

深圳市海致洋科技有限公司  
Shenzhen Haizhiyang Technology Co., Ltd

Product Specification  
产品规格书

产品型号 Product Model No.	Y15	
产品名称 Product Name	无线蓝牙耳机 Wireless Bluetooth Earphone	
封样版本 Sealed version	A/01	
制定日期 Compile date	2024-6-10	
制作 Compile	审核 Audit	核准 Approved
刘军 Liu Jun		

版本修改记录  
Version modification record

版本 Version	修改内容 Modify content	时间 Date
V.0	初版 Editio princeps	2024/6/10

目录/Content

- ID/配色图
- Feature/技术规格
- PCBA Design Section/PCBA 设计部分
- Operation/操作说明
- Reliability test standard/可靠性测试标准

## 1. ID/配色图



## 技术规格

### Technical specification

## 2. Feature/电性参数

蓝牙版本 Bluetooth Version	BT 5.4
蓝牙协议 Supported Bluetooth Profile	a2dp\avctp\avdtp\avrcp\hfp\spp\smP\att\gap gatt\rfcomm\sdp\l2cap profile a2dp 1.3\avctp 1.4\avdtp 1.3\ avrcp 1.5\hfp 1.5 \spp 1.0\rfcomm 1.2\pnp 1.3\hid 1.0\sdp core4.2\l2cap core 4.2
蓝牙芯片 Bluetooth chip	JL6973D4 (Semi Ear)
蓝牙芯片 Bluetooth chip	JL7003D8 (In ear)
佩戴方式 Way of wearing	入耳式+半入耳 In ear and semi ear
功能用途 Functional use	蓝牙聆听 Bluetooth listening
传输距离 Bluetooth Range	≥10 米 ≥10M
喇叭直径	Semi Ear: Φ13mm*2.7mm

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Horn diameter	
喇叭直径 Horn diameter	In ear: $\Phi 13*3.0\text{mm}$
喇叭频响范围 Horn frequency response range	20Hz - 20KHz
降噪功能 Noise reduction function	In ear: -25dB
产品阻抗 Product impedance	$32\ \Omega \pm 15\%$
喇叭灵敏度 Horn sensitivity	Semi Ear: 112.4dB $\pm$ 3dB
喇叭灵敏度 Horn sensitivity	In ear: 117dB $\pm$ 3dB
额定功率 Speaker Power	Semi Ear: 5mW
额定功率 Speaker Power	In ear: 10mW
麦克风 microphone	Semi Ear: KSA2718AT421GR
麦克风 microphone	In ear: S150T421-036
麦克风频响范围 Microphone Frequency Response	Semi Ear: 100Hz - 8kHz
麦克风频响范围 Microphone Frequency Response	In ear: 20Hz - 10kHz
麦克风灵敏度 Microphone Sensitivity	$-42 \pm 2\text{dB}$
载波频率 Carrier frequency	2.402GHz-2.480GHz
外壳材料 Housing material	ABS+PC
耳机电池类型 Battery Type	聚合物电池 400909-25mAh (半入耳) Polymer Battery 400909-25mAh (Semi Ear)
耳机电池类型 Battery Type	聚合物电池 451012-35mAh (入耳) Polymer Battery 451012-25mAh (In ear)
充电仓电池 Charging case battery	聚合物电池 802540-800mAh Polymer Battery 802540-800mAh
耳机充电时间 Charging Time	1.5 小时左右 About 1.5 hours


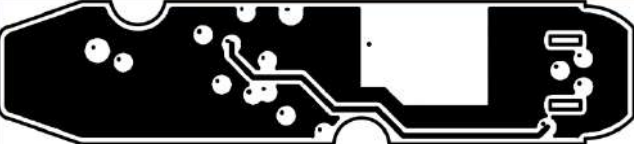
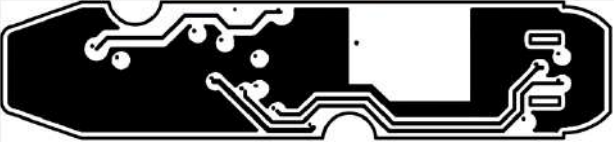


