Test Report

Report No.: AGC01085200301TA01

PRODUCT DESIGNATION	:	Li-ion Battery
BRAND NAME	:	CUBOT
MODEL NAME	:	J9
APPLICANT	:	Shenzhen Huafurui Technology Co., Ltd.
DATE OF ISSUE	:	Apr. 23, 2020
STANDARD(S)	:	IEC 62133-2:2017
REPORT VERSION	:	V1.0

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd

IEC 62133-2:2017

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 Reference No.	:	AGC01085200301TA01
Tested by (+ signature)	:	Xu Ren
Reviewed by (+ signature)	:	Xue Jiajia
Approved by (+signature)	:	Matte He
Date of issue	:	Apr. 23, 2020
Contents	:	Total 27 pages.

Testing laboratory

Name	:	Attestation of Global Compliance (Shenzhen) Co., Ltd.
Address	:	1, 2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Testing location	:	Same as above.

Applicant

Name	:	Shenzhen Huafurui Technology Co., Ltd.
Address	:	Unit 1401 &1402, 14/F, Jin qi zhi gu mansion (No.4 building of Chong wen Garden), Crossing of the Liu xian street and Tang ling road, Tao yuan street, Nan shan district, Shenzhen.Guangdong province.China

Manufacturer

Name	:	Zhongshan Tianmao Battery Co., Ltd
Address	:	No.208, Qianjin 1st Road, Xinqianjin Village, Tanzhou Town, Zhongshan City

Test specification

Standard	:	IEC 62133-2:2017
Test procedure	:	Type test
Procedure deviation	:	N/A
Test result	:	Pass

Test Report Form/blank test report

Test Report Form No.	:	AGC62133A
Test Report Form(s) Originator	:	AGC
Master TRF	:	Dated 2017-09

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add: 2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

Test item		
Product designation	:	Li-ion Battery
Brand name	:	CUBOT
Test model	:	J9
Rating(s)	:	3.85V, 4200mAh, 16.17Wh
Test item particulars		
Classification of installation and use	:	N/A
Supply connection	:	DC copper plate
Recommend charging method declared by the manufacturer	:	2100mA constant current charge to 4.4V, then constant voltage 4.4V charge till charged current declines to 126mA.
Discharge current(0.2I_tA)	:	840mA
Specified final voltage	:	2.75V
Upper limit charging voltage per cell	:	4.4V
Maximum charging current	:	4200mA
Charging temperature upper limit	:	45℃
Charging temperature lower limit	:	15℃
Polymer cell electrolyte type	:	☐ gel polymer ☐ solid polymer ☒ N/A
Test case verdicts		
Test case does not apply to the test object	:	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	:	Apr. 14, 2020
Date(s) of performance of test	:	Apr. 14, 2020 -Apr. 22, 2020
Attachment		
Attachment A	:	Photos of product

General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory.
The test results presented in this report relate only to the item tested.
"(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 point is used as the decimal separator.
The product fulfils the requirements of EN62133-2: 2017.

Report Revise Record:

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Apr. 23, 2020	Valid	Original report

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add: 2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

General product information

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

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

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
J9	4200mAh	3.85V	2100mA	840mA	4200mA	4200mA	4.4V	2.75V

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

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
456086PPN	4200mAh	3.85V	2100mA	840mA	4200mA	8400mA	4.4V	2.75V

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

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
456086PPN	4.4V	210mA	15°C	45°C

