Test Report issued under the responsibility of:

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.....:	TCTTJ20210411022ZB-BR10
Date of issue.....:	2021-05-20
Total number of pages.....:	23
Name of Testing Laboratory preparing the Report.....:	Shenzhen Tiansu Calibration and Testing Co., Ltd.
Applicant's name.....:	
Address.....:	
Test specification:	
Standard.....:	IEC 62133-2:2017
Test procedure.....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC62133_2A
Test Report Form(s) Originator.....:	DEKRA
Master TRF.....:	Dated 2017-08-10

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

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.

Test item description.....:	Rechargeable Li-ion Polymer Battery
Trade Mark.....:	N/A
Manufacturer.....:	
Model/Type reference.....:	602030
Ratings.....:	3.7V, 300mAh, 1.11Wh

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

☒	**CB Testing Laboratory:**	Shenzhen Tiansu Calibration and Testing Co., Ltd.	
Testing location/ address.....:		Building 4, No.2 Jinlong Road, Longgang District, Shenzhen, Guangdong, China.	
Tested by (name, function, signature).....:		Jolly Zhu/Project Handler	Jolly Zhu
Approved by (name, function, signature)...:		Simon Chen/Reviewer	Simon Chen
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature).....:			
Witnessed by (name, function, signature)..:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Witnessed by (name, function, signature)..:			
Approved by (name, function, signature)...:			
Supervised by (name, function, signature) :			

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

National Differences (3 pages)

Enclosures (11 pages)

Summary of testing:

Tests performed (name of test and test)	**Testing location:**
Testing for cell: 602030 7.2.1 CONTINUOUS CHARGING AT CONSTANT VOLTAGE (CELL) 7.3.1 EXTERNAL SHORT CIRCUIT (CELL) 7.3.3 FREE FALL 7.3.4 THERMAL ABUSE 7.3.5 CRUSHING OF CELLS 7.3.7 FORCED DISCHARDE 7.3.9 FORCED INTERNAL SHORT CIRCUIT (CELLS) **Testing for Battery:** 602030 - 7.3.2 EXTERNAL SHORT CIRCUIT (BATTERY) - 7.3.3 FREE FALL - 7.3.6 OVER-CHARGING OF BATTERY - 7.3.8 MECHANICAL TESTS (BATTERIES) - 7.3.8.1 VIBRATION - 7.3.8.2 MECHANICAL SHOCK -8.2 Small cell and battery safety information	Shenzhen Tiansu Calibration and Testing Co., Ltd. Building 4, No.2 Jinlong Road, Longgang District, Shenzhen, Guangdong, China.

Summary of compliance with National Differences (List of countries addressed):

KR

KR= Republic of Korea

☒ The product fulfils the requirements of EN62133-2: 2017

☒ The product fulfils the requirements of BS EN 62133-2: 2017

☒ The product fulfils the requirements of KC62133-2(2020-07)

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 Polymer Battery 602030
3.7V 300mAh 1.11Wh 1IMP7/21/31

Red wire "+" Black wire "-"
Made in China YYYYMMDD
Caution：Risk of Fire and Burns
Follow Manufacturer's Instructions

Information for safety mentioned on Battery'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.

Remark:
Above plate will be printed on the surface of the cell.
The code "YYYYMMDD" represents that:
YYYY for Year.
MM for Month.
DD for Day.

Test item particulars.....:	--
Classification of installation and use.....:	Portable applications
Supply Connection.....:	N/A
Recommend charging method declared by the manufacturer.....:	CC/CV
Discharge current (0,2 It A).....:	60mA
Specified final voltage.....:	3.0V
Upper limit charging voltage per cell.....:	4.2V
Maximum charging current.....:	300mA
Charging temperature upper limit.....:	45°C
Charging temperature lower limit.....:	10°C
Polymer cell electrolyte type.....:	☐ gel polymer ☐ solid polymer ☒ N/A
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item.....:	2021-04-14
Date (s) of performance of tests.....:	2021-04-15 to 2021-05-12

General remarks:

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

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

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

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

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

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

General product information and other remarks:

- Electronic components and one cell in 1-series and 1 parallel are mounted on PWB for Rechargeable Li-ion Polymer Battery model 602030.

- Inner cell (Model 602030) has been evaluated in this report according to IEC 62133-2:2017.

- Battery Pack (Model: 602030) has been evaluated to comply with UN 38.3 cover in test reports No. TCTTJ20210401598ZB-BR24 issued on 2021-04-22, issued by Shenzhen Tiansu Calibration and Testing Co., Ltd.

- Type reference 1IMP7/21/31 is IEC designation which is identical Model 602030 except for model designation.

Product Name		
Rechargeable Li-ion Polymer Battery		
Model Name		
602030		
Cell Manufacturer / Type		
	Battery	Cell
Nominal Capacity	300mAh	300mAh
Nominal Voltage	3.7V	3.7V
Maximum Charge Voltage	4.2V	4.2V
Normal Charge Current	60mA	60mA
Maximum Charge Current	300mA	300mA
Normal Discharge Current	60mA	60mA
Maximum Discharge Current	300mA	300mA
Discharge Cut-Off Voltage	3.0V	3.0V
End of charging current	3mA	3mA
Operation Ambient Range	45°C	45°C
	10°C	10°C

