Test Report

Report No. : TCT220915B110 Date : Sep. 15, 2022 Page No.: 1 of 3

Applicant:

Address:

The following sample was submitted and identified by/on behalf of the client as:

Sample Name:	polymer battery
Model No.:	400909
Sample Received Date:	2022.09.12
Testing Period:	2022.09.12—2022.09.15
Test Requested:	Accordance with Directive 2006/66/EC, to determine the Lead (Pb), Cadmium (Cd), Mercury (Hg) contents of the submitted sample(s).
Test Method:	Please refer to the following page(s).
Test Result(s):	Please refer to the following page(s).
Conclusion:	Test results of submitted sample(s) comply with the limit set by Directive 2006/66/EC and its amendment 2013/56/EU.

Checked by

Sin Lu

Signed for and on behalf of TCT

Noel Yin

Technical Manager

Test Report

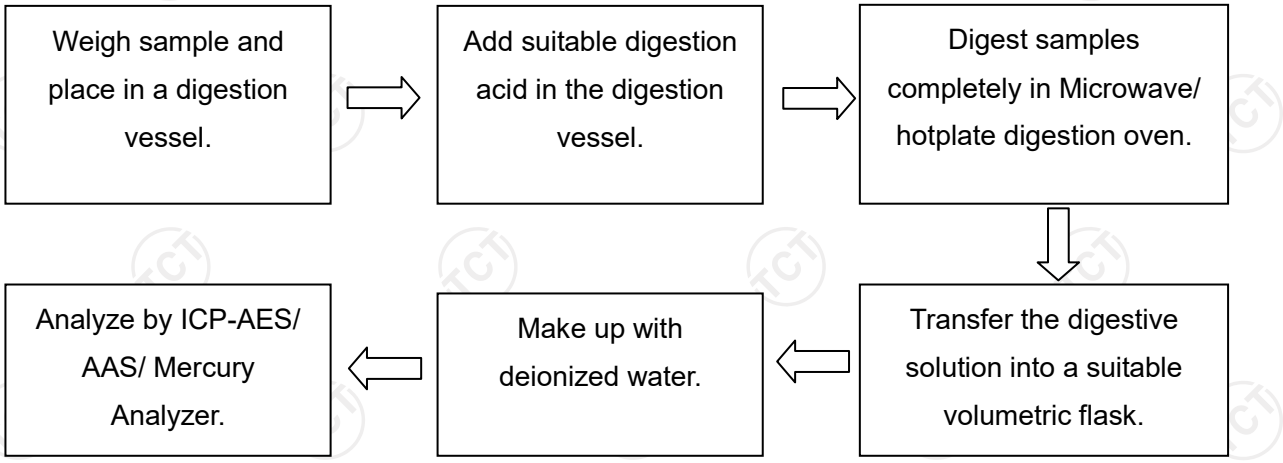
Test Results:

Lead, Cadmium and Mercury Content(s)

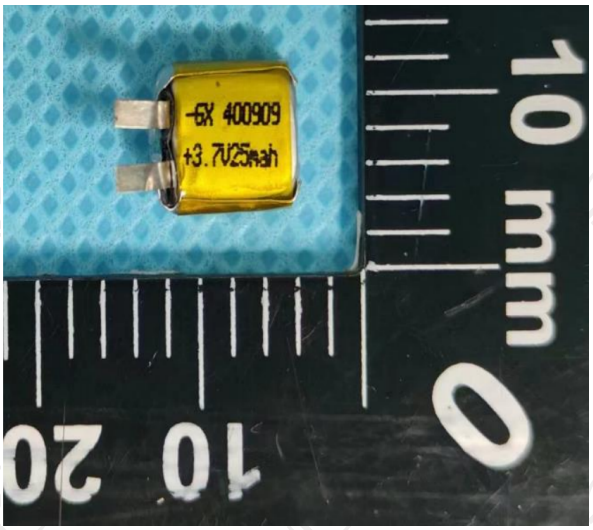
Test Items	Test Method	Unit	Test Results	MDL	Labelling Requirement[#]	Permissible Limit
Lead (Pb)	With reference to GB/T 20155-2018, Analysis was performed by ICP-OES	% (w/w)	N.D.	0.0010	＞0.004	--
Cadmium (Cd)			N.D.	0.0010	＞0.002	0.002[##]
Mercury (Hg)			N.D.	0.0001	＞0.0005	0.0005

Note :
- MDL = Method Detection Limit
- N.D. = Not detected, less than MDL.
- [#] = According to the article 21.3, batteries, accumulators and button cells containing more than 0,0005 % mercury, more than 0,002 % cadmium or more than 0,004 % lead, shall be marked with the chemical symbol for the metal concerned: Hg, Cd or Pb.
- [##] = Not apply to portable batteries and accumulators intended for use in:
  (a) emergency and alarm systems, including emergency lighting;
  (b) medical equipment; or
  (c) cordless power tools.
- Results shown is/are of total weight of the battery sample.
- "--" = Not Regulated.
- According to the article 21.1, all batteries, accumulators and battery packs should be appropriately marked with the crossed-out wheeled bin symbol.

Test Process:



Photo(s) of the sample(s)



***** End of Report *****

Remark：This report is considered invalidated without the Special Seal for Inspection of the TCT. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of TCT, this test report shall not be copied except in full and published as advertisement.

TEST REPORT

REPORT NO.: BAT2207221L

MODEL NO.: APL 502030

RECEIVED: July 18, 2022

TESTED: July 19, 2022 to July 22, 2022

APPLICANT:

ISSUED BY: Shenzhen SETEK Technology Co., Ltd.

LAB LOCATION: 1003, C Bldg, Fuyuan Business Trade Center, 44 District Bao'an, Shenzhen, China

This test report consists of 8 Pages in total, it may be duplicated completely for legal use with the approval of the applicant, It should not be reproduced except in full, without the written approval of our laboratory, and the test results in the report only apply to the tested sample.

SHENZHEN SETEK TECHNOLOGY CO., LTD.

Our website: www.setek.com.cn **E-mail: service@setek.com.cn**

TEL:86-755-26966362 **FAX: 86-755-26966270**

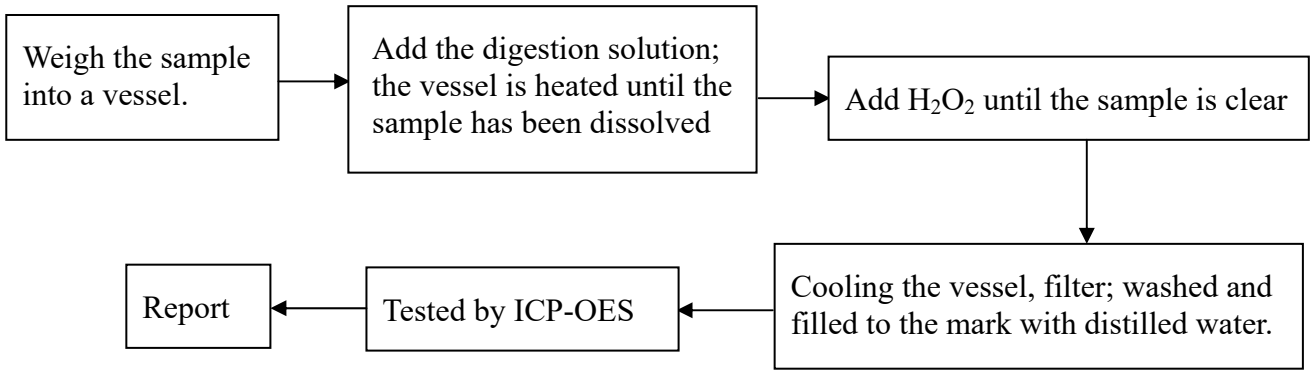
Prepared for	:	
Address	:	
Product	:	
Model No.	:	APL 502030
Trademark	:	N/A
Manufacturer	:	
Address	:	
Test Request	:	As Per EC 2006/66/EC and its amendment 2013/56/EU, direetive on batteries and accumulators and waste batteries and accumulators to determine the Pb, Cd, Hg content of the submitted sample.
Prepared by	:	Shenzhen SETEK Technology Co., Ltd.
Address	:	1003, C Bldg, Fuyuan Business Trade Center, 44 District Bao'an, Shenzhen, China Tel: (86-755) 26966362 Fax:(86-755) 26966270
Prepared by	:	(Engineer)
Approved by	:	(Manager)
Report Number	:	BAT2207221L
Date of Test	:	July 18, 2022 to July 22, 2022
Date of Report	:	July 26, 2022
Conclusion	:	Based on the test results of the submitted sample, the results do comply with EU directive EU 2006/66/EC and its amendment 2013/56/EU.
Test Results	:	PASS Detail data; please refer to the follow pages.

Testing method:

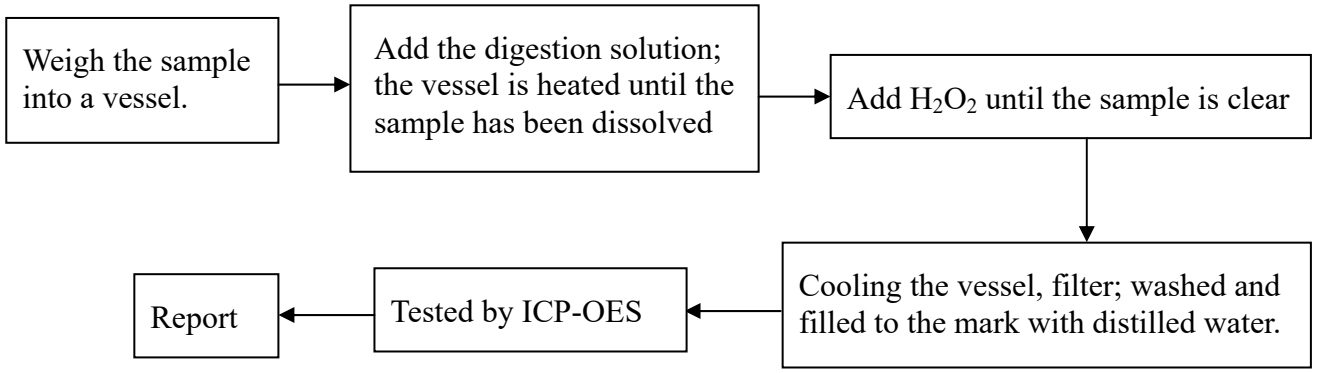
Test Item	Test Method	Measuring Instrument
Lead (Pb), Cadmium (Cd), Mercury (Hg)	US EPA 6010C:2007	ICP-OES

Test Flow:

1. To Determine Lead Content:



2. To Determine Cadmium Content:



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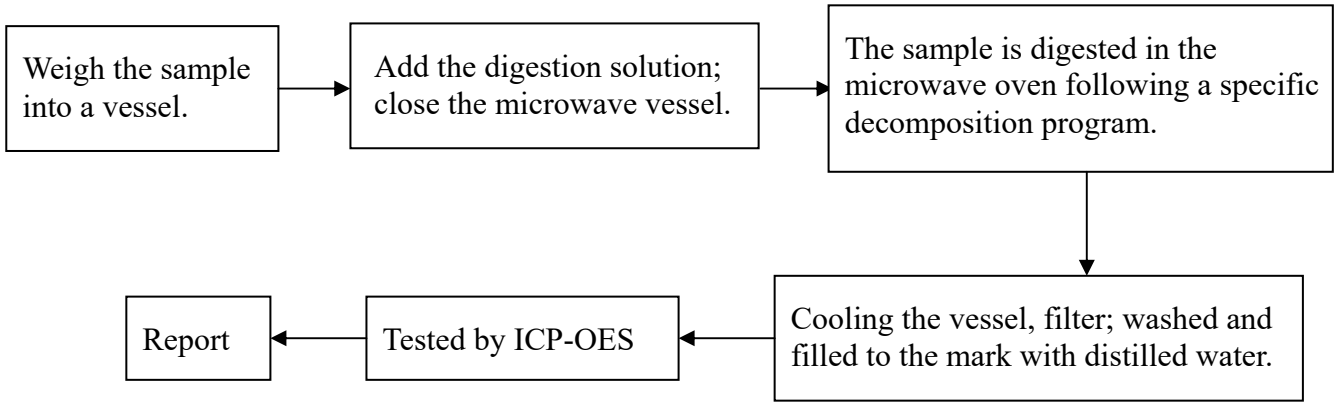
3. To Determine Mercury Content:



Specimen Description

Code	Sample name	Material	Description
A	Battery	/	Battery

Test Results:

No.	Test Items	Unit	Limit	Result
1	Lead (Pb)	mg/kg	/	N.D.
2	Cadmium (Cd)	mg/kg	20	N.D.
3	Mercury (Hg)	mg/kg	5	N.D.

