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. ..... :	EFGX23020131-IE-01-L01
Date of issue ..... :	2023-04-18
Total number of pages ..... :	37 Pages
Name of Testing Laboratory preparing the Report ..... :	Eurofins Electrical Testing Service (Shenzhen) Co., Ltd.
Applicant's name ..... :	GlobTek, Inc.
Address ..... :	186 Veterans Dr. Northvale, NJ 07647 USA
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

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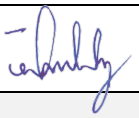
Test item description .....:	Li-ion Battery Pack
Trade Mark .....:	GlobTek, Inc.
Manufacturer.....:	GlobTek, Inc. 186 Veterans Dr. Northvale, NJ 07647 USA
Model/Type reference.....:	BL2600C186502S1P****(* can be 0-9 or A-Z or any special character or blank. represent customization of the wire length or connector type or designation and wiring of the connector, or firmware variations)
Ratings.....:	7.3V d.c., 2600mAh, 18.98Wh

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	Eurofins Electrical Testing Service (Shenzhen) Co., Ltd.	
Testing location/ address ..... :		1st Floor, Building 2, Chungu, Meisheng Huigu Science and Technology Park, No. 83 Dabao Road, Bao'an District, Shenzhen, China	
Tested by (name, function, signature) ..... :		Jane Jian Project Engineer	
Approved by (name, function, signature) .. :		Ethan Wang Designated reviewer	
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

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

Attachment I: (Republic of Korea) NATIONAL DIFFERENCES (3 pages)

Attachment II: 7 pages of photos.

Summary of testing:

The product covered by this report has been tested and complies with the applicable requirements of this standard.

Tests performed (name of test and test clause):

☐	Clause 5.2	Insulation and wiring
☐	Clause 7.2.1	Continuous charging at constant voltage (cells)
☒	Clause 7.2.2	Case stress at high ambient temperature (battery)
☐	Clause 7.3.1	External short circuit (cells)
☒	Clause 7.3.2	External short circuit (batteries)
☒	Clause 7.3.3	Free fall
☐	Clause 7.3.4	Thermal abuse (cells)
☐	Clause 7.3.5	Crush (cells)
☒	Clause 7.3.6	Over-charging of battery
☐	Clause 7.3.7	Forced discharge (cells)
☒	Clause 7.3.8.1	Vibration (battery)
☒	Clause 7.3.8.2	Mechanical shock (battery)
☐	Clause 7.3.9	Design evaluation – Forced internal short circuit (cells)

Testing location:

Eurofins Electrical Testing Service (Shenzhen) Co., Ltd.

1st Floor, Building 2, Chungu, Meisheng Huigu Science and Technology Park, No. 83 Dabao Road, Bao'an District, Shenzhen, China

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

List of countries addressed: EU Group, KR

EU Group Differences: No differences.

KR: South Korea

☒ **The product fulfils the requirements of IEC 62133-2:2017, EN 62133-2:2017 and KC 62133(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.

Three models are identical except for model name.

1. Remark: “YYYYMM” represents the date of manufacture. “MM” represents the month, “YY” represents the year.

2. the marking other models are same except model number and polarity indication.

Test item particulars.....:	Li-ion Battery Pack
Classification of installation and use.....:	To be used in final product
Supply Connection.....:	Supplied by terminal
Recommend charging method declared by the manufacturer.....:	CC/CV
Discharge current (0,2 It A).....:	520mA
Specified final voltage.....:	6.0V
Upper limit charging voltage per cell.....:	4.23V
Maximum charging current.....:	0°C -5°C: 260mA 5°C -15°C: 520mA 15°C-45°C: 1300mA
Charging temperature upper limit.....:	45°C
Charging temperature lower limit.....:	0°C
Polymer cell electrolyte type.....:	☐ gel polymer ☐ solid polymer ☒ N/A
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2023-02-13
Date (s) of performance of tests.....:	2023-03-21 ~ 2023-03-25

General remarks:

The test results presented in this report relate only to the object tested.

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"(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.
The related applicable CTL decisions have been considered and the requirements found fulfilled

Determination of the test result includes consideration of measurement uncertainty from the test equipment and methods.

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**

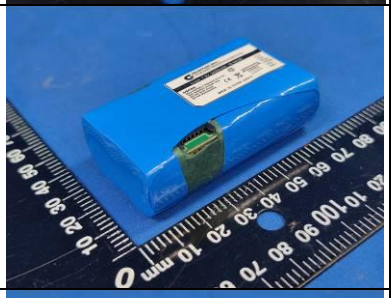
When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... :	GlobTek (Suzhou) Co., Ltd. Building 4, No. 76 JinLing East Road, Suzhou Industrial Park, Suzhou, JiangSu, 215021, China

General product information and other remarks:

This battery is constructed with two rechargeable li-ion cells in 2S and PCB circuit, provides with overcharge, over-discharge, short-circuits proof circuit as part of protection effect.

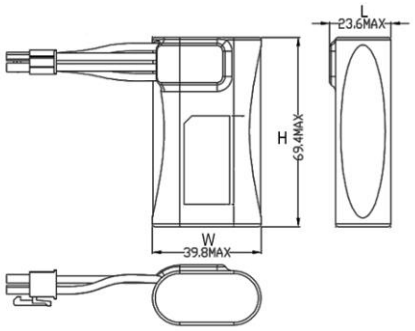
The mentioned models are same except the output terminal, enclosure and model number. There are three models BL2600C186502S1PFQU, BL2600C186502S1PFCU and BL2600C186502S1PFPCU were chosen to perform the tests, details as below.

