

# UN38.3 检测报告

## TEST REPORT

**报告编号:**

BCTC2201683645B

Report No.

**委托单位:**

东莞市佰佳盈电子科技有限公司

Applicant

Dongguan City Baijiaying Electronic  
Technology Co., Ltd.

**产品名称:**

可充电锂离子电池

Product Name

Rechargeable Li-ion Battery

**产品型号:**

18650 2000mAh 7.4V

Product Model

**检测日期:**

2021-12-31 至 2022-01-11

Test Date

**签发日期:**

2022-01-12

Issued Date



编号/No. : BCTC/RF-BAT-006

深圳市倍测检测有限公司  
Shenzhen BCTC Testing Co., Ltd.

检验检测专用章



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版本/Edition A.5

**Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests  
and Criteria (ST/SG/AC.10/11/Rev.7, 38.3)**

联合国《关于危险货物运输的建议书 试验和标准手册》第七版, 38.3 章节

**Client Information 客户信息**

|                               |  |
|-------------------------------|--|
| Applicant<br>委托单位             | Dongguan City Baijiaying Electronic Technology Co., Ltd.<br>东莞市佰佳盈电子科技有限公司                     |
| Applicant Address<br>委托单位地址   | No. 4, Jufu Road, Xin'an, Chang'an Town, Dongguan City, Guangdong, China<br>广东省东莞市长安镇新安聚福路 4 号 |
| Trade Mark<br>商标              | --   |
| Manufacturer<br>制造商           | Dongguan City Baijiaying Electronic Technology Co., Ltd.<br>东莞市佰佳盈电子科技有限公司                     |
| Manufacturer Address<br>制造商地址 | No. 4, Jufu Road, Xin'an, Chang'an Town, Dongguan City, Guangdong, China<br>广东省东莞市长安镇新安聚福路 4 号 |
| Contact Number<br>联系电话        | 13652427727  |
| E-mail<br>电子邮箱                | 545561510@qq.com   |
| Website<br>公司网址               | --   |

**Sample Information 样品信息**

|                           |  |
|---------------------------|--|
| Name of Sample<br>样品名称    | Rechargeable Li-ion Battery<br>可充电锂离子电池  |
| Model<br>型号               | 18650 2000mAh 7.4V   |
| Ratings<br>规格             | 7.4V, 2000mAh, 14.8Wh  |
| Appearance<br>外观          | Blue<br>蓝色   |
| Sample Size<br>样品尺寸       | 长度 L*宽度 W*厚度 T<br>66.3*36.7*18.6mm   |
| Test Sample No.<br>测试样品编号 | 电池/Battery: 211231236-B01~211231236-B18;<br>电芯/Cell: 220131259-C01~220131259-C30 |

| Test Items 测试项目 |   |                  |                        |
|-----------------|---|------------------|------------------------|
| Clause<br>章节    | Name of Test Items<br>测试项目名称  | Conclusion<br>结论 | Remarks<br>备注          |
| 38.3.4.1<br>T.1 | Altitude simulation<br>高度模拟   | Pass<br>通过       | --                     |
| 38.3.4.2<br>T.2 | Thermal test<br>温度试验  | Pass<br>通过       | --                     |
| 38.3.4.3<br>T.3 | Vibration<br>振动   | Pass<br>通过       | --                     |
| 38.3.4.4<br>T.4 | Shock<br>冲击   | Pass<br>通过       | --                     |
| 38.3.4.5<br>T.5 | External Short- circuit<br>外部短路   | Pass<br>通过       | --                     |
| 38.3.4.6<br>T.6 | <input checked="" type="checkbox"/> Impact 撞击 <input type="checkbox"/> Crush 挤压 | Pass<br>通过       | 18650 Cell<br>18650 电芯 |
| 38.3.4.7<br>T.7 | Overcharge<br>过度充电  | Pass<br>通过       | --                     |
| 38.3.4.8<br>T.8 | Forced discharge<br>强制放电  | Pass<br>通过       | --                     |

Remark 备注:

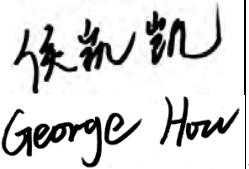
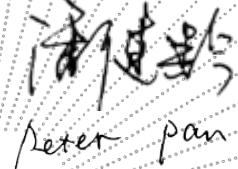
Testing sample condition code 测试样品状态代码:

① 1 cycle fully charged. 1 次循环之后完全充电; ② 25 cycle fully charged. 25 次循环之后完全充电;  
 ③ 1 cycle fully discharged. 1 次循环之后完全放电; ④ 25 cycle fully discharged. 25 次循环之后完全放电;  
 ⑤ 1 cycle 50% charged. 1 次循环之后充电 50%; ⑥ 25cycle 50% charged. 25 次循环之后充电 50%;

### Test Conclusion 结论

 After testing, the sample **meets** the standard requirements.

经测试, 该样品符合标准要求。

|   |   |  |  |   |   |
|---|---|--|--|---|---|
| Tested by:<br>George Hou<br>主检: 侯凯凯<br>Title: Test<br>engineer<br>职衔: 测试工<br>程师 |  | Reviewed by:<br>Andre Yu<br>审核: 余平<br>Title: Project<br>handler<br>职衔: 项目工程师 |  | Approved by:<br>Peter Pan<br>批准: 潘健黔<br>Title:<br>Manager<br>职衔: 经理 |  |
|---|---|--|--|---|---|

### T.1 Altitude Simulation 高度模拟

Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature (20±5°C)

将电芯和电池在温度为20±5°C、大气压力不大于11.6kpa的环境中贮存不少于6h。

#### Acceptance criteria 接受准则:

No leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.

