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检测
TESTING
CNAS L9092

UN38.3 检测报告

UN38.3 Test Report

报告编号： Report No.:	S2020062977420102
申请人： Applicant:	佰力电子（东莞）有限公司 Brich Electronic (DongGuan) Limited
申请人地址： Address:	广东省东莞市长安镇禾风围工业路 4 号 No.4, Hefengwei Industrial Road, Chang'an Town, Dongguan City, Guangdong Province
样品名称： Sample description:	可充电锂离子电池 Rechargeable Li-ion Battery
型号： Model:	XE205

方圆广电检验检测股份有限公司
Fangguang Inspection & Testing Co.,Ltd.

检 测 报 告

Test Report

申请编号： Application No.:	S20200629774201
制造商： Manufacturer:	佰力电子（东莞）有限公司 Brich Electronic (DongGuan) Limited
制造商地址： Address:	广东省东莞市长安镇禾风围工业路 4 号 No.4, Hefengwei Industrial Road, Chang'an Town, Dongguan City, Guangdong Province
生产厂： Factory:	佰力电子（东莞）有限公司 Brich Electronic (DongGuan) Limited
生产厂地址： Address:	广东省东莞市长安镇禾风围工业路 4 号 No.4, Hefengwei Industrial Road, Chang'an Town, Dongguan City, Guangdong Province
电话、邮箱、网址： Phone number, email address and website:	Tel: 0769-86240878; Email: zshaolin@brich.com.cn Website: http://www.brich.com.cn
商标： Trade mark:	N/A
样品数量： Number of Samples:	18pcs Batteries+30pcs cells
接收样品日期： Accepted date:	2020.06.29
检测地点： Test address:	广州市黄埔区云埔工业区方达路 2 号（新经济产业园）2 号厂房 1 楼 102 单元 Unit 102, 1/F., Building 2, No. 2, Fangda Road, Yunpu Industrial Zone, Huangpu District, Guangzhou, China
检测依据： Test criterion:	联合国《关于危险货物运输的建议书 试验和标准手册》 ST/SG/AC.10/11/Rev.6/Amend.1, Section 38.3 United Nations Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria ST/SG/AC.10/11/Rev.6/Amend.1, Section 38.3
检测结果： Test result:	所检项目的检测结果符合上述标准的要求。 The test results are in compliance with the above mentioned standards.
检测日期： Test date:	2020.07.08~2020.07.23
签发日期： Issue date:	2020.08.11

主检: **Tested by:**	**审核:** **Reviewed by:**	**批准:** **Approved by:**
周丽萍	陈岸华	阳琳

方圆广电检验检测股份有限公司 检验检测专用章 （广州分公司）

其他描述：
Other aspects:

测试的样品为可充电单电芯锂离子电池。

缩写说明: *P = 符合标准要求; F = 不符合标准要求; N/A = 不适用标准该项要求*
Abbreviations: *P = passed; F = failed; N/A = not applicable*

序号 No.	测试项目名称 Name of test	测试标准 Test standard	测试结果 Test result	本项结论 Conclusion	备注 Remarks
1	高度模拟 Altitude simulation	联合国《关于危险货物运输的建议书 试验和标准手册》 ST/SG/AC.10/11/Rev.6/Amend.1, Section 38.3 United Nations Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria ST/SG/AC.10/11/Rev.6/Amend.1, Section 38.3	见附表 1 See Appendix 1	合格 Passed	/
2	温度试验 Thermal test		见附表 2 See Appendix 2	合格 Passed	/
3	振动 Vibration		见附表 3 See Appendix 3	合格 Passed	/
4	Shock 冲击		见附表 4 See Appendix 4	合格 Passed	/
5	外部短路 External Short-circuit		见附表 5 See Appendix 5	合格 Passed	/
6	撞击 Impact		见附表 6 See Appendix 6	不适用 N/A	/
	挤压 Crush			合格 Passed	/
7	过度充电 Overcharge		见附表 7 See Appendix 7	合格 Passed	/
8	强制放电 Forced discharge		见附表 8 See Appendix 8	合格 Passed	/

产品描述 Product description	
样品名称 Sample name	可充电锂离子电池 Rechargeable Li-ion Battery
型号 Model	XE205
标称电压 Nominal Voltage	3.85Vdc
额定容量 Rated Capacity	390mAh
额定瓦时数 Watt-hour rating	1.502Wh
锂含量，仅限锂金属电池 Lithium content, for lithium metal battery only	N/A
充电方法 Charge method	先用 78mA 恒流充电至 4.40V，再恒压充电直到充电电流≤ 7.8mA. 78mA constant current charge to 4.40V, than constant voltage charge till charge current decline to 7.8mA.
放电方法 Discharge method	78mA 恒定电流持续放电至 3.0V。 Discharge with a constant current of 78mA to 3.0V.
最大充电电流 Maximum charge current	195mA
最大放电电流 Maximum discharge current	390mA
最大充电电压 Maximum charge Voltage	4.40V
放电截止电压 Discharge cut-off Voltage	3.0V
电芯组装 Cell assembly	Single cell battery / 单电芯电池
尺寸 Size	长度(L) × 宽度(W) × 高度(h) Max. 24.00mm x 25.00mm x 5.55mm
质量 Mass	大约 6.1g

