Shenzhen Global Test Service Co., Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road,
Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

TEST REPORT

EN 62133

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

Report Reference No.....:	GTS20200610019-1-15
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Testing Laboratory.....:	**Shenzhen Global Test Service Co., Ltd.**
Address.....:	No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong
Tested by (name + signature).....:	Yato. Yang
Approved by (+ signature).....:	Ray Chen
Applicant's name.....:	**Shenzhen Makerfire Technology Co.,Ltd.**
Address.....:	201 Room,Panbao Building,No.7-1 Lipu Street,Bantian, Longgang District,Shenzhen,PRC.
Manufacturer's name.....:	**Shenzhen Makerfire Technology Co.,Ltd.**
Address.....:	201 Room,Panbao Building,No.7-1 Lipu Street,Bantian, Longgang District,Shenzhen,PRC.
Factory's name.....:	**Foshan Shida Technology Co., Ltd.**
Address.....:	No. 30, Xingye Road, Area C, Shishan Science and Technology Industrial Park, Nanhai District, Foshan City, Guangdong Province
Test specification:	
Standard.....:	EN 62133-2: 2017
Test procedure.....:	N/A
Non-standard test method……..:	N/A

Test item description.....:	Lipo Battery
Trade Mark.....:	LiteBee
Model/Type reference.....:	C06-Lipo
Ratings.....:	7.4Vdc, 600mAh，4.44Wh

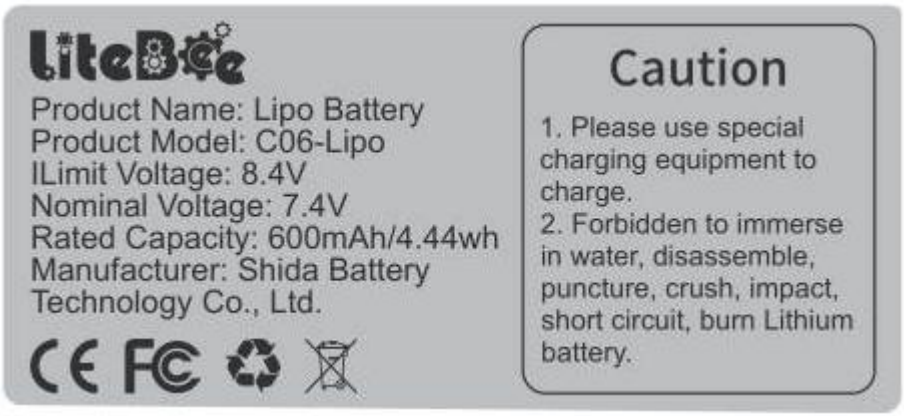
List of Attachments (including a total number of pages in each attachment):
-- Photos documentation (page 26 to 28).

Summary of testing:	

Tests performed (name of test and test clause):
cl.5.6.2 Design recommendation(Lithium system);
cl.7.1 Charging procedure for test purposes(for cell)
cl.7.1.1 First procedure
cl.7.1.2 Second procedure
cl.7.2.1 Continuous charging at constant voltage(cells);
cl.7.2.2 Case stress at high ambient temperature (battery) ;
cl.7.3.1 External short-circuit(Cells);
cl.7.3.2 External short-circuit (battery)
cl.7.3.4 Thermal abuse (Cells);
cl.7.3.5 Crush (Cells);
cl.7.3.6 Over-charging of battery
cl.7.3.7 Forced discharge (Cells);
cl.7.3.8 Mechanical tests (batteries)
Tests are made with the number of cells specified in EN 62133-2: 2017
	Testing location:
	Shenzhen Global Test Service Co., Ltd.
	Locate in No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

Copy of marking plate (representative)

The following information was printed on the label and adhered on the rear enclosure the batteries.



Remark:

- The above markings are the minimum requirements required by the safety standard. For the final productions samples, the additional markings which do not give rise to misunderstanding may be added.

Particulars; test item vs. test requirements	
Equipment mobility……..……:	☒ Li-ion Battery ☐ Nickel Battery
Dimension…….. … ...……..:	76.2*58.0*24.3 (mm)
Supply connection ……..:	N/A
Recommend charging method declaired by the manufacturer……..…….....:	Charge at constant current120mA until voltage reaches 8.4V, then charge at constant voltage 8.4V untill charge current is 12mA.
Charging current (A) ……....…….……..:	120mA
Specified final voltage……....……..:	6V
Maximum charging current.……....……..:	600mA
Mass of apparatus…… …..……..:	237.5g
Recommend of charging limit for lithium system	☒ Li-ion r cell ☐ Nickel cell
Dimension…….. … ...……..:	76.2*58.0*24.3 (mm)
Recommend charging method declaired by the manufacture ……....……..:	Charge at constant current1120mA until voltage reaches 4.35V, then charge at constant voltage 4.35V untill charge current is 12mA.
Charging current (A) ……....……..:	600mA
Specified final voltage……....…..……:	3.0V
Maximum charging current.……..……:	300mA
Mass of apparatus .....:	227.5g
Test case verdicts	
Test case does not apply to the test object ……:	N (N/A)
Test item does meet the requirement……:	P(ass)
Test item does not meet the requirement……..:	F(ail)
Testing.....…….::	
Date of receipt of test item.....……..::	2020-08-04
Date (s) of performance of tests..... ……..::	2020-08-04 to 2020-08-14

General remarks
"(see remark #)" refers to a remark appended to the report,
"(see appended table)" refers to a table appended to the report,
Throughout this report a comma is used as the decimal separator,
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 testing laboratory,
Clause numbers between brackets refer to clauses in IEC 62133(Optional remark).

Test Conclusion:
The submitted samples **Passed** with according EN 62133-2: 2017.