无漏液、无泄气、无分解、无破裂以及无着火现象；电芯或电池测试后的开路电压不低于测试前开路电压的90%。

| Sample No.<br>样品编号 | Sample<br>Condition<br>样品状态 | Weight 质量(g)       |                   | Weight<br>Loss<br>质量损失% | Voltage 电压(V)      |                   | Percentage<br>of residual<br>Voltage<br>残余电压% | Results<br>结果 |
|--------------------|-----------------------------|--------------------|-------------------|-------------------------|--------------------|-------------------|---|---------------|
|                    |                             | Before Test<br>测试前 | After Test<br>测试后 |                         | Before Test<br>测试前 | After Test<br>测试后 |   |               |
| B01                | ①                           | 93.685             | 93.684            | 0.001                   | 8.30               | 8.29              | 99.880  | A, B          |
| B02                | ①                           | 93.463             | 93.463            | 0.000                   | 8.29               | 8.28              | 99.879  | A, B          |
| B03                | ①                           | 93.562             | 93.561            | 0.001                   | 8.30               | 8.30              | 100.000                                       | A, B          |
| B04                | ①                           | 93.654             | 93.654            | 0.000                   | 8.28               | 8.27              | 99.879  | A, B          |
| B05                | ①                           | 93.448             | 93.447            | 0.001                   | 8.31               | 8.31              | 100.000                                       | A, B          |
| B06                | ②                           | 93.519             | 93.519            | 0.000                   | 8.30               | 8.29              | 99.880  | A, B          |
| B07                | ②                           | 93.627             | 93.626            | 0.001                   | 8.27               | 8.27              | 100.000                                       | A, B          |
| B08                | ②                           | 93.495             | 93.494            | 0.001                   | 8.29               | 8.28              | 99.879  | A, B          |

#### Results/ 结果:

A - No leakage, No venting, No disassembly, No rupture, No fire. 无漏液、无泄气、无分解、无破裂、无着火。

B - Voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. 测试后电压不低于测试前电压的90%。

C - Others (please explain). 其它。

### T.2 Thermal test 温度试验

Test cells and batteries are to be stored for at least six hours at a test temperature equal to  $72\pm2^{\circ}\text{C}$ , followed by storage for at least six hours at a test temperature equal to  $-40\pm2^{\circ}\text{C}$ . The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated 10 times, after which all test cells and batteries are to be stored for 24 hours at ambient temperature ( $20\pm5^{\circ}\text{C}$ ).

首先将样品放在 $72\pm2^{\circ}\text{C}$ 的环境中放置至少6个小时，然后放在 $-40\pm2^{\circ}\text{C}$ 的环境中放置至少6个小时。温度转换的最大间隔时间为30分钟。如此循环10次，最后将样品放在 $20\pm5^{\circ}\text{C}$ 的环境中静置24小时。

For large cells and batteries, The duration of exposure to the test temperature extremes should be at least 12 hours.

对于大电芯，在高温和低温中放置的时间最少12个小时。

#### Acceptance criteria 接受准则:

No leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.

无漏液、无泄气、无分解、无破裂以及无着火现象；电芯或电池测试后的开路电压不低于测试前开路电压的90%。

| Sample No.<br>样品编号 | Sample<br>Condition<br>样品状态 | Weight 质量(g)       |                   | Weight<br>Loss<br>质量损失% | Voltage 电压(V)      |                   | Percentage<br>of residual<br>Voltage<br>残余电压% | Results<br>结果 |
|--------------------|-----------------------------|--------------------|-------------------|-------------------------|--------------------|-------------------|---|---------------|
|                    |                             | Before Test<br>测试前 | After Test<br>测试后 |                         | Before Test<br>测试前 | After Test<br>测试后 |   |               |
| B01                | ①                           | 93.684             | 93.609            | 0.080                   | 8.29               | 8.20              | 98.914  | A, B          |
| B02                | ①                           | 93.463             | 93.384            | 0.085                   | 8.28               | 8.19              | 98.913  | A, B          |
| B03                | ①                           | 93.561             | 93.485            | 0.081                   | 8.30               | 8.21              | 98.916  | A, B          |
| B04                | ①                           | 93.654             | 93.573            | 0.086                   | 8.27               | 8.18              | 98.912  | A, B          |
| B05                | ②                           | 93.447             | 93.366            | 0.087                   | 8.31               | 8.22              | 98.917  | A, B          |
| B06                | ②                           | 93.519             | 93.437            | 0.088                   | 8.29               | 8.19              | 98.794  | A, B          |
| B07                | ②                           | 93.626             | 93.551            | 0.080                   | 8.27               | 8.18              | 98.912  | A, B          |
| B08                | ②                           | 93.495             | 93.422            | 0.078                   | 8.28               | 8.19              | 98.913  | A, B          |

#### Results/ 结果:

A - No leakage, No venting, No disassembly, No rupture, No fire. 无漏液、无泄气、无分解、无破裂、无着火。

B - Voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. 测试后电压不低于测试前电压的90%。

C - Others (please explain). 其它。

### T.3 Vibration 振动

Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face. /样品必须牢固地安装在振动台面上。振动以正弦波形式，从7Hz增加至200Hz，然后减少回到7Hz为一个循环，一个循环持续15分钟。对样品从三个互相垂直的方向上各进行3个小时12次的测试。每个振动方向必须是相互垂直的极性平面

#### For cells and small batteries 对于电芯和小电池：

From 7 Hz a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 8 gn occurs (approximately 50 Hz). A peak acceleration of 8 gn is then maintained until the frequency is increased to 200 Hz.

对数扫频为：从7Hz开始保持1gn的最大加速度直到频率为18Hz，然后将振幅保持在0.8mm (总偏移1.6mm) 并增加频率直到最大加速度达到8gn (频率约为50Hz)，将最大加速度保持在8gn直到频率增加到200 Hz.

#### For large batteries 对于大电池：

From 7 Hz to a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 2 gn occurs (approximately 25 Hz). A peak acceleration of 2 gn is then maintained until the frequency is increased to 200 Hz.

对数扫频为：从7Hz开始保持1gn的最大加速度直到频率为18Hz，然后将振幅保持在0.8mm (总偏移1.6mm) 并增加频率直到最大加速度达到2gn (频率约为25Hz)，将最大加速度保持在2gn直到频率增加到200Hz。

#### Acceptance criteria 接受准则：

No leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.