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Note:

1) MDL = Method Detection Limit.
2) N.D. = Not detected, less than MDL.
3) HLV = Hazardous limited value.
4) - According to the Directive 2006/66/EC, batteries, accumulators and Battery containing more than 0,0005 % mercury, more than 0,002 % cadmium or more than 0,004 % lead, shall be marked with the chemical symbol for the metal concerned: Hg, Cd or Pb.
5) - According to the Directive 2006/66/EC, Member States shall prohibit the placing on the market of batteries and accumulators, containing more than 0.0005% of mercury by weight and 0.002% of cadmium by weight, including in those cases where these batteries and accumulators are incorporated into appliances. Battery with a mercury content of no more than 2 % by weight shall be exempted from this prohibition.

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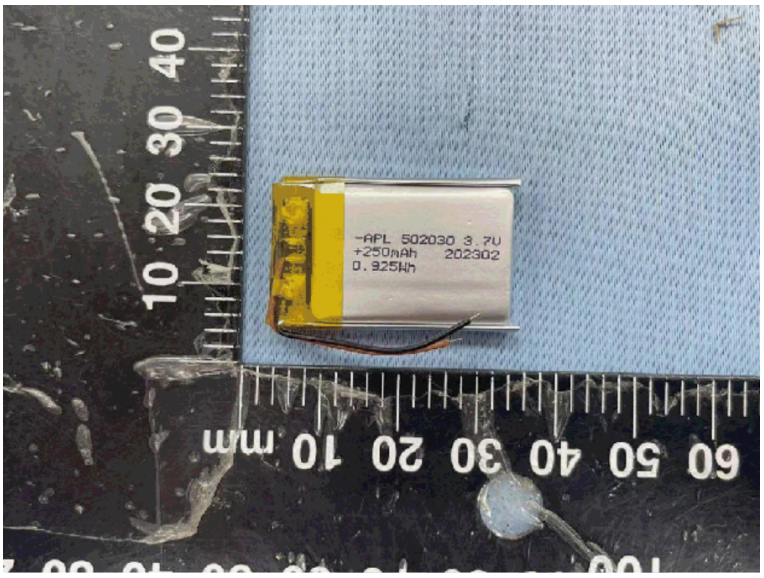
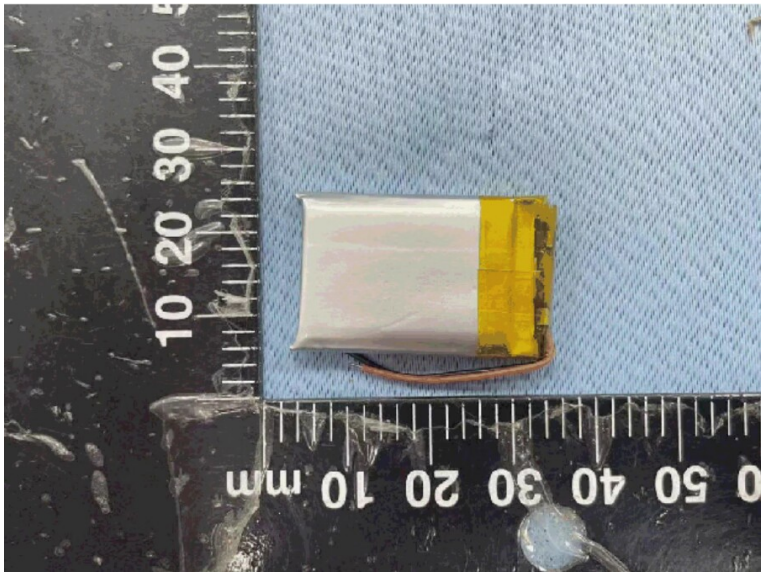
Sample Photo

(Photos of EUT)





*****End of the Report*****

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	:	TCT240227B011
Date of issue	:	2024-03-08
Total number of pages	:	26 Pages.
Tested by (name + signature)	:	Carry Wang
Inspected by (name + signature)	:	Aiden Liu
Approved by (name + signature)	:	Tomsin
Testing laboratory	:	Shenzhen TCT Testing Technology Co., Ltd.
Address	:	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Testing location	:	As above
Applicant's name	:	
Address	:	
Manufacturer's name	:	
Address	:	
Test specification:		
Standard	:	IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021
Test procedure	:	Type approved
Test result	:	Pass
Non-standard test method	:	N/A

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing Shenzhen TCT Testing Technology Co., Ltd.

Test item description	:	Li-ion Polymer Battery
Trade Mark	:	N/A
Model/type reference	:	GX 400909
Ratings	:	3.7V, 25mAh, 0.0925Wh

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List of Attachments (including a total number of pages in each attachment):

Attachment 1: Critical components information (page 22)

Attachment 2: Photo documentation (page 23-26)

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
cl.5.6.2 Design recommendation; cl.7.1 Charging procedure for test purposes (for Cells and Batteries); cl.7.2.1 Continuous charging at constant voltage (Cells); cl.7.3.1 External short circuit (Cells); cl.7.3.2 External short circuit (Batteries); cl.7.3.3 Free fall (Cells and Batteries); cl.7.3.4 Thermal abuse (Cells); cl.7.3.5 Crush (Cells); cl.7.3.6 Over-charging of battery; cl.7.3.7 Forced discharge (Cells); cl.7.3.8 Mechanical tests (Batteries); cl.7.3.9 Design evaluation – Forced internal short circuit (Cells) The electrolyte type of this cell doesn't belong to polymer, and the addition test cl.7.3.9 was carried out to evaluate the cell. Tests are made with the number of cells and batteries specified in IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021 Table 1.	**Shenzhen TCT Testing Technology Co., Ltd.** 2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

☒ **The product fulfils the requirements of EN 62133-2:2017, EN 62133-2:2017/A1:2021**

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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: N/A (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

- Li-ion Polymer Battery
Model: GX 400909 1ICP5/9/10
3.7V, 25mAh, 0.0925Wh

\+ Date: YYYYMMDD Made in China

WARNING: Risk of Fire and Burns. Do Not Open, Crush, Heat Above 60°C/140°F or Incinerate. Do not short circuit. If bulges severely, discontinue use. Follow Manufacturer's Instructions.

Date code: YYYYMMDD
YYYY=Year, MM= Month, DD=Day.

Information for safety mentioned on equipment's package:
Warning language
1. Keep small cells which are considered swallowable out of the reach of children.
2. Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2h of ingestion.
3. In case of ingestion of a cell, seek medical assistance promptly.

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Test item particulars..... :	
Classification of installation and use..... :	To be defined in final product
Supply Connection..... :	Electrode plate
Recommend charging method declared by the manufacturer..... :	Charging the battery with 12.5mA constant current and 4.2V constant voltage until the current reduces to 0.25mA at ambient 20°C±5°C.
Discharge current (0,2 It A) ..... :	5mA
Specified final voltage..... :	3.0V
Upper limit charging voltage per cell..... :	4.2V
Maximum charging current..... :	25mA
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 .....:	2024-02-27
Date (s) of performance of tests.....:	2024-02-27 to 2024-03-08

General remarks:

The test results presented in this report relate only to the object tested,
This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory,
"(Cell #XX)" refers to sample number of cells, "X" is 0~9;
"(Battery #XX)" refers to sample number of batteries, "X" is 0~9;
"(see below table)" refers to a table appended to the report.

Throughout this report a point is used as the decimal separator.

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

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

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General product information and other remarks:

This battery is constructed with single lithium-ion cell, and has overcharge, over-discharge, over current and short-circuits proof circuit.

The main features of the battery are shown as below (clause 7.1.1):

Model (Battery)	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Final Voltage
GX 400909	25mAh	3.7V	12.5mA	5mA	25mA	37.5mA	4.2V	3.0V

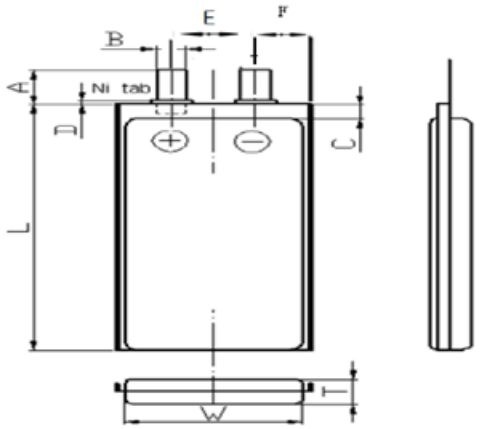
The main features of the cell in the battery are shown as below (clause 7.1.1):

Model (Cell)	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Final Voltage
GX 400909	25mAh	3.7V	12.5mA	5mA	25mA	37.5mA	4.2V	3.0V

The main features of the cell in the battery are shown as below (clause 7.1.2):

Model (Cell)	Upper limit charge voltage	Taper-off current (0.05 It A)	Lower charge temperature	Upper charge temperature
GX 400909	4.2V	1.25mA	0°C	45°C

Construction:



T	**4.0±0.1mm**
W	**9.0mm max.**
L	**9.5mm max.**

Cell

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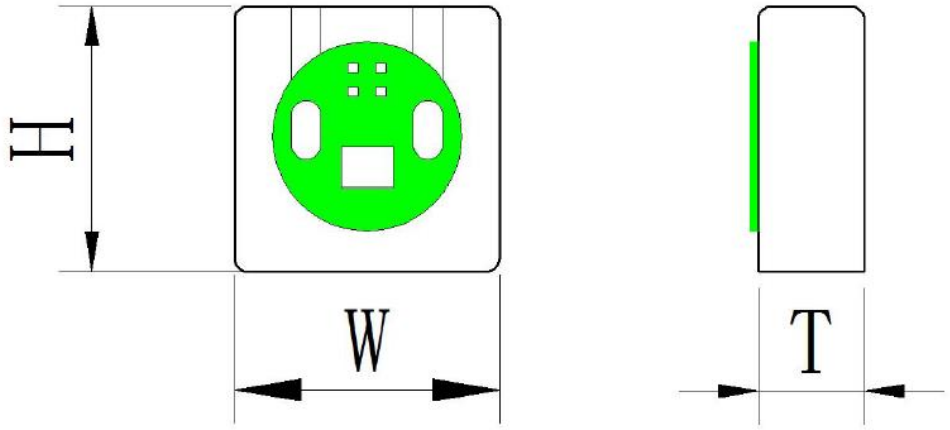
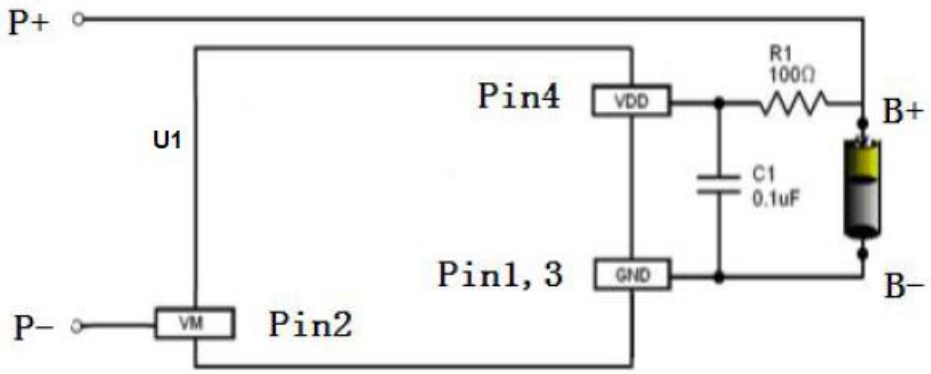


T	MAX4.2	W	MAX9.5	H	MAX9.5

Battery (Unit: mm)

Circuit diagram:



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IEC 62133-2			
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 metal surface exists.	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 clearance 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	Venting mechanism exists on the narrow side of pouch cell.	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	Overcharge, over discharge, over current and short-circuit proof circuit used in this battery. See tests of clause 7.	P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	See above.	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	The charging limits specified in the manufacturer's specification.	P
5.5	**Terminal contacts**		P

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IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	Electrode plate contacts complied with the requirements.	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-circuit		P
5.6	**Assembly of cells into batteries**		P
5.6.1	General		P
	Each battery have 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	Protective circuit equipped on battery.	P
	This protection may be provided external to the battery such as within the charger 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 have 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	Current, voltage and temperature limits specified by cell manufacturer.	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 added as appropriate and consideration given to the end-device application		P
	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	Safety analysis report provided by manufacturer.	P
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	Single cell battery, Max. Charging voltage of cell: 4.2V.	P

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IEC 62133-2			
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 not be 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 not discharged beyond the cell manufacturer's specified final voltage	Final voltage of cell: 3.0V, not exceed the final voltage specified by cell manufacturer.	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		P
	Mechanical protection for cells, cell connections and control circuits within the battery provided to prevent damage as a result of intended use and reasonably foreseeable misuse	Mechanical protection for cell connections and control circuits provided.	P
	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	Build-in batteries, mechanical protection for cells should be provided by end product.	N/A
	The battery case and compartments housing cells designed to accommodate cell dimensional tolerances during charging and discharging as recommended by the cell manufacturer	To be evaluated in final system.	N/A
	For batteries intended for building into a portable end product, testing with the battery installed within the end product considered when conducting mechanical tests		N/A
5.7	**Quality plan**		P

IEC 62133-2			
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	Complied. Quality plan provided.	P
5.8	**Battery safety components**		N/A
	According annex F	See TABLE: Critical components information	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
	Coin cells with resistance ≤ 3 Ω (measured according annex D) are tested according table 1	Not coin cells	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 overdischarge 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	See clause 7.3.2.	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	See page 4.	P
	Prior to charging, the battery have been discharged at 20 °C ± 5 °C at a constant current of 0,2 It A down to a specified final voltage	See page 4.	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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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	Charge temperature specified by manufacturer: 0-45°C. 0°C used for lower limit tests. 45°C used for upper limit tests.	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	Charging for 7days with 12.5mA.	P
	Results: No fire. No explosion. No leakage.....:	(See appended table 7.2.1)	P
7.2.2	Case stress at high ambient temperature (battery)		N/A
	Oven temperature (°C).....:		—
	Results: No physical distortion of the battery case resulting in exposure of internal protective components and cells		N/A
7.3	**Reasonably foreseeable misuse**		P
7.3.1	External short-circuit (cell)	Tested complied.	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)	Tested complied.	P
	The batteries 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
	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		P
	A single fault in the discharge protection circuit conducted on one to four (depending upon the protection circuit) of the five samples before conducting the short-circuit test	Single fault conducted on three samples.	P
	A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor	Single fault applies on Protect IC U1.	P
	Results: No fire. No explosion.....:	(See appended table 7.3.2)	P

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IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.3.3	Free fall	Tested complied.	P
	Results: No fire. No explosion	No fire. No explosion	P
7.3.4	Thermal abuse (cells)	Tested complied.	P
	Oven temperature (°C) .....:	130°C	—
	Results: No fire. No explosion	No fire. No explosion	P
7.3.5	Crush (cells)	Tested complied.	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		P
	Results: No fire. No explosion.....:	(See appended table 7.3.5)	P
7.3.6	Over-charging of battery	Tested complied.	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	5.88V applied.	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		N/A
	- Returned to ambient		P
	Results: No fire. No explosion.....:	(See appended table 7.3.6)	P
7.3.7	Forced discharge (cells)	Tested complied.	P
	Discharge a single cell to the lower limit discharge voltage specified by the cell manufacturer	Lower limit discharge voltage 3.0V	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
	- 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

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IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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	Tested complied.	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	Tested complied.	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)	Tested complied.	P
	The cells complied with national requirement for .....:	France, Japan, Republic of 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 for prismatic cell.	P
	Results: No fire ..... :	(See appended table 7.3.9)	P
8	**INFORMATION FOR SAFETY**		P
8.1	**General**		P
	Manufacturers of secondary cells ensure that information is provided about current, voltage and temperature limits of their products	Information for safety mentioned in manufacturer's specifications.	P
	Manufacturers of batteries ensure that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards	Information for safety mentioned in manufacturer's specifications.	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, any information relating to hazard avoidance resulting from a system analysis provided to the end user		N/A
8.2	**Small cell and battery safety information**	Small cells and batteries.	P
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:	Information for safety mentioned in manufacturer's specifications and on equipment's package.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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
9.1	**Cell marking**	The final product is battery	N/A
	Cells 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	See marking plate on page 3.	P
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity	Not coin batteries.	N/A
	Batteries are marked with an appropriate caution statement		P
	- Terminals have clear polarity marking on the external surface of the battery, or	The “-” and “+” polarity explicitly marked on surface of the battery.	P
	- Not be marked with polarity markings if the design of the external connector prevents reverse polarity connections		N/A
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	Not coin cells. Not coin batteries.	N/A
	Small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion is given on the immediate package	Not intended for direct sale.	N/A
9.4	**Other information**		P
	The following information are marked on or supplied with the battery:		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- Storage and disposal instructions	Information for storage and disposal instructions mentioned in manufacturer's specifications.	P
	- Recommended charging instructions	Information for recommended charging instructions mentioned in manufacturer's specifications.	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	Not coin cells.	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**	Complied.	P
A.3	**Consideration on charging voltage**	Complied.	P
A.3.1	General		P
A.3.2	Upper limit charging voltage	4.2V applied.	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	4.2V applied.	P
A.4	**Consideration of temperature and charging current**		P
A.4.1	General		P
A.4.2	Recommended temperature range	See A.4.2.2.	P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	Charging temperature range declared by client is: 0-45°C	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
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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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	Cell specified final voltage 3.0V, not exceed 3.0V specified by cell manufacturer.	P
A.4.6.3	Discharge current and temperature range		P
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		P
A.6.2	Example of a nickel particle preparation procedure		P
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
A.6.10	Caution for the disassembling process and pressing the electrode core		P
A.6.11	Recommended specifications for the pressing device		P

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IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX B	**RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS**		N/A
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**	Not coin cells.	N/A
D.2	**Method**		N/A
	A sample size of three coin cells is required for this measurement..... :	(See appended table D.2)	N/A
	Coin cells with an internal resistance of less than or equal to 3 Ω are subjected to the testing according to Clause 6 and Table 1		N/A
	Coin cells with an internal resistance greater than 3 Ω require no further testing		N/A
ANNEX E	**PACKAGING AND TRANSPORT**		N/A
ANNEX F	**COMPONENT STANDARDS REFERENCES**		N/A

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7.2.1	TABLE: Continuous charging at constant voltage (cells)			P
Sample no.	**Recommended charging voltage Vc (Vdc)**	**Recommended charging current I_{rec} (mA)**	**OCV before test (Vdc)**	**Results**
Cell #1	4.20	12.5	4.18	P
Cell #2	4.20	12.5	4.19	P
Cell #3	4.20	12.5	4.19	P
Cell #4	4.20	12.5	4.19	P
Cell #5	4.20	12.5	4.18	P

Supplementary information:

- No fire or explosion
- No leakage

7.3.1	TABLE: External short-circuit (cell)				P
Sample no.	**Ambient T (°C)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature ~~rise ΔT~~, °C**	**Results**
Samples charged at charging temperature upper limit (45°C)					
Cell #1	55.1	4.19	83	102.0	P
Cell #2	55.1	4.19	84	103.0	P
Cell #3	55.1	4.18	85	98.6	P
Cell #4	55.1	4.19	82	97.5	P
Cell #5	55.1	4.18	83	100.4	P
Samples charged at charging temperature lower limit (0°C)					
Cell #6	55.1	4.15	84	88.9	P
Cell #7	55.1	4.14	83	90.5	P
Cell #8	55.1	4.14	83	91.2	P
Cell #9	55.1	4.14	83	90.2	P
Cell #10	55.1	4.14	84	90.1	P

Supplementary information:

- No fire or explosion

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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~~, °C**	**Component single fault condition**	**Results**
Battery #1	23.1	4.19	82	81.2	Short circuit Protect IC U1	P
Battery #2	23.1	4.18	81	80.2	Short circuit Protect IC U1	P
Battery #3	23.1	4.19	82	82.0	Short circuit Protect IC U1	P
Battery #4	23.1	4.19	83	23.5	--	P
Battery #5	23.1	4.19	84	23.3	--	P

Supplementary information:

- No fire or explosion

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 (45°C)				
Cell #1	4.18	0	13.03	P
Cell #2	4.19	0	13.02	P
Cell #3	4.19	0	13.03	P
Cell #4	4.19	0	13.04	P
Cell #5	4.18	0	13.05	P
Cell #6	4.14	0	13.02	P
Cell #7	4.15	0	13.03	P
Cell #8	4.14	0	13.01	P
Cell #9	4.15	0	13.03	P
Cell #10	4.14	0	13.02	P

Note: A 13kN force applied at the wide side of prismatic cells. Voltage abrupt occurred.

