

# UN38.3

# TEST REPORT

ISSUED BY  
Shenzhen BALUN Technology Co., Ltd.



FOR  
**Li-ion Polymer Battery**

ISSUED TO  
GlobTek, Inc.

186 Veterans Dr. Northvale, NJ 07647, USA



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Date: Nov. 11, 2016

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Date: Nov. 11, 2016

Report No: BL-SZ16A0099-301

EUT Name: Li-ion Polymer Battery

Model Name: BL1800P0639602S1PPLB

Brand Name: GlobTek, Inc.

Test Standard: ST/SG/AC.10/11/Rev.6 Section 38.3

Test Conclusion: Pass

Test Date: Oct. 07, 2016 ~ Oct. 19, 2016

Date of Issue: Nov. 11, 2016

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**Revision History**

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Nov. 04, 2016</u>	<u>Initial Issue</u>

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## A.1 ADMINISTRATIVE DATA (基本信息)

### A.1.1 Identification of the Testing Laboratory (测试机构信息)

Company Name 公司名称	Shenzhen BALUN Technology Co., Ltd. (深圳市巴伦技术股份有限公司)
Address 地址	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong P. R. China (中国广东省深圳市南山区沙河西路白沙科技产业园 1 楼 B 区)
Accreditation Certificate 认可证书	The Laboratory has met the requirements of the CNAS Accreditation Criteria, has demonstrated compliance with ISO/IEC Standard 17025:2005. The accreditation certificate number is L6791. (巴伦实验室满足 CNAS 认可准则, 被证明符合 ISO/IEC17025:2005, 授权证书编号为 L6791)
Phone Number: 电话号码	+86 755 6685 0100
Fax Number 传真	+86 755 6182 4271

### A.1.2 EUT General Information (样品基本信息)

EUT Type 产品名称	Li-ion Polymer Battery
Brand Name 品牌	
Model Name 型号	BL1800P0639602S1PPLB
Applicant 申请人	GlobTek, Inc. Address: 186 Veterans Dr. Northvale, NJ 07647, USA
Manufacturer 制造商	GlobTek (Suzhou) Co., Ltd. Address: Building 4, No.76, Jinling East Road, Suzhou Industrial Park, Jiangsu 215021, P.R. China
Factory 生产厂	Same as Manufacturer.
Dimensions 尺寸	Approx. 62.0 (L) x 43.5 (W) x 14.0 (T)(mm)
Weight 重量	Approx. 68g

### A.1.3 EUT Technical Information (样品技术信息)

Parameters 参数	Product 成品	Cell 电芯
Nominal Voltage 标称电压	7.4V	3.7V
Limited Charge Voltage 充电上限电压	8.4V	4.2V
End of discharge voltage 放电终止电压	6V	3V
Maximum Continuous Charge Current 最大连续充电电流	1.8A	1.8A
Maximum Continuous Discharge Current 最大连续放电电流	1.8A	1.8A
Rated Capacity 额定容量	1800mAh	1800mAh

Note: The above EUT information was declared by the manufacturer, for more description of detailed features please refer to the manufacturer's specifications or user's manual.  
(上述测试样品信息被制造商宣告, 更多详细描述, 请参考制造商所提供的规格书或使用说明书)

## A.2 SUMMARY OF TEST RESULTS (测试结果概况)

NO. 序号	Test item 测试项目	Test reference 测试依据	Sample No. 样品编号	Conclusion 结果
1	Altitude Simulation 高度模拟	UN Manual of Test and Criteria, partIII,subsection 38.3.4.1 UN 试验和标准手册, 第 3 章节, 38.3.4.1 部分	B01~B08	Pass
2	Thermal test 温度试验	UN Manual of Test and Criteria, partIII,subsection 38.3.4.2 UN 试验和标准手册, 第 3 章节, 38.3.4.2 部分		Pass
3	Vibration 振动	UN Manual of Test and Criteria, partIII,subsection 38.3.4.3 UN 试验和标准手册, 第 3 章节, 38.3.4.3 部分		Pass
4	Shock 机械冲击	UN Manual of Test and Criteria, partIII,subsection 38.3.4.4 UN 试验和标准手册, 第 3 章节, 38.3.4.4 部分		Pass
5	External short circuit 外部短路	UN Manual of Test and Criteria, partIII,subsection 38.3.4.5 UN 试验和标准手册, 第 3 章节, 38.3.4.5 部分		Pass
6	Crush 挤压	UN Manual of Test and Criteria, partIII,subsection 38.3.4.6 UN 试验和标准手册, 第 3 章节, 38.3.4.6 部分	C01~C05	Pass
7	Overcharge 过充电	UN Manual of Test and Criteria, partIII,subsection 38.3.4.7 UN 试验和标准手册, 第 3 章节, 38.3.4.7 部分	B09~B16	Pass
8	Forced discharge 强制放电	UN Manual of Test and Criteria, partIII,subsection 38.3.4.8 UN 试验和标准手册, 第 3 章节, 38.3.4.8 部分	C06~C25	Pass

