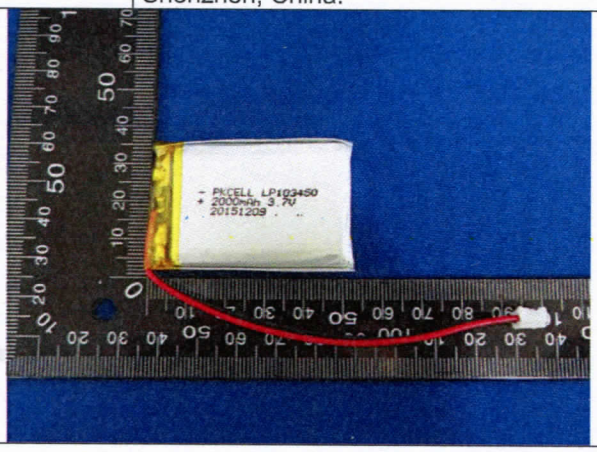
Test Report No: IC151223N025

TEST REPORT

To:	SHENZHEN PKCELL BATTERY CO., LTD.
Address:	E2 Building, Guangming Technology Park, No.24 Zhonghua Road, Longhua New Area, Shenzhen, China.

Factory name:	SHENZHEN PKCELL BATTERY CO., LTD.		
Location:	E2 Building, Guangming Technology Park, No.24 Zhonghua Road, Longhua New Area, Shenzhen, China.	Standards used:	☐ EN 62133:2013 ☒ IEC 62133: 2012 (Second Edition)
		Start date:	Dec. 07, 2015
		Finish date:	Dec. 31, 2015
		Sample No:	N151223-013-001-001
		Sections examined:	All clauses
		Re-testing:	None.
Rechargeable Lithium-Ion Polymer Battery, Model:LP103450		Remark / Note:	None.

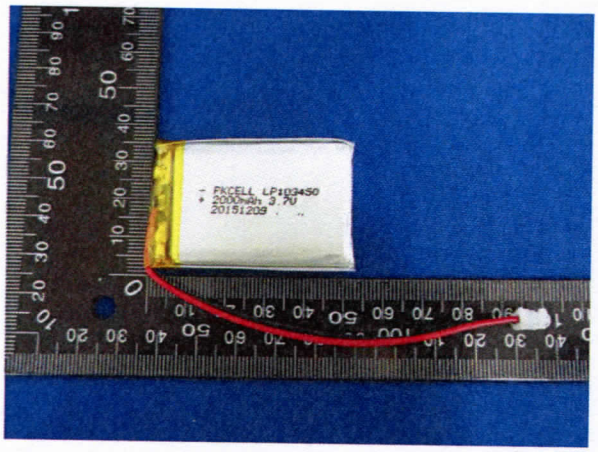
CONCLUSION: **The sample satisfies to the clauses examined**

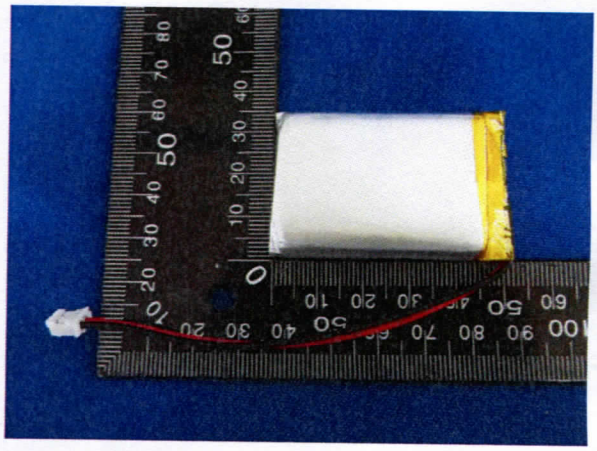
Test done by James Huang Engineer / Safety Department	Approved by Ted Wu Manger / Safety Department
	