Supplementary information:

- No fire or explosion

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7.3.6	TABLE: Over-charging of battery	P
Constant charging current (A) .....:	0.05	—
Supply voltage (Vdc) .....:	5.88	—

Sample no.	OCV before charging (Vdc)	Total charging time (minute)	Maximum outer case temperature (°C)	Results
Battery #1	3.34	90	33.2	P
Battery #2	3.34	90	31.5	P
Battery #3	3.34	90	32.9	P
Battery #4	3.33	90	31.0	P
Battery #5	3.35	90	33.1	P

Supplementary information:
- No fire or explosion

7.3.7	TABLE: Forced discharge (cells)	P

Sample no.	OCV before application of reverse charge (Vdc)	Measured reverse charge I_t (mA)	Lower limit discharge voltage (Vdc)	Results
Cell #1	3.32	25	3.0	P
Cell #2	3.33	25	3.0	P
Cell #3	3.32	25	3.0	P
Cell #4	3.32	25	3.0	P
Cell #5	3.33	25	3.0	P

Supplementary information:
- No fire or explosion

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
Battery #1	4.18	4.18	0.697	0.697	P
Battery #2	4.19	4.19	0.693	0.693	P
Battery #3	4.19	4.19	0.694	0.694	P

Supplementary information:
- No fire or explosion
- No rupture
- No leakage
- No venting

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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**
Battery #1	4.18	4.18	0.692	0.692	P
Battery #2	4.19	4.19	0.691	0.691	P
Battery #3	4.19	4.19	0.690	0.690	P

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting

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 (45°C)					
Cell #1	45	4.18	1	400	P
Cell #2	45	4.19	1	400	P
Cell #3	45	4.19	1	400	P
Cell #4	45	4.18	1	400	P
Cell #5	45	4.19	1	400	P
Samples charged at charging temperature lower limit (0°C)					
Cell #6	0	4.15	1	400	P
Cell #7	0	4.14	1	400	P
Cell #8	0	4.14	1	400	P
Cell #9	0	4.14	1	400	P
Cell #10	0	4.14	1	400	P

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.

- No fire

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 internal resistance less than or equal to 3 Ω, see test result on corresponding tables

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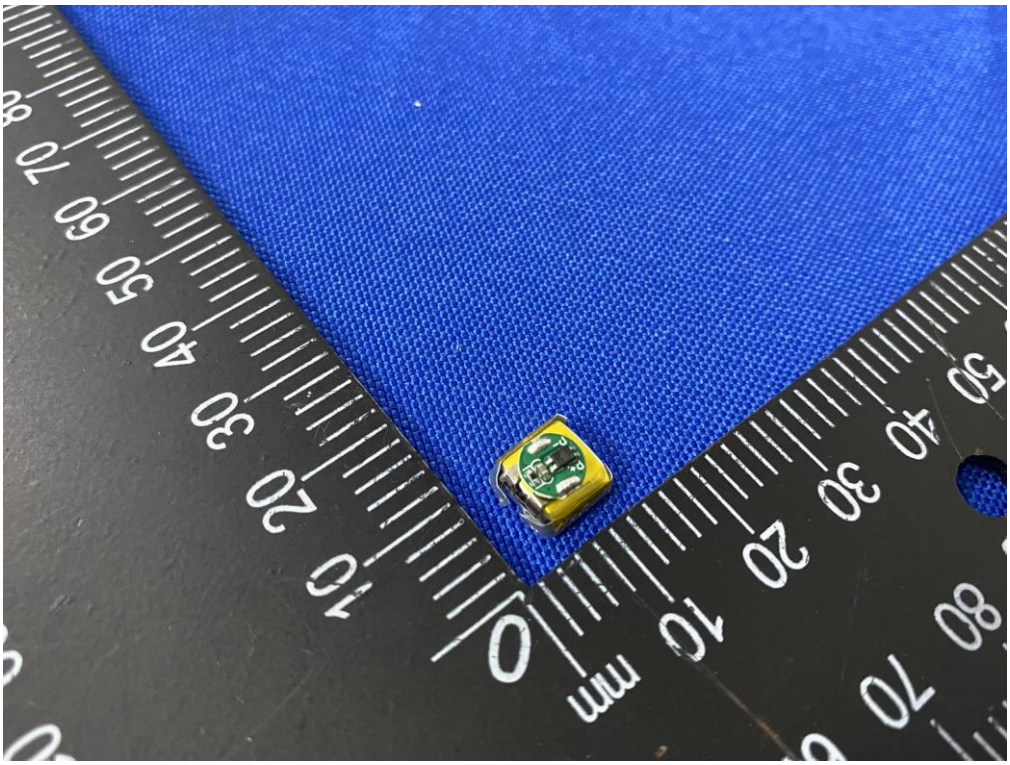
Attachment 1: Critical components information					P
Object / part No.	**Manufacturer / trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Cell		GX 400909	3.7V, 25mAh	IEC 62133-2:2017, IEC 62133-2:2017/AMD 1:2021	Tested with appliance
-Positive electrode	HuNan ShanShan New Energy Co., Ltd.	LC-412	$LiCoO_2$, PVDF, NMP, Conductive Additive	--	--
-Negative electrode	Da lian Hongguang Lithium Co., Ltd	CGP-1	Graphite, CMC, SBR, Distilled Water, Conductive Additive	--	--
-Electrolyte	ZHUHAI SMOOTHWAY ELECTRONIC MATERIALS CO., LTD.	SW-C013D	$LiPF_6$+EMC+EC+DMC	--	--
-Separator	Shenzhen Zhiyuan Lithium Energy Technology Co., Ltd.	9+3u	PE, Shutdown temperature: 130°C	--	--
PCB	Interchangeable	Interchangeable	V-0, 130°C	UL 796	UL approved
Protect IC (U1)	Xysemi	XB4322A	V_{CU}: 4.30±0.05V, V_{DL}: 2.4±0.1V	--	Tested with appliance
Tape	Interchangeable	Interchangeable	130°C	UL 510	UL approved
Supplementary information: [1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

