SPECIFICATION

Daxian Communication Technology Limited

深圳市大显科技有限公司

Shenzhen Daxian Technology Co., Ltd.

国光 LV mini speaker BT 天线组件

GGEC LV mini speaker BT Antenna assembly

产 品 规 格 书

Product Specification

客 户 connection	国光 GGEC	频 段 frequency range	2400 ~ 2500MHz
项目名称 entry name	LV mini speaker	版 本 edition	V1.0
物料编号 Material No	2-DX-858-009	颜 色 Color	黑色 Black
客户料号 Customer Item Number	**EAN00299**		
R F 设计 R F Design	沈 川 Chuan.Shen	结构设计 Structural Design	闭业智 YeZhi.Bi
品质经理 Quality Manager	胡子寅 Ziyin.Hu	技术总监 Technical Director	张 磊 Lei.Zhang
日 期 Date	2023-03-29		

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	Shenzhen Topant Technology Co., Ltd.
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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
V1.0	创建 found			2023-03-29	
V1.1					

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一 项目说明 Project Description

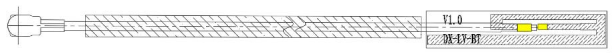
客 户 名： **Customer Name:**	国光 GGEC
整机类型： **Type of complete machine:**	音箱 loudspeaker box
天线频段： **Antenna band:**	2400 ~ 2500MHz
天线形式： **Antenna form:**	FPC+同轴线+线材海绵 FPC+coaxial line+wire sponge
馈电形式： **Feed form:**	焊接 weld
馈脚数量： **Number of feed legs:**	两个 Two
硬件版本： **Hardware version:**	/

二 BT 天线组件 Antenna assembly

1 规格 specifications

本报告主要提供 LV Mini Speaker 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 LV Mini Speaker 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的指标.

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**

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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 周圆，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 below

OTA 有源测试：OTA Active Test

BAND	CH	TRP (dBm)	TIS (dBm)
BT	0	4.39	-87.21
	39	4.47	-87.64
	78	4.68	-87.22

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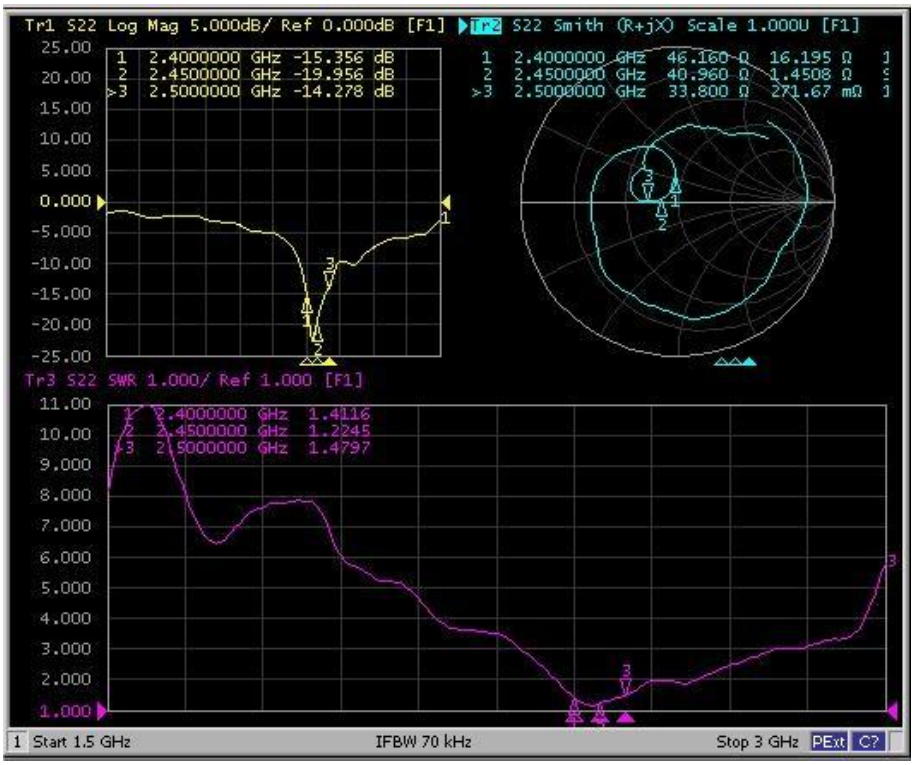
无源效率&增益 Passive efficiency&gain：

