

Test Report

Report No. : TCT220104C044

Date : Jan. 10, 2022

Page No.: 1 of 4

Applicant:

Address:

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

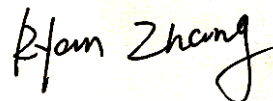
Sample Name: Li-ion Battery
Model No.: 602030
Sample Received Date: 2022.01.04
Testing Period: 2022.01.04—2022.01.10
Test Requested: Accordance with Directive 2006/66/EC, to determine the Lead (Pb), Cadmium (Cd), Mercury (Hg) contents of the submitted sample(s).
Test Method: Please refer to the following 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



Justin

Approved by



Ryan Zhang
Technical Manager



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Test Results:**Lead, Cadmium and Mercury Content(s)**

Test Method: With reference to IEC62321-4:2013+AMD1:2017, IEC 62321-5:2013

Analysis was performed by Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES)

Test Items	Unit	MDL	Labelling Requirement [#]	Permissible Limit	Test Results
Lead (Pb)	%	0.0010	>0.004	--	N.D.
Cadmium (Cd)	%	0.0010	>0.002	0.002 ^{##}	N.D.
Mercury (Hg)	%	0.0001	>0.0005	0.0005	N.D.

Specimen Description:

Battery

- Note :
- MDL = Method Detection Limit
 - N.D.= Not Detected(<MDL)
 - 1mg/kg= 1ppm = 0.0001%
 - "--"=Not Regulated
 - [#] = 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.
 - According to the article 21.1, all batteries, accumulators and battery packs should be appropriately marked with the crossed-out wheeled bin symbol.

Remark: - Results shown is/are of total weight of the battery sample.

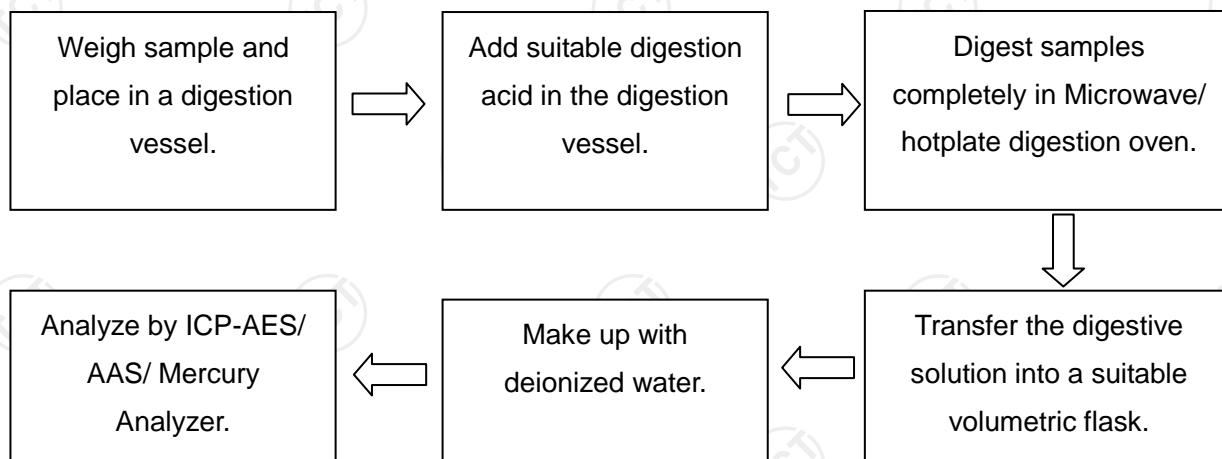
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Test Chart:



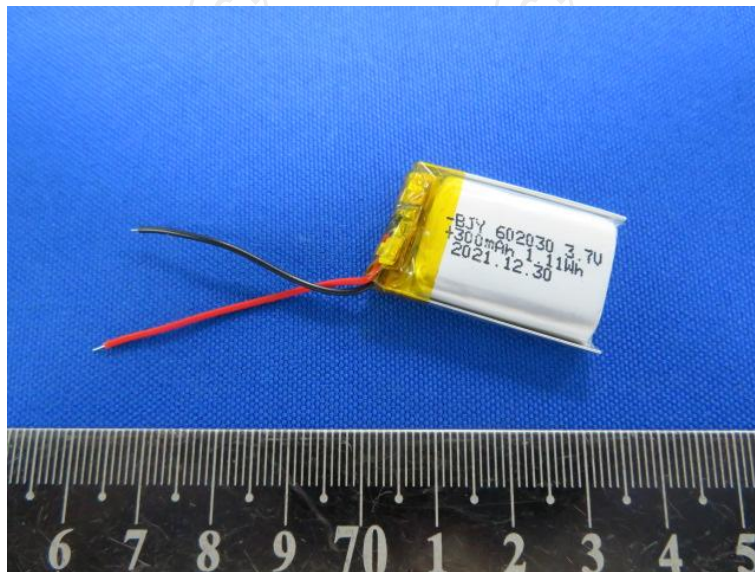
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Photo(s) of the sample(s)





***** 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.



<p>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</p>	
Report Number..... :	SZES210800549501
Date of issue..... :	2021-09-08
Total number of pages..... :	23 Pages
Name of Testing Laboratory preparing the Report..... :	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Applicant's name..... :	
Address..... :	
<p>Test specification:</p> <p>Standard..... : IEC 62133-2:2017</p> <p>Test procedure..... : SGS-CSTC</p> <p>Non-standard test method..... : N/A</p>	
Test Report Form No..... :	IEC62133_2A
Test Report Form(s) Originator.... :	DEKRA
Master TRF..... :	Dated 2017-08-10
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<p>General disclaimer:</p> <p>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 CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.</p>	



Test item description :	Rechargeable Li-ion Battery	
Trade Mark :	BJY	
Manufacturer :	Same as applicant	
Model/Type reference :	602030	
Ratings :	Rated Voltage: 3,7 V d.c. Rated Capacity: 300 mAh	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/> Testing Laboratory:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch	
Testing location/ address:	No.2, Jianghao Industrial Factory Area, No.490, Jinhua Road, Bantian Street, Longgang District, Shenzhen, Guangdong, China	
Tested by (name, function, signature):	Locs Lai / Project Engineer	
Approved by (name, function, signature):	Sara Wang / Report Reviewer	