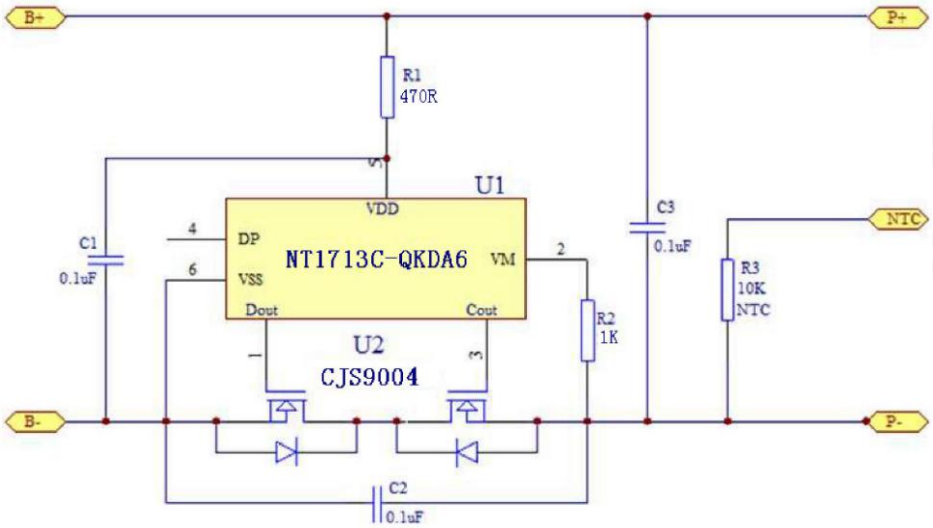
Copy of marking plate

This is reference label, final label should be including the content of it.

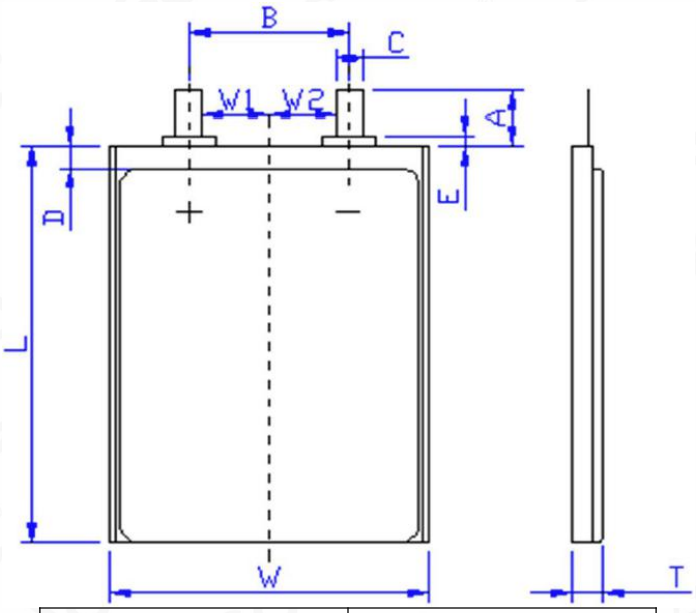
+ -
CUBOT
Li-ion Battery
J9
3.85V, 4200mAh, 16.17Wh
1ICP5/60/87 Date：YYYYMMDD

Remark: YYYY means year, MM means month, DD means day.

Circuit diagram

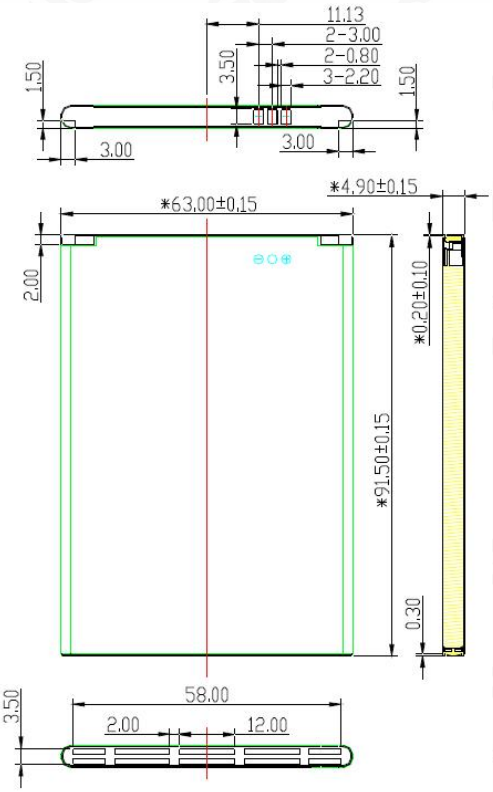


Construction



T	≤4.55mm
W	≤60.0mm
L	≤86.5mm

Cell



Battery (unit: mm)

IEC 62133-2:2017			
Clause	Requirement – Test	Result – Remark	Verdict
4	**Parameter measurement tolerances**		**P**
	Parameter measurement tolerances	Comply with relevant requirements.	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	Not metal case exists.	N
	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 line exists on the metal case of the 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		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 8.	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
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	DC copper plate used.	P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		P