Test T.1 to T.5 must be conducted in sequence on the same cell or battery. Test T.6 and T.8 should be conducted using not otherwise tested cells or batteries, Test T.7 may be conducted using undamaged batteries previously used in tests T.1 to T.5 for purposes of testing on cycled batteries.

必须用相同的电芯或电池按顺序进行试验 1 到试验 5。试验 6 和试验 8 中所用的样品必须为未进行其他测试的样品。为了测试循环后的电池, 试验 7 可用试验 1 到试验 5 后未损坏的电池。

Batteries of B01~B04, B09~B12 are full charged after one cycle;

电池 B01~B04, B09~B12 为一次循环的满电状态;

Component cells of C01~C05 are 50% charged after one cycle;

组成电池芯 C01~C05 为一次循环 50%满电状态;

Batteries of B05~B08, B13~B16 are full charged after fifty cycles;

电池 B05~B08, B13~B16 为五十次循环满电状态;

Component cells of C06~C15 are full discharged after one cycle;

组成电池芯 C16~C15 为一次循环后完全放电状态;

Component cells of C16~C25 are full discharged after fifty cycles.

组成电池芯 C16~C25 为五十次循环后完全放电状态。

### A.3 TEST ENVIRONMENT CONDITIONS (测试环境)

Temperature 温度(°C)	15~25°C
Relative Humidity 湿度 (%)	50~70%
Atmospheric Pressure 大气压(kPa)	N/A

### A.4 ANNOUNCE (声明)

- (1) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

没有拟制人和批准人签字，测试报告无效。

- (2) The test report is invalid if there is any evidence of falsification.

如果有任何证据证明该报告为伪造报告，测试报告无效。

- (3) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

报告中的测试结果只适用于在报告中所述的环境及制式下工作的被检测样品。

- (4) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

本报告只有巴伦有权进行更改或修订，修订信息需在修订章节做出注释。

- (5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

测试报告的内容, 部分或全部在事先未经实验室书面批准的不能用于宣传和/或促销。

## A.5 TEST EQUIPMENT LIST (测试设备清单)

No.	Equipment name	Manufacture	Serial No.	Calibration Date	Usage
1.	Temperature control extrusion blunt spines tester	BELL	BZ-CHN-L012	2016.10.15	√
2.	Battery Testing System	NEWARE	BZ-CHN-L003	2015.10.22	√
3.	High low temperature alternating test chamber	HARDY	BZ-KKX-L003	2016.10.15	√
4.	Electromagnetic vibration generator system	DONGLING	BZ-KKX-L001	2015.10.22	√
5.	Shock Testing Machine	DONGLING	BZ-KKX-L002	2015.10.22	√
6.	Vacuum chamber	BELL	BZ-CHN-L008	2016.10.15	√
7.	Heating Recorder	HOIKI	BZ-CHN-L019	2016.03.01	√
8.	Digital Multimeter	Victory	BZ-SFT-L089	2016.07.13	√
9.	External short-circuit test appliance	BELL	BZ-CHN-L009	2016.01.26	√
10.	Hammer tester	BELL	BZ-CHN-L007	2015.11.11	√
11.	DC Power Supply	Atecs	BZ-SFT-L070	2016.10.15	√

## A.6 TEST RESULTS (测试结果)

### A.6.1 Altitude simulation (高度模拟)

1) Requirement / 标准要求:

Cells or batteries meet this requirement if there is 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. The requirement relating to voltage is not applicable to test cells and batteries at full discharged states.

电池芯或电池应符合无渗漏，无排气，无解体，无破裂，无起火，每个电池芯或电池在试验后的开路电压不小于其在这一试验前的 90%。对完全放电状态下的被测电池芯和电池不做电压要求。

2) Test procedure / 测试步骤:

Test cells or batteries shall be stored at a pressure of 11.6kPa or less for at least six hour at ambient temperature ( $20\pm 5^{\circ}\text{C}$ ).