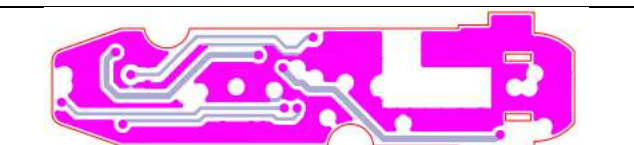

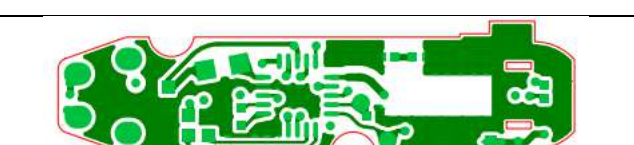
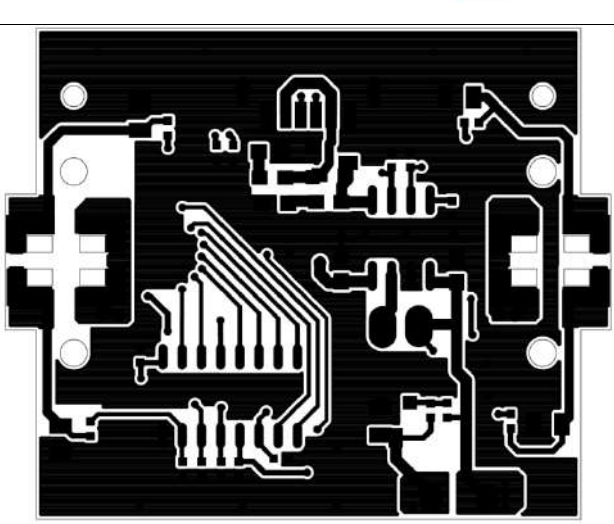
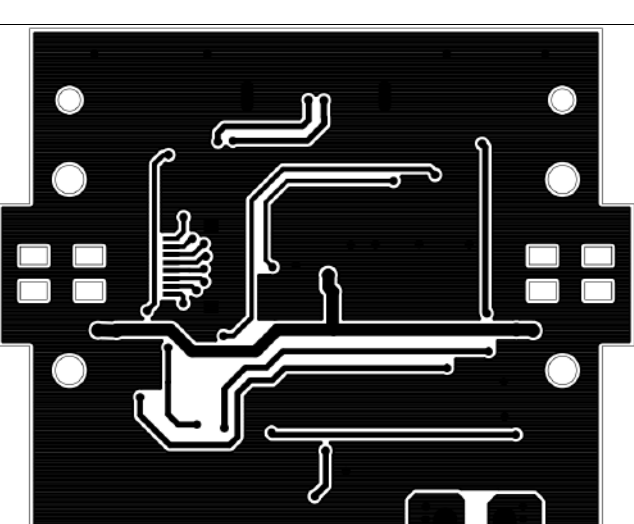
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音乐播放时间 Music Time	4 小时左右 About 4 hours
音乐播放电流 Music Playback Current	主机 12mA (粉色噪音) Host 12ma (pink noise)
通话播放电流 Call Play Current	主机 11mA (拨打 10086) Host 11ma (call 10086)
待机电流 Standby current	Semi Ear: $\leq 2\text{mA}$
关机电流 Shutdown current	Semi Ear: 10uA
耳机充电电流 Earphone charging current	Semi Ear: 40mA
音乐播放电流 Music Playing Current	In ear: $\approx 9\text{mA}$
通话播放电流 Call Playing Current	In ear: $\approx 10\text{mA}$
待机电流 Standby current	In ear: $\approx 5\text{mA}$
关机电流 Shutdown current	In ear: $\approx 19\text{uA}$
耳机充电电流 Earphone charging current	In ear: 30mA
耳机尺寸(长, 宽, 高) Earphone size (length, width, height)	32.8*16.96*18.75mm
产品重量 Product weight	62g
可选配件 Optional accessories	数据线: 一端 USB 接口; 一端 Type-c 接口 Number according to the line: one end of the USB interf One end Type-c interface
	L=0.5M $\pm$ 20mm (USB 头至尾端)Type-C 公头 L = 0.5M $\pm$ 20mm (USB head to tail) Type-C male
包装清单 Packing list	/
工作温度 Operating temperature	-20 $^{\circ}$ C 到 60 $^{\circ}$ C -20 $^{\circ}$ C-60 $^{\circ}$ C
存储温度 Storage temperature	-20 $^{\circ}$ C 到 60 $^{\circ}$ C -20 $^{\circ}$ C-60 $^{\circ}$ C

