IEC IECEE	**Test Report issued under the responsibility of:** **NCB TÜV SÜD PSB Pte. Ltd.** **15 International Business Park, TÜV SÜD@IBP** **Singapore 609937**	TÜV SÜD

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

Report Number. ..... :	211-2822601105-000
Date of issue ..... :	2026-03-25
Total number of pages ..... :	25 pages
Name of CB Testing Laboratory preparing the Report ..... :	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Applicant's name ..... :	Shenzhen Harding Energy Co., Ltd.
Address ..... :	Unit 201-202 Building 4, Dongchuang Intelligent Technology Industrial Park, Linghai Rd 2 Kuichong, Dapeng New District, 518119 Shenzhen, PEOPLE'S REPUBLIC OF CHINA
Test specification:	
Standard ..... :	IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
TRF template used ..... :	IECEE OD-2020-F1:2024, Ed.1.7
Test Report Form No. ..... :	IEC62133_2C
Test Report Form(s) Originator .... :	DEKRA Certification B.V.
Master TRF ..... :	Dated 2025-09-26

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General disclaimer:

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Test item description .....:	LI-ION POLYMER BATTERY
Trade Mark(s) .....:	N/A
Manufacturer.....:	Same as applicant
Model/Type reference.....:	LP-PAVMYRN1S1P
Ratings.....:	3.8Vd.c., 4400mAh

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**CB Testing Laboratory:**	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch	
Testing location/ address ..... :		Building A2, Jin'ao Industrial Park, No.150, Jingfang Road, Fuhai, Bao'an District, Shenzhen, Guangdong 518103, China Building 12 & 13, Zhiheng Wisdomland Business Park, Guankou Erlu, Nantou, Nanshan District, Shenzhen, Guangdong 518052, China	
Tested by (name, function, signature) ..... :		Damian Cai Project Handler	
Approved by (name, function, signature) .. :		Red Chen Project Reviewer	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):
Attachment No.1: 3 pages of (Republic of Korea) NATIONAL DIFFERENCES;
Attachment No.2: 4 pages of Photo Documentation.

Summary of testing:

Tests performed (name of test, test clause and date test performed):	**Testing location: (CBTL, SPTL, CTF, Subcontractor)**
Tests are made with the number of samples specified in Table 1 of IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021. clause 7.2.1 Continuous charging at constant voltage (cells) clause 7.2.2 Case stress at high ambient temperature (battery) clause 7.3.1 External short circuit (cell) clause 7.3.2 External short circuit (battery) clause 7.3.3 Free fall clause 7.3.4 Thermal abuse (cells) clause 7.3.5 Crush (cells) clause 7.3.6 Over-charging of battery clause 7.3.7 Forced discharge (cells) clause 7.3.8.1 Vibration clause 7.3.8.2 Mechanical shock clause 7.3.9 Forced internal short-circuit (cells) Date test performed: 2026-01-23 to 2026-03-06 The samples comply with the requirements of IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021.	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Address 1: Building A2, Jin'ao Industrial Park, No.150, Jingfang Road, Fuhai, Bao'an District, Shenzhen, Guangdong 518103, China Address 2: Building 12 & 13, Zhiheng Wisdomland Business Park, Guankou Erlu, Nantou, Nanshan District, Shenzhen, Guangdong 518052, China

Summary of compliance with National Differences

- IECEE Member countries that are also CENELEC members

Compliance with Group Differences evaluated ☐ **yes** ☐ **No** ☒ N/A
Comply with EN 62133-2:2017/A1:2021 and BS EN 62133-2:2017+A1:2021.

- IECEE Member countries with published National Differences which were evaluated: KR

- IECEE Member countries that did not publish any National Differences: N/A

To support compliance with published National Differences, attach a compilation of relevant ND and/or GD TRFs to the CB Test Report

Use of uncertainty of measurement for decisions on conformity (decision rule):

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other: … (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:

The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Remark:

"2604" represents the manufacture date is in week 4 of 2026, only for example.

Test item particulars.....:	
Classification of installation and use.....:	Use in portable applications
Supply Connection.....:	Supply by connector
Recommend charging method declared by the manufacturer.....:	Charge at constant current 880mA until voltage reaches 4.35V, then charge at constant voltage 4.35V till charge current is 88mA.
Discharge current (0,2 It A).....:	880mA
Specified final voltage.....:	3.0V
Upper limit charging voltage per cell.....:	4.35V
Maximum charging current.....:	2000mA
Charging temperature upper limit.....:	45°C
Charging temperature lower limit.....:	0°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 .....:	2026-01-22
Date (s) of performance of tests.....:	2026-01-23 to 2026-03-06

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... : Same as applicant

General product information and other remarks:

1. The LI-ION POLYMER BATTERY: LP-PAVMYRN1S1P is used for portable applications and consists of single cell, cell model: 784476, the cell is tested with the battery.

2. Additionally, detailed information of the cell and battery are as following:

Product name	Li-ion Polymer Cell	LI-ION POLYMER BATTERY
Type/model	784476	LP-PAVMYRN1S1P
Nominal voltage	3.8Vd.c.	3.8Vd.c.
Rated capacity	4400mAh	4400mAh
Charging voltage recommended by manufacturer	4.35V	4.35V
Upper limit charging voltage	4.35V	4.35V
Final voltage	3.0V	3.0V
Lower limit discharge voltage	3.0V	-
Charging current declared by manufacturer	880mA	880mA
Maximum charging current	4400mA	2000mA
Charging temperature upper limit	45°C	45°C
Charging temperature lower limit	0°C	0°C
First charging procedure (20°C ± 5°C)	Charge at constant current 880mA until voltage reaches 4.35V, then charge at constant voltage 4.35V till charge current is 88mA.	Charge at constant current 880mA until voltage reaches 4.35V, then charge at constant voltage 4.35V till charge current is 88mA.
Second charging procedure	Store at 45°C and 0°C for 1 to 4 hours, respectively, then charge at constant current 4400mA until voltage reaches 4.35V, then charge at constant voltage 4.35V till charge current reduced to 0.05 *I*t A (220mA)	-

Remark:
The final evaluation of the battery must be conducted in the end product for which the battery will be used.

