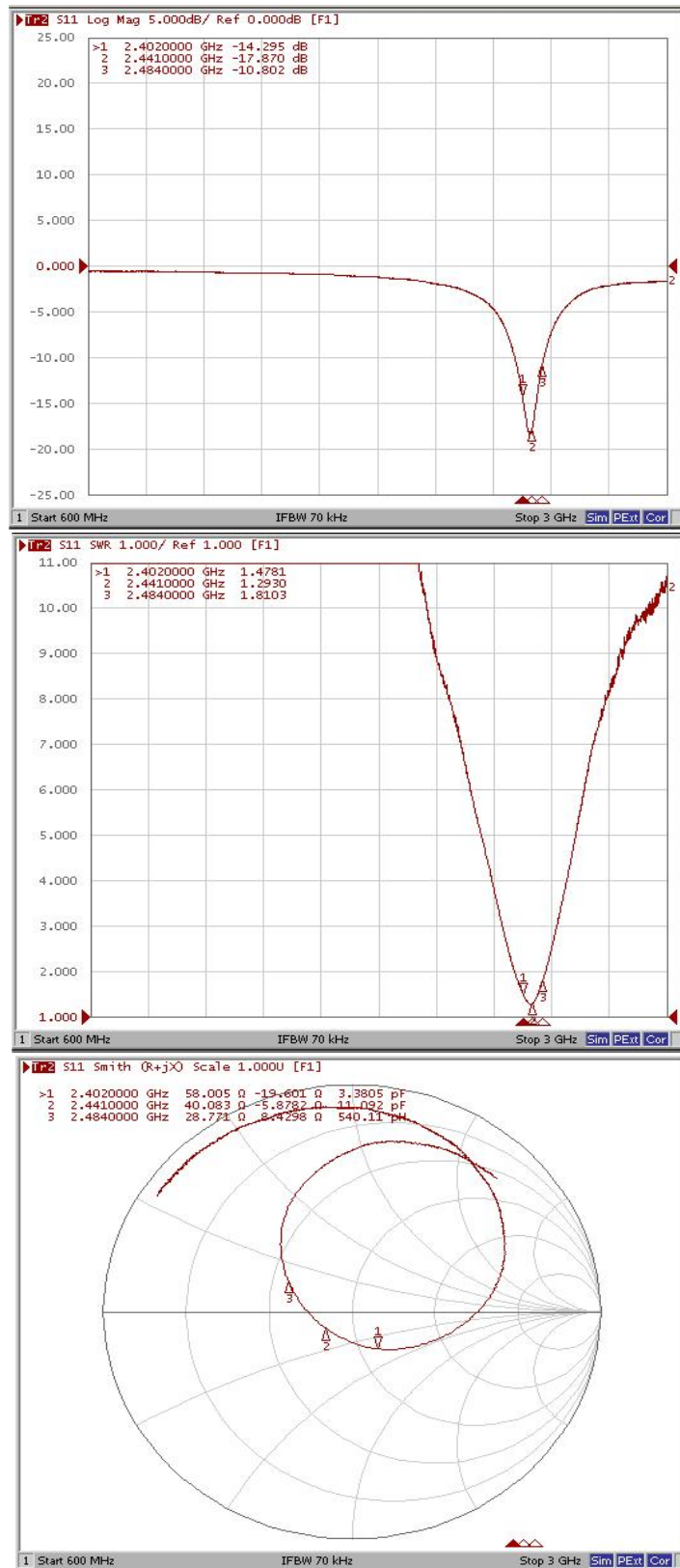
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#### 4、VSWR 参数图 VSWR parameter diagram