Model number	Type of enclosure	Test clauses
BL2600C186502S1PFQU		7.3.2, 7.3.3, 7.3.6, 7.3.8
BL2600C186502S1PFCU		7.3.3, 7.3.8
BL2600C186502S1PFPCU		7.2.2, 7.3.3, 7.3.8

Parameters:

Product name	Battery
Type/model	BL2600C186502S1PFQU
Nominal capacity	2600mAh
Nominal voltage	7.3V
Nominal charge current	780mA
Nominal discharge current	1300mA
Maximum charge current	0°C-5°C: 260mA 5°C-15°C: 520mA 15°C-45°C: 1300mA
Maximum discharge current	3900mA
Upper limit charging voltage	8.4V
Cut-off voltage	6.0V
Operating temperature	0-45°C

Construction:



Battery (L x W x H= 23.6mm x 39.8mm x 69.4mm)

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Clause	Requirement + Test	Result - Remark	Verdict
4	**PARAMETER MEASUREMENT TOLERANCES**		**P**
	Parameter measurement tolerances		P
5	**GENERAL SAFETY CONSIDERATIONS**		**P**
5.1	**General**		P
	Cells and batteries so designed and constructed that they are safe under conditions of both intended use and reasonably foreseeable misuse		P
5.2	**Insulation and wiring**		P
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ	No metal case 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		N/A
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief		P
5.4	**Temperature, voltage and current management**		P
	Batteries are designed such that abnormal temperature rise conditions are prevented	Overcharge, over discharge, over current and short-circuit proof circuit used in this battery. See tests of clause 7.	P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	See above.	P
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that specified chargers are designed to maintain charging within the temperature, voltage and current limits specified	The charging limits specified in the manufacturer's specification.	P
5.5	**Terminal contacts**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current		P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		P
	Terminal contacts are arranged to minimize the risk of short-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	Overcharge, over discharge, over current and short-circuit proof circuit used in this battery	P
	This protection may be provided external to the battery such as within the charger or the end devices		N/A
	If protection is external to the battery, the manufacturer of the battery provide this safety relevant information to the external device manufacturer for implementation		N/A
	If there is more than one battery housed in a single battery case, each battery have protective circuitry that can maintain the cells within their operating regions		N/A
	Manufacturers of cells specify current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly	Current, voltage and temperature limits specified by cell manufacturer.	P
	Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate circuitry to prevent operation of cells outside the limits specified by the cell manufacturer		N/A
	Protective circuit components added as appropriate and consideration given to the end-device application		P
	The manufacturer of the battery provide a safety analysis of the battery safety circuitry with a test report including a fault analysis of the protection circuit under both charging and discharging conditions confirming the compliance		P
5.6.2	Design recommendation		P
	For the battery consisting of a single cell or a single cellblock, it is recommended that the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 2		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that the voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Table 2, by monitoring the voltage of every single cell or the single cellblocks		P
	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		P
	For batteries consisting of series-connected cells or cell blocks, cells have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer		P
	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		P
5.6.3	Mechanical protection for cells and components of batteries		P
	Mechanical protection for cells, cell connections and control circuits within the battery provided to prevent damage as a result of intended use and reasonably foreseeable misuse	Mechanical protection for cell connections and control circuits provided.	P
	The mechanical protection can be provided by the battery case or it can be provided by the end product enclosure for those batteries intended for building into an end product		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

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Clause	Requirement + Test	Result - Remark	Verdict
	The manufacturer prepares and implements a quality plan that defines procedures for the inspection of materials, components, cells and batteries and which covers the whole process of producing each type of cell or battery	Complied. ISO 9001 was provided.	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		P
	Coin cells with resistance ≤ 3 Ω (measured according annex D) are tested according table 1	Not coin cells	N/A
	Unless otherwise specified, tests are carried out in an ambient temperature of 20 °C ± 5 °C		P
	The safety analysis of 5.6.1 identify those components of the protection circuit that are critical for short-circuit, overcharge and overdischarge protection		P
	When conducting the short-circuit test, consideration given to the simulation of any single fault condition that is likely to occur in the protecting circuit that would affect the short-circuit test	See clause 7.3.2.	P
7	**SPECIFIC REQUIREMENTS AND TESTS**		**P**
7.1	**Charging procedure for test purposes**		P
7.1.1	First procedure		P
	This charging procedure applies to subclauses other than those specified in 7.1.2		P
	Unless otherwise stated in this document, the charging procedure for test purposes is carried out in an ambient temperature of 20 °C ± 5 °C, using the method declared by the manufacturer		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

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Clause	Requirement + Test	Result - Remark	Verdict
	After stabilization for 1 h and 4 h, respectively, at ambient temperature of highest test temperature and lowest test temperature, as specified in Table 2, cells are charged by using the upper limit charging voltage and maximum charging current, until the charging current is reduced to 0.05 It A, using a constant voltage charging method	Charge temperature 0-45°C declared. 45°C used for upper limit tests temperature, 0°C used for lower limit tests temperature.	P
7.2	**Intended use**		P
7.2.1	Continuous charging at constant voltage (cells)		N/A
	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		N/A
	Results: No fire. No explosion. No leakage.....:		N/A
7.2.2	Case stress at high ambient temperature (battery)	For model BL2600C186502S1PFPCU	P
	Oven temperature (°C).....:	70	-
	Results: No physical distortion of the battery case resulting in exposure of internal protective components and cells		P
7.3	**Reasonably foreseeable misuse**		P
7.3.1	External short-circuit (cell)		N/A
	The cells were tested until one of the following occurred:		N/A
	- 24 hours elapsed; or		N/A
	- The case temperature declined by 20 % of the maximum temperature rise		N/A
	Results: No fire. No explosion.....:		N/A
7.3.2	External short-circuit (battery)	Tested complied.	P
	The batteries were tested until one of the following occurred:		P
	- 24 hours elapsed; or		P
	- The case temperature declined by 20 % of the maximum temperature rise		N/A
	In case of rapid decline in short circuit current, the battery pack remained on test for an additional one hour after the current reached a low end steady state condition		N/A
	A single fault in the discharge protection circuit 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		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Results: No fire. No explosion..... :	(See appended table 7.3.2)	P
7.3.3	Free fall	Tested complied.	P
	Results: No fire. No explosion		P
7.3.4	Thermal abuse (cells)		N/A
	Oven temperature (°C) .....:		—
	Results: No fire. No explosion		N/A
7.3.5	Crush (cells)		N/A
	The crushing force was released upon:		N/A
	- The maximum force of 13 kN ± 0.78 kN has been applied; or		N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained		N/A
	Results: No fire. No explosion..... :		N/A
7.3.6	Over-charging of battery	Tested complied.	P
	The supply voltage which is:		P
	- 1.4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6.0 V) for single cell/cell block batteries or		N/A
	- 1.2 times the upper limit charging voltage resented in Table A.1 per cell for series connected multi-cell batteries, and	10.152V	P
	- Sufficient to maintain a current of 2.0 It A throughout the duration of the test or until the supply voltage is reached		P
	Test was continued until the temperature of the outer casing:		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)		N/A
	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		N/A
	Results: No fire. No explosion..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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)	The battery cell have been tested in forced internal short-circuit by CB report SZES190301141401.	N/A
	The cells complied with national requirement for ..... :	France, Japan, Korea, Switzerland	—
	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	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		P
	As appropriate, any information relating to hazard avoidance resulting from a system analysis provided to the end user		P
	Do not allow children to replace batteries without adult supervision		P
8.2	**Small cell and battery safety information**	Not small cell and battery.	N/A
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:		N/A
	- Keep small cells and batteries which are considered swallowable out of the reach of children		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion		N/A
	- In case of ingestion of a cell or battery, seek medical assistance promptly		N/A
9	**MARKING**		**P**
9.1	**Cell marking**	The final product is battery.	N/A
	Cells marked as specified in IEC 61960, except coin cells		N/A
	Coin cells whose external surface area is too small to accommodate the markings on the cells show the designation and polarity		N/A
	By agreement between the cell manufacturer and the battery and/or end product manufacturer, component cells used in the manufacture of a battery need not be marked		N/A
9.2	**Battery marking**	See marking plate on page 4	P
	Batteries marked as specified in IEC 61960, except for coin batteries		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 cells.	N/A
	Terminals have clear polarity marking on the external surface of the battery		N/A
	Batteries with keyed external connectors designed for connection to specific end products need not be marked with polarity markings if the design of the external connector prevents reverse polarity connections		P
9.3	**Caution for ingestion of small cells and batteries**	Not small cell and battery.	N/A
	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		N/A
	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 disposal instructions given in manufacturer's specifications.	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Recommended charging instructions	Information for recommended charging instructions given 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 cell	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