无漏液、无泄气、无分解、无破裂以及无着火现象；电芯或电池测试后的开路电压不低于测试前开路电压的90%。

| Sample No.<br>样品编号 | Sample<br>Condition<br>样品状态 | Weight 质量(g)       |                   | Weight<br>Loss<br>质量损失% | Voltage 电压(V)      |                   | Percentage<br>of residual<br>Voltage<br>残余电压% | Results<br>结果 |
|--------------------|-----------------------------|--------------------|-------------------|-------------------------|--------------------|-------------------|---|---------------|
|                    |                             | Before Test<br>测试前 | After Test<br>测试后 |                         | Before Test<br>测试前 | After Test<br>测试后 |   |               |
| B01                | ①                           | 93.609             | 93.608            | 0.001                   | 8.20               | 8.19              | 99.878  | A, B          |
| B02                | ①                           | 93.384             | 93.384            | 0.000                   | 8.19               | 8.17              | 99.756  | A, B          |
| B03                | ①                           | 93.485             | 93.483            | 0.002                   | 8.21               | 8.21              | 100.000                                       | A, B          |
| B04                | ①                           | 93.573             | 93.572            | 0.001                   | 8.18               | 8.17              | 99.878  | A, B          |
| B05                | ②                           | 93.366             | 93.364            | 0.002                   | 8.22               | 8.21              | 99.878  | A, B          |
| B06                | ②                           | 93.437             | 93.437            | 0.000                   | 8.19               | 8.19              | 100.000                                       | A, B          |
| B07                | ②                           | 93.551             | 93.548            | 0.003                   | 8.18               | 8.16              | 99.756  | A, B          |
| B08                | ②                           | 93.422             | 93.421            | 0.001                   | 8.19               | 8.18              | 99.878  | A, B          |

#### Results/ 结果：

A - No leakage, No venting, No disassembly, No rupture, No fire. 无漏液、无泄气、无分解、无破裂、无着火。

B - Voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. 测试后电压不低于测试前电压的90%。

C - Others (please explain). 其它。

### T.4 Shock 冲击

Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each cell shall be subjected to a half-sine shock of peak acceleration of 150 gn and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of 50 gn and pulse duration of 11 milliseconds. Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the battery. The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries. The formulas below are provided to calculate the appropriate minimum peak accelerations.

以稳固的托架固定住每个电池/电芯样品，每个样品应该经受峰值加速度为150gn以及脉冲持续时间为6ms的半正弦冲击，另外，大型电池/电芯应该经受峰值加速度为50gn以及脉冲持续时间为11ms的半正弦冲击.每一个电池将受到一个半正弦冲击的峰值加速度取决于电池的质量。对于小型电池，脉冲持续时间为6毫秒，对于大型电池，脉冲时间为11毫秒。下面提供的公式用来计算适当的最小峰值加速度。

| Battery         | Minimum peak acceleration   | Pulse duration |
|-----------------|---|----------------|
| Small batteries | 150 gn or result of formula<br>$Acceleration(g_n) = \sqrt{\frac{100850}{mass^a}}$<br>whichever is smaller | 6 ms           |
|                 | 50 gn or result of formula<br>$Acceleration(g_n) = \sqrt{\frac{30000}{mass^a}}$<br>whichever is smaller   |                |
| Large batteries |   | 11 ms          |
|                 |   |                |

<sup>a</sup> Mass is expressed in kilograms.

Each sample was subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cell for a total of 18 shocks.

每个测试样品须在三个互相垂直的电池安装方位的正方向经受三次冲击，接着在反方向经受三次冲击，总共经受18次冲击。

#### Acceptance criteria 接受准则:

No leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.

无漏液、无泄气、无分解、无破裂以及无着火现象；电芯或电池测试后的开路电压不低于测试前开路电压的90%。

| Sample No.<br>样品编号 | Sample<br>Condition<br>样品状态 | Weight 质量(g)       |                   | Weight<br>Loss<br>质量损失% | Voltage 电压(V)      |                   | Percentage<br>of residual<br>Voltage<br>残余电压% | Results<br>结果 |
|--------------------|-----------------------------|--------------------|-------------------|-------------------------|--------------------|-------------------|---|---------------|
|                    |                             | Before Test<br>测试前 | After Test<br>测试后 |                         | Before Test<br>测试前 | After Test<br>测试后 |   |               |
| B01                | ①                           | 93.608             | 93.607            | 0.001                   | 8.19               | 8.18              | 99.878  | A, B          |
| B02                | ①                           | 93.384             | 93.384            | 0.000                   | 8.17               | 8.16              | 99.878  | A, B          |
| B03                | ①                           | 93.483             | 93.482            | 0.001                   | 8.21               | 8.21              | 100.000                                       | A, B          |
| B04                | ①                           | 93.572             | 93.571            | 0.001                   | 8.17               | 8.16              | 99.878  | A, B          |
| B05                | ②                           | 93.364             | 93.363            | 0.001                   | 8.21               | 8.20              | 99.878  | A, B          |
| B06                | ②                           | 93.437             | 93.437            | 0.000                   | 8.19               | 8.19              | 100.000                                       | A, B          |
| B07                | ②                           | 93.548             | 93.546            | 0.002                   | 8.16               | 8.15              | 99.877  | A, B          |
| B08                | ②                           | 93.421             | 93.421            | 0.000                   | 8.18               | 8.18              | 100.000                                       | A, B          |

#### Results/ 结果:

A - No leakage, No venting, No disassembly, No rupture, No fire. 无漏液、无泄气、无分解、无破裂、无着火。

B - Voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. 测试后电压不低于测试前电压的90%。

C - Others (please explain). 其它。

### T.5 External short circuit 外部短路

The samples were shall be heated for a period of time noted below, to reach a homogeneous stabilized temperature of  $57 \pm 4^{\circ}\text{C}$ , measured on the external case:

为使样品达到均匀稳定的初始温度:  $57 \pm 4^{\circ}\text{C}$ , 样品需在此环境下暴露一段时间。

Small cells and small batteries: 6 hours. 小电芯和小电池至少暴露6小时。  
 Large cells and large batteries: 12 hours. 大电芯和大电池至少暴露12小时。  
 \_\_\_\_\_ hours, assessed depended on the size and design of the sample. \_\_\_\_\_ 小时, 根据样品尺寸设计评估所得。

The samples were then subjected to a short circuit condition with a total external resistance of less than 0.1 ohm, until:

然后将样品正负极用小于0.1欧姆的总电阻回路进行短路, 直到:

For Small cells, small batteries and large cells 小电芯, 小电池和大电芯:

1 hour after the external case temperature of sample has returned to  $57 \pm 4^{\circ}\text{C}$ .  
 样品外表温度恢复到 $57 \pm 4^{\circ}\text{C}$ 之后保持短路状态1小时以上。

For Large batteries 大电池:

After the external case temperature of sample has decreased by half of the maximum temperature increase observed during the test and remains below that value.  
 样品表面温度下降所测最大温升的一半, 并保持低于该数值。

#### Acceptance criteria 接受准则:

The external temperature does not exceed  $170^{\circ}\text{C}$ , and there is no disassembly, no rupture and no fire during the test and within six hours after the test.