<table>
<tr><th colspan="2">测试方法和要求
Test method and requirement</th></tr>
<tr><td>测试标准
Test Standard</td><td>联合国《关于危险货物运输的建议书 试验和标准手册》
ST/SG/AC.10/11/Rev.6/Amend.1, Section 38.3
United Nations Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria
ST/SG/AC.10/11/Rev.6/Amend.1, Section 38.3</td></tr>
<tr><td>测试项目
Test Item</td><td>T.1 高度模拟，T.2 温度试验，T.3 振动，T.4 冲击，T.5 外部短路，T.6 挤压，T.7 过度充电，T.8 强制放电
T.1 Altitude simulation, T.2 Thermal test, T.3 Vibration, T.4 shock, T.5 External short circuit, T.6 Crush, T.7 Overcharge, T.8 Forced discharge</td></tr>
<tr><td>测试程序
Test Procedure</td><td>小型电芯或电池应按顺序进行试验 T.1 至 T.5。试验 T.6 和 T.8 应使用另外未试验过的电芯或电池。试验 T.7 可以使用原先在试验 T.1 至 T.5 中使用过的未损坏电池进行，以便测试经过充放电的电池。
Tests T.1 to T.5 shall be conducted in sequence on the same cell or battery. Tests T.6 and T.8 shall 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.</td></tr>
<tr><td>质量损失
Mass Loss</td><td>Mass loss means a loss of mass that exceeds the values in Table 38.3.1 below.
质量损失是指超过下表 38.3.1 所列数值的质量损失。
<table>
<tr><th>Mass M of cell or battery
电芯或电池质量 M</th><th>Mass loss limit
质量损失限值</th></tr>
<tr><td>M<1g</td><td>0.5%</td></tr>
<tr><td>1g≤M≤75g</td><td>0.2%</td></tr>
<tr><td>M>75g</td><td>0.1%</td></tr>
</table>
质量损失的量化数值可用下式计算：
In order to quantify the mass loss, the following procedure is provided:
Mass loss (%)=((M1-M2))/M1×100
式中：M1是试验前的质量，M2是试验后的质量。如果质量损失不超过表38.3.1所列的数值，应视为“无质量损失”。
Where M1 is the mass before the test and M2 is the mass after the test. When mass loss does not exceed the values in Table 38.3.1, it shall be considered as “no mass loss”.</td></tr>
<tr><td>测试环境条件
Test Environment Condition</td><td>环境温度：20℃~25℃，环境湿度：45%~75%
Ambient temperature: 20℃~25℃, Ambient humidity: 45%~75%</td></tr>
</table>

可充电电芯或电池规定试验概要表—单电芯电池 Summary table of required tests for rechargeable cells and batteries—Single cell batteries									
样品类别 Sample category	样品状态 Sample status	T.1	T.2	T.3	T.4	T.5	T.6	T.7	T.8
Single cell batteries 单电芯电池	First cycle, fully charged state 第 1 个充电周期，完全充电状态	5(B1#~B5#)					/	4 (B11#~B14#)	/
	25th cycle, fully charged state 第 25 个充电周期，完全充电状态	5(B6#~B10#)					/	4 (B15#~B18#)	/
Cells not transported separately from a battery 电芯不与电池分开运输	First cycle, 50% charged state 第 1 个充电周期，50%充电状态	/	/	/	/	/	5 (C1#~C5#)	/	/
	25th cycle, 50% charged state 第 25 个充电周期，50%充电状态	/	/	/	/	/	5 (C6#~C10#)	/	/
	First cycle, fully discharged state 第 1 个充电周期，完全放电状态	/	/	/	/	/	/	/	10 (C11#~C20#)
	25th cycle, fully discharged state 第 25 个充电周期，完全放电状态	/	/	/	/	/	/	/	10 (C21#~C30#)

附表 1 Appendix 1	T.1 高度模拟 T.1 Altitude simulation

1.1	**测试程序** **Test procedure**
	试验电芯和电池在环境温度(20±5°C)下，储存在小于等于 11.6kPa 的压力下至少六小时。 Test cells and batteries shall be stored at a pressure of 11.6kPa or less for at least six hours at ambient temperature (20±5°C).
1.2	**要求** **Requirement**
	如果无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电芯或电池在试验后的开路电压不小于其在进行这一试验前电压的 90%，电芯和电池即符合这一要求。有关电压的要求不适用于完全放电状态的试验电池和电池组。 Cells and 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 fully discharged states.
1.3	**测试结果** **Result**

样品编号 Sample No.	测试前 Before		测试后 After		质量损失 Mass loss (%)	剩余电压 Residual OCV (%)	测试结果 Test result
	Mass 样品质量 (g)	Voltage 开路电压 (V)	Mass 样品质量 (g)	Voltage 开路电压 (V)			
B1#	6.032	4.379	6.032	4.378	0.000	99.980	**P**
B2#	6.054	4.379	6.052	4.377	0.033	99.950	**P**
B3#	6.019	4.379	6.018	4.377	0.017	99.950	**P**
B4#	6.019	4.378	6.015	4.377	0.066	99.980	**P**
B5#	6.050	4.379	6.050	4.378	0.000	99.980	**P**
B6#	6.043	4.378	6.041	4.377	0.033	99.980	**P**
B7#	6.028	4.379	6.028	4.377	0.000	99.950	**P**
B8#	6.034	4.378	6.034	4.377	0.000	99.980	**P**
B9#	6.095	4.378	6.093	4.378	0.033	100.000	**P**
B10#	6.049	4.378	6.045	4.378	0.066	100.000	**P**

注： 所有样品无泄漏，无排气，无解体，无破裂和无着火。

Note: All samples were no leakage, no venting, no disassembly, no rupture and no fire.

