# TEST REPORT

**IEC 62133-2**
**Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications – Part 2: Lithium systems**

| | | |
|---|---|---|
| **Reference No.** | : | WTX20X08059835B |
| **Applicant** | : | IPOWER CORPORATION |
| **Address** | : | 345 E. Colorado Blvd. #202, Pasadena, CA 91101, USA |
| **Manufacturer** | : | Zhongshan Taidu Technology Co., Ltd. |
| **Address** | : | 81, Renmin Road, Minzhong Town, Zhongshan City, Guangdong (528441), China |
| **Product Name** | : | Li-Polymer Rechargeable Battery |
| **Model No.** | : | IP9V-800 |
| **Trade Mark** | : | IPOWERUS |
| **Total pages** | : | 23 pages |
| **Standards** | : | IEC 62133-2: 2017 |
| **Date of Issue** | : | 2020-11-11 |
| **Test Report Form No.** | | WXB-62133-02A |
| **Test Result** | : | The submitted samples comply with the above standards |

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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| | |
|---|---|
| **List of Attachments (including a total number of pages in each attachment):**<br>Attachments 1: Photos documentation (3 pages); | |
| **Summary of testing:** | |
| **Tests performed (name of test and test clause):**<br>☒7.2.1 Continuous charging at constant voltage (cells)<br>☐7.2.2 Case stress at high ambient temperature (battery)<br>☒7.3.1 External short-circuit (cell)<br>☒7.3.2 External short-circuit (battery)<br>☒7.3.3 Free fall<br>☒7.3.4 Thermal abuse (cells)<br>☒7.3.5 Crush (cells)<br>☒7.3.6 Over-charging of battery<br>☒7.3.7 Forced discharge (cells)<br>☒7.3.8.1 Vibration<br>☒7.3.8.2 Mechanical shock<br>☐7.3.9 Design evaluation – Forced internal short circuit (cells) | **Testing location:**<br>**Waltek Testing Group (Shenzhen) Co., Ltd.**<br>1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China |
| **Summary of compliance with National Differences**<br><br>☒ **The product fulfils the requirements of IEC 62133-2: 2017.** | |

| | |
|---|---|
| **Test item particulars:** | |
| **Classification of installation and use** | To be defined in final product |
| **Supply connection** | Terminal |
| **Recommend charging method declaired by the manufacturer** | Charge at a constant current 160mA(0.2C) till voltage reaches 8.4V,then charge at a constant voltage 8.4V till current reduce to 40mA |
| **Discharge current (0,2 $I_t$ A)** | 160mA |
| **Specified final voltage:** | 6.0V |
| **Upper limit charging voltage per cell:** | 4.25V |
| **Maximum charging current** | 160mA |
| **Charging temperature upper limit** | 45°C |
| **Charging temperature lower limit** | 10°C |
| **Polymer cell electrolyte type** | ☐ gel polymer..... ☐ solid polymer ☒ N/A |
| **Possible test case verdicts:** | |
| **- test case does not apply to the test object** | N/A |
| **- test object does meet the requirement** | P (Pass) |
| **- test object does not meet the requirement** | F (Fail) |
| **Testing** | |
| **Date of receipt of test item** | 2020-09-22 |
| **Date (s) of performance of tests** | 2020-09-22 ~ 2020-11-05 |
| | |
| **General remarks:** | |
| The test results presented in this report relate only to the object tested.<br>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.<br>"(See Enclosure #)" refers to additional information appended to the report.<br>"(See appended table)" refers to a table appended to the report.<br><br>**Throughout this report a ☐comma / ☒point is used as the decimal separator.** | |
| **Name and address of factory (ies)** | Same as manufacturer |

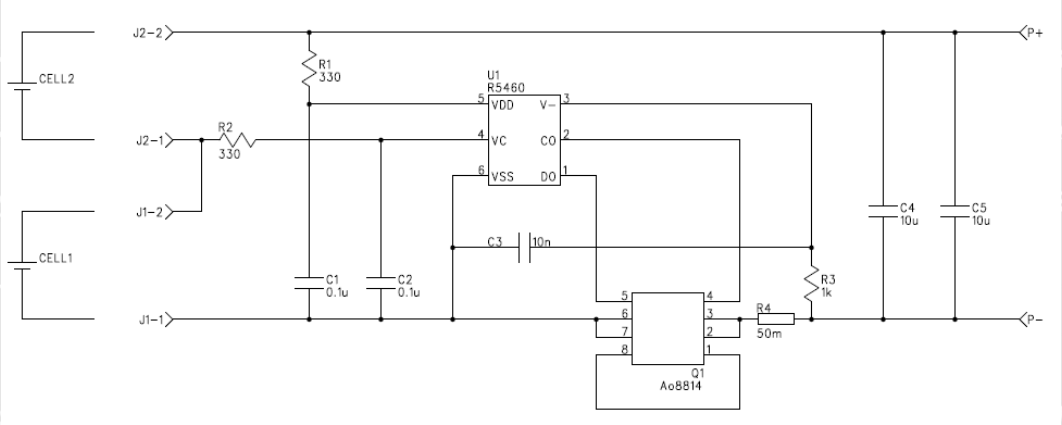
**General product information:**

The cells and batteries have been tested and evaluated according to their specified working conditions (as given below), which are provided by client.