将电芯和电池在常温 ( $20\pm 5^{\circ}\text{C}$ )，气压不大于 11.6kPa 的环境中贮存至少 6 个小时。

3) Data showed in table 1 数据见表 1

Table 1 表 1

The state of batteries 电池状态	Sample NO. 样品序号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压 (%)	Results # 结论 #
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 一次循环后满电状态	B01	66.829	8.34	66.827	8.33	0.003	99.88	Pass
	B02	66.158	8.34	66.157	8.33	0.002	99.88	Pass
	B03	68.951	8.33	68.951	8.33	0.000	100.00	Pass
	B04	66.683	8.33	66.683	8.33	0.000	100.00	Pass
Full charged after fifty cycle 五十次循环后满电状态	B05	66.841	8.34	66.841	8.33	0.000	99.88	Pass
	B06	67.770	8.34	67.768	8.34	0.003	100.00	Pass
	B07	66.452	8.34	66.451	8.33	0.002	99.88	Pass
	B08	68.300	8.33	68.297	8.33	0.004	100.00	Pass

#: No leakage, No venting, No disassembly No rupture and no fire  
#: 无漏液、无排气、无分解、无破裂以及无着火现象



## A.6.2 Thermal test (温度试验)

### 1) Requirement / 标准要求:

Cells or batteries meet this requirement if there is 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. The requirement relating to voltage is not applicable to test cells and batteries at full discharged states.

电池芯或电池应符合无渗漏，无排气，无解体，无破裂，无起火，每个电池芯或电池在试验后的开路电压不小于其在这一试验前的90%。对完全放电状态下的被测电池芯和电池不做电压要求。

### 2) Test procedure / 测试步骤:

Test cells or batteries are to be stored for at least six hours at a test temperature equal to  $75\pm 2^{\circ}\text{C}$ , followed by storage for at least six hours at a test temperature equal to  $-40\pm 2^{\circ}\text{C}$ . The maximum time interval between test temperature extremes in 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 ( $20\pm 5^{\circ}\text{C}$ ), For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.

将电池芯或电池在温度为 $75\pm 2^{\circ}\text{C}$ 的条件下贮存不少于6个小时（大电池应不少于12个小时），然后，在温度 $-40\pm 2^{\circ}\text{C}$ 条件下贮存不少于6个小时（大电池应不少于12个小时），温度转化最大间隔时间不能超过30min，重复操作上述步骤10次，然后，将其在环境温度为 $20\pm 5^{\circ}\text{C}$ 的条件下放置24个小时，对大电芯和大电池，在极端温度下放置时间为12 小时。

### 3) Data showed in table 2 数据见表 2

Table 2 表 2

The state of batteries 电池状态	Sample NO. 样品序号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压 (%)	Results # 结论 #
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 一次循环后满电状态	B01	66.827	8.33	66.824	8.14	0.004	97.72	Pass
	B02	66.157	8.33	66.157	8.15	0.000	97.84	Pass
	B03	68.951	8.33	68.946	8.14	0.007	97.72	Pass
	B04	66.683	8.33	66.682	8.15	0.001	97.84	Pass
Full charged after fifty cycle 五十次循环后满电状态	B05	66.841	8.33	66.838	8.15	0.004	97.84	Pass
	B06	67.768	8.34	67.766	8.14	0.003	97.60	Pass
	B07	66.451	8.33	66.450	8.15	0.002	97.84	Pass
	B08	68.297	8.33	68.296	8.15	0.001	97.84	Pass
#: No leakage, No venting, No disassembly No rupture and no fire #: 无漏液、无排气、无分解、无破裂以及无着火现象								

### A.6.3 Vibration (振动)

1) Requirement / 标准要求:

Cells or batteries meet this requirement if there is 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. The requirement relating to voltage is not applicable to test cells and batteries at full discharged states.

电池芯或电池应符合无渗漏，无排气，无解体，无破裂，无起火，每个电池芯或电池在试验后的开路电压不小于其在这一试验前的 90%。对完全放电状态下的被测电池芯和电池不做电压要求。

2) Test procedure / 测试步骤:

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. The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12 kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries).

For cells and small batteries: from 7 Hz a peak acceleration of 1  $g_n$  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  $g_n$  occurs (approximately 50 Hz). A peak acceleration of 8  $g_n$  is then maintained until the frequency is increased to 200 Hz. For large batteries: from 7 Hz to a peak acceleration of 1  $g_n$  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  $g_n$  occurs (approximately 25 Hz). A peak acceleration of 2  $g_n$  is then maintained until the frequency is increased to 200 Hz.