Date: Dec. 31, 2015	Date: Dec. 31, 2015

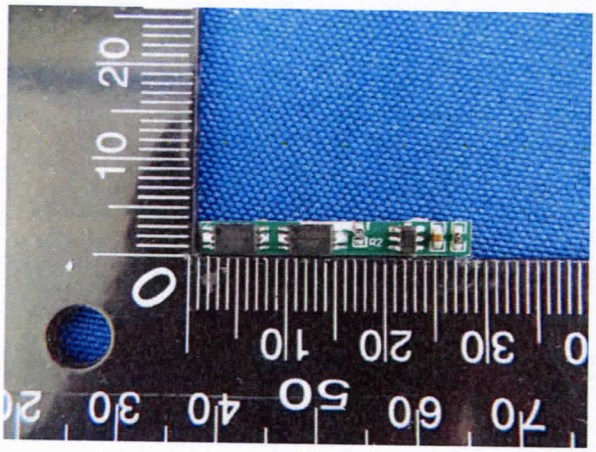
History of Remark-Note

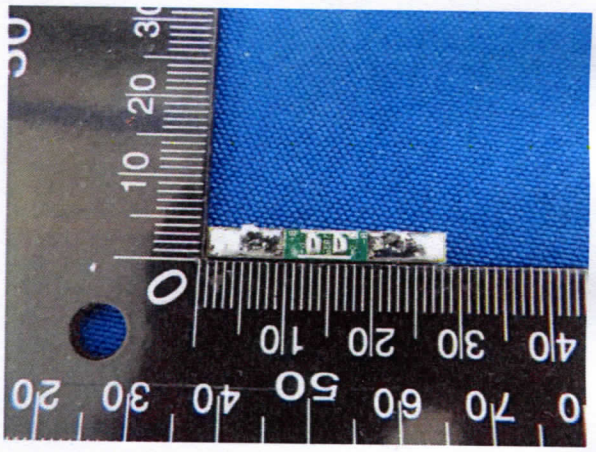
Clause	N/A	Picture of the problem
Description of the problem:		N/A
N/A		
Modification result:		N/A
N/A		
Clause	N/A	Picture of the problem
Description of the problem:		N/A
N/A		
Modification result:		N/A
N/A		

Open View



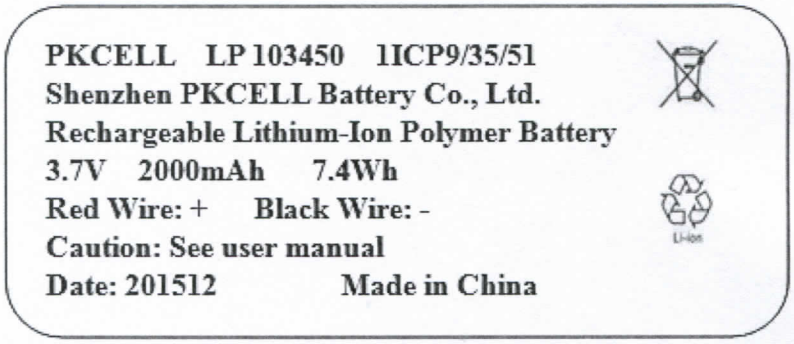






Test item description .....:	**Rechargeable Lithuim-Ion Polymer Battery**
Trade Mark .....:	PKCELL
Manufacturer .....:	SHENZHEN PKCELL BATTERY CO., LTD.
Model/Type reference.....:	LP103450 (1ICP9/35/51)
Ratings .....:	3.7V, 2000mAh

Copy of marking plate(Battery pack):



Summary of testing:

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

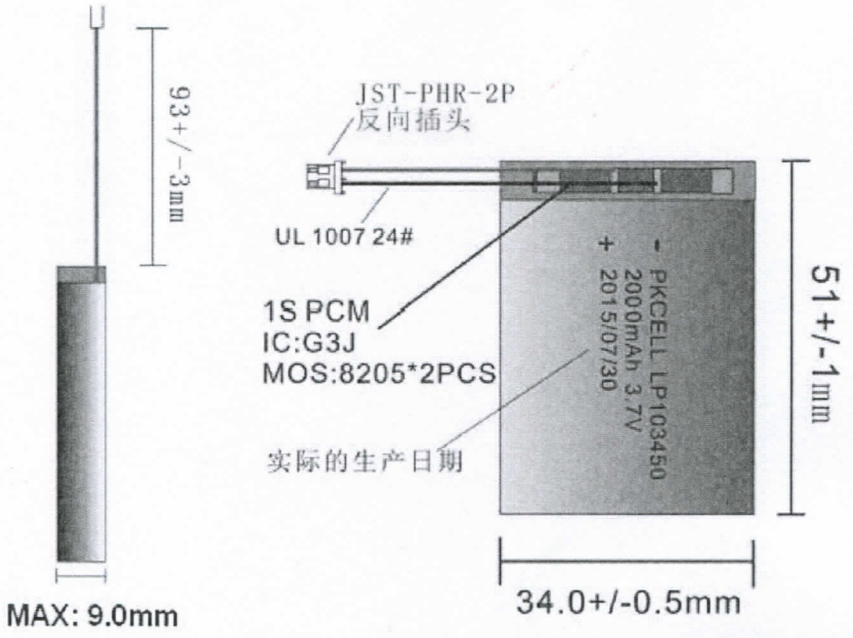
Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

General product information:

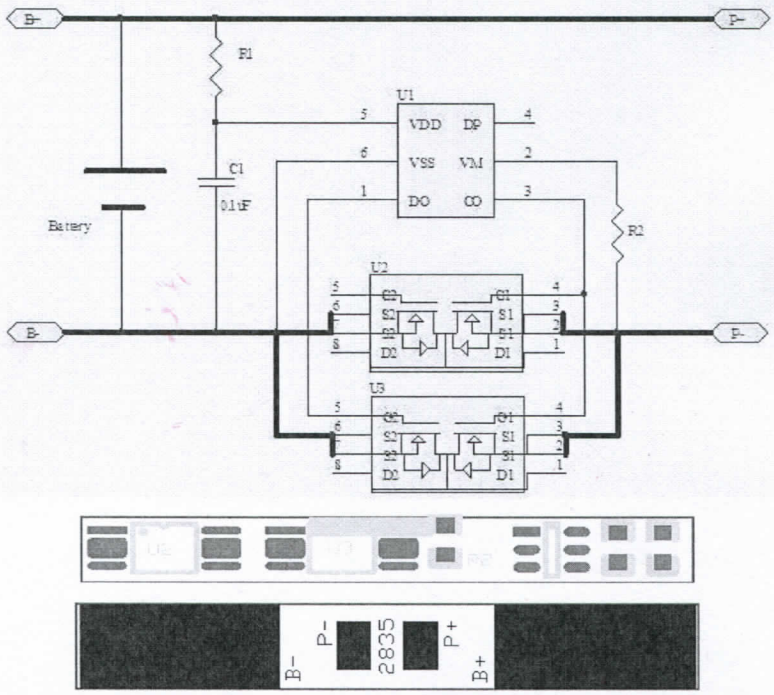
1, This battery is constructed with single lithium polymer cell, and battery pack has overcharge, over-dischage, over current and short-circuits proof circuit. and details information of the battery as following:

Product description:	Rechargeable Lithium Ion Polymer Battery
Model of pack:	LP103450
Rated voltage:	3.7V
Rated capacity:	2000mAh
Recommend charge voltage:	4.20V
Overcharge Voltage Protection	4.20V
Maximum charge current:	2000mA
Maxmum discharge current:	3000mA
Number of cells in battery pack:	1 pc
End of discharge voltage of single cell:	3.0V
Model of cell:	103450
Rated voltage of single cell:	3.7V
Rated capacity of single cell:	2000mAh
Recommend charge voltage of single cell:	4.20V
Maximum charge current of single cell:	2000mA
Maxmum discharge current:	3000mA
End of discharge voltage of single cell:	3.0V

2, Construction/Dimensions



3, Protection circuit diagram and PCB layout:



Test item particulars :	**Rechargeable Litium Ion Polymer Battery**
Classification of installation and use :	Built-in and use in portable applications
Supply connection :	Customize DC connector
Recommend charging method declaired by the manufacturer :	CC(1000mA)/CV(4.2V), until the current reduces to 20mA at ambient 20℃± 5℃ or clause 8.1.2
Discharge current (0,2 I_t A) :	400mA
Specified final voltage :	3.0V
Chemistry :	☐ nickel systems.....☒ lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell :	4.2V
Maximum charging current :	2000mA
Charging temperature upper limit :	45℃
Charging temperature lower limit :	0℃
Polymer cell electrolyte type :	☒ gel polymer..... ☐ solid polymer ☐ N/A
Mass of equipment (g) :	28.0 for battery pack; 26.0 for cell;

Possible test case verdicts:	
- test case does not apply to the test object :	N/A (Not applicable)
- test object does meet the requirement :	P (Pass)
- test object does not meet the requirement :	F (Fail)
- test object does not demand :	ND (Not demanded)
Testing :	
Date of receipt of test item :	Dec. 23, 2015
Date(s) of performance of tests :	Dec. 23, 2015 to Dec. 31, 2015

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict
4	**Parameter measurement tolerances**		**P**
	Parameter measurement tolerances	Both normal and foreseeable misuses are evaluated in the report. All control and measure values were within the tolerances.	P
5	**General safety considerations**		**P**
5.1	General	The battery is safe and continues to function in all respects under the condition of intended use.	P
5.2	Insulation and wiring	See below	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	The battery pack is bulid-in type, and it is should be evaluated in the final assembly.	N/A
	Insulation resistance (MΩ)..... :		—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements	The cross section areas of wire were considered enough to carry the rating current of the battery.	P
	Orientation of wiring maintains adequate creepage and clearance distances between conductors	The terminals were soldering with end product which can provides good mechanical strength.	P
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse	The distance between the terminals is considered enough to minimize the possibility of short circuits.	P
5.3	Venting	See below	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	The edge of packing which next to the terminals was considered as the pressure relief mechanism, which can release the pressure during the abnormal operation.	P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief	No such outer case used, and will be evaluated in the final product.	N/A
5.4	Temperature/voltage/current management	See below	P

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict
	Batteries are designed such that abnormal temperature rise conditions are prevented	Protection circuit provided.	P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	Protection circuit provided.	P
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that associated chargers are designed to maintain charging within the temperature, voltage and current limits specified	The battery vender had provided specifications including charge instruction for equipment manufacture reference.	P
5.5	Terminal contacts	See below	P
	Terminals have a clear polarity marking on the external surface of the battery	Customize DC connecftor used and it can be prevented reverse polarity connecting.	N/A
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	The cross section areas of wire were considered enough to carry the rating current of the battery.	P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance	The terminals were soldering with cell which can provides good mechanical strength.	P
	Terminal contacts are arranged to minimize the risk of short circuits	The distance between the terminals is considered enough to minimize the possibility of short circuits.	P
5.6	Assembly of cells into batteries	See below	P
5.6.1	If there is more than one battery housed in a single battery case, cells used in the assembly of each battery have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer	The battery is composited by one cell.	N/A
	Each battery has an independent control and protection	Independent control and protection provided.	P
	Manufacturers of cells make recommendations about current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly	Cell vender provided cell spec including current, voltage and temperature limitation.	P
	Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate separate circuitry to prevent the cell reversal caused by uneven discharges	The battery pack has no design for selective discharge.	N/A