Details information of the cell and battery, as following:

| Product | Cell | Battery |
|---|---|---|
| Model | TDLP682340 | IP9V-800 |
| Nominal voltage | 3.7V | 7.4V |
| Rated capacity | 800mAh | 800mAh |
| Charge method | C.C./C.V. | C.C./C.V. |
| Charge temp. range | 10~45°C | 10~45°C |
| Std. charge current | 160mA | 160mA |
| Max. charge current | 160mA | 160mA |
| Max. discharge current | 800mA | 800mA |
| Upper limit charge voltage | 4.25V | 8.5V |
| End-of-charge current | 40mA | 40mA |
| Discharge Cut-off voltage | 3.0V | 6.0V |
| Dimension | MAX. 38.2mm×23.5mm×6.9mm | MAX. 48.4mm×25.8mm×16.7mm |
| Weight | Approx. 12.1 g | Approx. 32.0 g |
| Shape | Prismatic | Prismatic |

**Circuit diagram:**




**Copy of marking plate:**

Li-Polymer Rechargeable Battery
IP9V-800
— (2ICP7/24/39)
7.4Vd.c., 800mAh, 5.92Wh
CAUTION
-Do not disassemble or modify
-Do not short-circuit
+ -Do not dispose in fire
-Do not expose to high temperature
YYMMDD
Zhongshan Taidu Technology Co., Ltd.

Remark: YY represents the years, MM represents the months, DD represents the date.