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 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		P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	Cell specification and battery specification have been provided. The design of the battery refers to the parameters of the cell	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	Battery specifications have been 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	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	Battery without selective discharge function.	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		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	Cell upper limit of the charging voltage: 4.2V	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	This shall be considered in end product.	N/A
	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		N/A
	The mechanical protection can be provided by the battery case or it can be provided by the end product enclosure for those batteries intended for building into an end product		N/A
	The battery case and compartments housing cells 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		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. ISO 9001:2015 certificate	P
5.8	**Battery safety components**		N/A
	According annex F		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		P
7	**SPECIFIC REQUIREMENTS AND TESTS**		P
7.1	**Charging procedure for test purposes**		P
7.1.1	First procedure		P
	This charging procedure applies to subclauses other than those specified in 7.1.2		P
	Unless otherwise stated in this document, the charging procedure for test purposes is carried out in an ambient temperature of 20 °C ± 5 °C, using the method declared by the manufacturer		P
	Prior to charging, the battery have been discharged at 20 °C ± 5 °C at a constant current of 0,2 It A down to a specified final voltage		P
7.1.2	Second procedure		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 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	Highest test temperature: 45°C Lowest test temperature: 10°C	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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)		N/A
	Oven temperature (°C)..... :	70	—
	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		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		P
	A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor	(See appended table 7.3.2)	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	—
	Results: No fire. No explosion		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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	5.88V	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 table7.3.6)	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
	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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.3.9	Design evaluation – Forced internal short-circuit (cells)		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 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	Considered in end product.	N/A
	As appropriate, any information relating to hazard avoidance resulting from a system analysis provided to the end user	Considered in end product.	N/A
	Do not allow children to replace batteries without adult supervision	Considered in end product.	P
8.2	**Small cell and battery safety information**	Small 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
	- 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**		P
	Cells marked as specified in IEC 61960, except coin cells		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Coin cells whose external surface area is too small to accommodate the markings on the cells show the designation and polarity	Not coin cells.	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		P
9.2	**Battery marking**		P
	Batteries marked as specified in IEC 61960, except for coin batteries	IEC Designation: 1IMP7/21/31	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 battery.	N/A
	Terminals have clear polarity marking on the external surface of the battery	See page 4.	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 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
	Storage and disposal instructions	Information for storage and disposal instructions in manufacturer's specifications	P
	Recommended charging instructions	Information for recommended charging instructions in manufacturer's specifications	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	Not coin cells.	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		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	4.2V applied.	N/A
A.4	**Consideration of temperature and charging current**		P
A.4.1	General		P
A.4.2	Recommended temperature range	Charging temperature declared by client is: 10-45°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 is 3.0V	P
A.4.6.3	Discharge current and temperature range		P
A.4.6.4	Scope of application of the discharging current		P

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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX B	**RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS**		P
ANNEX C	**RECOMMENDATIONS TO THE END-USERS**		P
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 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**		**N/A**

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)]**
01. Cell		602030	3.7V, 300mAh, 1.11Wh	--	Considered with battery pack in this report
- Electrolyte	Dongguan Shanshan Battery Material Co., Ltd.	LD-134BJ	Composition: $LiPF_6$, Conductivity: 13.00mS/cm	---	--
- Separator	Hunan Sinoma Battery Material Co., Ltd.	16μm	750mm(L)*26mm(W)*0.016mm(T), Shutdown	--	--
- Negative electrode	Dongguan Lirui Electronics Co., Ltd.	JM-NA2	Material: Graphite, Dimensions: 345mm(L)*24mm(W)*0.102mm(T), Specific capacity: 350mAh/g	--	--
- Positive electrode	Dongguan Lirui Electronics Co., Ltd.	HLM-202	$LiMn_2o_4$, Dimensions: 320mm(L)*24mm(W)*0.165mm(T), Specific capacity:100mAh/g	--	--
02. PCB	Shenzhen Xingbaoshun Electronics Co., Ltd.	1432	ZXD-1432-16-200	--	--
03. IC(U1)	Shenzhen Developer Microelectronics Co., Ltd	DW01AP	Over-charge detection Voltage:4.30±0.05V Over-discharge Detection Voltage: 2.4±0.1V	--	--
04. MOSFET (U2)	Shenzhen Developer Microelectronics Co., Ltd	8205A	VDS=20V, VGS=±8V, ID= 6A	--	--
05. R2	Guoju Co., Ltd	0402	1KΩ±5%	--	--
06. Wiring	Interchangeable	3239	30AWG 150°C , 3KV-DC	--	--
Supplementary information: [1)] Provided evidence ensures the agreed level of compliance. See OD-2039.					

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

7.2.1	TABLE: Continuous charging at constant voltage (cells)			P
Sample no.	**Recommended charging voltage Vc (Vdc)**	**Recommended charging current I_{rec} (A)**	**OCV before test (Vdc)**	**Results**
C1#	4.2	0.06	4.191	A, B
C2#	4.2	0.06	4.184	A, B
C3#	4.2	0.06	4.188	A, B
C4#	4.2	0.06	4.185	A, B
C5#	4.2	0.06	4.183	A, B

Supplementary information:

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

7.3.1	TABLE: External short-circuit (cell)				P
Sample no.	**Ambient T (°C)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature rise ΔT (K)**	**Results**
Samples charged at charging temperature upper limit (45°C)					
C6#	55.3	4.178	80.5	59.8	A, B
C7#	55.3	4.173	81.7	68.4	A. B
C8#	55.3	4.169	80.7	66.7	A, B
C9#	55.3	4.174	80.2	55.6	A, B
C10#	55.3	4.177	82.4	57.3	A, B
Samples charged at charging temperature lower limit (10°C)					
C11#	55.3	4.124	80.1	59.9	A, B
C12#	55.3	4.119	82.8	62.2	A. B
C13#	55.3	4.117	81.3	69.9	A, B
C14#	55.3	4.120	82.4	64.9	A, B
C15#	55.3	4.115	80.9	56.8	A, B

Supplementary information:

A - No fire or explosion

B - Others (please explain) The test was completed after the cell casing cooled to 20% of the maximum temperature rise.

