

**MESSRS.****SPECIFICATION FOR APPROVAL****承 認 书**

|                   |                         |
|-------------------|-------------------------|
| Product           | WATERPROOF TYPE SPEAKER |
| Part No.          | HDK-4004BB-9C (RoHS)    |
| Customer          |                         |
| Customer Part No. |                         |

|                    |                    |                     |
|--------------------|--------------------|---------------------|
| Approved By        | Checked By         | Made By             |
| 王台平<br>SEP-27-2020 | 曹丽萍<br>SEP-27-2020 | LILY<br>SEP-27-2020 |

**常 州 华 龙 电 子 有 限 公 司**

DRAGONSTATE ELECTRONIC CORPORATION

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EDITION:1.1

## 1. Specification

HDK-4004BB-9C (RoHS)

| ITEM |                                 | SPECIFICATIONS                                                                                                                            |              |
|------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 01   | Type 属性                         | Dynamic speaker 动态式扬声器                                                                                                                    |              |
| 02   | Dimension 尺寸                    | External diameter Φ40mm 外径Φ40 mm                                                                                                          |              |
| 03   | Rated Input Power 额定输入功率        | 2.0W                                                                                                                                      |              |
| 04   | Max. Input Power 最大输入功率         | 2.2W for 1 minute 2.2W 在内 1 分钟                                                                                                            |              |
| 05   | Impedance 阻抗                    | 4 ohm ± 15% at 2000Hz 1.0V                                                                                                                |              |
| 06   | Resonance Frequency (Fo) 谐振频率   | 650Hz ± 20% at Fo 1V                                                                                                                      |              |
| 07   | Sensitivity (S.P.L.) 灵敏度        | 95dB (890mV / 0.1m) ± 3 dB                                                                                                                | at AVE1.0KHz |
|      |                                 | 104dB (2.83V / 0.1m) ± 3 dB                                                                                                               |              |
| 08   | Frequency Range 频率范围            | Fo - 7KHz                                                                                                                                 |              |
| 09   | Total Harmonics Distortion 谐波失真 | Max 10 % at 1 KHz, 2.0W.                                                                                                                  |              |
| 10   | Dustproof and waterproof 防水等级   | IP67                                                                                                                                      |              |
| 11   | Weight 重量                       | 9.6g ± 0.2g                                                                                                                               |              |
| 12   | Appearance 外观                   | Should not exist any obstacle to be harmful to normal operation; damages, cracks, rusts and distortions, etc.<br>沒有會影響功能的:損壞, 裂痕, 鏽跡, 變型等 |              |
| 13   | Operation Test 工作测试             | Must be normal at program source - 2.0W<br>测试的工作功率為 2.0W                                                                                  |              |
| 14   | Buzz, Rattle, etc. 异音测试         | Should not be audible at 2.83V sine Wave between 200 to 5KHz<br>加電壓 2.83V 频率 200 to 5KHz 的正旋波時不會聽到任何杂音                                    |              |
| 15   | Polarity 极性                     | When positive voltage is applied to the terminal marked (+), diaphragm should move to the front.<br>正電壓接至(+)極時, 音膜振動是朝向喇叭前方               |              |
| 16   | Terminal Strength 端子强度          | Capable of withstand 1kg load for 30 seconds without resulting in any damage or rejection.<br>能夠承受 1kg 負載達 30 秒不會造成任何損壞                   |              |
| 17   | Temperature 温度                  | Operating temperature: -30℃ to +70℃<br>工作温度: -30℃ to +70℃<br>Storage temperature: -30℃ to +70℃<br>儲存温度: -30℃ to +70℃                      |              |

## 2-1. Test Condition 测试条件

### Standard 标准测试

Temperature 温度 : 15 ~ 35°C

Relative humidity 相对湿度 : 25% ~ 85%,

Atmospheric pressure 大气压力 : 860mbar to 1060mbar.