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict
	Protective circuit components are added as appropriate and consideration given to the end-device application	The battery pack's protective circuit was considered in line with end device application.	P
	When testing a battery, the manufacturer of the battery provides a test report confirming the compliance according to this standard	After testing the cell and battery pack were compliance and according this standard.	N/A
5.6.2	Design recommendation for lithium systems only	See below	P
	For the battery consisting of a single cell or a single cellblock: - Charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Clause 8.1.2, Table 4; or	The battery consisting of a single cell and the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 4.	P
	- Charging voltage of the cell does not exceed the different upper limit of the charging voltage determined through Clause 8.1.2, NOTE 1.	The battery consisting of a single cell and the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 4.	P
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks: - The voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Clause 8.1.2, Table 4, by monitoring the voltage of every single cell or the single cellblocks; or	The battery consisting of a single cell and the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 4.	N/A
	- The voltages of any one of the single cells or single cellblocks does not exceed the different upper limit of the charging voltage, determined through Clause 8.1.2, NOTE 1, by monitoring the voltage of every single cell or the single cellblocks	The battery consisting of a single cell and the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 4.	P
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks: - Charging is stopped when the upper limit of the charging voltage, specified in Clause 8.1.2, Table 4, is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks; or	The battery consisting of a single cell and the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 4.	N/A

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict
	- Charging is stopped when the upper limit of the different charging voltage, determined through Clause 8.1.2, NOTE 1, is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks	The battery consisting of a single cell and the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 4.	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	The manufacturer's procedures for the inspection of materials, components, cells and batteries and which covers the process of producing each type of cell and battery comply with the requirement. ISO 9001 certificate provided.	P
6	**Type test conditions**		**P**
	Tests were made with the number of cells or batteries specified in Table 1 for nickel-cadmium and nickel-metal hydride systems and Table 2 for lithium systems, using cells or batteries that are not more than six months old	The Battery pack under testing was less than 3 months old.	P
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.	The testing was conducted at the ambient range of 15.0°C - 25°C.	P
7	**Specific requirements and tests (nickel systems)**		**N/A**
7.1	Charging procedure for test purposes	The battery pack is lithium system	N/A
7.2	Intended use	The battery pack is lithium system	N/A
7.2.1	Continuous low-rate charging (cells)	The battery pack is lithium system	N/A
	Results: No fire. No explosion	The battery pack is lithium system	N/A
7.2.2	Vibration	The battery pack is lithium system	N/A
	Results: No fire. No explosion. No leakage	The battery pack is lithium system	N/A

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict
7.2.3	Moulded case stress at high ambient temperature	The battery pack is lithium system	N/A
	Oven temperature (℃) .....:		—
	Results: No physical distortion of the battery casing resulting in exposure if internal components	The battery pack is lithium system	N/A
7.2.4	Temperature cycling	The battery pack is lithium system	N/A
	Results: No fire. No explosion. No leakage.	The battery pack is lithium system	N/A
7.3	Reasonably foreseeable misuse	The battery pack is lithium system	N/A
7.3.1	Incorrect installation cell	The battery pack is lithium system	N/A
	The test was carried out using: - Four fully charged cells of the same brand, type, size and age connected in series, with one of them reversed; or	The battery pack is lithium system	N/A
	- A stabilized dc power supply.	The battery pack is lithium system	N/A
	Results: No fire. No explosion .....:	The battery pack is lithium system	N/A
7.3.2	External short circuit	The battery pack is lithium system	N/A
	The cells or batteries were tested until one of the following occurred: - 24 hours elapsed; or	The battery pack is lithium system	N/A
	- The case temperature declined by 20% of the maximum temperature rise	The battery pack is lithium system	N/A
	Results: No fire. No explosion .....:	The battery pack is lithium system	N/A
7.3.3	Free fall	The battery pack is lithium system	N/A
	Results: No fire. No explosion.	The battery pack is lithium system	N/A
7.3.4	Mechanical shock (crash hazard)	The battery pack is lithium system	N/A
	Results: No fire. No explosion. No leakage.	The battery pack is lithium system	N/A

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict
7.3.5	Thermal abuse	The battery pack is lithium system	N/A
	Oven temperature (℃) .....:		—
	Results: No fire. No explosion.	The battery pack is lithium system	N/A
7.3.6	Crushing of cells	The battery pack is lithium system	N/A
	The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied; or	The battery pack is lithium system	N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained	The battery pack is lithium system	N/A
	The cell is prismatic type and a second set of samples was tested, rotated 90°around longitudinal axis compared to the first set	The battery pack is lithium system	N/A
	Results: No fire. No explosion .....:	The battery pack is lithium system	N/A
7.3.7	Low pressure	The battery pack is lithium system	N/A
	Chamber pressure (kPa) .....:		—
	Results: No fire. No explosion. No leakage.	The battery pack is lithium system	N/A
7.3.8	Overcharge	The battery pack is lithium system	N/A
	Results: No fire. No explosion .....:	The battery pack is lithium system	N/A
7.3.9	Forced discharge	The battery pack is lithium system	N/A
	Results: No fire. No explosion .....:	The battery pack is lithium system	N/A

