TEST REPORT

Product Name:	Power bank
Trade Mark:	N/A
Model Number:	DB 001 DB 002, DB 003, DB 004, DB 005, AE 001, AE 002, AE 003, AE 004, AE 005
Prepared For:	SHENZHEN U-CREATE ELECTRONIC TECHNOLOGY CO., LTD.
Address:	4th Floor, Building 1, Jiayida Science And Technology Park, Liukeng New Village, Shiyan Town, Baoan District, Shenzhen City, Guangdong Province,China
Prepared By:	Shenzhen DL Testing Technology Co., Ltd.
Address:	101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China
Date of Receipt:	Dec. 05, 2022
Test Date:	Dec. 05, 2022 - Dec. 09, 2022
Issue Date:	Dec. 09, 2022
Report No.:	DL-20221208023S

TEST REPORT

UL 2056

Outline of Investigation for Safety of Power Banks

Report Number..... :	DL-20221208023S
Tested by (name) ..... :	Hardy Chen
Compiled by (name) ..... :	Ray Liang
Approved by (name) ..... :	Jade Yang
Date of issue ..... :	2022-12-09
Total number of pages ..... :	19 pages
Name of Testing Laboratory preparing the Report	Shenzhen DL Testing Technology Co., Ltd.
Test location..... :	101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China
Address..... :	
Applicant's name ..... :	SHENZHEN U-CREATE ELECTRONIC TECHNOLOGY CO., LTD.
Address..... :	4th Floor, Building 1, Jiayida Science And Technology Park, Liukeng New Village, Shiyan Town, Baoan District, Shenzhen City, Guangdong Province,China
Test specification:	
Standard ..... :	UL 2056: 2015 (Second Edition) UL 2054: 2011 (Second Edition)
Non-standard test method..... :	N/A
Test Report Form No..... :	TEST REPORT UL 2056
Test Report Form(s) Originator..... :	DL-Test
Master TRF ..... :	Dated 2019-09
Test item description ..... :	Power bank
Trade Mark..... :	N/A
Manufacturer..... :	SHENZHEN U-CREATE ELECTRONIC TECHNOLOGY CO., LTD. 4th Floor, Building 1, Jiayida Science And Technology Park, Liukeng New Village, Shiyan Town, Baoan District, Shenzhen City, Guangdong Province,China
Model/Type reference..... :	DB 001 DB 002, DB 003, DB 004, DB 005, AE 001, AE 002, AE 003, AE 004, AE 005
Ratings..... :	Input: 5.0V⎓2.4A Output: 5.0V⎓2.4A Capacity: 5000mAh (3.7V)

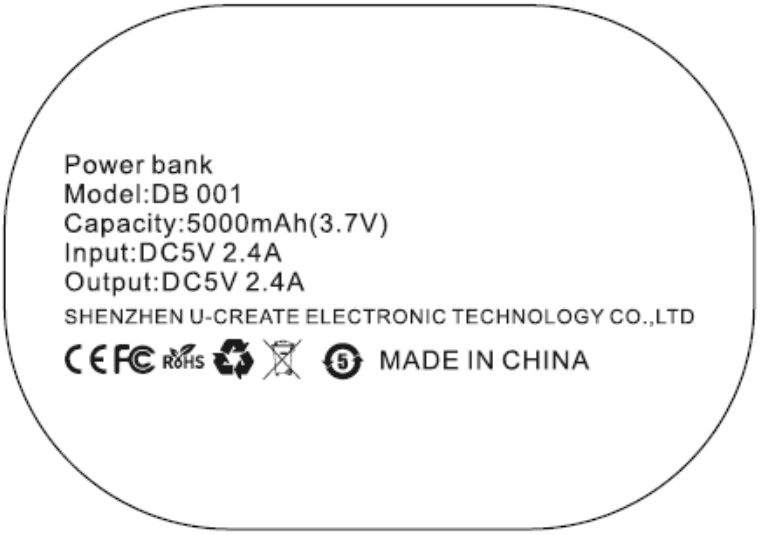
List of Attachments (including a total number of pages in each attachment):
N/A

Summary of testing:
All tests were measured under the most severe condition and the test conditions.

