Test Report issued under the responsibility of:

TEST REPORT
IEC 62133, First Edition
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. ..... :	131000411SHA-002
Date of issue ..... :	2013-11-27
Total number of pages	22
CB Testing Laboratory ..... :	Intertek Testing Services Shanghai
Address ..... :	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
Applicant's name ..... :	GlobTek, Inc.
Address ..... :	186 Veterans Drive Northvale, NJ 07647 USA
Test specification:	
Standard ..... :	IEC 62133: 2002 (1st Edition)
Test procedure ..... :	CB scheme
Non-standard test method…….:	N/A
Test Report Form No. ..... :	IEC62133A
Test Report Form(s) Originator..... :	UL International Demko A/S
Master TRF ..... :	Dated 2008-02

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

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

Test item description..... :	Lithium-ion battery
Trade Mark..... :	
Manufacturer..... :	GlobTek, Inc. 186 Veterans Drive Northvale, NJ 07647 USA

Model/Type reference..... :	BL2200F6034501S2P*** Demonstration of model: The 1st* denote capital letter Z The 2nd * denote output plug type, detail as follow: A = Strip + tin B = Button C = Contacts J = 2p JST K = 3p JST L = 4p JST M = 2p Molex N = 3p Molex P = 4p Molex T = 2p Tyco U = 3p Tyco V = 4p Tyco W = 5p JST 1 = 1p contact 2 = 2p contact 3 = 3p contact The 3rd* denote capital letter L
Ratings..... :	3,7V / 2200mAh / 8,14Wh

Testing procedure and testing location:	
☒ **CB Testing Laboratory:**	Intertek Testing Services Shanghai
Testing location/ address ..... :	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
☐ **Associated CB Test Laboratory:**	
Testing location/ address ..... :	
Tested by (name + signature) :	Freddy Li Freddy Li
Approved by (+ signature) :	Raymond Zhou
☐ Testing procedure: TMP	
Tested by (name + signature) :	
Approved by (+ signature) :	
Testing location/ address ..... :	
☐ Testing procedure: WMT	
Tested by (name + signature) :	
Witnessed by (+ signature) :	
Approved by (+ signature) :	
Testing location/ address ..... :	
☐ Testing procedure: SMT	
Tested by (name + signature) :	
Approved by (+ signature) :	
Supervised by (+ signature) :	
Testing location/ address ..... :	
☐ Testing procedure: RMT	
Tested by (name + signature) :	
Approved by (+ signature) :	
Supervised by (+ signature) :	
Testing location/ address ..... :	

Summary of testing:

Tests performed (name of test and test clause):		**Testing location:**
Continuous low-rate charging	4.2.1	**Intertek Testing Services Shanghai**
Vibration	4.2.2	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
Temperature cycling	4.2.4	
External short circuit	4.3.2	
Free fall	4.3.3	
Mechanical shock (crash hazard)	4.3.4	
Thermal abuse	4.3.5	
Crushing of cells	4.3.6	
Low pressure	4.3.7	
Overcharge for lithium systems	4.3.9	
Forced discharge	4.3.10	
Cell protection against at high charging rate	4.3.11	

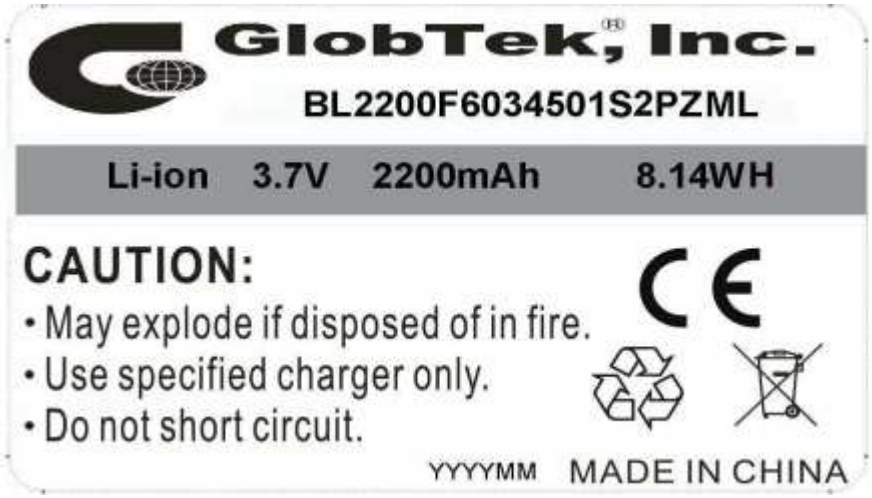
Because client was not able to provide the CB certificate of cell, additional testing against cells performed.
All models are identical expect the output plug.
Manufacturer provided BL2600C1865001S2PZML as typical model for the testing.

