

Test Report 检测报告

Report No. 报告编号:
U00902220701102Z

Query Password
查询密码: QW5319

Date: Jul. 6, 2022
日期: 2022年7月6日

Page 1 of 5
页码: 1 / 5

Applicant

委托单位:

Contact information

联络信息:

The following sample(s) was (were) submitted and identified by client as:

以下测试样品信息由申请者所提供确认:

Sample Name 样品名称 : Polymer Li-ion Battery 聚合物锂离子电池
Model No.型号 : 602030-300mAh
Manufacturer 制造商 :

Address 地址 :

Received Date 接收日期 : Jul. 1, 2022
2022年7月1日
Testing Period 检测日期 : From Jul. 1, 2022 to Jul. 6, 2022
2022年7月1日 ~ 2022年7月6日
Test Request 检测要求 : Please refer to next page(s). 请参见下页
Test Result(s)检测结果 : Please refer to next page(s). 请参见下页

Shen Zhen UONE Test Co., LTD.
深圳市宇冠检测有限公司

Prepared by 编制人

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Summary of test results

检测内容:

TEST REQUEST

测试要求

European Directive 2006/66/EC & Amendment of 2013/56/EU Heavy Metals Content

(1) in Batteries and Accumulators and Waste Batteries and Accumulators

电池指令 2006/66/EC 及其修订指令 2013/56/EU

Lead, Cadmium, Mercury content

铅、镉、汞

CONCLUSION

结论

PASS

合格

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Test Material(s) List 测试材料清单:

Material No. 材料编号	Description 描述
1	Battery (whole) 电池(整体)

Test Result(s):

检测结果:

(1) Lead, Cadmium, Mercury content 铅、镉、汞

Test Method: with reference to IEC 62321-5: 2013, IEC62321-4: 2013+A1:2017, was analyzed by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES).

测试方法: 参考 IEC 62321-5: 2013, IEC62321-4: 2013+A1:2017, 使用电感耦合等离子体发射光谱法(ICP-OES) 分析。

Substances 检测物质	Pb 铅	Cd 镉	Hg 汞	Conclusion 结论
Limit (mg/kg) 限值 (mg/kg)	40	20	5	
MDL (mg/kg)	2	2	2	
Material No. 材料编号	Result (mg/kg) 结果 (mg/kg)			PASS 合格
1	N.D.	N.D.	N.D.	

Note

备注:

1. mg/kg = milligram per kilogram (ppm).mg/kg = 毫克每千克(ppm)。
2. MDL = method detection limit. MDL = 方法检出限。
3. N.D.=not detected(or less than MDL).N.D. = 未检测到 (小于 MDL) 。
4. The test results shown of Cadmium, Mercury and Lead Content are of total weight of the battery sample 其中镉(Cd)、铅(Pb)、汞(Hg)的检测结果显示为整个电池的质量比。
5. Batteries, accumulators and button cells containing more than 0.0005% mercury, more than 0.002% cadmium or more than 0.004% lead, shall be marked with the chemical symbol for the metal concerned: Hg, Cd or Pb. The symbol indicating the heavy metal content shall be printed beneath the symbol shown in Annex II and shall cover an area of at least one quarter the size of that symbol 含汞超过 0.0005%、或含镉超过 0.002%、或含铅超过 0.004% 的电池、蓄电池和纽扣电池应标注相应金属的化学符号: Hg、Cd 或 Pb。上述化学符号应标注在附录 II 标识的符号下面, 面积至少应为附录 II 标识的符号的四分之一。