Tests performed (name of test and test clause):	**Testing location:**
- 8.4 Abnormal Charging Test; - 8.5 Abusive Overcharge Test; - 8.7/8.8 Battery Pack Component Temperature Test and Battery Pack Surface Temperature Test; - 8.9 Limited power sources; - 9 Power Input Test; - 10 Overload of Output Ports Test; - 12 Capacity Verification Test	Shenzhen DL Testing Technology Co., Ltd. 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China

Summary of compliance with National Difference: N/A

Copy of marking plate (representative)



Test item particulars ..... :	
Classification of installation and use ..... :	Portable applications
Supply connection ..... :	DC port
Recommend charging method declaired by the manufacturer ..... :	5V⎓2.4A
Specified final discharge ..... :	2.5V for cell
Maximum charging current for cell..... :	10000mA
Maximum discharging current for cell ..... :	10000mA
Maximum Ambient Temperature (T_{max}) ..... :	45°C
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..... :	2022-12-05
Date (s) of performance of tests..... :	2022-12-05 to 2022-12-09

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.

Name and address of factory (ies) ..... :	SHENZHEN U-CREATE ELECTRONIC TECHNOLOGY CO., LTD. 4th Floor, Building 1, Jiayida Science And Technology Park, Liukeng New Village, Shiyan Town, Baoan District, Shenzhen City, Guangdong Province,China

General product information and other remarks:

The equipment under test (EUT) is Power bank which contains certified cell complied UL 1642.
The Power bank supply maximum ambient temperature is specified as 0~45°C for Charging and 0~ 45°C for Discharging.

Test condition:
Temperature: 20±5 °C
Relative humidity: 60%
Air pressure: 950 mbar
All models just model name is different, unless otherwise all tests were conducted at the model of DB 001.
The test samples were pre-production samples without serial number.

UL 2056			
Clause	Requirement – Test	Result - Remark	Verdict
6	**Glossary**		P
6.1	DIRECT PLUG-IN CONSTRUCTION – A construction which employs a blade assembly on the enclosure for connection to the ac mains circuit.	The EUT has no such device.	N/A
6.2	POWER BANK – Also known as portable USB chargers or portable back-up battery power. A standalone, portable power supply with built-in lithium or nickel batteries and dc/dc converter circuitry for mobile use of powering electronic devices through USB or similar universal interfaces.	The EUT is mobile power supply which contan with lithium battery cell and DC/DC converter inside.	P

CONSTRUCTION			
7	**General**		P
7.1	Power banks shall comply with the requirements in the Standard for Household and Commercial Batteries, UL 2054.	Complied.	P
7.2	The input port from external power supply is in general dc jack or USB port, and shall not be of the types described in 1.3.		P
7.3	If the built-in dc/dc converter circuitry generates voltage exceeding 42.4 Vac or 60 Vdc, this circuitry shall comply with the applicable requirements of either the Standard for Information Technology Equipment – Safety – Part 1: General Requirements, UL 60950-1 or the Standard for Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements, UL 62368-1.	The EUT operation voltage is Max 12Vdc which has no exceeding 42.4 Vac or 60 Vdc.	N/A
7.4	For power banks with direct plug-in construction, the following shall be met:	The power bnak has no direct plug-in construction.	N/A
	a) The power bank and its built-in ac/dc power supply shall comply with the applicable requirements of either the Standard for Information Technology Equipment – Safety – Part 1: General Requirements, UL 60950-1 or the Standard for Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements, UL 62368-1.	The power bnak has no direct plug-in construction.	N/A