Summary of compliance with National Differences:

This report covers group differences for CENELEC countries.

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Note:

Symbol	Meaning
“Li-ion”	Lithium ion battery
BL2200F6034501S2P***	Model name
3,7V 2200mAh 8,14Wh	Ratings
GlobeTek, Inc.	name of manufacturer
YYYY	year of manufacture
MM	month of manufacture

Test item particulars ..... :	
Classification of installation and use ..... :	General Use
Supply Connection ..... :	Wiring harness
..... :	
..... :	
Possible test case verdicts:	
- test case does not apply to the test object ..... :	N/A
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
Testing ..... :	
Date of receipt of test item ..... :	2013-10-22
Date (s) of performance of tests ..... :	2013-10-24 To 2013-11-20

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 is used as the decimal separator.

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

The cells and batteries were tested and evaluated as per the specification provided by the client.

The samples tested were charged or discharged as specified by manufacturer. Charge method is to use the constant current 440mA to charge the battery to 4,2V, then use the constant voltage 4,2V to charge the battery until the charge current is 50mA or less. Discharge method is to use constant current 440mA to 3 V.

General product information:

The product covered by this report is Lithium Ion Battery which is for general use; model no. BL2200F6034501S2P*** which nominal voltage is 3,7V, consists of 1S2P.

Detailed information of the cell is shown as below:

Manufacturer	
Model	603450
Nominal voltage	3,7V
Nominal capacity	1100mAh
Recommended charging current	220mA
Maximum charging voltage	4,2V
Maximum charging current	1100mA
Maximum discharging current (continuous / impulse)	1100mA
End-of-discharging voltage	3,0V

Factory: GlobTek (Suzhou) Co., Ltd.
Building 4, No. 76 JinLing East Road , Suzhou Industrial Park, Suzhou JiangSu, 215021, China