8	**Specific requirements and tests (lithium systems)**		**P**
8.1	Charging procedures for test purposes	See below	P
8.1.1	First procedure: This charging procedure applied to tests other than those specified in 8.1.2	The batteries are charged in the ambient temp(20 ℃ ± 5 ℃) and charging procedure according to manufacturer's spec.	P

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict
8.1.2	Second procedure: This charging procedure applied to the tests of 8.3.1, 8.3.2, 8.3.4, 8.3.5, and 8.3.9	The batteries are charged at the specified values (45℃) plus 5 ℃ for the upper limit and (0℃) minus 5 ℃ for the lower limit	P
	If a cell's specified upper and/or lower charging temperature exceeds values for the upper and/or lower limit test temperatures of Table 4, the cells were charged at the specified values plus 5 ℃ for the upper limit and minus 5 ℃ for the lower limit	-Specified charge temperature 0-45℃; Tested upper limit temperature: 50℃; Tested lower limit temperature: -5℃;	P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1).....:	Test results which verify that the specified values (45℃) plus 5 ℃ for the upper limit and (0℃) minus 5 ℃ for the lower limit when tested by the methods specified in 8.2 to 8.3 meet the requirements.	P
	For a different upper limit charging voltage (i.e. other than for lithium cobalt oxide systems at 4,25 V), the applied upper limit charging voltage and upper limit charging temperatures were adjusted accordingly	The upper limit charge voltage for cell is 4.2Vdc.	N/A
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1).....:		N/A
8.2	Intended use	See below	P
8.2.1	Continuous charging at constant voltage (cells)	The Cells were tested for 7 days.	P
	Results: No fire. No explosion .....:	(See Table 8.2.1)	P
8.2.2	Moulded case stress at high ambient temperature (battery)	No moulded case used.	N/A
	Oven temperature (℃) .....:		—
	Results: No physical distortion of the battery casing resulting in exposure if internal components		N/A
8.3	Reasonably foreseeable misuse	See below	P
8.3.1	External short circuit (cell)	See below	P
	The cells were tested until one of the following occurred: - 24 hours elapsed; or	The cells were tested for until the case temperature declined by 20% of the maximum temperature rise.	N/A

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict
	- The case temperature declined by 20% of the maximum temperature rise	The cells were tested for until the case temperature declined by 20% of the maximum temperature rise.	P
	Results: No fire. No explosion .....:	(See Table 8.3.1)	P
8.3.2	External short circuit (battery)	See below	P
	The cells were tested until one of the following occurred: - 24 hours elapsed; or	The batteries were tested for 24 hours.	P
	- The case temperature declined by 20% of the maximum temperature rise	The batteries were tested for 24 hours.	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	In short circuit test the voltage of cellblock has no drop under 0.8V or 0.1V in 30 minutes a period.	N/A
	Results: No fire. No explosion .....:	(See Table 8.3.2)	P
8.3.3	Free fall	See below Free fall sample ID: Cell: 103450 / C36; 103450 / C37; 103450 / C38; Battery pack: LP103450 / B16; LP103450 / B17; LP103450 / B18;	P
	Results: No fire. No explosion.	No fire. No explosion.	P

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict
8.3.4	Thermal abuse (cells)	See below Thermal abuse sample ID: Cells: 50 degree C: 103450 / C26; 103450 / C27; 103450 / C28; 103450 / C29; 103450 / C30; -5 degree C: 103450 / C31; 103450 / C32; 103450 / C33; 103450 / C34; 103450 / C35;	P
	The cells were held at 130°C ± 2°C for: - 10 minutes; or	Tested and complied	P
	- 30 minutes for large cells (gross mass of more than 500 g as defined in IEC 62281)	Not large cells	N/A
	Oven temperature (℃) .....:	130.6℃	—
	Gross mass of cell (g).....:	Small cell(<500g)	—
	Results: No fire. No explosion.	No fire. No explosion.	P
8.3.5	Crush (cells)	See below	P
	The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied; or	The cells were tested for untill 10% of deformation has occurred compared to the initial dimension	N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained; or	The cells were tested for untill 10% of deformation has occurred compared to the initial dimension	N/A
	- 10% of deformation has occurred compared to the initial dimension	The cells were tested for untill 10% of deformation has occurred compared to the initial dimension	P
	Results: No fire. No explosion .....:	(See Table 8:3.2)	P
8.3.6	Over-charging of battery	See below	P