振动以正弦波形式在 7Hz 和 200Hz 之间进行对数扫描，15 分钟之后回到 7Hz。该循环应对电池芯的三个互相垂直的方向上分别重复 12 次，各 3 个小时。一个振动的方向必须垂直于端子面。对数扫描频率应对质量小于 12kg 的电池和电芯（电芯和小电池）与质量大于 12kg 的电池（大电池）有所不同。

对电芯和小电池：从 7Hz 起以 1 $g_n$  峰值加速度持续到 18Hz，振幅维持在 0.8mm(总偏移 1.6mm)，增加频率直到峰值加速度达到 8 $g_n$ （约 50Hz），之后保持峰值加速度 8 $g_n$  直到频率增加到 200Hz。对大电池：从 7Hz 起以峰值加速度 1 $g_n$  持续到 18Hz，振幅维持在 0.8mm(总偏移 1.6mm) 增加频率直到峰值加速度达到 2 $g_n$ （约 25Hz），和频率增加直到峰值加速度为 2 $g_n$ ，保持峰值加速度 2 $g_n$  直到频率增加到 200Hz。

3) Data showed in table 3 数据见表 3

Table 3 表 3

The state of batteries 电池状态	Sample NO. 样品序号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压 (%)	Results # 结论 #
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 一次循环后满电状态	B01	66.824	8.14	66.824	8.14	0.000	100.00	Pass
	B02	66.157	8.15	66.156	8.13	0.002	99.75	Pass
	B03	68.946	8.14	68.944	8.14	0.003	100.00	Pass
	B04	66.682	8.15	66.682	8.14	0.000	99.88	Pass
Full charged after fifty cycle 五十次循环后满电状态	B05	66.838	8.15	66.835	8.13	0.004	99.75	Pass
	B06	67.766	8.14	67.765	8.14	0.001	100.00	Pass
	B07	66.450	8.15	66.448	8.14	0.003	99.88	Pass
	B08	68.296	8.15	68.296	8.14	0.000	99.88	Pass
#: No leakage, No venting, No disassembly No rupture and no fire #: 无漏液、无排气、无分解、无破裂以及无着火现象								

#### A.6.4 Shock (机械冲击)

##### 1) Requirement / 标准要求:

Cells or batteries meet this requirement if there is 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. The requirement relating to voltage is not applicable to test cells and batteries at full discharged states.

电池芯或电池应符合无渗漏，无排气，无解体，无破裂，无起火，每个电池芯或电池在试验后的开路电压不小于其在这一试验前的 90%。对完全放电状态下的被测电池芯和电池不做电压要求。

##### 2) Test procedure / 测试步骤:

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.

Each cell or battery shall be subjected to three shocks in the positive direction and to three shocks in the negative direction in each of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.

Battery	Minimum peak acceleration	Pulse duration
Small batteries	150 g <sub>n</sub> or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{100850}{mass^*}\right)}$ whichever is smaller	6 ms
Large batteries	50 g <sub>n</sub> or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{30000}{mass^*}\right)}$ whichever is smaller	11 ms

\* Mass is expressed in kilograms.

被测电池芯和电池应固定在可以支撑被测样品所有面的试验设备的坚固台面上。

每个电池芯应用峰值加速度为 150gn、脉冲时间 6 毫秒的半正弦波进行冲击，不过，大电池芯应以峰值加速度为 50gn、脉冲时间 11 毫秒的半正弦波进行冲击。

每个电池应用根据质量换算的峰值加速度来进行半正弦波冲击，小电池的脉冲时间为 6 毫秒，大电池的脉冲时间为 11 毫秒，根据图中的公式来确定对应的最小峰值加速度。

每个电池芯和电池应在三个垂直的正向各承受 3 次冲击，负向再各承受 3 次冲击，总共 18 次。

3) Data showed in table 4 数据见表 4

Table 4 表 4

The state of batteries 电池状态	Sample NO. 样品序号	Pre-test 试验前		After test 试验后		Mass loss 质量损失 (%)	Voltage after test/Voltage pre-test 试验后电压/试验前电压 (%)	Results # 结论 #
		Mass 质量 (g)	Voltage 电压 (V)	Mass 质量 (g)	Voltage 电压 (V)			
Full charged after one cycle 一次循环后满电状态	B01	66.824	8.14	66.824	8.13	0.000	99.88	Pass
	B02	66.156	8.13	66.155	8.13	0.002	100.00	Pass
	B03	68.944	8.14	68.940	8.13	0.006	99.88	Pass
	B04	66.682	8.14	66.681	8.14	0.001	100.00	Pass
Full charged after fifty cycle 五十次循环后满电状态	B05	66.835	8.13	66.835	8.13	0.000	100.00	Pass
	B06	67.765	8.14	67.765	8.13	0.000	99.88	Pass
	B07	66.448	8.14	66.448	8.14	0.000	100.00	Pass
	B08	68.296	8.14	68.294	8.14	0.003	100.00	Pass

#: No leakage, No venting, No disassembly No rupture and no fire

#: 无漏液、无排气、无分解、无破裂以及无着火现象

## A.6.5 External short circuit (外部短路)

### 1) Requirement / 标准要求:

Cells or component cells meet this requirement if their 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.