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
1	**General**		P
	Parameter measurement tolerances		P
2	**General Safety Considerations**		P
	Cells and batteries subject to intended use be safe and continue to function in all respects	All test passed	P
	Cells and batteries subject to reasonably foreseeable misuse do not present significant hazards.	All test passed	P
2.1	**Insulation and Wiring**		P
	–Insulation Resistance between an accessible metal case (excluding electrical contacts) and positive terminals ≥ 5MΩ.	Battery without metal case	N/A
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements	See tests of clause 4	P
	Orientation of wiring maintains adequate creepage and clearance distances between conductors. Mechanical integrity of internal connections are sufficient to accommodate conditions of reasonably foreseeable misuse.	See tests of clause 4	P
2.2	**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.	Safety valve for venting exists	P
	Encapsulant used to support cells within an outer casing does not cause the battery to overheat during normal operation no inhibit pressure relief.		N/A
2.3	**Temperature/current management**		P
	The batteries are designed such that abnormal temperature rise conditions are prevented.	Not designed this function	N/A
	Means is provided to limit current to safe levels during charge and discharge.		P
2.4	**Terminal contacts**		P
	Terminals have a clear polarity marking on the external surface of the battery	Connect with special wiring harness	N/A
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current.	See tests of clause 4	P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance.		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Terminal contacts are arranged to minimize the risk of short circuits.	Connect with special wiring harness	P
2.5	**Assembly of cells into batteries**		P
	Cells used in the battery assembly have closely matched capacities, are of the same design, and are of the same chemistry and same manufacturer.	Same model of cells are used in the battery	P
	The battery incorporates separate circuitry to prevent cell reversal from uneven charges as the pack is designed for the selective discharge of a portion of its series connected cells.		P
2.6	**Quality Plan**		P
	The manufacture has prepared a quality plan defining the procedures for the inspection of materials, components, cells and batteries and which covers the process of producing each type of cell and battery.	ISO 9001 certificate of manufacturer is provided.	P
3	**Type Test Conditions**		P
	Tests were conducted with the number of cells or batteries as outlined in Table 1 of IEC 62133 with cells or batteries that were not more than 3 months old.	Tests are conducted with the number of battery packs specified in Table 1. Battery packs are not more than 3 months old.	P
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.		P
4	**Specific requirements and tests**		P
4.1	**Charging procedure for test purposes**	Charge method is provided by client.	P
4.2	**Intended Use**		P
4.2.1	Continuous Low Rate Charge	Only cell	P
	Fully charged cells are subjected for 28 days to a charge as specified by the manufacturer.		P
	Nickel systems: no fire, no explosion		N/A
	Lithium systems: no fire, no explosion, no leakage		P
4.2.2	Vibration	Both cell and battery	P
	The measured open circuit voltage of the fully charged cells or batteries is within anticipated parameters		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	The cells or batteries are subjected to a vibration sequence as outlined in Table 2 of IEC 62133 with amplitude of 0.75 mm and a total maximum excursion of 1.52 mm. The frequency was varied at the rate of 1 Hz/min between the limits of 10 Hz and 55 Ha. The entire range of frequencies (10 Hz to 55 Hz) and return (55 Hz to 10 Hz) was traversed in 90 min ± 5 min for each mounting position.		P
	The vibration was applied in each of three mutually perpendicular directions.		P
	Results: no fire, no explosion, no leakage	See Table 4.2.2.	P
4.2.3	Moulded case stress at high ambient temperature	Battery without moulded case	N/A
	Fully charged batteries were placed in an air-circulating oven at a temperature of 70°C ± 2°C for 7 hours. Afterwards, they are removed and allowed to return to room temperature.		N/A
	Results: no physical distortion of the battery casing resulting in exposure if internal components.		N/A
4.2.4	Temperature cycling	Both cell and battery	P
	Fully charged cells or batteries were subjected to temperature cycling (-20C, +75C) in forced draught chambers according to the procedure outlined in 4.2.4 b) and Fig. 1 of IEC 62133.		P
	After the fifth cycle, the cells or batteries were stored for 7 days prior to examination.		P
	Results: No fire, no explosion, no leakage		P
4.3	**Reasonably foreseeable misuse**		P
4.3.1	Incorrect installation of a cell (nickel systems only)	Lithium system	N/A
	Four fully charged cells of the same brand, type, size and age were connected in series with one of the four cells reversed. The assembly was connected across a 1-ohm resistor until the vent opens or until the temperature of the reversed cell returns to ambient temperature.		N/A
	Alternatively, a stabilized dc power supply was used t simulate the conditions imposed on the reversed cell.		N/A
	Results: no fire, no explosion		N/A
4.3.2	External short circuit	Both cell and battery	P
	Fully charged cells or batteries were subjected to a short circuit test at 20°C ± 5°C.		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Fully charged cells or batteries were subjected to a short circuit test at 55°C ± 5°C.		P
	The external resistance did not exceed 100 mΩ.		P
	The cells or batteries were tested for 24 h or until the case temperature declined by 20% of the maximum temperature rise.		P
	Results: no fire, no explosion.	See Table 4.3.2.	P
4.3.3	Free fall	Both cell and battery	P
	Fully charged cells or batteries were dropped 3 times from a height of 1.0 m onto a concrete floor.		P
	Results: no fire, no explosion		P
4.3.4	Mechanical shock (crash hazard)	Both cell and battery	P
	Fully charged cells or batteries were subjected to a total of three shocks of equal magnitude applied in each of three mutually perpendicular directions. At least on of the directions was perpendicular to a flat face. During the initial 3 milliseconds, the minimum average acceleration was 75 g_n. The peak acceleration was between 125 g_n and 175 g_n.		P
	Results: no fire, no explosion, no leakage		P
4.3.5	Thermal abuse	Only cell	P
	Fully charged cells were placed in a gravity or circulating air-convention oven. The oven temperature was raised at a rate of 5°C/min ± 2°C/min to a temperature of 130°C ± 2°C. The cell remained at that temperature for 10 minutes before the test was discontinued.		P
	Results: no fire, no explosion		P
4.3.6	Crushing of cells	Only cell	P
	Fully charged cells were crushed between two flat surfaces with a hydraulic ram exerting a force of 13 kN ± 1 kN.		P
	A cylindrical or prismatic cell was crushed with its longitudinal axis parallel to the flat surfaces of the crushing apparatus.		P
	A second set of prismatic cells was tested, rotated 90 degrees around their longitudinal axis compared to the first set.		P
	Results: no fire, no explosion.		P
4.3.7	Low pressure	Only cell	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Fully charged cells are placed in a vacuum chamber whose internal pressure was gradually reduced to a pressure equal to or less than 11.6 kPa and held at that value for 6 hours.		P
	Results: no fire, no explosion, no leakage		P
4.3.8	Overcharge for nickel systems	Lithium system	N/A
	A discharged cell or battery was subjected to a high-rate charge of 2.5 times the recommended charging current for a time that produced a 250% charge input (250% of rated capacity).		N/A
	Results: no fire, no explosion.		N/A
4.3.9	Overcharge for lithium systems	Only cell	P
	A discharged cell was charged from a power supply of ≥ 10 V, at a charging current I_{rec} recommended by the manufacturer for 2.5 C_5/I_{rec} hours..		P
	Results: no fire, no explosion.		P
4.3.10	Forced discharge	Only cell	P
	Discharged cells intended for use in multi-cell applications, were subjected to a reverse charge at 1.0 I_t (A) for 90 minutes.		P
	Results: no fire, no explosion		P
4.3.11	Cell protection against a high charging rate (lithium systems only)	Only cell	P
	Discharged cells were charged at three times the charging current recommended by the manufacturer until the cells was fully charged or an internal safety devices cut off the charge current before the cell became fully charged.		P
	Results: no fire, no explosion		P
5	**Information for safety**		P
	Information is provided to equipment manufacturers in the form of instructions to minimize and mitigate hazards associated with the cells or batteries in accordance with guidelines outlined in informative Annex A.		N/A
	Information is provided to end-users in the form of instructions to minimize and mitigate hazards associated with the batteries in accordance with guidelines outlined in informative Annex B.	Information is mentioned in the user manual	P
6	**Marking**		
6.1	**Cell Marking**	Battery	N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Nickel system cells are marked in accordance with IEC 61951-1, -2, IEC 61440, or IEC 61436 as applicable. See Copy of Marking Plate item in the beginning of this report.		N/A
	Lithium system cells are marked in accordance with IEC 61960. See Copy of Marking Plate item in the beginning of this report.		N/A
6.2	**Battery Marking**		P
	Batteries of nickel systems are marked in accordance with IEC 61951, or IEC 61951 -2 as applicable. See Copy of Marking Plate item in the beginning of this report	Lithium system	N/A
	Batteries of lithium system are marked in accordance with IEC 61960. See Copy of Marking Plate item in the beginning of this report.		P
	Batteries are marked with the cautionary marks.		P
6.3	**Other Information**		P
	Disposal instructions are marked on the battery or supplied in the information packaged with the battery.	Symbol printed on the label	P
	Recommended charging instruction are marked on the battery or supplied in the information packaged with the battery.	End user shall read the user manual before use	P
7	**Packaging**		
	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.		P
8	**CENELEC Group Modification and National Difference**		
Annex ZA	Normative references to international publications with their corresponding European publications		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