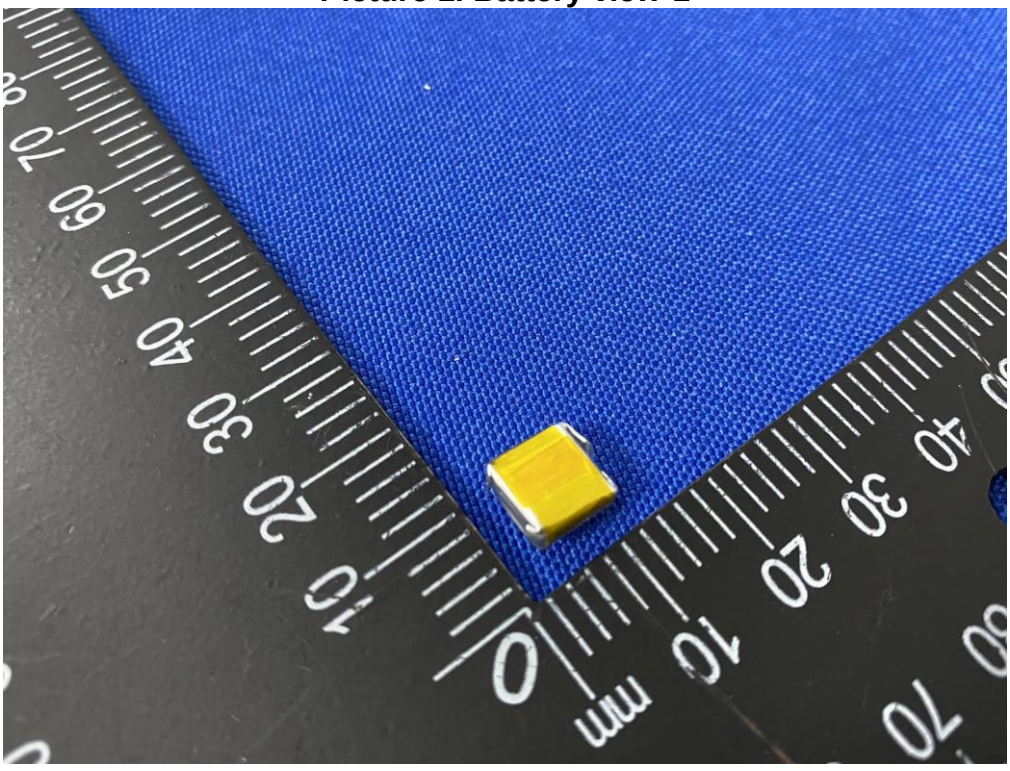
Attachment 2

Photo Documentation

Product: Li-ion Polymer Battery
Type Designation: GX 400909



Picture 1. Battery view-1



Picture 2. Battery view-2

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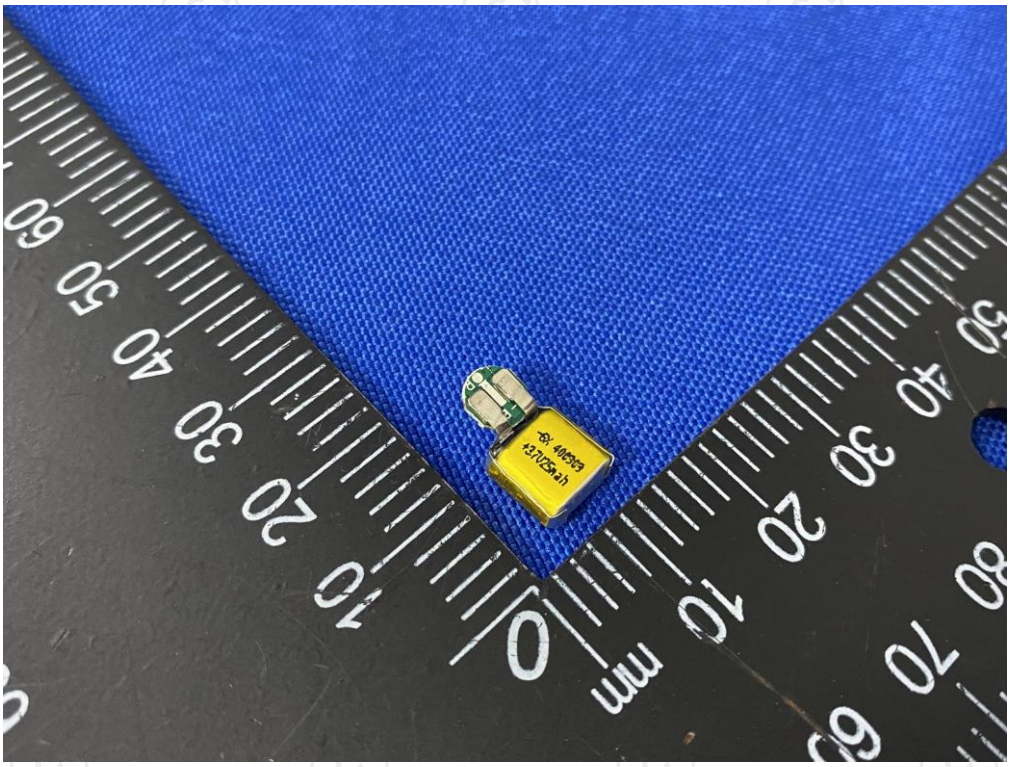
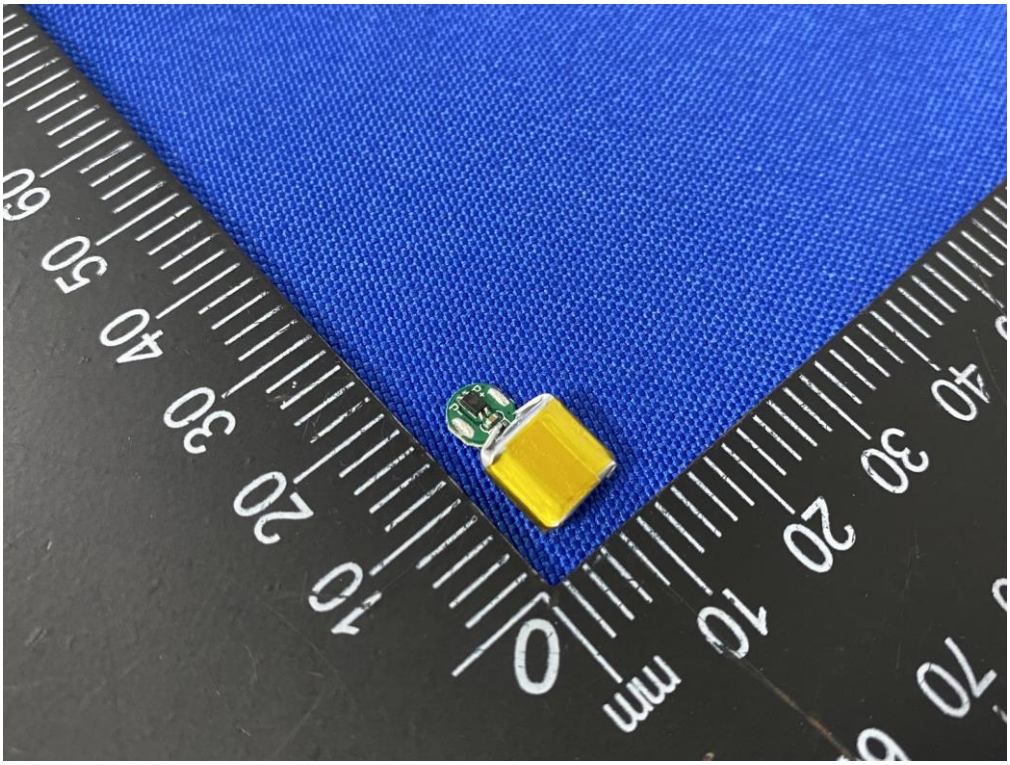
Photo Documentation