电池芯或组成电池芯应满足以下要求：试验过程中及试验后 6 个小时内无解体，无破裂及燃烧，表面温度不超过 170°C。

### 2) Test procedure / 测试步骤:

The cell or component cell to be tested shall be temperature stabilized so that its external case temperature reaches  $(57 \pm 4)^\circ\text{C}$  and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm at  $(57 \pm 4)^\circ\text{C}$ . This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to  $57 \pm 4^\circ\text{C}$ .

电池芯或组成电池芯应在外壳温度稳定在  $(57 \pm 4)^\circ\text{C}$  时进行测试，之后电池芯或电池应在  $(57 \pm 4)^\circ\text{C}$ 、外阻小于 0.1 欧姆的情况下进行短路。短路条件持续到电芯或电池表面温度回到  $(57 \pm 4)^\circ\text{C}$  后至少一小时。

### 3) Data showed in table 5 数据见表 5

Table 5 表 5

The state of batteries 电池状态	Sample NO. 样品序号	Test Ambient Temperature (°C) 测试环境温度(°C)	External Peak temperature(°C) 表面最高温度(°C)	Results # 结论 #
Full charged after one cycle 一次循环后满电状态	B01	57.3	57.5	Pass
	B02	57.3	57.5	Pass
	B03	57.3	57.8	Pass
	B04	57.3	57.4	Pass
Full charged after fifty cycle 五十次循环后满电状态	B05	57.3	57.4	Pass
	B06	57.3	57.6	Pass
	B07	57.3	57.5	Pass
	B08	57.3	57.4	Pass
#: No disassembly, No rupture and no fire #: 无解体、无破裂和无起火				

## A.6.6 Crush (挤压)

### 1) Requirement / 标准要求:

Cells and component cells meet this requirement if their 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.

电芯或组成电芯应满足以下要求：试验过程中及试验后 6 个小时内无解体，无破裂及燃烧，表面温度不超过 170°C。

### 2) Test procedure / 测试步骤:

Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18 mm in diameter)  
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.

The crushing is to be continued until the first of the three options below is reached:

- (a) The applied force reaches 13 kN  $\pm$  0.78 kN;
- (b) The voltage of the cell drops by at least 100 mV; or
- (c) The cell is deformed by 50% or more of its original thickness.

挤压试验适用于直径小于 18 mm 的圆柱型电池芯和棱柱型、袋型和纽扣型电池芯。

电池芯或组成电池芯在两个平面之间进行挤压。挤压在刚好接触样品时以 1.5 cm/s 的速度缓慢进行。挤压应持续到下面三个选项之一到达为止：

- (a) 施加到电芯上的压力达到 13 kN  $\pm$  0.78 kN；
- (b) 电芯电压下降至少 100mV；或
- (c) 电芯形变与原电芯相比变化 50% 以上。

### 3) Data showed in table 6 数据见表 6

Table 6 表 6

The state of cells 电芯状态	Sample NO. 样品序号	Ambient Temperature(°C) 环境温度 (°C)	External Peak temperature(°C) 表面最高温度(°C)	Results # 结论 #
50% charged after one cycle 一次循环后 50% 充电状态	C01	24.6	25.0	Pass
	C02	24.6	25.3	Pass
	C03	24.6	25.7	Pass
	C04	24.6	25.1	Pass
	C05	24.6	25.4	Pass

#: No disassembly, No rupture and no fire

#: 无解体、无破裂和无起火

## A.6.7 Overcharge (过充电)

### 1) Requirement / 标准要求:

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

可再充电电池应满足以下要求：样品在试验过程中及试验后 7 天内无解体和无燃烧。

### 2) Test procedure / 测试步骤:

The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:

(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.

(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. Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.