UL 2056			
Clause	Requirement – Test	Result - Remark	Verdict
	b) A barrier shall be provided between the built-in ac/dc power supply and built-in battery pack. The barrier shall comply with the requirements of electrical insulation and fire enclosure of either the Standard for Information Technology Equipment – Safety – Part 1: General Requirements, UL 60950-1 or the Standard for Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements, UL 62368-1.	The power bank has no provide built-in ac/dc power supply	N/A
PERFORMANCE			
8	**General**		P
8.1	Unless otherwise superseded by a requirement in this Outline, power banks shall comply with the requirements of battery packs in the Standard for Household and Commercial Batteries, UL 2054.	Complied.	P
8.2	For the Abnormal Charging Test and Abusive Overcharge Test in the Standard for Household and Commercial Batteries, UL 2054, 8.3 – 8.5 shall be followed.	Considered.	P
8.3	The tests shall be conducted at the input point of battery protecting circuit. Note – This means dc/dc converter circuitry will be bypassed to result in battery overcharging, which is required for the evaluation of protecting circuit.	Complied.	P
8.4	For the Abnormal Charging Test in the Standard for Household and Commercial Batteries, UL 2054, the following shall be taken as maximum current Ic: Rated maximum charging current of the built-in battery (rather than the power bank).	See table 8.4.	P
8.5	For the Abusive Overcharge Test in the Standard for Household and Commercial Batteries, UL 2054, the C5 amp rate of the built-in battery (rather than the power bank) shall be taken for the purpose of this test.	See table 8.5.	P
8.6	For the Battery Pack Component Temperature Test and Battery Pack Surface Temperature Test in the Standard for Household and Commercial Batteries, UL 2054, 8.7 and 8.8 shall be followed.	See below.	P
8.7	For output loading temperature test, a fully charged power bank shall be discharged. Any load of the output ports that can be operated at the same time shall be considered to result in maximum temperature rise.	See table 8.7/8.8	P

UL 2056			
Clause	Requirement – Test	Result - Remark	Verdict
8.8	For input loading temperature test, a fully discharged power bank shall be charged in accordance with manufacturer's specifications. Any load of the output ports that can be operated at the same time shall be considered to result in maximum temperature rise.	See table 8.7/8.8.	P
8.9	Each output port shall be a limited power source in accordance with the Standard for Household and Commercial Batteries, UL 2054, the Standard for Information Technology Equipment – Safety – Part 1: General Requirements, UL 60950-1, or the Standard for Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements, UL 62368-1, or a Class 2 power source in accordance with the Standard for Class 2 Power Units, UL 1310.	See table 8.9.	P
8.10	Each output port shall be a SELV circuit in accordance with the Standard for Information Technology Equipment – Safety – Part 1: General Requirements, UL 60950-1 or be an ES1 in accordance with the Standard for Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements, UL 62368-1.	The EUT operation voltage is Max 12Vdc which has no exceeding 42.4 Vac or 60 Vdc.	P
9	**Power Input Test**		**P**
9.1	The current input to a power bank shall not exceed 110% of the marked input current rating of the power bank, when the power bank is operated under the conditions of maximum normal load.	See table 9.	P
9.2	Maximum normal load shall consist of the maximum current draw while the power bank is operating in all possible modes. This may include charging the built-in battery, and output ports unloaded or loaded at the rated maximum normal load. Any load that can be operated at the same time shall be considered in order to obtain the maximum normal load.	Considered.	P
10	**Overload of Output Ports Test**		P
10.1	Each power output pin of output port shall be overloaded in accordance with 10.2 – 10.5.	See table 10	P
10.2	In accordance with manufacturer's specifications, fully charge the built-in battery of power bank.	Considered.	P
10.3	The power bank is covered with one layer of cheesecloth and placed on a softwood board covered with one layer of tissue paper.	Considered.	P