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Clause	Requirement – Test	Result - Remark	Verdict
	Test was continued until the temperature of the outer casing: - Reached steady state conditions (less than 10℃ change in 30-minute period); or		N/A
	- Returned to ambient	After 5 minutes, the max. temperature of outer case retured to ambient.	P
	Results: No fire. No explosion .....:	(See Table 8.3.6)	P
8.3.7	Forced discharge (cells)	Seel below	P
	Results: No fire. No explosion .....:	(See Table 8.3.7)	P
8.3.8	Transport tests	See below	P
	Manufacturer's documentation provided to show compliance with UN Recommendations on Transport of Dangerous Goods	The battery pack and cell meets UN Manual of Tests and Criteria.	P
8.3.9	Design evaluation – Forced internal short circuit (cells)	See be lowe	P
	The cells complied with national requirement for.....:	France, Japan, Korea and Switzerland	—
	The pressing was stopped upon: - A voltage drop of 50 mV has been detected; or	The pressing force of 400 N has been reached	N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached	The pressing force of 400 N has been reached	P
	Results: No fire .....:	See table 8.3.9	P

9	**Information for safety**		**P**
	The manufacturer of secondary cells ensures that information is provided about current, voltage and temperature limits of their products.	Provided in the cell specification, which is given to the equipment manufacturer.	P
	The manufacturer of batteries ensures that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards.	Provided battery specification including with safety instruction for equipment manufacture.	P
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product	Provided in the battery specification, which will be considered during the end product investigation.	N/A

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict
	As appropriate, information relating to hazard avoidance resulting from a system analysis is provided to the end user .....:	Provided in the battery specification, which will be considered during the end product investigation.	N/A
10	**Marking**		**P**
10.1	Cell marking		N/A
	Cells marked as specified in the applicable cell standards: IEC 61951-1, IEC 61951-2 or IEC 61960.	By agreement between the manufacturer and user, the cell is used in the manufacture of a battery. So it need not be marked.	N/A
10.2	Battery marking	See below.	P
	Batteries marked in accordance with the requirements for the cells from which they are assembled.	See copy of the marking plate.	P
	Batteries marked with an appropriate caution statement.	See copy of the marking plate.	P
10.3	Other information	See below.	P
	Storage and disposal instructions marked on or supplied with the battery.	The disposal instructions are provided in the specification.	P
	Recommended charging instructions marked on or supplied with the battery.	The recommended charging instructions are provided in the specification.	P
11	**Packaging**		**P**
	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.	The material and packing which can prevent cell for short circuit, mechanical damage and possible ingress.	P

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict

Annex A	**Charging range of secondary lithium ion cells for safe use**		**P**
A.1	General	See below.	P
A.2	Safety of lithium-ion secondary battery	The charge voltage of battery pack cell is 4.2Vdc.	P
A.3	Consideration on charging voltage	See below.	P
A.3.1	General	The charge voltage of battery pack cell is 4.2Vdc.	P
A.3.2	Upper limit charging voltage	See below.	P
A.3.2.1	General	The charge voltage of battery pack cell is 4.2Vdc.	P
A.3.2.2	Explanation of safety viewpoint		N/A
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	The charge voltage of battery pack cell is 4.2Vdc.	P
A.4	Consideration of temperature and charging current		P
A.4.1	General		P
A.4.2	Recommended temperature range	The cell and battery pack charging temperature is 0-45 degree C.	P
A.4.2.1	General	See below	P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	Test results which verify that the cells, charged at the new lower and high limit of test temperature (lower than 0 ℃ -5 ℃ ; high than 45℃ +5 ℃), and by using the upper limit of charging voltage are tested by the test methods, specified in 8.2 to 8.3.	P
A.4.3	High temperature range	The cell high charging temperature was declared by client is 45℃.	P
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 high temperature range		N/A

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict
A.4.3.4	Safety consideration when specifying new upper limit in high temperature range	Upper temperature:50℃.	P
A.4.4	Low temperature range	The cell lower charging temperature was declared by client is 0℃.	P
A.4.4.1	General		P
A.4.4.2	Explanation of safety viewpoint		N/A
A.4.4.3	Safety considerations, when specifying charging conditions in low temperature range		N/A
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	Lower temperature:-5℃.	P
A.4.5	Scope of the application of charging current		P
A.5	Sample preparation		N/A
A.5.1	General		P
A.5.2	Insertion procedure for nickel particle to generate internal short		P
	The insertion procedure carried out at 20℃±5℃ an d under -25 ℃ of dew point		P
A.5.3	Disassembly of charged cell		P
A.5.4	Shape of nickel particle	Complied.	P
A.5.5	Insertion of nickel particle to cylindrical cell	The cell is the prismatic type.	N/A
A.5.5.1	Insertion of nickel particle to winding core	The cell is the prismatic type.	N/A
A.5.5.2	Mark the position of nickel particle on the both end of winding core of the separator	The cell is the prismatic type.	N/A
A.5.6	Insertion of nickel particle to prismatic cell		P

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Clause	Requirement – Test	Result - Remark	Verdict