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**
B4#	23.7	4.184	83.2	1.5	Normal	A, B
B5#	23.6	4.183	82.1	97.3	Short U2(1-3)	A, B
B6#	23.6	4.179	80.4	99.4	Short U2(1-3)	A, B
B7#	23.7	4.185	81.5	92.6	Short U2(1-3)	A, B
B8#	23.8	4.186	82.3	4.9	Short R2	A, B

Supplementary information:

A - No fire or explosion

B - Others (please explain) Rapid decline in short circuit current, the battery pack should remain on test for an additional one hour after the current reaches a low end steady state condition.

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)				
C29#	4.176	4.176	13.11	A, B
C30#	4.174	4.174	13.06	A, B
C31#	4.171	4.171	13.09	A, B
C32#	4.179	4.179	13.13	A, B
C33#	4.181	4.181	13.10	A, B
Samples charged at charging temperature lower limit (10°C)				
C34#	4.123	4.123	13.04	A, B
C35#	4.125	4.125	13.08	A, B
C36#	4.118	4.118	13.05	A, B
C37#	4.116	4.116	13.11	A, B
C38#	4.119	4.119	13.14	A, B

Supplementary information:

A - No fire or explosion

B - Others (please explain) Force released after maximum level reached.

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

7.3.6	TABLE: Over-charging of battery				P
Constant charging current (A).....:		0.60			—
Supply voltage (Vdc).....:		5.88			—
Sample no.	**OCV before charging (Vdc)**	**Total charging time (minute)**	**Maximum outer case temperature (°C)**	**Results**	
B12#	3.439	114	26.8	A, B	
B13#	3.456	111	26.0	A, B	
B14#	3.419	89	26.3	A, B	
B15#	3.445	90	26.3	A, B	
B16#	3.434	116	26.1	A, B	

Supplementary information:

A - No fire or explosion

B - Others (please explain) The test was continued until the temperature of the outer casing reached steady state conditions.

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**
C39#	3.529	0.30	3.0	A, B
C40#	3.504	0.30	3.0	A. B
C41#	3.504	0.30	3.0	A, B
C42#	3.503	0.30	3.0	A. B
C43#	3.506	0.30	3.0	A, B

Supplementary information:

A - No fire or explosion

B - Others (please explain) The voltage did not reach negative value of upper limit charging voltage.

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**
B17#	4.177	4.176	6.924	6.924	A, B, C, D
B18#	4.180	4.180	6.920	6.919	A, B, C, D
B19#	4.179	4.179	6.927	6.927	A, B, C, D

Supplementary information:

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

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

7.3.8.2	TABLE: Mechanical shock				P
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
B20#	4.180	4.179	6.921	6.921	A, B, C, D
B21#	4.178	4.178	6.918	6.918	A, B, C, D
B22#	4.175	4.175	6.923	6.923	A, B, C, D

Supplementary information:

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

7.3.9	TABLE: Forced internal short circuit (cells)				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)					
C44#	45	4.173	1	403.6	A, B
C45#	45	4.175	1	404.7	A, B
C46#	45	4.178	1	401.6	A, B
C47#	45	4.169	1	405.2	A, B
C48#	45	4.171	1	408.4	A, B
Samples charged at charging temperature lower limit (10°C)					
C49#	10	4.117	1	406.9	A, B
C50#	10	4.121	1	411.1	A, B
C51#	10	4.123	1	413.8	A, B
C52#	10	4.124	1	407.5	A, B
C53#	10	4.115	1	421.1	A, B

Supplementary information:

[1)] Identify one of the following:
1: Nickel particle inserted between positive and negative (active material) coated area.
2: Nickel particle inserted between positive aluminium foil and negative active material coated area.
A - No fire
B - Others (please explain) Test concluded when 400 N pressure was reached, and 50 mV voltage drop was not achieved.

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

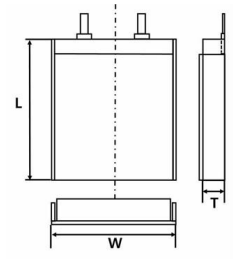
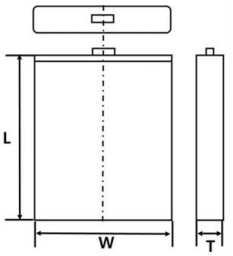
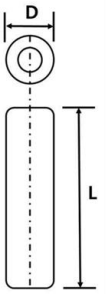
D.2	TABLE: Internal AC resistance for coin cells			N/A
Sample no.	**Ambient T (°C)**	**Store time (h)**	**Resistance Rac (Ω)**	**Results [1)]**
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--

Supplementary information:

[1)] Coin cells with internal resistance less than or equal to 3 Ω, see test result on corresponding tables

IEC62133_2A ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT **IEC 62133-2** **(Republic of Korea) NATIONAL DIFFERENCES** (Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications - Part 2: Lithium systems)			
Differences according to.....:	National standard KC62133-2(2020-07)		
TRF template used:.....:	IECEE OD-2020-F3, Ed. 1.1		
Attachment Form No..... :	KR_ND_IEC62133_2A		
Attachment Originator.....:	KTR		
Master Attachment.....:	Dated 2020-09-25		
	National Differences		P
7.3.6	**Over-charging of battery**		N/A
(Revision)	***[Add the bolded text]*** b) Test The test shall be carried out in an ambient temperature of 20 °C ± 5 °C. Each test battery shall be discharged at a constant current of 0,2 It A, to a final discharge voltage specified by the manufacturer. Sample batteries shall then be charged at a constant current of 2,0 It A, using a supply voltage which is: • 1,4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6,0 V) for single cell/cell block batteries or • 1,2 times the upper limit charging voltage presented in Table A.1 per cell for series connected multi-cell batteries, and • sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached. **<u>• In case the charging voltage specified by the manufacturer is higher than the overcharge test voltage, the maximum charging voltage specified by manufacturer should be applied with 2.0 ItA,</u>** **<u>(e.g., quick charging power bank, etc.)</u>**		N/A