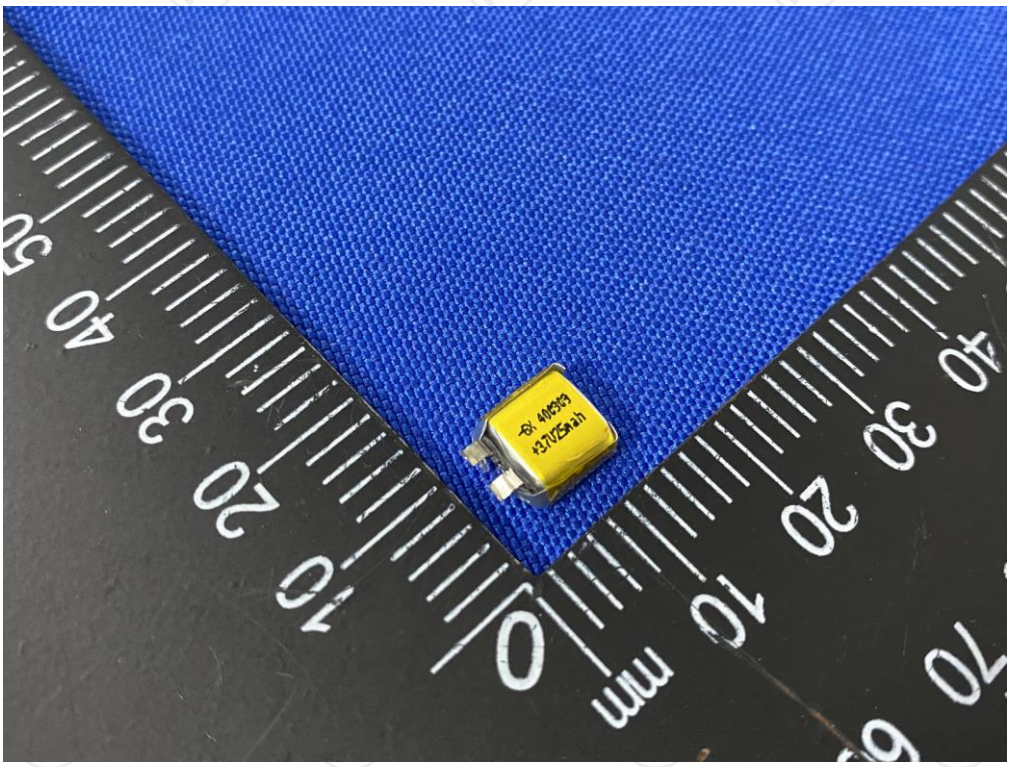


Picture 3. Battery view-3

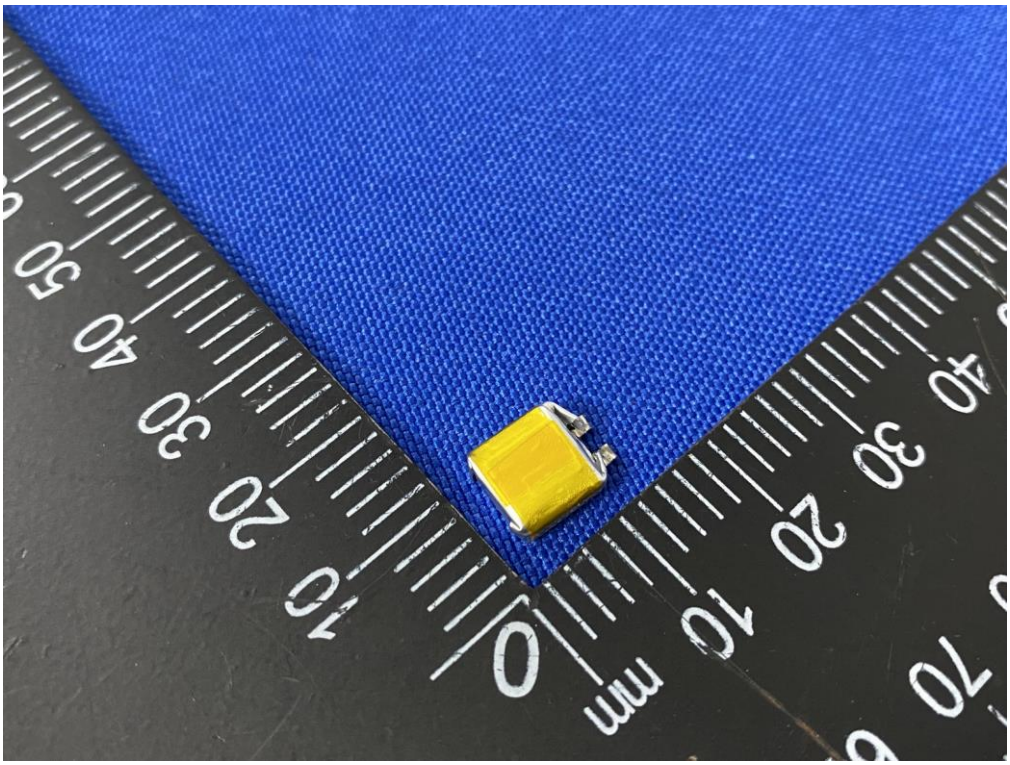


Picture 4. Battery view-4

Photo Documentation

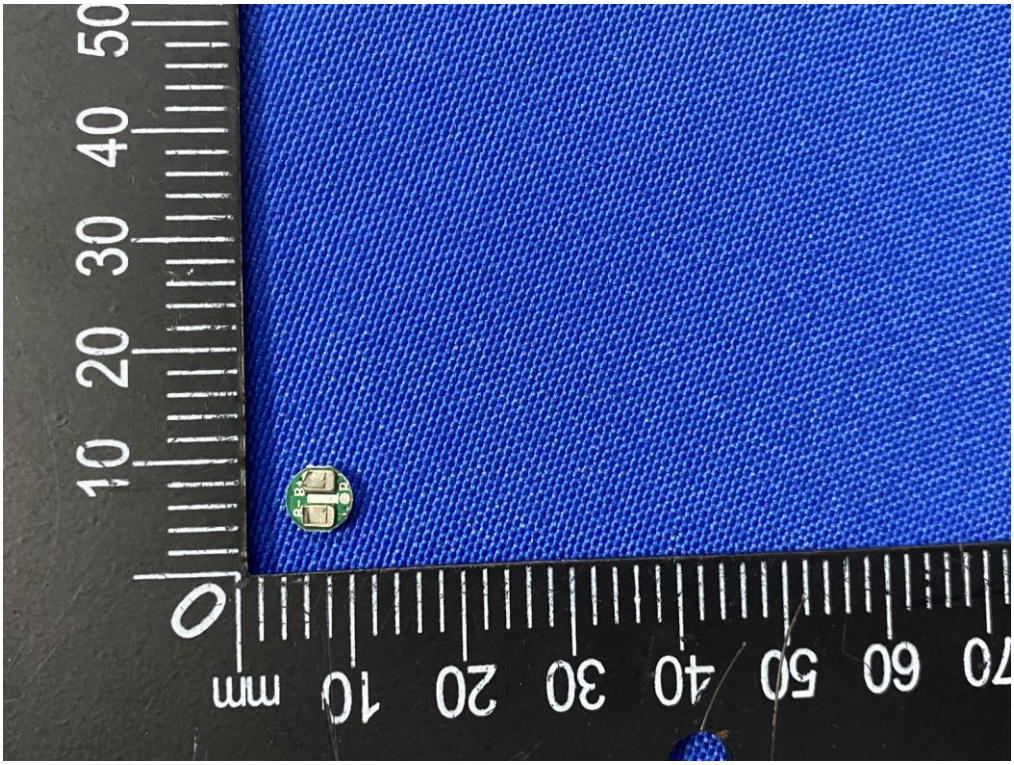


Picture 5. Cell view-1

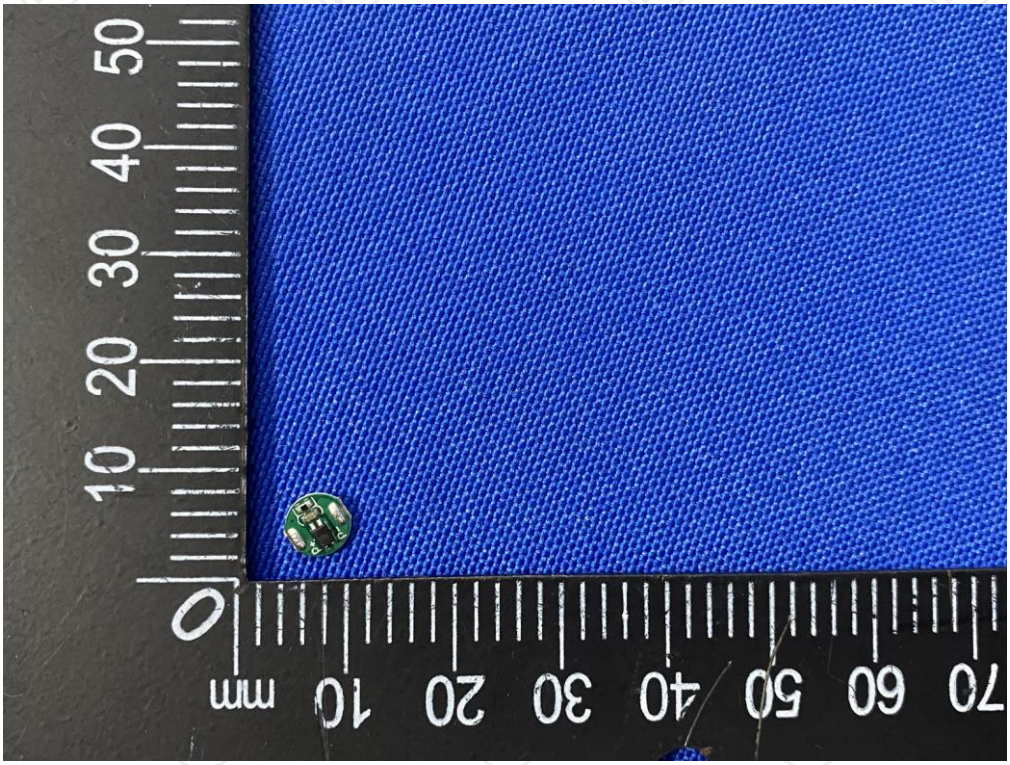


Picture 6. Cell view-2

Photo Documentation



Picture 7. Protection board view-1



Picture 8. Protection board view-2

***** End of Test Report *****

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IEC 62133-2 TEST REPORT

For

Li-ion Battery

Model: APL 502030 3.7V

Prepared for:

Prepared by: Shenzhen NCT Testing Technology Co., Ltd.
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Report Number: NCT23020524XI1-1
Date of Test: 2023-05-18 to 2023-06-01
Date of Issue: 2023-06-01

Tested By: Miller Gao Reviewed By: Hely Wang Approved By: Boris Lin

Miller Gao Hely Wang Boris Lin

Seal of NCT

The results detailed in this test report relate only to the specific sample(s) tested. This report is not to be reproduced except in full, without written approval from NCT Testing Technology.

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. .....:	NCT23020524XI1-1
Date of issue .....:	2023-06-01
Total number of pages.....	27 pages
Applicant's name .....:	
Address .....:	
Test specification:	
Standard.....:	IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021
Test procedure .....:	Test Report
Non-standard test method .....:	N/A
Test item description.....:	Li-ion Battery
Trade Mark .....:	N/A
Manufacturer.....:	Same as applicant
Address .....:	Same as applicant
Model/Type reference .....:	APL 502030 3.7V
Ratings .....:	3.7V, 250mAh, 0.925Wh

Testing procedure and testing location:

Testing Laboratory:

Testing location/ address.....: Shenzhen NCT Testing Technology Co., Ltd.
A101, 1/F., &2F., B2, Fuqiao 6th Area, Xintian, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

List of Attachments:

Appendix 1: 3 pages of Photo Documentation

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
cl.5.6.2 Design recommendation; cl.7.1 Charging procedure for test purposes (for Cells and Batteries); cl.7.2.1 Continuous charging at constant voltage (cells); cl.7.3.1 External short circuit (cells); cl.7.3.2 External short circuit (batteries); cl.7.3.3 Free fall (cells and batteries); cl.7.3.4 Thermal abuse (cells); cl.7.3.5 Crush (cells); cl.7.3.6 Over-charging of battery; cl.7.3.7 Forced discharge (cells); cl.7.3.8 Mechanical tests (batteries); cl.7.3.9 Design evaluation – Forced internal short circuit (cells) Tests are made with the number of cells and batteries specified in IEC 62133-2: 2017 +AMD1:2021 Table 1.	Shenzhen NCT Testing Technology Co., Ltd. A101, 1/F., &2F., B2, Fuqiao 6th Area, Xintian, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Summary of compliance with National Differences

N/A

☒ The product fulfils the requirements of EN 62133-2: 2017+A1:2021

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.

Li-ion Battery

Model: APL 502030 3.7V (1ICP5/20/30)

Rated: 3.7V 250mAh 0.925Wh

Red wire: + Black wire: -

YYYYMM

Information for safety mentioned on equipment's package

Potential for fire or buming.Do not disassemble,puncture,crush,heat or burn.
Use only with specified charger.
Keep small cells and batteries which are considered swallowable out of the reach of children.
Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2h of ingestion.
In case of ingestion of a cell or battery, seek medical assistance promptly.

Test item particulars .....:	
Classification of installation and use .....:	To be defined in final product
Supply connection .....:	Lead wire
Recommend charging method declared by the manufacturer..... :	Charging the battery with 50mA constant current until 4.2V, then constant voltage until charge current reduces to 5mA at ambient 20°C±5°C.
Discharge current (0,2 I_t A) ..... :	50mA
Specified final voltage..... :	3.0V
Upper limit charging voltage per cell.....:	4.2V
Maximum charging current.....:	250mA
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 .....:	2023-05-18
Date (s) of performance of tests.....:	2023-05-18 to 2023-06-01
General remarks:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(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.**	
Name and address of factory (ies) ……:	Same as applicant

General product information:

This battery is constructed with one lithium-ion cell and has overcharge, over-discharge, over current and short-circuits proof circuit.

The main features of the battery pack are shown as below (clause 7.1.1):

Model (Battery)	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
APL 502030 3.7V	250mAh	3.7V	50mA	50mA	250mA	250mA	4.2V	3.0V

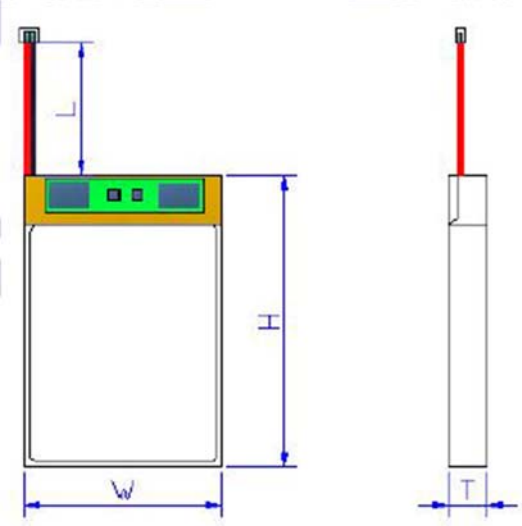
The main features of the cell in the battery pack are shown as below (clause 7.1.1):

Model (Cell)	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
APL 502030 3.7V	250mAh	3.7V	50mA	50mA	250mA	250mA	4.2V	3.0V

The main features of the cell in the battery pack are shown as below (clause 7.1.2):

Model (Cell)	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
APL 502030 3.7V	4.2V	12.5mA	0°C	45°C

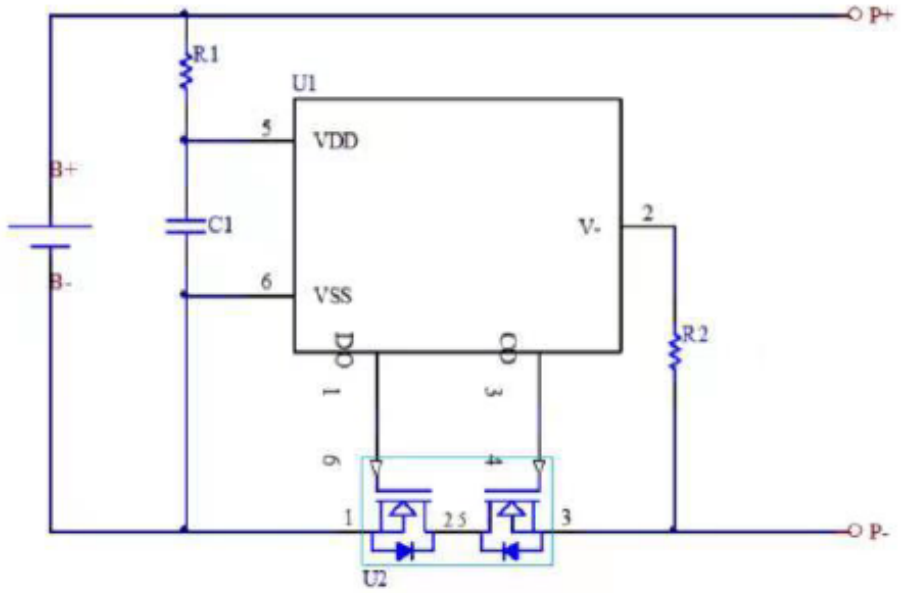
Construction:



H:≤31.2mm	W: ≤20.0mm	T: ≤5.0mm

Battery

Circuit diagram:



IEC 62133-2			
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 metal surface exists.	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	Venting mechanism exists on narrow side of the pouch cell.	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	Overcharge, overdischarge, over current and short-circuit proof circuit used in this battery. See tests of clause 7.	P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	See above.	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	The charging limits specified in the manufacturer's specification.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
5.5	**Terminal contacts**		P
	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	Protective circuit equipped on battery.	P
	This protection may be provided external to the battery such as within the charger 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	Current, voltage and temperature limits specified by cell manufacturer.	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		P
	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	Safety analysis report provided by manufacturer.	P
5.6.2	Design recommendation		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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	Single cell battery, Max. Charging voltage of cell: 4.2V, not exceed 4.2V specified in Clause 7.1.2, Table 2.	P
	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	Final voltage of cell: 3.0V, not exceed the final voltage specified by cell manufacturer.	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		P
	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	Mechanical protection for cell connections and control circuits provided.	P
	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	Build-in batteries, mechanical protection for battery should be provided by 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	To be evaluated in final system.	N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	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	Complied. Quality plan certificate	P
5.8	**Battery safety components**	See TABLE: Critical components information	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	Not coin cells	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	See clause 7.3.2.	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	See page 4.	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	See page 4.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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
	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	Charge temperature range: 0-45°C declared. 0°C used for lower limit tests. 45°C used for upper limit tests.	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	Charging for 7 days with 50mA.	P
	Results: no fire, no explosion, no leakage.....:	(See appended table 7.2.1)	P
7.2.2	Case stress at high ambient temperature (battery)		N/A
	Oven temperature (°C).....:		—
	Results: no physical distortion of the battery case resulting in exposure of internal protective components and cells		N/A
7.3	**Reasonably foreseeable misuse**		P
7.3.1	External short-circuit (cell)	Tested complied.	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)	Tested complied.	P
	The batteries 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
	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		P