UL 2056			
Clause	Requirement – Test	Result - Remark	Verdict
10.4	Each power output pin of output port shall then be loaded to draw the maximum current, for at least 1 h.	See below.	P
10.5	After this test, the cheesecloth and tissue paper shall remain intact.	After testing, the cheesecloth and tissue paper shall remain intact.	P
11	**Flammability of Photovoltaic Cells Test**		N/A
11.1	This test shall be conducted if the power bank is provided with integral photovoltaic cells as a power source.	The EUT has no such component.	N/A
11.2	In accordance with manufacturer's specifications, fully charge the built-in battery of the power bank.	The EUT has no such component.	N/A
11.3	The power bank is covered with one layer of cheesecloth and placed on a softwood board covered with one layer of tissue paper.	The EUT has no such component.	N/A
11.4	The power bank is subjected to single component fault that is likely to occur and which would result in flammability issue of the photovoltaic cells, such as back-feed of battery power, and is kept in this state for 1 h.	The EUT has no such component.	N/A
11.5	After this test, the cheesecloth and tissue paper shall remain intact.	The EUT has no such component.	N/A
12	**Capacity Verification Test**		P
12.1	The marked electrical capacity of power bank, measured at the power output pin of output port, shall comply with the Standard for Secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes – Secondary Lithium Cells and Batteries for Portable Applications, IEC 61960, Clause 7.3.1, Discharge Performance at 20 °C (Rated Capacity), and the modified test method in 12.2.	See table 12.1.	P
12.2	The power bank is discharged at a constant current equals to rated current of the output port, until its voltage is equal to the end-of-discharge voltage of the output port, specified by the manufacturer.	Complied.	P
MARKINGS			
13	**General**		P
13.1	Unless otherwise superseded by a requirement in this Outline, power banks shall comply with the requirements in the Standard for Household and Commercial Batteries, UL 2054.	Considered.	P

UL 2056			
Clause	Requirement – Test	Result - Remark	Verdict
13.2	For electrical ratings, the following information shall be provided:	See below	P
	a) Input rating in Vdc or Vac and A. If there are more than one input ports, the rating of each port shall be provided;	See marking plate.	P
	b) Output rating in Vdc and A. If there are more than one output ports, it shall include rating of each port and the combined rating (if it is not equal to the summation of all ports); and	See marking plate.	P
	c) Electrical capacity in Ah or mAh. If there are more than one output ports/output ratings, either the capacity of each port/rating shall be provided, or the minimum capacity of these ports/ratings shall be provided.	See marking plate.	P
INSTRUCTIONS			
14	**General**		P
14.1	Power banks shall be provided with legible instructions pertaining to the proper selection and replacement of its power supply or charger.	Safety instruction has been provided.	P
14.2	Power banks shall be provided with legible instructions pertaining to a risk of fire or injury to persons associated with the use of the product.	Safety instruction has been provided.	P
14.3	An illustration is allowed with a required instruction to clarify the intent but shall not replace the written instruction.	Safety instruction has been provided.	P
15	**Instructions Pertaining to Risk of Fire or Injury to Persons**		N/A
15.1	Instructions pertaining to a risk of fire or injury to persons shall warn the user of reasonably foreseeable risks and state the precautions to be taken to reduce such risks. Such instructions shall be preceded by the heading "INSTRUCTIONS PERTAINING TO RISK OF FIRE OR INJURY TO PERSONS" or the equivalent.	Safety instruction has been provided.	P
15.2	Unless otherwise indicated, the text of the instructions in 15.4 shall be in the words specified or words that are equivalent, clear, and understandable. Substitution of the signal word "DANGER" for "WARNING" is allowed when the risk associated with the product is such that a situation exists which, if not avoided, will result in death or serious injury.	Safety instruction has been provided.	P

UL 2056			
Clause	Requirement – Test	Result - Remark	Verdict
15.3	Numbering of the items in the list in 15.4 and including other instructions pertaining to a risk of fire or injury to persons that the manufacturer determines to be necessary and that do not conflict with the intent of the instructions are acceptable.	Safety instruction has been provided.	P
15.4	The instructions pertaining to a risk of fire or injury to persons shall include those items in the following list that are applicable to the product. The statement “IMPORTANT SAFETY INSTRUCTIONS” or the equivalent shall precede the list, and the statement “SAVE THESE INSTRUCTIONS” or the equivalent shall either precede or follow the list. The word “WARNING” shall be entirely in upper case letters or shall be emphasized to distinguish it from the rest of the text.	Safety instruction has been provided.	P