### Basic 基本测试

Temperature 温度: 20±3°C

Relative humidity 相对湿度: 60% ~ 70%,

Atmospheric pressure 大气压力: 860mbar to 1060mbar

## 2-2. Standard Test Fixture 标准测试设备

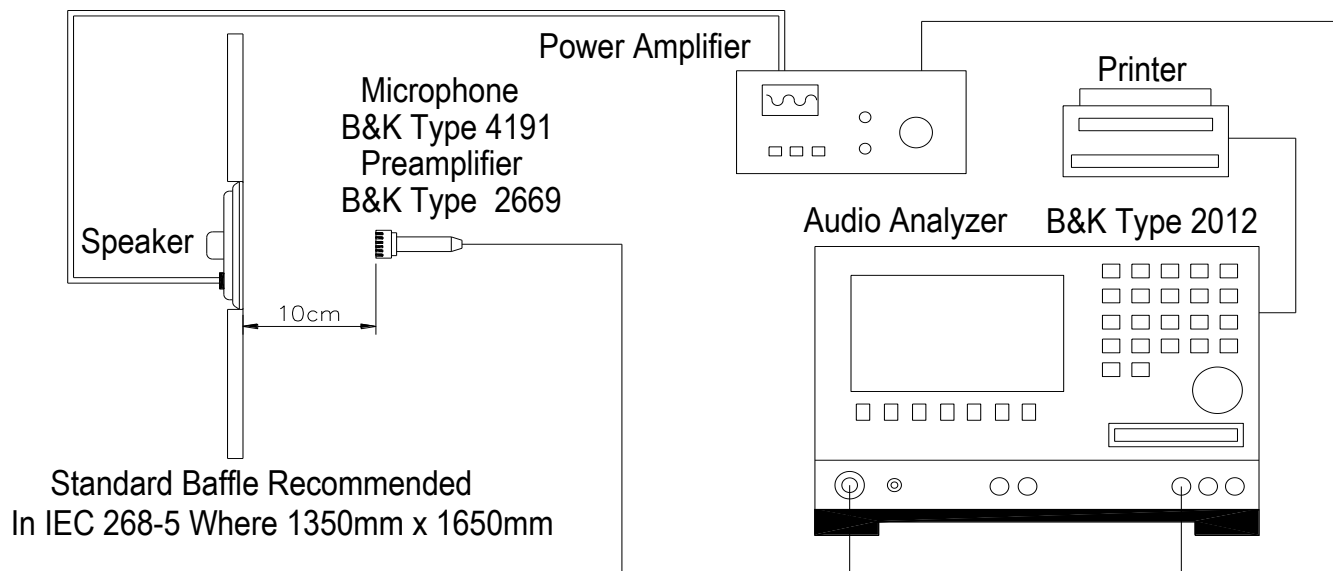
1. Input Power 输入功率: (2. 83V )