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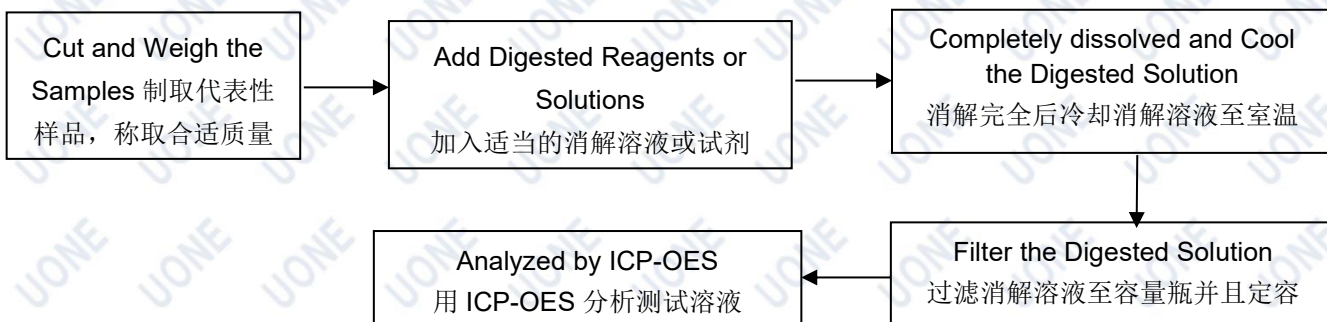
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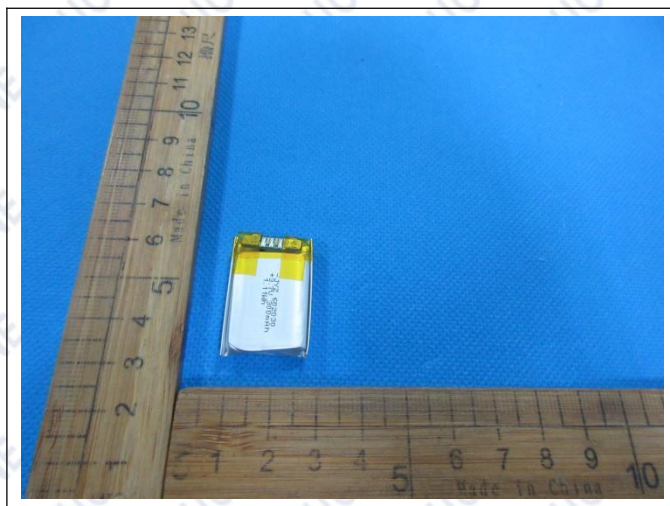
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Test Process Flow 检测流程图

1. Lead, Cadmium, Mercury 铅、镉、汞



Photo(s) of Sample 样品图片:



End of Report 报告结束

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Statement 声明

- The information as listed on the first page of this test report was all provided by the client except the received date, testing period, test result(s) and test request. The client shall be responsible for the representativeness of sample and authenticity of materials, for which UONE shall bear no responsibilities.

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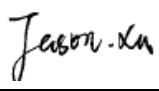

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Test Report issued under the responsibility of:



TEST REPORT IEC 62133-2 Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications – Part 2: Lithium systems	
Report Number :	S03A22050139S001
Date of issue :	2022-05-20
Total number of pages	10
Name of Testing Laboratory preparing the Report	Guangdong ESTL Technology Co., Ltd.
Applicant's name	
Address :	
Test specification:	
Standard	IEC 62133-2:2017
Test procedure	CB Scheme
Non-standard test method	N/A
Test Report Form No.	IEC62133_2A
Test Report Form(s) Originator :	DEKRA
Master TRF	Dated 2017-08-10
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General disclaimer: 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 CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

Test item description :	Polymer Lithium-ion Battery	
Trade Mark :	N/A	
Manufacturer		
Model/Type reference :	602030 (IEC designation: 1INP7/21/31)	
Ratings :	3.7V 300mAh 1.11Wh	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	Guangdong ESTL Technology Co., Ltd.
	Testing location/ address :	No. 9 & 11 Headquarters 2nd Road, Songshan Lake Park, Dongguan, Guangdong 523808, China
	Tested by (name, function, signature) :	Jason Xu / Project Handler 
	Approved by (name, function, signature) ...:	Rod Liu/ Reviewer 
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
	Testing location/ address :	
	Tested by (name, function, signature) :	
	Approved by (name, function, signature) ...:	
<input type="checkbox"/>	Testing procedure: CTF Stage 2:	
	Testing location/ address :	
	Tested by (name + signature) :	
	Witnessed by (name, function, signature) . :	
	Approved by (name, function, signature) ...:	
<input type="checkbox"/>	Testing procedure: CTF Stage 3:	
<input type="checkbox"/>	Testing procedure: CTF Stage 4:	
	Testing location/ address :	
	Tested by (name, function, signature) :	
	Witnessed by (name, function, signature) . :	
	Approved by (name, function, signature) ...:	
	Supervised by (name, function, signature) :	

<p>List of Attachments (including a total number of pages in each attachment):</p> <ul style="list-style-type: none"> - National Differences (3 pages) - Enclosure (7 pages) 	
<p>Summary of testing:</p>	
<p>Tests performed (name of test and test clause):</p> <p>Test items:</p> <p>cl.7.3.6 Over-charging of battery;</p> <p>cl.7.3.9 Forced internal short-circuit (cells);</p> <p>Tests are made with the number of cells and batteries specified in IEC 62133-2:2017 Table 1.</p>	<p>Testing location:</p> <p>Guangdong ESTL Technology Co., Ltd. No. 9 & 11 Headquarters 2nd Road, Songshan Lake Park, Dongguan, Guangdong 523808, China</p>
<p>Summary of compliance with National Differences (List of countries addressed):</p> <p>KR</p> <p>KR= Republic of Korea</p> <p><input checked="" type="checkbox"/> The product fulfils the requirements of EN 62133-2: 2017.</p>	

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.