2.1 – 2.5	**TABLE: List of critical Components**				P
Object/part No.	Manufacturer/ trademark	Type/Model	Technical Data	Standard	Marks of Conformity
PCB material	trustpcb	3038	Min.105℃, Min.94V-1	IEC 621323	Test with appliance
Insulated material under PCB	TOYO FIBRE	NF-77	Min.90℃, Min.94V-1	IEC 621323	Test with appliance
MOSFET	Altha	AO8810	TSSOP8	IEC 621323	Test with appliance
Protection chip	macnica	101KD	SOT23-6	IEC 621323	Test with appliance
Internal Wires	Dong Guan Sheng Pai Electric Wire&Cable Co.,Ltd and Various	UL1007	Maximum 80 ℃, VW-1,AWG#20	IEC 621323	Test with appliance
Cells		603450	3.7V 1100mAh	IEC 621323	Test with appliance
Electrolyte	Zhangjiagang Guotai-Huarong New Chemical Materials Co.,Ltd	LB-388N	EC/DMC/EMC 1:1:1 $LiPF_6$1mol/l	IEC 621323	Test with appliance
Separator	Celgard, LLC Corporate	PP	25 μ m	IEC 621323	Test with appliance
Anode	Tianjin B&M Science and Technology Joint-Stock Co., ltd	BM520	lithium nickel cobalt manganese oxide	IEC 621323	Test with appliance
Cathode	BTR NEW ENERGY MATERIALS INC.	BTR818	graphite(density：1.63-1.73g/cm^3)	IEC 621323	Test with appliance
supplementary information: none					