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Clause	Requirement – Test	Result - Remark	Verdict
	IMPORTANT SAFETY INSTRUCTIONS WARNING – When using this product, basic precautions should always be followed, including the following: a) Read all the instructions before using the product. b) To reduce the risk of injury, close supervision is necessary when the product is used near children. c) Do not put fingers or hands into the product. d) Do not expose power bank to rain or snow. e) Use of a power supply or charger not recommended or sold by power pack manufacturer may result in a risk of fire or injury to persons. f) Do not use the power bank in excess of its output rating. Overload outputs above rating may result in a risk of fire or injury to persons. g) Do not use the power bank that is damaged or modified. Damaged or modified batteries may exhibit unpredictable behavior resulting in fire, explosion or risk of injury. h) Do not disassemble the power bank. Take it to a qualified service person when service or repair is required. Incorrect reassembly may result in a risk of fire or injury to persons. i) Do not expose a power pack to fire or excessive temperature. Exposure to fire or temperature above 100°C may cause explosion. The temperature of 100°C can be replaced by the temperature of 212°F. j) Have servicing performed by a qualified repair person using only identical replacement parts. This will ensure that the safety of the product is maintained. k) Switch off the power bank when not in use.	Safety instruction has been provided.	P

UL 2056			
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**
Cell	Shenzhen Zhengsheng New Energy Co., LTD	21700T	3.7V, 4800mAh	UL 1642	UL
Plastic enclosure	LG CHEM (GUANGZHOU) ENGINEERING PLASTICS CO LTD	LUPOY EF-1006F(m)	V-0, 120°C	UL 94	UL E248280
PCB	DONGGUAN DONGHONGXIN ELECTRONICS CO LTD	DHXX1	V-0, 130°C	UL 94 UL796	UL E342984
Supplementary information: 1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

UL 2056			
Clause	Requirement – Test	Result - Remark	Verdict

8.4	TABLE: Abnormal Charging Test (Battery)					P
Model	**Target Maximum Charge Voltage, Vdc**	**Target Maximum Charge current (3 x Imax), mA**	**Faulted Protective Device**	**Maximum Internal Cell Casing temp. (°C)**	**Hand warmer surface temp. (°C)**	**Comments**
Ambient temperature (°C):		24.9				
DB 001	5.25	7200	Q1 Pin 3-5 short	28.5	27.1	No explode or catch fire

Supplementary information:
No explode or catch fire;
The DC/DC converter circuit was bypassed (Test is conducted at the input point of Battery).
Tmax was recorded on the centre of the outside case.

8.5	TABLE: Abusive Overcharge Test (Battery)					P
Model	**Maximum Charging Current [10 x $I(C_5)$ / 5 x $I(C_5)$], mA**	**Maximum Supply Voltage, Vdc**	**Faulted Protective Device**	**Maximum Internal Cell Casing temp. (°C)**	**Power Bank surface temp. (°C)**	**Comments**
Ambient temperature (°C):			24.7			
DB 001	10000	5.25	U1 Pin1-6 short	28.6	27.5	No explode or catch fire
DB 001	10000	5.25	U1 Pin1-6 short	28.7	27.2	No explode or catch fire
DB 001	5000	5.25	U1 Pin1-6 short	29.2	27.1	No explode or catch fire
DB 001	5000	5.25	U1 Pin1-6 short	28.3	27.7	No explode or catch fire

Supplementary information:
No explode or catch fire;
The DC/DC converter circuit was bypassed (Test is conducted at the input point of Battery).
Tmax was recorded on the centre of the outside case;
The supply voltage need have the ability to maintain the 10 times or 5 times C_5 rate.

8.9	TABLE: Limited power sources						P
Circuit output tested							
Note: Measured Uoc (V) with all load circuits disconnected							
Model	**Components**	**Uoc (V)**	**Isc (A)**		**S (VA)**		
			Meas.	**Limit**	**Meas.**	**Limit**	

UL 2056			
Clause	Requirement – Test	Result - Remark	Verdict

DB 001	Normal operation	5.03	3.46	8	17.1	100
	U2 Pin3-8 short	0	0	8	0	100
	C8 short	0	0	8	0	100
supplementary information:						

9	**TABLE: Power Input Test**			**P**
U (V)	**I measured (A)**	**I rated (A)**	**P (W)**	**Condition/status**
5.0Vdc	1.82	2.4	9.10	Charging mode
Supplementary information: Charging only with internal battery fully discharged.				