<p>+ (Red) Polymer Lithium-ion Battery 602030 3.7V 300mAh 1.11Wh - (Black) 1INP7/21/31 YYMMDD</p>

Remark: 1. "YYMMDD" represents the date of manufacture. "DD" represents the day, "MM" represents the month, "YY" represents the year. For example, "220505" represents the cell manufactured on May 5th, 2022. This manufacture date is only for example.

2. Below information will be marked on the immediate package.

Caution:

- **Keep small cells and batteries which are considered swallowable out of the reach of children.**
- **Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion.**
- **In case of ingestion of a cell or battery, seek medical assistance promptly.**
- **If children use the battery, their guardians should explain the proper handling.**

Test item particulars.....:	
Classification of installation and use.....:	To be defined in final system
Supply Connection	DC Wire
Recommend charging method declared by the manufacturer	Charging the cell with 60mA constant current until 4.2V, then constant voltage until charge current reduces to 15mA at ambient 20°C±5°C
Discharge current (0,2 It A)	60mA
Specified final voltage.....:	2.45V
Upper limit charging voltage per cell.....:	4.25V
Maximum charging current	300mA
Charging temperature upper limit	45°C
Charging temperature lower limit.....:	0°C
Polymer cell electrolyte type.....:	<input type="checkbox"/> gel polymer <input type="checkbox"/> solid polymer <input checked="" type="checkbox"/> N/A
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item	2022-05-12
Date (s) of performance of tests	2022-05-14 to 2022-05-16
General remarks:	
<p>"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC60080-02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)	

General product information and other remarks:

This battery is constructed with 1pcs Li-ion cell (1S1P), and has overcharge, over-discharge, over current and short-circuits proof circuit.

1INP7/21/31 is the marking of IEC 62133 requirement for the model 602030.

The original CB Test Report No. SA2006307S 006 issued on 2020-07-08, Certif. No. DK-100049-UL issued on 2020-07-17.

This original Test Report was issue by Dongguan Anci Electronic Technology Co., Ltd.

The Amendment Test Report by Guangdong ESTL Technology Co., Ltd.

Amendment 1 Report:

This Amendment Report modified on 2022-05-20 to include the following changes/additions, which were considered technical modifications:

1. Copy of marking plate adds a "Small cell and battery safety information", see Page 6 of 11 for detail;
2. The main features of the battery and cell are put into GPI;
3. TABLE: Critical components information: Correct MOS U2 model "8205S" to "FH8205S", and Correct Technical data "ID=6A" to "ID=5A", due to typo;
4. TABLE: Critical components information: Increase Technical data of Alternative wire;
5. Increase National Differences of KR, see National Differences for detail;
6. Changes Supply voltage of cl.7.3.6 from "5.88V" to "5.95V", due to calculation error, cl.7.3.6 has additional tests based upon the changes;
7. Changes Chamber ambient of cl.7.3.9 from "10°C" to "-5°C", due to test error, cl.7.3.9 has additional tests based upon the changes.
8. Update view of battery, see Enclosure for detail.

The main features of the battery are shown as below:

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Limited Charge Voltage	Cut-off Voltage
602030	300mAh	3.7V	60mA	60mA	300mA	300mA	4.20V	2.45V

The main features of the battery are shown as below:

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
602030	4.25V	15mA	0°C	45°C

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

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Limited Charge Voltage	Cut-off Voltage
602030 (Cell)	300mAh	3.7V	60mA	60mA	300mA	300mA	4.20V	2.45V

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

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
602030 (Cell)	4.25V	15mA	0°C	45°C