<p>List of Attachments (including a total number of pages in each attachment): Attachment 1: 4 pages of Photos; Attachment 2: 3 pages of Information for safety; Attachment 3: 1 page of Packaging; Attachment 4: 2 pages of Product specification.</p>	
<p>Summary of testing: The sample(s) tested complies with the requirements of IEC 62133-2: 2017. When determining the test conclusion, the Measurement Uncertainty of test has been considered. Remark: Battery and cell were considered and tested according to standard in this report.</p>	
<p>Tests performed (name of test and test clause):</p> <ul style="list-style-type: none"> <input type="checkbox"/> 5.2 Insulation resistance <input checked="" type="checkbox"/> 7.2.1 Continuous charging at constant voltage (cells) <input type="checkbox"/> 7.2.2 Case stress at high ambient temperature (battery) <input checked="" type="checkbox"/> 7.3.1 External short circuit (cell) <input checked="" type="checkbox"/> 7.3.2 External short circuit (battery) <input checked="" type="checkbox"/> 7.3.3 Free fall <input checked="" type="checkbox"/> 7.3.4 Thermal abuse (cells) <input checked="" type="checkbox"/> 7.3.5 Crush (cells) <input checked="" type="checkbox"/> 7.3.6 Over-charging of battery <input checked="" type="checkbox"/> 7.3.7 Forced discharge (cells) <input checked="" type="checkbox"/> 7.3.8 Mechanical tests (batteries) <input type="checkbox"/> 7.3.9 Design evaluation – Forced internal short circuit (cells) <input type="checkbox"/> Annex D Measurement of the internal AC resistance for coin cells 	<p>Testing location: SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch No.2, Jianghao Industrial Factory Area, No.430, Jihua Road, Bantian Street, Longgang District, Shenzhen, Guangdong, China</p>
<p>Summary of compliance with National Differences (List of countries addressed): none. <input checked="" type="checkbox"/> The product fulfils the requirements of EN 62133-2:2017 and BS EN 62133-2:2017.</p>	

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.

Rechargeable Li-ion Battery

602030 (1INP6/21/31)

3,7V 300mAh Date code: YYYYMMDD

Red (+) Black (-)

Caution: Do not Short circuit

Do not expose cells or batteries to heat or fire.



Remark: 'YYYYDDMM' represents the manufacturing date: 'YYYY' represents the year, 'MM' represents the month, 'DD' represents the day.

Test item particulars	--
Classification of installation and use	--
Supply Connection	--
Recommend charging method declared by the manufacturer	CC/CV
Discharge current (0,2 It A)	0,06 A
Specified final voltage	2,75 V
Upper limit charging voltage per cell	4,2 V
Maximum charging current	3600 mA
Charging temperature upper limit	45°C
Charging temperature lower limit	0°C
Polymer cell electrolyte type	<input type="checkbox"/> gel polymer <input checked="" type="checkbox"/> solid polymer <input type="checkbox"/> 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	2021-08-11
Date (s) of performance of tests	2021-08-11 to 2021-08-24
General remarks:	
<p>"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p> <p>This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.</p>	

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:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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:	
Product description:	Rechargeable Li-ion Battery
Model of pack:	602030
Designation of pack:	1INP6/21/31
Rated voltage:	3,7 V
Rated capacity:	300 mAh
Maximum charge current:	3600 mA
Number of cells in battery pack:	One cell
Model of cell:	602030
Designation of cell:	INP6/21/31
Rated voltage of cell:	3,7 V
Rated capacity of cell:	300 mAh
Maximum charge current of cell:	3600 mA
Remark: See Attachment 4 for more detailed product specification.	

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 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 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	Cell: Seal the seam around the aluminium foil as the venting mechanism. Battery: Same as 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	No encapsulation used	N/A
5.4	Temperature, voltage and current management		P
	Batteries are designed such that abnormal temperature rise conditions are prevented	Protection circuit was used.	P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	Protection circuit was used.	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	Charge and discharge instructions were provided.	P
5.5	Terminal contacts		P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		P
	Terminal contacts are arranged to minimize the risk of short-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		P
	This protection may be provided external to the battery such as within the charger or the end devices	The protection is within the battery	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	Single battery pack without separate case	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 added as appropriate and consideration given to the end-device application		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	Single cell battery	P

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		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		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	The mechanical protection will be provided by the end product.	P
	The battery case and compartments housing cells 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 considered when conducting mechanical tests	Should be considered in end product.	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	Self-declaration was submitted.	P
5.8	Battery safety components		P
	According annex F		P

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	Cells and batteries are not more than six months old.	P
	Coin cells with resistance $\leq 3 \Omega$ (measured according annex D) are tested according table 1		N/A
	Unless otherwise specified, tests are carried out in an ambient temperature of $20 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$		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		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 $20 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$, using the method declared by the manufacturer		P
	Prior to charging, the battery have been discharged at $20 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$ 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

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		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. No leakage :	(See appended table 7.2.1)	P
7.2.2	Case stress at high ambient temperature (battery)	No moulded case	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)		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	Applies to samples in normal condition Rapid decline in short circuit current, protective electronic circuit operate	P
	- The case temperature declined by 20 % of the maximum temperature rise	Applies to samples in single fault condition	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		N/A
	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		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor	Single fault applies to MOSFET (Q2)	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, remain at this temperature for 30 min	—
	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		N/A
	- Returned to ambient		P
	Results: No fire. No explosion	(See appended table 7.3.6)	P
7.3.7	Forced discharge (cells)		P
	If 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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	If 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)	Polymer cell declared by manufacturer	N/A
	The cells complied with national requirement for		—
	The pressing was stopped upon:		N/A
	- A voltage drop of 50 mV has been detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached		N/A
	Results: No fire.....		N/A

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	See Attachment 4 for detail.	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	See Attachment 2 for detail.	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
	Do not allow children to replace batteries without adult supervision		N/A
8.2	Small cell and battery safety information	Small cell and battery	P
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:		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		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 marked as specified in IEC 61960, except for coin batteries	See marking plate for detail.	P
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity. Batteries also marked with an appropriate caution statement	Not coin batteries	N/A
	Terminals have clear polarity marking on the external surface of the battery		P
	Batteries with keyed external connectors designed for connection to specific end products need not be marked with polarity markings if the design of the external connector prevents reverse polarity connections		N/A
9.3	Caution for ingestion of small cells and batteries	Small cell and battery	P
	Coin cells and batteries identified as small batteries according to 8.2 include a caution statement regarding the hazards of ingestion in accordance with 8.2		P
	When small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion given on the immediate package		N/A
9.4	Other information		P

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

	Storage and disposal instructions	Storage and disposal instructions were supplied with the battery. See Attachment 2 for detail	P
	Recommended charging instructions	Recommended charging instructions were supplied with the battery. See Attachment 4 for detail	P

10	PACKAGING AND TRANSPORT		P
	Packaging for coin cells not small enough to fit within the limits of the ingestion gauge of Figure 3		N/A
	The materials and packaging design are chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants	See Attachment 3 for detail	P