3. PCBA Design Section/PCBA 设计部分

耳机充电仓/Earphone charging case

PCB 贴片线稿图 PCB Line Drawing	PCB 贴片线稿图 PCB Line Drawing
	
	
	
	
	

整机降噪曲线深度 Depth of overall noise reduction curve

1.1	型号 Model	Y15 ANC
1.9	降噪深度曲线 Noise reduction depth curve	

喇叭 Speaker (Semi Ear)

1.1	型号 Model	LD 13-8-116 钛膜喇叭 LD 13-8-116 titanium speaker
1.2	阻抗 Impedance	30 Ω ±15%
1.3	额定输入功率 Rated input power	10mW
1.4	最大输入功率 Maximum input power	20mW
1.5	灵敏度 Sensitivity	112dB ± 3dB
1.6	频率范围 Frequency range	20Hz ~ 20KHz
1.7	失真率 Distortion Rate	THD < 3% @ 1kHz

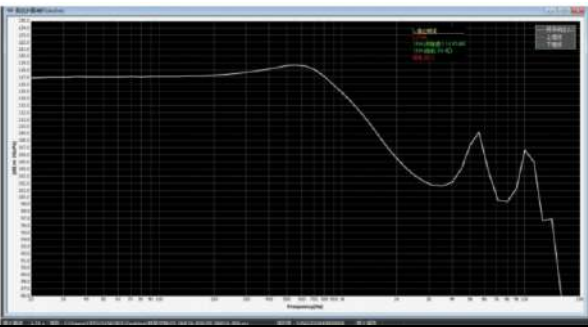
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1..8	尺寸 Dimension	
1.9	频率响应曲线 Frequency Response Curve	

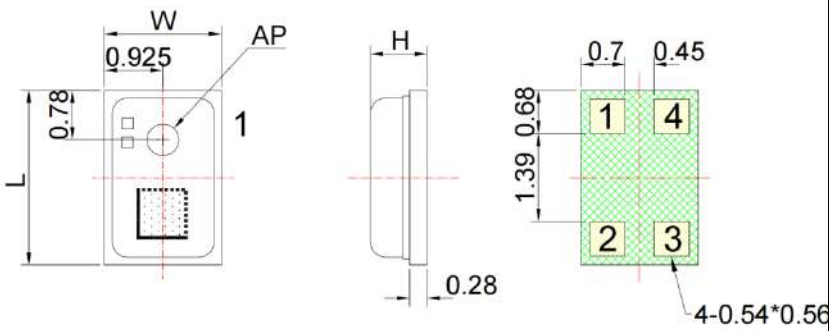
## 喇叭 Speaker (入耳式)

1.1	型号 Model	LD 13-6-17 (降噪喇叭) LD 13-6-17 (Noise reduction speaker)
1.2	阻抗 Impedance	32Ω ±15%
1.3	额定输入功率 Rated input power	10mW
1.4	最大输入功率 Maximum input power	20mW
1.5	灵敏度 Sensitivity	117dB ± 3dB
1.6	频率范围 Frequency range	20Hz ~ 20KHz
1.7	失真率 Distortion Rate	1% 95db SPL at 1KHZ
1..8	尺寸 Dimension	

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1.9	频率响应曲线 Frequency Response Curve	
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## 麦克风 MIC. (Semi Ear)