Freq (MHz)	Effi (%)	Effi (dB)	Gain (dBi)
2400	39.68	-4.01	1.35
2410	40.33	-3.94	1.53
2420	40.46	-3.93	1.64
2430	41.62	-3.81	1.96
2440	41.29	-3.84	1.88
2450	41.07	-3.86	1.86
2460	40.65	-3.91	1.82
2470	40.75	-3.90	1.79
2480	40.99	-3.87	1.69
2490	40.54	-3.92	1.67
2500	39.82	-4.00	1.81

4、VSWR 参数图 VSWR parameter diagram



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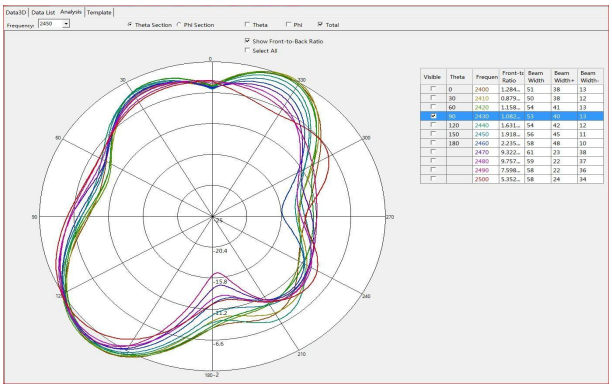
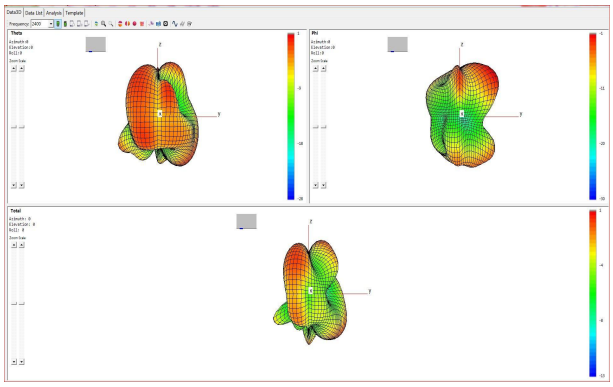
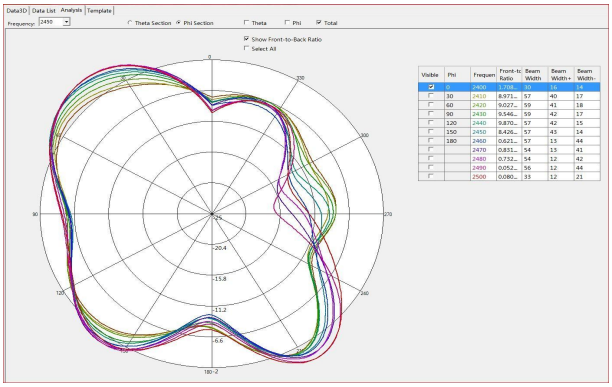
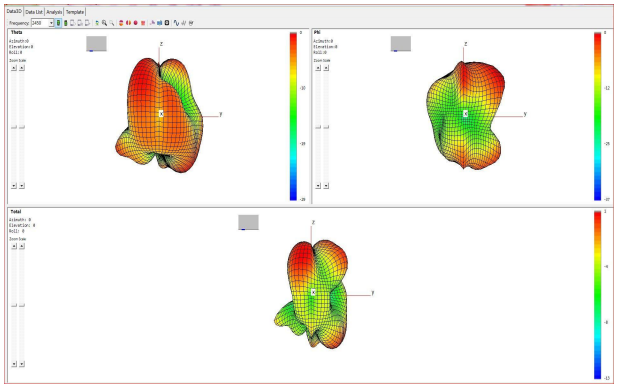
5、无源场型图-2450MHz