10	**TABLE: Overload of Output Ports Test**				**P**
Ambient temperature (°C):		24.9			
Component No.	**Output rated**	**Supply voltage (V)**	**Test time (h)**	**Maximum load Current (A)**	**Observation**
Output	5V⎓2.4A	5.03	1h	4.20	Cheesecloth and tissue paper remained intact
Supplementary information: Cheesecloth remained intact Cheesecloth charred or flamed Tissue paper remained intact Tissue paper charred or flamed					

11	**TABLE: Flammability of Photovoltaic Cells Test**				**N/A**
Ambient temperature (°C):					
Component No.	**Output rated**	**Supply voltage (V)**	**Test time (h)**	**Maximum load Current (A)**	**Observation**
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UL 2056			
Clause	Requirement – Test	Result - Remark	Verdict

Supplementary information:

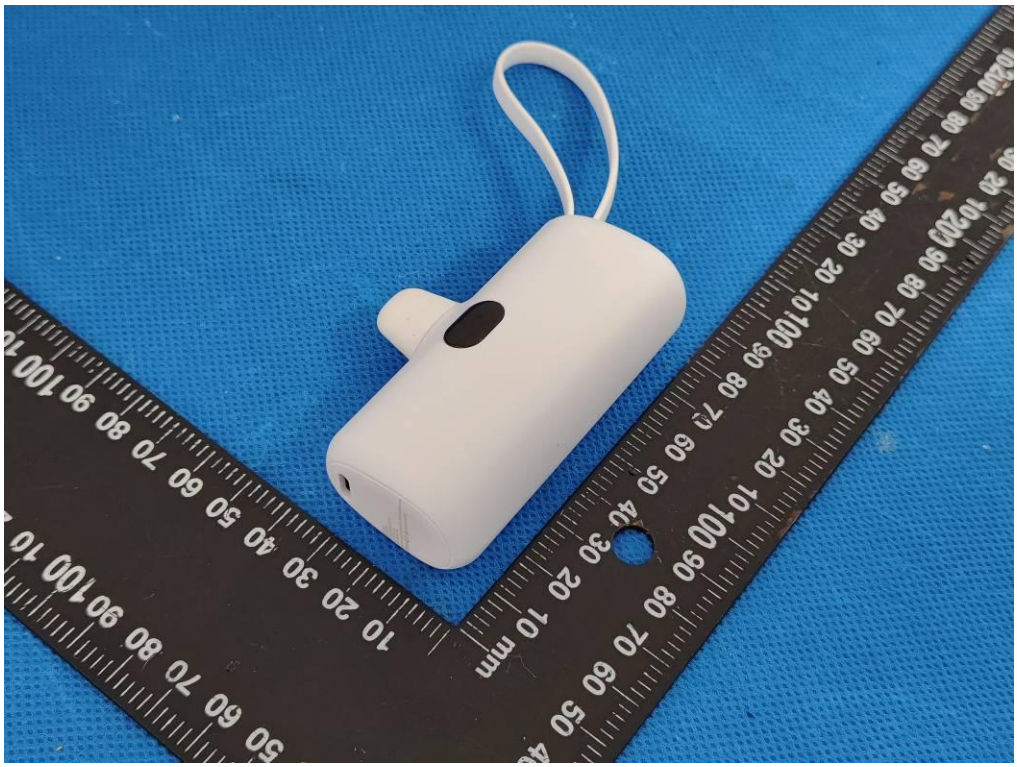
- A: No Effect
- B: Deformation
- C: Venting
- D: Leakage
- E: Smoking
- F: Rupture
- G: Fire
- H: Explosion
- Other (Please Explain)

12	Capacity Verification Test (According to cl 7.3.1 (IEC 61960)			P
Output port	**OCV before discharge, (Vdc)**	**Discharge constant current, (mA)**	**Measured value Capacity (mAh)**	**Rated Capacity (mAh)**
DC port output	5.03	2400	5010	5000

Note(s):
After charged stored in an ambient of 20 °C ± 5 °C for 1 h to 4 h.
The delivered capacity was greater than or equal to the minimum 100% rated capacity.