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	The upper limit charging voltage is 4,2 V during test.	N/A
A.4	Consideration of temperature and charging current		P
A.4.1	General		P
A.4.2	Recommended temperature range		P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	The recommended temperature range: 0°C to 45°C in specification.	P
A.4.3	High temperature range	The upper charging temperature is 45°C	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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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	The upper charging temperature is 0C	P
A.4.4.1	General		P
A.4.4.2	Explanation of safety viewpoint		P
A.4.4.3	Safety considerations, when specifying charging conditions in the low temperature range		P
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range		N/A
A.4.5	Scope of the application of charging current		P
A.4.6	Consideration of discharge		P
A.4.6.1	General		P
A.4.6.2	Final discharge voltage and explanation of safety viewpoint		P
A.4.6.3	Discharge current and temperature range		P
A.4.6.4	Scope of application of the discharging current		P
A.5	Sample preparation		N/A
A.5.1	General		N/A
A.5.2	Insertion procedure for nickel particle to generate internal short		N/A
A.5.3	Disassembly of charged cell		N/A
A.5.4	Shape of nickel particle		N/A
A.5.5	Insertion of nickel particle 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		N/A
A.6	Experimental procedure of the forced internal short-circuit test		N/A
A.6.1	Material and tools for preparation of nickel particle		N/A
A.6.2	Example of a nickel particle preparation procedure		N/A
A.6.3	Positioning (or placement) of a nickel particle		N/A
A.6.4	Damaged separator precaution		N/A
A.6.5	Caution for rewinding separator and electrode		N/A
A.6.6	Insulation film for preventing short-circuit		N/A
A.6.7	Caution when disassembling a cell		N/A
A.6.8	Protective equipment for safety		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
A.6.9	Caution in the case of fire during disassembling		N/A
A.6.10	Caution for the disassembling process and pressing the electrode core		N/A
A.6.11	Recommended specifications for the pressing device		N/A
ANNEX 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 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		P
ANNEX F	COMPONENT STANDARDS REFERENCES		P

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⁾
Cell		602030	3,7 Vdc 300 mAh	IEC 62133-2: 2017 EN 62133-2: 2017	Tested with appliance
- Electrolyte	Heyuan Lianmao New Manterlals Co., Ltd.	LM-YLJ01	LiPF ₆ Conductivity: 7,6 mS/cm	--	--
- Separator	Shenzhen Jinglitai Technology Co., Ltd.	0.016mm	PP&PE&PP Dimensions: 680mm * 26mm * 0,016mm Shut down temperature: 130°C	--	--
- Positive electrode	Soundon New Energy Technology Co., Ltd.	SN2A	LiNiCoMnO ₂ Dimensions: 280mm * 23mm * 0,137mm Specific capacity: 155mAh/g	--	--
- Negative electrode	Ganzhou ruifu Technology Co., Ltd.	AGF-1	Graphite Dimensions: 305mm * 24mm * 0,117mm Specific capacity: 355 mAh/g	--	--
Protection IC (U1)	Shenzhen xinfeihong Electronics Co., Ltd.	DW01A	Overcharge Detection Voltage: 4,28 ± 0,05V Over-discharge Detection Voltage: 2,4 ± 0,10V Operating temperature range: -40°C ~ 85°C	--	--
MOSFET (Q2)	Shenzhen xinfeihong Electronics Co., Ltd.	8205A	Id: 5A Vds: 20V Vgs: ±12V Operating temperature range: -55°C ~ 150°C	--	--

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

PCB	SHEN ZHEN JIRUIDA CIRCUIT TECHNOLOGY CO LTD	JRD-S	V-0 130°C	UL796	UL (E340032)
Lead wires	Shenzhen Yongjia wire heat shrinkable tube Co., Ltd.	1571	26AWG FT-2 80°C	--	--

Supplementary information:

¹⁾ Provided evidence ensures the agreed level of compliance. See OD-CB2039.

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 V _c (Vdc)	Recommended charging current I _{rec} (A)	OCV before test (Vdc)	Results	
Cell: 602030 (#1)	4,2	0,3	4,180	Pass	
Cell: 602030 (#2)	4,2	0,3	4,179	Pass	
Cell: 602030 (#3)	4,2	0,3	4,182	Pass	
Cell: 602030 (#4)	4,2	0,3	4,178	Pass	
Cell: 602030 (#5)	4,2	0,3	4,181	Pass	
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 (K)	Results	
Samples charged at charging temperature upper limit¹⁾						
Cell: 602030 (#6)	54,6	4,177	83,5	63,7	Pass	
Cell: 602030 (#7)	54,6	4,176	81,6	56,6	Pass	
Cell: 602030 (#8)	54,6	4,179	88,3	69,4	Pass	
Cell: 602030 (#9)	54,6	4,178	86,3	59,2	Pass	
Cell: 602030 (#10)	54,6	4,179	84,7	61,3	Pass	
Samples charged at charging temperature lower limit²⁾						
Cell: 602030 (#11)	54,5	4,106	83,3	58,0	Pass	
Cell: 602030 (#12)	54,5	4,103	85,3	54,2	Pass	
Cell: 602030 (#13)	54,5	4,105	81,7	51,4	Pass	
Cell: 602030 (#14)	54,5	4,098	88,4	62,3	Pass	
Cell: 602030 (#15)	54,5	4,107	86,6	55,6	Pass	
Supplementary information:						
- No fire or explosion						
1) Cells charged at 45°C by using 4,2 V and 300 mA until the charging current reduced to 15 mA;						
2) Cells charged at 0°C by using 4,2 V and 300 mA until the charging current reduced to 15 mA.						

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
Pack: 602030 (#44)	24,3	4,165	84,5	--*	Normal	Pass
Pack: 602030 (#45)	24,3	4,160	86,3	111,8	SC Q2 PIN (1-2)	Pass
Pack: 602030 (#46)	24,3	4,162	82,1	109,8	SC Q2 PIN (1-2)	Pass
Pack: 602030 (#47)	24,3	4,164	84,6	110,1	SC Q2 PIN (1-2)	Pass
Pack: 602030 (#48)	24,3	4,163	83,9	111,2	SC Q2 PIN (1-2)	Pass

Supplementary information:

- No fire or explosion
- SC = Short circuit
- * Shut down immediately and tested for 24 hours, no max. temperature was noted.