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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 $\leq 3 \Omega$ (measured according annex D) are tested according table 1	Not Coin cells	N/A
	Unless otherwise specified, tests are carried out in an ambient temperature of $20 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$		P
	The safety analysis of 5.6.1 identify those components of the protection circuit that are critical for short-circuit, overcharge and overdischarge protection		P
	When conducting the short-circuit test, consideration given to the simulation of any single fault condition that is likely to occur in the protecting circuit that would affect the short-circuit test		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	Complied.	P
	Unless otherwise stated in this document, the charging procedure for test purposes is carried out in an ambient temperature of $20 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$, using the method declared by the manufacturer	Complied.	P
	Prior to charging, the battery have been discharged at $20 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$ at a constant current of 0,2 It A down to a specified final voltage	Complied.	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	Complied.	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	Charge temperature 0-45°C declared.	P
7.3	Reasonably foreseeable misuse		P
7.3.6	Over-charging of battery	Tests Complied.	P
	The supply voltage which is:		P
	- 1,4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6,0 V) for single cell/cell block batteries or		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- 1,2 times the upper limit charging voltage presented in Table A.1 per cell for series connected multi-cell batteries, and		N/A
	- Sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached		P
	Test was continued until the temperature of the outer casing:		P
	- Reached steady state conditions (less than 10 °C change in 30-minute period); or		N/A
	- Returned to ambient		P
	Results: No fire. No explosion..... :	(See appended table 7.3.6)	P
7.3.9	Design evaluation – Forced internal short-circuit (cells)	Tests Complied.	P
	The cells complied with national requirement for :	France, Japan, Korea, Switzerland	—
	The pressing was stopped upon:		P
	- A voltage drop of 50 mV has been detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached	400N, prismatic cells.	P
	Results: No fire :	(See appended table 7.3.9)	P

IEC 62133-2			
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		602030	3.7V 300mAh	IEC 62133-2: 2017	Tested with appliance
- Electrolyte	Anhui Xingli New Energy Co., Ltd.	H52459704	EC/DEC/EMC/LiPF ₆	--	Tested with appliance
- Separator	XinMingZhi city science and Technology Co Ltd	PE-12	PE, 130°C	--	Tested with appliance
- Anode	Guangzhou Hongsen material Co., Ltd.	HSNCM523-C-1	Li(NiCoMn)O ₂ , Ni:Co:Mn=5:2:3	--	Tested with appliance
- Cathode	Ganzhou Ruifu Technology Co., Ltd.	AGF-4	Graphite	--	Tested with appliance
IC (U1)	Vimicro electronics co., ltd	VADW01	V _{det1} =4.3±0.05V, V _{det2} =2.50±0.075V	--	Test with applicable
MOS (U2)	SHEN ZHEN FINE MADE ELECTRONICS GROUP CO., LTD.	FH8205S	V_{DS}=24V, V_{GS}=±12V, I_D=5A	--	Test with applicable
PCB	Interchangeable	Interchangeable	V-0, 130°C	UL 796	UL approved
Wire	DONGGUAN BANG KAI HARDWARE ELECTRONICS CO LTD	1571	32AWG, 30V, 80°C	UL758	UL E172829
Alternative	Interchangeable	Interchangeable	Min. 32AWG, Min. 30V, Min. 80°C	UL 758	UL approved
Supplementary information:					
1) Provided evidence ensures the agreed level of compliance. See OD-2039.					

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

7.3.6	TABLE: Over-charging of battery				P
Constant charging current (A)		0.6		—	
Supply voltage (Vdc)		5.95		—	
Sample no.	OCV before charging (Vdc)	Total charging time (minute)	Maximum outer case temperature (°C)	Results	
B1#	3.347	80	30.0	P	
B2#	3.352	80	30.3	P	
B3#	3.345	80	29.7	P	
B4#	3.338	80	30.3	P	
B5#	3.341	80	30.5	P	
Supplementary information:					
- No fire or explosion					
- 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°C)						
C1#	45	4.221	1	400	P	
C2#	45	4.215	1	400	P	
C3#	45	4.217	1	400	P	
C4#	45	4.214	1	400	P	
C5#	45	4.220	1	400	P	
Samples charged at charging temperature lower limit(-5°C)						
C6#	-5	4.152	1	400	P	
C7#	-5	4.149	1	400	P	
C8#	-5	4.120	1	400	P	
C9#	-5	4.153	1	400	P	
C10#	-5	4.151	1	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						
- Others (please explain)						

IEC62133_2A ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 62133-2 (Republic of Korea) NATIONAL DIFFERENCES (Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications - Part 2: Lithium systems)			
Differences according to.....: National standard KC62133-2(2020-07)			
TRF template used:.....: IECEE OD-2020-F3, Ed. 1.1			
Attachment Form No.....: KR_ND_IEC62133_2A			
Attachment Originator.....: KTR			
Master Attachment.....: Dated 2020-09-25			
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	National Differences		
7.3.6	Over-charging of battery		N/A
(Revision)	[Add the bolded text] b) Test The test shall be carried out in an ambient temperature of 20 °C ± 5 °C. Each test battery shall be discharged at a constant current of 0,2 It A, to a final discharge voltage specified by the manufacturer. Sample batteries shall then be charged at a constant current of 2,0 It A, using a supply voltage which is: <ul style="list-style-type: none"> • 1,4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6,0 V) for single cell/cell block batteries or • 1,2 times the upper limit charging voltage presented in Table A.1 per cell for series connected multi-cell batteries, and • sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached. <u>• In case the charging voltage specified by the manufacturer is higher than the overcharge test voltage, the maximum charging voltage specified by manufacturer should be applied with 2.0 ItA, (e.g., quick charging power bank, etc.)</u>	N/A	