电池表面温度不超过 $170^{\circ}\text{C}$ , 测试中和结束后6h内观察样品无分解、无破裂、无着火现象发生。

| Sample No.<br>样品编号 | Sample Condition<br>样品状态 | Voltage Before Test<br>测试前电压(V) | Maximum Temperature<br>最高温度 (°C) | Results<br>结果 |
|--------------------|--------------------------|---------------------------------|----------------------------------|---------------|
| B01                | ①                        | 8.18                            | 57.9                             | A, B          |
| B02                | ①                        | 8.16                            | 58.1                             | A, B          |
| B03                | ①                        | 8.21                            | 58.2                             | A, B          |
| B04                | ①                        | 8.16                            | 57.8                             | A, B          |
| B05                | ②                        | 8.20                            | 57.9                             | A, B          |
| B06                | ②                        | 8.19                            | 58.3                             | A, B          |
| B07                | ②                        | 8.15                            | 58.0                             | A, B          |
| B08                | ②                        | 8.18                            | 58.2                             | A, B          |

#### Results/ 结果:

A - No disassembly, No rupture, No fire during the test and within six hours after the test., 测试中和结束后6h内观察样品无分解、无破裂、无着火现象发生。

B - The external temperature does not exceed  $170^{\circ}\text{C}$ . 电池表面温度未超过 $170^{\circ}\text{C}$ 。

C - Others (please explain). 其它。

### T.6 Impact 撞击 / Crush 挤压

**Impact 撞击 (Applicable to cylindrical cells greater than or equal to 18 mm in diameter)** 适用于直径大于或等于18mm的圆柱形电芯)

The sample cell or component cell is to be placed on a flat smooth surface. A 15.8 mm $\pm$ 0.1mm diameter, at least 6 cm long, or the longest dimension of the cell, whichever is greater, Type 316 stainless steel bar is to be placed across the centre of the sample. A 9.1 kg $\pm$ 0.1 kg mass is to be dropped from a height of 61 $\pm$ 2.5 cm at the intersection of the bar and sample in a controlled manner using a near frictionless, vertical sliding track or channel with minimal drag on the falling mass. The vertical track or channel used to guide the falling mass shall be oriented 90 degrees from the horizontal supporting surface. 将样品放在一个平坦的光滑平面上。将一直径为15.8 mm $\pm$ 0.1mm. 长度不小于6cm的316不锈钢棒横过样品中部放置后，将一质量为9.1 kg $\pm$ 0.1 kg的重物从61 $\pm$ 2.5 cm的高度落向样品

The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8 mm $\pm$ 0.1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact. 接受撞击的样品，纵轴应与平坦的表面平行并与横放在样品中心的直径15.8 mm $\pm$ 0.1mm弯曲表面的纵轴垂直。每一个样品只接受一次撞击。

**Crush 挤压 (Applicable to prismatic, pouch, coin/button cells and cylindrical cells not more than 18 mm in diameter)** 适用于棱柱形、袋状、硬币/纽扣电芯和直径不超过18mm的圆柱形电芯)

A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached. 将样品放在两个平面之间挤压，挤压速度逐渐加大，在第一个接触点上的速度大约为1.5cm/s。挤压持续进行，直到出现以下三种情况之一：

(a) The applied force reaches 13kN $\pm$ 0.78kN; /施加力达到13kN $\pm$ 0.78kN

(b) The voltage of the cell drops by at least 100 mV; /样品的电压下降至少100mV

(c) The cell is deformed by 50% or more of its original thickness. /电池变形达原始厚度的50%以上。

A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis. 棱柱形或袋状电芯应从最宽的一面施压。纽扣/硬币形电芯应从其平坦表面施压。圆柱形应从与纵轴垂直的方向施压。

Each test cell or component cell is to be subjected to one crush only. The test sample shall be observed for a further 6 h. The test shall be conducted using test cells or component cells that have not previously been subjected to other tests. 每个样品都是全新样品，并且只经受一次施压。施压结束后样品应静置观察6小时。

**Acceptance criteria 接受准则**

The external temperature does not exceed 170°C, and there is no disassembly, no rupture and no fire during the test and within six hours after the test.

电池表面温度不超过170°C，测试中和结束后6h内观察样品无分解、无破裂、无着火现象发生。

| Sample No.<br>样品编号 | Sample Condition<br>样品状态 | Voltage Before Test<br>测试前电压 (V) | Maximum Temperature<br>最高温度 (°C) | Results<br>结果 |
|--------------------|--------------------------|----------------------------------|----------------------------------|---------------|
| C01                | ⑤                        | 3.905                            | 109.7                            | A, B          |
| C02                | ⑤                        | 3.900                            | 127.5                            | A, B          |
| C03                | ⑤                        | 3.894                            | 127.1                            | A, B          |
| C04                | ⑤                        | 3.911                            | 124.7                            | A, B          |
| C05                | ⑤                        | 3.909                            | 116.4                            | A, B          |
| C06                | ⑥                        | 3.904                            | 128.3                            | A, B          |
| C07                | ⑥                        | 3.903                            | 122.1                            | A, B          |
| C08                | ⑥                        | 3.899                            | 127.8                            | A, B          |
| C09                | ⑥                        | 3.905                            | 123.6                            | A, B          |
| C10                | ⑥                        | 3.902                            | 128.8                            | A, B          |