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Clause	Requirement + Test	Result - Remark	Verdict
	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	Single fault conducted on three samples.	P
	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	Single fault applies on MOSFET (U2).	P
	Results: no fire, no explosion..... :	(See appended table 7.3.2)	P
7.3.3	Free fall	Tested complied.	P
	Results: no fire, no explosion	No fire. No explosion	P
7.3.4	Thermal abuse (cells)	Tested complied.	P
	Oven temperature (°C)..... :	130°C	—
	Results: no fire, no explosion	No fire. No explosion	P
7.3.5	Crush (cells)	Tested complied.	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	Tested complied.	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	5.88V applied.	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)	Tested complied.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	- 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	Tested complied.	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	Tested complied.	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)	Tested complied.	P
	The cells complied with national requirement for ..... :	France, Japan, Republic of Korea, 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 for prismatic cells.	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	Information for safety mentioned in manufacturer's specifications.	P
	Manufacturers of batteries provides information regarding how to minimize and mitigate hazards to equipment manufacturers or end-users	Information for safety mentioned in manufacturer's specifications.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	Do not allow children to replace batteries without adult supervision		P
8.2	**Small cell and battery safety information**	Small cells and batteries.	P
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:	Information for safety mentioned on equipment's package.	P
	- 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
9.1	**Cell marking**		N/A
	Cells are marked as specified in IEC 61960, except coin cells	The final product is battery.	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	The battery is marked in accordance with IEC 61960, also see copy of marking plate.	P
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity	Not coin battery.	N/A
	Batteries are marked with an appropriate caution statement		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- Terminals have clear polarity marking on the external surface of the battery, or	The “Red wire: +” and “Black wire: -” polarity explicitly marked on surface of the battery.	P
	- Not be marked with polarity markings if the design of the external connector prevents reverse polarity connections		N/A
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	Not coin cells	N/A
	Small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion is given on the immediate package	Not intended for direct sale.	N/A
9.4	**Other information**		P
	The following information are marked on or supplied with the battery:		P
	- Storage and disposal instructions	Information for storage and disposal instructions mentioned in manufacturer’s specifications.	P
	- Recommended charging instructions	Information for recommended charging instructions mentioned in manufacturer’s specifications.	P
10	**PACKAGING AND TRANSPORT**		P
	Packaging for coin cells are not be small enough to fit within the limits of the ingestion gauge of Figure 3	Not coin cells.	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**	Complied.	P
A.3	**Consideration on charging voltage**	Complied.	P
A.3.1	General		P
A.3.2	Upper limit charging voltage	4.2V applied.	P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		P

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Clause	Requirement + Test	Result - Remark	Verdict
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	4.2V applied.	P
A.4	**Consideration of temperature and charging current**		P
A.4.1	General		P
A.4.2	Recommended temperature range	Charging temperature range declared by client is: 0-45°C	P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied		N/A
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
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	Cell specified final voltage 3.0V, not exceed 3.0V specified by cell manufacturer.	P
A.4.6.3	Discharge current and temperature range		P
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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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		P
A.6.2	Example of a nickel particle preparation procedure		P
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
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**		N/A
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**	Not coin cells.	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 .....:	(See appended table D.2)	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

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

ANNEX F	**COMPONENT STANDARDS REFERENCES**	N/A

Shenzhen NCT Testing Technology Co., Ltd.
2008

5.1 – 5.6	TABLE: Critical components information				
Object/part no.	**Manufacturer/ trademark**	**Type/model**	**Technical data**	**Standard**	**Mark(s) of conformity**
Lead wire	SHENZHEN SHUNJIA ELECTRICAL TECHNOLOGY CO LTD	1571	80°C, 30AWG, 30Vac	UL 758	UL E490463
Lead wire (Alternative)	Interchangeable	Interchangeable	min. 80°C, min. 30AWG, min. 30Vac	UL 758	UL approved
PCB	Shenzhen Assunny Precision Circuit Scien-Tech Co., LTD	RD	V-0, 130 ºC	UL 796	UL E248037
PCB (Alternative)	Interchangeable	Interchangeable	V-0, 130ºC	UL 796	UL approved
Protective IC (U1)	Developer	DW01	Over-charge detection Voltage:4.28±0.05V Over-discharge detection Voltage: 2.4±0.1V	--	Tested with appliance
MOSFET (U2)	Developer	8205A	V_{DS}=20V, V_{GS}=±12V, I_D= 5A	--	Tested with appliance
Cell		APL 502030 3.7V	3.7V, 250mAh	IEC 62133-2: 2017, IEC 62133-2: 2017/AMD1: 2021	Tested with appliance
-Positive electrode	--	--	$LiCoO_2$, PVDF, NMP, Conductive Additive	--	--
-Negative electrode	--	--	Graphite, CMC, SBR, Distilled Water, Conductive	--	--
-Separator	--	--	Shutdown temperature: 130°C	--	--
-Electrolyte	--	--	$LiPF_6$+EMC+EC+DMC	--	--
Supplementary information: N/A					

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**
Cell #1	4.200	0.050	4.181	P
Cell #2	4.200	0.050	4.177	P
Cell #3	4.200	0.050	4.182	P
Cell #4	4.200	0.050	4.180	P
Cell #5	4.200	0.050	4.179	P
Supplementary information: - No fire or explosion - No leakage				

7.3.1	TABLE: External short-circuit (cell)				P
Sample no.	**Ambient T (°C)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature ~~rise ΔT~~ (°C)**	**Results**
Samples charged at charging temperature upper limit (45°C)					
Cell #1	55.4	4.165	82.4	113.6	P
Cell #2	55.4	4.167	81.6	116.8	P
Cell #3	55.4	4.164	85.0	114.3	P
Cell #4	55.4	4.165	84.1	117.4	P
Cell #5	55.4	4.166	83.4	115.1	P
Samples charged at charging temperature lower limit (0°C)					
Cell #6	55.5	4.153	84.8	118.0	P
Cell #7	55.5	4.148	81.9	116.3	P
Cell #8	55.5	4.152	86.3	115.8	P
Cell #9	55.5	4.147	82.7	114.3	P
Cell #10	55.5	4.150	84.2	117.5	P
Supplementary information: - No fire or explosion					

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~~ (°C)**	**Component single fault condition**	**Results**
Battery #1	23.3	4.179	85.1	114.3	MOS	P
Battery #2	23.3	4.182	81.8	117.1	MOS	P
Battery #3	23.3	4.177	83.5	115.8	MOS	P
Battery #4	23.3	4.180	82.9	23.9	/	P
Battery #5	23.3	4.183	86.0	23.8	/	P
Supplementary information: - No fire or explosion						

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 (45°C)				
Cell #1	4.164	4.161	13.01	P
Cell #2	4.159	4.155	13.01	P
Cell #3	4.163	4.160	13.02	P
Cell #4	4.158	4.154	13.00	P
Cell #5	4.162	4.159	13.03	P
Samples charged at charging temperature lower limit (0°C)				
Cell #6	4.149	4.146	13.02	P
Cell #7	4.151	4.147	13.01	P
Cell #8	4.153	4.150	13.00	P
Cell #9	4.147	4.144	13.02	P
Cell #10	4.150	4.146	13.01	P
Supplementary information: - No fire or explosion				

7.3.6	TABLE: Over-charging of battery				P
Constant charging current (A) ..... :		0.50			—
Supply voltage (Vdc) ..... :		5.88			—
Sample no.	**OCV before charging (Vdc)**	**Total charging time (minute)**	**Maximum outer case temperature (°C)**	**Results**	
Battery #1	3.285	61.0	23.7	P	
Battery #2	3.272	61.0	23.8	P	
Battery #3	3.293	61.0	23.9	P	
Battery #4	3.288	61.0	23.8	P	
Battery #5	3.279	61.0	23.7	P	
Supplementary information: - No fire or explosion					

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**
Cell #1	3.294	0.250	3.000	P
Cell #2	3.278	0.250	3.000	P
Cell #3	3.281	0.250	3.000	P
Cell #4	3.286	0.250	3.000	P
Cell #5	3.297	0.250	3.000	P
Supplementary information: - No fire or explosion				

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**
Battery #1	4.182	4.178	5.708	5.707	P
Battery #2	4.177	4.174	5.883	5.881	P
Battery #3	4.180	4.176	5.752	5.751	P
Supplementary information: - No fire or explosion - No rupture - No leakage - No venting					

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**
Battery #1	4.180	4.177	5.846	5.845	P
Battery #2	4.183	4.179	5.761	5.760	P
Battery #3	4.179	4.175	5.829	5.827	P

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting

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 (45°C)					
Cell #1	45	4.158	1	400	P
Cell #2	45	4.156	1	400	P
Cell #3	45	4.155	1	400	P
Cell #4	45	4.153	1	400	P
Cell #5	45	4.154	1	400	P
Samples charged at charging temperature lower limit (0°C)					
Cell #6	0	4.147	1	400	P
Cell #7	0	4.148	1	400	P
Cell #8	0	4.143	1	400	P
Cell #9	0	4.145	1	400	P
Cell #10	0	4.145	1	400	P

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.

- No fire or explosion

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 internal resistance less than or equal to 3 Ω, see test result on corresponding tables