附表 2 Appendix 2	T.2 温度试验 T.2 Thermal test

2.1	**测试程序** **Test procedure**
	将电芯和电池在温度为 72±2°C 的条件下贮存不少于 6 个小时，然后，在温度-40±2°C 条件下贮存不少于 6 个小时，两个温度间的间隔最长为 30min.重复操作上述步骤直到 10 次，然后，将其在环境温度为 20±5°C 的条件下放置 24 个小时。 Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72±2°C, followed by storage for at least six hours at a test temperature equal to -40±2°C. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20±5°C).
2.2	**要求** **Requirement**
	如果无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电芯或电池在试验后的开路电压不小于其在进行这一试验前电压的 90%，电芯和电池即符合这一要求。有关电压的要求不适用于完全放电状态的试验电池和电池组。 Cells and 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 fully discharged states.
2.3	**测试结果** **Result**

样品编号 Sample No.	测试前 Before		测试后 After		质量损失 Mass loss (%)	剩余电压 Residual OCV (%)	测试结果 Test result
	Mass 样品质量 (g)	Voltage 开路电压 (V)	Mass 样品质量 (g)	Voltage 开路电压 (V)			
B1#	6.032	4.378	6.032	4.301	0.000	98.240	**P**
B2#	6.052	4.377	6.052	4.299	0.000	98.220	**P**
B3#	6.018	4.377	6.017	4.297	0.017	98.170	**P**
B4#	6.015	4.377	6.015	4.297	0.000	98.170	**P**
B5#	6.050	4.378	6.050	4.301	0.000	98.240	**P**
B6#	6.041	4.377	6.041	4.299	0.000	98.220	**P**
B7#	6.028	4.377	6.028	4.298	0.000	98.200	**P**
B8#	6.034	4.377	6.034	4.298	0.000	98.200	**P**
B9#	6.093	4.378	6.092	4.300	0.016	98.220	**P**
B10#	6.045	4.378	6.045	4.300	0.000	98.220	**P**

注： 所有样品无泄漏，无排气，无解体，无破裂和无着火。

Note: All samples were no leakage, no venting, no disassembly, no rupture and no fire.

附表 3 Appendix 3	T.3 振动 T.3 Vibration
3.1	**测试程序** **Test procedure**
	电芯和电池紧固于振动机平台，但紧固程度不能造成电池变形以致不能准确传递振动。振动应是正弦波形，对数频率扫描从 7 赫兹到 200 赫兹，再回到 7 赫兹，跨度为 15 分钟。这一振动过程须对三个互相垂直的电池安装方位的每一方向重复进行 12 次，总共为时 3 小时。其中一个振动方向必须与端面垂直。 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 wave form with a logarithmic sweep between 7Hz and 200Hz 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 position of the cell. One of the directions of vibration must be perpendicular to the terminal face.
	作对数式频率扫描，对总质量不足 12 千克的电芯和电池(电芯和小型电池)，和对 12 千克及更大的电池(大型电池)应有所不同。 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).
	对电芯和小型电池：从 7 赫兹开始，保持 1gn 的最大加速度，直到频率达到 18 赫兹。然后将振幅保持在 0.8 毫米(总偏移 1.6 毫米)，并增加频率直到最大加速度达到 8 gn (频率约为 50 赫兹)。将最大加速度保持在 8 gn 直到频率增加到 200 赫兹。 For cells and small batteries: 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.
	对大型电池：从 7 赫兹开始，保持 1 gn 的最大加速度，直到频率达到 18 赫兹。然后将振幅保持在 0.8 毫米(总偏移 1.6 毫米)，并增加频率直到最大加速度达到 2 gn (频率约为 25 赫兹)。将最大加速度保持在 2 gn 直到频率增加到 200 赫兹。 For large batteries: 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.
3.2	**要求** **Requirement**
	如果无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电芯或电池在试验后的开路电压不小于其在进行这一试验前电压的 90%，电芯和电池即符合这一要求。有关电压的要求不适用于完全放电状态的试验电池和电池组。 Cells and 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 fully discharged states.

3.3	**测试结果** **Result**						
样品编号 Sample No.	测试前 Before		测试后 After		质量损失 Mass loss (%)	剩余电压 Residual OCV (%)	测试结果 Test result
	Mass 样品质量 (g)	Voltage 开路电压 (V)	Mass 样品质量 (g)	Voltage 开路电压 (V)			
B1#	6.032	4.301	6.032	4.301	0.000	100.000	**P**
B2#	6.052	4.299	6.050	4.299	0.033	100.000	**P**
B3#	6.017	4.297	6.017	4.297	0.000	100.000	**P**
B4#	6.015	4.297	6.015	4.297	0.000	100.000	**P**
B5#	6.050	4.301	6.048	4.300	0.033	99.980	**P**
B6#	6.041	4.299	6.040	4.299	0.017	100.000	**P**
B7#	6.028	4.298	6.028	4.298	0.000	100.000	**P**
B8#	6.034	4.298	6.034	4.298	0.000	100.000	**P**
B9#	6.092	4.300	6.090	4.299	0.033	99.980	**P**
B10#	6.045	4.300	6.045	4.299	0.000	99.980	**P**
注： 所有样品无泄漏，无排气，无解体，无破裂和无着火。 Note: All samples were no leakage, no venting, no disassembly, no rupture and no fire.							