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Clause	Requirement + Test	Result - Remark	Verdict
4	**PARAMETER MEASUREMENT TOLERANCES**		P
	Parameter measurement tolerances		P
5	**GENERAL SAFETY CONSIDERATIONS**		P
5.1	**General**		P
	Cells and batteries so designed and constructed that they are safe under conditions of both intended use and reasonably foreseeable misuse		P
5.2	**Insulation and wiring**		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 externally exposed metal surface	N/A
	Insulation resistance (MΩ) ..... :		—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		P
	Orientation of wiring maintains adequate clearances and creepage distances between conductors		P
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse		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 and 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 specified chargers are designed to maintain charging within the temperature, voltage and current limits specified		P
5.5	**Terminal contacts**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current		P
	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		P
	This protection may be provided external to the battery such as within the charger or the end devices	Consider in end product	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	Consider in end product	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	Consider in end product	N/A
	The manufacturer of the battery provide 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, it is recommended that the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 2		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, it is recommended that 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		N/A
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that 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		N/A
	For batteries consisting of series-connected cells or cell blocks, nominal charge voltage are not counted as an overcharge protection		N/A
	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		N/A
	It is recommended that the cells and cell blocks are not discharged beyond the cell manufacturer's specified final voltage		P
	For batteries consisting of series-connected cells or cell blocks, cell balancing circuitry are incorporated into the battery management system		N/A
5.6.3	Mechanical protection for cells and components of batteries	Consider in end product	N/A
	Mechanical protection for cells, cell connections and control circuits within the battery are provided to prevent damage as a result of intended use and reasonably foreseeable misuse		N/A
	The mechanical protection can be provided by the battery case or it can be provided by the end product enclosure for those batteries intended for building into an end product		N/A
	The battery case and compartments housing cells are 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 is considered when conducting mechanical tests		N/A
5.7	**Quality plan**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	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**		N/A
6	**TYPE TEST AND SAMPLE SIZE**		P
	Tests are 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 are measured in accordance with Annex D. Coin cells with internal resistance less than or equal to 3 Ω are tested in accordance with Table 1		N/A
	Unless otherwise specified, tests are carried out in an ambient temperature 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 is 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 procedure for test purposes**		P
7.1.1	First procedure		P
	This charging procedure applies to subclauses 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 has 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		P
	This charging procedure applies only to 7.3.1, 7.3.4, 7.3.5, and 7.3.9		P

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Clause	Requirement + Test	Result - Remark	Verdict
	After stabilization for 1 h to 4 h, at an ambient temperature of the highest test temperature and the lowest test temperature, respectively, 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 current to constant voltage charging method		P
7.2	**Intended use**		P
7.2.1	Continuous charging at constant voltage (cells)		P
	Fully charged cells are subjected for 7 days to a charge using the charging method for current and standard voltage specified by the cell manufacturer		P
	Results: no fire, no explosion.....:	(See appended table 7.2.1)	P
7.2.2	Case stress at high ambient temperature (battery)	This test is specially requested by client.	P
	Oven temperature (°C).....:	70°C±2°C	—
	Results: no physical distortion of the battery case resulting in exposure of internal protective components and cells		P
7.3	**Reasonably foreseeable misuse**		P
7.3.1	External short-circuit (cell)		P
	The cells were tested until one of the following occurred:		P
	- 24 hours elapsed; or		N/A
	- The case temperature declined by 20 % of the maximum temperature rise		P
	Results: no fire, no explosion.....:	(See appended table 7.3.1)	P
7.3.2	External short-circuit (battery)		P
	The batteries were tested until one of the following occurred:		P
	- 24 hours elapsed; or		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 pack remained on test for an additional one hour after the current reached a low end steady state condition		N/A
	A single fault in the discharge protection circuit is conducted on one to four (depending upon the protection circuit) of the five samples before conducting the short-circuit test		P