**Results/ 结果:**

A - No disassembly, No rupture, No fire during the test and within six hours after the test. 测试中和结束后6h内观察样品无分解、无破裂、无着火现象发生。

B - The external temperature does not exceed 170°C. 电池表面温度未超过170°C。

C - Others (please explain). 其它。

### T.7 Overcharge 过度充电 (电芯不适用本项测试)

The charge current shall be twice the manufacturer's recommended maximum continuous charge current. Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours. The minimum voltage of the test shall be as follows:

在室温下, 以 2 倍的制造商宣称的最大持续充电电流对样品充电, 测试时间为 24 小时。测试的最小电压如下:

(a) When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V. /如果制造商宣称的充电电压不超过 18V, 本测试的最小充电电压应是制造商宣称的最大充电电压的两倍或者是 22V 之中的较小者。

(b) When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage. /如果制造商宣称的充电电压超过 18V, 本测试的最小充电电压应该是制造商宣称的最大充电电压的 1.2 倍。

Tests were conducted at ambient temperature  $20 \pm 5^{\circ}\text{C}$ . The duration of the test was 24 hours.

测试在环境温度下进行, 试验持续 24 小时。

Acceptance criteria 接受准则:

Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

测试中和结束后 7 天内观察样品无解体、无起火现象发生。

| Sample No.<br>样品编号 | Condition<br>样品状态 | Voltage of Before Test<br>测试前电压(V) | Overcharge<br>current<br>过充电流(mA) | Overcharge<br>voltage<br>过充电压(V) | Results<br>结果 |
|--------------------|-------------------|------------------------------------|-----------------------------------|----------------------------------|---------------|
| B09                | ①                 | 8.29                               | 4000                              | 16.8                             | A             |
| B10                | ①                 | 8.30                               |                                   |                                  | A             |
| B11                | ①                 | 8.27                               |                                   |                                  | A             |
| B12                | ①                 | 8.31                               |                                   |                                  | A             |
| B13                | ②                 | 8.28                               |                                   |                                  | A             |
| B14                | ②                 | 8.30                               |                                   |                                  | A             |
| B15                | ②                 | 8.29                               |                                   |                                  | A             |
| B16                | ②                 | 8.31                               |                                   |                                  | A             |

Results/ 结果:

A - No disassembly and no fire during the test and within seven days after the test. 测试中和结束后 7 天内观察样品无解体、无起火现象发生。

B - Others (please explain). 其它。

### T.8 Forced Discharge 强制放电

Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer.

在室温下, 将单个电芯连接在12V的直流电源上进行强制放电, 此直流电源供给每个电芯初始电流为制造商宣称的最大放电电流。

The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).

指定的放电电流通过串联在测试电芯上的合适大小和功率的负载来获得, 每个电芯的强制放电时间(小时)为额定容量除以初始电流(安培)。

#### Acceptance criteria 接受准则:

Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

测试中和结束后7天内观察样品无解体、无起火现象发生。

| Sample No.<br>样品编号 | Condition<br>样品状态 | Initial Discharge Current<br>初始放电电流 (mA) | Voltage Before Test<br>测试前电压(V) | Results<br>结果 |
|--------------------|-------------------|--|---------------------------------|---------------|
| C11                | ③                 | 2000                                     | 3.227                           | A             |
| C12                | ③                 |  | 3.222                           | A             |
| C13                | ③                 |  | 3.236                           | A             |
| C14                | ③                 |  | 3.225                           | A             |
| C15                | ③                 |  | 3.231                           | A             |
| C16                | ③                 |  | 3.234                           | A             |
| C17                | ③                 |  | 3.227                           | A             |
| C18                | ③                 |  | 3.233                           | A             |
| C19                | ③                 |  | 3.220                           | A             |
| C20                | ③                 |  | 3.232                           | A             |
| C21                | ④                 |  | 3.221                           | A             |
| C22                | ④                 |  | 3.224                           | A             |
| C23                | ④                 |  | 3.237                           | A             |
| C24                | ④                 |  | 3.229                           | A             |
| C25                | ④                 |  | 3.236                           | A             |
| C26                | ④                 |  | 3.224                           | A             |
| C27                | ④                 |  | 3.235                           | A             |
| C28                | ④                 |  | 3.228                           | A             |
| C29                | ④                 |  | 3.234                           | A             |
| C30                | ④                 |  | 3.227                           | A             |