General product information:

The main features of the battery are shown as below :

model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
C06-Lipo	600mAh	7.4V	120mA	120mAh	600mA	12000mA	8.4V	6V

The main features of the cell within the battery are shown as below :

model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
C06-Lipo	600mAh	3.8V	120mA	120mAh	300mA	300mA	4.35V	3V

The main features of the cell are shown as below:

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
C06-Lipo	3.8	N/A	0℃	45℃

Circuit diagram:

N/A

Outline dimension drawing:

N/A

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
4	**Parameter measurement tolerances**		P
	Parameter measurement tolerances		
5	**General safety considerations**		P
5.1	General		P
	The safety of secondary cells and batteries requires the consideration of two sets of applied conditions: 1) Intended use; 2) Reasonably foreseeable misuse.	Refer to the following clauses.	P
	Cells and batteries shall be so designed and constructed that they are safe under conditions of both intended use and reasonably foreseeable misuse. It is expected that cells or batteries subjected to misuse may fail to function following such experience. They shall not however present significant hazards. It may also be expected that cells and batteries subjected to intended use shall not only be safe but shall continue to be functional in all respects.	Refer to the following clauses.	P
	Potential hazards which are the subject of this document are:		P
	• fire, • burst/explosion, • leakage of cell electrolyte, • venting, • burns from excessively high external temperatures, • rupture of battery case with exposure of internal components.		P
	Conformity with 5.2 to 5.7 for cells and batteries other than coin cells, with an internalresistance greater than 3 Ω, is checked by inspection, by the tests of Clauses 7, and in accordance with the appropriate standard (see Clause 2 and Table 1). The internal resistanceis to be measured in accordance with Annex D.		N/A
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 shall be not less than 5 MΩ at 500 V DC when measured 60 s after applying the voltage.	No accessible metal case exists;	N/A
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		P
5.3	Venting		P

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
	Battery cases and cells shall incorporate a pressure relief mechanism or shall be so constructed that they will relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition. If encapsulation is used to support cells within an outer case, the type of encapsulant and the method of encapsulation shall neither cause the battery to overheat during normal operation nor inhibit pressure relief.	Venting mechanism facilitated on cells.	P
5.4	Temperature/voltage/current management		P
	The design of batteries shall be such that abnormal temperature-rise conditions are prevented. Batteries shall be designed to be within temperature, voltage and current limits as specified by the cell manufacturer. Batteries shall be 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.	Overcharge, over-discharge, over current and short-circuit proof circuit used in this battery. See tests of clause 7. The charging limits are specified in the manufacturer's specifications.	P
5.5	Terminal contacts		N/A
	The size and shape of the terminal contacts shall ensure that they can carry the maximum anticipated current. External terminal contact surfaces shall be formed from conductive materials with good mechanical strength and corrosion resistance. Terminal contacts shall be arranged so as to minimize the risk of short-circuit.	The "+" and "-" polarity explicitly marked on surface of the cell. See page 5. DC lead wire complied with the requirements.	N/A
5.6	Assembly of cells into batteries		N/A
5.6.1	General		N/A
	Each battery should 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. However this protection may be provided external to the battery such as within the charger or the end devices. Ifprotection is external to the battery, the manufacturer of the battery shall 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 should have protective circuitry that can maintain the cells within their operating regions.	Considered in the end-device.	N/A
	Manufacturers of cells shall specify current, voltage and temperature limits so that the battery manufacturer/designer may ensure properdesign and assembly (see Annex A).		N/A

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
	Protective circuit components should be added as appropriate and consideration given to the end-device application. The manufacturer of the battery should 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.	The protections will be considered in the end-device.	N/A
5.6.2	Design recommendation		P
	The voltage of each cell, or each cellblock consisting of parallel-connected plural cells, should not exceed the upper limit of the charging voltage specified in Table 2, excepting the case where the portable electronic devices or similar devices have the equivalent function.		P
	The following should be considered at the battery level and by the device designer	See below table 5.6.2;	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 should be provided to prevent damage as a result of intended use and reasonably foreseeable misuse. 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.		P
	The battery case and compartments housing cells should be designed to accommodate cell dimensional tolerances during charging and discharging as recommended by the cell manufacturer.		P
	For batteries intended for building into a portable end product, testing with the battery installed within the end product should be considered when conducting mechanical tests.		N/A
5.7	Quality plan		P
	The manufacturer shall prepare and implement 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. Manufacturers should understand their process capabilities and should institute the necessary process controls as they relate to product safety.	The manufacturer has ISO 9001:2018 certificate and such quality plan.	P
5.8	Battery safety components		P
	See Annex.		P

6	**Type test and sample size**		**P**

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
	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. The internal resistance of coin cells shall be measured in accordance with Annex D. Coin cells with internal resistance less than or equal to 3 Ω shall be tested in accordance with Table 1. Unless otherwise specified, tests are carried out in an ambient temperature of 20 °C ± 5 °C.	NOTE Test conditions are for type tests only and do not imply that intended use includes operation under these conditions. Similarly, the limit of six months is introduced for consistency and does not imply that battery safety is reduced after six months. Tests are carried out at 20°C ± 5°C	P
7	**Specific requirements and tests**		P
7.1	Charging procedures 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 shall 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 usin the upper limit charging voltage and maximum charging current, until the charging current is reduced to 0,05 It A, using a constant voltage charging method.		P
7.2	Intended use		P
7.2.1	Continuous charging at constant voltage (cells)		P
	a) Requirement A continuous charge at constant voltage shall not cause leakage, fire or explosion. b) Test 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. c) Acceptance criteria	No fire, no explosion, no leakage. Test results see appended table 7.2.1	P
7.2.2	Case stress at high ambient temperature (battery)		P