IEC 62133-2:2017			
Clause	Requirement – Test	Result – Remark	Verdict
	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
	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
	If there is more than one battery housed in a single battery case, each battery have protective circuitry that can maintain the cells within their operating regions	Single cell battery	N
	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 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
	Protective circuit components added as appropriate and consideration given to the end-device application		N
	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
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	Charging voltage: 4.4V, not exceed 4.4V specified in clause 7.1.2, Table 2	P
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that the voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Table 2, by monitoring the voltage of every single cell or the single cellblocks		N
	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
	For batteries consisting of series-connected cells or cell blocks, nominal charge voltage not be counted as an		N

IEC 62133-2:2017			
Clause	Requirement – Test	Result – Remark	Verdict
	overcharge protection		
	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
	It is recommended that the cells and cell blocks not discharged beyond the cell manufacturer's specified final voltage	Final voltage of battery: 2.75V, not exceed the final voltage specified by cell manufacturer.	P
	For batteries consisting of series-connected cells or cell blocks, cell balancing circuitry incorporated into the battery management system		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 cells, cell connections and control circuits provided.	P
	The mechanical protection can be provided by the battery case or it can be provided by the end product enclosure for those batteries intended for building into an end product	Build-in battery, Mechanical protection for cells should be provided by end product.	P
	The battery case and compartments housing cells designed to accommodate cell dimensional tolerances during charging and discharging as recommended by the cell manufacturer	To be evaluated in final system.	P
	For batteries intended for building into a portable end product, testing with the battery installed within the end product considered when conducting mechanical tests		P
5.7	**Quality plan**		P
	The manufacturer prepares and implements a quality plan that defines procedures for the inspection of materials, components, cells and batteries and which covers the whole process of producing each type of cell or battery	Complied. Quality plan provided.	P
5.8	**Battery safety components**		P
	According annex F	See TABLE: Critical components information.	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
	Unless otherwise specified, tests are carried out in an		P

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add: 2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

IEC 62133-2:2017			
Clause	Requirement – Test	Result – Remark	Verdict
	ambient temperature of 20 °C ± 5 °C		
	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	Charging temperature specified by client is: 15-45℃ 45℃ used for upper limit tests; 15℃ used for lower limit tests.	P
7.2	**Intended use**		P
7.2.1	**Continuous charging at constant voltage (cells)**		P
	Fully charged cells are subjected for 7 days to a charge using the charging method for current and standard voltage specified by the cell manufacturer	Tested complied.	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)**	Tested complied.	P
	Oven temperature (°C).....:	70	—
	Results: No physical distortion of the battery case resulting in exposure of internal protective components and cells	No physical distortion of the battery casing resulting in exposure if internal components	P

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add: 2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

IEC 62133-2:2017			
Clause	Requirement – Test	Result – Remark	Verdict
7.3	**Reasonably foreseeable misuse**		P
7.3.1	**External short-circuit (cell)**	Tested complied.	P
	The cells were tested until one of the following occurred:		P
	- 24 hours elapsed; or		N
	- The case temperature declined by 20 % of the maximum temperature rise		P
	Results: No fire. No explosion.....:	(See appended table 7.3.1)	P
7.3.2	**External short-circuit (battery)**	Tested complied.	P
	The batteries were tested until one of the following occurred:		P
	- 24 hours elapsed; or		P
	- The case temperature declined by 20 % of the maximum temperature rise		N
	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 single fault in the discharge protection circuit conducted on one to four (depending upon the protection circuit) of the five samples before conducting the short-circuit test	Single fault conducted on four samples. Fault MOSFET U2 four samples.	P
	A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor	Single fault applies on MOSFET U2 four samples.	P
	Results: No fire. No explosion.....:	(See appended table 7.3.2)	P
7.3.3	**Free fall**		P
	Results: No fire. No explosion	No fire. No explosion	P
7.3.4	**Thermal abuse (cells)**		P
	Oven temperature (°C).....:	130°C ±2°C	—
	Results: No fire. No explosion	No fire. No explosion	P
7.3.5	**Crush (cells)**		P
	The crushing force was released upon:		P
	- The maximum force of 13 kN ± 0,78 kN has been applied; or		P
	- An abrupt voltage drop of one-third of the original voltage has been obtained		N
	Results: No fire. No explosion.....:	(See appended table 7.3.5)	P
7.3.6	**Over-charging of battery**	Tested complied.	P
	The supply voltage which is:		P