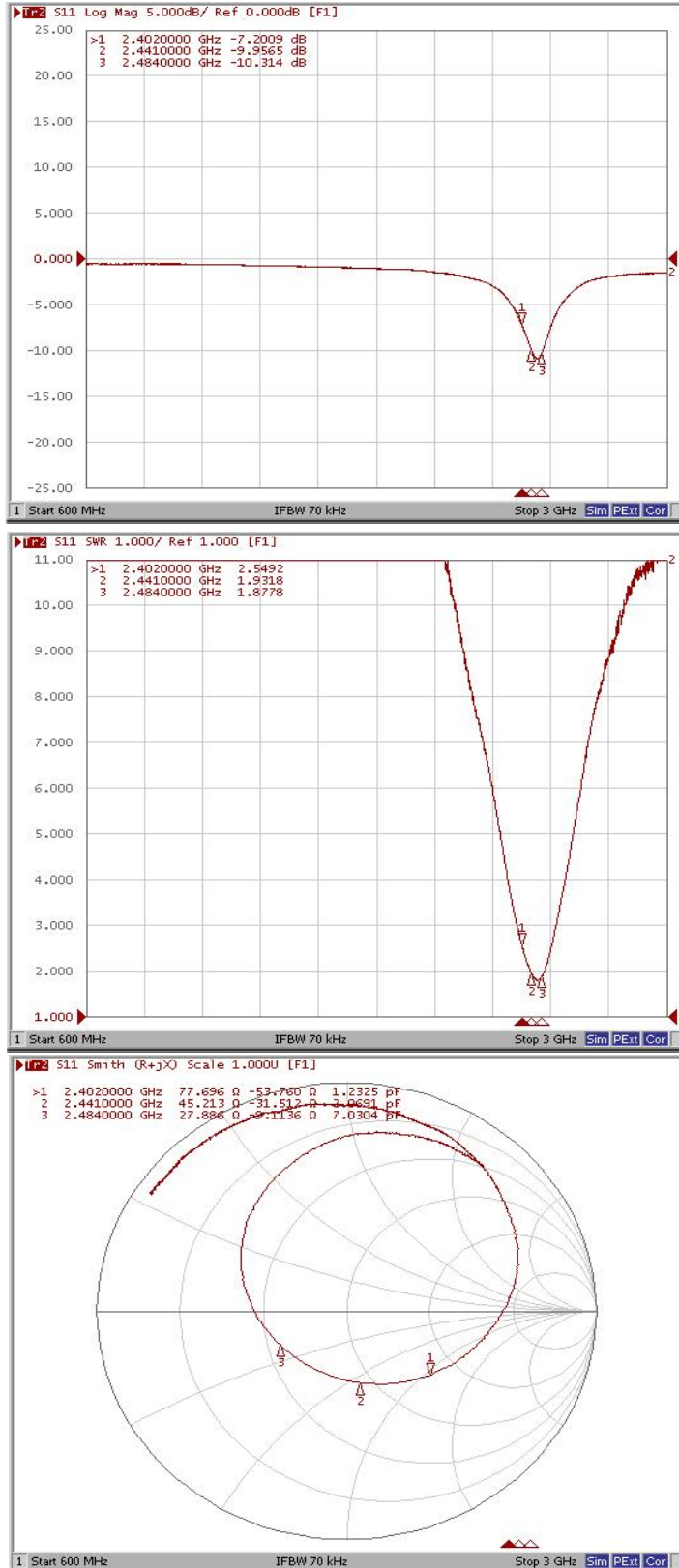
R 边-头模



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R 边-自由空间