2.1	型号 Model	KSA2718AT421GR
2.2	灵敏度 Sensitivity	$-42 \pm 2\text{dB}$
2.3	阻抗 Impedance	$400 \Omega$
3.4	消耗电流 Current Consumption	$\leq 150\mu\text{A}$
2.5	频率范围 Frequency	100Hz ~8KHz
2.6	指向性 Directivity	全方位 all around
2.7	信噪比 S/N Signal to noise ratio	59dB
2.8	尺寸 Dimension	

2.9	频率响应曲线图 Frequency Response	
2.10	测试电路图 Measurement Circuit	

麦克风 MIC. (入耳式)

2.1	型号 Model	S15OT421-036
2.2	灵敏度 Sensitivity	$-42 \pm 2\text{dB}$
2.3	阻抗 Impedance	$400 \Omega$
3.4	消耗电流 Consumption current	$\leq 150\mu\text{A}$
2.5	频率范围 Frequency range	100Hz ~8KHz
2.6	指向性 Directivity	全方位 all around
2.7	信噪比 S/N Signal to noise	59dB



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	ratio	
2.8	尺寸 Dimension	
2.9	频率响应曲线图 Frequency Response	
2.10	测试电路图 Measurement Circuit	

电池部分 Part of the battery

耳机电池 Earphone battery			
生产厂家 Manufacturer	硕悦锂电 Shuoyue Lithium Battery	标准电压 Standard voltage	3.7V-4.2V
电池类型 Battery type	聚合物电池 Polymer battery	循环寿命次数 (循环后容量≥80%) Number of cycle life (Volume ≥ 80% after cycle)	不小于 300 次 Less than 300.
寿命循环测试容量 Life cycle test capacity	Discharge: 0.5C to 3.0V	充电截止电压 Charge cut-off voltage	4.20±0.03V
电池容量 Battery	25mAh/3.7v (semi ear)	过放保护电压 Over discharge protection	3.0V

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capacity	35mAh/3.7v(in ear)	voltage	
附电池规格书/Battery Specification:			
电池实物图（正面） Battery physical map (front)		电池实物图（反面） Battery physical map (reverse)	
			

#### 4. Operation/功能操作/使用说明

序号 no	功能 function	操作描述 Operation description	指示灯 Indicator light	语音包 Voice packet
<b>耳机 Earphone</b>				
1	开机 power on	取出充电仓，耳机自动开机 remove the charging case headphones to turn on	白灯闪烁 white light flashing	power on
2	手动开机 Manual power on	耳机不在充电仓内，关机状态下长按 MFB 键 3S 开机 The headset is not in the charging case, long press the MFB key 3S to turn on the power in the off state	白灯闪烁 white light flashing	power on
3	关机 power off	耳机放入充电仓，耳机进入充电状态 Put the headset into the charging case, the headset enters the charging state	白灯常亮 White light always on	power off
4	手动关机 Manual power off	开机状态长按 MFB 键 6S，耳机关机 Long press MFB key for 6S in power-on state, earphone off	白灯闪烁 white light flashing	power off
5	超时关机 Timeout shutdown	开机状态下，TWS 与设备连接不成功，5 分钟自动关机 TWS connects unsuccessfully with the device in the power-on state and automatically shuts down in 5 minutes		power on