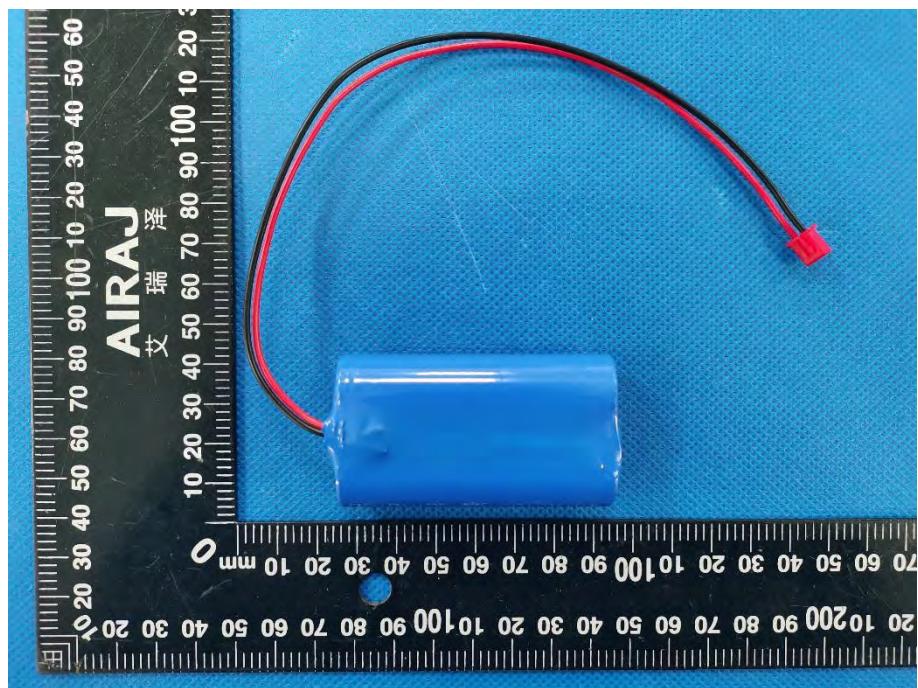
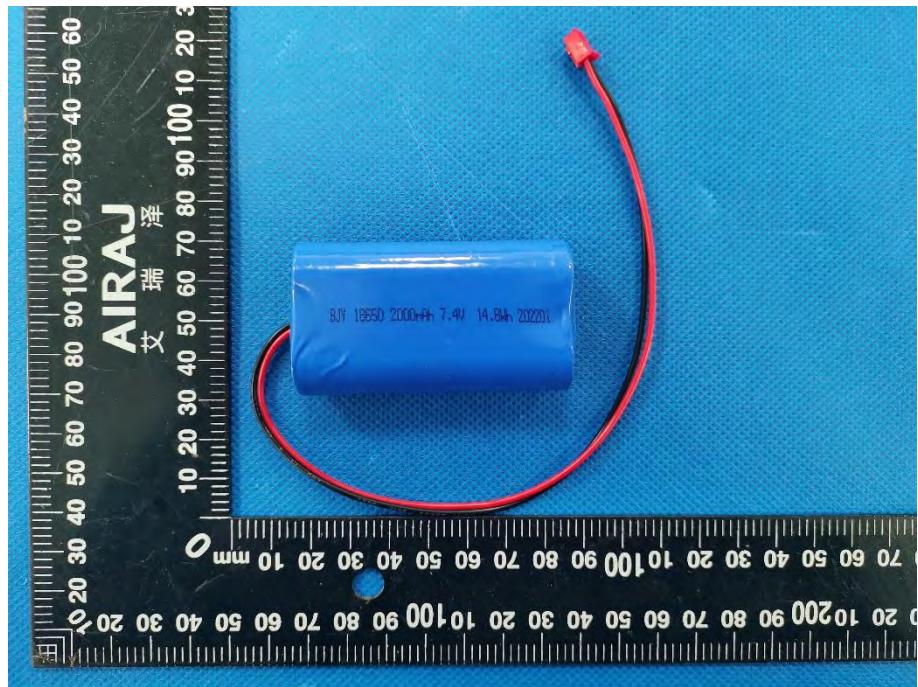
#### Results/ 结果:

A - No disassembly and no fire during the test and within seven days after the test. 测试中和结束后7天内观察样品无解体、无起火现象发生。

B - Others (please explain). 其它。

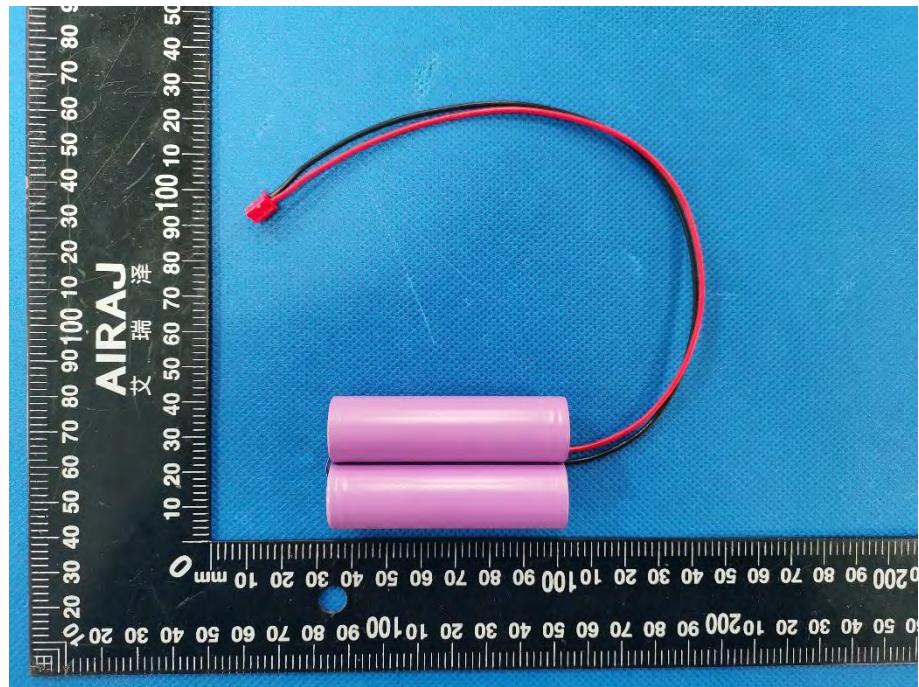
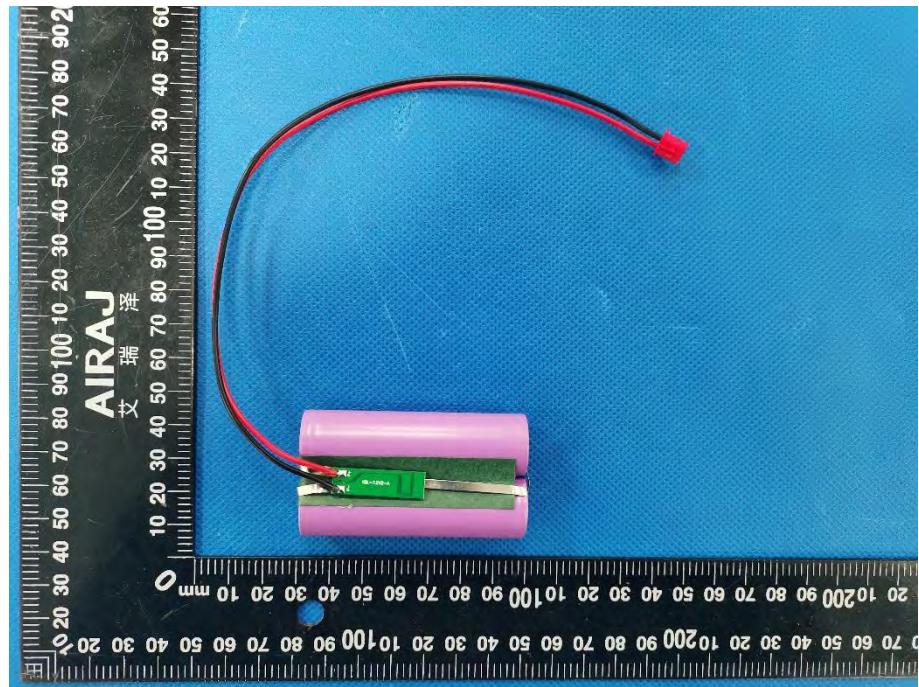