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **4** | **Parameter measurement tolerances** | | **P** |
| | Parameter measurement tolerances | All control and measure values were within the tolerances. | P |
| **5** | **General safety considerations** | | **P** |
| 5.1 | General | Considered | P |
| 5.2 | Insulation and wiring | See below. | P |
| | The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ | No metal surface exist. | N/A |
| | Insulation resistance (MΩ) .....: | -- | -- |
| | Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements | | N/A |
| | Orientation of wiring maintains adequate creepage and clearance distances between conductors | | N/A |
| | Mechanical integrity of internal connections accommodates reasonably foreseeable misuse | Considered | P |
| 5.3 | Venting | | P |
| | Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition | | P |
| | Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief | | N/A |
| 5.4 | Temperature/voltage/current management | | P |
| | Batteries are designed such that abnormal temperature rise conditions are prevented | | P |
| | Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer | | P |
| | Batteries are provided with specifications and charging instructions for equipment manufacturers so that associated chargers are designed to maintain charging within the temperature, voltage and current limits specified | | P |
| 5.5 | Terminal contacts | See below. | P |
| | The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current | Maximum anticipated current can be carried. | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance | | P |
| | Terminal contacts are arranged to minimize the risk of short circuits | | P |
| 5.6 | Assembly of cells into batteries | | P |
| 5.6.1 | General | | P |
| | Each battery has an independent control and protection for current voltage, temperature and any other parameter required for safety and to maintain the cells within their operating region. | | N/A |
| | This protection was provide esternal to the battery such as within the chargeer or the end devices. | | N/A |
| | If protection is external to the battery ,the manufacturer of the battery provide this safety relevant information to the external device manufacturer for implementation. | | N/A |
| | If there is more than one battery housed in a single battery case, each battery has protective circuitry that can maintain the cells within their operating regions. | | N/A |
| | Manufacturers of cells specify current, voltage and temperature limits so that the battery manufacturer/ designer may ensure proper design and assembly | | P |
| | Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate circuitry to prevent operation of cells outside the limits specified by the cell manufacturer. | | N/A |
| | Protective circuit components are added as appropriate and consideration given to the end-device application | | N/A |
| | The manufacturer of the battery provides a safety analysis of the battery safety circuitry with a test report including a fault analysis of the protection circuit under both charging and discharging conditions confirming the compliance. | | N/A |
| 5.6.2 | Design recommendation | | P |
| | For the battery consisting of a single cell or a single cellblock, the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 2; | | N/A |
| | For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, the voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Table 2, by monitoring the voltage of every single cell or the single cellblocks | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, charging is stopped when the upper limit of the charging voltage is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks | | P |
| | For batteries consisting of series-connected cells or cell blocks, nominal charge voltage were not counted as an overcharge protection. | | P |
| | For batteries consisting of series-connected cells or cell blocks, cells have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer | | P |
| | The cells and cell blocks not discharged beyond the cell manufacturer's specified final voltage | | P |
| | For batteries consisting of series-connected cells or cell blocks, cell balancing circuitry incorporated into the battery management system | | N/A |
| 5.6.3 | Mechanical protection for cells and components of batteries | | N/A |
| | Mechanical protection for cells, cell connections and control circuits within the battery were provided to prevent damage as a result of intended use and reasonably foreseeable misuse. | | N/A |
| | The mechanical protection was provided by the battery case or by the end product enclosure for those batteries intended for building into an end product | | N/A |
| | The battery case and compartments housing cells were designed to accommodate cell dimensional tolerances during charging and discharging as recommended by the cell manufacturer | | N/A |
| | For batteries intended for building into a portable end product, testing with the battery installed within the end product was considered when conducting mechanical tests | | N/A |
| 5.7 | Quality plan | | P |
| | The manufacturer prepares and implements a quality plan that defines procedures for the inspection of materials, components, cells and batteries and which covers the whole process of producing each type of cell or battery | | P |
| 5.8 | Battery safety components | | P |
| **6** | **Type test and sample size** | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Tests were made with the number of cells or batteries specified in Table 1, using cells or batteries that are not more than six months old. | | P |
| | The internal resistance of coin cells be measured in accordance with Annex D. Coin cells with internal resistance less than or equal to 3 Ω were tested in accordance with Table 1. | | N/A |
| | Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C. | | P |
| | The safety analysis of 5.6.1 identify those components of the protection circuit that are critical for short-circuit, overcharge and over discharge protection | | P |
| | When conducting the short-circuit test, consideration given to the simulation of any single fault condition that is likely to occur in the protecting circuit that would affect the short-circuit test | | P |
| **7** | **Specific requirements and tests** | | P |
| 7.1 | Charging procedures for test purposes | | P |
| 7.1.1 | First procedure:<br>This charging procedure applied to tests other than those specified in 7.1.2 | | P |
| | Unless otherwise stated in this document, the charging procedure for test purposes is carried out in an ambient temperature of 20 °C ± 5 °C, using the method declared by the manufacturer | | P |
| | Prior to charging, the battery shall have been discharged at 20 °C ± 5 °C at a constant current of 0,2 It A down to a specified final voltage | | P |
| 7.1.2 | Second procedure:<br>This charging procedure applied to the tests of 7.3.1, 7.3.4, 7.3.5, and 7.3.9 | | P |
| | After stabilization for 1 h and 4 h, respectively, at ambient temperature of highest test temperature and lowest test temperature, as specified in Table 2, cells are charged by using the upper limit charging voltage and maximum charging current, until the charging current is reduced to 0,05 It A, using a constant voltage charging method | | P |
| 7.2 | Intended use | See below | P |
| 7.2.1 | Continuous charging at constant voltage (cells) | Considered | P |
| | Results: No fire, no explosion, no leakage ..... : | No fire, no explosion, no leakage (See Table 7.2.1) | P |
| 7.2.2 | Case stress at high ambient temperature (battery) | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Oven temperature (°C) ..... : | | -- |
| | Results: No physical distortion of the battery casing resulting in exposure if internal components | -- | N/A |
| 7.3 | Reasonably foreseeable misuse | See below | P |
| 7.3.1 | External short-circuit (cell) | Considered | P |
| | The cells were tested until one of the following occurred:<br>- 24 hours elapsed; or | | N/A |
| | - The surface temperature declined by 20% of the maximum temperature rise | Considered | P |
| | Results: No fire， no explosion..... : | No fire. No explosion<br>(See Table 7.3.1) | P |
| 7.3.2 | External short-circuit (battery) | Considered | P |
| | The batteries were tested until one of the following occurred:<br>- 24 hours elapsed; or | Considered | P |
| | - The case temperature declined by 20% of the maximum temperature rise | | N/A |
| | In case of rapid decline in short circuit current, the battery remained on test for an additional one hour after the current reached a low end steady state condition | | P |
| | A single fault in the discharge protection circuit were conducted on one to four of the five samples before conducting the short-circuit test | MOSFET Q1(Pin2-7) short circuit | P |
| | Results: No fire, no explosion ..... : | No fire, no explosion<br>(See Table 7.3.2) | P |
| 7.3.3 | Free fall | | P |
| | Results: No fire, no explosion. | No fire, no explosion. | P |
| 7.3.4 | Thermal abuse (cells) | Considered | P |
| | The cells were held at 130°C ± 2°C for 30 minutes; | Considered | P |
| | Oven temperature (°C) ..... : | The oven temperature was raised at a rate of 5°C /min ± 2°C /min to a temperature of 130°C ± 2°C. | -- |
| | Gross mass of cell (g) ..... : | 12.1g | -- |
| | Results: No fire, no explosion. | No fire, no explosion | P |
| 7.3.5 | Crush (cells) | Considered | P |
| | The crushing force was released upon:<br>- The maximum force of 13 kN ± 078 kN has been applied; or | Considered | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - An abrupt voltage drop of one-third of the original voltage has been obtained; or | | N/A |
| | Results: No fire, no explosion ..... : | No fire, no explosion<br>(See Table 7.3.5) | P |
| 7.3.6 | Over-charging of battery | | P |
| | Sample batteries be charged at a constant current of 2.0 It A, using a supply voltage which is: | | P |
| | - 1.4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6.0 V) for single cell/cell block batteries or | | N/A |
| | - 1.2 times the upper limit charging voltage presented in Table A.1 per cell for series connected multi-cell batteries, and | 10.2V | P |
| | - sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached. | | P |
| | Test was continued until the temperature of the outer casing:<br>- Reached steady state conditions (less than 10°C change in 30-minute period); or | | P |
| | - Returned to ambient. | | N/A |
| | Results: No fire, no explosion ..... : | No fire, no explosion<br>(See Table 7.3.6) | P |
| 7.3.7 | Forced discharge (cells) | | P |
| | - The discharge voltage reaches the negative value of upper limit charging voltage within the testing duration, the voltage maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration | | N/A |
| | - The discharge voltage does not reach the negative value of upper limit charging voltage within the testing duration, the test terminated at the end of the testing duration | | P |
| | Results: No fire. No explosion..... : | (See Table 7.3.7) | P |
| 7.3.8 | Mechanical tests (batteries) | | P |
| 7.3.8.1 | Vibration | | P |
| | Results: No fire, no explosion, no rupture, no leakage or venting. | No fire, no explosion, no rupture, no leakage or venting | P |
| 7.3.8.2 | Mechanical shock | | P |
| | Results: No leakage, no venting, no rupture, no explosion and no fire during test | No fire, no explosion, no rupture, no leakage or venting | P |
| 7.3.9 | Design evaluation – Forced internal short circuit (cells) | . | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | The cells complied with national requirement for ..... : | | -- |
| | The pressing was stopped upon:<br>- A voltage drop of 50 mV has been detected; or | | N/A |
| | - The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached | | N/A |
| | Results: No fire ..... : | (See Table 7.3.9) | N/A |
| **8** | **Information for safety** | | **P** |
| **8.1** | **General** | | |
| | The manufacturer of secondary cells ensures that information is provided about current, voltage and temperature limits of their products. | Showed in specification | P |
| | The manufacturer of batteries ensures that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards. | | P |
| | Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product | | N/A |
| | As appropriate, information relating to hazard avoidance resulting from a system analysis is provided to the end user | | N/A |
| | Do not allow children to replace batteries without adult supervision | | P |
| 8.2 | Small cell and battery safety information | Small cell and battery | P |
| | Small cells and batteries and equipment using small cells and batteries are to be provided with information regarding ingestion hazards | | P |
| | Small cells and batteries that may pose an ingestion hazard are those that can fit within the limits of the ingestion gauge shown in Figure 3. | | P |
| | The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:<br>-Keep small cells and batteries which are considered swallowable out of the reach of children | | P |
| | -Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion | | P |
| | -In case of ingestion of a cell or battery, seek medical assistance promptly | | P |
| **9** | **Marking** | | **P** |