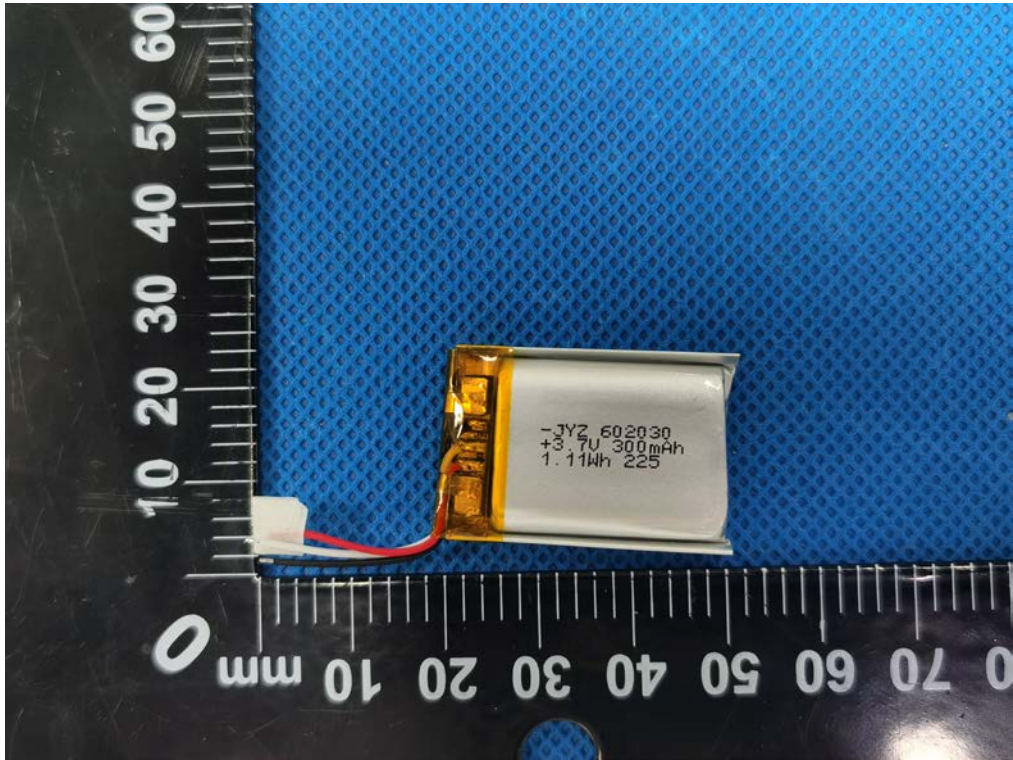
IEC62133_2A ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>[Replace to the following statement]</p> <p>c) Acceptance criteria</p> <p>Overcharging exceeding to the limits specified by the manufacturer should not result in fire or explosion.</p>		N/A
Annex G	Definition for shape and materials of outer case for cell		—
<i>(Addition)</i>	<p>G.1 General</p> <p>Annex G provides definitions for shape and materials of outer case for cell</p> <p>G.2 Shape of outer case for cell</p> <p>G 2.1 Cylindrical cell</p> <p>Cell with a cylindrical shape in which the overall height is equal to or greater than diameter.</p> <p>G 2.2 Prismatic cell</p> <p>Cell having the shape of a parallelepiped whose faces are rectangular</p> <p>G.3 Materials of outer case for cell</p> <p>G.3.1 Soft case</p> <p>Non-metallic outer case or container for cell</p> <p>G.3.2 Hard case</p> <p>Metallic outer case or container for cell.</p>	<p>(Shape of outer cases)</p> <p><input type="checkbox"/> Cylindrical</p> <p><input checked="" type="checkbox"/> Prismatic</p> <p>(Materials of outer cases)</p> <p><input type="checkbox"/> Hard</p> <p><input checked="" type="checkbox"/> Soft</p>	—
Annex H	Calculation method of the volumetric energy density for cell		—
<i>(Addition)</i>	<p>Annex H provide a calculation method of the volumetric energy density for cell in use of smart phone, tablet, notebook.</p> <p>H.1 General</p> <p>Unless otherwise stated in the Annex E, the dimensions for calculation are based on these for cell before shipment and the volumetric energy density shall be calculated with a maximum values specified by manufacturer. If the specification for cell can't be provided a dimension for calculation, the manufacturer's other documentation shall be provided to demonstrate compliance for its calculation.</p>	281.5 Wh / L	—