## Test Sample 测试样品照片



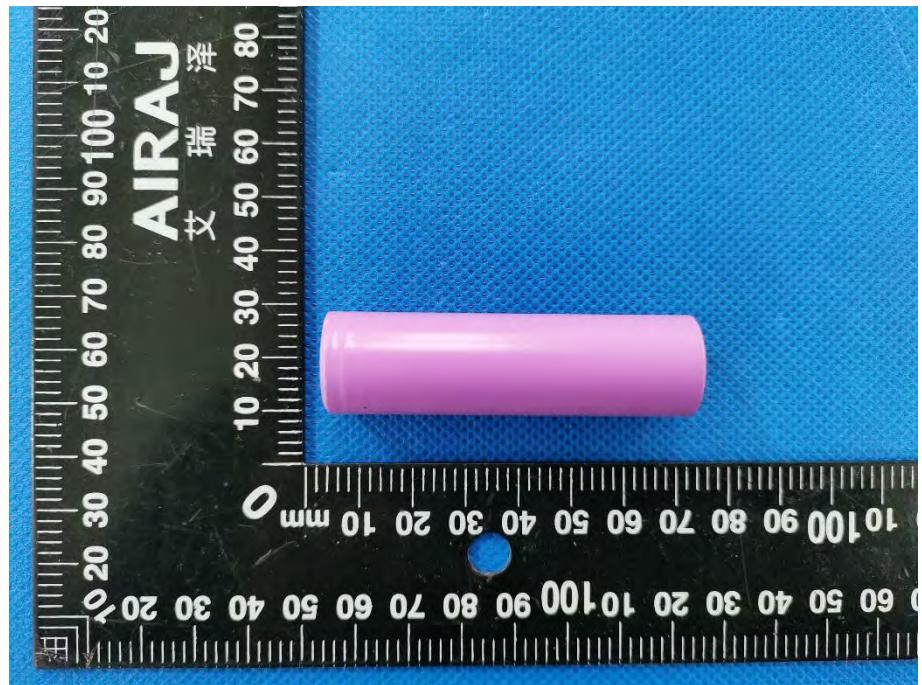
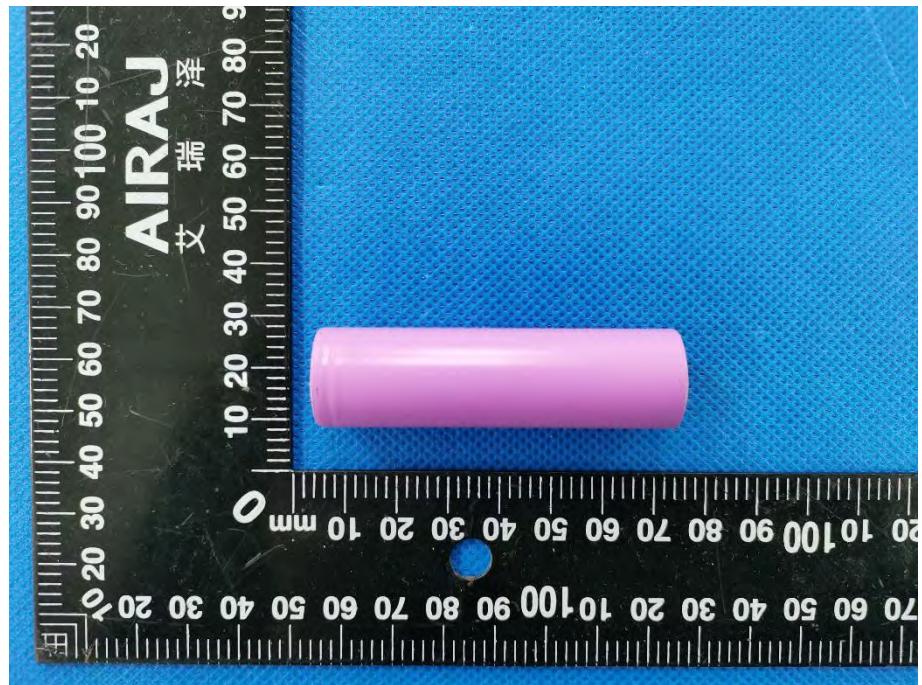