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	4.23V	P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		P
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied		P
A.4	**Consideration of temperature and charging current**		P
A.4.1	General		P
A.4.2	Recommended temperature range		P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	Charging temperature declared by client is: 0-45°C	P
A.4.3	High temperature range	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
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	0°C	N/A
A.4.4.1	General		N/A
A.4.4.2	Explanation of safety viewpoint		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
A.4.4.3	Safety considerations, when specifying charging conditions in the low temperature range		N/A
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range		N/A
A.4.5	Scope of the application of charging current		P
A.4.6	Consideration of discharge		P
A.4.6.1	General		P
A.4.6.2	Final discharge voltage and explanation of safety viewpoint		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
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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX B	**RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS**		**N/A**
ANNEX C	**RECOMMENDATIONS TO THE END-USERS**		**N/A**
ANNEX D	**MEASUREMENT OF THE INTERNAL AC RESISTANCE FOR COIN CELLS**		**N/A**
D.1	**General**		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**		**N/A**
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[2)]**	**Mark(s) of conformity[1)]**
Cell	Tianjin Lishen Battery Joint-Stock Co., Ltd.	LR1865SK	3.65V, 2600mAh	IEC 62133-2:2017	Certificate No.: FI-40845
PCB	Guangde Boya Xinxing Electronic Technology Co Ltd	BY-1	V-0, 130°C Thickness: 1.6mm	IEC 62133-2:2017 UL 796	Tested with battery UL E475783
Alternative	Interchangeable	Interchangeable	V-0, 130°C	UL 796	UL approved
IC (U1)	TEXAS INSTRUMENTS	BQ40Z50-R2	VCC: -0.3V~30V, TSTG: -65°C~150°C	IEC 62133-2:2017	Tested with battery
IC (U2)	TEXAS INSTRUMENTS	BQ294702DSGT	Input voltage.max: 20V, OVP: 3.85V~4.6V Tstg: -40°C~110°C	IEC 62133-2:2017	Tested with battery
MOSFET (Q2, Q3)	NCEPOWER	NCEP3065QU	Vdss: 30V, ID: 65A Tstg: -55°C~150°C	IEC 62133-2:2017	Tested with battery
MOSFET (Q4)	PANJIT	2N7002	VDS: 60V VGS: ±20V ID: 250mA TSTG: -55°C~150°C	IEC 62133-2:2017	Tested with battery
MOSFET (Q5)	VISHAY.	SI1416EDH	VDS: 30V VGS: ±12V ID: 3.9A TSTG: -55°C~150°C	IEC 62133-2:2017	Tested with battery
PTC (F1)	Dexerials	SFJ-0812U	Operating voltage: 4.0V-9.0V Rated current: 12A	IEC 62133-2:2017	Tested with battery
Wire 1	ZHUANG SHAN CHUAN ELECTRICAL PRODUCTS (KUNSHAN) CO LTD	1007	22AWG, 80°C, 300V	IEC 62133-2:2017 UL 758	Tested with battery UL E333601
Wire 2	Suzhou Jiahuishu Electronic Co Ltd	1007	22AWG, 80°C, 300V	IEC 62133-2:2017 UL 758	Tested with battery UL E353532
(Alternative)	Interchangeable	Interchangeable	MIN.22AWG, MIN.80°C, MIN.300V	UL 758	UL approved
Connector (Optional)	Molex L L C	39013045	Min.V-2	IEC 62133-2:2017	Tested with battery UL E29179

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

(Alternative) (optional plastic contacts for housing version)	Interchangeable	Interchangeable	Min.V-2	--	UL approved

Supplementary information:

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

[2)] License available upon request.