附表 4 Appendix 4	T.4 冲击 T.4 Shock
4.1	**测试程序** **Test procedure**
	试验电芯和电池用坚固支架紧固在试验机上，支架支撑着每个试验电池组的所有安装面。 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.
	每个电芯须经受最大加速度 150 gn 和脉冲持续时间 6 毫秒的半正弦波冲击。不过，大型电芯须经受最大加速度 50 gn 和脉冲持续时间 11 毫秒的半正弦波冲击。 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.
	每个电池须经受的正弦波冲击的最大加速度取决于电池的质量。小型电池须经受最大加速度 150 gn 或加速度(gn)= √(100850/质量*)，取数值较小者，和脉冲持续时间 6 毫秒的半正弦波冲击。大型电池须经受最大加速度 50 gn 或加速度(gn)= √(30000/质量*)，取数值较小者，和脉冲持续时间 11 毫秒的半正弦波冲击。（* 质量为千克） Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the battery. Small batteries shall be subjected to a half-sine shock of peak acceleration of 150 gn or Acceleration (gn)= √(100850/mass*), whichever is smaller, and pulse duration of 6 milliseconds. Large batteries shall be subjected to a half-sine shock of peak acceleration of 50 gn or Acceleration (gn)= √(30000/mass*), whichever is smaller, and pulse duration of 11 milliseconds. (* Mass is expressed in kilograms.)
	每个电芯或电池须在三个互相垂直的电芯或电池安装方位的正极方向经受三次冲击，接着在负极方向经受三次冲击，总共经受 18 次冲击。 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.
4.2	**要求** **Requirement**
	如果无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电芯或电池在试验后的开路电压不小于其在进行这一试验前电压的 90%，电芯和电池即符合这一要求。有关电压的要求不适用于完全放电状态的试验电池和电池组。 Cells and 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 fully discharged states.

4.3	**测试结果** **Result**						
样品编号 Sample No.	测试前 Before		测试后 After		质量损失 Mass loss (%)	剩余电压 Residual OCV (%)	测试结果 Test result
	Mass 样品质量 (g)	Voltage 开路电压 (V)	Mass 样品质量 (g)	Voltage 开路电压 (V)			
B1#	6.032	4.301	6.032	4.300	0.000	99.980	**P**
B2#	6.050	4.299	6.050	4.299	0.000	100.000	**P**
B3#	6.017	4.297	6.017	4.297	0.000	100.000	**P**
B4#	6.015	4.297	6.015	4.297	0.000	100.000	**P**
B5#	6.048	4.300	6.048	4.300	0.000	100.000	**P**
B6#	6.040	4.299	6.040	4.299	0.000	100.000	**P**
B7#	6.028	4.298	6.028	4.298	0.000	100.000	**P**
B8#	6.034	4.298	6.034	4.298	0.000	100.000	**P**
B9#	6.090	4.299	6.089	4.298	0.016	99.980	**P**
B10#	6.045	4.299	6.045	4.299	0.000	100.000	**P**
注： 所有样品无泄漏，无排气，无解体，无破裂和无着火。 Note: All samples were no leakage, no venting, no disassembly, no rupture and no fire.							

附表 5 Appendix 5	T.5 外部短路 T.5 External short circuit
5.1	**测试程序** **Test procedure**
	对于待试电芯或电池，应加温一段必要的时间，使从外壳测量的温度达到均匀的稳定温度 57 ± 4°C。这段时间的长短取决于电芯或电池的大小和设计，对于这个持续时间应加以评估和记录。如无法进行这种评估，则小型电芯和小型电池的暴露时间应至少 6 小时，大型电芯和小型电池的暴露时间应至少 12 小时。然后，电芯或电池应在 57 ± 4°C 条件下经受总外电阻小于 0.1 欧姆的短路条件。 The cell or battery to be tested shall be shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of 57 ± 4 °C, measured on the external case. This period of time depends on the size and design of the cell or battery and should be assessed and documented. If this assessment is not feasible, the exposure time shall be at least 6 hours for small cells and small batteries, and 12 hours for large cells and large batteries. Then the cell or battery at 57 ± 4 °C shall be subjected to one short circuit condition with a total external resistance of less than 0.1 ohm.
	这一短路条件应在电芯或电池外壳温度回到 57 ± 4°C 后继续至少 1 小时，或在大型电池的情况下外壳温度降幅达试验中所观察的的最高温升幅的二分之一并保持低于该数值。 This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 57 ± 4 °C, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value.
	短路和降温阶段的温度应至少相当于环境温度。 The short circuit and cooling down phases shall be conducted at least at ambient temperature.
5.2	**测试结果** **Result**
	如果外壳温度不超过170℃，并且在试验过程中及试验后6小时内无解体、无破裂，无起火，电池和电池组即符合本项要求。 Cells and batteries meet this requirement if their 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.

5.3	**测试结果** **Result**	
样品编号 Sample No.	表面最大温度 Maximum case temperature, (°C)	测试结果 Test result
B1#	55.5	**P**
B2#	55.2	**P**
B3#	55.1	**P**
B4#	55.3	**P**
B5#	55.0	**P**
B6#	55.3	**P**
B7#	55.1	**P**
B8#	55.2	**P**
B9#	55.2	**P**
B10#	55.5	**P**

注： 所有样品外壳温度不超过 170℃，在试验过程中及试验后 6 小时内无解体、无破裂、无起火。

Note: All samples external temperature not exceed 170°C, and there was no disassembly, no rupture and no fire during the test and within six hours after the test.