## Test Sample 测试样品照片



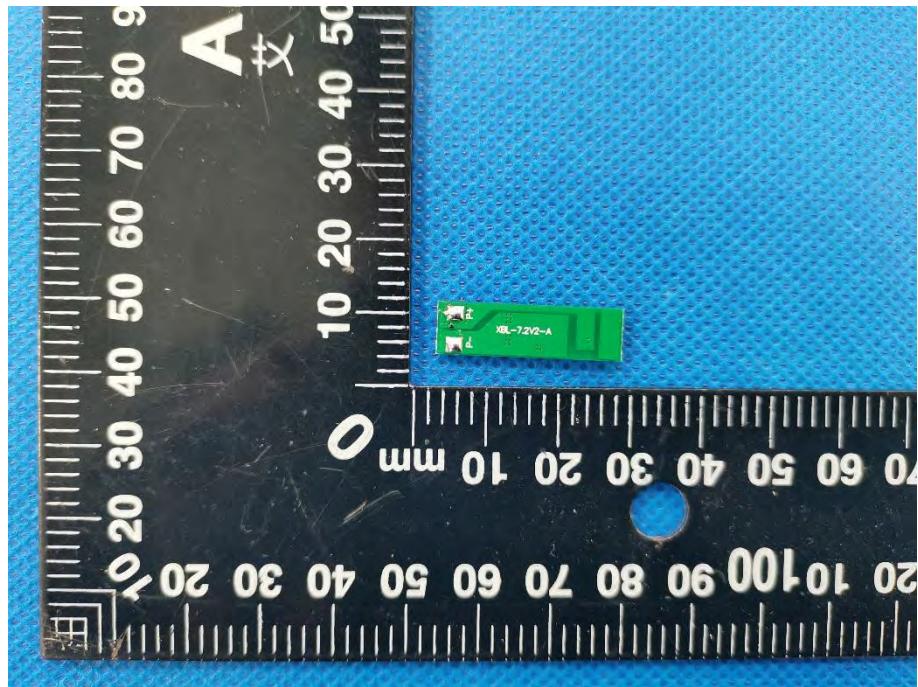
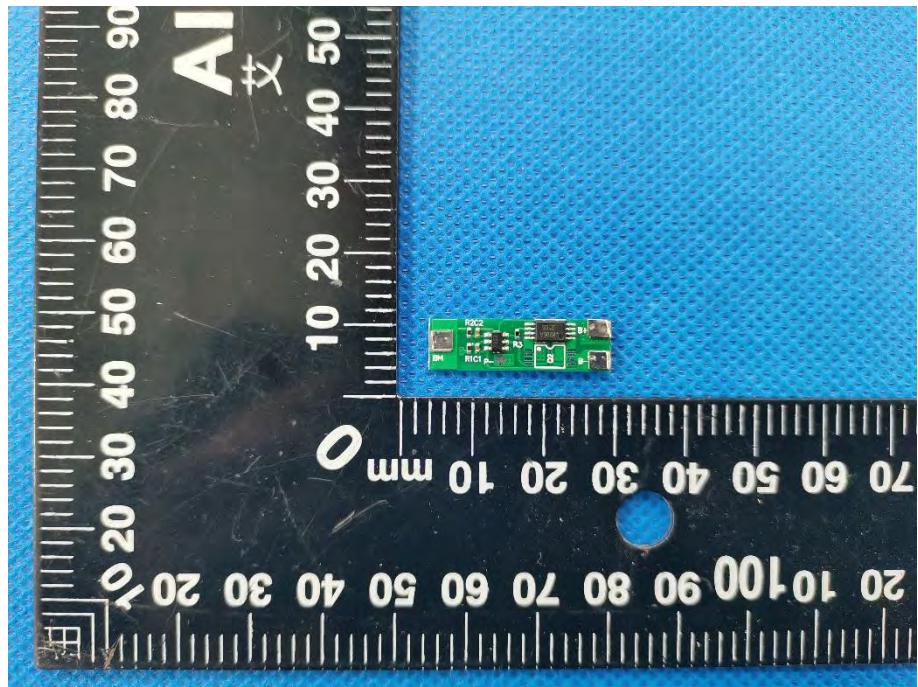


## Test Sample 测试样品照片





## Test Sample 测试样品照片





## Label 标签

BJY 18650 2000mAh 7.4V 14.8Wh 202201



## Equipment List 设备清单

| No.序号 | Name 名 称                                   | Model 型 号                | Series No.设备编号 |
|-------|--|--------------------------|----------------|
| 1     | 瑞能充放电仪<br>Charging and Discharge Tester    | CDS 60V10A,<br>CTS 20V5A | BCTC-BAT-003   |
| 2     | 电池低压高空模拟试验机<br>Altitude Simulation Tester  | GX-3020-Z                | BCTC-BAT-006   |
| 3     | 可程式恒温恒湿试验箱<br>Temp & Humi. Chamber         | BTKS5-150C               | BCTC-BAT-009   |
| 4     | 振动试验机<br>Vibration Tester                  | EV103                    | BCTC-BAT-010   |
| 5     | 加速度冲击试验机<br>Shock Tester                   | HSKT10                   | BCTC-BAT-011   |
| 6     | 温控型短路试验机<br>Thermal Control Short Tester   | GX-6055-B5               | BCTC-BAT-015   |
| 7     | 电池冲击试验机<br>Battery Impact Tester           | BE-5066                  | BCTC-BAT-020   |
| 8     | 毫欧表<br>milliohmmeter                       | VC480C+                  | BCTC-BAT-025   |
| 9     | 电子天平<br>Electric Scale                     | JJ1523BC                 | BCTC-BAT-034   |
| 10    | 多路温度测试仪<br>Multichannel temperature tester | AT4516                   | BCTC-BAT-036   |
| 11    | 多路温度测试仪<br>Multichannel temperature tester | AT4516                   | BCTC-BAT-037   |
| 12    | 电子负载<br>direct-current load                | IT8512A+                 | BCTA-BAT-039   |
| 13    | 电子负载<br>direct-current load                | IT8512A+                 | BCTC-BAT-040   |
| 14    | DC直流电源<br>DC direct-current                | IT6502D                  | BCTC-BAT-042   |
| 15    | DC直流电源<br>DC direct-current                | IT6502D                  | BCTC-BAT-043   |
| 16    | 数字万用表<br>Digital Multimeter                | UT139C                   | BCTC-BAT-045   |

注：以上仪器设备均在计量校准周期内。

Remark: The above equipment are within the calibration cycle.

## 声 明

### STATEMENT

**1. 本次检测所用的测量设备的量值均可以溯源到国家计量标准。**

The equipment lists are traceable to the national reference standards.

**2. 检测报告未经本实验室书面批准，不得部分复制。**

The test report can not be partially copied unless prior written approval is issued from our lab.

**3. 报告未加盖“检测专用章”无效。**

The test report is invalid without stamp of laboratory.

**4. 报告无检测、批准人员签字无效。**

The test report is invalid without signature of person(s) testing and authorizing.

**5. 本次检测的结果仅对所检测样品有效。**

The test process and test result is only related to the Unit Under Test.

**6. 本实验室的质量体系符合ISO/IEC17025标准的要求。**

The quality system of our laboratory is in accordance with ISO/IEC17025.

**7. 如对本报告有异议，可在收到报告后15天内向本单位申诉，逾期不予受理。**

If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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\*\*\*\*\* 结束 \*\*\*\*\*

\*\*\*\*\* END \*\*\*\*\*