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

ENCLOSURE

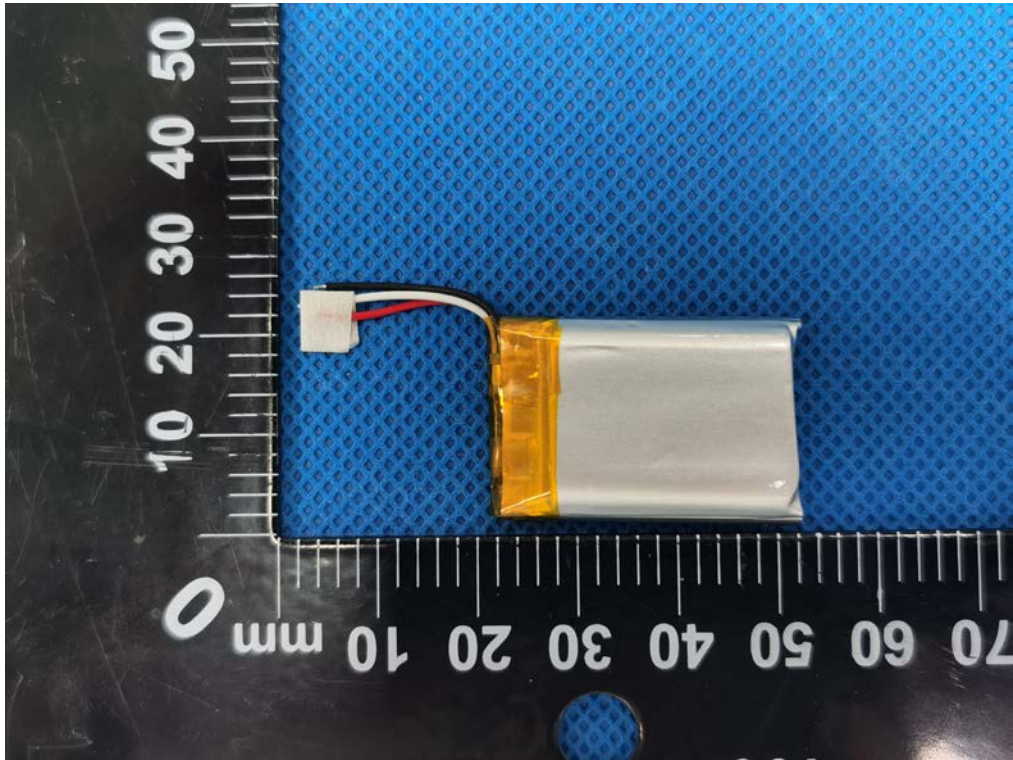
Supplement ID	Description
01-1	Overall View 1 of Battery
01-2	Overall View 2 of Battery
01-3	Overall View 1 of PCB
01-4	Overall View 2 of PCB
01-5	Overall View 1 of Cell
01-6	Overall View 2 of Cell