| IEC 62133-2:2017 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 9.1 | Cell marking | Tested with appliance | N/A |
| | Cells marked as specified in IEC 61960 | | N/A |
| | Coin cells whose external surface area is too small to accommodate the markings on the cells show the designation and polarity | | N/A |
| | By agreement between the cell manufacturer and the battery and/or end product manufacturer, component cells used in the manufacture of a battery need not be marked. However, the cell marking can be indicated with the battery, the instructions and/or the specifications. | | N/A |
| 9.2 | Battery marking | | P |
| | Batteries marked as specified in IEC 61960 | | P |
| | Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity | Not coin cells | N/A |
| | Batteries marked with an appropriate caution statement. | | P |
| | Terminals have clear polarity marking on the external surface of the battery | | N/A |
| | Batteries with keyed external connectors designed for connection to specific end products need not be marked with polarity markings if the design of the external connector prevents reverse polarity connections | | P |
| 9.3 | Caution for ingestion of small cells and batteries | Small cell and battery | P |
| | Coin cells and batteries identified as small batteries according to 8.2 include a caution statement regarding the hazards of ingestion in accordance with 8.2 | | P |
| | When small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion given on the immediate package | | P |
| 9.4 | Other information | See below. | P |
| | Storage and disposal instructions marked on or supplied with the battery. | Information for safety mentioned in manufacturer's specification. | P |
| | Recommended charging instructions marked on or supplied with the battery. | Information for safety mentioned in manufacturer's specification. | P |
| **10** | **Packaging and transport** | | **P** |
| | Packaging for coin cells shall not be small enough to fit within the limits of the ingestion gauge of Figure 3 | Considered. | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| **Annex A** | **Charging range of secondary lithium ion cells for safe use** | | **P** |
|---|---|---|---|
| A.1 | General | | P |
| A.2 | Safety of lithium-ion secondary battery | | P |
| A.3 | Consideration on charging voltage | | P |
| A.3.1 | General | 4.25V applied | P |
| A.3.2 | Upper limit charging voltage | | P |
| A.3.2.1 | General | 4.25V applied | P |
| A.3.2.2 | Explanation of safety viewpoint | | N/A |
| A.3.2.3 | Safety requirements, when different upper limit charging voltage is applied | | N/A |
| A.4 | Consideration of temperature and charging current | | P |
| A.4.1 | General | | P |
| A.4.2 | Recommended temperature range | | P |
| A.4.2.1 | General | | P |
| A.4.2.2 | Safety consideration when a different recommended temperature range is applied | 10-45°C by client | P |
| A.4.3 | High temperature range | | P |
| A.4.3.1 | General | | P |
| A.4.3.2 | Explanation of safety viewpoint | | P |
| A.4.3.3 | Safety considerations when specifying charging conditions in high temperature range | | P |
| A.4.3.4 | Safety consideration when specifying new upper limit in high temperature range | | N/A |
| A.4.4 | Low temperature range | | P |
| A.4.4.1 | General | | P |
| A.4.4.2 | Explanation of safety viewpoint | | P |
| A.4.4.3 | Safety considerations, when specifying charging conditions in low temperature range | | P |
| A.4.4.4 | Safety considerations when specifying a new lower limit in the low temperature range | | N/A |
| A.4.5 | Scope of the application of charging current | | P |
| A.4.6 | Consideration of discharge | | P |
| A.4.6.1 | General | | P |
| A.4.6.2 | Final discharge voltage and explanation of safety viewpoint | | P |
| A.4.6.3 | Discharge current and temperature range | | P |
| A.4.6.4 | Scope of application of the discharging current | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| A.5 | Sample preparation | | N/A |
| A.5.1 | General | | N/A |
| A.5.2 | Insertion procedure for nickel particle to generate internal short | | N/A |
| | The insertion procedure carried out at 20°C±5°C and under -25 °C of dew point | | N/A |
| A.5.3 | Disassembly of charged cell | | N/A |
| A.5.4 | Shape of nickel particle | | N/A |
| A.5.5 | Insertion of nickel particle to cylindrical cell | | N/A |
| A.5.5.1 | Insertion of nickel particle to winding core | | N/A |
| A.5.5.2 | Marking the position of nickel particle on the both ends of winding core of the separator | | N/A |
| A.5.6 | Insertion of nickel particle in prismatic cell | | N/A |
| A.6 | Experimental procedure of the forced internal short-circuit test | | N/A |
| A.6.1 | Material and tools for preparation of nickel particle | | N/A |
| A.6.2 | Example of a nickel particle preparation procedure | | N/A |
| A.6.3 | Positioning (or placement) of a nickel particle | | N/A |
| A.6.4 | Damaged separator precaution | | N/A |
| A.6.5 | Caution for rewinding separator and electrode | | N/A |
| A.6.6 | Insulation film for preventing short-circuit | | N/A |
| A.6.7 | Caution when disassembling a cell | | N/A |
| A.6.8 | Protective equipment for safety | | N/A |
| A.6.9 | Caution in the case of fire during disassembling | | N/A |
| A.6.10 | Caution for the disassembling process and pressing the electrode core | | N/A |
| A.6.11 | Recommended specifications for the pressing device | | N/A |
| **Annex D** | Measurement of the internal AC resistance for coin cells | | N/A |
| **D.1** | General | | N/A |
| **D.2** | Method | | N/A |
| **Annex E** | Packaging and transport | | N/A |
| **Annex F** | Component standards references | | N/A |