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add: 2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

IEC 62133-2:2017			
Clause	Requirement – Test	Result – Remark	Verdict
	- 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	6V applied.	P
	- 1,2 times the upper limit charging voltage resented in Table A.1 per cell for series connected multi-cell batteries, and		N
	- 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
	- Returned to ambient		P
	Results: No fire. No explosion.....:	(See appended table 7.3.6)	P
7.3.7	**Forced discharge (cells)**		P
	If the discharge voltage reaches the negative value of upper limit charging voltage within the testing duration, the voltage is maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration		P
	If the discharge voltage does not reach the negative value of upper limit charging voltage within the testing duration, the test is terminated at the end of the testing duration		P
	Results: No fire. No explosion.....:	(See appended table 7.3.7)	P
7.3.8	**Mechanical tests (batteries)**		P
7.3.8.1	**Vibration**		P
	Results: No fire, no explosion, no rupture, no leakage or venting..... :	(See appended table 7.3.8.1)	P
7.3.8.2	**Mechanical shock**		P
	Results: No leakage, no venting, no rupture, no explosion and no fire..... :	(See appended table 7.3.8.2)	**P**
7.3.9	**Design evaluation – Forced internal short-circuit (cells)**		P
	The cells complied with national requirement for.....:	France, Japan, Korea, Switzerland	P
	The pressing was stopped upon:		P
	- A voltage drop of 50 mV has been detected; or		N
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached	400N	P
	Results: No fire.....:	(See appended table 7.3.9)	P

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add: 2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

IEC 62133-2:2017			
Clause	Requirement – Test	Result – Remark	Verdict
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 of safety mentioned in manufacturer's specification.	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 of safety mentioned in manufacturer's specification.	P
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product		N
	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
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:		N
	- Keep small cells and batteries which are considered swallowable out of the reach of children		N
	- Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion		N
	- In case of ingestion of a cell or battery, seek medical assistance promptly		N

9	**Marking**		P
9.1	**Cell marking**		P
	Cells marked as specified in IEC 61960, except coin cells	The final product is battery.	N
	Coin cells whose external surface area is too small to accommodate the markings on the cells show the designation and polarity		N
	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
9.2	**Battery marking**		P
	Batteries marked as specified in IEC 61960, except for coin batteries	The battery is marked in accordance with IEC 61960, also see page 4.	P

IEC 62133-2:2017			
Clause	Requirement – Test	Result – Remark	Verdict
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity. Batteries also marked with an appropriate caution statement	Not coin batteries.	N
	Terminals have clear polarity marking on the external surface of the battery	"+", "-"	P
	Batteries with keyed external connectors designed for connection to specific end products need not be marked with polarity markings if the design of the external connector prevents reverse polarity connections		N
9.3	**Caution for ingestion of small cells and batteries**	Not small cell and battery	N
	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
	When small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion given on the immediate package		N
9.4	**Other information**		P
	Storage and disposal instructions	Information for storage and disposal instructions mentioned in manufacturer's specifications.	P
	Recommended charging instructions	Information for recommended charging instructions mentioned in manufacturer's specifications.	P
10	**Packaging and transport**		P
	Packaging for coin cells not small enough to fit within the limits of the ingestion gauge of Figure 3	Not coin cell	N
	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	4.4V	P
A.3.2.1	General		P

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add: 2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

IEC 62133-2:2017			
Clause	Requirement – Test	Result – Remark	Verdict
A.3.2.2	Explanation of safety viewpoint	4.4V applied.	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	Charging temperature declared by client is: 15-45℃.	N
A.4.2.1	General		N
A.4.2.2	Safety consideration when a different recommended temperature range is applied		N
A.4.3	High temperature range	Not higher than the temperature range specified in this standard.	N
A.4.3.1	General		N
A.4.3.2	Explanation of safety viewpoint		N
A.4.3.3	Safety considerations when specifying charging conditions in the high temperature range		N
A.4.3.4	Safety considerations when specifying a new upper limit in the high temperature range		N
A.4.4	Low temperature range	Not lower than the temperature range specified in this standard.	N
A.4.4.1	General		N
A.4.4.2	Explanation of safety viewpoint		N
A.4.4.3	Safety considerations, when specifying charging conditions in the low temperature range		N
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range		N
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	2.75V	P
A.4.6.3	Discharge current and temperature range		P
A.4.6.4	Scope of application of the discharging current		P
A.5	**Sample preparation**		P
A.5.1	General		P
A.5.2	Insertion procedure for nickel particle to generate internal short		P
A.5.3	Disassembly of charged cell		P