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6	配对模式 pairing mode	<p>翻开充电仓盖，耳机拿出自动进入 TWS 配对状态，等待数秒后两耳机自动连上，然后打开手机上的蓝牙设备搜索。</p> <p>Flip open the charging case cover, the earphone comes out and automatically enters the TWS pairing state, wait for a few seconds after the two earphone are automatically connected, and then open the Bluetooth device search on your phone.</p>	<p>配对状态：左右耳红灯闪烁 配对成功：左右灯灭 Pairing status: left and right ear red lights blinking Successful pairing: left and right lights off</p>	TWS connected
7	TWS 与设备连接 TWS connection to equipment	<p>设备打开蓝牙功能，搜索配对名为“Y15”的蓝牙设备，并点击连接，直至手机显示与耳机连接成功</p> <p>Turn on the Bluetooth function, search for a paired Bluetooth device named "Y15," and click Connect until the phone shows that it has successfully connected to the earphone</p>	<p>连接成功：左右灯灭 Successful connection: left and right lights off</p>	Connected
	TWS 与设备断开 TWS is disconnected from the device	<p>在有配对记录的时候开机，回连手机，回连不上进入配对模式</p> <p>When there is a pairing record, turn on the phone, reconnect the phone, and if unable to connect, enter pairing mode</p>	/	
8	TWS 与设备断开 TWS is disconnected from the device	<p>设备与 TWS 断开，TWS 自动进入搜索配对模式</p> <p>The device is disconnected from the TWS and the TWS automatically enters search pairing mode</p>	/	disconnected
9	回连模式 Backlink mode	<p>开机配对后，自动进入回连最后配对的设备，回连不上或没设备连接 5 分钟自动关机</p> <p>After boot pairing, automatically enter back to connect the last paired device, can't back to connect or no device connection 5 minutes automatically shut down</p>	/	connected
10	超距回连 Over distance connection	<p>连接状态下，超距后 5 分钟内可自动回连。如仍未回连，自动关机</p> <p>In the connected state, it can automatically reconnect within 5 minutes after exceeding the distance. If not</p>	/	power off

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		reconnected, automatically shut down		
11	接听/挂断电话 Answer / hang up	来电时单击左耳或者右耳 Click on the left or right ear when making a phone call	/	
12	拒接电话 Refuse to answer	来电时长按左耳或者右耳 2S Long press left or right ear for 2 S when calling	/	
13	播放/暂停 Play / Pause	单击左耳或者右耳 Click on the left or right ear	/	
14	音量加 Increase the volume	双击右边 Double click on the right	/	
15	音量减 Reduce the volume	双击左边 Double click on the left	/	
16	上一曲 Previous song	三击左耳 Three click to the left ear	/	
17	下一曲 Next song	三击右耳 Three click to the right ear	/	
18	语音助手 (如 SIRI) Voice assistant s (e.g. SIRI)	长按左耳或者右耳 2S, 唤醒 SiRi Long press on the left or right ear 2S to wake up SiRi	/	
19	降噪模式 切换 Noise Reduction Mode Switch	长按左耳 3S (模式切换顺序: 降噪开启-通透模式-普通模式) Long press left ear 3S (Mode switching sequence: ANC On - Transparency Mode - Normal Mode)	/	
20	音乐游戏 模式切换 Music Mode/Game Mode	四击切换音乐/游戏模式 Four-tap to switch music/game modes	/	Music Mode/Game Mode
21	低电量提醒	开机状态中, 电池电压低于 3.3V Battery voltage is less than 3.3V in	每隔 1 分钟指示灯快闪 2 次	Low batter

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	Low battery alert	power state	Indicator light blinks 2 times every 1 minute	y
22	低电关机 Low power shutdown	开机状态中，电池电压低于 3.2V Battery voltage less than 3.2V in power state	红灯长亮 1 秒 Red light stays on for 1 second	
23	耳机充电 Earphone charging	放入充电仓中，左右耳机充电分别单个触发控制 In the charging case, the left and right earphones are separately triggered and controlled.	耳机指示灯常亮，饱满灭掉 earphone indicator light is always on, full extinguished	
24	来电铃声 Incoming Call Ringtone	苹果/安卓：同手机铃声 Apple / Android: Same ringtone	/	
25	默认音量 Default volume	耳机开机音量默认 50% Earphone Boot Volume Default 50%	/	
26	电量展示 Electricity display	连接设备上面需显示 TWS 当前电量 The current TWS charge must be displayed on the connected device	/	
27	AAC	支持 AAC 音频解码 Support for AAC audio decoding		

**充电仓 Charging case**

序号 no.	功能 function	操作描述 Operation description	指示灯 Indicator light	
1	充电仓充电 Charging case charging	数码管数字显示 100，10S 后灭灯 Digital tube digital display 100, after 10S extinguish the light		
2	充电盒对耳机充电 Charging case to charge	数码管跑马灯亮 10S 灭灯，耳机红灯常亮，饱满灭掉 The digital tube displays 0 digits and flashes 6 times before turning off the prompt		

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	the earphone	
3	低电量提醒 Low battery alert	数码管显示 0 数字闪烁 6 次提示后熄灭 The digital tube displays 0 digits and flashes 6 times before turning off the prompt
4	低电关机 Low power shutdown	电池达到关机电压，不给耳机充电，充电仓关机，灯灭。 The battery reaches the shutdown voltage, does not charge the earphones, the charging case is turned off, and the light is off.