充电电流应是制造商建议的最大连续充电电流的两倍。最小试验电压应满足如下所述：

(a) 制造商建议的充电电压不大于 18V 时，最小试验电压应是电池最大充电电压或 22V 两者中的较小值。

(b) 制造商建议的充电电压大于 18 伏特时，最小试验电压应是最大充电电压的 1.2 倍。试验应在环境温度下进行。试验时间应为 24 小时。

### 3) Data showed in table 7 数据见表 7

Table 7 表 7

The state of batteries 电池状态	Sample NO. 样品序号	Phenomenon 现象	Results 结论
Full charged after one cycle 一次循环后满 电状态	B09	No disassembly, no fire	Pass
	B10	No disassembly, no fire	Pass
	B11	No disassembly, no fire	Pass
	B12	No disassembly, no fire	Pass
Full charged after fifty cycle 五十次循环后 满电状态	B13	No disassembly, no fire	Pass
	B14	No disassembly, no fire	Pass
	B15	No disassembly, no fire	Pass
	B16	No disassembly, no fire	Pass

## A.6.8 Forced discharge (强制放电)

### 1) Requirement / 标准要求:

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

一次电芯或可再充电电芯应满足以下要求：样品在试验过程中及试验后 7 天内无解体和无燃烧。

### 2) Test procedure / 测试步骤:

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

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).