附表 6 Appendix 6	T.6 挤压 T.6 Crush
6.1	**测试程序** **Test procedure**
	适用于棱柱形、袋状、硬币/纽扣电芯和直径小于 18.0mm 的圆柱形电芯。 Applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0mm in diameter.
	将电芯或组成电芯放在两个平面之间挤压，挤压力度逐渐加大，在第一个接触点上的速度大约为 1.5 厘米/秒。挤压持续进行，直到出现以下三种情况之一： a) 作用力达到 13kN±0.78kN； b) 电池芯电压降至少达到 100mV； c) 电池厚度和最初比较变形至少 50%。 一旦达到最大压力，电压降超过 100 mV 或者电池芯变形超过 50%，压力应该解除。 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. a) The applied force reaches 13kN±0.78kN; 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. Once the maximum pressure has been obtained. the voltage drops by 100mV or more. or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.
	棱柱形或袋装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。圆柱形电芯应从与纵轴垂直的方向施压。 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.
	每个试样电芯或组成电芯只做一次挤压试验。试样应继续观察 6 小时。试验应使用之前未做过其他试验的电芯或组成电芯进行。 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.
6.2	**要求** **Requirement**
	如果外壳温度不超过 170℃，并且在试验过程中及试验后 6 小时内无解体、无破裂，无起火，电芯和组成电芯即符合本项要求。 Cells and component cells meet this requirement if their external temperature does not exceed 170 °C and there is no disassembly and no fire during the test and within six hours after this test.

6.3	**测试结果** **Result**	
样品编号 Sample No.	Max. External Temperature 样品表面最高温度（℃）	测试结果 Test result
C1#	24.6	**P**
C2#	24.5	**P**
C3#	24.5	**P**
C4#	24.4	**P**
C5#	24.6	**P**
C6#	24.5	**P**
C7#	24.5	**P**
C8#	24.5	**P**
C9#	24.4	**P**
C10#	24.5	**P**
注：所有样品外壳温度不超过 170℃，并且在试验过程中及试验后 6 小时内无解体和无起火。 Note: All samples external temperature not exceed 170°C and there was no disassembly and no fire during the test and within six hours after the test.		

附表 7 Appendix 7	T.7 过度充电 T.7 Overcharge

7.1	**测试步骤** **Test procedure**
	以 2 倍制造商推荐的最大持续充电电流对样品充电 The charge current shall be twice the manufacturer's recommended maximum continuous charge current
	如果厂家推荐的充电电压不超过 18V，本测试的最小充电电压应该是两倍的厂家推荐的最大充电电压或者是 22V。试验应在环境温度下进行，进行试验的时间应为 24 小时。 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 or 22V. Tests are to be conducted at ambient temperature, the duration of the test shall be 24 hours.
	如果厂家推荐的充电电压超过 18V，本测试的最小充电电压应该为 1.2 倍的厂家推荐的最大充电电压。试验应在环境温度下进行，进行试验的时间应为 24 小时。 When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times maximum charge voltage. Tests are to be conducted at ambient temperature, the duration of the test shall be 24 hours.
7.2	**要求** **Requirement**
	充电电池如在试验过程中和试验后 7 天内无解体，无起火，即符合本项要求。 Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.
7.3	**测试结果** **Result**

样品编号 Sample No.	测试前开路电压 (V) Voltage Before test (V)	测试电压 (V) Voltage test (V)	充电电流 (A) Charging current (A)	测试结果 Test result
B11#	4.381	8.8	0.195	**P**
B12#	4.379	8.8	0.195	**P**
B13#	4.379	8.8	0.195	**P**
B14#	4.380	8.8	0.195	**P**
B15#	4.379	8.8	0.195	**P**
B16#	4.378	8.8	0.195	**P**
B17#	4.381	8.8	0.195	**P**
B18#	4.380	8.8	0.195	**P**

注： 所有样品在试验过程中和试验后 7 天内无解体和无起火。
Note: All samples were no disassembly and no fire during the test and within seven days after the test.

附表 8 Appendix 8	T.8 强制放电 T.8 Forced discharge

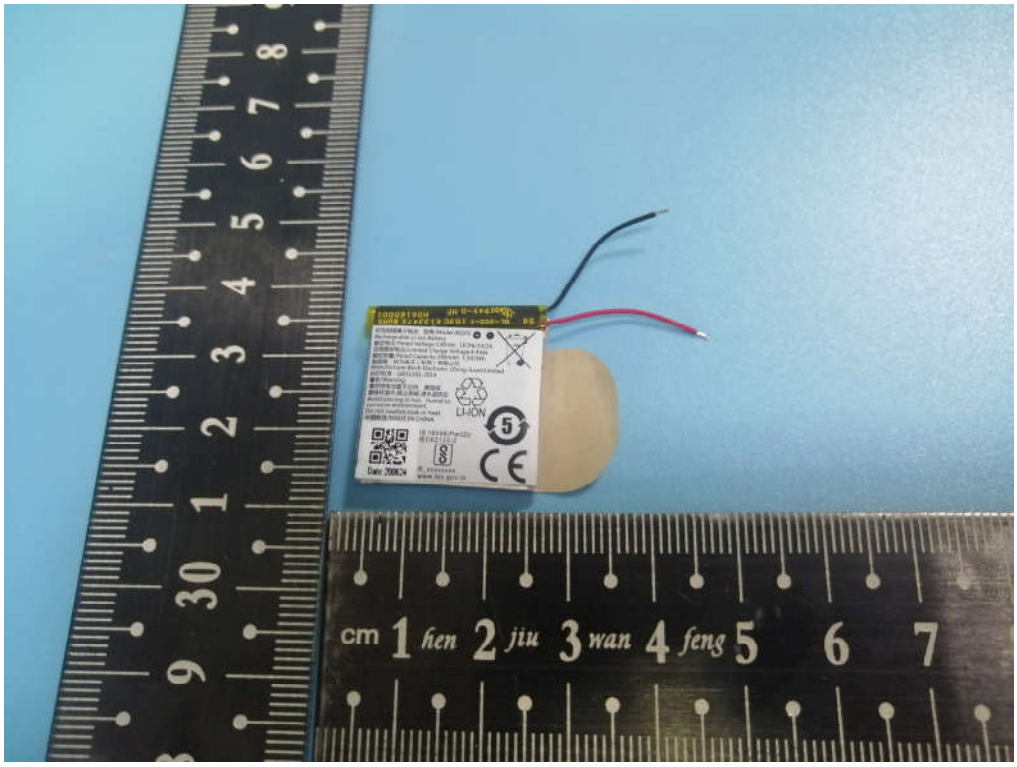
8.1	**测试步骤** **Test procedure**				
	每个电芯在环境温度下与 12V 直流电电源串联在起始电流等于制造商给定的最大放电电流的条件下强制放电。将适当大小和额定值的电阻负荷与试验电流串联，计算得出给定的放电流。对于每个电芯进行强制放电，放电时间为额定容量除以初始电流。 Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified 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).				
8.2	**要求** **Requirement**				
	原电芯或充电电芯如在试验过程中和试验后 7 天内无解体，无起火，即符合本项要求。 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.				
8.3	**测试结果** **Result**				
	初始放电电流 (A)	0.398	放电时间 (min)	60	
样品编号 Sample No.	测试前开路电压 (V) Voltage Before test (V)	测试结果 Test result	样品编号 Sample No.	测试前开路电压 (V) Voltage Before test (V)	测试结果 Test result
C11#	3.336	**P**	C21#	3.320	**P**
C12#	3.330	**P**	C22#	3.334	**P**
C13#	3.325	**P**	C23#	3.318	**P**
C14#	3.316	**P**	C24#	3.328	**P**
C15#	3.323	**P**	C25#	3.334	**P**
C16#	3.318	**P**	C26#	3.323	**P**
C17#	3.322	**P**	C27#	3.316	**P**
C18#	3.325	**P**	C28#	3.319	**P**
C19#	3.317	**P**	C29#	3.324	**P**
C20#	3.319	**P**	C30#	3.321	**P**
注： 所有样品在试验过程中和试验后 7 天内无解体和无起火。 Note: All samples were no disassembly and no fire during the test and within seven days after the test.					