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 limit¹⁾				
Cell: 602030 (#29)	4,178	4,178	12,998	Pass
Cell: 602030 (#30)	4,179	4,178	12,998	Pass
Cell: 602030 (#31)	4,178	4,178	12,998	Pass
Cell: 602030 (#32)	4,181	4,180	12,998	Pass
Cell: 602030 (#33)	4,183	4,183	12,999	Pass
Samples charged at charging temperature lower limit²⁾				
Cell: 602030 (#34)	4,101	4,101	12,999	Pass
Cell: 602030 (#35)	4,104	4,104	12,997	Pass
Cell: 602030 (#36)	4,105	4,104	12,998	Pass
Cell: 602030 (#37)	4,103	4,103	12,998	Pass
Cell: 602030 (#38)	4,106	4,106	12,999	Pass

Supplementary information:

- No fire or explosion
- The maximum force of 13 KN ± 0,78 KN has been applied, the force was released.
- ¹⁾ Cells charged at 45°C by using 4,2 V and 300 mA until the charging current reduced to 15 mA;
- ²⁾ Cells charged at 0°C by using 4,2 V and 300 mA until the charging current reduced to 15 mA.

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

7.3.6	TABLE: Over-charging of battery			P
Constant charging current (A)		0,6		—
Supply voltage (Vdc)		5,88		—
Sample no.	OCV before charging (Vdc)	Total charging time (minute)	Maximum outer case temperature (°C)	Results
Pack: 602030 (#52)	3,422	140	28,1	Pass
Pack: 602030 (#53)	3,416	140	28,1	Pass
Pack: 602030 (#54)	3,418	140	27,6	Pass
Pack: 602030 (#55)	3,420	140	27,8	Pass
Pack: 602030 (#56)	3,412	140	28,4	Pass
Supplementary information:				
- No fire or explosion				
- Ambient temperature was 22,6°C.				

7.3.7	TABLE: Forced discharge (cells)			P
Sample no.	OCV before application of reverse charge (Vdc)	Measured reverse charge I _r (A)	Lower limit discharge voltage (Vdc)	Results
Cell: 602030 (#39)	3,122	0,3	2,75	Pass
Cell: 602030 (#40)	3,019	0,3	2,75	Pass
Cell: 602030 (#41)	3,120	0,3	2,75	Pass
Cell: 602030 (#42)	3,122	0,3	2,75	Pass
Cell: 602030 (#43)	3,125	0,3	2,75	Pass
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
Pack: 602030 (#57)	4,165	4,165	6,1532	6,1531	Pass
Pack: 602030 (#58)	4,168	4,167	6,2999	6,2997	Pass
Pack: 602030 (#59)	4,164	4,164	6,2156	6,2154	Pass
Supplementary information:					
- No fire or explosion					
- No rupture					
- No leakage					
- No venting					

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

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	
Pack: 602030 (#60)	4,164	4,164	6,1536	6,1534	Pass	
Pack: 602030 (#61)	4,166	4,165	6,2413	6,2410	Pass	
Pack: 602030 (#62)	4,163	4,163	6,3245	6,3244	Pass	
Supplementary information: - No fire or explosion - No rupture - No leakage - No venting						

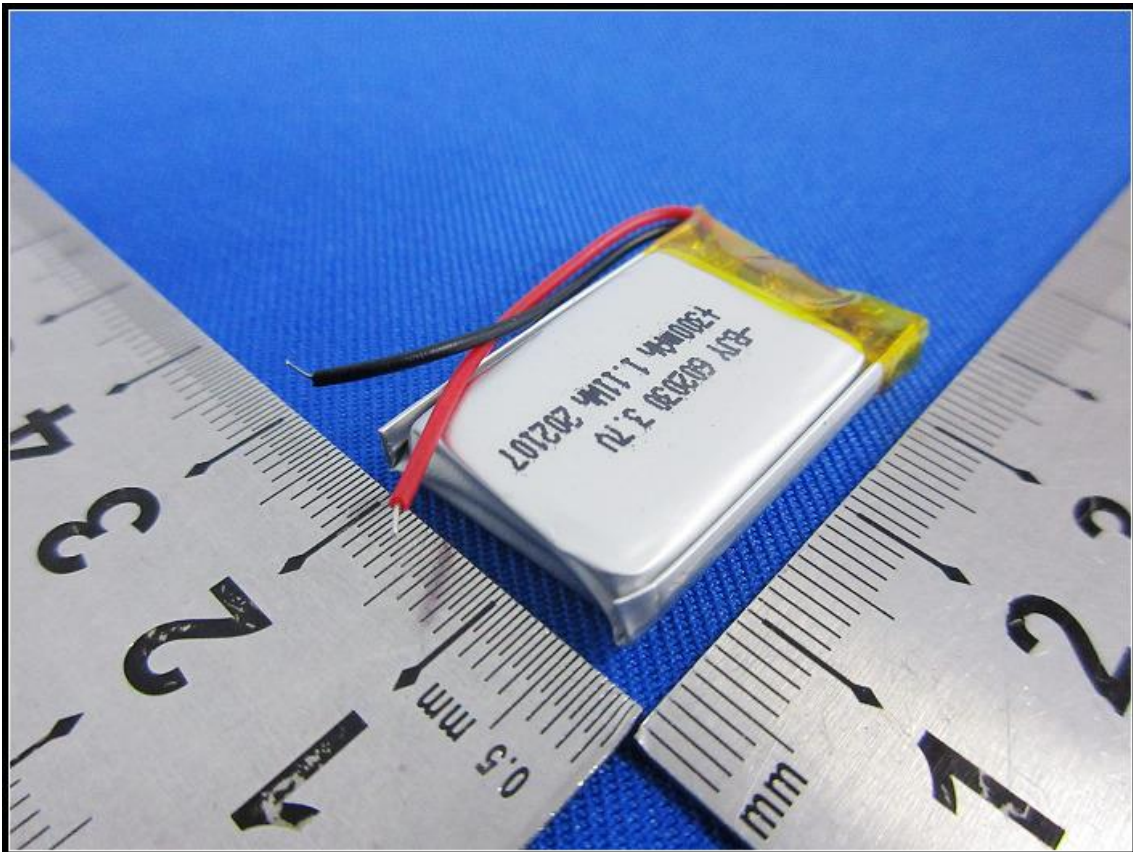
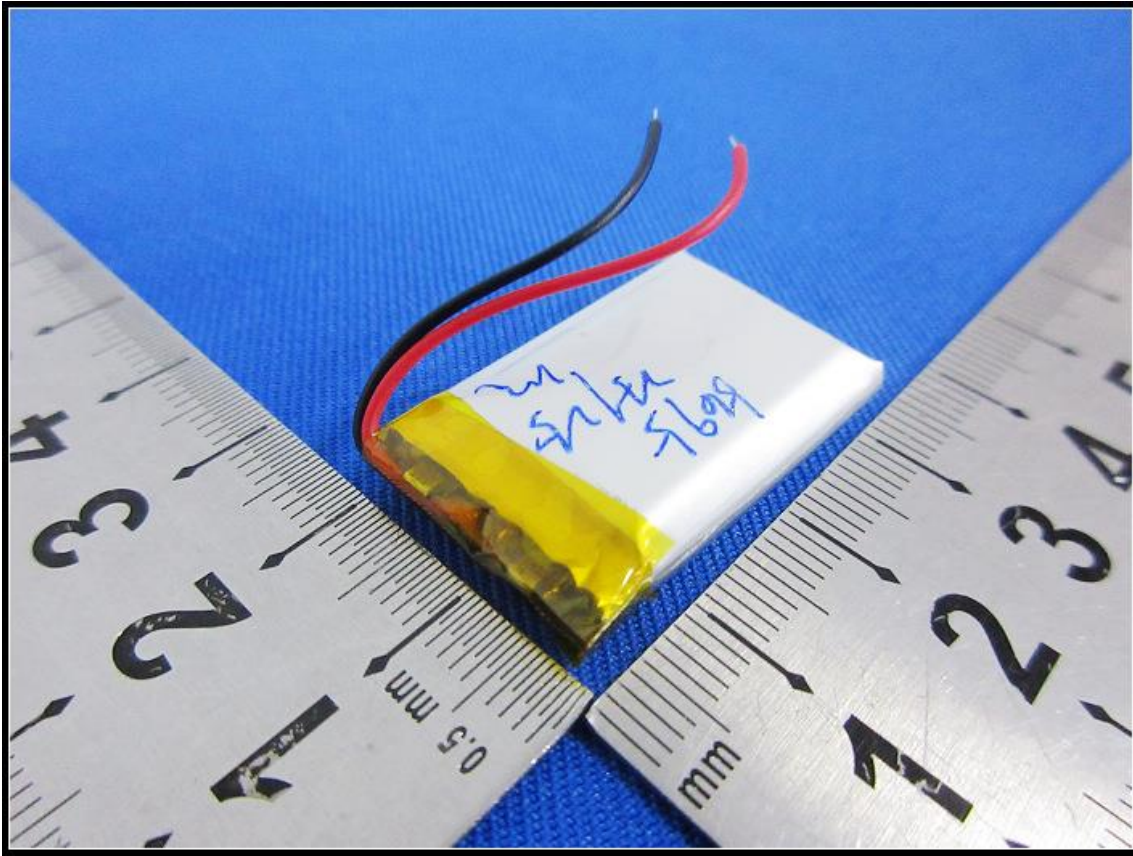
7.3.9	TABLE: Forced internal short circuit (cells)					N/A
Sample no.	Chamber ambient T (°C)	OCV before test (Vdc)	Particle location 1)	Maximum applied pressure (N)	Results	
Samples charged at charging temperature upper limit						
--	--	--	--	--	--	
Samples charged at charging temperature lower limit						
--	--	--	--	--	--	
Supplementary information: --						