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
	a) Requirement Internal components of batteries shall not be exposed during use at high temperature. This requirement only applies to batteries with a moulded case. b) Test Fully charged batteries, according to the first procedure in 7.1.1, are exposed to a moderately high temperature to evaluate case integrity. The battery is placed in an air circulating oven at a temperature of 70 °C ± 2 °C. The batteries remain in the oven for 7 h, after which they are removed and allowed to return to room temperature. c) Acceptance criteria	No physical distortion of the battery case resulting in exposure of internal protective components and cells.	P
7.3	Reasonably foreseeable misuse		P
7.3.1	External short-circuit (cell)		P
	a) Requirements Short-circuiting of the positive and negative terminals of the cell at high temperature shall not cause fire or explosion. b) Test Fully charge each cell according to the second procedure in 7.1.2. Store in an ambient temperature of 55 °C ± 5 °C. After stabilization for 1 h to 4 h and while still in an ambient temperature of 55 °C ± 5 °C, the cell is short-circuited by connecting the positive and negative terminals with a total external resistance of 80 mΩ ± 20 mΩ. The cell remains on test for 24 h or until the surface temperature declines by 20 % of the maximum temperature rise, whichever is the sooner. – 16 – IEC 62133-2:2017 © IEC 2017 c) Acceptance criteria - four fully charged cells of the same brand, type, size and age connected in series, with one of them reversed; or	No fire, no explosion Test results see appended table 7.3.1	P
7.3.2	External short-circuit (battery)		P

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
	a) Requirements Short-circuiting of the positive and negative terminals of the battery shall not cause fire or explosion. b) Test A fully charged battery according to the procedure in 7.1.1 is stored in an ambient temperature of 20 °C ± 5 °C. The battery is then short-circuited by connecting the positive and negative terminals with a total external resistance of 80 mΩ ± 20 mΩ. The battery remains on test for 24 h or until the case temperature of battery declines by 20 % of the maximum temperature rise, whichever is the sooner. However, in case of a rapid decline in the short-circuit current, the battery should remain on test for an additional one hour after the current reaches a low end steady state condition. This typically refers to a condition where the per cell voltage (series cells only) of the battery is below 0,8V and is decreasing by less than 0,1 V in a 30-min period. A single fault in the discharge protection circuit should be conducted on one to four (depending upon the protection circuit) of the five samples before conducting the shortcircuit test. A single fault applies to protective component parts such as MOSFET (metal oxide semiconductor field-effect transistor), fuse, thermostat or positive temperature coefficient (PTC) thermistor. and age connected in series, with one of them reversed; or c) Acceptance criteria	NOTE Examples of single fault conditions in the discharge protection circuit can include shorting over a discharge MOSFET or over a fuse or other protection device. Protection devices found to meet the requirements of applicable component standards such as those outlined in Annex F or electronics circuits evaluated for functional safety are not subject to single fault conditions. No fire, no explosion.	P
7.3.3	Free fall		P
	a) Requirements Dropping a cell or battery (for example, from a bench top) shall not cause fire or explosion. b) Test Free fall test is conducted at an ambient temperature of 20 °C ± 5 °C, by using cells or batteries that are charged to a fully charged state, in accordance with the first procedure in 7.1.1. Each cell or battery is dropped three times from a height of 1.0 m onto a flat concrete floor or metal floor. The cells or batteries are dropped so as to obtain impacts in random orientations. After the test, the cell or battery shall be put on rest for a minimum of 1 h and then a visual inspection shall be performed. c) Acceptance criteria	No fire, no explosion Test results see appended table 7.3.3	P
7.3.4	Thermal abuse(cells)		P

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
	a) Requirements An extremely high temperature shall not cause fire or explosion. b) Test Each fully charged cell, according to the second procedure in 7.1.2, is placed in a gravity or circulating air-convection oven, in an ambient temperature of 20 °C ± 5 °C, for 1 h. The oven temperature is raised at a rate of 5 °C/min ± 2 °C/min to a temperature of 130 °C ± 2 °C. The cell remains at this temperature for 30 min before the test is terminated. c) Acceptance criteria	No fire, no explosion. Test results see appended table 7.3.4	P
7.3.5	Crush (cells)		P
	a) Requirements Severe crushing of a cell shall not cause fire or explosion. b) Test Each fully charged cell, charged according to the second procedure at the upper limit charging temperature in 7.1.2, is immediately transferred and crushed between two flat surfaces in an ambient temperature. The force for the crushing is applied by a device exerting a force of 13 kN ± 0,78 kN. Once the maximum force has been applied, or an abrupt voltage drop of one-third of the original voltage has been obtained, the force is released.A cylindrical or prismatic cell is crushed with its longitudinal axis parallel to the flat surfaces of the crushing apparatus. Test only the wide side of prismatic cells. A coin cell shall be crushed by applying the force on its flat surface. c) Acceptance criteria	No fire, no explosion Test results see appended table 7.3.5	P
7.3.6	Over-charging of battery		P

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
	a) Requirements Charging for longer periods than specified by the manufacturer shall not cause fire or explosion. 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. A thermocouple shall be attached to each test battery. For batteries with a case, the temperature shall be measured on the battery case. The test shall be continued until the temperature of the outer case reaches steady state conditions (less than 10 °C change in a 30-min period) or returns to ambient. c) Acceptance criteria	No fire, no explosion.	P
7.3.7	Forced discharge (cells)		P
	a) Requirements A cell shall withstand polarity reversal without causing fire or explosion. A protective device in a battery or system can be adopted. b) Test Discharge a single cell to the lower limit discharge voltage specified by the cell manufacturer. The discharged cell is then subjected to a forced discharge at 1 It A to the negative value of the upper limit charging voltage. The total duration for the forced discharge testing is 90 min. If the discharge voltage reaches the negative value of upper limit charging voltage within the testing duration, the voltage shall be maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration. (Case 1 of Figure 1) If the discharge voltage does not reach the negative value of upper limit charging voltage within the testing duration, the test shall be terminated at the end of the testing duration. (Case 2 of Figure 1) c) Acceptance criteria	No fire, no explosion. Test results see appended table 7.3.7	P
7.3.8	Mechanical tests (batteries)		P
7.3.8.1	Vibration		