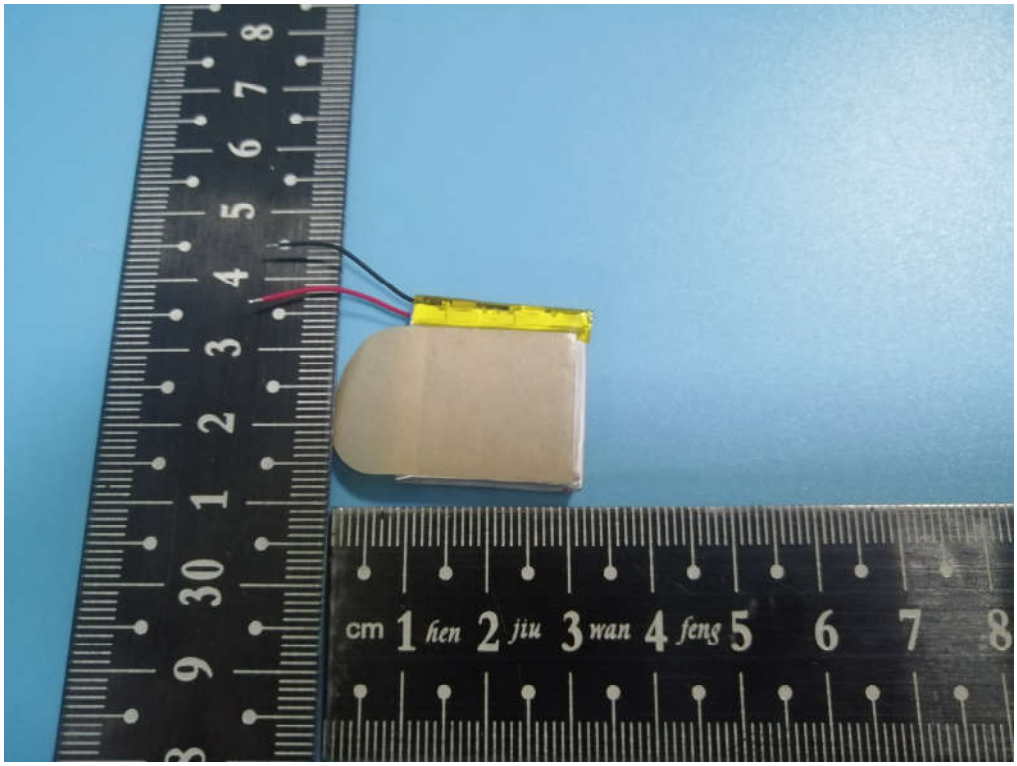
使用设备清单 / Equipment list

序号	名 称	型 号	编 号	校准有效期
1.	电池性能测试系统	CT-4008-5V6A-8-S1	FGZGJC-2017-290	2020-12-02
2.	数据采集仪	34970A	FGZGJC-2017-242	2021-05-11
3.	数字万用表	17B+	FGZGJC-2017-268	2021-03-24
4.	电池内阻测试仪	BT3562	FGZGJC-2017-243	2021-03-25
5.	高温烘箱	GX-3020-M	FGZGJC-2017-291	2021-04-21
6.	可程式高低温试验箱	KWGDS6025IIFA	FGZGJC-2017-236	2021-03-25
7.	振动试验系统	MPA101/L315M	FGZGJC-2017-247	2021-01-13
8.	低压真空箱	BE-8104	FGZGJC-2017-248	2021-03-25
9.	电池挤压试验机	BE-6045T	FGZGJC-2017-244	2020-12-02
10.	冲击台	IS300	FGZGJC-2017-246	2021-03-22
11.	电子天平	JJ200B	FGZDA-2018-003	2021-03-26
12.	直流稳压电源	MCH-K3010DN	FGZDA-2018-002	2020-12-17
13.	电子负载	IT-E151	FTJGDB-2016-039	2020-09-10
14.	电子负载	IT-E151	FTJGDB-2016-029	2020-09-10
15.	温湿度计	JR900	FGZDA-2018-007	2021-03-15
16.	温湿度计	JR900	FGZDA-2018-008	2021-03-15