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: --					

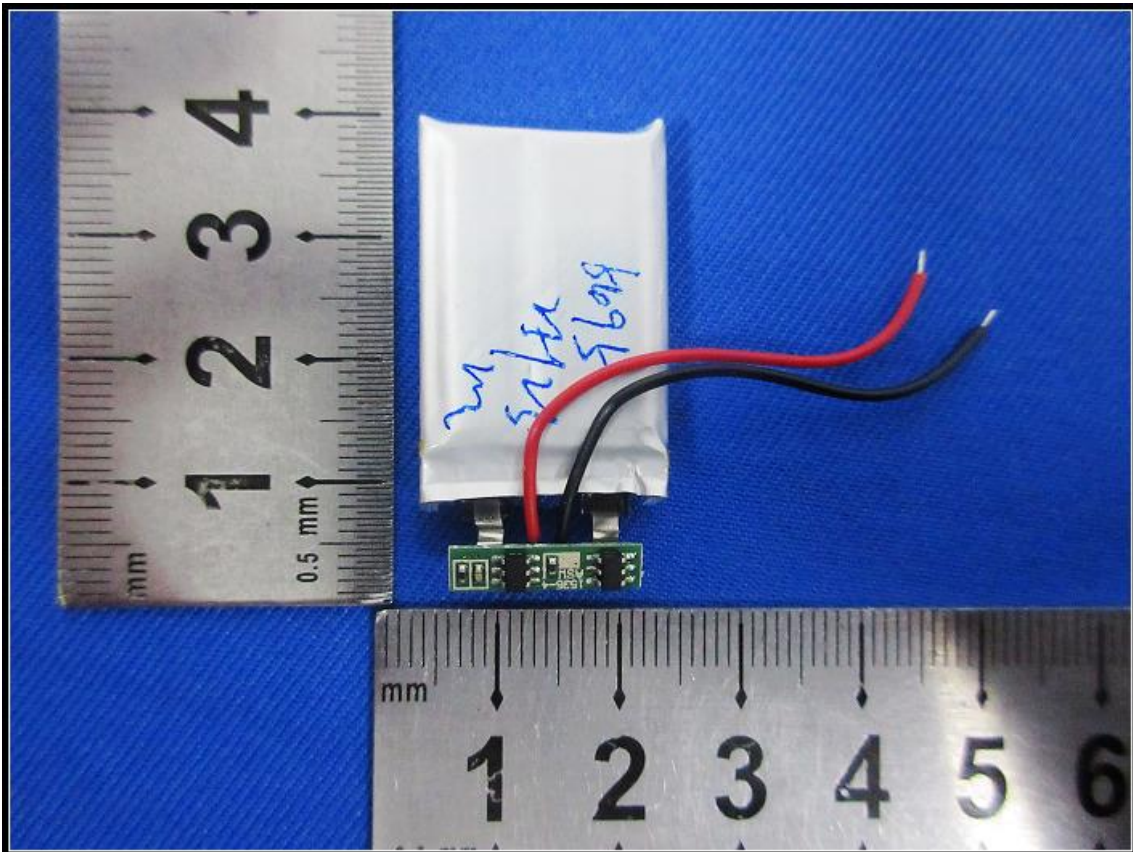
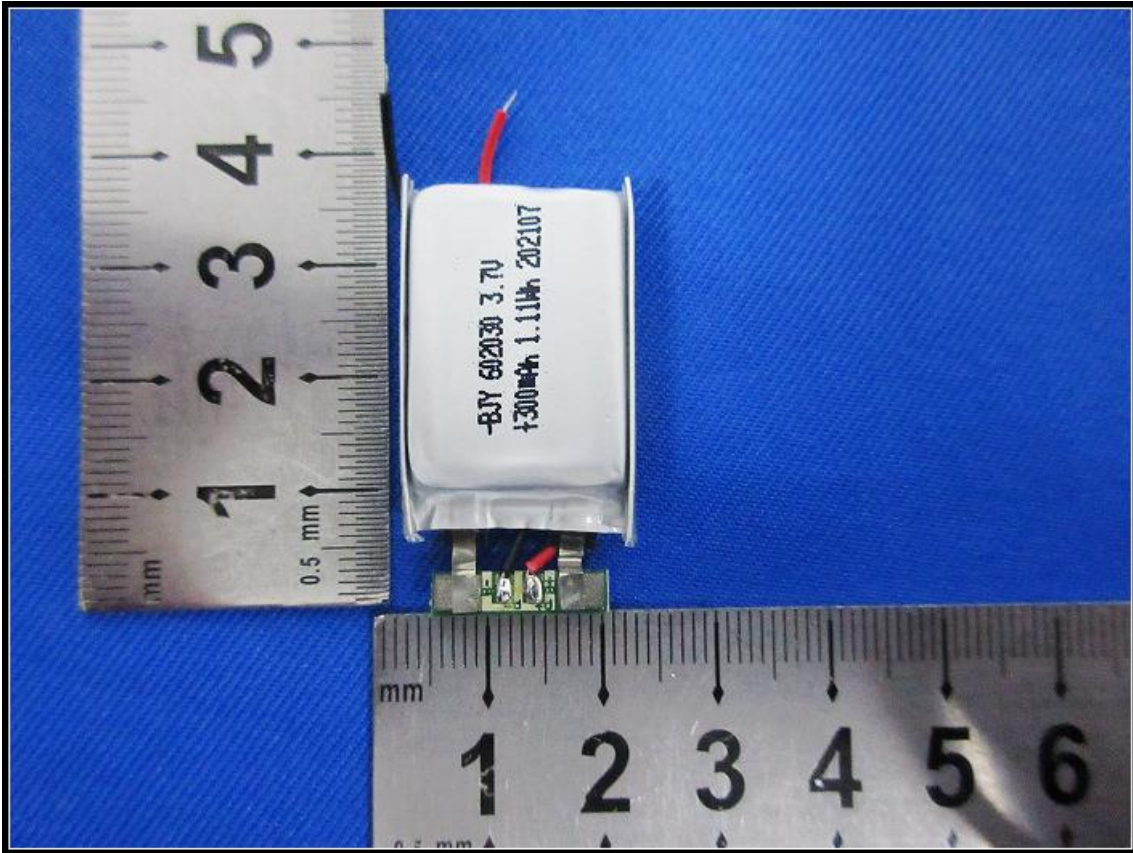
---End report---