| | TABLE: Critical components information | | | | P |
|---|---|---|---|---|---|
| **Object/part no.** | **Manufacturer/ trademark** | **Type/model** | **Technical data** | **Standard** | **Mark(s) of conformity** [1)] |
| Lead wire (Red & Black) | SHENZHEN XINLIAN WIRE&CABLE CO., LTD. | 10027 | 28AWG, 105°C, 300V | UL 758 | UL E502584 |
| -PCB | Shenzhen Jia Li Chuang Technology Development Co., Ltd. | JLC-1 | V-0, 130°C | UL796 UL796F | UL E479892 |
| Protect IC | RICOH | R5460N212AF | Overcharge detection voltage: 4.29V, Overdischarge detection voltage: 3.0V, Short protection voltage: 1.1V, $T_{opr}$: -40°C to +85°C | -- | -- |
| MOSFET | Alpha & Omega Semiconductor., Ltd. | AO8814 | $V_{DS}$:20V, $V_{GS}$:10V, $I_D$:7.5A, $T_J$:-55°C to +150°C | -- | -- |
| Cell | Shenzhen Echeeta New Energy Technology Co.,Ltd | TDLP682340 | Rated Voltage: 3,7 Vd.c., Rated Capacity: 800mAh | IEC 62133-2: 2017 | Tested with appliance |
| -Electrolyte | HENAN HUARUI ADVANCED MATRIALS TECHNOLOGY CO., LTD | HR306 | Lithium hexafluorophosphate, Total dissolved solids (25°C): 9.4±0.5ms/cm, Free acid(HF)≤30PPM, Water content($H_2O$) ≤10PPM | -- | -- |
| -Separator | AsahiKASEI | 16um | Width:19.0+0.5/-0mm, Thickness:16um±2um, Shutdown temperature:135°C to 140°C, Single layer, Porosity≥36% | -- | -- |
| -Negative electrode | DaLian Hongguang Lithium Co.,Ltd | HG-8D | Graphite, Conductive, Copper Foil | -- | -- |
| -Positive electrode | Hu Nan Shanshan Energy Co.,Ltd | LC412 | $LiCoO_3$, PVDF, Conductive, Aluminum Foil | -- | -- |
| -Positive electrode tab | Huizhou City HUA WO TECHNOLOGY CO.,LTD | 0.1mm×2mm | Aluminium | -- | -- |
| -Negative electrode tab | Huizhou City HUA WO TECHNOLOGY CO.,LTD | 0.1mm×2mm | Nickel | -- | -- |
| -Aluminum plastic film | Crown Advanced Material Co., ltd | 113um | PP+AL+PA | -- | -- |

**Supplementary information:**

**[1)] Provided evidence ensures the agreed level of compliance.**

| 7.2.1 | TABLE: Continuous charging at constant voltage (cells) | | | P |
|---|---|---|---|---|
| **Model** | **Recommended charging voltage $V_c$, (Vdc)** | **Recommended charging current $I_{rec}$, (A)** | **OCV at start of test, (Vdc)** | **Results** |
| TDLP682340 (#1) | 4.20 | 0.16 | 4.191 | A, B |
| TDLP682340 (#2) | 4.20 | 0.16 | 4.190 | A, B |
| TDLP682340 (#3) | 4.20 | 0.16 | 4.193 | A, B |
| TDLP682340 (#4) | 4.20 | 0.16 | 4.190 | A, B |
| TDLP682340 (#5) | 4.20 | 0.16 | 4.190 | A, B |
| **Supplementary information:**<br>A - No fire or explosion<br>B - No leakage<br>C - Others (please explain) | | | | |

| 7.3.1 | TABLE: External short circuit (cell) | | | | P |
|---|---|---|---|---|---|
| **Model** | **Ambient, (°C)** | **OCV at start of test, (Vdc)** | **Resistance of circuit, (Ω)** | **Maximum case temperature T, (°C)** | **Results** |
| **Samples charged at charging temperature upper limit (45°C)** | | | | | |
| TDLP682340 (#6) | 55.2 | 4.244 | 0.083 | 124.1 | A |
| TDLP682340 (#7) | 55.2 | 4.244 | 0.084 | 125.3 | A |
| TDLP682340 (#8) | 55.2 | 4.246 | 0.083 | 112.4 | A |
| TDLP682340 (#9) | 55.2 | 4.244 | 0.085 | 129.4 | A |
| TDLP682340 (#10) | 55.2 | 4.246 | 0.082 | 118.4 | A |
| **Samples charged at charging temperature lower limit (10°C)** | | | | | |
| TDLP682340 (#11) | 54.9 | 4.211 | 0.085 | 127.1 | A |
| TDLP682340 (#12) | 54.9 | 4.217 | 0.086 | 122.8 | A |
| TDLP682340 (#13) | 54.9 | 4.217 | 0.085 | 116.4 | A |
| TDLP682340 (#14) | 54.9 | 4.212 | 0.083 | 123.0 | A |
| TDLP682340 (#15) | 54.9 | 4.211 | 0.084 | 121.9 | A |
| **Supplementary information:**<br>A - No fire or explosion<br>B - Others (please explain) | | | | | |