ID 01-1



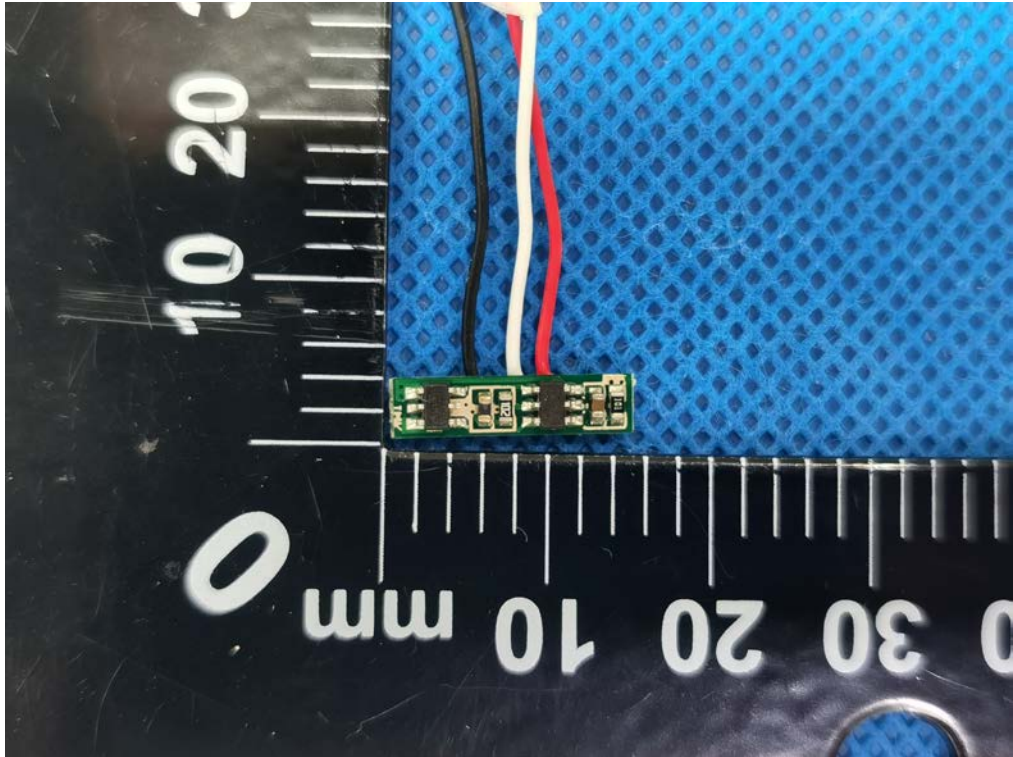
Overall View 1 of Battery

ID 01-2



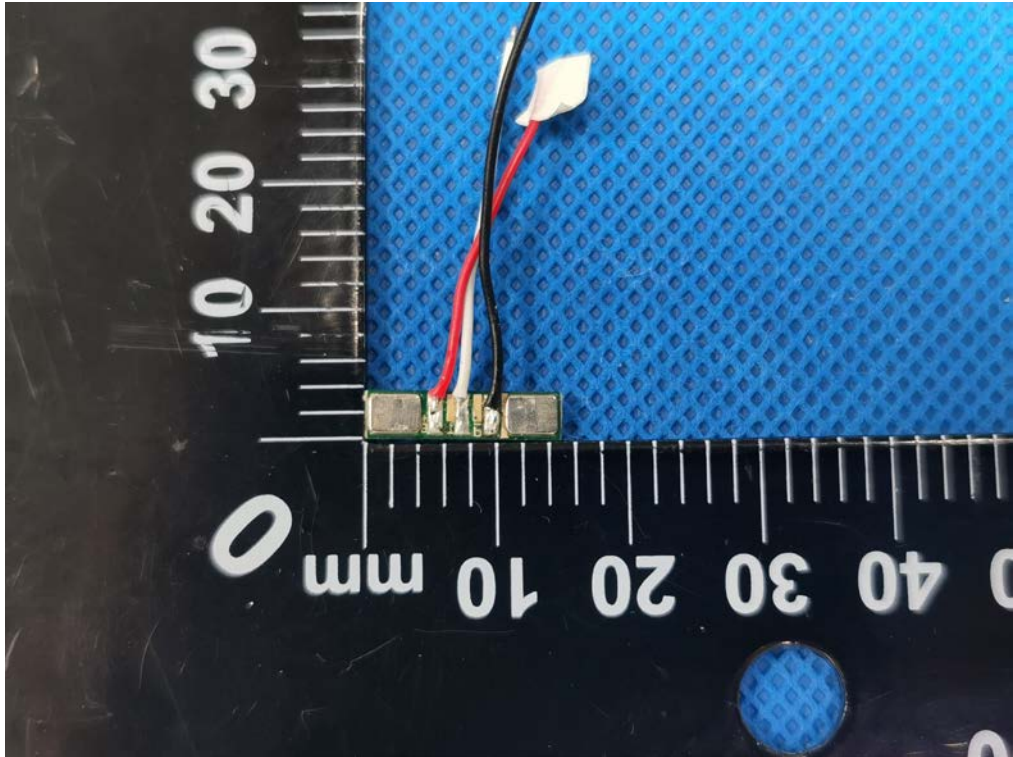
Overall View 2 of Battery

ID 01-3