每个电芯必须在环境温度下，通过串联与 12 伏特的直流电电源进行强制放电，初始电流为生产商规定的最大放电电流。

规定的放电电流通过用合适的尺寸和大小的负载和被测电池芯串联一起来获得。每个电池被强制放电的时间(小时)应等于其额定容量除以起始试验电流(安培)。

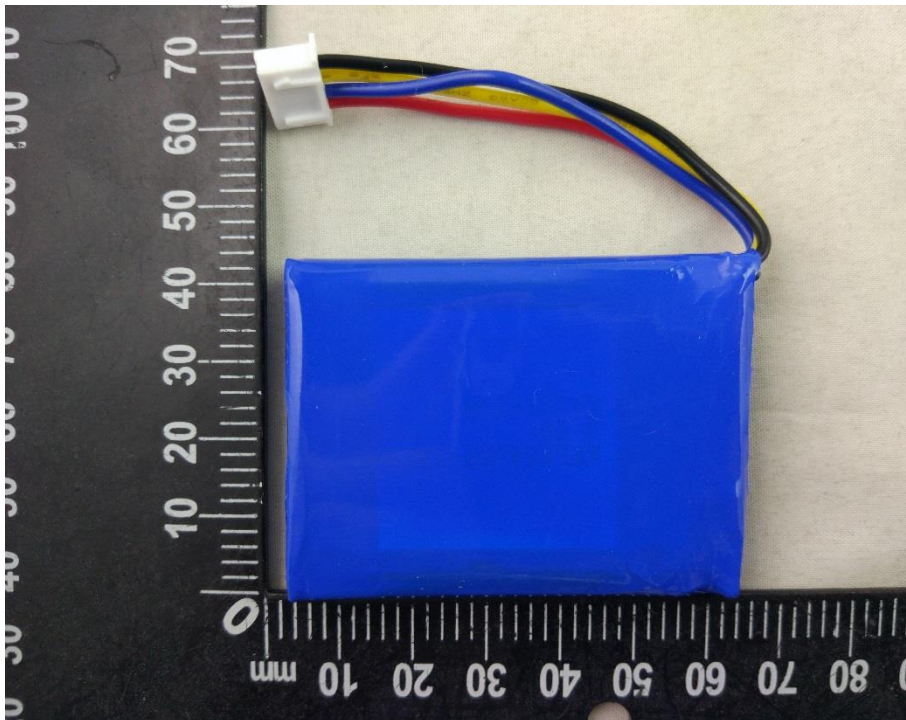
### 3) Data showed in table 8 数据见表 8

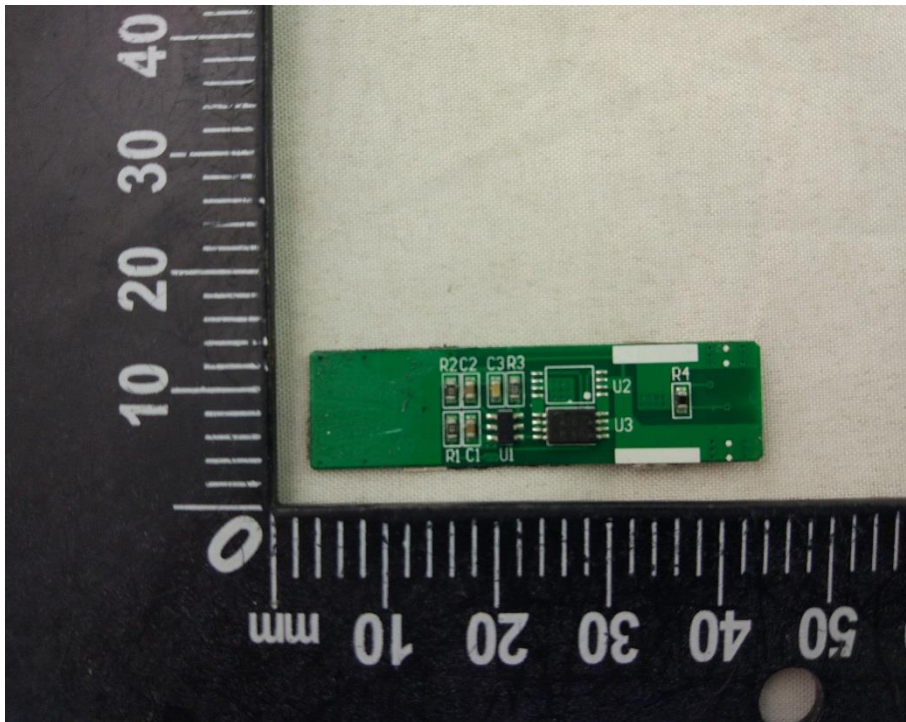
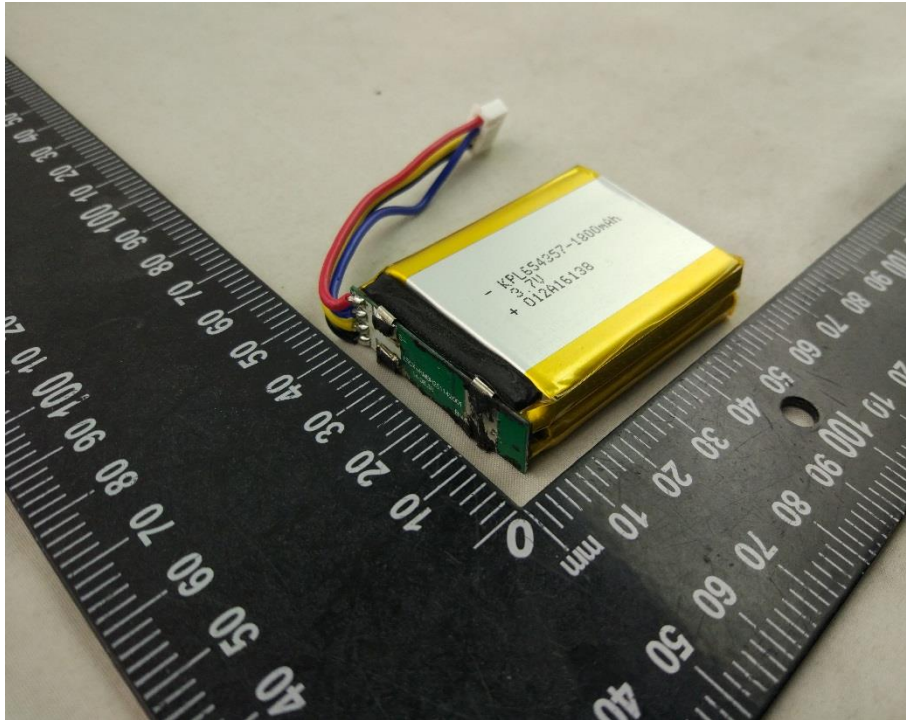
Table 8 表 8