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: 4.2.1 Continuous Low Rate Charge Test				P
Model	Recommended Charging Method, CC, CV, or CC/CV	Recommended Charging Voltage Vc, Vdc	Recommended Charging Current Irec, A	OCV at Start of Test, Vdc	Results
603450	CC/CV	4.2	1.1	4,19	P
				4,19	P
				4,19	P
				4,18	P
				4,18	P
supplementary information: - No Fire or Explosion - No Leakage					

	TABLE: 4.2.2 – Vibration Test	P
Model	OCV at Start of Test, Vdc	Results
603450	4,18	P
	4,19	P
	4,19	P
	4,19	P
	4,19	P
BL2200F6034501S2P ***	4,20	P
	4,20	P
	4,20	P
	4,19	P
	4,19	P
supplementary information: - No Fire or Explosion - No Leakage		

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: 4.3.1 – Incorrect Installation of a Cell Test (Nickel Systems)		N/A
Model	OCV (reversed cell) Vdc	Results	
supplementary information: - No Fire or Explosion - No Leakage - Leakage - Fire - Explosion - Bulge - Other (Please Explain)			

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

		TABLE: 4.3.2 External Short Circuit Test			P
Model	Ambient (At 20°C ± 5ºC or 55℃ ± 5°C)	OCV at start of test, Vdc	Resistance of Circuit, mΩ	Maximum Case Temperature Rise ΔT, °C	Results
603450	20°C	4,19	71	94	P
		4,19	73	101	P
		4,19	76	94	P
		4,18	82	94	P
		4,18	84	95	P
	55°C	4,19	71	63	P
		4,19	73	66	P
		4,19	76	63	P
		4,19	82	64	P
		4,18	84	61	P
BL2200F603450 1S2P***	20°C	4,19	71	Protected immediately, no high temperature rise	P
		4,19	73		P
		4,19	78		P
		4,20	80		P
		4,19	84		P
	55°C	4,19	71	Protected immediately, no high temperature rise	P
		4,18	73		P
		4,19	78		P
		4,19	80		P
		4,19	84		P
supplementary information: - No Fire or Explosion					

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: 4.3.8 – Overcharge Test (Nickel Systems)			N/A
Model	OCV prior to charging, Vdc	Maximum Charge Current, A	Time for Charging, h	Results
supplementary information: - No Fire or Explosion - No Leakage - Leakage - Fire - Explosion - Bulge - Other (Please Explain)				