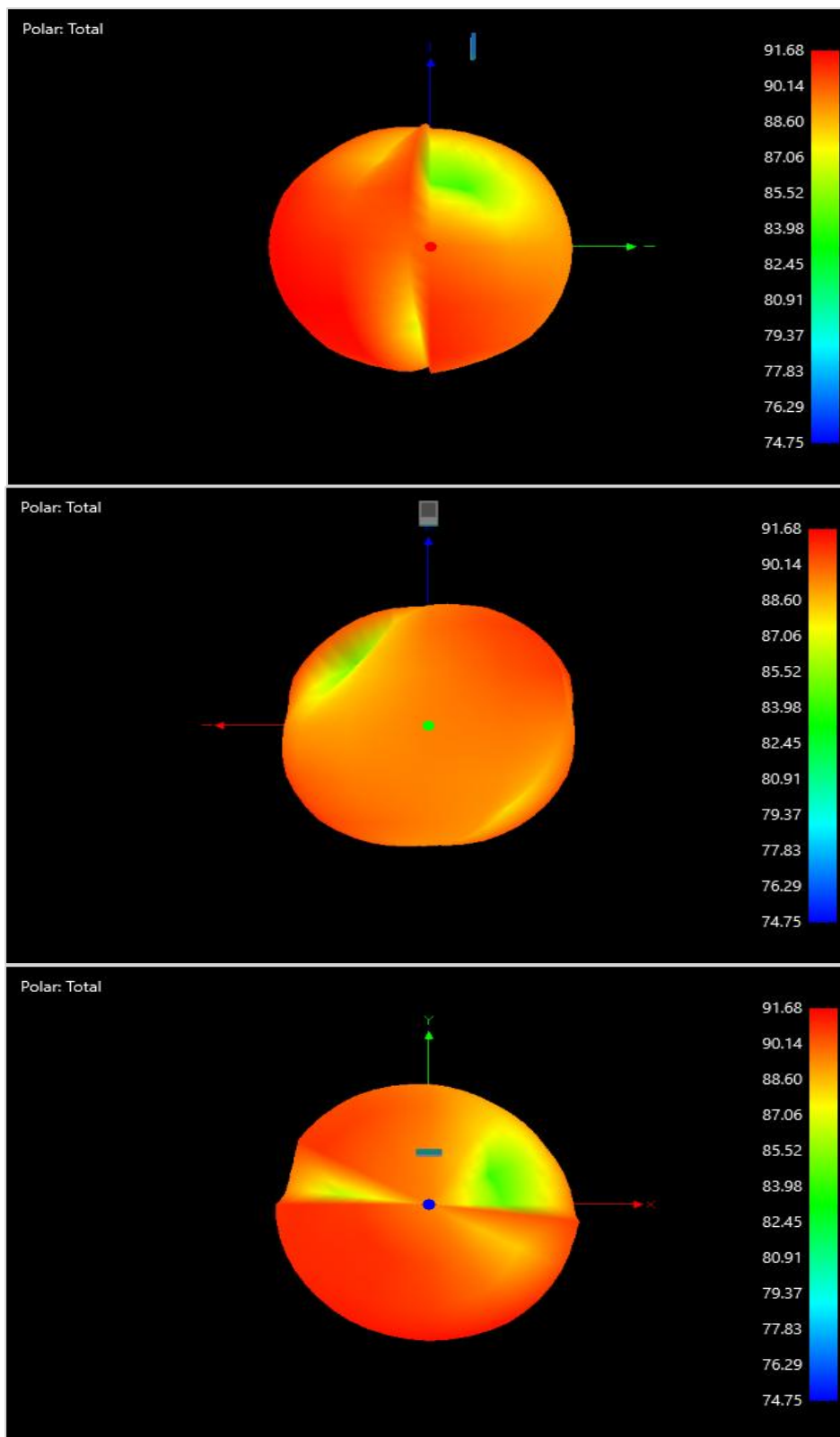


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## 5、有源场型图 Passive Field Pattern Diagram