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
	a) Requirements Vibration encountered during transportation and use shall not cause leakage, fire or explosion. b) Test batteries, fully charged in accordance with the charging procedure of 7.1.1, shall be firmly secured to the platform of the vibration machine without distorting them in such a manner as to faithfully transmit the vibration. Test batteries shall be subjected to sinusoidal vibration according to Table 3. This cycle shall be repeated 12 times for a total of approximately 3 h for each of three mutually perpendicular mounting positions. One of the directions shall be perpendicular to the terminal face. c) Acceptance criteria	(See Table 7.3.8.1 Table 3) No fire, no explosion, no rupture, no leakage or venting.	P
7.3.8.2	Mechanical shock(crash hazard)		P
	a) Requirements Shock encountered during transportation and use shall not cause leakage, fire or explosion. This test simulates rough handling during transport and use. b) Test procedure Test batteries, fully charged in accordance with the charging procedure of 7.1.1, shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each test battery shall be subjected to three shocks in each direction of three mutually perpendicular mounting positions of the battery for a total of 18 shocks. For each shock, the parameters given in Table 4 shall be applied. c) Acceptance criteria	(See Table 7.3.8.2 Table 4) There shall be no leakage, no venting, no rupture, no explosion and no fire during this test.	P
7.3.9	Design evaluation – Forced internal short-circuit (cells)	(See Table 7.3.9)	N/A

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
8	**Information for safety**		**P**
8.1	General		P
	The use, and particularly abuse, of portable sealed secondary lithium cells and batteries may result in the creation of hazards and may cause harm. Manufacturers of secondary cells shall ensure that information is provided about current, voltage and temperature limits of their products. Manufacturers of batteries shall ensure that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards. It is the equipment manufacturer's responsibility to inform end-users of the potential hazards arising from the use of equipment containing secondary cells and batteries. Systems analyses should be performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product. As appropriate, any information relating to hazard avoidance resulting from a system analysis should be provided to the end user.		P
	Guidance is provided in IEC TR 62188 on the design and manufacture of portable batteries, and non-exhaustive lists of good advice are provided for information in Annexes B and C. Conformity can be checked by examination of manufacturer's documentation.	Do not allow children to replace batteries without adult supervision.	P
8.2	Small cell and battery safety information		P
	Small cells and batteries and equipment using small cells and batteries are to be provided with information regarding ingestion hazards. Small cells and batteries that may pose an ingestion hazard are those that can fit within the limits of the ingestion gauge shown in Figure 3.		P
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them: • Keep small cells and batteries which are considered swallow able out of the reach of children. • Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion. • In case of ingestion of a cell or battery, seek medical assistance promptly.	(See Table 8.2 Table 3)	P

9	**Marking**		**P**
9.1	Cell marking		N/A

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
	Cells shall be marked as specified in IEC 61960, except coin cells. Coin cells whose external surface area is too small to accommodate the markings on the cells shall show the designation and polarity. 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. However, the cell marking can be indicated with the battery, the instructions and/or the specifications.	Conformity is checked by inspection.	N/A
9.2	Battery marking		P
	Batteries shall be marked as specified in IEC 61960, except for coin batteries. Coin batteries whose external surface area is too small to accommodate the markings on the batteries shall show the designation and polarity. Batteries shall also be marked with an appropriate caution statement.	see page 3.	P
	Terminals shall have clear polarity marking on the external surface of the battery.		P
	Exception: 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.	Conformity is checked by inspection.	P
9.3	Caution for ingestion of small cells and batteries		N/A
	Coin cells and batteries identified as small batteries according to 8.2 shall 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 shall be given on the immediate package.	Conformity is checked by inspection.	N/A
9.4	Other information		P
	The following information shall be marked on or supplied with the battery:	See Specification book	P
	• storage and disposal instructions; • recommended charging instructions. The battery.	See Specification book	P
	Conformity is checked by examination of markings and manufacturer's documentation.	See Specification book	P

10	**Packaging and transport**		N/A
	Cells or batteries were provided with packaging that was adequate to avoid mechanical damage during transport, handling and stacking. The materials and pack design was chosen to prevent the development of unintentional electrical conduction, corrosion of the terminal and ingress of moisture.		N/A

EN 62133-2: 2017			
Clause	Requirement + Test	Result - Remark	Verdict
Annex A	**Charging range of secondary lithium ion cells for safe use**		P
A1	Refer to Annex E for information regarding packaging and transport.		P
A.2	Safety of lithium-ion secondary battery	Complied.	P
A.3	Consideration on charging voltage	Complied.	P
A.3.1	General	Charging voltage is 8.4V	P
A.3.2	Upper limit charging voltage	8.4V	P
A.4	Consideration of temperature and charging current	Charging temperature declared by client is: 0-45°C.	P
A.4.1	General		P
A.4.2	Recommended temperature range		P
A.4.3	High temperature range		P
A.4.4	Low temperature range		P
A.4.5	Scope of the application of charging current		P
A.4.6	Consideration of discharge		P
A.5	Sample preparation		P
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 to cylindrical cell		N/A
A.5.5.1	Insertion of nickel particle in winding core		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	Positioning (or placement) of a nickel particle		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

EN 62133-2: 2017			
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)]**
-Electrolyte	JN	1301	DMC, EC, PC, EMC	--	--
-Separator	YITU	20μm*95mm*17 10mm	20μm, Nylon, PP, shutdown temperature: min. 135°C	--	--
-Positive electrode	Shenzhen Grand Powersource Co., Ltd	126μm×92mm ×887mm	LiCoO2, PVDF, NMP, Conductive Additive, Aluminum Foil	--	--
-Negative electrode	LiCoO2, PVDF, NMP, Conductive Additive, Aluminum Foil	112μm×90mm ×882mm	Graphite, CMC, SBR, H2O, Conductive Additive, Copper Foil	--	--
Insulation tape	Various	Various	Min. 130°C	UL 510	UL
Supplementary information:					