Attachment 1 Photo documentation

Whole unit

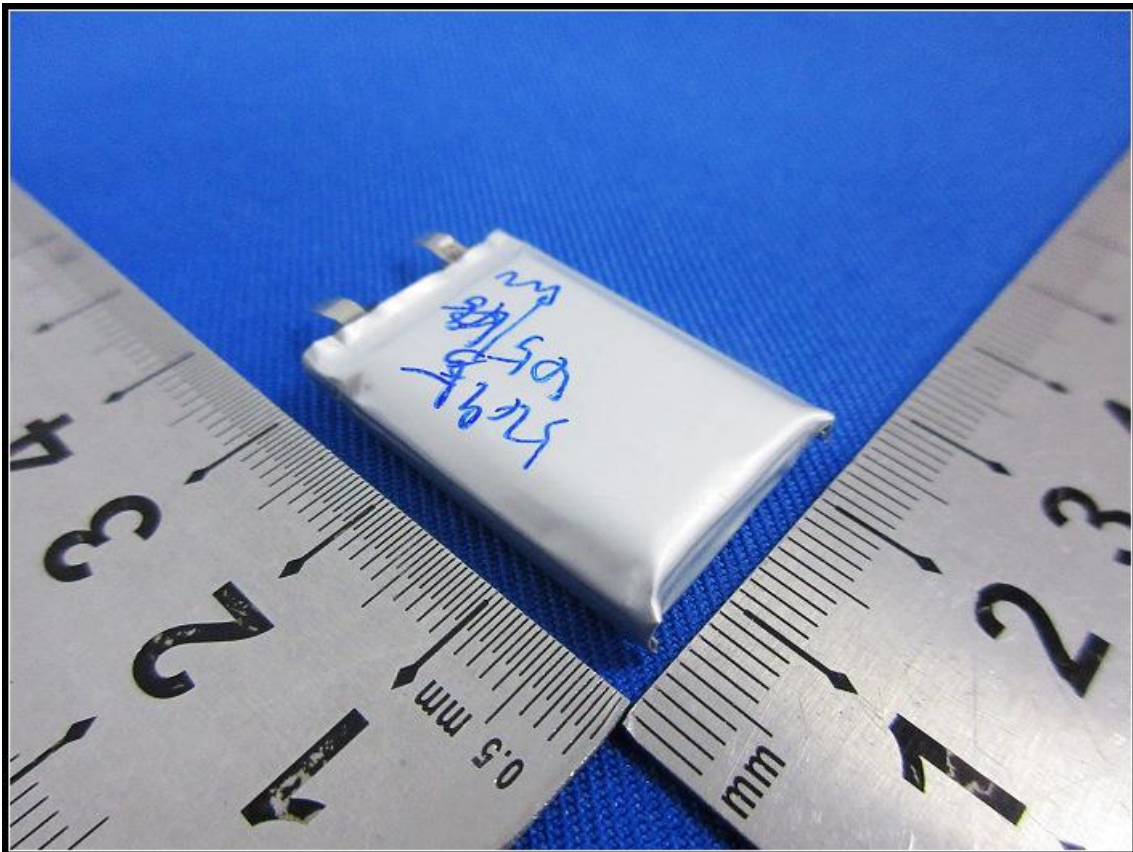
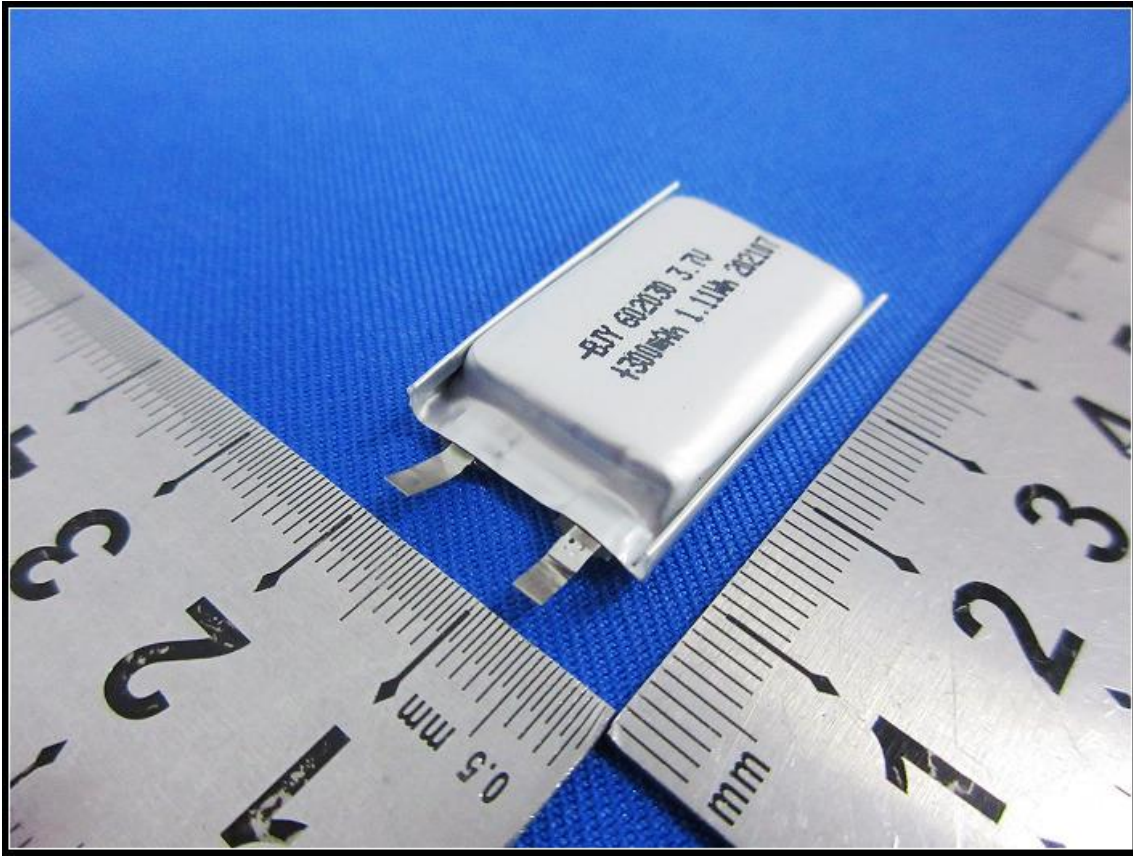