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

7.2.1	TABLE: Continuous charging at constant voltage (cells)	N/A

Sample no.	Recommended charging voltage Vc (Vdc)	Recommended charging current I_{rec} (A)	OCV before test (Vdc)	Results

Supplementary information:

- No fire or explosion
- No leakage
- Others (please explain)

7.3.1	TABLE: External short-circuit (cell)	N/A

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 _°C					
Samples charged at charging temperature lower limit _ °C					

Supplementary information:

- No fire or explosion
- Others (please explain)

7.3.2	TABLE: External short-circuit	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

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

BL2600C18650 2S1PFQU 001#	23.8	8.32	80	4.0	Q3 S-C	No fire or explosion
BL2600C18650 2S1PFQU 002#	23.8	8.30	85	1.3	Q4 S-C	No fire or explosion
BL2600C18650 2S1PFQU 003#	23.8	8.34	90	0.7	F1 S-C	No fire or explosion
BL2600C18650 2S1PFQU 004#	23.8	8.33	78	0.3	--	No fire or explosion
BL2600C18650 2S1PFQU 005#	23.8	8.32	82	0.4	--	No fire or explosion

Supplementary information: 24 hours elapsed.

- No fire or explosion
- Others (please explain)
- S-C=Short Circuit

7.3.5	TABLE: Crush (cells)	N/A

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 °C				
Samples charged at charging temperature lower limit °C				

Supplementary information:

- No fire or explosion
- Others (please explain)

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

7.3.6	TABLE: Over-charging of battery	P
Constant charging current (A) .....:	5.2	—
Supply voltage (Vdc) .....:	10.152	—

Sample no.	OCV before charging (Vdc)	Total charging time (minute)	Maximum outer case temperature (°C)	Results
BL2600C186502 S1PFQU 009#	6.25	60	42.9	No fire or explosion
BL2600C186502 S1PFQU 010#	6.19	60	39.7	No fire or explosion
BL2600C186502 S1PFQU 011#	6.33	60	44.6	No fire or explosion
BL2600C186502 S1PFQU 012#	6.21	60	40.2	No fire or explosion
BL2600C186502 S1PFQU 013#	6.23	60	41.7	No fire or explosion

Supplementary information: Test stopped when the temperature of the outer case returned to ambient.
- No fire or explosion
- Others (please explain)

7.3.7	TABLE: Forced discharge (cells)	N/A

Sample no.	OCV before application of reverse charge (Vdc)	Measured reverse charge I_t (A)	Lower limit discharge voltage (Vdc)	Results

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

7.3.8.1	TABLE: Vibration (BL2600C186502S1PFQU)	P

Sample no.	OCV before test (Vdc)	OCV after test (Vdc)	Mass before test (g)	Mass after test (g)	Results

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

BL2600C186502S1PFQU 014#	8.30	8.30	105.48	105.45	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFQU 015#	8.32	8.32	105.55	105.53	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFQU 016#	8.31	8.31	105.51	105.49	No fire or explosion. No rupture or leakage. No venting.

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting
- Others (please explain)

7.3.8.1	TABLE: Vibration (BL2600C186502S1PFPCU)				P
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
BL2600C186502S1PFPCU 026#	8.31	8.31	134.51	134.51	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFPCU 027#	8.30	8.30	134.50	134.50	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFPCU 028#	8.30	8.30	134.51	134.51	No fire or explosion. No rupture or leakage. No venting.

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting
- Others (please explain)

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

7.3.8.1	TABLE: Vibration (BL2600C186502S1PFCU)	P

Sample no.	OCV before test (Vdc)	OCV after test (Vdc)	Mass before test (g)	Mass after test (g)	Results
BL2600C186502S1PFCU 035#	8.30	8.30	105.24	105.24	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFCU 036#	8.30	8.30	105.20	105.20	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFCU 037#	8.31	8.31	105.21	105.21	No fire or explosion. No rupture or leakage. No venting.

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting
- Others (please explain)

7.3.8.2	TABLE: Mechanical shock (BL2600C186502S1PFQU)	P

Sample no.	OCV before test (Vdc)	OCV after test (Vdc)	Mass before test (g)	Mass after test (g)	Results
BL2600C186502S1PFQU 017#	8.32	8.32	105.52	105.52	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFQU 018#	8.35	8.35	105.50	105.50	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFQU 019#	8.33	8.33	105.44	105.44	No fire or explosion. No rupture or leakage. No venting.

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting
- Others (please explain)

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

7.3.8.2	TABLE: Mechanical shock (BL2600C186502S1PFPCU)				P
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
BL2600C186502S1PFPCU 029#	8.32	8.32	134.52	134.52	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFPCU 030#	8.31	8.31	135.50	135.50	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFPCU 031#	8.33	8.33	134.44	134.44	No fire or explosion. No rupture or leakage. No venting.

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting
- Others (please explain)

7.3.8.2	TABLE: Mechanical shock (BL2600C186502S1PFCU)				P
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
BL2600C186502S1PFCU 038#	8.32	8.32	105.24	105.24	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFCU 039#	8.30	8.30	105.21	105.21	No fire or explosion. No rupture or leakage. No venting.
BL2600C186502S1PFCU 040#	8.31	8.31	105.24	105.24	No fire or explosion. No rupture or leakage. No venting.

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

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting
- Others (please explain)

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 °C					
#					
#					
#					
#					
#					
Samples charged at charging temperature lower limit °C					
#					
#					
#					
#					
#					

Supplementary information:

[1)] Identify one of the following:

1: Nickel particle inserted between positive and negative (active material) coated area.

2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

- No fire or explosion
- Others (please explain)

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

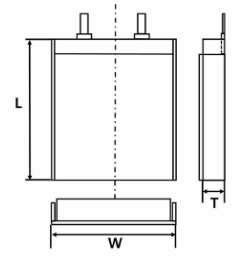
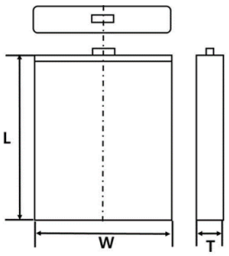
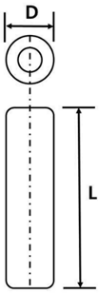
Supplementary information:

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

Attachment I: (Republic of Korea) NATIONAL DIFFERENCES

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		
Copyright © 2020 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.			
	National Differences		P
7.3.6	**Over-charging of battery**		P
(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. **• 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,** **(e.g., quick charging power bank, etc.)**	The charging voltage specified by the manufacturer is lower than the overcharge test voltage.	P