	TABLE: 4.3.9 – Overcharge Tests (Lithium Systems)				P
Model	OCV at start of test, Vdc	Maximum Charging Current, mA	Maximum Charging Voltage, Vdc	Total Time of Charging, h	Results
603450	3,26	1100	4,25	12,5	P
	3,25	1100	4,25	12,5	P
	3,26	1100	4,25	12,5	P
	3,24	1100	4,25	12,5	P
	3,24	1100	4,25	12,5	P
supplementary information: - No Fire or Explosion					

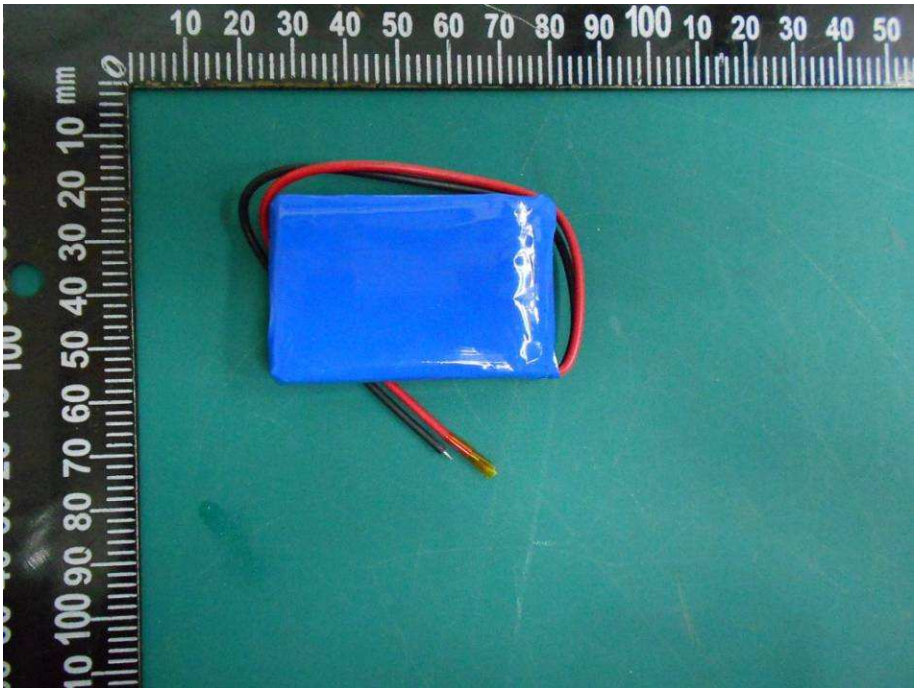
IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: 4.3.10 – Forced Discharge Test			P
Model	OCV before application of reverse charge, Vdc	Measured Reverse Charge It, A	Total Time for Reversed Charge Application, Min	Results
603450	3,19	1,1	90	P
	3,21	1,1	90	P
	3,19	1,1	90	P
	3,20	1,1	90	P
	3,20	1,1	90	P
supplementary information: - No Fire or Explosion				

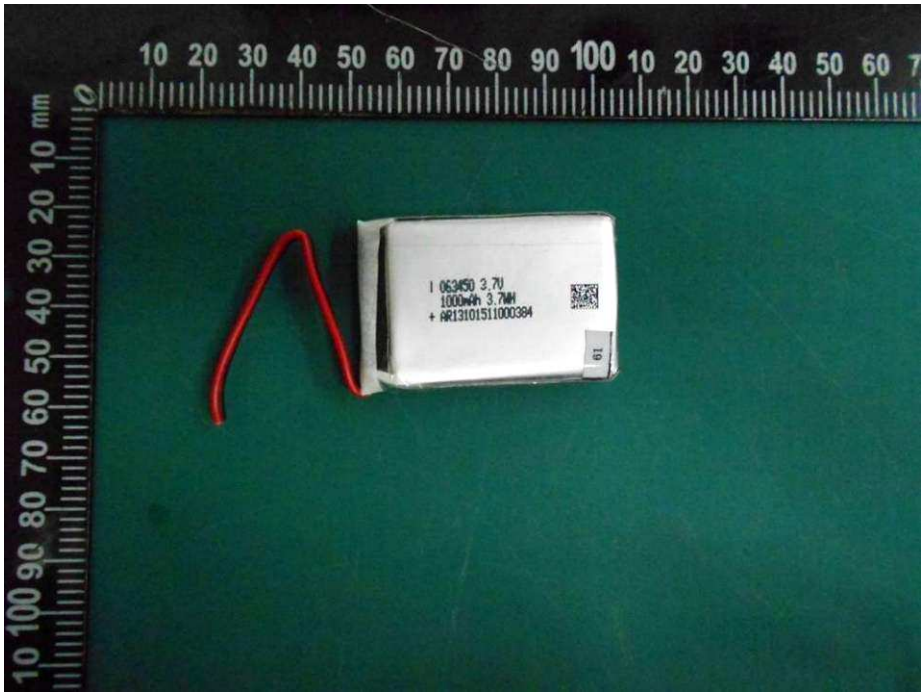
	TABLE: 4.3.11 – Cell Protection Against a High Charging Rate Test (Lithium Systems)			P
Model	OCV at start of test, Vdc	Maximum Charging Current, mA	Maximum Charging Voltage, Vdc	Results
603450	3,24	550	4,2	P
	3,24	550	4,2	P
	3,26	550	4,2	P
	3,25	550	4,2	P
	3,26	550	4,2	P
supplementary information: - No Fire or Explosion				