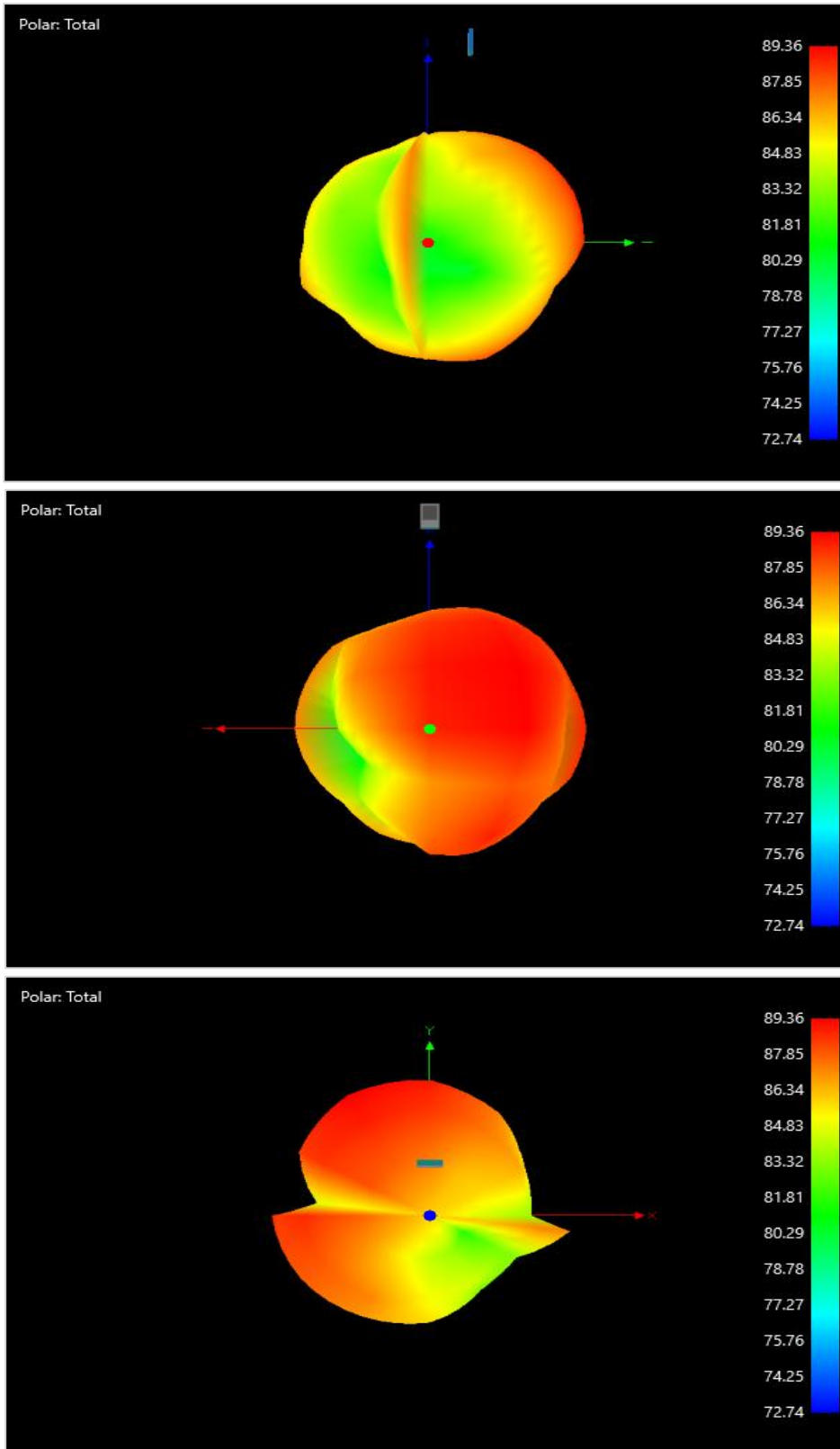
R 边--自由空间状态