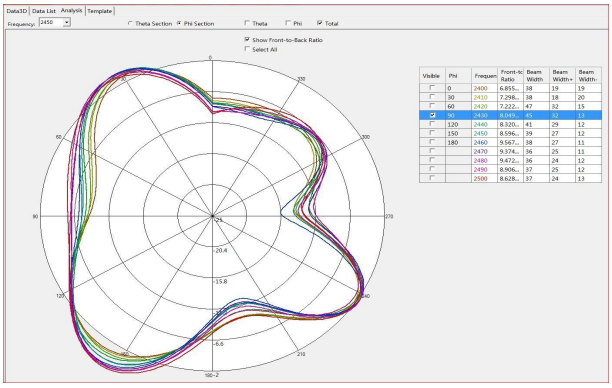
Passive Field Pattern Diagram - 2450MHz

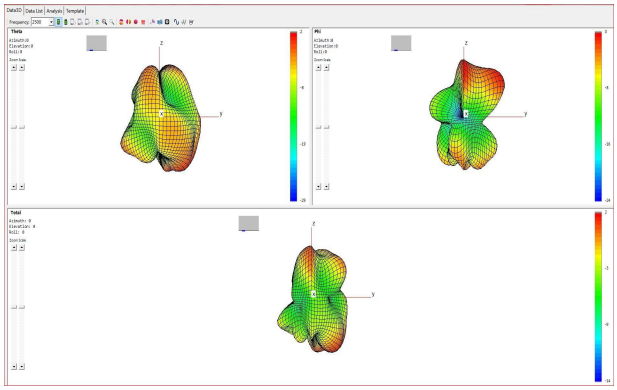












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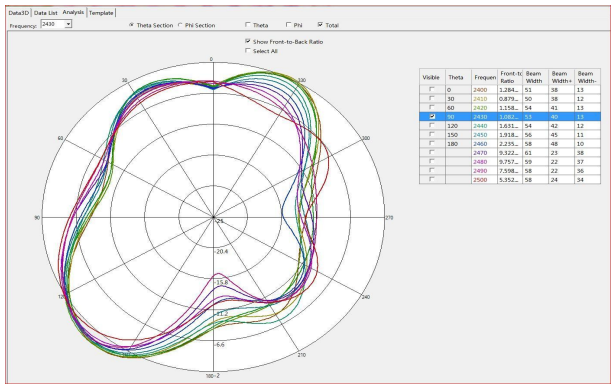
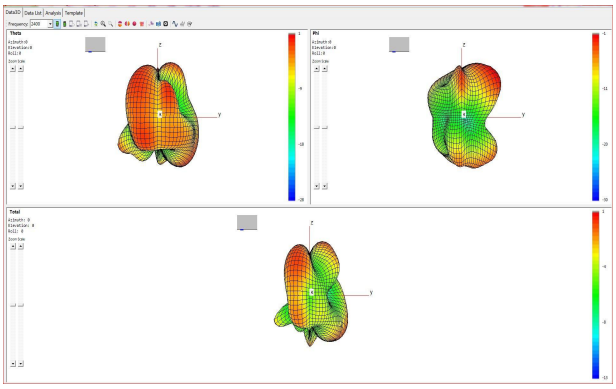
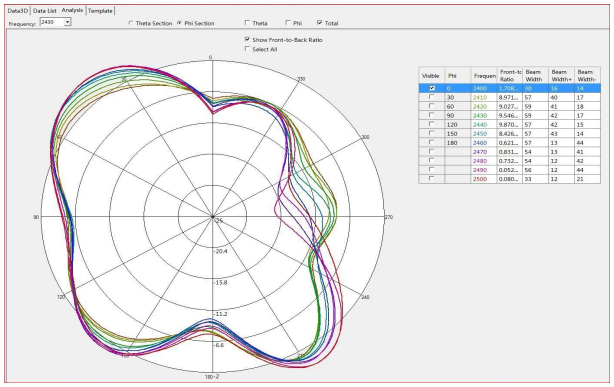
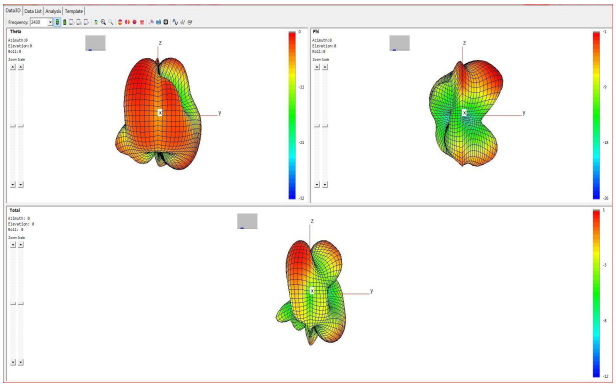
5.1 无源场型图-2430MHz