	TABLE: Critical components information				P
Object/part no.	**Manufacturer/ trademark**	**Type/model**	**Technical data**	**Standard**	**Mark(s) of conformity [1)]**
Cell	SHENZHEN PKCELL BATTERY CO., LTD.	103450	3.7V, 2000mAh	IEC 62133: 2012	Tested in this report
-Electrolyte	DONGGUAN SHANSHAN BATTERY MATERIAL CO.,LTD	LD-1071	Total dissolved solids(25°C)9.4±0.5ms/cm, free acid (HF)≤30PPM, water content(H20) ≤10PPM	--	--
-Separator	Xuran	16*44	Width:44+0.5/-0mm, shut down temperature:135°C -140°C single layer, thickness: 12um±2 um. Porosity≥36%	--	--
- Cathode	HUNAN CHANGYUAN LICO CO.,LTD	LC206	LiCoO2, PVDF, Conductive, Copper Foil	--	--
- Anode	HUNAN SHANSHAN ADVANCED MATERIALS CO.,LTD	FSN-1	Graphite, Conductive, Copper Foil	--	--
Insulating tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	CT* (b)(g)	130°C	UL 510	UL E165111
Insulating tape	Interchangeable	--	130°C	UL 510	UL
- Description: Interchangeable based on standardized dimensions and specified rating.					
Lead wire	DONGGUAN DANYANG ELECTRONICS WIRE CO LTD	1007	300Vac, min.24AWG, min. 80°C.	UL 758	E332522
Lead wire	Interchangeable	--	300Vac, min.24AWG, min. 80°C.	--	--
- Description: Interchangeable based on standardized dimensions and specified rating.					

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Protective board	Shenzhen Yesight Technology Co., Ltd.	710171148	Overcharge detection voltage: 4.28±0.025V; Overdischarge detection voltage: 3.0±0.05V Over current detection current: 1.0A-3.0A	--	--
- Protective IC (U1)	SII	S-8261ABJMD-G3J2x	Overcharge detection voltage: 4.28±0.025V; Overdischarge detection voltage: 3.0±0.05V Over current detection current: 1.0A-3.0A.	--	--
- MOSFET(U2, U3)	Fortune SEMICONDUCTOR CORPORATION	FS8205A	VDS:20.0V ID:6.0A Tstg:-55 to 150℃	--	--
PCB	SHENZHEN MEIYADI ELECTRONICS CO LTD	MYD-1	V-0, 130°C.	UL 94 UL 796	UL E348865
PCB	Interchangeable	--	V-0, 130°C	UL 94 UL 796	UL
- Description: Interchangeable based on standardized dimensions and specified rating.					
Supplementary information: [1] **Provided evidence ensures the agreed level of compliance. See OD-CB2039.**					

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Clause	Requirement – Test	Result - Remark	Verdict

7.2.1	TABLE: Continuous low rate charge (cells)				N/A
Model	Recommended charging method, (CC, CV, or CC/CV)	Recommended charging voltage V_c, (Vdc)	Recommended charging current I_{rec}, (A)	OCV at start of test, (Vdc)	Results
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--	--	--	--	--	--
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--	--	--	--	--	--

Supplementary information:

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

7.2.2	TABLE: Vibration		N/A
Model		OCV at start of test, (Vdc)	Results
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Supplementary information:

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

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Clause	Requirement – Test	Result - Remark	Verdict

7.3.1	TABLE: Incorrect installation (cells)		N/A
Model		**OCV of reversed cell, (Vdc)**	**Results**
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Supplementary information:

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

7.3.2	TABLE: External short circuit				N/A
Model	**Ambient (at 20°C ± 5°C or 55°C ± 5°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (Ω)**	**Maximum case temperature rise ΔT, (°C)**	**Results**
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Supplementary information:

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

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Clause	Requirement – Test	Result - Remark	Verdict

7.3.6	TABLE: Crush			N/A
Model	**OCV at start of test, (Vdc)**	**OCV at removal of crushing force, (Vdc)**	**Results**	
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Supplementary information:

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

7.3.8	TABLE: Overcharge				N/A
Model	**OCV prior to charging, (Vdc)**	**Maximum charge current, (A)**	**Time for charging, (hours)**	**Results**	
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Supplementary information:

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

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Clause	Requirement – Test	Result - Remark	Verdict

7.3.9	TABLE: Forced discharge (cells)			N/A
Model	**OCV before application of reverse charge, (Vdc)**	**Measured reverse charge I_t, (A)**	**Time for reversed charge, (minutes)**	**Results**
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Supplementary information:

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

IEC/EN 62133			
Clause	Requirement – Test	Result - Remark	Verdict

8.2.1	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**
103450 / C01	4.20	1.00	4.19	No fire, no leakage, no explosion
103450 / C02	4.20	1.00	4.19	No fire, no leakage, no explosion
103450 / C03	4.20	1.00	4.19	No fire, no leakage, no explosion
103450 / C04	4.20	1.00	4.19	No fire, no leakage, no explosion
103450 / C05	4.20	1.00	4.19	No fire, no leakage, no explosion

Supplementary information:

- No fire or explosion
- No leakage

8.3.1	TABLE: External short circuit (cell)				P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum case temperature rise ΔT, (°C)**	**Results**
Samples charged at charging temperature upper limit (50℃)					
103450 / C06	19.5	4.20	84.2	109.5	No fire, No explosion
103450 / C07	19.5	4.20	84.6	115.7	No fire, No explosion
103450 / C08	19.5	4.20	84.7	113.3	No fire, No explosion
103450 / C09	19.5	4.20	85.1	109.3	No fire, No explosion
103450 / C10	19.5	4.20	84.6	116.4	No fire, No explosion
Samples charged at charging temperature lower limit (-5℃)					
103450 / C11	20.5	4.18	84.3	109.8	No fire, No explosion