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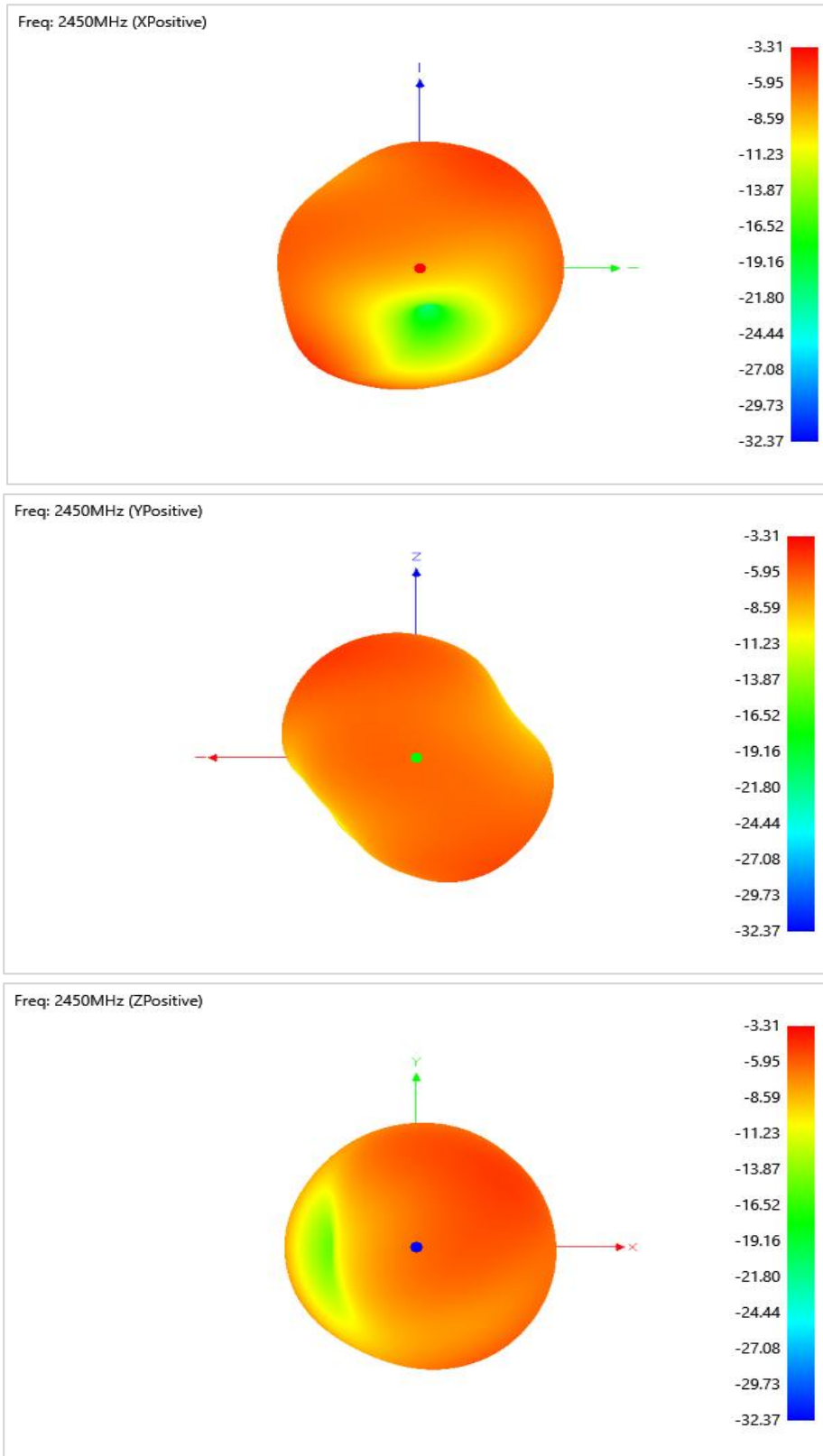
R 边--头模状态