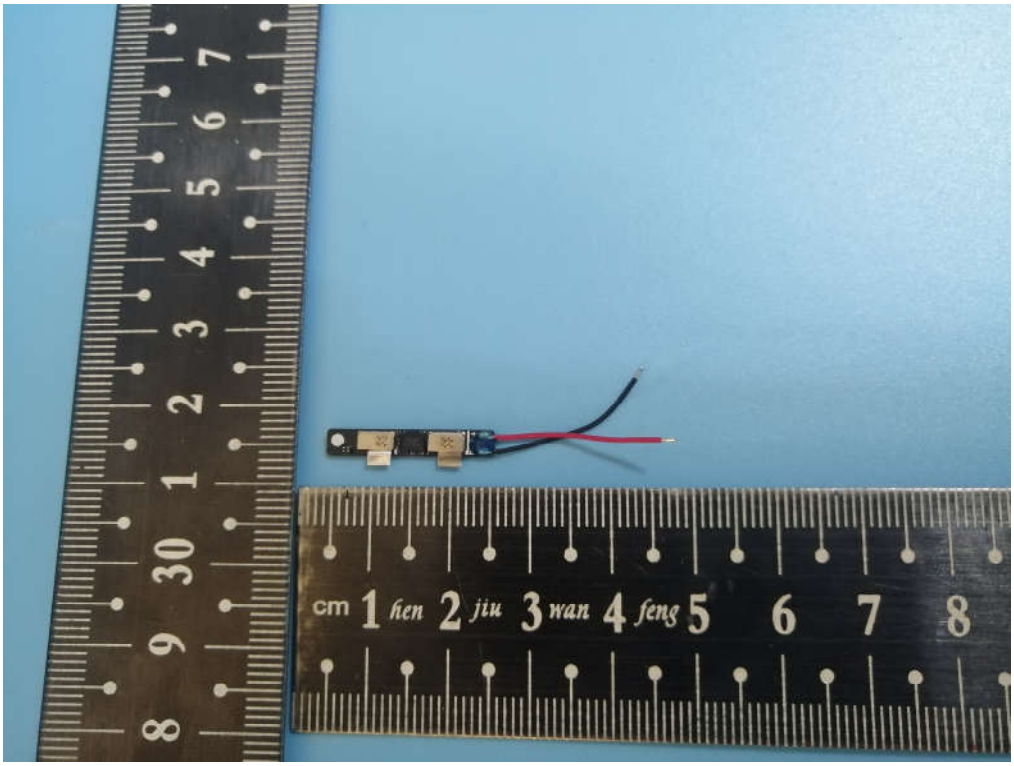
* 以上仪器设备均正常工作

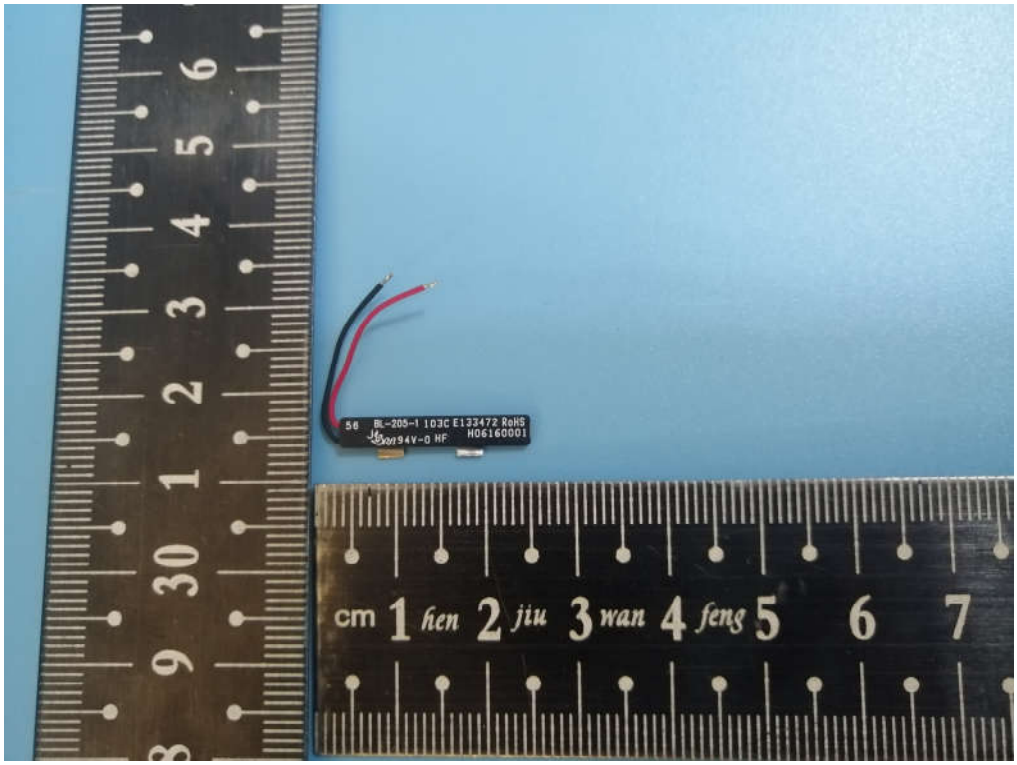
样 品 照 片 / Photos of sample