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Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: Continuous charging at constant voltage (cells)			P
Model	Recommended charging voltage V_c, (Vdc)	Recommended charging current I_{rec}, (A)	OCV at start of test, (Vdc)	Results
SDL-802540Sp-600 mAh (C01)	4.35	0.12	4.32	P
SDL-802540Sp-600 mAh (C02)	4.35	0.12	4.32	P
SDL-802540Sp-600 mAh (C03)	4.35	0.12	4.33	P
SDL-802540Sp-600 mAh (C04)	4.35	0.12	4.32	P
SDL-802540Sp-600 mAh (C05)	4.35	0.12	4.32	P
Supplementary information: - No fire or explosion - No leakage - No Explosion - Leakage - Fire - Explosion - Bulge - Others (please explain)				

7.2.2	TABLE: Case stress at high ambient temperature (battery)			P
Model	OCV at start of test, (Vdc)	Test temperature (°C)	Duration (h)	Results
Samples charged at charging temperature upper limit				
SDL-802540Sp-600 mAh (B01)	8.3	70	7	P
SDL-802540Sp-600 mAh (B02)	8.3	70	7	P
SDL-802540Sp-600 mAh (B03)	8.3	70	7	P
Supplementary information: - No fire or explosion - No leakage - No Explosion - Leakage - Fire - Explosion - Bulge - Others (please explain)				

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Clause	Requirement + Test	Result - Remark	Verdict

7.3.1	TABLE: External short circuit (cell)				P
Test sample	Ambient (℃)	OCV at start of test, (Vdc)	Resistance of circuit, (Ω)	Maximum case temperature rise △T, (K)	Results
Condition: Samples charged at charging temperature lower limit (45℃)					
SDL-802540Sp-600 mAh (C06)	55.2	4.33	0.080	86.8	P
SDL-802540Sp-600 mAh (C07)	55.3	4.34	0.080	84.0	P
SDL-802540Sp-600 mAh (C08)	55.5	4.33	0.080	79.2	P
SDL-802540Sp-600 mAh (C09)	55.1	4.34	0.080	81.1	P
SDL-802540Sp-600 mAh (C10)	55.7	4.33	0.080	83.6	P
Condition: Samples charged at charging temperature lower limit (10℃)					
SDL-802540Sp-600 mAh (C11)	55.1	4.33	0.080	86.8	P
SDL-802540Sp-600 mAh (C12)	55.0	4.34	0.080	74.0	P
SDL-802540Sp-600 mAh (C13)	55.6	4.33	0.080	89.2	P
SDL-802540Sp-600 mAh (C14)	55.5	4.34	0.080	71.1	P
SDL-802540Sp-600 mAh (C15)	55.3	4.33	0.080	83.6	P
Remark: Test was terminated after case temperature declined by 20% of the maximum temperature rise. Supplementary information: -No fire or explosion -No leakage -Leakage -Fire -Explosion -Bulge -Others (please explain)					

7.3.2	TABLE: External short circuit (battery)				P
External short circuit test (battery)					
Test sample	Ambient (℃)	OCV at start of test, (Vdc)	Resistance of circuit, (Ω)	Maximum case temperature rise △T, (K)	Results
SDL-802540Sp-600 mAh (B04)	22.3	8.3	0.080	--	P
SDL-802540Sp-600 mAh (B05)	22.8	8.3	0.080	--	P
SDL-802540Sp-600 mAh (B06)	21.3.	8.3	0.080	--	P

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Clause	Requirement + Test	Result - Remark	Verdict

SDL-802540Sp-600 mAh (B07)	22.5	8.3	U1	--	P
SDL-802540Sp-600 mAh (B08)	21.6	8.3	C1	--	P

Remark: Test was terminated after remain on test for 24 hours.
Supplementary information:
-No fire or explosion
-No leakage
-Leakage
-Fire
-Explosion
-Bulge
-Others (please explain)

7.3.3	**Free fall**	**P**
Test sample	Height(m)	Results
For cells		
SDL-802540Sp-600 mAh (C16)	1m	P
SDL-802540Sp-600 mAh (C17)	1m	P
SDL-802540Sp-600 mAh (C18)	1m	P
For batteries		
SDL-802540Sp-600 mAh (B09)	1m	P
SDL-802540Sp-600 mAh (B10)	1m	P
SDL-802540Sp-600 mAh (B11)	1m	P

Supplementary information:
-No fire or explosion
-No leakage
-Leakage
-Fire
-Explosion
-Bulge
-Others (please explain)

7.3.4	**Thermal abuse (cells)**	**P**
Test sample	Results	
Condition: Samples charged at charging temperature upper limit (45℃)		
SDL-802540Sp-600 mAh (C19)	P	
SDL-802540Sp-600 mAh (C20)	P	
SDL-802540Sp-600	P	

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Clause	Requirement + Test	Result - Remark	Verdict

mAh (C21)	
SDL-802540Sp-600 mAh (C22)	P
SDL-802540Sp-600 mAh (C23)	P
Condition: Samples charged at charging temperature upper limit (10℃)	
SDL-802540Sp-600 mAh (C24)	P
SDL-802540Sp-600 mAh (C25)	P
SDL-802540Sp-600 mAh (C26)	P
SDL-802540Sp-600 mAh (C27)	P
SDL-802540Sp-600 mAh (C28)	P
Supplementary information: -No fire or explosion -No leakage -Leakage -Fire -Explosion -Bulge -Others (please explain)	