Photos of product

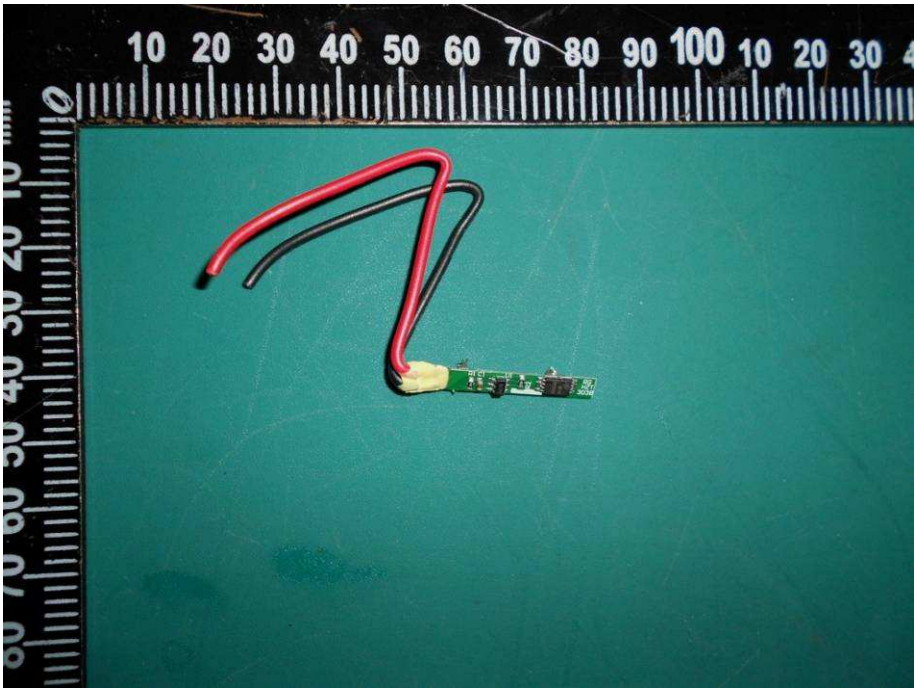
Overall View (with wrapper)