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 G	**Definition for shape and materials of outer case for cell**		—
(Addition)	G.1 General Annex G provides definitions for shape and materials of outer case for cell G.2 Shape of outer case for cell G 2.1 Cylindrical cell Cell with a cylindrical shape in which the overall height is equal to or greater than diameter. G 2.2 Prismatic cell Cell having the shape of a parallelepiped whose faces are rectangular G.3 Materials of outer case for cell G.3.1 Soft case Non-metallic outer case or container for cell G.3.2 Hard case Metallic outer case or container for cell.	(Shape of outer cases) ☒ Cylindrical ☐ Prismatic (Materials of outer cases) ☒ Hard ☐ Soft	—
Annex H	**Calculation method of the volumetric energy density for cell**		—
(Addition)	Annex H provide a calculation method of the volumetric energy density for cell in use of smart phone, tablet, notebook. H.1 General Unless otherwise stated in the Annex E, the dimensions for calculation are based on these for cell before shipment and the volumetric energy density shall be calculated with a maximum values specified by manufacturer. If the specification for cell can't be provided a dimension for calculation, the manufacturer's other documentation shall be provided to demonstrate compliance for its calculation.	541.48Wh / L	—

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

Attachment I: Photos

Photo 1.

Battery view (BL2600C186502S1PFQU)

Photo 2.

Battery view (BL2600C186502S1PFQU)

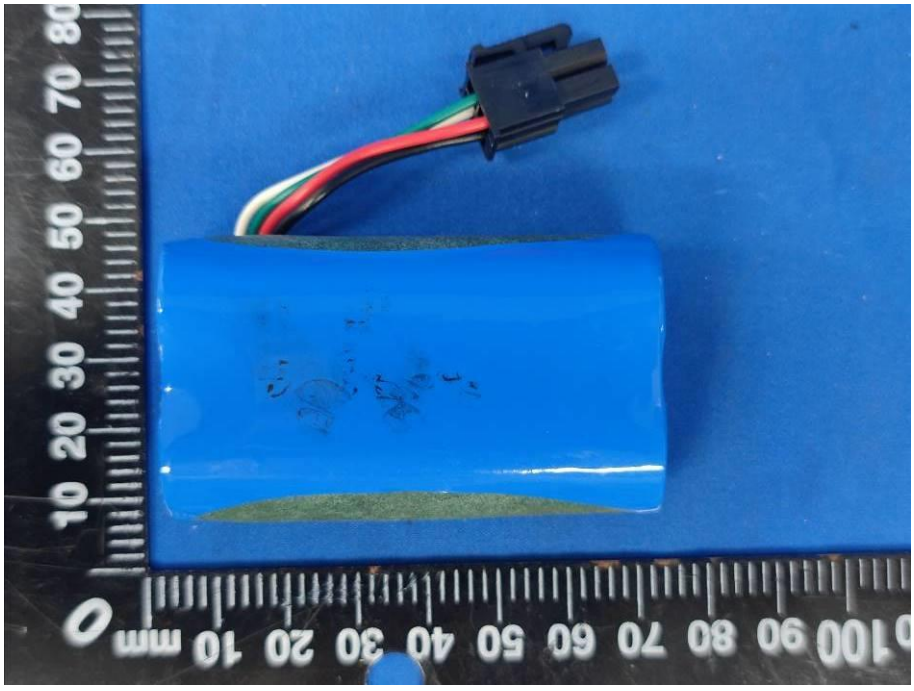


Photo 3.

Battery internal view

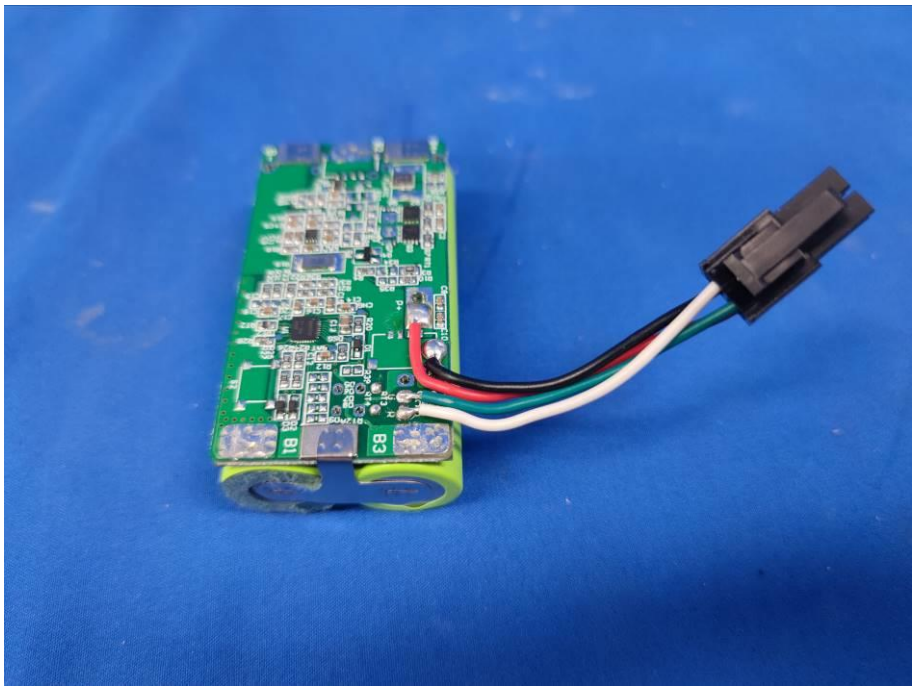


Photo 4.