7.3.5	**TABLE: Crush**	**P**
Test sample	Force applied by	Results
Condition: Samples charged at charging temperature upper limit (45℃)		
SDL-802540Sp-600 mAh (C29)	Wide side	P
SDL-802540Sp-600 mAh (C30)	Wide side	P
SDL-802540Sp-600 mAh (C31)	Wide side	P
SDL-802540Sp-600 mAh (C32)	Wide side	P
SDL-802540Sp-600 mAh (C33)	Wide side	P
Condition: Samples charged at charging temperature upper limit (10℃)		
SDL-802540Sp-600 mAh (C34)	Wide side	P
SDL-802540Sp-600 mAh (C35)	Wide side	P
SDL-802540Sp-600 mAh (C36)	Wide side	P
SDL-802540Sp-600	Wide side	P

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Clause	Requirement + Test	Result - Remark	Verdict

mAh (C37)		
SDL-802540Sp-600 mAh (C38)	Wide side	P

Supplementary information:
-No fire or explosion
-No leakage
-Leakage
-Fire
-Explosion
-Bulge
-Others (please explain)

7.3.6	TABLE: Over-charging of battery				P
Test sample	OCV at start of test, Vdc	Maximum Charging Current, A	Maximum Charging Voltage, Vdc	Maximum outer casing temperature, (℃)	Results
SDL-802540Sp-600 mAh (B12)	6.33	1.2	10	--	P
SDL-802540Sp-600 mAh (B13)	6.34	1.2	10	--	P
SDL-802540Sp-600 mAh (B14)	6.41	1.2	10	--	P
SDL-802540Sp-600 mAh (B15)	6.25	1.2	10	--	P
SDL-802540Sp-600 mAh (B16)	6.37	1.2	10	--	P

Supplementary information:
-No fire or explosion
-No leakage
-Leakage
-Fire
-Explosion
-Bulge
-Others (please explain)

7.3.7	TABLE: Forced discharge (cells)			P
Test sample	Voltage Measured before Test (V)	Measured Reverse Charge It, (A)	Time for reversed charge, (minutes)	Results
SDL-802540Sp-600 mAh (C39)	3.34	0.6	90	P
SDL-802540Sp-600 mAh (C40)	3.36	7.9	90	P
SDL-802540Sp-600 mAh (C41)	3.26	7.9	90	P
SDL-802540Sp-600 mAh (C42)	3.30	7.9	90	P

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Clause	Requirement + Test	Result - Remark	Verdict

SDL-802540Sp-600 mAh (C43)	3.27	7.9	90	P

Supplementary information:
-No fire or explosion
-No leakage
-Leakage
-Fire
-Explosion
-Bulge
-Others (please explain)

7.3.8	TABLE: Mechanical tests (batteries)			P
Model	**OCV at start of test, (Vdc)**	**Test frequency (Hz)**	**Vibration time (h)**	**Results**
7.3.8.1 Vibration				
SDL-802540Sp-600 mAh (B17)	8.3	7Hz~200Hz~7Hz	15 min	P
SDL-802540Sp-600 mAh (B18)	8.3	7Hz~200Hz~7Hz	15 min	P
SDL-802540Sp-600 mAh (B19)	8.3	7Hz~200Hz~7Hz	15 min	P
Model	**OCV at start of test, (Vdc)**	**Acceleration (gn)**	**Number of shocks per half axis**	**Results**
7.3.8.2 Mechanical shock				
SDL-802540Sp-600 mAh (B20)	8.3	150 gn	3	P
SDL-802540Sp-600 mAh (B21)	8.3	150 gn	3	P
SDL-802540Sp-600 mAh (B22)	8.3	150 gn	3	P

Supplementary information:
- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

7.3.9	TABLE: Forced internal short circuit (cells)				N/A
Model	Chamber ambient, (°C)	OCV at start of test, (Vdc)	Particle location 1)	Maximum applied pressure, (N)	Results
Samples charged at charging temperature upper limit(--°C)					
--	--	--	--	--	--

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--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
Samples charged at charging temperature upper 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 insterted between positive aluminium foil and negative active material coated area;
- No Fire
- No Explosion
- No Leakage
- Fire: the emission of flames from a cell or battery.
- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.
- Leakage: visible escape of liquid electrolyte.