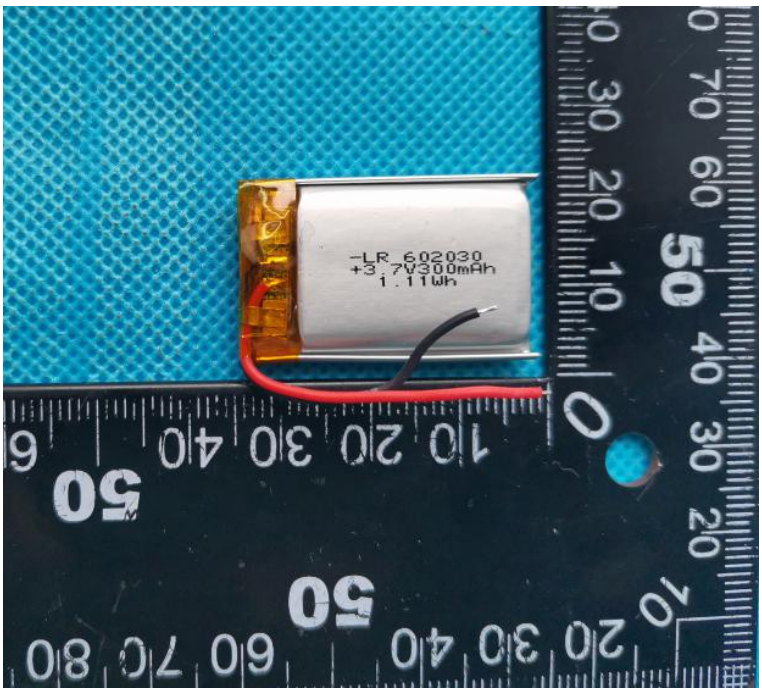
IEC62133_2A ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	[Replace to the following statement] c) Acceptance criteria Overcharging exceeding to the limits specified by the manufacturer should not result in fire or explosion.		N/A
Annex D	**Definition for shape and materials of outer case for cell**		—
(Addition)	D.1 General Annex D provides definitions for shape and materials of outer case for cell D.2 Shape of outer case for cell D2.1 Cylindrical cell Cell with a cylindrical shape in which the overall height is equal to or greater than diameter. D2.2 Prismatic cell Cell having the shape of a parallelepiped whose faces are rectangular D.3 Materials of outer case for cell D.3.1 Soft case Non-metallic outer case or container for cell D.3.2 Hard case Metallic outer case or container for cell.	(Shape of outer cases) ☐ Cylindrical ☒ Prismatic (Materials of outer cases) ☐ Hard ☒ Soft	—
Annex E	**Calculation method of the volumetric energy density for cell**		—
(Addition)	Annex E provide a calculation method of the volumetric energy density for cell in use of smart phone, tablet, notebook. E.1 General Unless otherwise stated in the Annex E, the dimensions for calculation are based on these for cell before shipment and the volumetric energy density shall be calculated with a maximum values specified by manufacturer. If the specification for cell can't be provided a dimension for calculation, the manufacturer's other documentation shall be provided to demonstrate compliance for its calculation.	243Wh / L	—

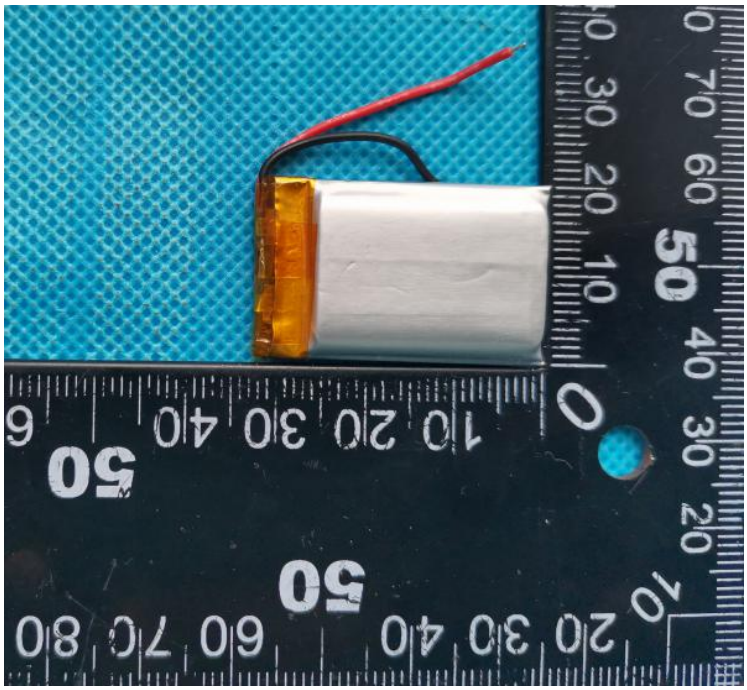
IEC62133_2A ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	E.2 Calculation Method  L : Length (max.) of cell (including terrace) W : Width (max.) of cell T : Thickness (max.) when shipping charge (For reference, Please Exclude the dimension of any tape that Is attached to cell) $Volumetric\ energy\ density\ (Wh/L) = \frac{Nominal\ voltage\ (V) \times Rated\ capacity\ (Ah)}{Length\ (L) \times Width\ (W)\ \times Thickness\ (T)}$ [E.1 – Prismatic cell using soft case]  L : Length (max.) of cell W : Width (max.) of cell T : Thickness when shipping charge (For reference, Please Exclude the dimension of any tape that Is attached to cell) $Volumetric\ energy\ density\ (Wh/L) = \frac{Nominal\ voltage\ (V) \times Rated\ capacity\ (Ah)}{Length\ (L) \times Width\ (W)\ \times Thickness\ (T)}$ [E.2 – Prismatic cell using hard case]  D : Diameter (max.) of cell L : Length (max.) of cell (According to shape of cell at shipping, The dimension of tube for cell may be included In overall dimension of cell) $Volumetric\ energy\ density\ (Wh/L) = \frac{Nominal\ voltage\ (V) \times Rated\ capacity\ (Ah)}{3.14159\ \times \frac{Diameter\ (D)^2}{4} \times Length(L)}$ [E.3 – Cylindrical cell using hard case]		—