2. Zero Level : -dB

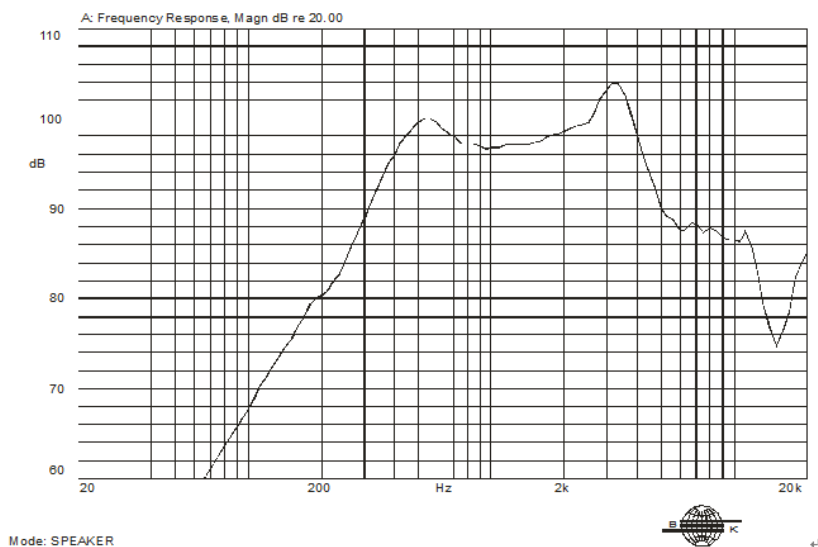
3. Mode 模式: SPEAKER 喇叭

4. potentiometer Range : 50dB

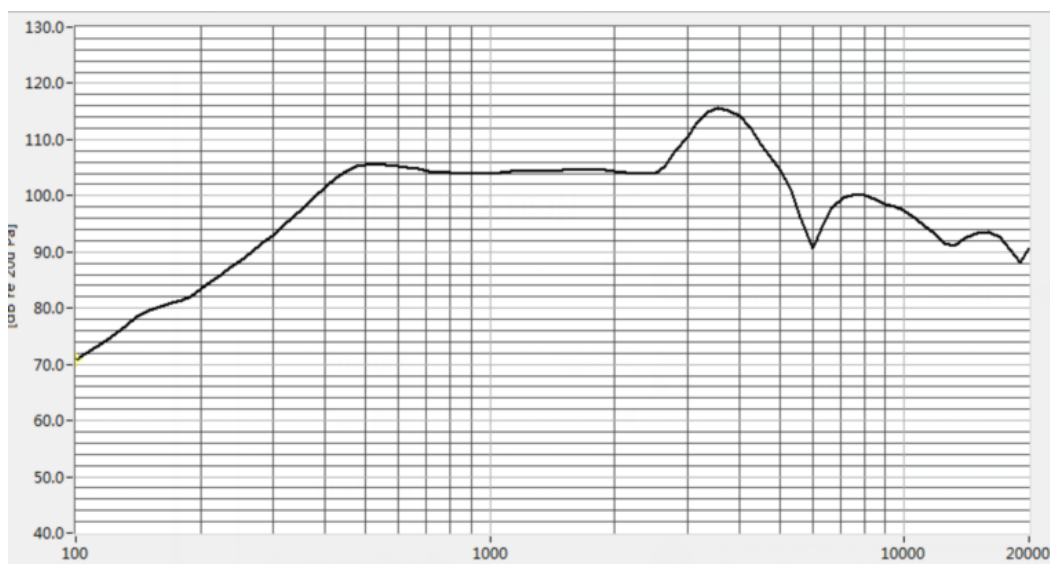
5. Sweep Time 扫描时间: 0.5sec



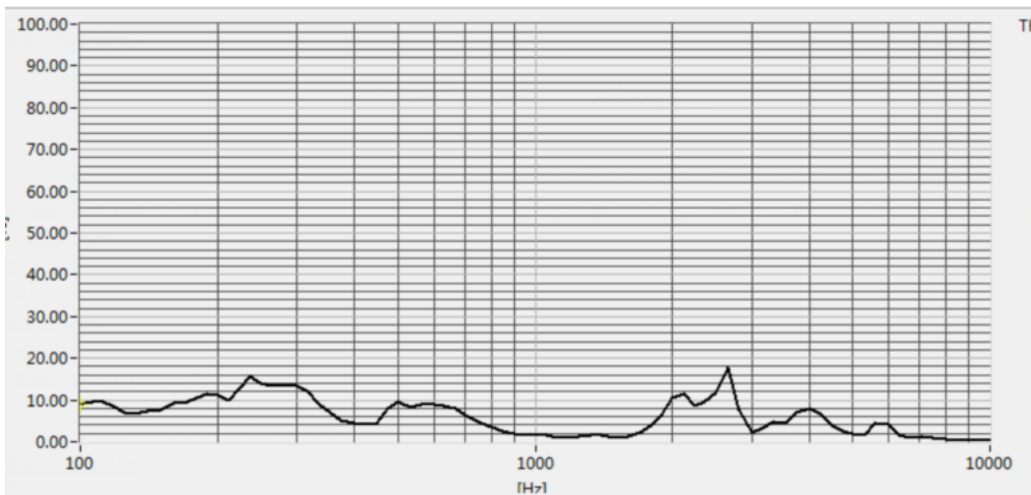
## 2.3 Frequency Response Curve 频响曲线



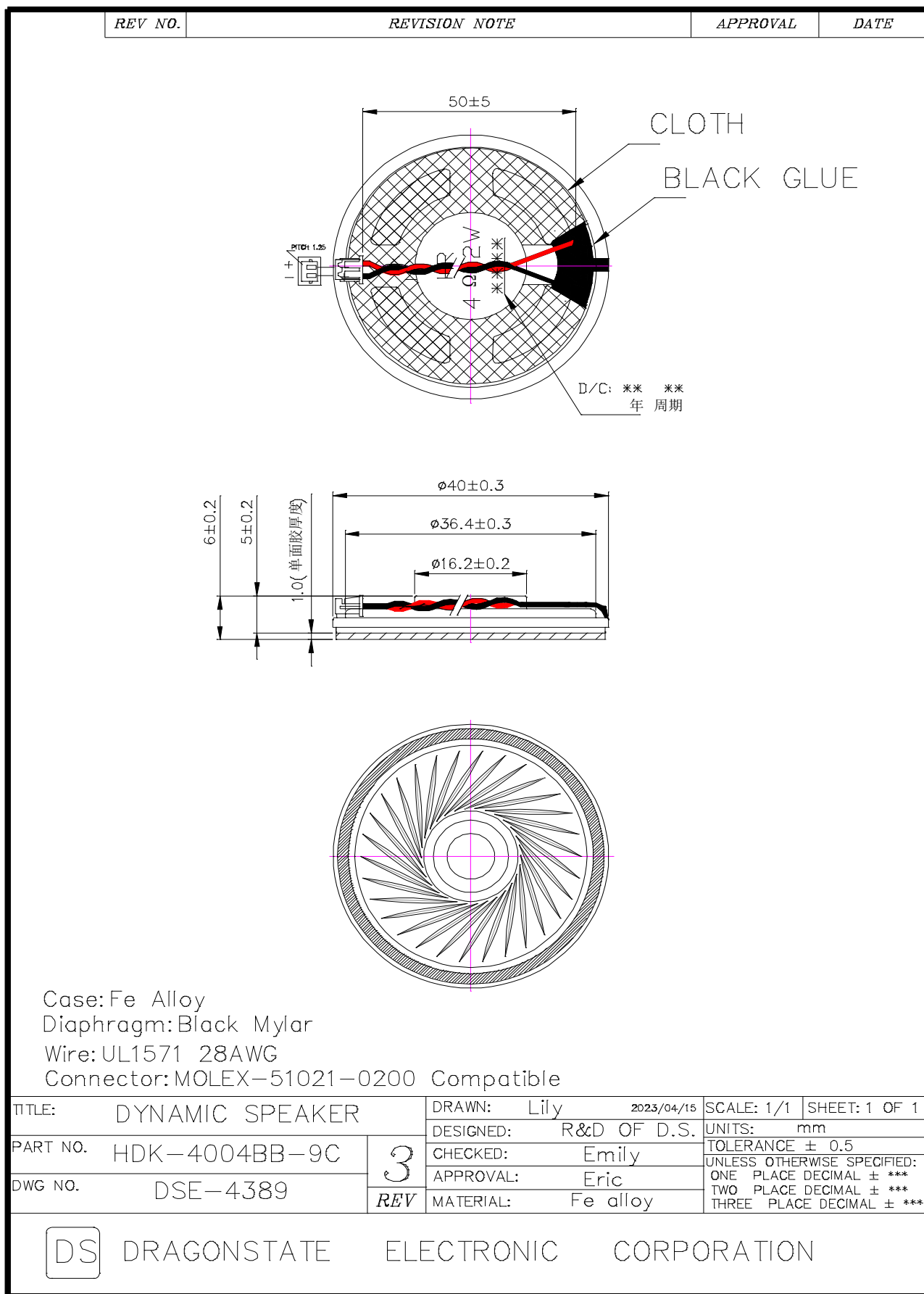