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Clause	Requirement + Test	Result - Remark	Verdict
	A single fault applies to protective component parts such as MOSFET (metal oxide semiconductor field-effect transistor), fuse, thermostat or positive temperature coefficient (PTC) thermistor		P
	Results: no fire, no explosion..... :	(See appended table 7.3.2)	P
7.3.3	Free fall		P
	Results: no fire, no explosion		P
7.3.4	Thermal abuse (cells)		P
	Oven temperature (°C)..... :	130°C±2°C	—
	Results: no fire, no explosion		P
7.3.5	Crush (cells)		P
	The crushing force was released upon:		P
	- The maximum force of 13 kN ± 0,78 kN has been applied; or		P
	- An abrupt voltage drop of one-third of the original voltage has been obtained		N/A
	Results: no fire, no explosion..... :	(See appended table 7.3.5)	P
7.3.6	Over-charging of battery		P
	The 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		P
	- 1,2 times the upper limit charging voltage resented in Table A.1 per cell for series connected multi-cell batteries, and		N/A
	- 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:		P
	- 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..... :	(See appended table 7.3.6)	P
7.3.7	Forced discharge (cells)		P
	Discharge a single cell to the lower limit discharge voltage specified by the cell manufacturer		P
	The discharged cell is then subjected to a forced discharge at 1 It A to the negative value of the upper limit charging voltage		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- The discharge voltage reaches the negative value of upper limit charging voltage within the testing duration. The voltage is 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 is terminated at the end of the testing duration		P
	Results: no fire, no explosion ..... :	(See appended 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. ..... :	(See appended table 7.3.8.1)	P
7.3.8.2	Mechanical shock		P
	Results: no leakage, no venting, no rupture, no explosion and no fire ..... :	(See appended table 7.3.8.2)	P
7.3.9	Design evaluation – Forced internal short-circuit (cells)		P
	The cells complied with national requirement for ..... :	France, Japan, Korea and Switzerland	—
	The pressing was stopped upon:		P
	- 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	400N	P
	Results: no fire ..... :	(See appended table 7.3.9)	P
8	**INFORMATION FOR SAFETY**		P
8.1	**General**		P
	Manufacturers of secondary cells provides information about current, voltage and temperature limits of their products		P
	Manufacturers of batteries provides information regarding how to minimize and mitigate hazards to equipment manufacturers or end-users		P
	Systems analyses are performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product		N/A
	As appropriate, any information relating to hazard avoidance resulting from a system analysis is provided to the end user		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Do not allow children to replace batteries without adult supervision		P
8.2	**Small cell and battery safety information**		N/A
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:		N/A
	- Keep small cells and batteries which are considered swallowable out of the reach of children		N/A
	- Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion		N/A
	- In case of ingestion of a cell or battery, seek medical assistance promptly		N/A
9	**MARKING**		P
9.1	**Cell marking**		N/A
	Cells are marked as specified in IEC 61960, except coin cells		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		N/A
9.2	**Battery marking**		P
	Batteries are marked as specified in IEC 61960, except for coin batteries	Battery marked as specified in IEC 61960-3:2017	P
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity		N/A
	Batteries are marked with an appropriate caution statement		P
	- Terminals have clear polarity marking on the external surface of the battery, or		N/A
	- 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**		N/A
	Coin cells and batteries identified as small batteries include a caution statement regarding the hazards of ingestion in accordance with 8.2		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion is given on the immediate package		N/A
9.4	**Other information**		P
	The following information are marked on or supplied with the battery:		P
	- Storage and disposal instructions		P
	- Recommended charging instructions		P
10	**PACKAGING AND TRANSPORT**		N/A
	Packaging for coin cells are not be small enough to fit within the limits of the ingestion gauge of Figure 3		N/A
ANNEX A	**CHARGING AND DISCHARGING 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		P
A.3.2	Upper limit charging voltage		P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		P
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied		P
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		P
A.4.3	High temperature range		N/A
A.4.3.1	General		N/A
A.4.3.2	Explanation of safety viewpoint		N/A
A.4.3.3	Safety considerations when specifying charging conditions in the high temperature range		N/A
A.4.3.4	Safety considerations when specifying a new upper limit in the high temperature range		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
A.4.4	Low temperature range		N/A
A.4.4.1	General		N/A
A.4.4.2	Explanation of safety viewpoint		N/A
A.4.4.3	Safety considerations, when specifying charging conditions in the low temperature range		N/A
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	Consider in end product	N/A
A.4.6.3	Discharge current and temperature range	Consider in end product	N/A
A.4.6.4	Scope of application of the discharging current		P
A.5	**Sample preparation**		P
A.5.1	General		P
A.5.2	Insertion procedure for nickel particle to generate internal short		P
A.5.3	Disassembly of charged cell		P
A.5.4	Shape of nickel particle		P
A.5.5	Insertion of nickel particle in cylindrical cell		N/A
A.5.5.1	Insertion of nickel particle in winding core		N/A
A.5.5.2	Marking the position of the nickel particle on both ends of the winding core of the separator		N/A
A.5.6	Insertion of nickel particle in prismatic cell		P
A.6	**Experimental procedure of the forced internal short-circuit test**		P
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		P
A.6.4	Damaged separator precaution		P
A.6.5	Caution for rewinding separator and electrode		P
A.6.6	Insulation film for preventing short-circuit		P
A.6.7	Caution when disassembling a cell		P
A.6.8	Protective equipment for safety		P
A.6.9	Caution in the case of fire during disassembling		P

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Clause	Requirement + Test	Result - Remark	Verdict
A.6.10	Caution for the disassembling process and pressing the electrode core		P
A.6.11	Recommended specifications for the pressing device		P
ANNEX B	**RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS**		P
ANNEX C	**RECOMMENDATIONS TO THE END-USERS**		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
	A sample size of three coin cells is required for this measurement		N/A
	Coin cells with an internal resistance greater than 3 Ω require no further testing .....:		N/A
	Coin cells with an internal resistance less than or equal to 3 Ω are subjected to the testing according to Clause 6 and Table 1		N/A
ANNEX E	**PACKAGING AND TRANSPORT**		N/A
ANNEX F	**COMPONENT STANDARDS REFERENCES**		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: Continuous charging at constant voltage (cells)			P
Sample No.	**Recommended charging voltage Vc (Vdc)**	**Recommended charging current I_{rec} (A)**	**OCV before test (Vdc)**	**Results**
C1	4.35	0.88	4.340	A, B
C2	4.35	0.88	4.341	A, B
C3	4.35	0.88	4.340	A, B
C4	4.35	0.88	4.341	A, B
C5	4.35	0.88	4.342	A, B

Supplementary information:
A - No fire or explosion
B - No leakage
C - Others (please explain)