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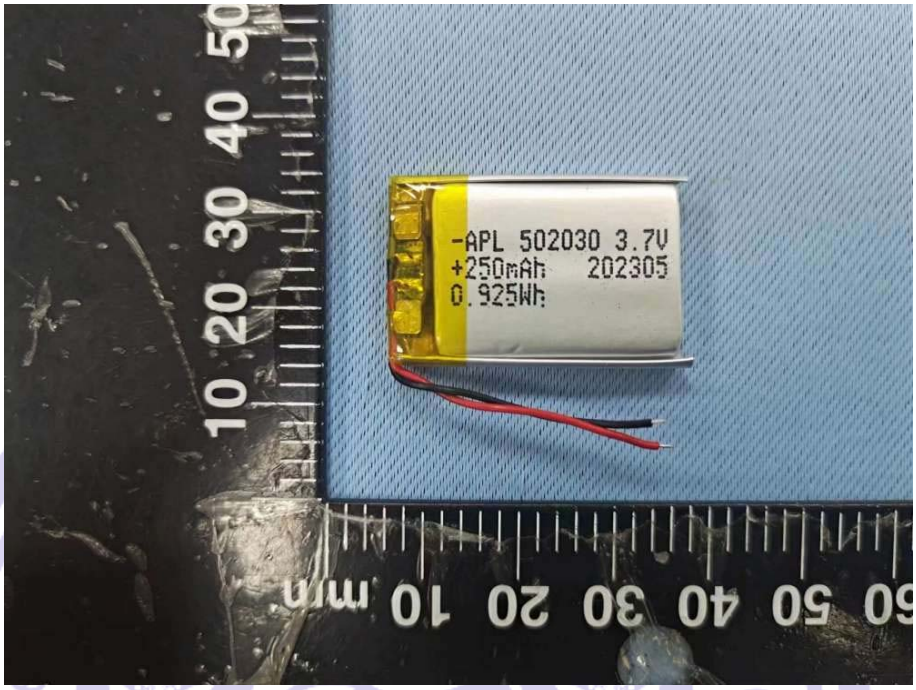
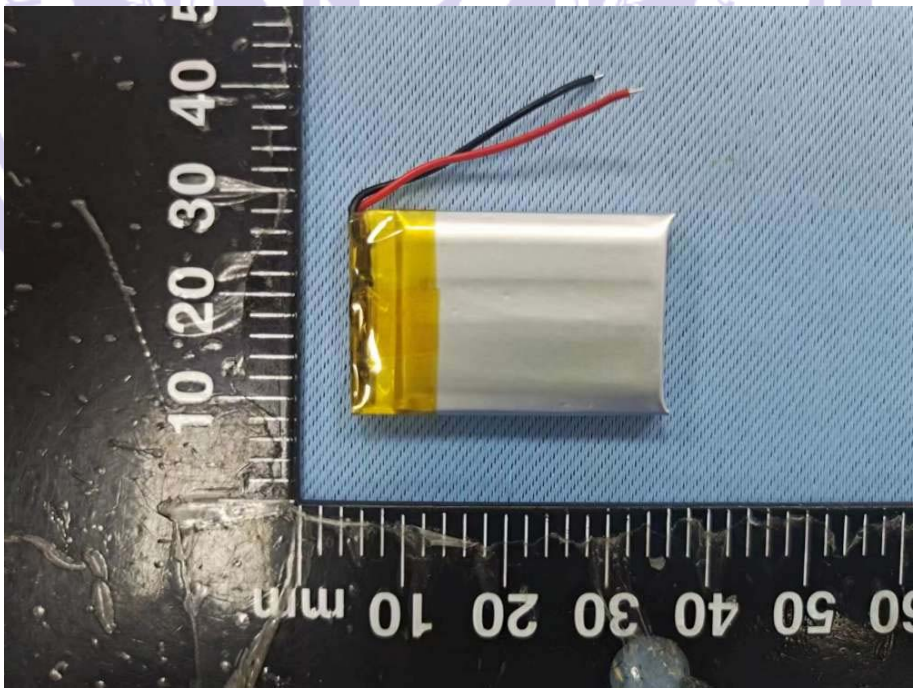
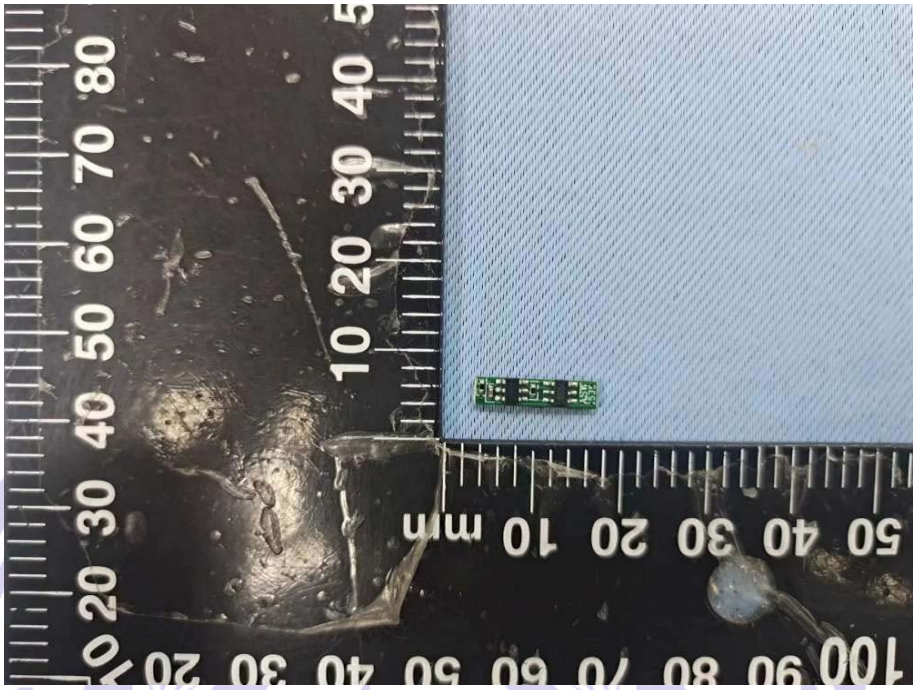
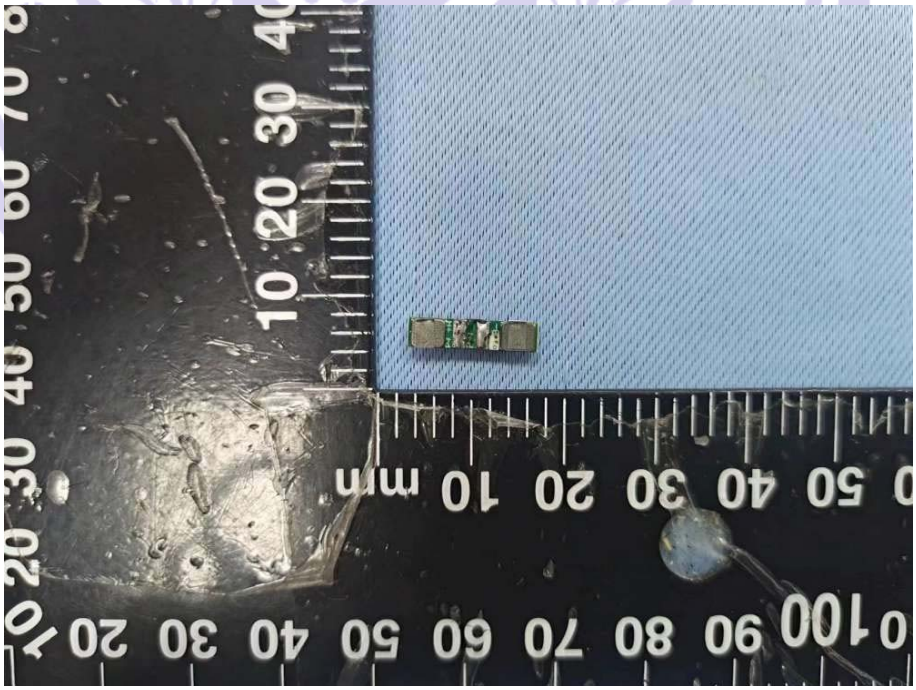
Appendix 1

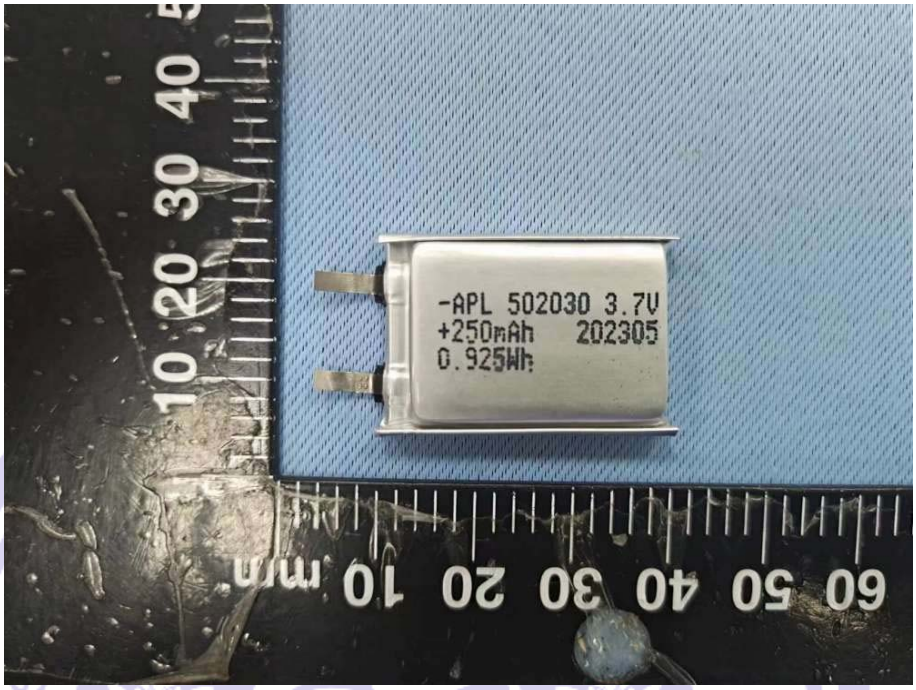
Photo Documentation

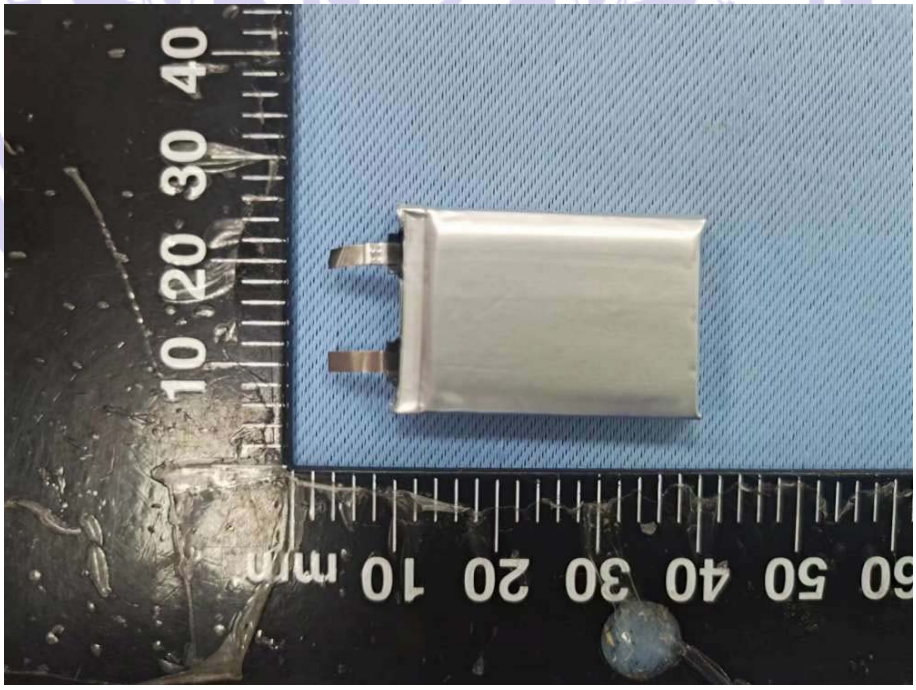
Details of:	Fig.1–Front view of battery APL 502030 3.7V
	

Details of:	Fig. 2–Back view of battery APL 502030 3.7V
	

Details of:	Fig.3–Front view of PCM
	

Details of:	Fig.4–Back view of PCM
	

Details of:	Fig.5–Front view of cell APL 502030 3.7V
	

Details of:	Fig. 6–Back view of cell APL 502030 3.7V
	

---End of Test Report---