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Clause	Requirement – Test	Result - Remark	Verdict

103450 / C12	20.5	4.18	84.6	117.6	No fire, No explosion
103450 / C13	20.5	4.19	84.8	114.6	No fire, No explosion
103450 / C14	20.5	4.18	84.7	112.9	No fire, No explosion
103450 / C15	20.5	4.18	84.9	109.4	No fire, No explosion
Supplementary information: - No fire or explosion					

8.3.2	TABLE: External short circuit (battery)				P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum case temperature rise ΔT, (°C)**	**Results**
Samples charged at charging temperature upper limit (50℃)					
LP103450 / B01	55.0	4.20	84.7	0.6	No fire, No explosion
LP103450 / B02	55.0	4.20	84.6	0.5	No fire, No explosion
LP103450 / B03	55.0	4.20	85.2	0.5	No fire, No explosion
LP103450 / B04	55.0	4.20	85.1	0.7	No fire, No explosion
LP103450 / B05	55.0	4.20	84.6	0.5	No fire, No explosion
Samples charged at charging temperature lower limit (-5℃)					
LP103450 / B06	55.0	4.18	84.9	0.7	No fire, No explosion
LP103450 / B07	55.0	4.18	84.7	0.6	No fire, No explosion
LP103450 / B08	55.0	4.18	85.3	0.6	No fire, No explosion
LP103450 / B09	55.0	4.18	85.5	0.5	No fire, No explosion
LP103450 / B10	55.0	4.18	84.7	0.7	No fire, No explosion

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Clause	Requirement – Test	Result - Remark	Verdict

Supplementary information:

- No fire or explosion

8.3.5	TABLE: Crush (Cells)				P
Model	**OCV at start of test, (Vdc)**	**OCV at removal of crushing force, (Vdc)**	**Width/ diameter of cell before crush, (mm)**	**Required deformation for crush, (mm)**	**Results**
Samples charged at charging temperature upper limit (50℃)					
103450 / C16	4.20	4.20	8.78	0.88	No fire, No explosion
103450 / C17	4.20	4.20	8.74	0.87	No fire, No explosion
103450 / C18	4.20	4.20	8.57	0.86	No fire, No explosion
103450 / C19	4.20	4.20	8.65	0.87	No fire, No explosion
103450 / C20	4.20	4.20	8.73	0.87	No fire, No explosion
Samples charged at charging temperature lower limit (-5℃)					
103450 / C49	4.18	4.18	8.58	0.86	No fire, No explosion
103450 / C50	4.18	4.18	8.70	0.87	No fire, No explosion
103450 / C51	4.18	4.18	8.78	0.88	No fire, No explosion
103450 / C52	4.18	4.18	8.64	0.86	No fire, No explosion
103450 / C53	4.18	4.18	8.73	0.87	No fire, No explosion

Supplementary information:

- No fire or explosion

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Clause	Requirement – Test	Result - Remark	Verdict

8.3.6	TABLE: Over-charging of battery		P
Constant charging current (A) .....:		4.0	—
Supply voltage (Vdc) .....:		4.2	—

Model	OCV before charging, (Vdc)	Resistance of circuit, (Ω)	Maximum outer casing temperature, (°C)	Results
LP103450 / B11	3.22	0.018	42.8	No fire, No explosion
LP103450 / B12	3.22	0.017	47.5	No fire, No explosion
LP103450 / B13	3.22	0.019	47.5	No fire, No explosion
LP103450 / B14	3.22	0.018	47.3	No fire, No explosion
LP103450 / B15	3.22	0.018	43.5	No fire, No explosion

Supplementary information:

- No fire or explosion

8.3.7	TABLE: Forced discharge (cells)	P

Model	OCV before application of reverse charge, (Vdc)	Measured Reverse charge I_t, (A)	Time for reversed charge, (minutes)	Results
103450 / C21	3.22	2.0	90	No fire, No explosion
103450 / C22	3.23	2.0	90	No fire, No explosion
103450 / C23	3.22	2.0	90	No fire, No explosion
103450 / C24	3.26	2.0	90	No fire, No explosion
103450 / C25	3.22	2.0	90	No fire, No explosion

Supplementary information:

- No fire or explosion

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Clause	Requirement – Test	Result - Remark	Verdict

8.3.9	TABLE: Forced internal short circuit (cells)				P
Model	**Chamber ambient, (°C)**	**OCV at start of test, (Vdc)**	**Particle location [1)]**	**Maximum applied pressure, (N)**	**Results**
103450 / C39	10	4.19	1	400	No fire
103450 / C40	10	4.18	1	400	No fire
103450 / C41	10	4.18	1	400	No fire
103450 / C42	10	4.18	1	400	No fire
103450 / C43	10	4.19	1	400	No fire
103450 / C44	45	4.20	1	400	No fire
103450 / C45	45	4.20	1	400	No fire
103450 / C46	45	4.20	1	400	No fire
103450 / C47	45	4.20	1	400	No fire
103450 / C48	45	4.20	1	400	No fire

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
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)