PCB view

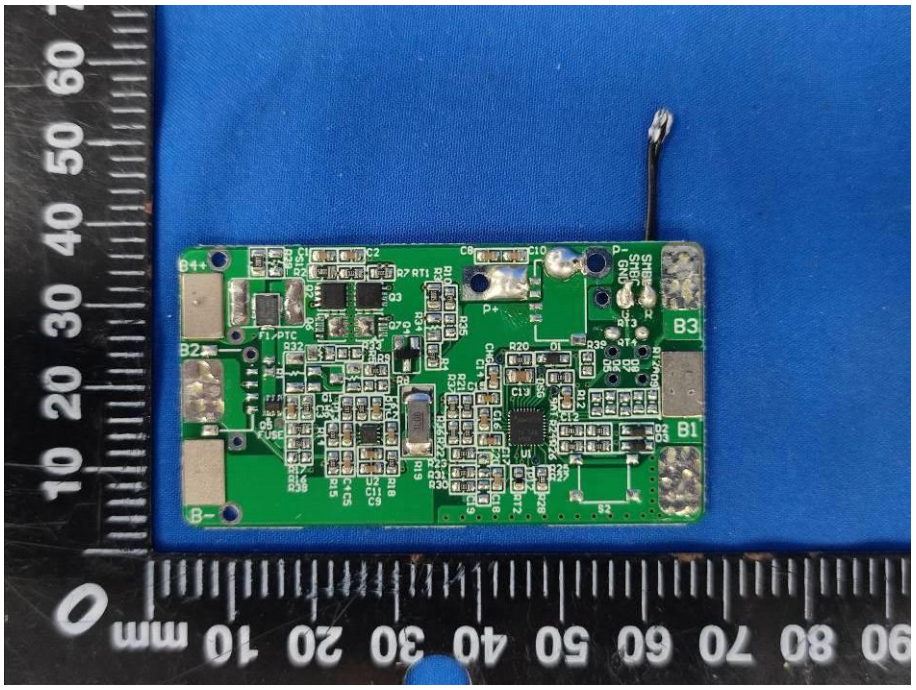


Photo 5

PCB view

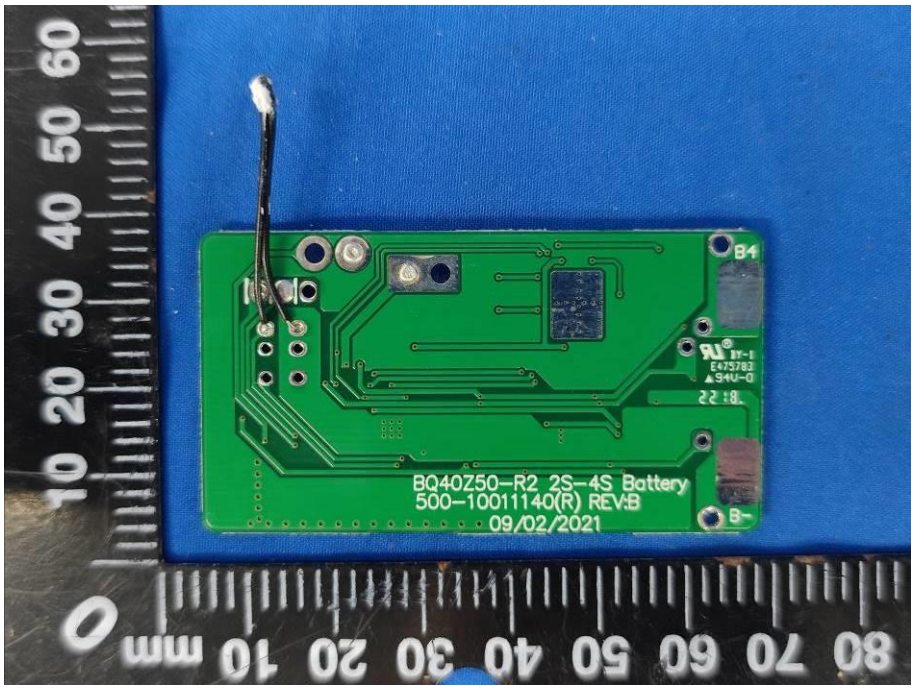


Photo 6.

Cell view

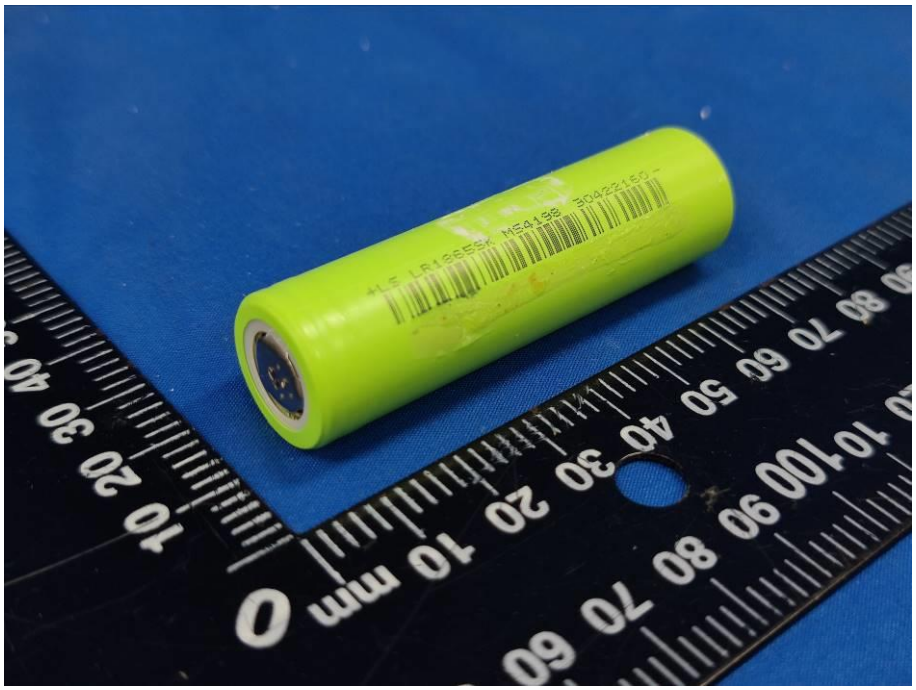


Photo 7.