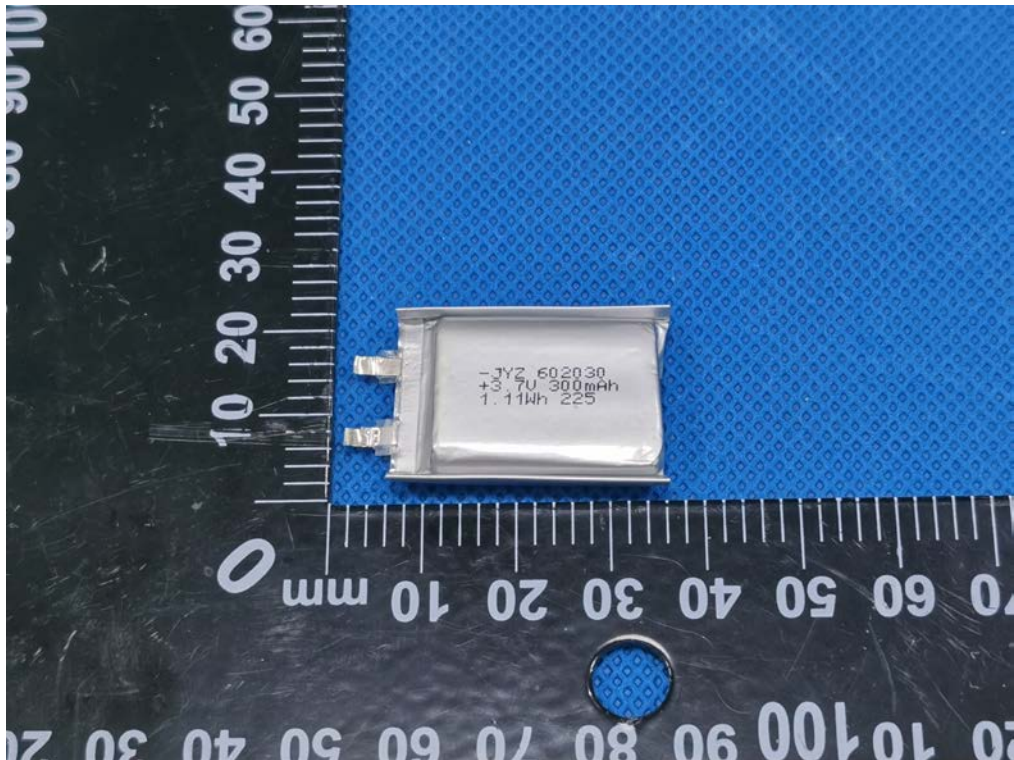
Overall View 1 of PCB

ID 01-4



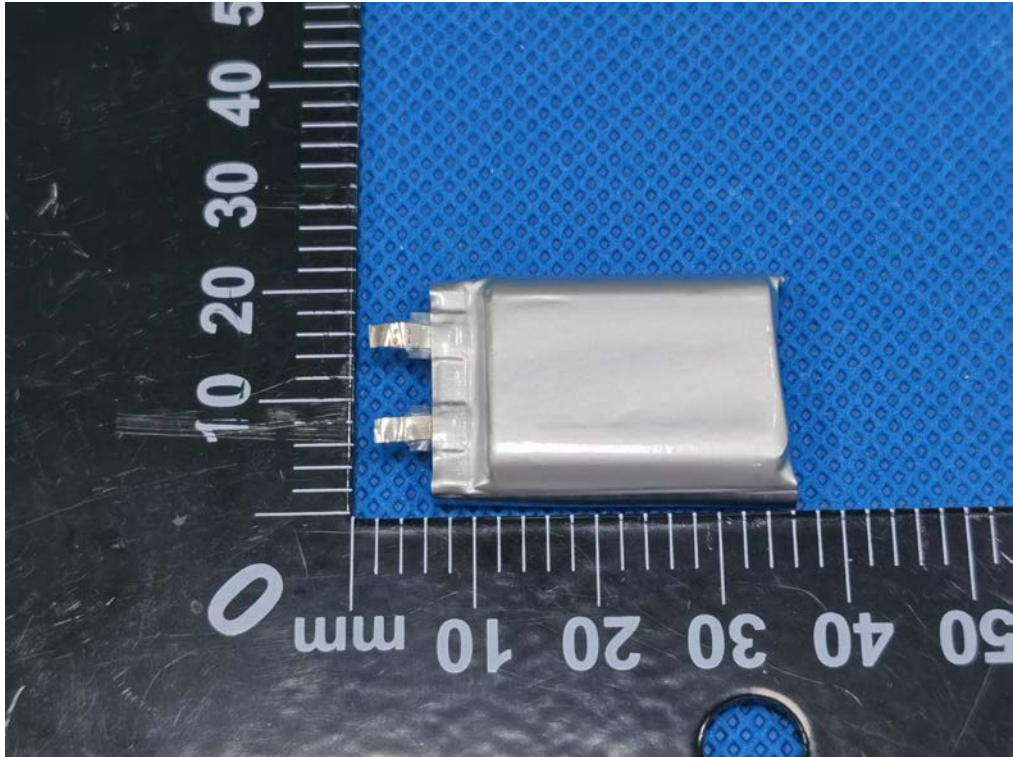
Overall View 2 of PCB

ID 01-5



Overall View 1 of Cell

ID 01-6



Overall View 2 of Cell