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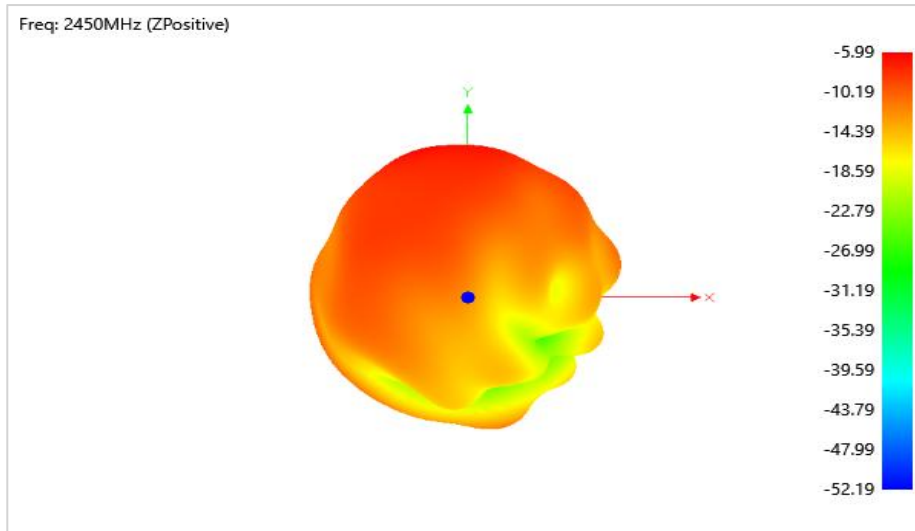
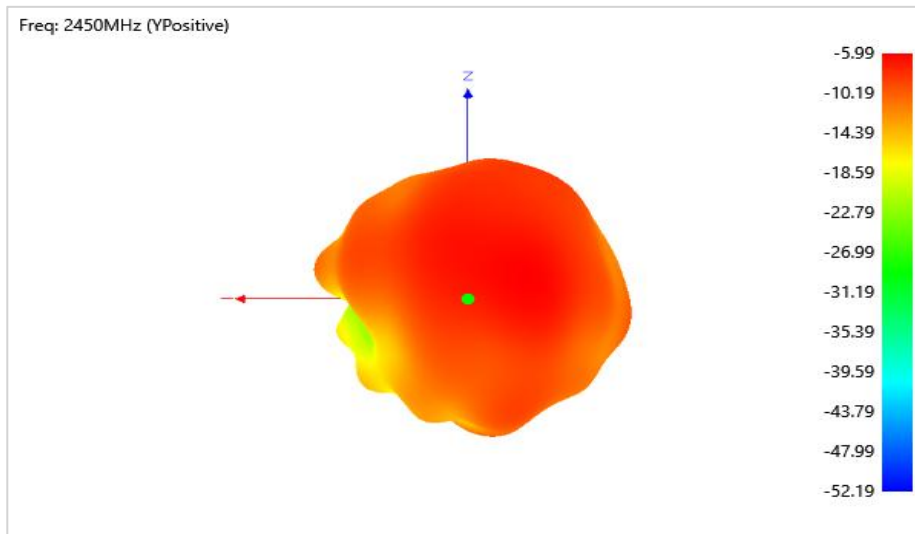
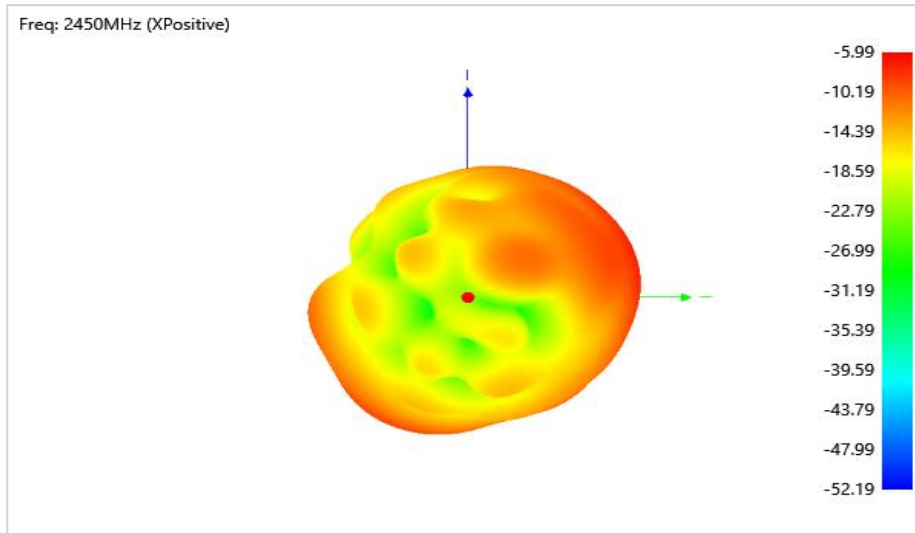
## 6、无源场型图 Passive Field Pattern Diagram 自由空间状态