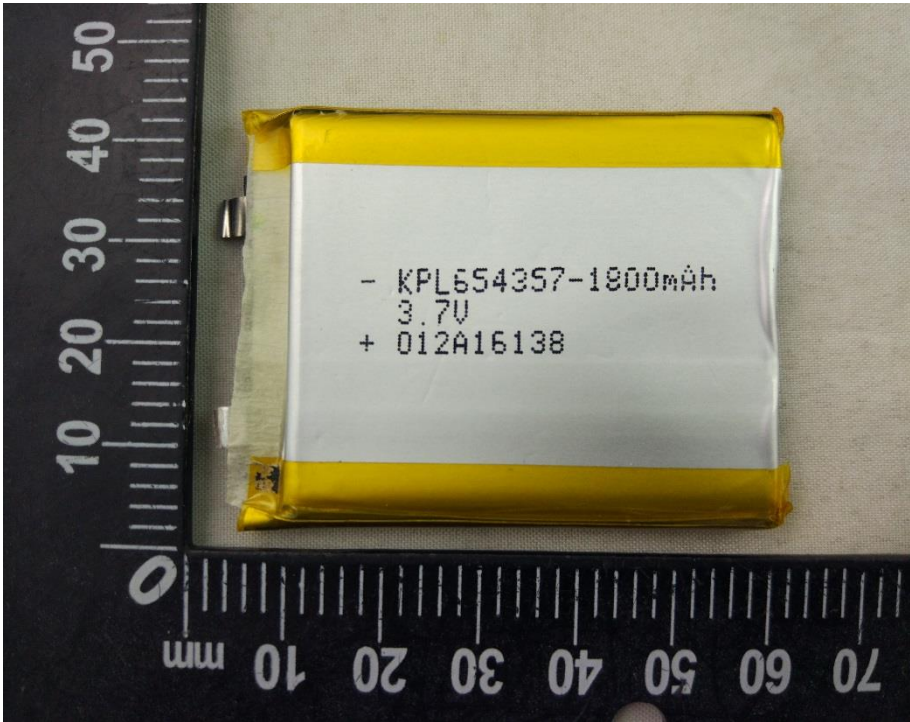
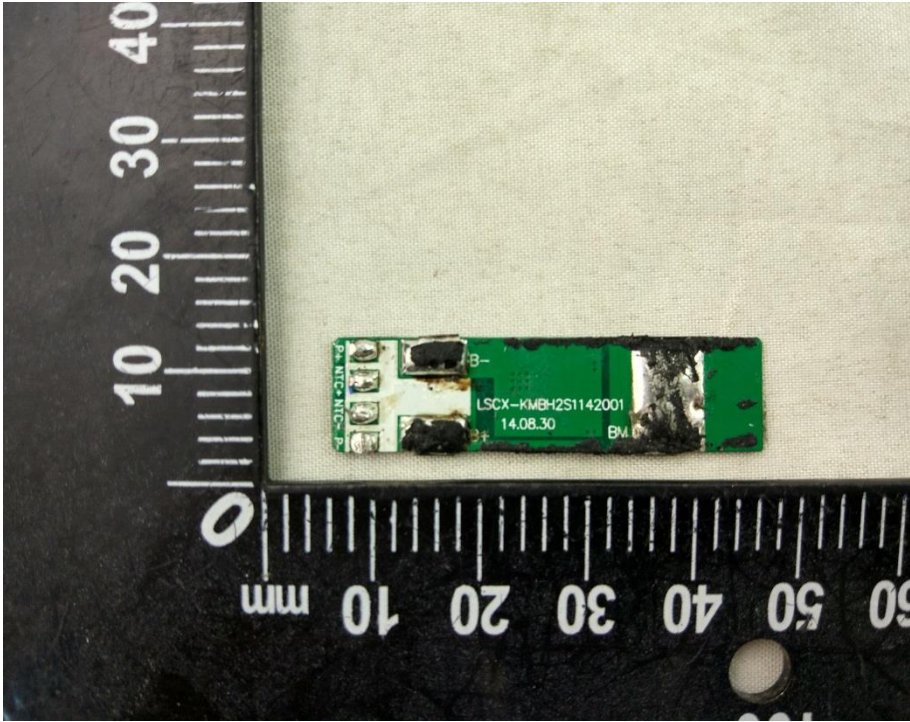
The state of cells 电池芯状态	Sample NO. 样品序号	Phenomenon 现象	Results 结论
Full discharged after one cycle 一次循环完全放 电状态	C06	No disassembly, no fire	Pass
	C07	No disassembly, no fire	Pass
	C08	No disassembly, no fire	Pass
	C09	No disassembly, no fire	Pass
	C10	No disassembly, no fire	Pass
	C11	No disassembly, no fire	Pass
	C12	No disassembly, no fire	Pass
	C13	No disassembly, no fire	Pass
	C14	No disassembly, no fire	Pass
Full discharged after fifty cycle 五十次循环后完 全放电状态	C15	No disassembly, no fire	Pass
	C16	No disassembly, no fire	Pass
	C17	No disassembly, no fire	Pass
	C18	No disassembly, no fire	Pass
	C19	No disassembly, no fire	Pass
	C20	No disassembly, no fire	Pass
	C21	No disassembly, no fire	Pass
	C22	No disassembly, no fire	Pass
	C23	No disassembly, no fire	Pass
	C24	No disassembly, no fire	Pass
	C25	No disassembly, no fire	Pass



### 附录 A EUT PHOTOS (样品照片)







-- END OF REPORT --