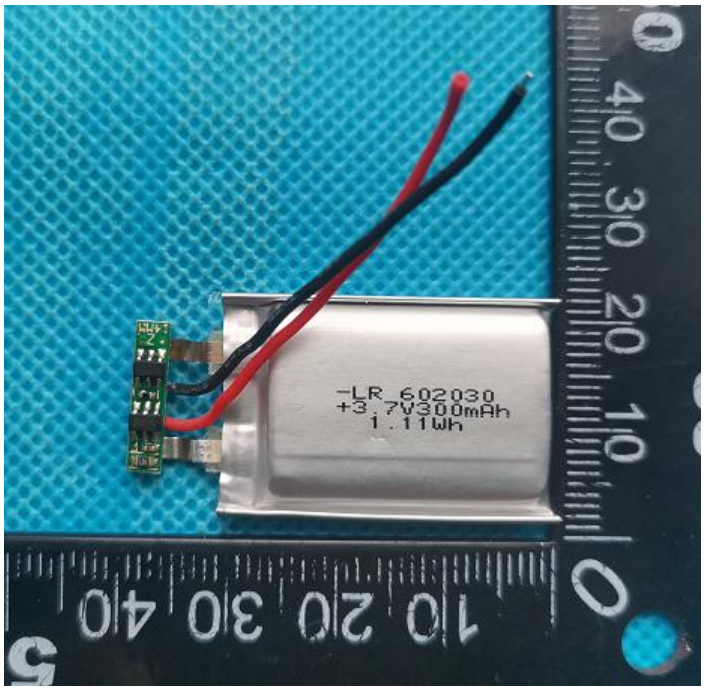
Enclosures

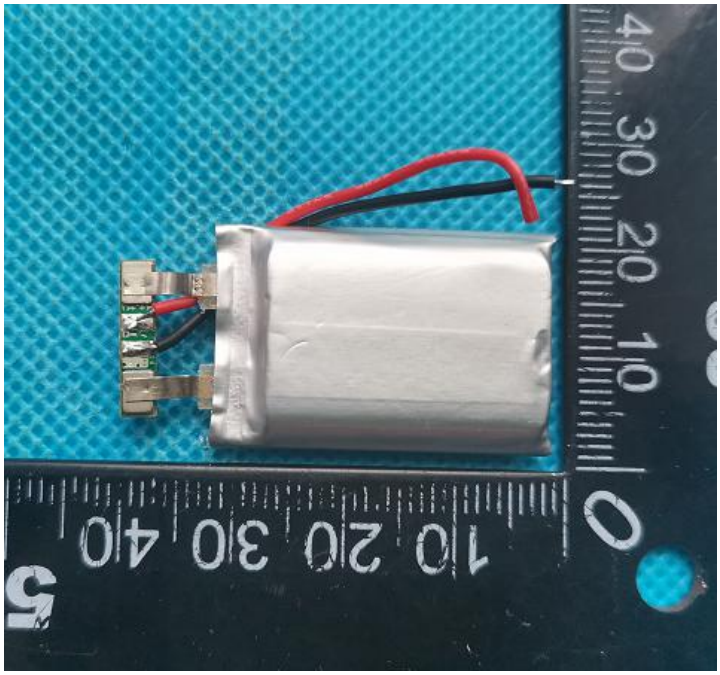
Supplement ID	Description
01	Overall view of Rechargeable Li-ion Polymer Battery, Model 602030
02	Overall view of Internal Rechargeable Li-ion Polymer Cell, Model 602030
03	PWB for Rechargeable Li-ion Polymer Battery, Model 602030
04	PWB layout of Rechargeable Li-ion Polymer Battery, Model 602030
05	Assembly Drawing for Rechargeable Li-ion Polymer Battery, Model 602030
06	Package of Model 602030
07	Safety information and instruction for Rechargeable Li-ion Polymer Battery, Model 602030
08	ISO 9001 Certificate for manufacturer