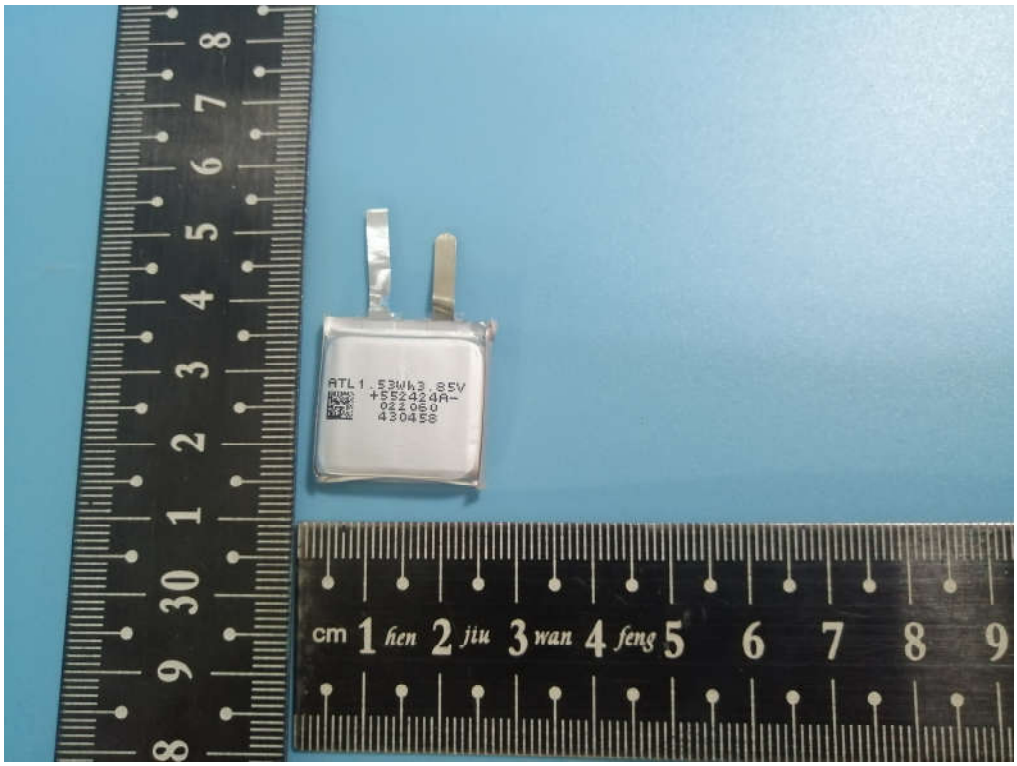


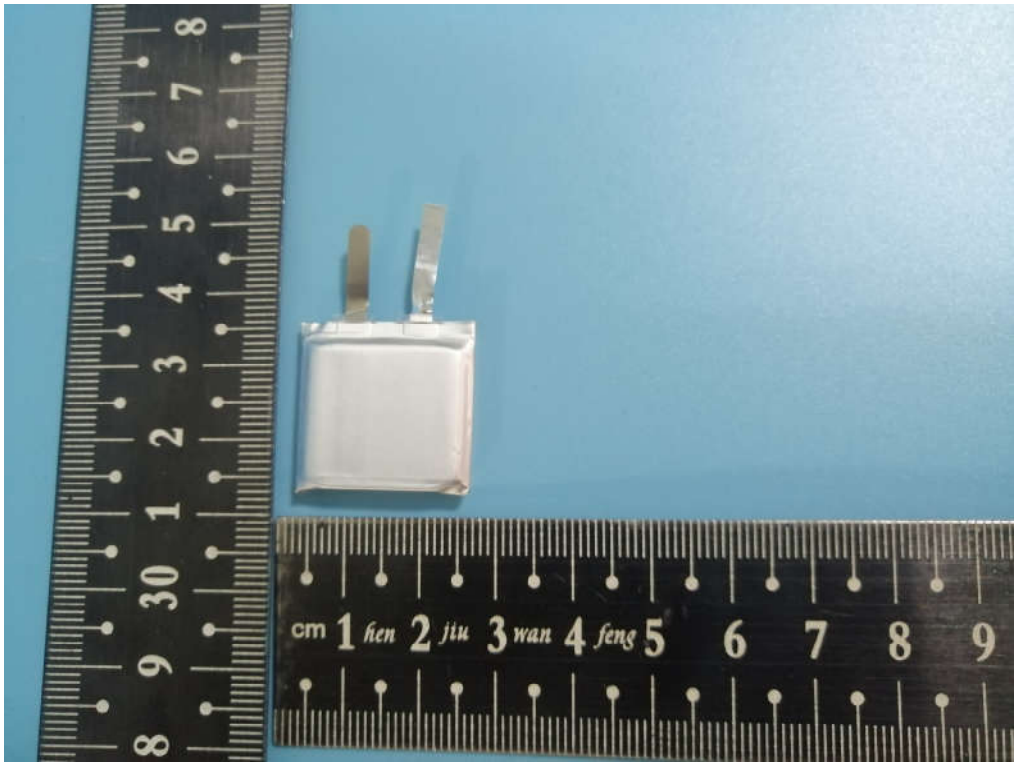


IC+MOS (**CM1112-DAE**)









-- 报告结束 --
-- end of report --