7.3.1	TABLE: External short circuit (cell)				P
Sample No.	**Ambient (°C)**	**OCV at start of test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature rise ΔT (K)**	**Results**
Samples charged at charging temperature upper limit					
C6	55.6	4.332	87	61.3	A
C7	55.6	4.334	90	62.2	A
C8	55.6	4.333	85	63.8	A
C9	55.6	4.331	88	60.0	A
C10	55.6	4.330	84	61.7	A
Samples charged at charging temperature lower limit					
C11	54.8	4.292	86	57.5	A
C12	54.8	4.289	85	59.2	A
C13	54.8	4.288	89	59.5	A
C14	54.8	4.288	91	57.9	A
C15	54.8	4.293	84	60.3	A

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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.2	TABLE: External short circuit (battery)					P
Sample No.	**Ambient T (°C)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature rise ΔT (K)**	**Component single fault condition**	**Results**
B1	23.3	4.338	86	0.3	No	A
B2*	23.3	4.340	90	4.5	Yes	A
B3*	23.3	4.339	85	4.4	Yes	A
B4**	23.3	4.341	87	0.2	Yes	A
B5**	23.3	4.339	86	0.2	Yes	A

Supplementary information:

A - No fire or explosion

B - Others (please explain)

* Tested with MOSFET (Q1) (Pin 2,3 to Pin 6,7) short circuit;

** Tested with PTC (PTC) short circuit

7.3.5	TABLE: Crush (cells)			P
Sample No.	**OCV before test (Vdc)**	**OCV at removal of crushing force (Vdc)**	**Maximum force applied to the cell during crush (kN)**	**Results**
Samples charged at charging temperature upper limit				
C26	4.332	4.332	13.04	A
C27	4.331	4.331	13.02	A
C28	4.332	4.331	13.03	A
C29	4.330	4.330	13.00	A
C30	4.330	4.329	13.02	A
Samples charged at charging temperature lower limit				
C31	4.292	4.292	13.02	A
C32	4.289	4.289	13.00	A
C33	4.291	4.291	13.03	A
C34	4.292	4.291	13.00	A
C35	4.291	4.291	12.99	A

Supplementary information:

A - No fire or explosion

B - Others (please explain)

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.6	TABLE: Over-charging of battery				P
Constant charging current (A) .....:		8.8			—
Supply voltage (Vdc) .....:		6.0			—
Sample No.	**OCV before charging (Vdc)**	**Total charging time (minute)**	**Maximum outer case temperature (°C)**	**Results**	
B6	3.324	120	23.3	A	
B7	3.328	120	23.5	A	
B8	3.325	120	23.6	A	
B9	3.327	120	23.4	A	
B10	3.325	120	23.5	A	

Supplementary information:

A - No fire or explosion

B - Others (please explain)

7.3.7	TABLE: Forced discharge (cells)			P
Sample No.	**OCV before application of reverse charge (Vdc)**	**Measured reverse charge I_t (A)**	**Lower limit discharge voltage (Vdc)**	**Results**
C36	3.321	4.4	3.0	A
C37	3.318	4.4	3.0	A
C38	3.322	4.4	3.0	A
C39	3.319	4.4	3.0	A
C40	3.324	4.4	3.0	A

Supplementary information:

A - No fire or explosion

B - Others (please explain)

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.8.1	TABLE: Vibration				P
Sample No.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
B11	4.335	4.332	61.633	61.630	A, B, C, D
B12	4.334	4.331	62.420	62.418	A, B, C, D
B13	4.334	4.330	61.979	61.976	A, B, C, D

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

7.3.8.2	TABLE: Mechanical shock				P
Sample No.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
B14	4.334	4.333	61.813	61.812	A, B, C, D
B15	4.335	4.334	62.254	62.252	A, B, C, D
B16	4.335	4.333	62.179	62.177	A, B, C, D

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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.9	TABLE: Forced internal short circuit (cells)				P
Sample No.	**Chamber ambient T (°C)**	**OCV before test (Vdc)**	**Particle location [1)]**	**Maximum applied pressure (N)**	**Results**
Samples charged at charging temperature upper limit					
C41	45	4.332	1	400	A
C42	45	4.333	1	400	A
C43	45	4.332	1	400	A
C44	45	4.330	1	400	A
C45	45	4.331	1	400	A
Samples charged at charging temperature lower limit					
C46	0	4.291	1	400	A
C47	0	4.289	1	400	A
C48	0	4.290	1	400	A
C49	0	4.292	1	400	A
C50	0	4.291	1	400	A

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.

Remark: There is no particle location 2 for this cell.

A - No fire

B - Others (please explain)

D.2	TABLE: Internal AC resistance for coin cells			N/A
Sample no.	**Ambient T (°C)**	**Store time (h)**	**Resistance Rac (Ω)**	**Results [1)]**

Supplementary information:

[1)] Coin cells with an internal resistance less than or equal to 3 Ω, see test result on corresponding tables according to Clause 6 and Table 1.