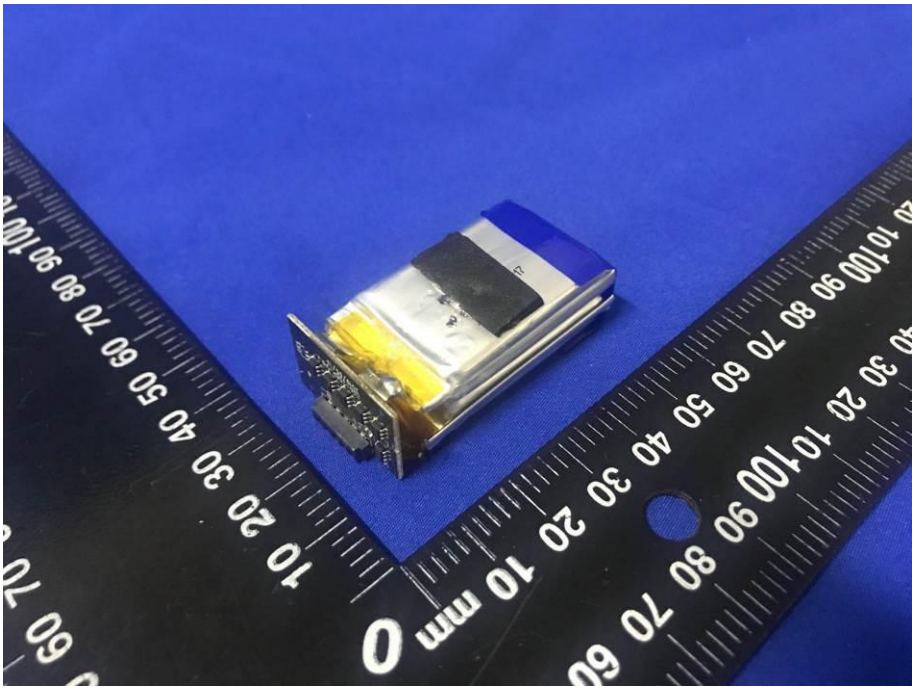
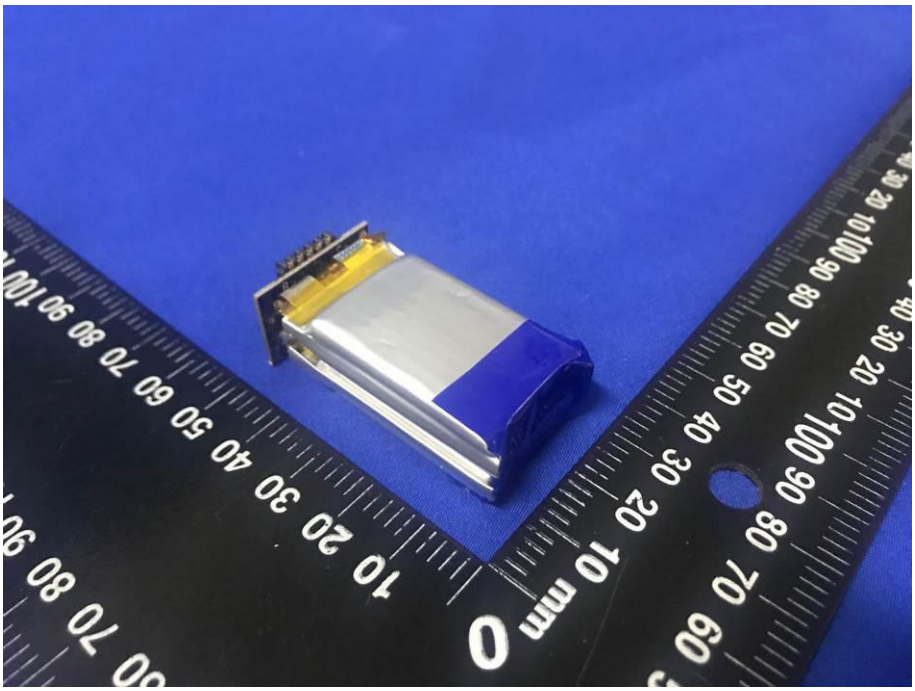
Photo 1 [√] Complete [ ] external [ ] Internal [ ] Component [ ] PCB [ ] Adapter [ ] cells	
Photo 2 [√] Complete [ ] external [ ] Internal [ ] Component [ ] PCB [ ] Adapter [ ] cells	