Cell view

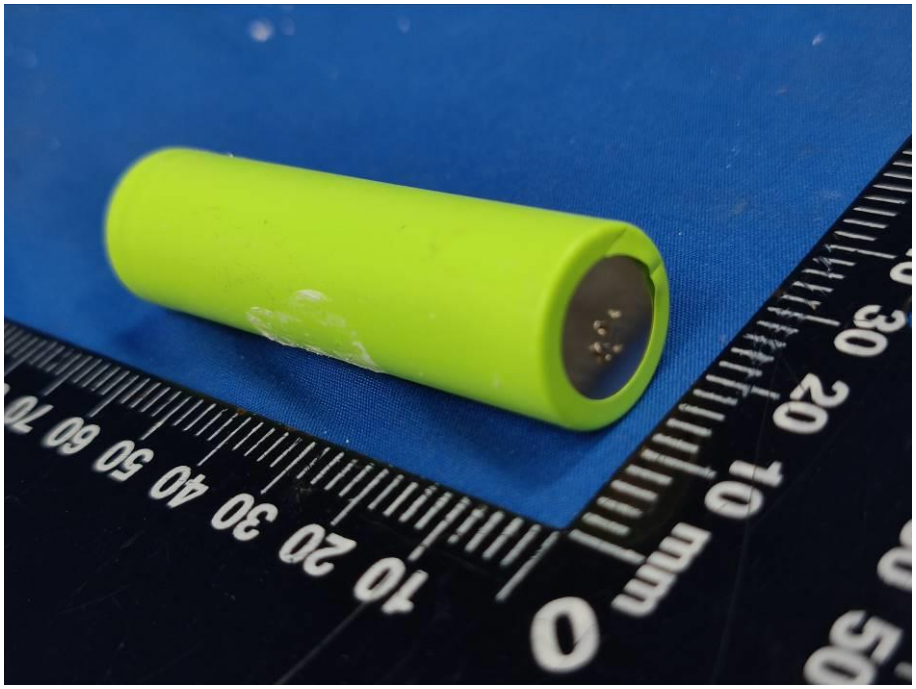


Photo 8.

Battery view (BL2600C186502S1PFPCU)

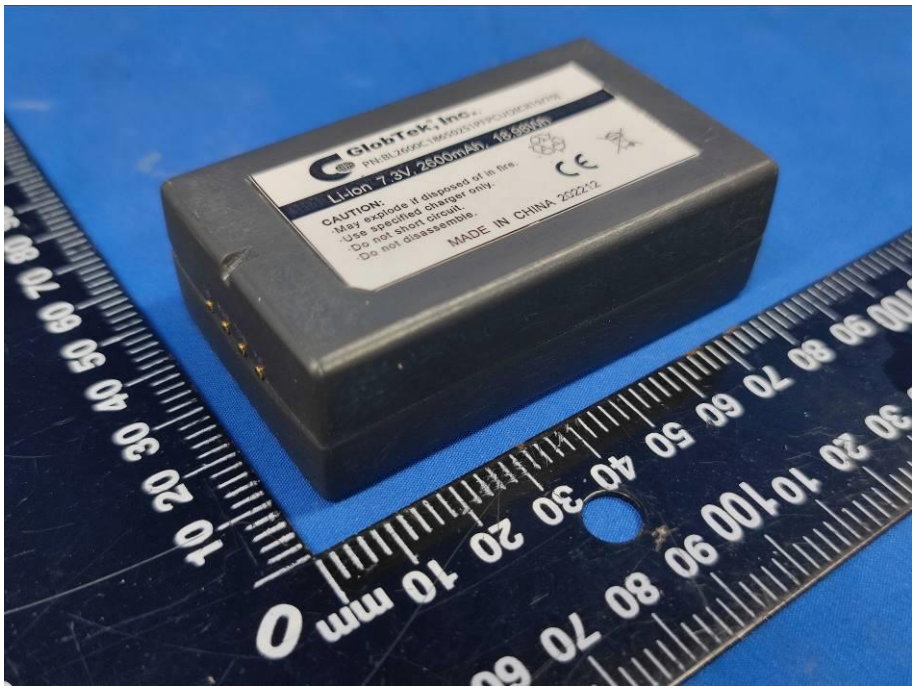


Photo 9.

Battery view (BL2600C186502S1PFPCU)

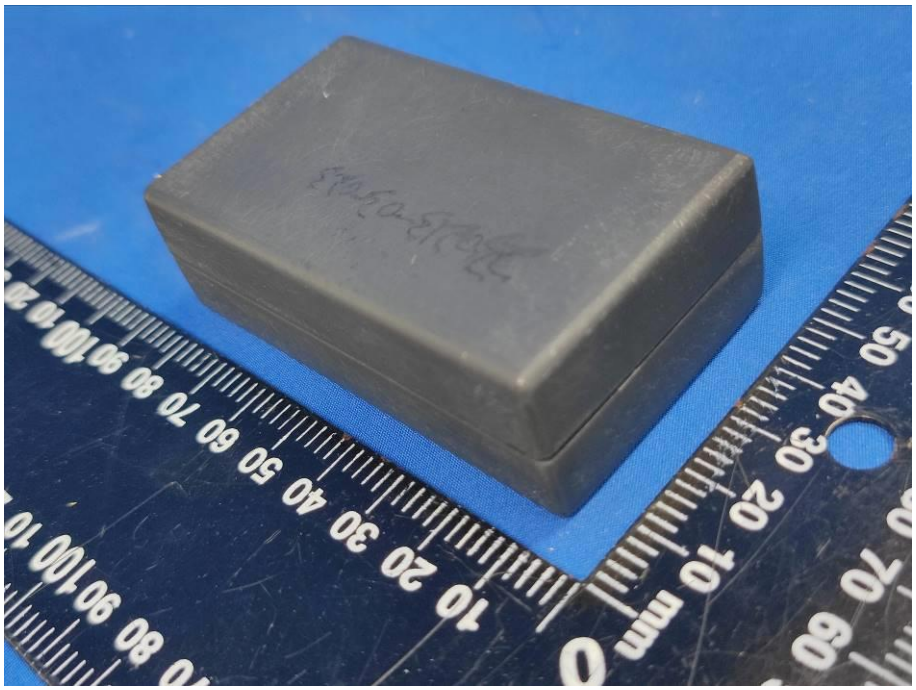


Photo 10.

Input and output port

Photo 11.