ID 01

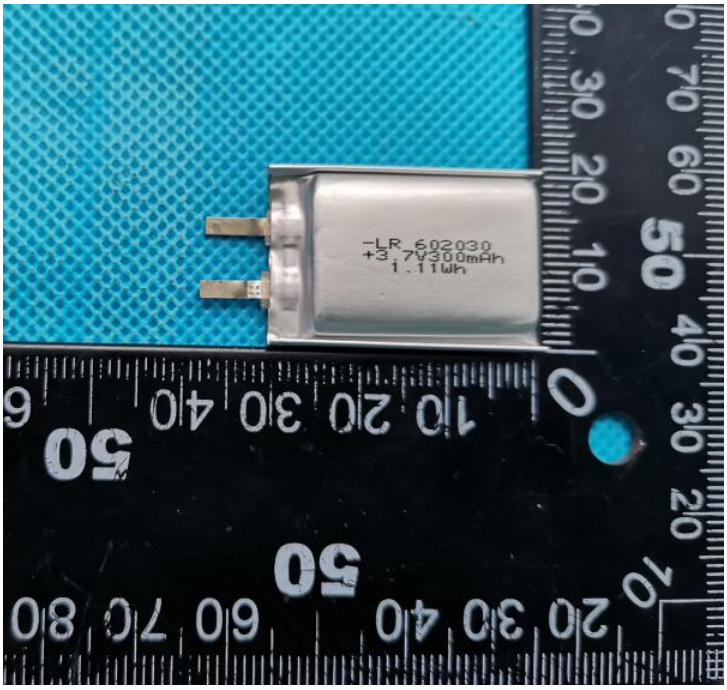


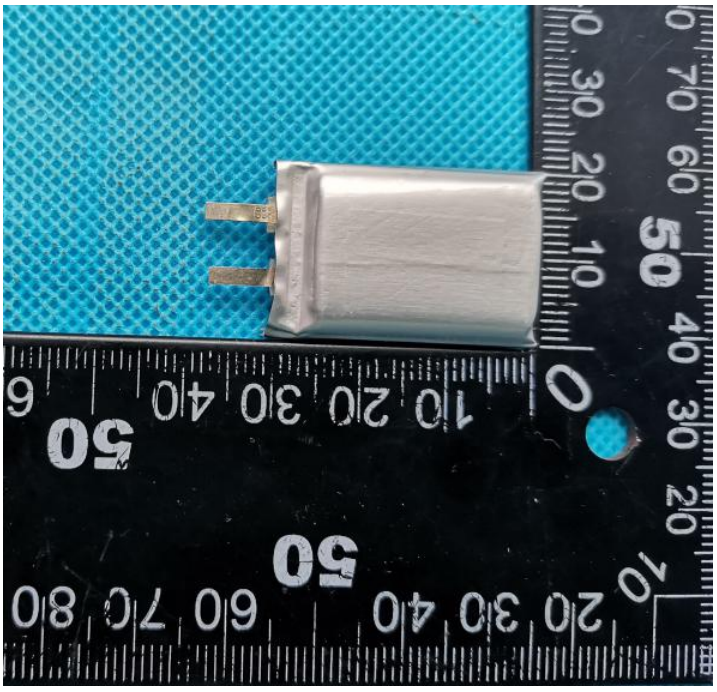



-LR 602030
+3.7V300mAh
1.11Wh

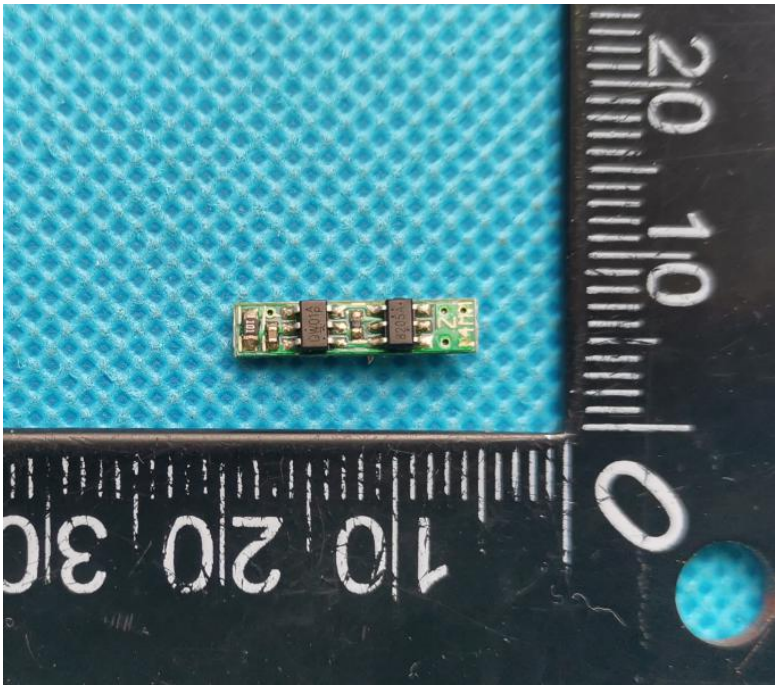


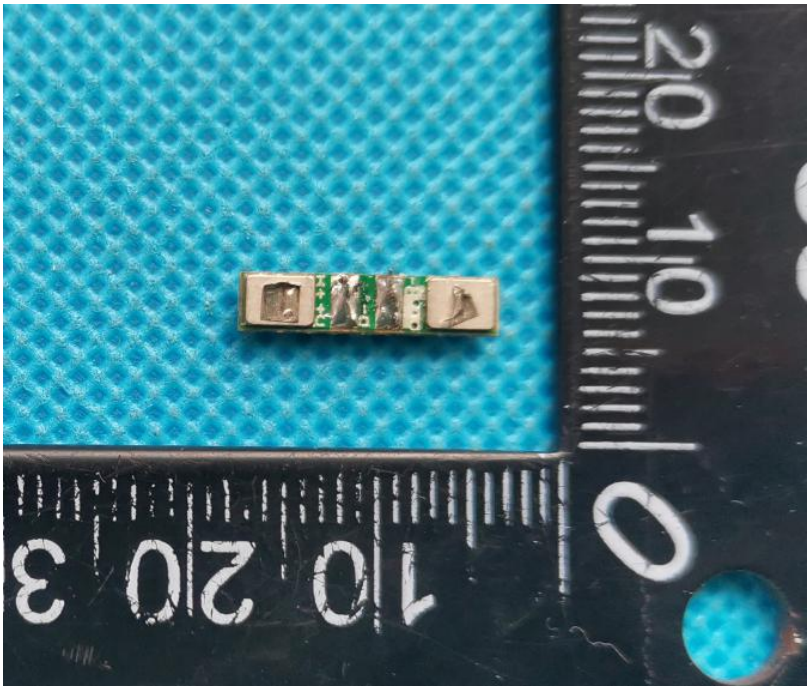
ID 02



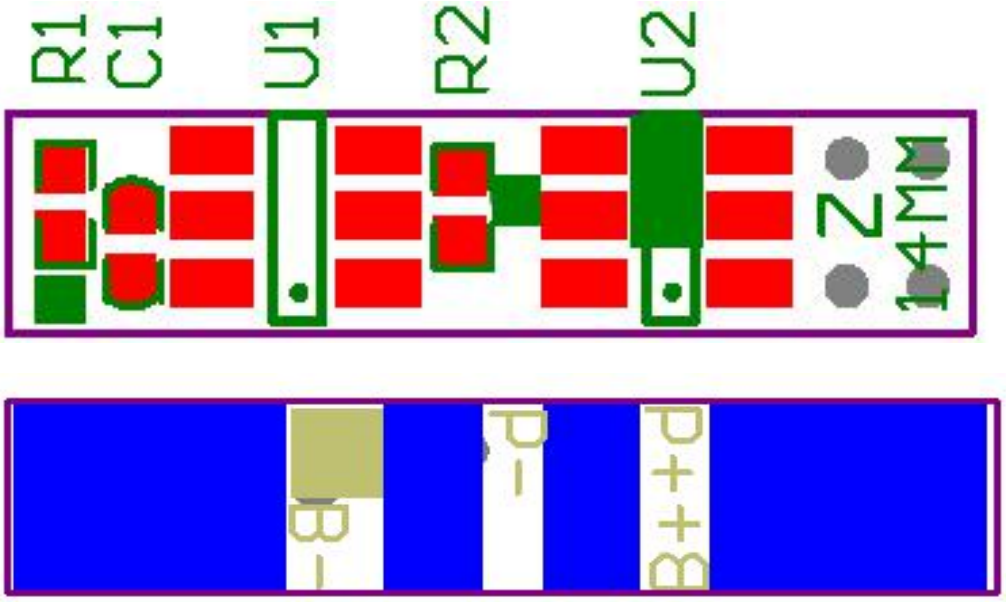