| 7.3.2 | TABLE: External short circuit (battery) | | | | P |
|---|---|---|---|---|---|
| **Model** | **Ambient, (°C)** | **OCV at start of test, (Vdc)** | **Resistance of circuit, (Ω)** | **Maximum case temperature T (°C)** | **Results** |
| IP9V-800 (#1) | 22.7 | 8.395 | 0.081 | 23.1 | A |
| *IP9V-800 (#2) | 22.7 | 8.397 | 0.083 | 35.6 | A |
| *IP9V-800 (#3) | 22.7 | 8.399 | 0.085 | 37.6 | A |
| *IP9V-800 (#4) | 22.7 | 8.391 | 0.083 | 36.1 | A |
| *IP9V-800 (#5) | 22.7 | 8.396 | 0.083 | 43.3 | A |

**Supplementary information:**

A- No fire or explosion

B- Others (please explain)

*Test with MOSFET Q1 (Pin2-7) short circuit

| 7.3.5 | TABLE: Crush(Cell) | | P |
|---|---|---|---|
| **Model** | **OCV at start of test, (Vdc)** | **OCV at removal of crushing force, (Vdc)** | **Results** |
| **Samples charged at charging temperature upper limit (45°C)** | | | |
| TDLP682340 (#29) | 4.247 | 4.245 | A |
| TDLP682340 (#30) | 4.243 | 4.243 | A |
| TDLP682340 (#31) | 4.243 | 4.243 | A |
| TDLP682340 (#32) | 4.244 | 4.243 | A |
| TDLP682340 (#33) | 4.242 | 4.243 | A |
| **Samples charged at charging temperature lower limit (10°C)** | | | |
| TDLP682340 (#34) | 4.197 | 4.195 | A |
| TDLP682340 (#35) | 4.200 | 4.200 | A |
| TDLP682340 (#36) | 4.198 | 4.198 | A |
| TDLP682340 (#37) | 4.200 | 4.199 | A |
| TDLP682340 (#38) | 4.200 | 4.200 | A |

**Supplementary information:**

A- No fire or explosion

B- Others (please explain)

| 7.3.6 | TABLE: Over-charging of battery | | | | P |
|---|---|---|---|---|---|
| Constant charging current (A) ..... : | | | 1.6 | | -- |
| Supply voltage (Vdc) ..... : | | | 10.2 | | -- |
| **Model** | **OCV before charging, (Vdc)** | **Total charging time (min)** | **Maximum outer casing temperature, (°C)** | | **Results** |
| IP9V-800 (#9) | 6.534 | 120 | 34.9 | | A |
| IP9V-800 (#10) | 6.493 | 120 | 38.0 | | A |
| IP9V-800 (#11) | 6.481 | 120 | 36.4 | | A |
| IP9V-800 (#12) | 6.566 | 120 | 36.3 | | A |
| IP9V-800 (#13) | 6.552 | 120 | 37.2 | | A |
| **Supplementary information:**<br>A- No fire or explosion<br>B- Others (please explain) | | | | | |

| 7.3.7 | TABLE: Forced discharge (cells) | | | | P |
|---|---|---|---|---|---|
| **Model** | **OCV before application of reverse charge, (Vdc)** | **Measured Reverse charge $I_t$, (A)** | **Time for reversed charge, (minutes)** | | **Results** |
| TDLP682340 (#39) | 3.046 | 0.8 | 90 | | A |
| TDLP682340 (#40) | 3.057 | 0.8 | 90 | | A |
| TDLP682340 (#41) | 3.065 | 0.8 | 90 | | A |
| TDLP682340 (#42) | 3.048 | 0.8 | 90 | | A |
| TDLP682340 (#43) | 3.095 | 0.8 | 90 | | A |
| **Supplementary information:**<br>A- No fire or explosion<br>B- Others (please explain) | | | | | |

| 7.3.8.1 | TABLE: Vibration | | | | P |
|---|---|---|---|---|---|
| **Model** | **OCV (V)** | | **Mass of Test Battery (g)** | | **Result** |
| | **Before test** | **After test** | **Before test** | **After test** | |
| IP9V-800 (#14) | 8.392 | 8.390 | 31.172 | 31.171 | A, B, C, D |
| IP9V-800 (#15) | 8.399 | 8.397 | 31.274 | 31.273 | A, B, C, D |
| IP9V-800 (#16) | 8.398 | 8.397 | 32.015 | 32.015 | A, B, C, D |
| **Supplementary information:**<br>A- No fire or explosion<br>B- No rupture<br>C- No leakage<br>D- No venting<br>E- Others (please explain) | | | | | |

| 7.3.8.2 | TABLE: Mechanical shock | | | | P |
|---|---|---|---|---|---|
| Model | OCV (V) | | Mass of Test Battery (g) | | Result |
| | Before test | After test | Before test | After test | |
| IP9V-800 (#17) | 8.396 | 8.395 | 31.719 | 31.718 | A, B, C, D |
| IP9V-800 (#18) | 8.397 | 8.396 | 31.628 | 31.626 | A, B, C, D |
| IP9V-800 (#19) | 8.396 | 8.396 | 31.576 | 31.574 | A, B, C, D |