IEC 62133-2:2017			
Clause	Requirement – Test	Result – Remark	Verdict
A.5.4	Shape of nickel particle		P
A.5.5	Insertion of nickel particle in cylindrical cell		N
A.5.5.1	Insertion of nickel particle in winding core		N
A.5.5.2	Marking the position of the nickel particle on both ends of the winding core of the separator		N
A.5.6	Insertion of nickel particle in prismatic cell		P
A.6	**Experimental procedure of the forced internal short-circuit test**		P
A.6.1	Material and tools for preparation of nickel particle		P
A.6.2	Example of a nickel particle preparation procedure		P
A.6.3	Positioning (or placement) of a nickel particle		P
A.6.4	Damaged separator precaution		P
A.6.5	Caution for rewinding separator and electrode		P
A.6.6	Insulation film for preventing short-circuit		P
A.6.7	Caution when disassembling a cell		P
A.6.8	Protective equipment for safety		P
A.6.9	Caution in the case of fire during disassembling		P
A.6.10	Caution for the disassembling process and pressing the electrode core		P
A.6.11	Recommended specifications for the pressing device		P

Annex B	**Recommendations to equipment manufacturers and battery assemblers**	N

Annex C	**Recommendations to the end-users**	N

Annex D	**Measurement of the internal ac resistance for coin cells**		N
D.1	**General**		N
D.2	**Method**		N
	A sample size of three coin cells is required for this measurement..... :	(See appended table D.2)	N
	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
	Coin cells with an internal resistance greater than 3 Ω require no further testing		N

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add: 2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

IEC 62133-2:2017			
Clause	Requirement – Test	Result – Remark	Verdict
Annex E	**Packaging and transport**		N

Annex F	**Component standards references**	P

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add：2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

Table: Critical components information					P
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
PCB	SHEN ZHEN JIRUIDA CIRCUIT TECHNOLOGY CO LTD	JRD-S	V-0, 130℃	--	UL: E340032
IC(U1)	Neotec Semiconductor Ltd.	NT1713C-QKDA6	Overcharge protection voltage: 4.475±0.025V, Overdischarge protection voltage: 2.5±0.035V, Overcurrent detection voltage: 0.15±0.01V, Topr:-40℃~+85℃	--	--
MOSFET(U2)	JIANGSU CHANGJIANG ELECTRONICS TECHNOLOGY CO., LTD	CJS9004	V_{DSS}: 20V, V_{GS}: ±12V, I_D: 10A, I_{DM}: 50A, Rds: 7.5-9.7mΩ	--	--
NTC	MURATA MFG CO LTD	NCP15XH103 @****	10KΩ ±1%, B=3380, Tmax (℃): 125, Class: C4, CA: 2, 4, #	--	UL: E137188
Cell	ZHONGSHAN TIANMAO BATTERY CO., LTD.	456086PPN	3.85Vd.c., 4200mAh	--	--
Electrolyte	Shenzhen Capchem Technology Co., Ltd	LBC3045Q19	$LiPF_6$/Dimethyl carbonate /Ethyl acetate /Ethylene carbonate	--	--
Separator	Shenzhen xu ran Electronic Co., Ltd	13μm（7+6）	PE/PVDF/Al_2O_3 two layers	--	--
Positive electrode	HuNan Shanshan Advanced Material Co., Ltd.	LC9000E	$LiCoO_2$,	--	--
Negative electrode	Jiangxi Zichen Technology Co., Ltd	G49	Graphite	--	--
Alunminum plastic film	DNP	D-EL40H(Ⅲ)	113μ	--	--
Supplementary information: 1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

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
C01	4.4	2.1	4.35	P
C02	4.4	2.1	4.36	P
C03	4.4	2.1	4.36	P
C04	4.4	2.1	4.36	P
C05	4.4	2.1	4.36	P

Supplementary information:

- No fire or explosion
- No leakage
- 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~~ (℃)	Results
Samples charged at charging temperature upper limit (45℃)					
C06	55.8	4.34	84	108.9	P
C07	55.8	4.34	85	109.2	P
C08	55.8	4.34	82	113.8	P
C09	55.8	4.35	85	107.2	P
C10	55.8	4.34	83	105.8	P
Samples charged at charging temperature lower limit (15℃)					
C11	55.4	4.31	86	117.4	P
C12	55.4	4.32	84	112.9	P
C13	55.4	4.32	85	118.6	P
C14	55.4	4.31	85	107.3	P
C15	55.4	4.32	83	109.2	P

Supplementary information:

- No fire or explosion
- Others (please explain)

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add: 2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

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~~ (℃)**	**Component single fault condition**	**Results**
B01	23.5	4.34	84	96.4	MOSFET U2	P
B02	23.5	4.34	84	93.8	MOSFET U2	P
B03	23.5	4.34	82	98.6	MOSFET U2	P
B04	23.5	4.35	85	92.5	MOSFET U2	P
B05	23.5	4.34	83	24.4	--	P
Supplementary information: - No fire or explosion - Others (please explain)						

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℃)				
C16	4.35	4.35	13.18	P
C17	4.35	4.35	13.05	P
C18	4.34	4.34	13.27	P
C19	4.34	4.34	13.21	P
C20	4.34	4.34	13.12	P
Samples charged at charging temperature lower limit (15℃)				
C21	4.32	4.32	13.08	P
C22	4.32	4.32	13.04	P
C23	4.31	4.31	13.19	P
C24	4.31	4.31	13.27	P
C25	4.31	4.31	13.24	P
Supplementary information: - No fire or explosion - Others (please explain)				

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add: 2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

7.3.6	Table: Over-charging of battery				P
Constant charging current (A)..... :			8.4		—
Supply voltage (Vdc)..... :			6		—
Sample no.	**OCV before charging (Vdc)**	**Total charging time (minute)**	**Maximum outer case temperature (°C)**		**Results**
B06	3.30	70	48.2		P
B07	3.29	70	47.8		P
B08	3.30	70	48.5		P
B09	3.30	70	47.2		P
B10	3.30	70	48.9		P
Supplementary information: - No fire or explosion - Others (please explain)					

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**
C26	3.30	4.2	2.75	P
C27	3.30	4.2	2.75	P
C28	3.29	4.2	2.75	P
C29	3.29	4.2	2.75	P
C30	3.29	4.2	2.75	P
Supplementary information: - No fire or explosion - Others (please explain)				

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**
B14	4.35	4.35	64.219	64.218	P
B15	4.35	4.35	64.264	64.263	P
B16	4.35	4.35	64.287	64.286	P
Supplementary information: - No fire or explosion - No rupture - No leakage - No venting - Others (please explain)					

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**
B17	4.34	4.34	64.195	64.194	P
B18	4.34	4.34	64.475	64.474	P
B19	4.35	4.35	64.288	64.287	P

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting
- 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℃)					
C44	45	4.34	1	400	P
C45	45	4.34	1	400	P
C46	45	4.34	1	400	P
C47	45	4.34	2	400	P
C48	45	4.35	2	400	P
Samples charged at charging temperature lower limit (15℃)					
C49	15	4.31	1	400	P
C50	15	4.32	1	400	P
C51	15	4.32	1	400	P
C52	15	4.31	2	400	P
C53	15	4.31	2	400	P

Supplementary information:

[1)] Identify one of the following:

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

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

- No fire or explosion
- Others (please explain)

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add: 2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