ID 03

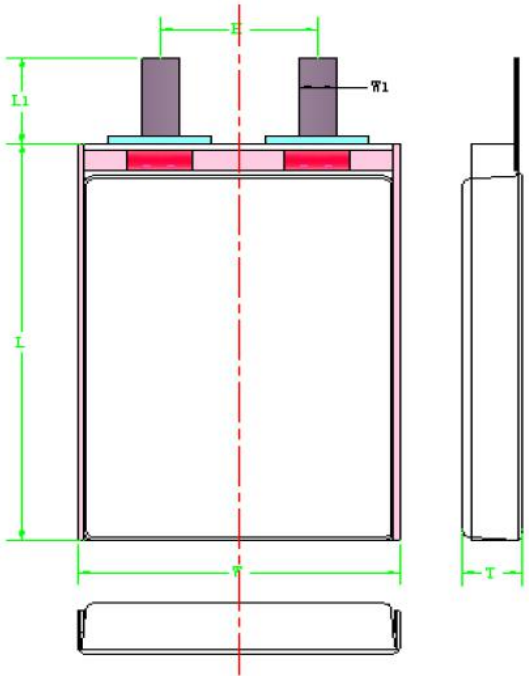




ID 04

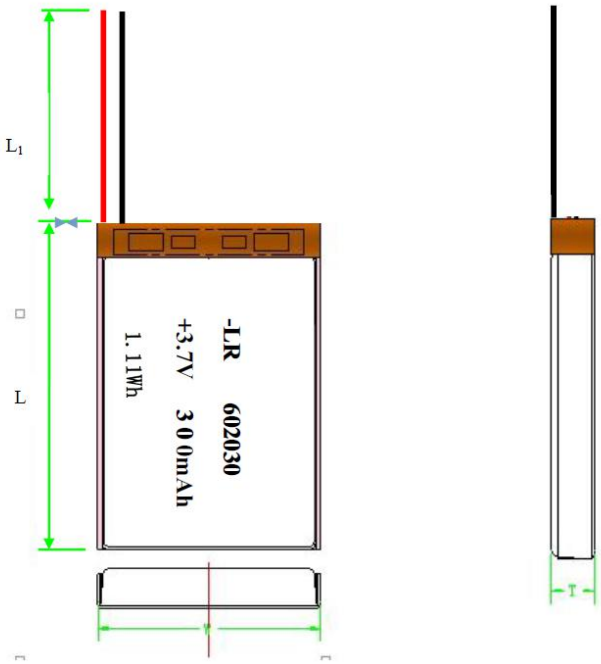


ID 05



L	W	T
31.0MAX.	21.0MAX.	7.0MAX.

Cell(Unit: mm)

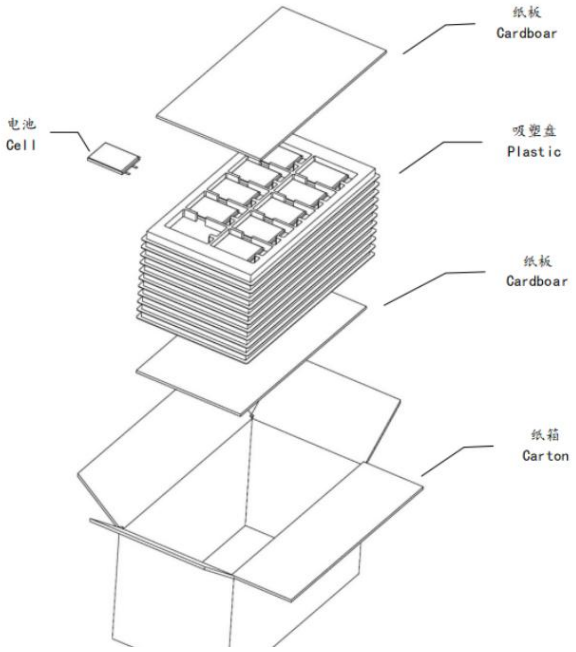


L	W	T
32.0 MAX.	21.0MAX.	7.0MAX.