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头模状态

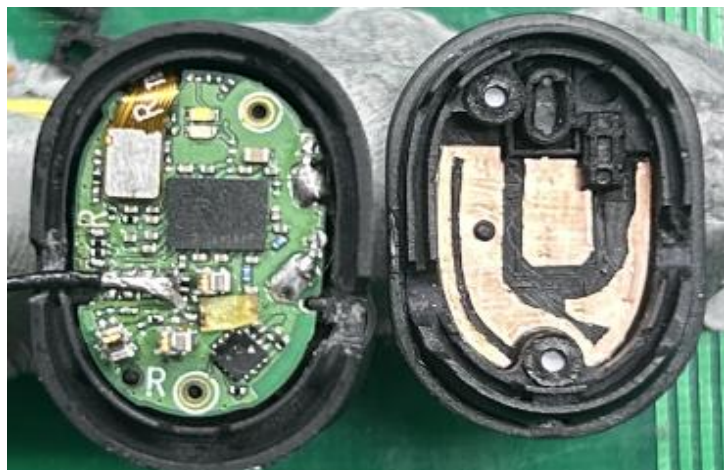


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## 7、天线装机事项 Antenna installation matters



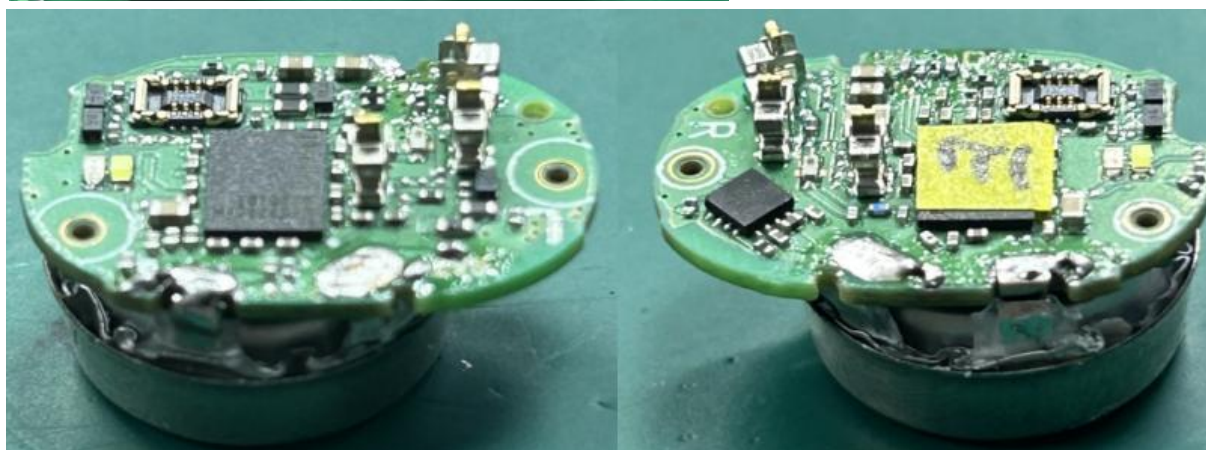
R 边--天线实物图片

R side-physical picture of antenna



喇叭上需要粘贴一层离型纸，避免电池钢壳与喇叭磁钢接触

A layer of release paper needs to be pasted on the horn to avoid the contact between the battery steel shell and the horn magnetic steel.



电池的极耳，不要伸出主板太长，进来平齐主板上表面，焊接点的厚度尽量控制在 **0.5MM**

The tab of the battery should not protrude too long from the main board, but should come in to flush the upper surface of the main board, and the thickness of the welding point should be controlled at 0.5MM as far as possible.

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电池目前主板是紧挨着摆放

The battery is currently placed next to the motherboard.