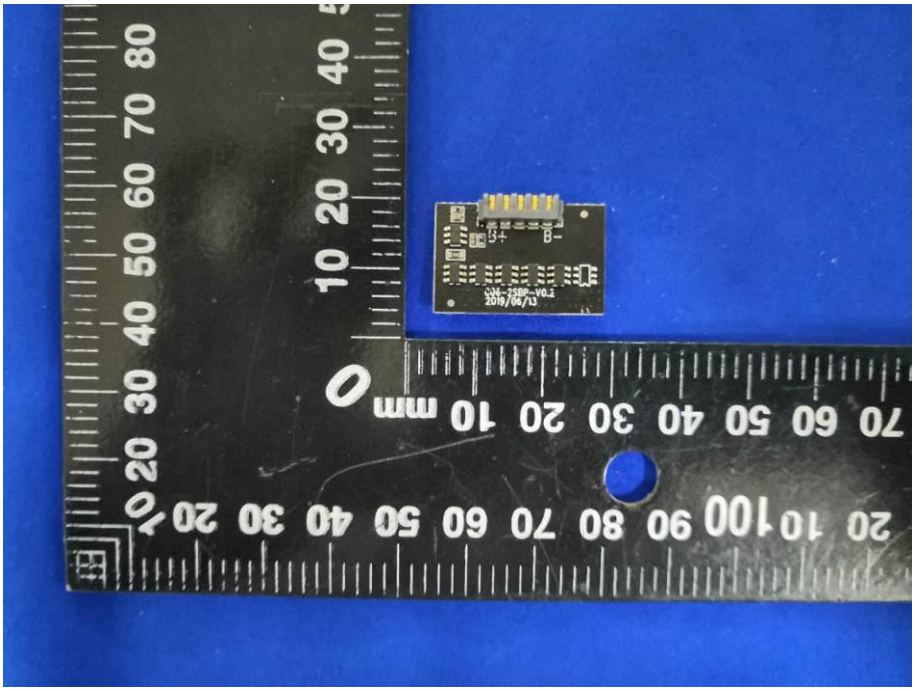
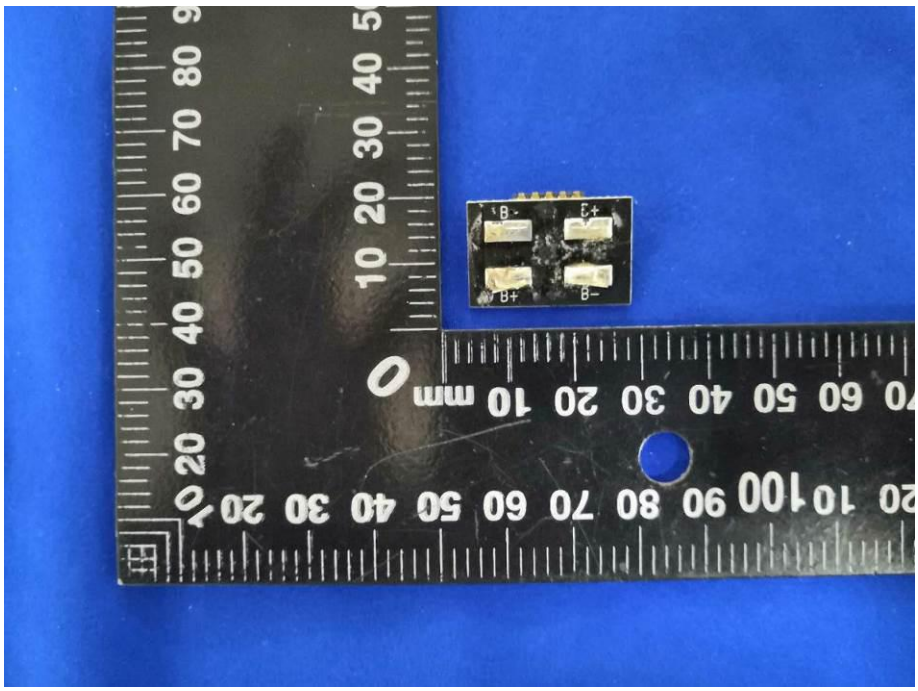
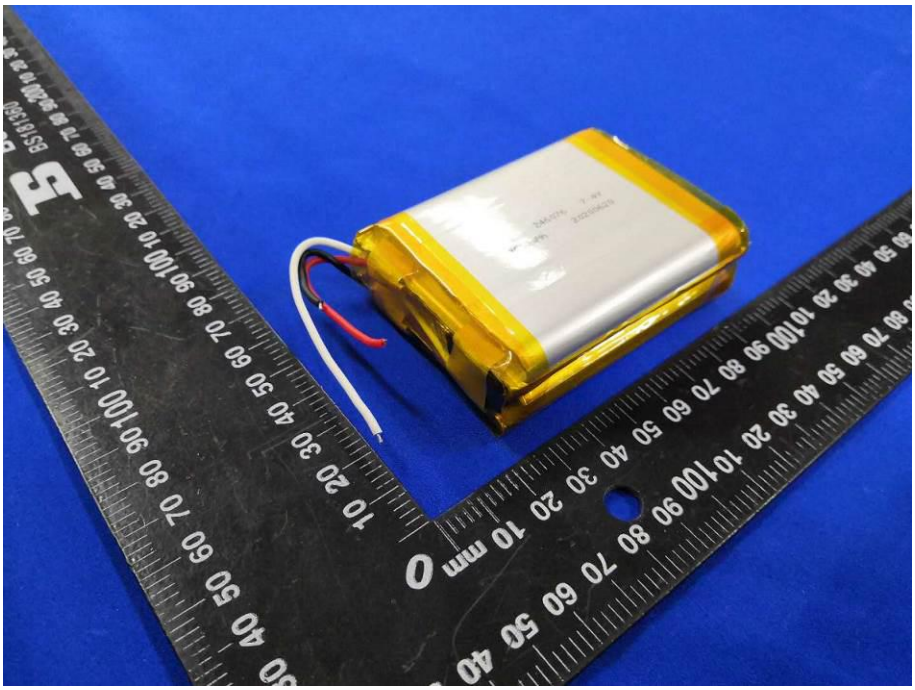
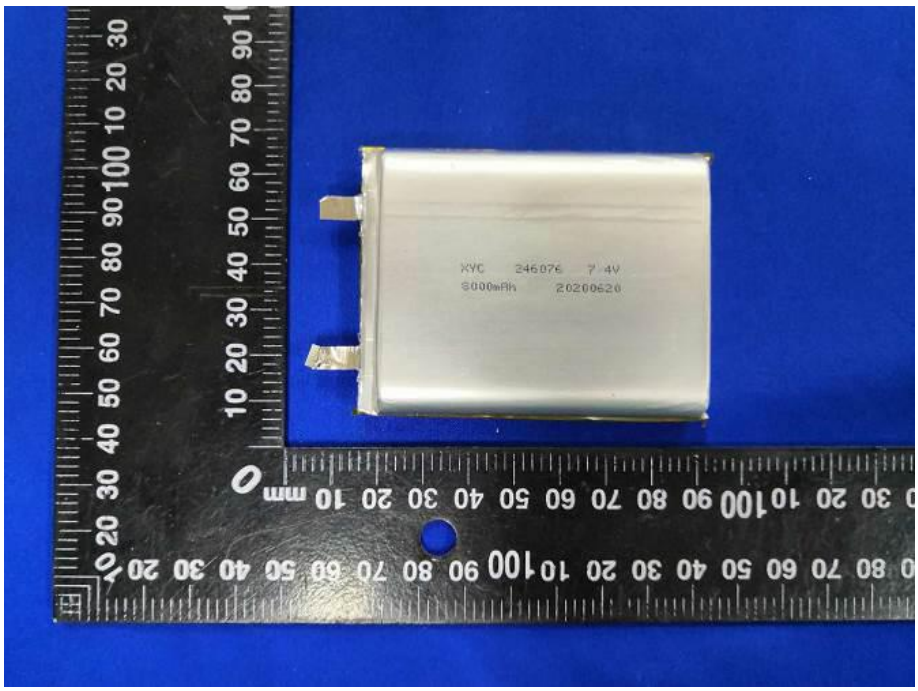
Photo 3 [ ] Complete [ ] external [ ] Internal [ ] Component [√] PCB [ ] Adapter [ ] cells	
Photo 4 [ ] Complete [ ] external [ ] Internal [ ] Component [ ] PCB [ ] Adapter [ ] cells	

Photo 5 [ ] Complete [ ] external [ ] Internal [ ] Component [ ] PCB [ ] Adapter [√] cells	
Photo 6 [ ] Complete [ ] external [ ] Internal [ ] Component [ ] PCB [ ] Adapter [√] cells	

------End of report------