Battery view (BL2600C186502S1PFCU)

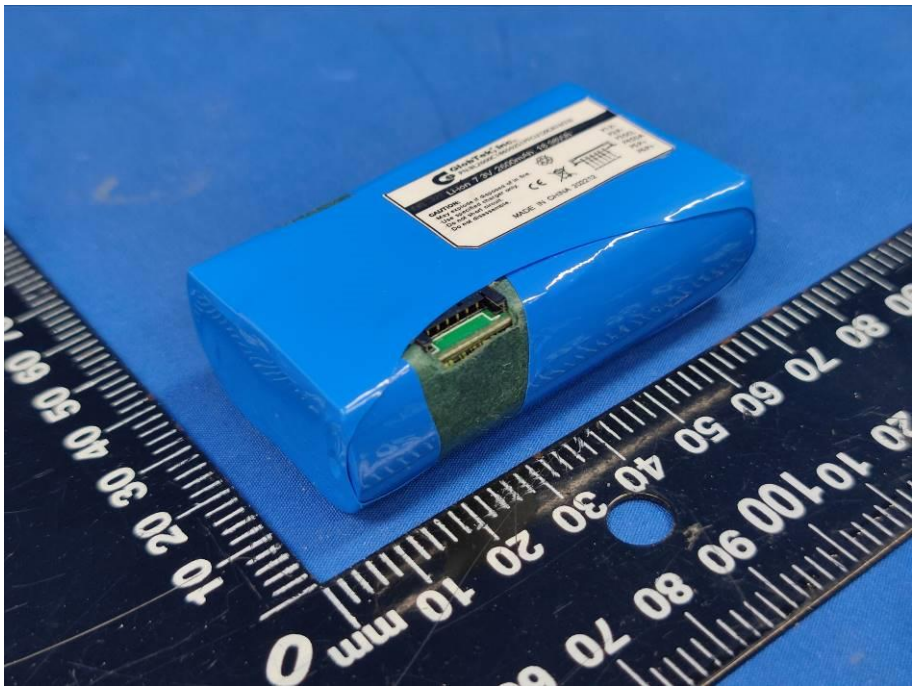


Photo 12.

Battery view (BL2600C186502S1PFCU)

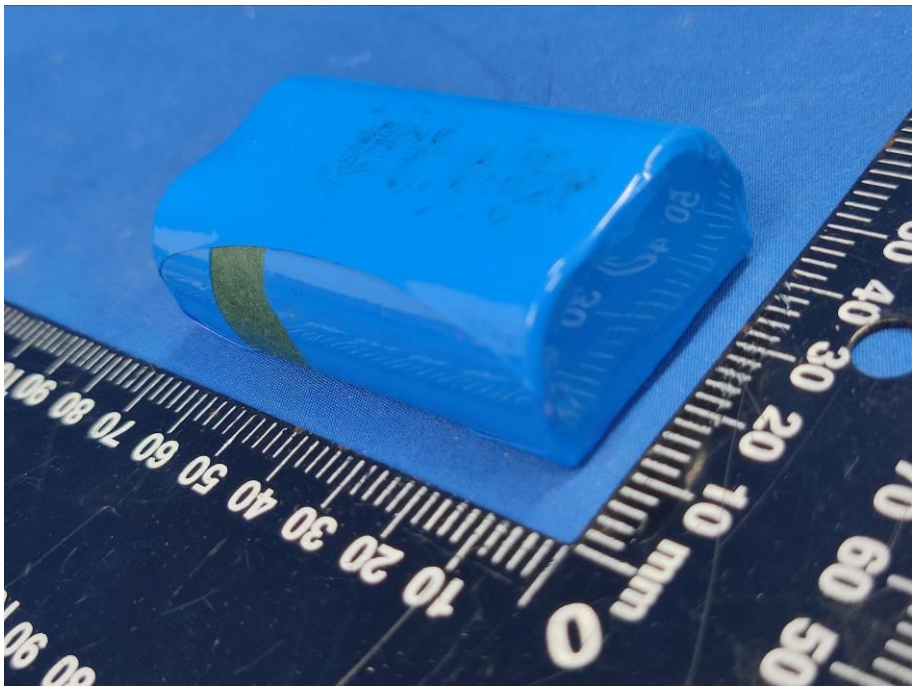
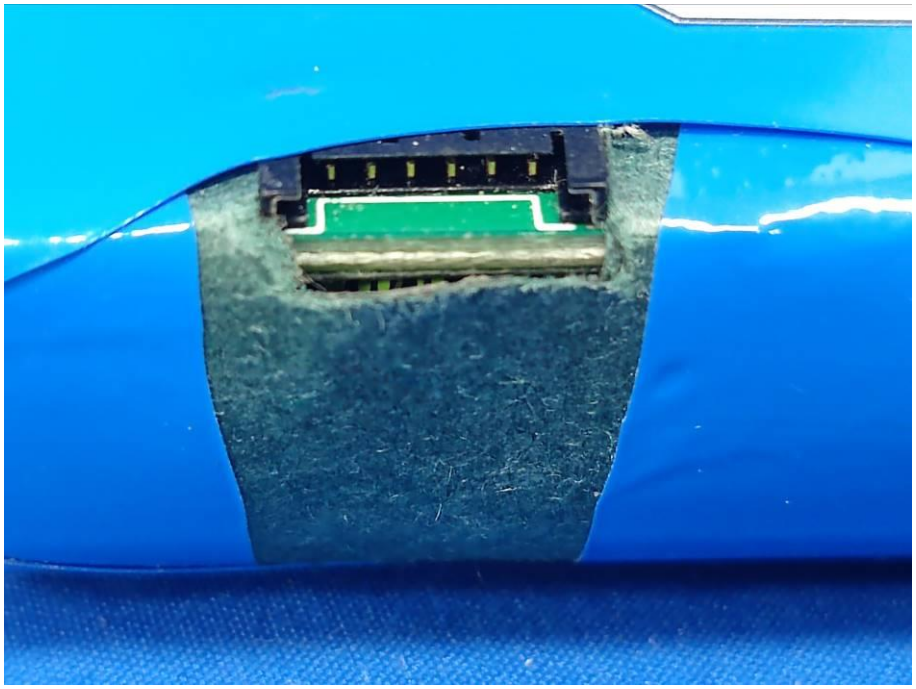


Photo 13.

Input and output port



----- End of Report -----