**Supplementary information:**

A- No fire or explosion
B- No rupture
C- No leakage
D- No venting
E- Others (please explain)

| 7.3.9 | TABLE: Forced internal short circuit (cells) | | | | N/A |
|---|---|---|---|---|---|
| Model | Chamber ambient, (°C) | OCV at start of test, (Vdc) | Particle location [1)] | Maximum applied pressure, (N) | Results |
| -- | -- | -- | -- | -- | -- |

**Supplementary information:**

[1)] Identify one of the following:
1: Nickel particle inserted between positive and negative (active material) coated area.
2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

A- No fire or explosion
B- Others (please explain)

## Attachment 1
## Photo Documentation

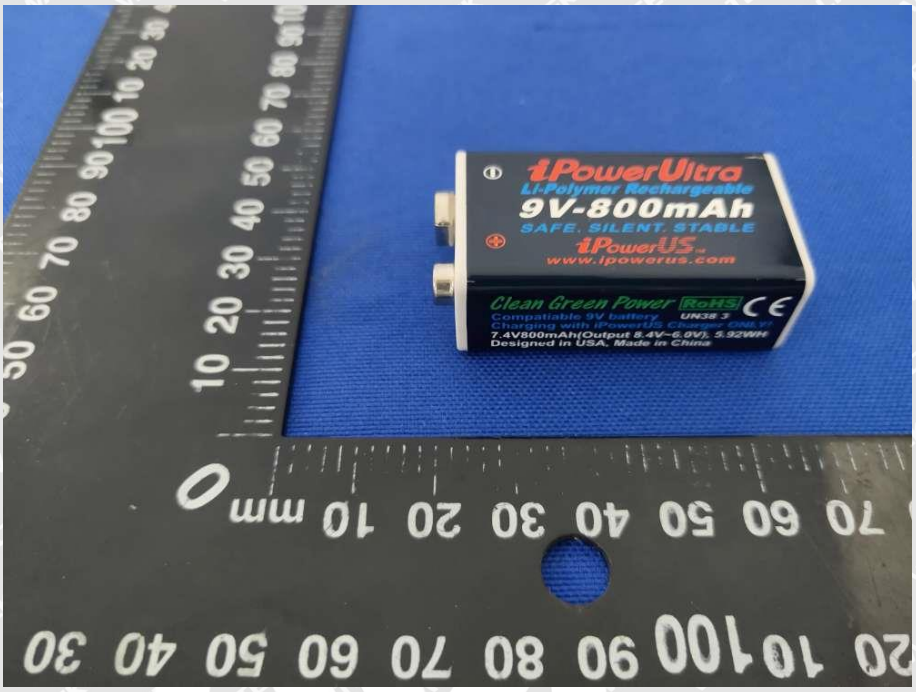


Photo 1


Photo 2

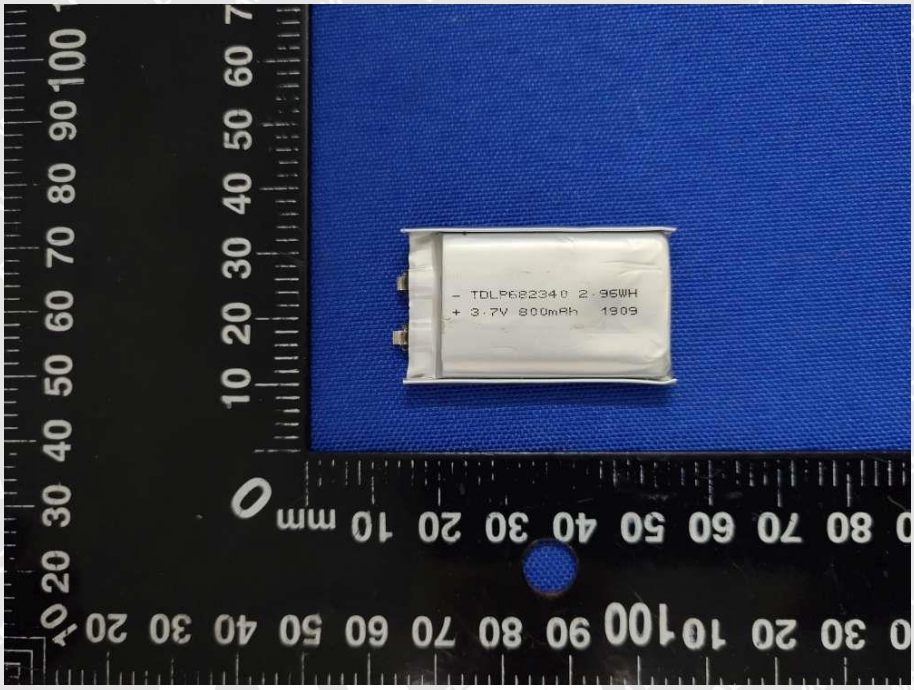


Photo 3

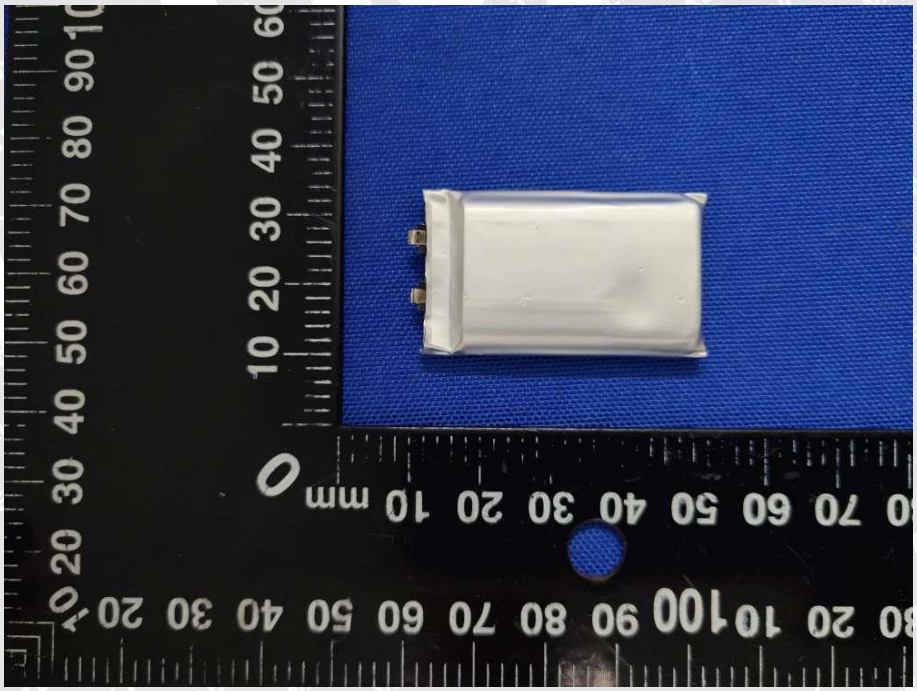

Photo 4

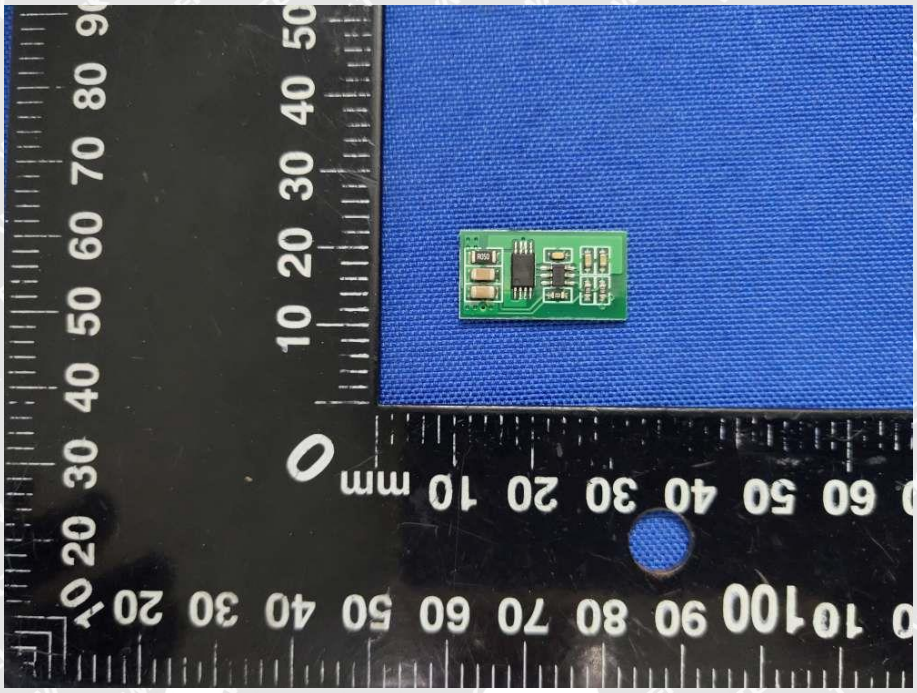

Photo 5

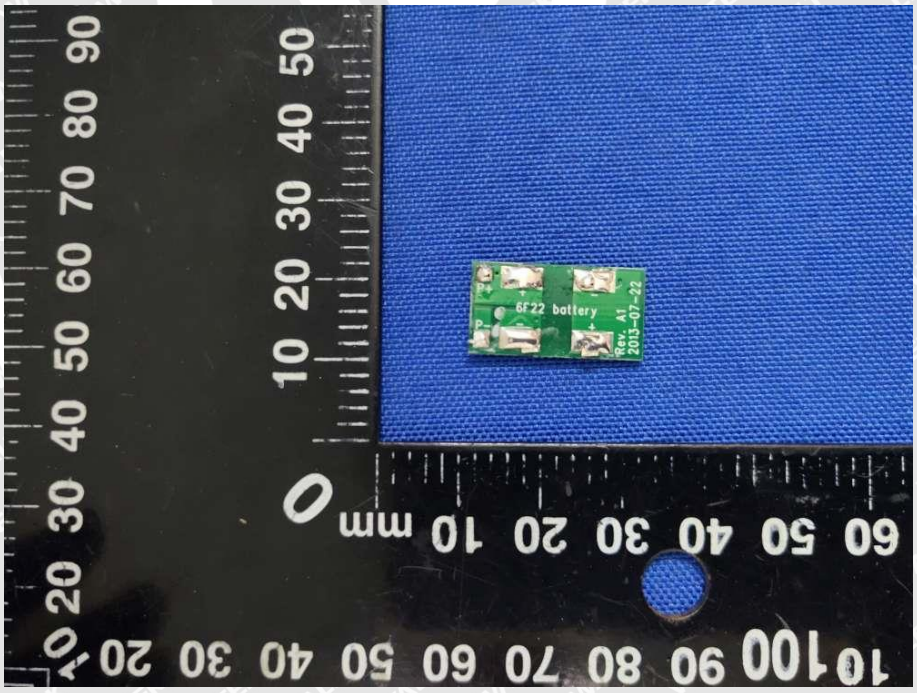


Photo 6

====== End of Report ======