Attachment 1 Photo documentation



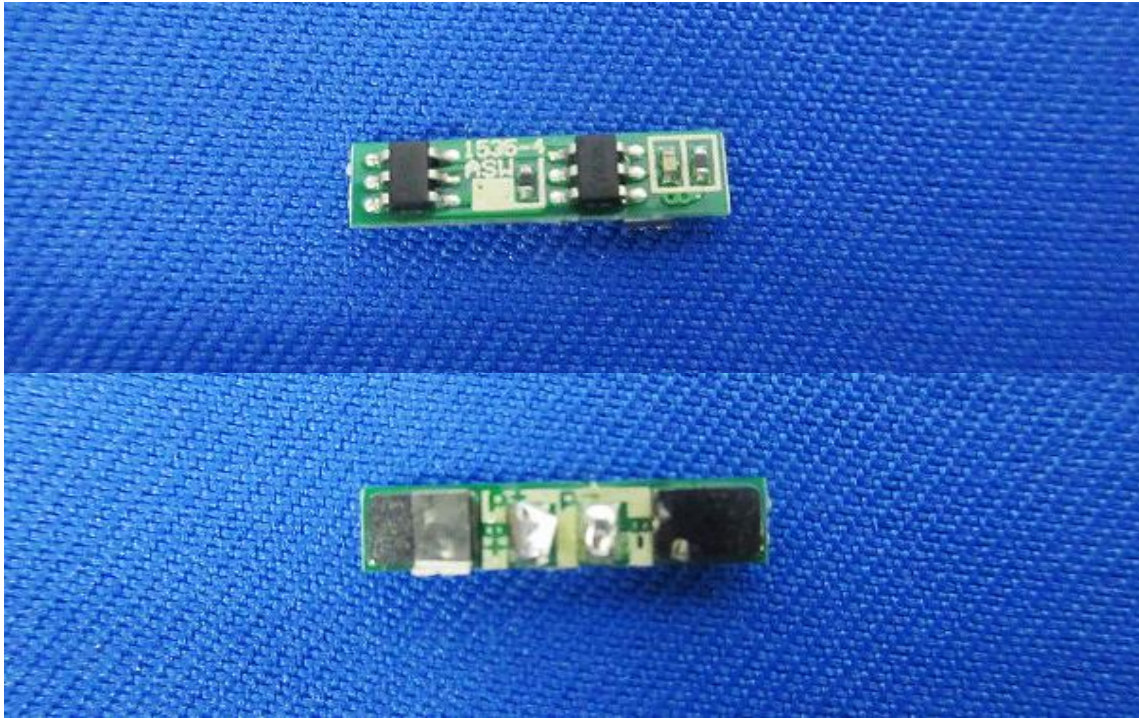
Attachment 1 Photo documentation

Cell



Attachment 1 Photo documentation

PCB



--- End of Attachment 1 ---

Attachment 2 Information for safety

matters needing attention

When there is no adult supervision, do not let children play with the battery. It should be placed where children can't get it;

Do not mix new, old batteries or batteries of different models, especially dry batteries and rechargeable batteries;

Do not try to regenerate the primary battery by heating, charging or other methods to avoid danger;

Do not short-circuit the rechargeable battery, otherwise it will damage the battery, heat and burn the battery.

Do not heat the battery or throw the battery into water or fire. Putting the battery into water will invalidate the battery, and putting the battery into fire will break the battery or cause damage

Do not disassemble the battery or try to penetrate the battery with sharp tools, because the electrolyte inside the battery will hurt skin and clothing.

Attachment 2 Information for safety

The battery that has not been used for a long time shall be taken out for charging and discharging every 3 months or so;

The battery shall be stored in a cool and dry place to avoid direct sunlight;

Nickel charger and lithium charger cannot be mixed;

The battery cannot be welded. The high temperature generated during welding will damage the internal structure of the battery, which may make the battery unusable or even dangerous;

Reverse charging is not allowed. Reverse charging is equivalent to over discharge. Over discharge will cause adverse reactions inside the battery, cause serious damage to the battery, generate a large amount of gas, and may cause chemical leakage of the rechargeable battery.

Do not put the rechargeable battery under the rain. Rainwater can conduct electricity. When the battery is placed under the rain, it is likely to have a short circuit, which will make the battery hot due to instantaneous high current discharge, which will damage the battery or

Attachment 2 Information for safety

cause danger.

If the battery cannot be stored in a high temperature or high humidity environment, the reaction of the battery itself will intensify, so it is unable to provide sufficient capacity to consumers. In addition, under high temperature and high humidity, the aging speed of the battery will also be greatly accelerated, which will also corrode electronic components (except high temperature batteries).

The positive and negative poles of the battery shall be inserted reversely, otherwise the battery will swell or break;

When the battery is stored, it is best not to mix it with metal objects, and the insulating film wrapped outside should not be torn off at will.