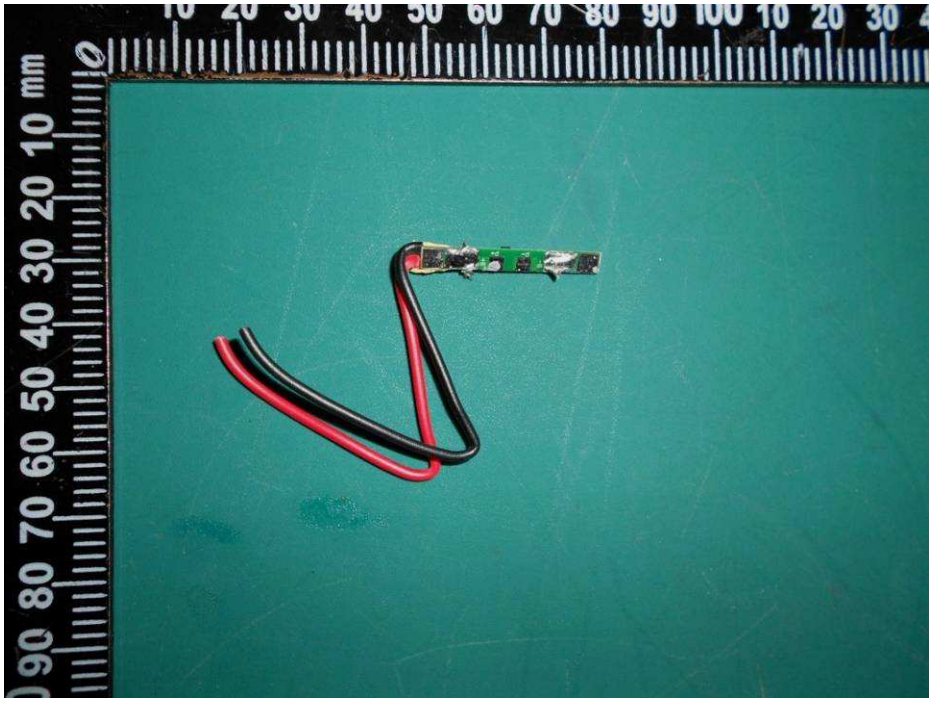
Overall View (without wrapper)



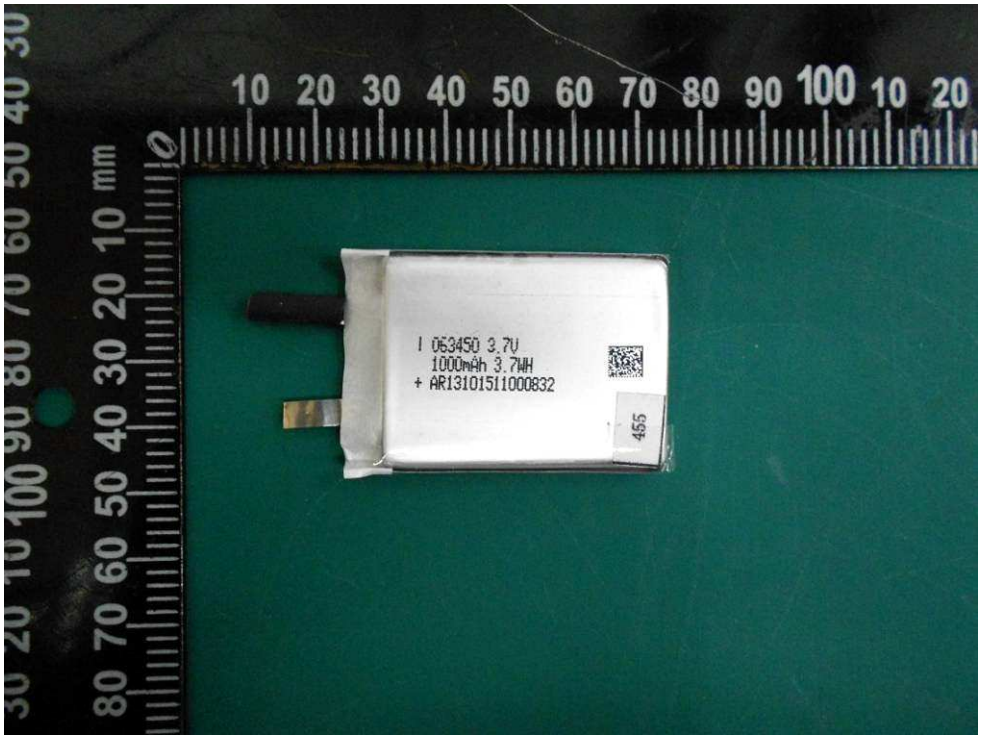
PCB1



PCB2



Cell close-up view



End of Report