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Critical components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity** [1)]
1. Li-ion Polymer Cell	JUHEYUAN SCIENCE & TECHNOLOGY CO.,LTD.	784476	3.8Vd.c., 4400mAh	IEC 62133-2:2017, IEC 62133-2:2017/AMD 1:2021	Tested with battery
-Positive electrode	BASF SHANSHAN BATTERY MATERIALS (NINGXIANG) CO.,LTD	LC95X	$LiCoO_2$	-	-
-Negative electrode	Shanghai Shanshan New Material Co.,Ltd	SK3-H	Graphite	-	-
-Separator	Shenzhen Lithium Echo New Energy Technology Co., Ltd.	0.012*71.7mm	PE+ Al_2O_3+PVDF, Thickness: 12μm	-	-
-Electrolyte	Shenzhen Capchem Technology Co., Ltd.	LBC448E33	$LiPF_6$+DEC+EMC+EC	-	-
-Aluminium plastic film	Guangdong Guanglin Materials Co., Ltd.	GL-113TP	Aluminum foil+CPP, Thickness: 113μm	-	-
2. IC (U1)	SHENZHEN ICM MICROELECTRONICS CO.,LTD	CM1003-S07EA	Overcharge Detection Voltage: 4.425V±0.025V, Over-discharge Detection Voltage: 2.500V±0.050V	IEC 62133-2:2017, IEC 62133-2:2017/AMD 1:2021	Tested with battery
3. MOSFET (Q1)	JIANGSU CHANGJING ELECTRONICS TECHNOLOGY CO., LTD	CJS8810	V_{DS}: 20V, V_{GS}: ±12V, I_D: 7A(Ta=25°C)	IEC 62133-2:2017, IEC 62133-2:2017/AMD 1:2021	Tested with battery
4. PTC (PTC)	Wayon Electronics Co., Ltd.	LP-ISML300	V_{max}: 8Vdc, I_h: 3A, I_t: 6A, I_{max}: 50A	UL 1434	UL E202125
5. PCB	DONGGUAN HRSC PCB CO LTD	HX-009	V-0, 130°C	UL 796	UL E230194

IEC 62133-2					
Clause	Requirement + Test		Result - Remark		Verdict
-Alternative	Interchangeable	Interchangeable	V-0, 130°C	UL 796	UL Approved
6. Wires	DONGGUAN ZHONGZHENG WIRE & CABLE TECH CO LTD	1007	24AWG, 80°C, 300Vac	UL 758	UL E336285
-Alternative	Interchangeable	Interchangeable	24AWG, 80°C, 300Vac	UL 758	UL Approved
Supplementary information: 1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

---END---

Report No.: 211-2822601105-000

ATTACHMENT to TRF IEC62133_2C

ATTACHMENT TO TEST REPORT

IEC 62133-2
(Republic of Korea) NATIONAL DIFFERENCES
(Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications - Part 2: Lithium systems)

Differences according to ..... : National standard KC62133-2(2025-10)

TRF template used:.....: IECEE OD-2020-F3:2024, Ed. 1.3

Attachment Form No..... : KR_ND_IEC62133_2C

Attachment Originator..... : KTR

Master Attachment..... : Dated 2025-10-27

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Clause	Requirement + Test	Result - Remark	Verdict
	National Differences		P
7.3.6	**Over-charging of battery**		N/A
(Revision)	***[Add the bolded text]*** b) Test The test shall be carried out in an ambient temperature of 20 °C ± 5 °C. Each test battery shall be discharged at a constant current of 0,2 I_t A, to a final discharge voltage specified by the manufacturer. Sample batteries shall then be charged at a constant current of 2,0 I_t A, using a supply voltage which is: • 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 • 1,2 times the upper limit charging voltage presented in Table A.1 per cell for series connected multi-cell batteries, and • sufficient to maintain a current of 2,0 I_t A throughout the duration of the test or until the supply voltage is reached. **• In case the charging voltage specified by the manufacturer is higher than the overcharge test voltage, the maximum charging voltage specified by manufacturer should be applied with 2.**0 I_t A**.** **(e.g., quick charging power bank, etc.)**	No this condition	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	[Replace to the following statement] c) Acceptance criteria Filling beyond the manufacturer's specified limits should not result in ignition or explosion		N/A
Annex G	**Definition for shape and materials of outer case for cell**		-
(Addition)	G.1 General Annex G provides definitions for shape and materials of outer case for cell G.2 Shape of outer case for cell G 2.1 Cylindrical cell Cell with a cylindrical shape in which the overall height is equal to or greater than diameter. G 2.2 Prismatic cell Cell having the shape of a parallelepiped whose faces are rectangular G.3 Materials of outer case for cell G.3.1 Soft case Non-metallic outer case or container for cell G.3.2 Hard case Metallic outer case or container for cell.	(Shape of outer cases) ☐ Cylindrical ☒ Prismatic (Materials of outer cases) ☐ Hard ☒ Soft	-
Annex H	**Calculation method of the volumetric energy density for cell**		-
(Addition)	Annex H provide a calculation method of the volumetric energy density for cell in use of smart phone, tablet, notebook. H.1 General Unless otherwise stated in the Annex E, the dimensions for calculation are based on these for cell before shipment and the volumetric energy density shall be calculated with a maximum values specified by manufacturer. If the specification for cell can't be provided a dimension for calculation, the manufacturer's other documentation shall be provided to demonstrate compliance for its calculation.	Not use for smart phone, tablet, notebook.	-

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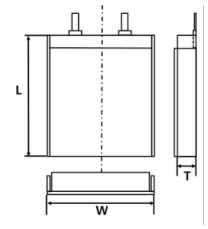
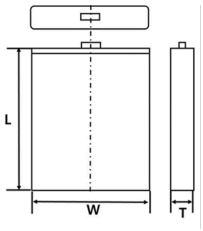
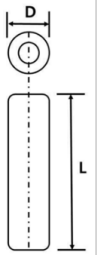
Clause	Requirement + Test	Result - Remark	Verdict
	H.2 Calculation Method  L : Length (max.) of cell (including terrace) W : Width (max.) of cell T : Thickness (max.) when shipping charge (For reference, Please Exclude the dimension of any tape that Is attached to cell) $Volumetric\ energy\ density\ (Wh/L) = \frac{Nominal\ voltage\ (V) \times Rated\ capacity\ (Ah)}{Length\ (L) \times Width\ (W)\ \times Thickness\ (T)}$ [H.1 – Prismatic cell using soft case]  L : Length (max.) of cell W : Width (max.) of cell T : Thickness when shipping charge (For reference, Please Exclude the dimension of any tape that Is attached to cell) $Volumetric\ energy\ density\ (Wh/L) = \frac{Nominal\ voltage\ (V) \times Rated\ capacity\ (Ah)}{Length\ (L) \times Width\ (W)\ \times Thickness\ (T)}$ [H.2 – Prismatic cell using hard case]  D : Diameter (max.) of cell L : Length (max.) of cell (According to shape of cell at shipping, The dimension of tube for cell may be included In overall dimension of cell) $Volumetric\ energy\ density\ (Wh/L) = \frac{Nominal\ voltage\ (V) \times Rated\ capacity\ (Ah)}{3.14159\ \times \frac{Diameter\ (D)^2}{4} \times Length(L)}$ [H.3 – Cylindrical cell using hard case]		-