FR (2.83V/10cm)



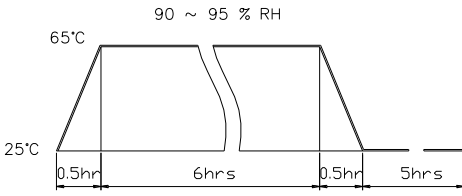
THD (2.83V/10cm)



### 3. Dimension 尺寸

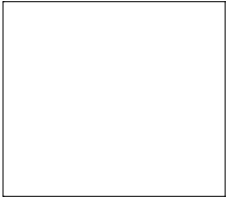
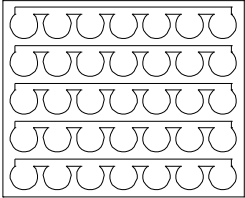
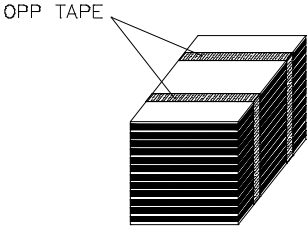
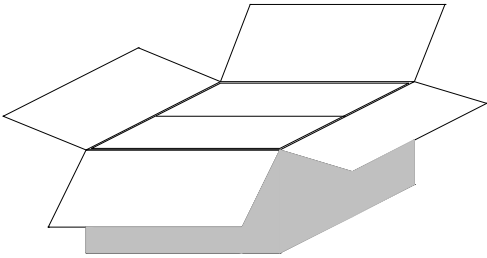