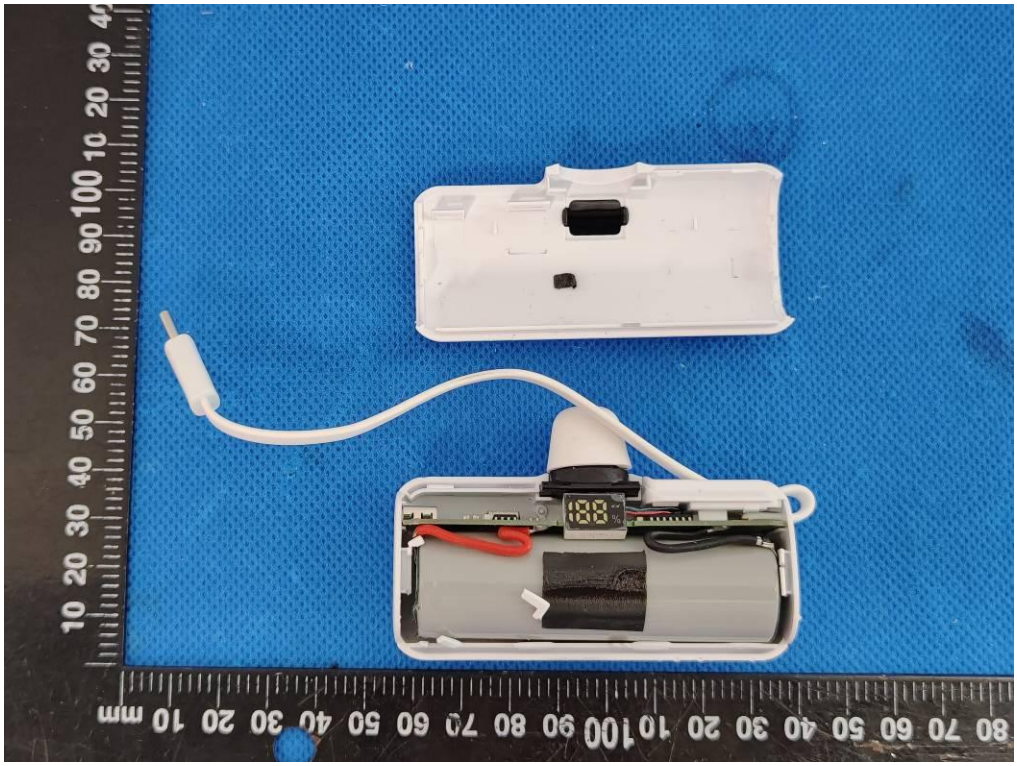
Photos:

General view-1 of EUT

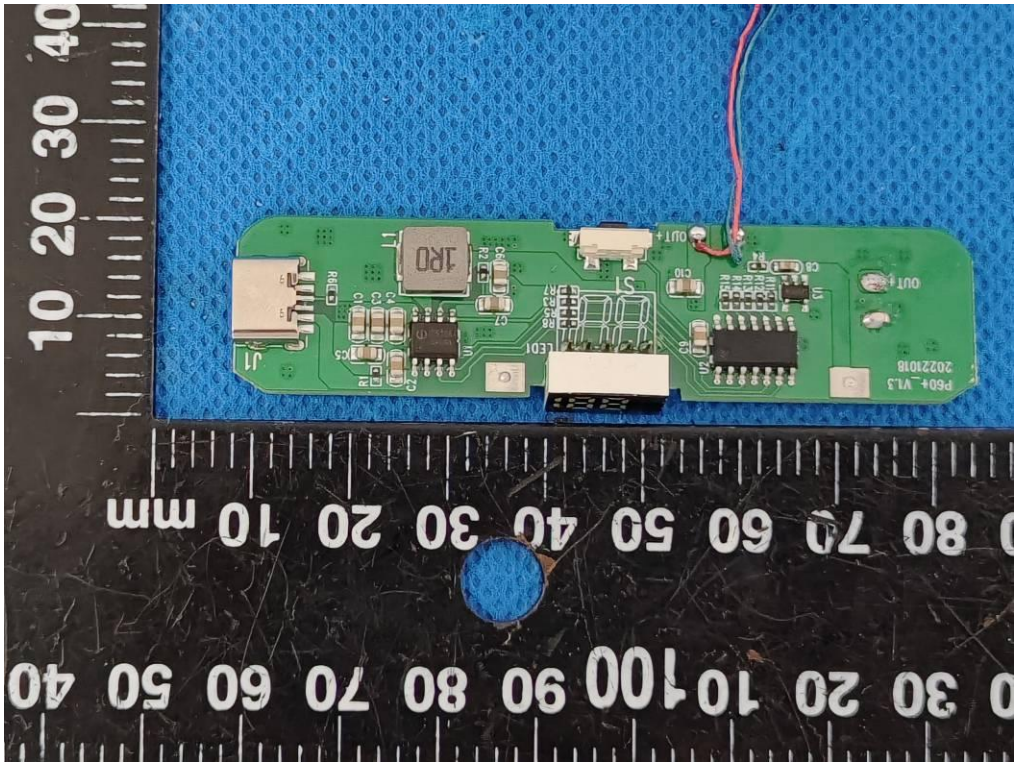


General view-2 of EUT

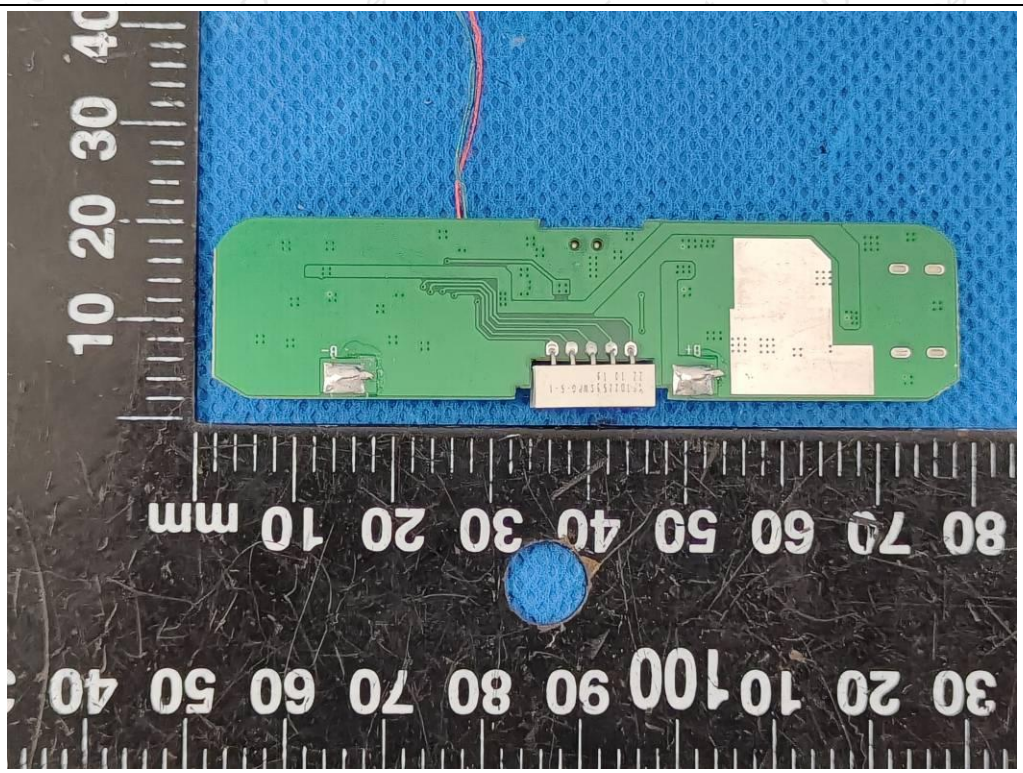
General view-3 of EUT



General view-4 of Internal



Internal view-5 of PCB



General view-6 of PCB

General view-7 of Battery

General view-8 of Label

--- End of Report ---