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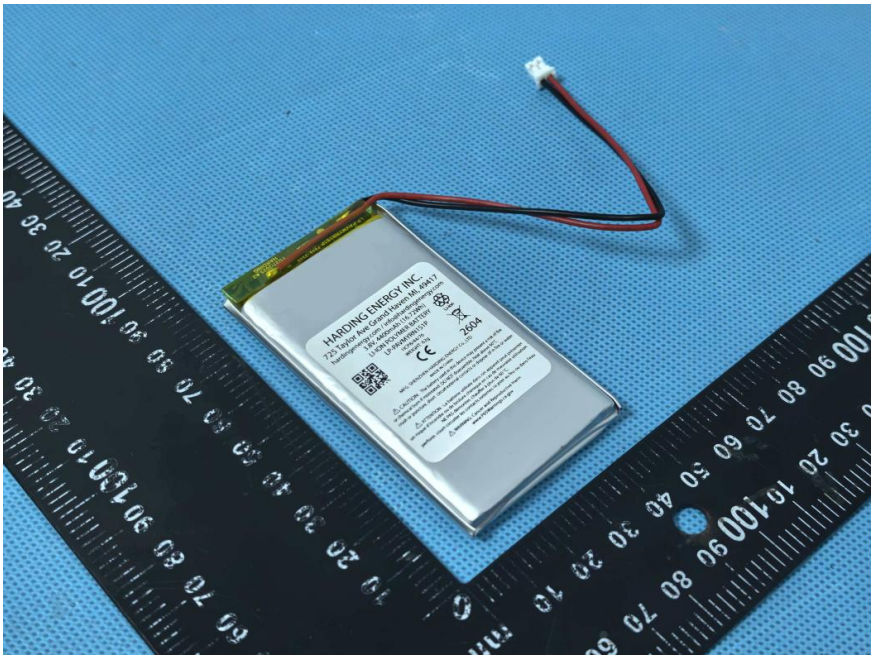
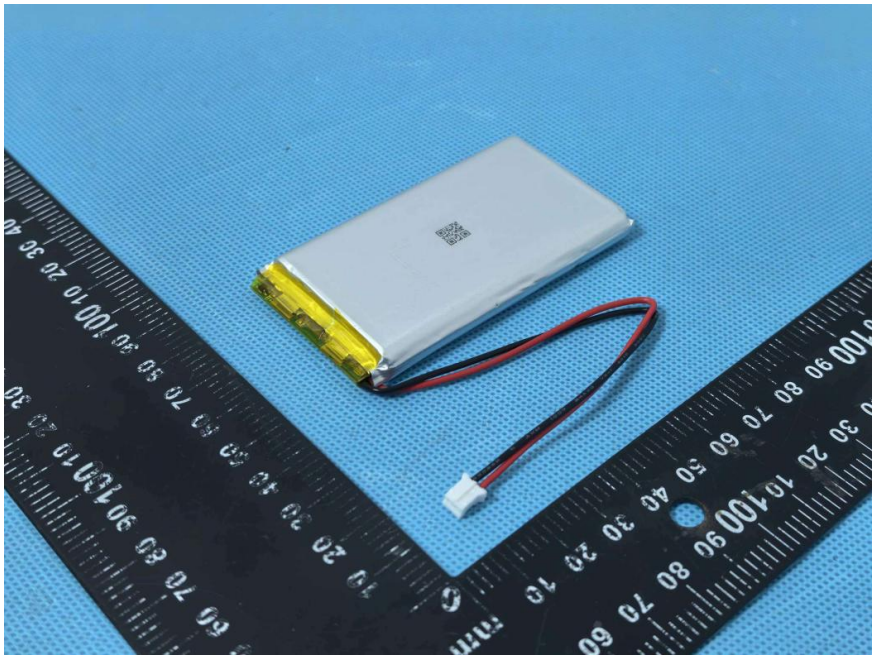
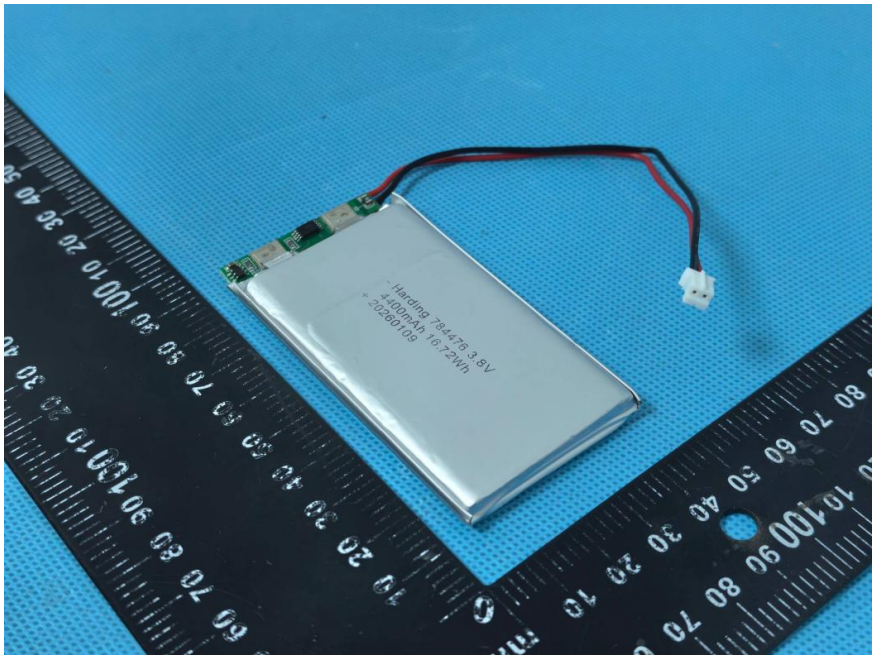
Attachment No.2
Photo Documentation