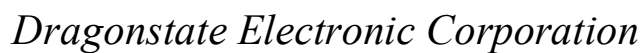
## 4. Reliability Test 可靠性测试

| Items. |                                   | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01     | High temp. Test<br>高温测试           | Keep 96 hours at $+70^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and leave 3 hours in normal temperature and then check<br>$+70^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 持续 96 小时, 在常温下存放 3 小时后测试                                                                                                                                                                                                                                                                                                       |
| 02     | Low temp. Test<br>低温测试            | Keep 96 hours at $-20^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and leave 3 hours in normal temperature and then check<br>$-30^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 持续 96 小时, 在常温下存放 3 小时后测试                                                                                                                                                                                                                                                                                                       |
| 03     | Humidity test<br>湿度测试             | Keep 96 hours at $+40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ relative humidity 95% and leave 3 hours in normal temperature and then checked.<br>$+40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 相对湿度 95%持续 96 小时, 在常温下存放 3 小时后测试                                                                                                                                                                                                                                                                      |
| 04     | Temp./Humidity cycle<br>温湿度循环测试   | The part shall be subjected 5 cycles. One cycle shall be 12 hours and consist of;<br>在以下条件 5 次循环, 每次 12 小时, 在常温下存放 3 小时后测试<br> <p>The graph shows a temperature cycle from 25°C to 65°C. The temperature rises from 25°C to 65°C in 0.5 hours, stays at 65°C for 6 hours, and then falls back to 25°C in 0.5 hours. The humidity is maintained at 90% to 95% RH during the 6-hour high-temperature plateau.</p> |
| 05     | Thermal cycle test.<br>热循环测试      | Low temperature: $-30^{\circ}\text{C} \pm 3^{\circ}\text{C}$ , temperature: $+70^{\circ}\text{C} \pm 3^{\circ}\text{C}$ , cycle: 1 hour/cycle each, and then keep 5 cycles in a room.<br>低温 $-30^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 高温 $+70^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 一小时一个周期, 同一个试验箱 5 个周期                                                                                                                                                                                      |
| 06     | Vibration 振动测试                    | $10 \sim 200 \sim 10\text{Hz}$ sin-wave sweep 15min. 5G(constant)<br>X, Y, Z 3 direction. 2 hours each, total 6 hours.<br>$10 \sim 200 \sim 10\text{Hz}$ 正弦波振动 15 分钟, X, Y, Z 三个面, 2 小时一次, 共 6 小时                                                                                                                                                                                                                                                                                                 |
| 07     | Fix drop test<br>固定跌落测试           | Fix on jig. Then drop from 152cm height to the concrete floor<br>X, y, z 6 direction. 5 times each, total 30 times.<br>固定夹具中, 152cm 跌落水泥地, X, Y, Z 六个面, 每面 5 次, 共 30 次                                                                                                                                                                                                                                                                                                                            |
| 08     | Free drop test<br>自由跌落测试          | Free drop from 100cm height to the concrete floor<br>X, y, z 6 direction. 1 times each, total 6 times.<br>100cm 跌落水泥地, X, Y, Z 六个面, 每面 1 次, 共 6 次                                                                                                                                                                                                                                                                                                                                                 |
| 09     | Rated Power test<br>额定功率测试        | Rated Power Pink noise is applied for 96 hours<br>额定功率粉噪声持续 96 hours                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 10     | Max Power test<br>最大功率测试          | Max power 1 min on - 2 min off 10 cycles.<br>最大功率 1 分钟通, 停 2 分钟, 10 次循环                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 11     | Terminal strength test<br>拉力测试    | Capable of withstand 1kg load for 30 seconds without resulting in any damage or rejection<br>1kg 拉力 30 秒, 没有导致产品损坏                                                                                                                                                                                                                                                                                                                                                                                |
| 12     | Protection against liquid<br>防水测试 | Protected against 30 MINS of immersion under 1M pressure<br>水下 1 米 30 分钟不漏水                                                                                                                                                                                                                                                                                                                                                                                                                       |

Criterion: After these test , the change of S.P.L shall be within  $\pm 3 \text{ dB}$  . 所有试验后, 音压都在  $\pm 3 \text{ dB}$  之内

## 5. Packing 包装

| REV NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | REVISION NOTE | APPROVAL               | DATE  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------|-------|
| <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>↓</p>  <p>↓</p>  <p>↓</p>  </div> <div style="text-align: left;"> <p>Cover(350*280*5mm)<br/>Material: Eps</p> <p>Box(350*280*16mm)<br/>35pcs<br/>Material: Eps</p> <p>Middle(350*280*160mm)<br/>350pcs<br/>Material: Eps</p> <p>Outer Box(590*390*405mm)<br/>1400pcs<br/>Material: Paper</p> </div> </div> <p style="text-align: right; margin-top: 20px;">单位: mm</p> |               |                        |       |
| TITLE: packing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               | DRAWN: Lily 2014/06/09 |       |
| PART NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |               | DESIGNED: R&D OF D.S.  |       |
| DWG NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               | CHECKED: Emily         |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | APPROVAL: Eric         |       |
| REV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               | MATERIAL: ***          |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | SCALE: 2:1             |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | SHEET: 1 of 1          |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | UNITS: mm              |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | TOLERANCE              |       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | 20~11                  | ± 0.3 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | 10~5                   | ± 0.2 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               | <4                     | ± 0.1 |
| <div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 10px;">DS</div> <div>DRAGONSTATE ELECTRONIC CORPORATION</div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |                        |       |



## 6. History change record 变更记录

[illegible]