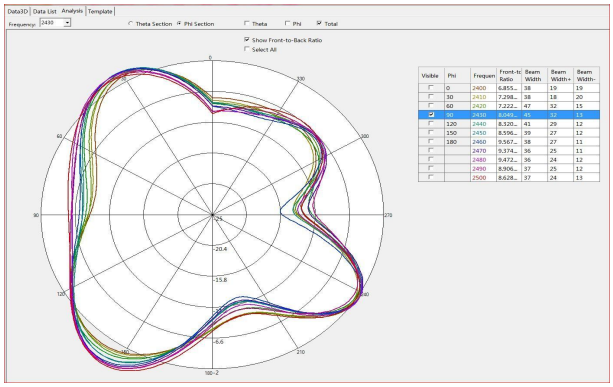
Passive Field Pattern Diagram - 2430MHz

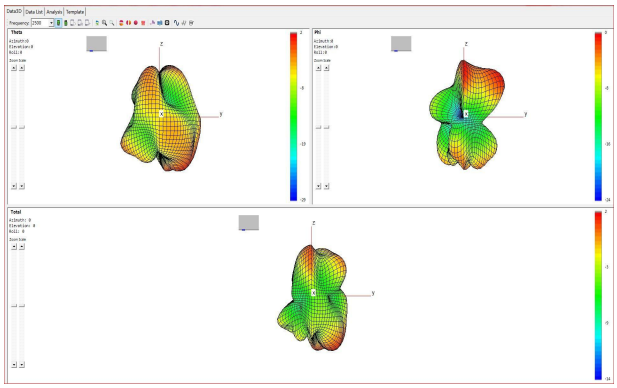




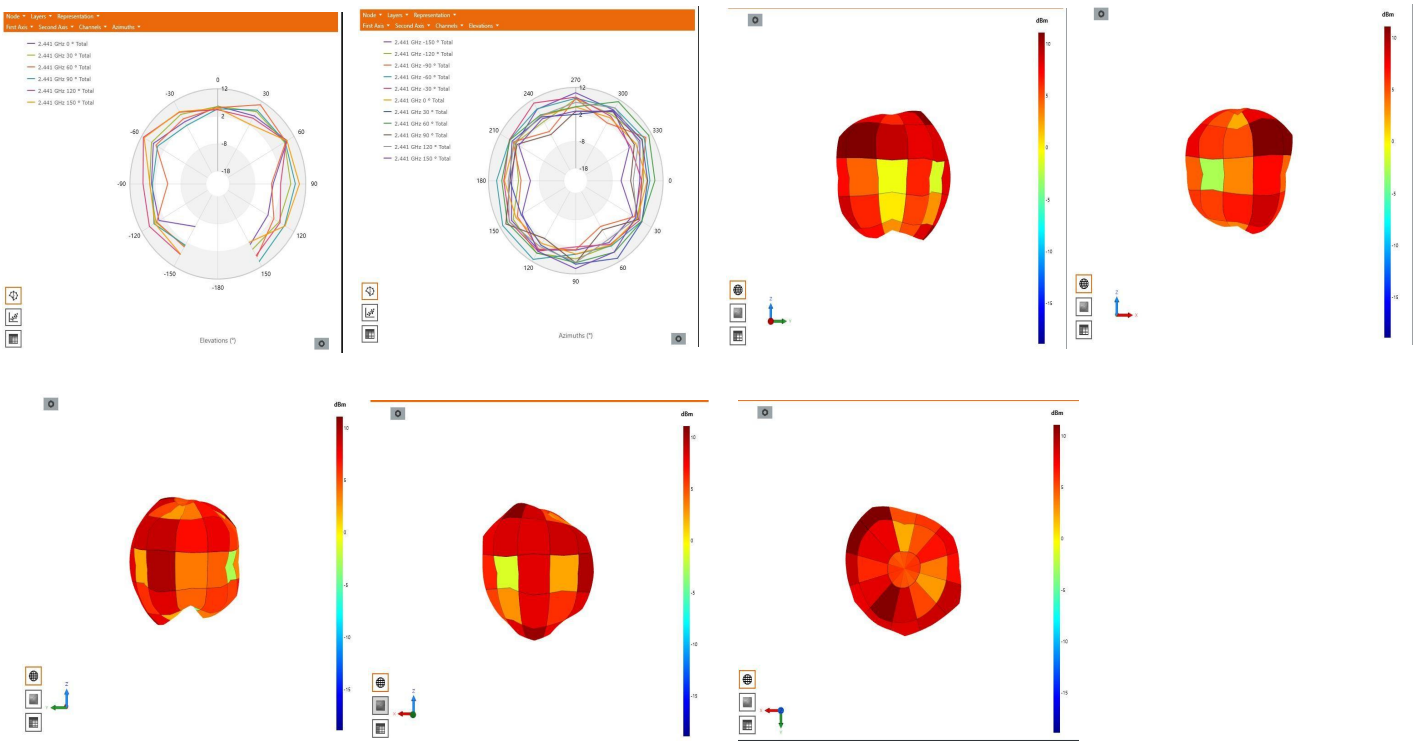




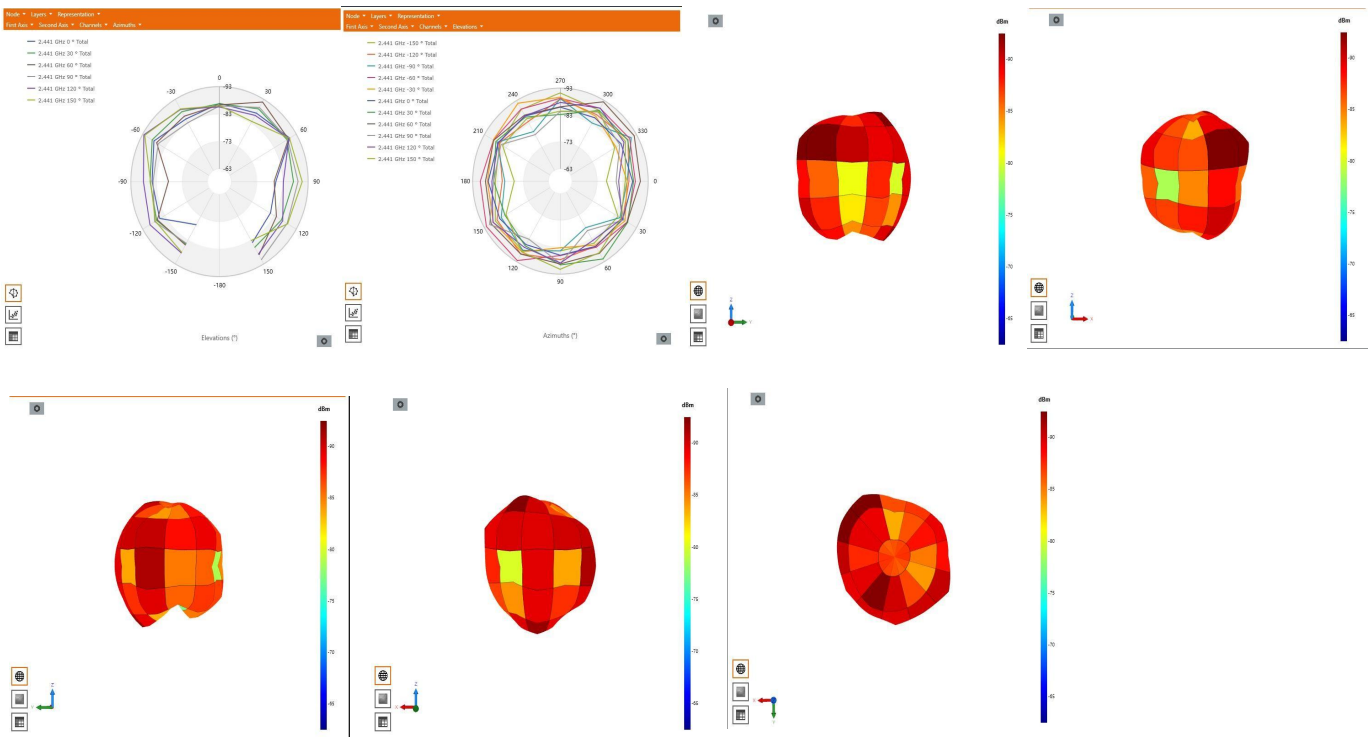




6、有源场型图-TRP　Active Field Pattern Diagram - TRP



6.1 有源场型图-TIS　Active Field Pattern Diagram - TIS



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8、户外拉距测试 Outdoor pull distance test

测试场地 Test site	机器摆放方向 Machine placement direction	BT(苹果13) BT(Iphone13)	BT(苹果6s) BT(Iphone13)
鹤洲 HeZhou	前 Front	80m	70m
	后 Behind	80m	70m
	左 Left	90m	70m
	右 Right	90m	70m

9、环境处理 Environmental treatment

上半球金属壳与主板和按键小板的红色圈内螺丝柱平面出做 打磨处理，使主板和按键小板与上半球的金属壳体接地充分。
Grind the surface of the upper hemisphere metal shell and the red circle inner screw stud of the main board and key board to fully ground the main board and key board to the upper hemisphere metal shell.