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: --				

Attachment A
Photos of product

Fig. 1－View of battery

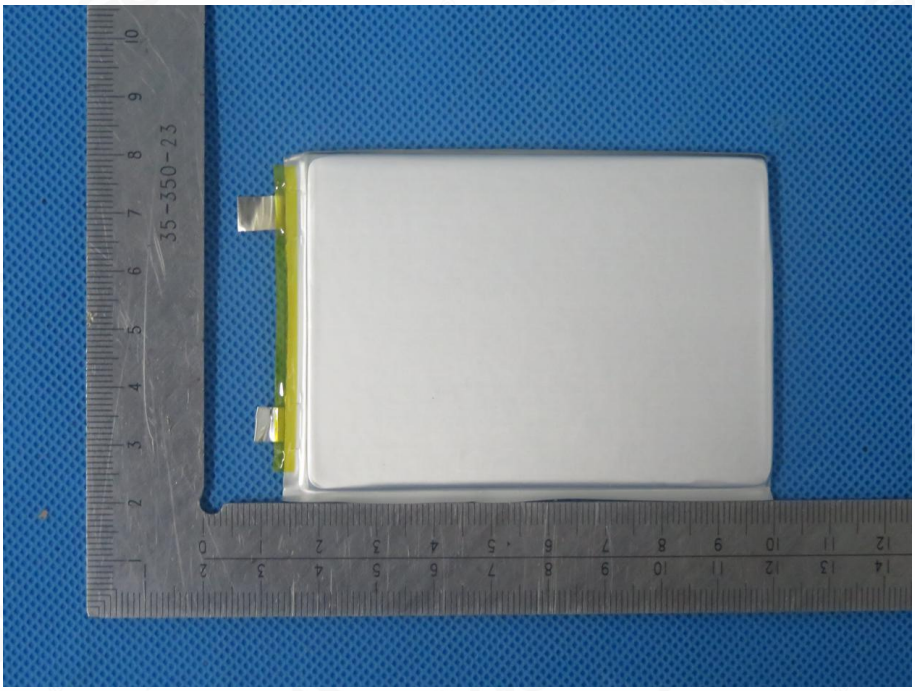


Fig. 2－View of cell

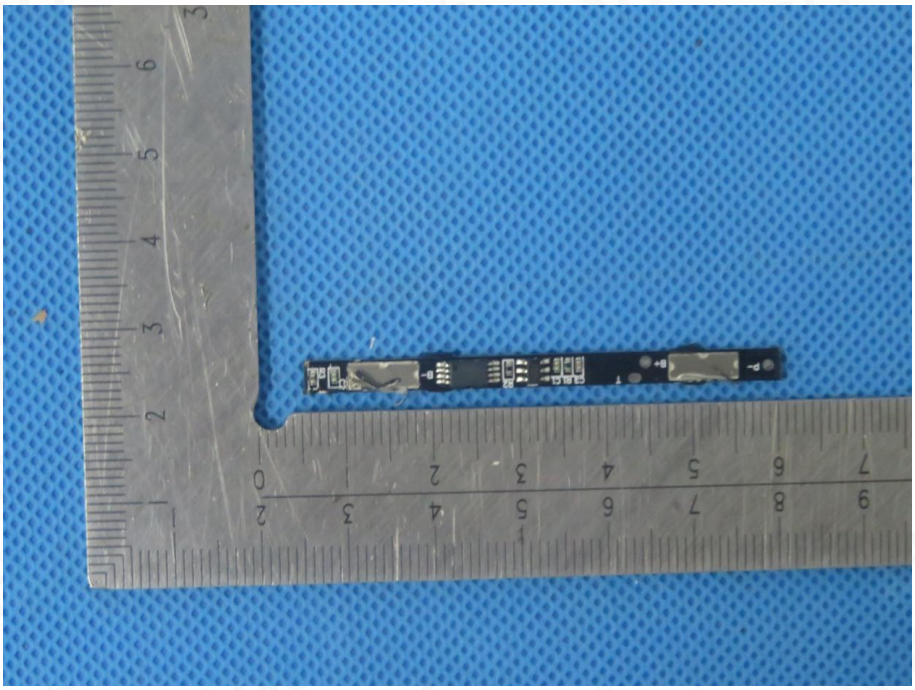


Fig. 3－View of PCB

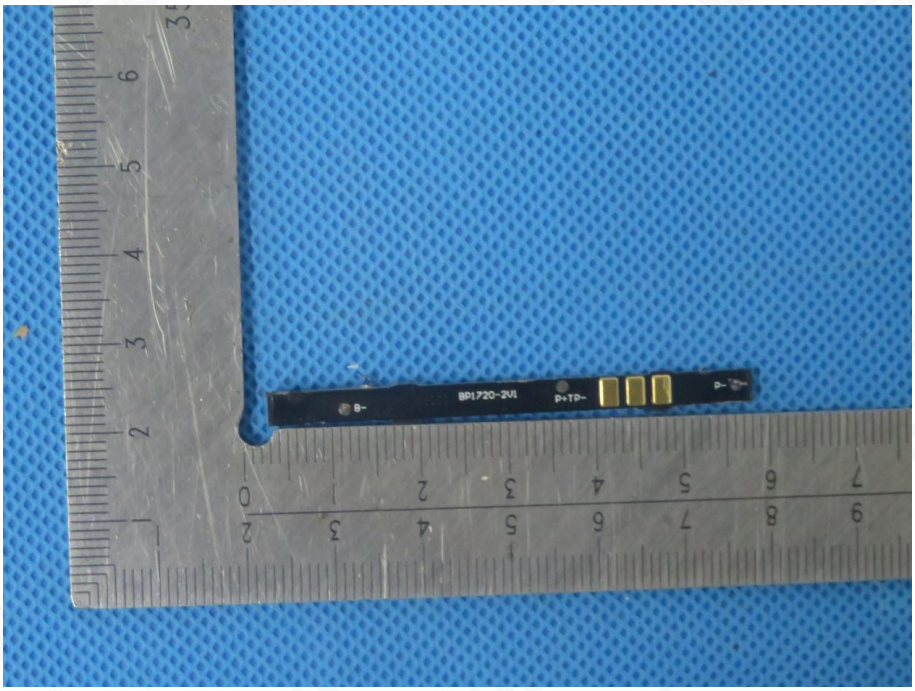


Fig. 4 — View of PCB

Test Equipment

No	Equipment Name	Model No.	Equipment No.	Calibration validity	Using (√)
1	Battery Testing System	CT-4008-5V6A-S1	AGC-BT-E062	2021-04-07	√
2	Temperature Short-circuit Tester	BE-8102	AGC-BT-E106	2021-03-24	√
3	Battery Crush Tester	GX-5067-CSM	AGC-BT-E126	2021-03-24	√
4	Drop Tester	BE-F315S	AGC-BT-E013	2020-12-10	√
5	Vacuum Tester	XB-OTS-L270	AGC-BT-E015	2021-03-23	√
6	Rapid Temperature Change Tester	EAT225-40A5	AGC-BT-E016	2021-03-23	√
7	DC Power Supply	PSW30-36	AGC-BT-E045	2021-04-10	√
8	DC Power Supply	PSW30-36	AGC-BT-E046	2021-04-10	√
9	DC Power Supply	PSW30-36	AGC-BT-E048	2021-04-10	√
10	DC Power Supply	IT6932A	AGC-BT-E050	2021-04-10	√
11	DC Power Supply	TPR-6410D	AGC-BT-E054	2021-04-10	√
12	DC Power Supply	TPR-6410D	AGC-BT-E055	2021-04-10	√
13	DC Power Supply	TPR-6410D	AGC-BT-E056	2021-04-10	√
14	Forced Internal Short Circuit Tester	GX-6055-CSM	AGC-BT-E137	2021-03-23	√