8. Storage and Others

贮存及其它事项

a) Long Time Storage

If the Cell is stored for a long time, the cell's storage should be 3.6~3.9V and the cell is to be stored in a condition as No.4.4。

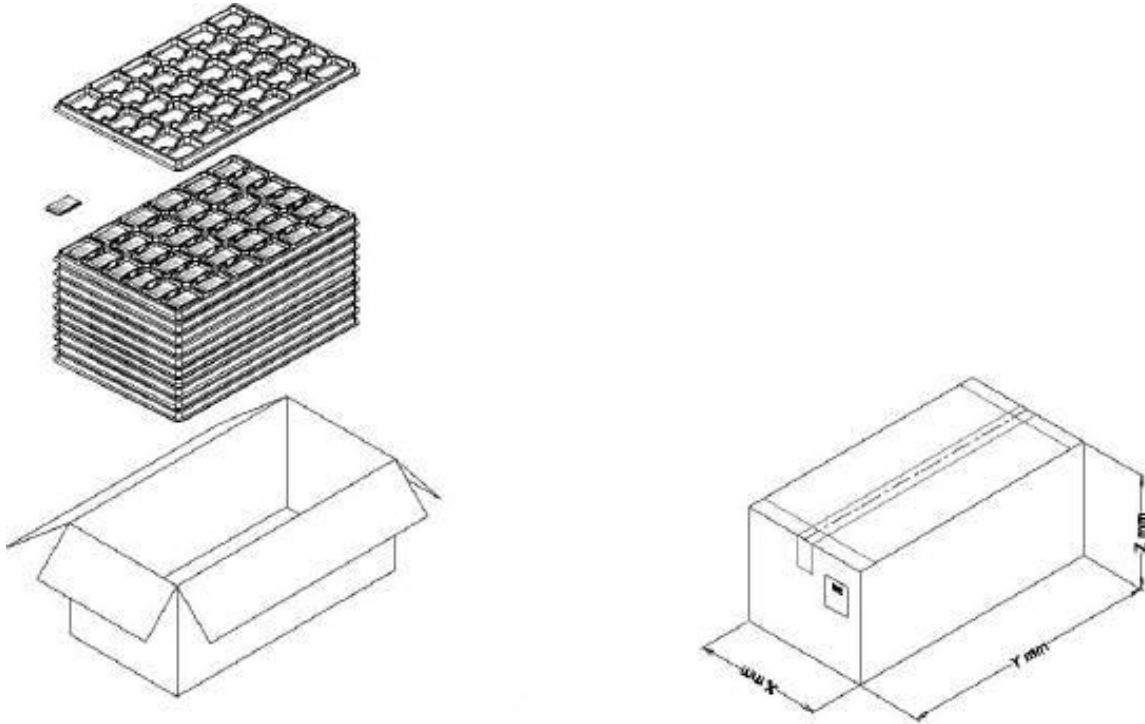
长期贮存

长期贮存的电池（超过 3 个月）须置于干燥、凉爽处。贮存电压为 3.6~3.9V 且贮存环境要求如 4.4,（每隔三个月做 充放电一次）。

- **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 2 h of ingestion.**
- **In case of ingestion of a cell or battery, seek medical assistance promptly.**

— When disposing of secondary cells or batteries, keep cells or batteries of different electrochemical systems separate from each other.(电池处置信息)

--- End of Attachment 2 ---

Attachment 3 Packaging

The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:

- 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 2 h of ingestion.
- In case of ingestion of a cell or battery, seek medical assistance promptly.

--- End of Attachment 3 ---

Attachment 4 Product specification

Specification of Pack

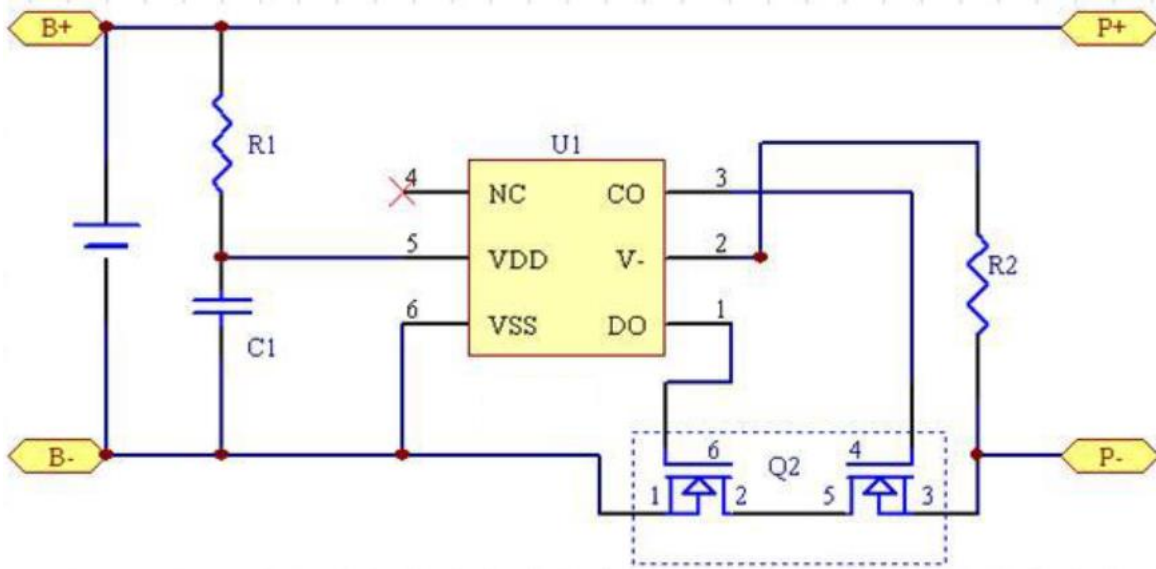
Item	Specifications	Comments
Capacity (容量)	300mAh	
Nominal voltage (标称电压)	3.7V	
Max. charge voltage (最大充电电压)	4.2V	
Max. charge current (最大充电电流)	3600mA	3600mA
Min. discharge voltage (最小放电电压)	2.75V	
Charge temperature (充电温度)	0°C ~ +45°C	

Specification of Cell

Items 项目	Specifications 规格
Charge voltage 充电电压	4.2V
Nominal voltage 标称电压	3.7V
Nominal capacity 标称容量	300mAh @ 0.2C Discharge(放电)
Max.charge current 最大充电电流	3600mA
Discharge cut-off voltage 放电截止电压	2.75V
Operating temperature 工作温度	Charging: 0°C~45°C 充电: 0°C~45°C

Attachment 4 Product specification

Circuit diagram



--- End of Attachment 4 ---