10、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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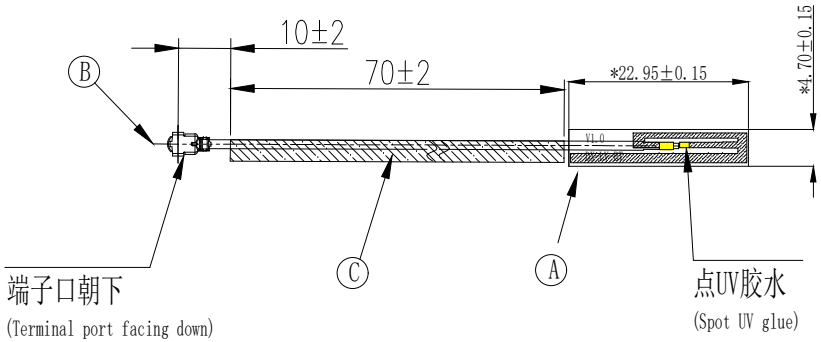
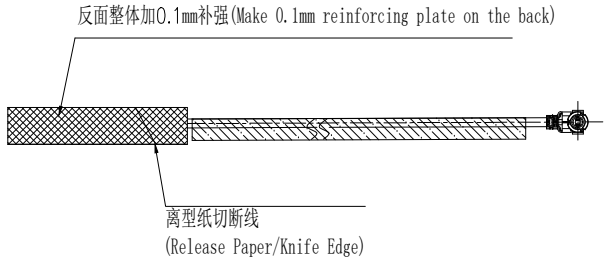
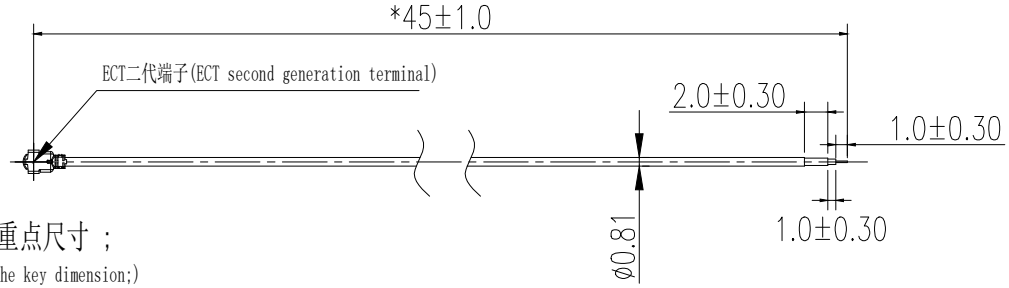
	0~10	10~30	30~50	50~	角度	○	◎	⊥	▱
	0.05	0.10	0.15	0.20	1°	0.02	0.02	0.03	0.05







技术要求:
(technical requirement:)

1. "*"为重点尺寸 ;
(1. "*"is the key dimension;)
2. 未标注尺寸请依图纸;
(2. Please refer to the drawing for unspecified dimensions;)
3. 不可有虚焊、漏焊、短线、断线等操作不良;
(3. There should be no poor operation such as faulty soldering, missing soldering, short wires, broken wires, etc;)
4. 符合 RoHS 要求 .
(4. Meet RoHS requirements.)

序号(serial number)	零件名称(Part Name)	材质(material)	颜色(colour)	备注(Note)
C	线材海绵(Cable sponge)	PUF	黑色(black)	
B	端子同轴线(RF connector)	Cable	黑色(black)	
A	FPC	Electrolytic copper PI	黑色(black)	

版 本(edition)	描述(describe)	日期(date)	备注(Note)
A	首次发行(Initial Issue)	2022.11.22	

TOPANT 深 圳 大 显 科 技 有 限 公 司
Shenzhen Topant Technology Co., Ltd.

机型(Machine model)	LV mini speaker	产品颜色(Product Color)	黑色(black)	日期(date)	2022/11/22
项目编码(Project Code)	C-DX-858-009	模面处理(Mold surface treatment)	NA	结构(MD)	闭业智
零件名称(Part Name)	BT天线(BT antenna)	单位 (unit) mm	比例 (scale) 1:1	射频(RF)	沈川
零件编码(Part Number)	2-DX-858-009	第三视角 (Third perspective)		审核(check)	胡俊
材质(material)	FPC+sponge+RF connector			批准(ratify)	张磊
保存路径(Save Path)				当前版本(current version)	A