Battery (Unit: mm)

ID 06

Package Information	
Package Weight	3.96kg
Battery net weight	3.37kg
Battery Number	500pcs
Package size	315*265*245mm



ID 07

9. Warning and Cautions 警告及注意事项

Danger warning (it should be described in manual or instruction for users, indicated especially) to prevent the possibility of the battery from leaking, heating, explosion. Please observe the following precautions:
危险警告：（应在使用说明手册或说明书中，特别注明）为防止电池可能发生泄漏，发热，爆炸，请注意以下预防措施：
Don't immerse the battery in water and seawater. Please put it in cool and dry environment if no using.
严禁将电池浸入海水或水中，保存不用时，应放置在阴凉干燥的环境中。
Do not discard or leave the battery near a heat source as fire or heater
禁止将电池在热高温源（如火、加热器）旁等使用、留置或丢入。
Being charged, using the battery charger specifically for that purpose
充电时请选用锂离子电池专用充电器。
Don't reverse the positive and negative terminals
严禁颠倒正负极使用电池。
Don't connect the battery to an electrical outlet directly.
严禁将电池直接接入电源插座。
Don't connect the positive and negative terminal directly with metal objects such as wire. Short terminals of battery is strictly prohibited, it may damage battery.
禁止用金属直接连接电池正负极短路，任何时候禁止短路电芯，它会导致电芯严重损坏。
Do not transport and store the battery together with metal objects such as necklaces, hairpins.
禁止将电池与金属，如发夹，项链等一起运输或贮存。
Do not strike , throw or trample the battery.
禁止敲击或抛掷，踩踏电池等。
Do not directly solder the battery and pierce the battery with a nail or other sharp object
禁止直接焊接电池和用钉子或其它利器刺穿电池。
Do not use lithium ion battery and others different lithium polymer battery model in mixture
禁止与液态锂离子或不同型号的聚合物锂电池混合使用
Prohibition of use of damaged cells
禁止使用已损坏的电芯
Don't bend or fold sealing edge. Don't open or deform folding edge Don't fillet the end of the folding edge
禁止弯折顶封边，禁止打开或破坏折边，禁止导折电芯折边底部
Don't fall, hit, bend battery body.
禁止坠落、冲击、弯折电芯。
Battery pack designing and packing Prohibition injury batteries.
电池外壳设计和包装禁止损伤电池。
Never disassemble the cells
在任何情况下不得拆卸电芯
The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.
更换电芯应由电芯供应商或设备供应商完成，用户不得自行更换。
Keep the battery away from babies£ 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.
电池应远离小孩，吞咽可能导致烧伤，软组织穿孔，甚至死亡。摄入后2小时内可能出现严重烧伤，如摄入细胞或电池，应立即求医。

Caution 小心

◆ Do not use or leave the battery at very high temperature conditions (for example, strong direct sunlight or a vehicle in extremely hot conditions). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.

禁止在高温下（直热的阳光下或很热的汽车中）使用或放置电池，否则可能会引起电池过热，起火或功能失效，寿命减短。

◆ Do not use it in a location where is electrostatic and magnetic greatly, otherwise, the safety devices may be damaged, causing hidden trouble of safety.

禁止在强静电和强磁场的地方使用，否则易破坏电池安全保护装置，带来不安全的隐患。

◆ If the battery leaks, and the electrolyte get into the eyes. Do not wipe eyes, instead, rinse the eyes with clean running water, and immediately seek medical attention. Otherwise, eyes injury can result.

如果电池发生泄漏，电解液进入眼睛，请不要揉擦，应用清水冲洗眼睛，并立即送医治疗，否则会伤害眼睛。

◆ If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charge and stop using it.

如果电池发出异味，发热，变色，变形或使用，贮存，充电过程中出现任何异常现象，立即将电池从装置或充电器中移离并停用。

◆ In case the battery terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.

如果电池弄脏，使用前应用干布抹净，否则可能会导致接触不良功能失效。

Prohibition of use of damaged cells

禁止使用已损坏的电芯

◆ Be aware discharged batteries may cause fire; tape the terminals to insulate them.

废弃之电池应用绝缘纸包住电极，以防起火，爆炸。

ID08

NOA

QUALITY MANAGEMENT SYSTEM CERTIFICATE

This is to Certify that the QUALITY MANAGEMENT SYSTEM of

has been assessed by NOA Certification and found to comply with

GB/T 19001-2016 idt ISO9001:2015

for the scope of

Production and sales of lithium batteries

Certificate Number: NOA2102701

Unified Social Credit Code: 91441900MA536EBT76

Initial Certification Date: 18 Mar. 2021

Surveillance Audit Pass Label: Surveillance 1 Audit Pass Label | Surveillance 2 Audit Pass Label | Surveillance 3 Audit Pass Label

Certification Manager

ISO 9001 MANAGEMENT CERTIFICATION

ANAB ACCREDITED ISO/IEC 17021 MANAGEMENT SYSTEMS CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

Please scan the QR code above by WeChat to check certificate validity.

Certificate Issue Date: 18 Mar. 2021 Certificate Expiry Date: 18 Mar. 2024

This certificate is issued by NOA testing & certification, the certificate holder shall accept surveillance audit by NOA and the certificate shall be renewed by NOA prior to its expiry date as required. To verify the validity of certificate, please visit www.noagroup.org . The certificate information is also available on the CNCA official website: www.cnca.gov.cn .

NOA Certification Service

Add.: Building 26,Lane 2777,East Jinxiu Road,Free Trade Zone,Shanghai,China Email:noa@noagroup.org