### 5. 可靠性测试标准 Reliability Test Standards

试验项目 Test item	子类别 Sub-Category	标准 standard
Temperature test 温度测试	Storage with package - Damp Heat (高温储存试验)	High temperature storage test: test temperature: 60°C, test time: 48 hours 高温贮存试验 测试温度 70°C, 测试时间 48 小时
	Storage with package - Cold (低温储存试验)	Low temperature storage test temperature - 20°C, test time 48 hours 低温贮存试验 测试温度 -20°C, 测试时间 48 小时
	Thermal shock (part of Accelerated life tests (高低温循环测试))	Low temperature LT: - 20 °C for 1 h/high temperature HT: 60 °C for 1 h; Cycles: 24 times, a total of 48 hours; 低温低温试验: -20° C1 小时/高温试验: 60° C 保温 1 小时; 周期: 24 次, 共 48 小时;
Transportation Tests 运输测试	Random Vibration test (震动试验)	频率 5~55Hz, 振幅:5mm, 扫频方式, 30min. 5 ~ 55 hz frequency, amplitude, 5 mm, frequency sweeping method, 30 min.
	Package Drop test (包装跌落试验)	Faces:6 Edge:3 Corner:1 Per National Spec (按照国标)
	Free Drop test (Bare product) (裸机跌落试验 裸机自然状态下)	1) 1.2m 2) 3 times on concrete or 6 times on the wooden board (水泥地面: 3 次; 或者木质地板: 6 次)
	switch life tests (开关寿命测试)	Press force=160±30g, Travel=0.15-0.22, Life=50000 次 /在 160±30 的力度下以 100 次/分的速度, 对按键进行开关闭动作, 至少 10000, 功能正常。

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Reliability Test 可靠性试验	Durability 插拔壽命	Speed=3cycles/min, total cycle=3000, no deformation. 3000 次插拔, 插拔速度 3 次/分钟, 外观无变形
	Headband Pull Test (抽拉测试)	1. 插拔测试机, 30 次/分钟, 500G 的力抽拉 3000 次, (抽拉正常, 功能无损坏) /Speed=30cycles/min, total cycle=3000, 500g,
	Headband Expansion (头带扩张测试)	1. 头带扩张测试机。2., 30 次/分, 扩张 3000 次无变形, 产品功能正常。 Speed=30cycles/min, total cycle=3000, No crack.
	Twist test (头带扭转测试)	Speed =30cycles /min and the rotation degree to 45° , total test cycles=3,000, no crack. 1. 头带扭矩 45 度不断裂, 扭转 3000 次, 功能正常, 30 次/分。
	Salt spray test (corrosion) (盐雾试验)	5% NaCl, 35°C 24Hr in a tester → wash → Remove water → 4Hrs, room temperature NaCl 5%, 35°C, 在测试仪中 24 小时-洗涤-去水- 4 小时, 室温
	Perspiration resistance test (PU/cloth/ coated surface, metal/ plated/ laser logo) 耐汗性测试	Dried surface, Artificial perspiration: approx. pH 4.0 and pH 5.0 Wrap the Double layers gauzes containing Artificial perspiration around the specimen Leave the specimen in the chamber at a temperature 65 ± 2 ° C, humidity of 90 to 95 %, for 48 hours. Take the specimen out of the chamber, leave it under a room temperature for 2 hours, and clean the surface by washing in running tap water. CRITERIA: No significant discoloration, Cracks, blistering and deformation (material degradation), Stickiness of external surfaces, Haze of transparent plastic. 外表干净, 干燥的样品, 人工汗水成份/升: 1 升蒸溜水, 加 8 克磷酸二氢钠二水合物 (NaH <sub>2</sub> PO <sub>4</sub> •2H <sub>2</sub> O), 8 克氯化钠 (NaCl), 5 克醋酸混合成 pH 值为 4.5 左右的溶液, 用双层蘸满汗液的纱布敷在样品表面, 将样品放入温湿度为 65 ± 2 ° C、90 to 95 %, 48 后取出, 恢复常 2 小时, 用自来水冲洗干净, 白色纱布上无褪色, 染色现象
	Alcohol Test on coated surface /酒精测试(喷油、丝印件)	1. 95% 医用酒精。2. 500G, 30 次。3. 两层棉布在表面外理件上来回算一次循环, 擦拭 30 次无露底, 掉漆现象。95% medicinal alcohol, 30 cycles with 500g weight on the cotton cloth
	Abrasion test on	Loading: 250 g; Cycles: 50 times, HB pencil