## 8、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！

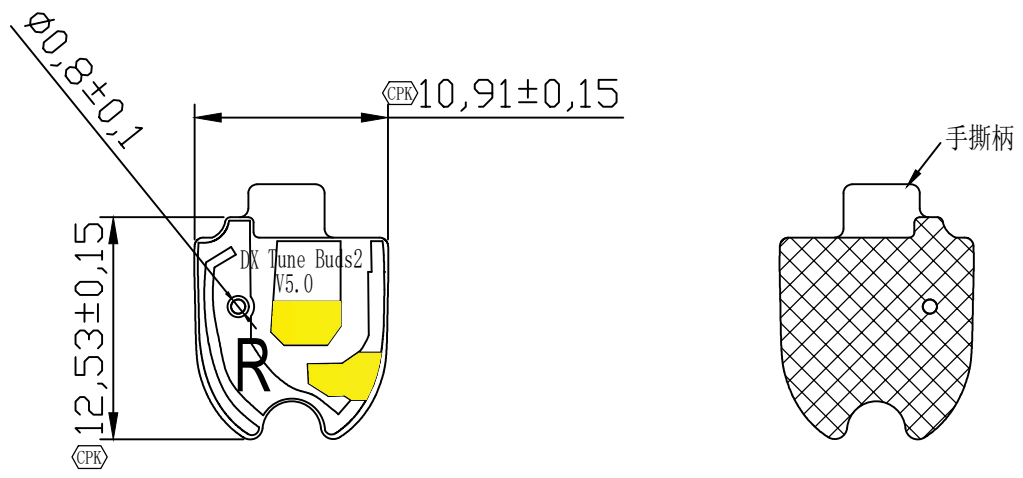
This antenna is designed based on the prototype provided by the customer. The electrical parameters and structural performance have met the technical requirements, please confirm!

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
5	6	7	8
版本	标记	更改内容	签名 日期



**技术要求:**

- 正面代表FPC铜箔走线覆盖油墨或覆盖膜部分，背面代表背胶原装胶纸部分；
- 带“\*”尺寸为重点尺寸，带“CPK”需要做CPK的尺寸，“（）”为实配尺寸，“△”为设计变更；未注公差参照公差表；
- 表面干净，无脏污，无露铜，脱落等不良；
- 红色线 □ 为FPC的最大外形，绿色线 ■ 为天线走线；黄色线 —— 为离型纸切断线，蓝色线 —— 为天线变更标记；■ 为镀金区，■ 为背胶区，□ 为离型纸手撕位；
- 满足盐雾实验/附着测试等相关可靠性测试，按我司内部可靠性试验标准执行，所有物料均符合我司产品环境物质禁用管理标准；
- FPC来料按整版方式制作；
- 产品包装必须干净、整洁，包装过程不允许对产品造成脏污。

层叠图及材料规格	公差表
镍2-6um; 金≥0.05um	长宽50mm以下规则的外形到外形 ±0.10
黄色覆盖膜 T=27±5um 白色丝印	长宽50mm以上不规则的外形到外形 ±0.15
电解铜 T=0.5oz	走线到外形 ±0.15
热固胶 T=20um	走线到走线 ±0.05
PI基材 T=25um	孔径 ±0.10
背胶3M9471 T=50um	孔中心到外形 ±0.15
原装离型纸 T=100±20um	孔中心到孔中心 ±0.10
PI补强, T=0.15mm	油墨到走线 ±0.30
背胶TESA 9846 T=50um	补强或背胶到外形 ±0.35
原装离型纸 T=100±20um	

机种	Tune Buds 2	名称	蓝牙天线-R	审核	吴锡欢
项目编码	CB-uds-2-004	R F	胡鹏	批准	张磊
零件编码	2B-uds-2-004-1	结构	周锐斌	日期	2024-04-29
版本	A1	图框	A4	 深圳大显科技有限公司 Shenzhen Daxian Technology Co., Ltd.	
比例	1:1	第三视角			
单位	MM				