15	Vibration Test Instrument	MPA403 /M124M /GT600M	AGC-BT-E070	2021-04-06	√
16	Rapid Temperature Change Tester	EAT225-40A5	AGC-BT-E074	2021-03-23	√
17	Digital Multimeter	117C	AGC-BT-E154	2021-04-10	√
18	Electronic Load	3310F	AGC-BT-E102	2021-04-10	√
19	Data Acquisition Instrument	AT4524	AGC-BT-E103	2021-03-24	√
20	Data Acquisition Instrument	34970A	AGC-BT-E108	2021-03-24	√
21	Mechanical Shock Test Instrument	DP-1200-60	AGC-RE-E062	2020-11-27	√
22	Thermal Shock Tester	GX-3020-B800T	AGC-BT-E138	2021-03-24	√
23	Battery Swallowing Gauge	AG133F3	AGC-BT-E120	2021-04-01	√

Attestation of Global Compliance(Shenzhen)Co.,Ltd.
Add：2/F., Building 2,Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

Statement

1. This report is invalid without the special seal for report of AGC and the signatures of approver.

2. This report is invalid if it is blotted out and deleted.

3. If the applicant has any questions about results, shall submit to AGC within 15 days.

4. This report is responsible for the sample provided by the client only.

5. This report shall not be reproduced except in full, or extracted without the written approval of AGC.

6. This report photocopy is invalid without the blue chop.

----END OF REPORT----