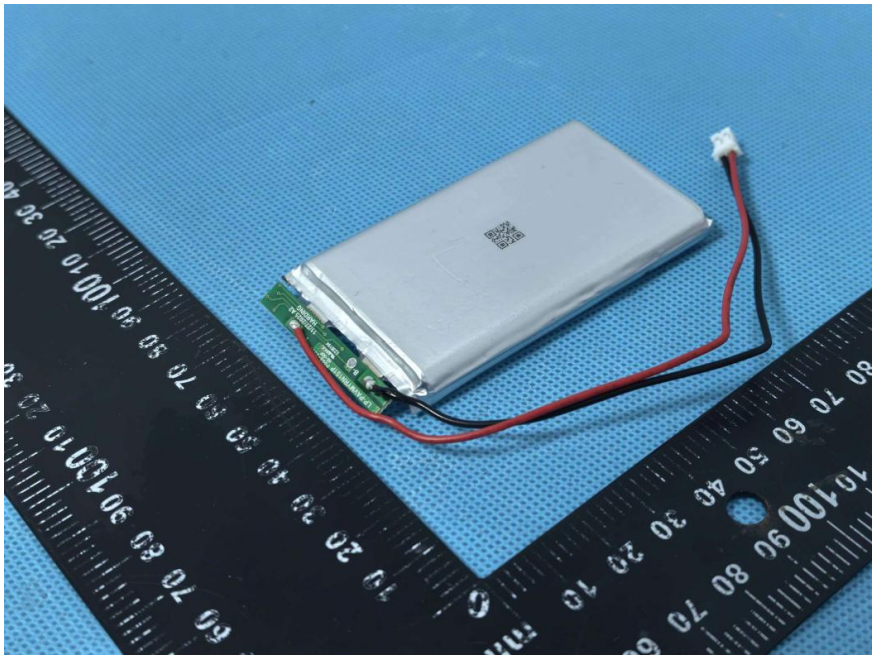
Report No.: 211-2822601105-000

Details of:	Picture 1: View 1 of the battery, model: LP-PAVMYRN1S1P
	

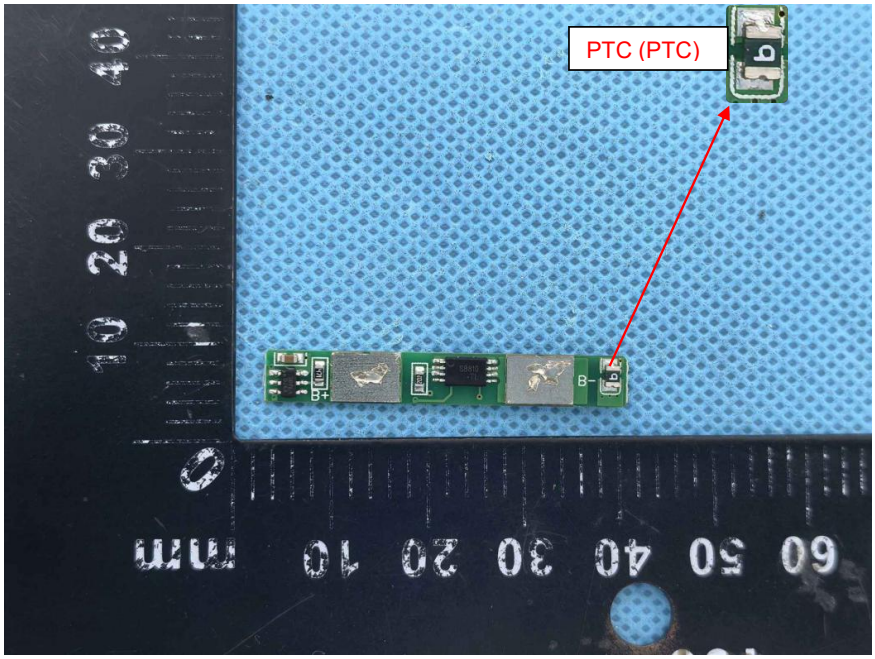
Details of:	Picture 2: View 2 of the battery
	