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coated surface /磨损试验(喷油、丝印件)	(250 克的力 50 次, HB 铅笔)
grid cut test on coated surface 百格测试(喷油、丝印件)	1, Dried surface, 6x6 cut-lattice by cross-cutter , 1mmx1mm cutting spacing, on a surface as flat as possible of the test object ( If the specimen is very small and there is not enough space to cut the surface in lattice patterns, cut it in a cross ), clear surface by hairbrush. 2, 3M tape(Scotch 610#) 3 times/point, only one peel for each tape, Apply a piece of tape over the cuts. The tape must be carefully applied to the test surface in order to avoid bubbles between the tape and the surface, the tape should be stay on the surface 60sec, remove the tape quickly pulling in 45 degree angle. 干燥的表面, 用专用百格刀在产品平面划出 6 行 6 列 1mmx1mm 的小方格, 如果产品面小不足又划方格, 可划一个交叉十字, 用毛刷清洁测试面, 用 3M SCOTCH610#胶带贴在格子表面赶出气泡并保持 1 分钟, 每个点以 45 度角快速拉起 3 次, 胶带经一次拉起后不能再用。经测试后的样品方格内不脱层。

## 6 . 温馨提示 Warm prompt

- 1) 耳机充电过程中, 耳机处于关机状态, 会断开与手机的连接, 电源适配器必须选用 5V±0.2V  
During the headset charging process, the headset is in a shutdown state, which will disconnect from the mobile phone, and the power source adapter must be selected 5V ± 0.2V
- 2) 耳机开机后, 如果手机未搜索到耳机, 可以先关闭手机蓝牙再重新打开手机蓝牙, 手机会重新搜索  
After the headset is turned on, if the phone does not search for the headset, you can turn off the Bluetooth of the phone first and then turn on the Bluetooth of the phone again.

## 7 . 运输要求 Transport requirements

产品在半荷电 (50%-90%电量状态) 包装成箱经行运输, 在运输过程中应防止剧烈振动, 冲击或挤压, 防止日晒雨淋, 可适用于汽车、火车、轮船、飞机等普通交通工具运输。

The product should be packed into boxes with half charge (50% -90% charge state) for transportation. During transportation, it should be protected from severe vibration, shock or extrusion,

sun and rain. It can be applied to cars, trains, ships, planes and other ordinary transport vehicles.

## 8. 产品使用时警告事项及注意事项

### Warnings and precautions when using the product

1. 切勿使用具有腐蚀性的清洁剂清洁本产品。  
Do not use aggressive cleaning agents to clean this product.
2. 切勿让本产品加热或靠近火源。  
Do not allow this product to be heated or near a source of fire.
3. 切勿让本产品长时间受阳光直接照射。  
Do not expose this product to direct sunlight for prolonged periods.
4. 切勿将本产品弃置于火中，避免发生爆炸。  
Do not throw this product into a fire to avoid explosion.
5. 切勿尝试拆出本产品做任何修改。  
Do not attempt to disassemble the product to make any modifications.
6. 如长时间不使用本产品，请将它储存于干燥的环境中，并每月至少为耳机充电一次以延长寿命，避免极端的温度和灰尘。  
If you do not use this product for a long time, please store it in a dry environment and charge the headset at least once a month to extend its life.