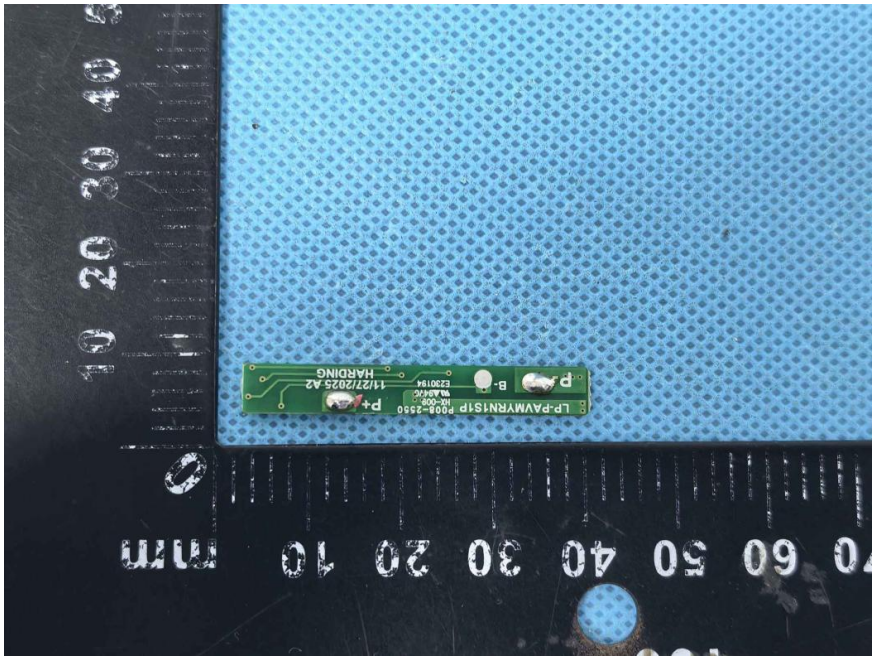
Attachment No.2
Photo Documentation

Details of:	Picture 3: View 1 of the battery with the insulation tape removed
	

Details of:	Picture 4: View 2 of the battery with the insulation tape removed
	

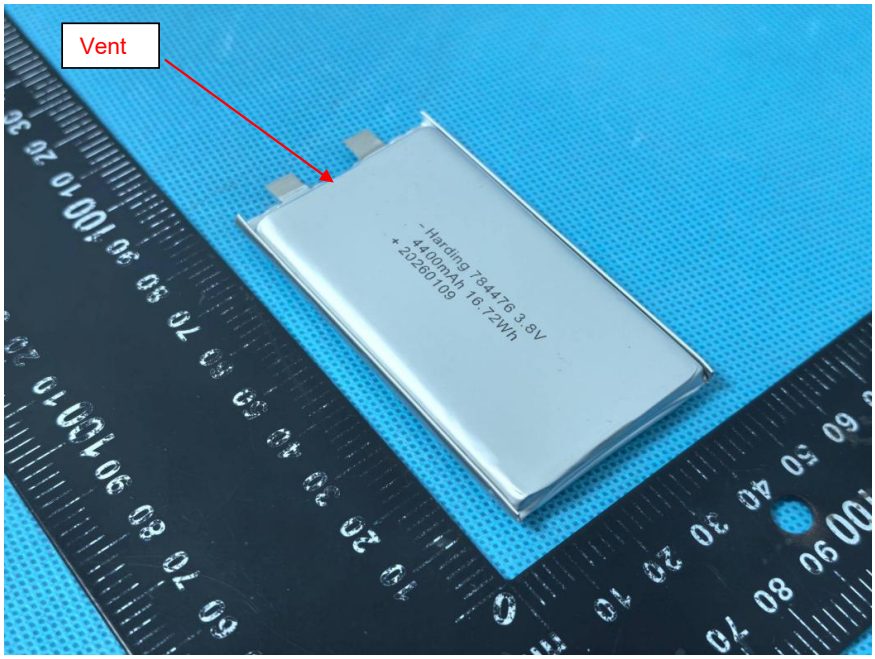
Attachment No.2
Photo Documentation

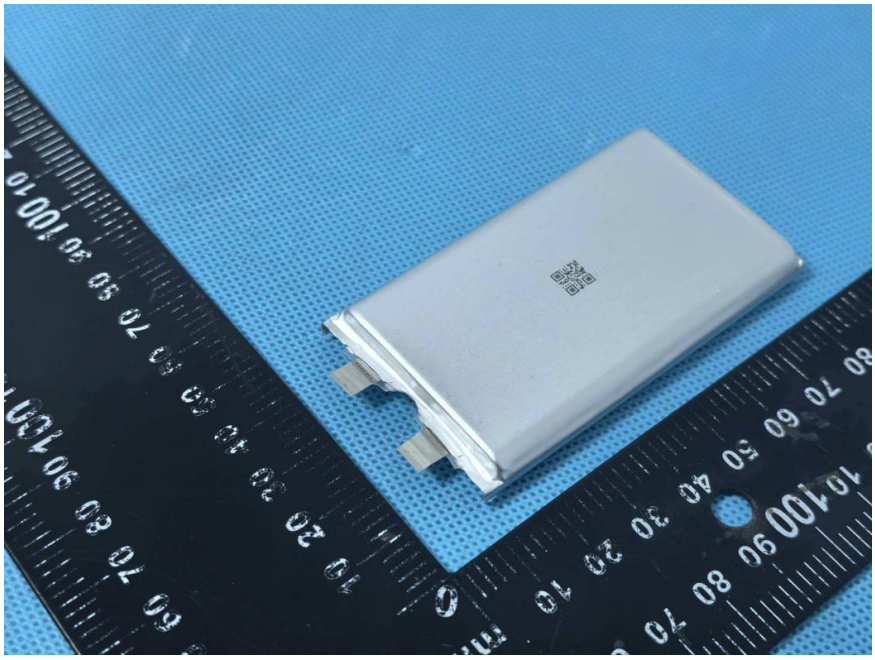
Details of:	Picture 5: Top view of PCM
	

Details of:	Picture 6: Back view of PCM
	

Attachment No.2
Photo Documentation

Report No.: 211-2822601105-000

Details of:	Picture 7: View 1 of the cell, cell model: 784476
	

Details of:	Picture 8: View 2 of the cell
	

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