TEST REPORT

On Behalf of

Shenzhen Yinke Intelligent Co.,Ltd

Product Name:	Portable source
Brand Name:	N/A
Model Number:	YKCDB-D10
Prepared For:	Shenzhen Yinke Intelligent Co.,Ltd
Address:	Room 1902,Unit 3,Building 2(Phase 1).DaChong Commercial Center,No: 9676 ,ShenNan Avenue,DaChong Community,YueHai Road,NanShan District,ShenZhen
Prepared By:	Shenzhen DL Testing Technology Co., Ltd.
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Report No.:	DL-2020041086S
Date of Receipt:	Apr. 24, 2020
Test Date:	Apr. 24, 2020 - Apr. 29, 2020
Date of Report:	Apr. 29, 2020

TEST REPORT

IEC 62133: 2012(2nd 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. ....:	DL-2020041086S
Tested by (name+ signature) ....:	Herman Zheng
Compiled by (+ signature) ....:	Sam Fu
Approved by (+ signature) ....:	Jade Yang
Date of issue ....:	Apr. 29, 2020
Testing laboratory ....:	Shenzhen DL Testing Technology Co., Ltd.
Address ....:	Part One of 301, A-2 Factory Building, Yalijia Industrial Plant, No. 87, Hengping Road, Yuanshan Street, Longgang District, Shenzhen, China
Testing location ....:	As above
Test specification ....:	
Standard ....:	IEC 62133: 2012(2nd Edition)
Test procedure ....:	Type approved
Procedure deviation ....:	N/A.
Non-standard test method ....:	N/A.

This test report is specially limited to the above client company and product model only, It may not be duplicated without prior written consent of DL. Test.

Test item description ....:	Portable source
Trade Mark ....:	N/A
Manufacturer ....:	NingXia JingWang Communication & Technology Co.,Ltd
Address ....:	No:116,LiuPanShan West Road,XiXia District, YinChuan ,NingXia Province, China
Model/type reference ....:	YKCDB-D10
Ratings ....:	Input: DC5V⎓2.0A Output: DC5V⎓2.0A

Particulars: test item vs. test requirements	
Classification of installation and use ....:	Build-in and use in portable applications
Supply connection...:	Terminals
Chemistry...:	☒ Lithium systems ☐ nickel systems
Dimension ....:	L: 121mm W: 75mm T: 14mm
Shape ....:	☒Prismatic ☐Pouch ☐Coin/button ☐Cylindrical
Mass of apparatus ....:	0.248Kg
Polymer cell electrolyte type...:	☒gel polymer ☐solid polymer
Possible test case verdicts:	
- test case does not apply to the test object ....:	N/A
- test object does meet the requirement ....:	P(ass)
- test object does not meet the requirement ....:	F(ail)
Testing:	
Date of receipt of test item ....:	Apr. 24, 2020
Date(s) of performance of test ....:	Apr. 24, 2020 - Apr. 29, 2020

General remarks:
"(see remark #)" refers to a remark appended to the report,
"(see appended table)" refers to a table appended to the report,
Throughout this report a comma is used as the decimal separator,
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 testing laboratory,
Clause numbers between brackets refer to clauses in IEC 62133(Optional remark).

General product information:

This battery is constructed with one Pouch cells, and has overcharge, over-discharge, over current and short-circuits proof circuit.

The main features of the cell in the battery pack are shown as below(clause 8.1.1):

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
1160106	10000 mAh	3.7V	2.0A	2.0A	2.0A	2.0A	4.2V	3.0V

The main features of the cell in the battery pack are shown as below (clause 8.1.2):

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
1160106	3.7V	200mA	10℃	45℃

The main features of the battery pack are shown as below (clause 8.1.1):

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
YKCDB-D10	10000 mAh	3.7V	2.0A	2.0A	5A	5A	4.2V	3.0V

The main features of the battery pack are shown as below (clause 8.1.2):

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
YKCDB-D10	4.2V	200mA	10℃	45℃

Circuit diagram:

Tests Performed (name of test and test clause):

Tests are made with the number of samples specified in Table 2 of IEC 62133:2012(2nd Edition).

Test items:

Cl.6 type test conditions

Cl.8.1 Charging procedures for test purposes

Cl.8.2.1 Continuous charging at constant voltage (cells)

Cl.8.2.2 Moulded case stress at high ambient temperature (battery)

Cl.8.3.1 External short circuit(cell)

Cl.8.3.2 External short circuit (battery)

Cl.8.3.3 Free fall

Cl.8.3.4 Thermal abuse (cells)

Cl.8.3.5 Crush(cells)

Cl.8.3.6 Over-charging of battery

Cl.8.3.7 Forced discharge (cells)

Testing Location:

Shenzhen DL Testing Technology Co., Ltd.

Part One of 301, A-2 Factory Building, Yalijia Industrial Plant, No. 87, Hengping Road, Yuanshan Street, Longgang District, Shenzhen, China

Cl.8.3.8 Transport tests The samples comply with the requirement of IEC 62133:2012(2nd Edition)	

Test conclusion:

Portable Source BATTERY 10000MAH YKCDB-D10/AMADEUS SOGETTO BATTERY 10000MAH YKCDB-D10 submitted by Shenzhen Yinke Intelligent Co.,Ltd are tested according to IEC 62133: 2012(2nd 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.

Test result: Pass.

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.

Portable source
Model: YKCDB-D10
Cell capacit : 3.7V 10000mAh 37Wh
Rating: Input: DC5V⎓2.0A
Output: DC5V⎓2A

NingXia JingWang Communication & Technology Co.,Ltd
Made in China

IEC 62133: 2012			
Clause	**Requirement – Test**	**Result - Remark**	**Verdict**
4	**Parameter measurement tolerances**		P
	Parameter measurement tolerances		P
5	**General safety considerations**		P
	Cells and batteries subject to intended use be safe and continue to function in all respects	Refer to the following clauses.	P
	Cells and batteries subject to reasonably foreseeable misuse do not present significant hazards.	Refer to the following clauses.	P
5.2	Insulation and wiring		P
	–Insulation Resistance between an accessible metal case (excluding electrical contacts) and positive terminals ≥ 5MΩ.	No metal case exists.	**N/A**
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements	See tests of clause 8.	P
	Orientation of wiring maintains adequate creepage and clearance distances between conductors. Mechanical integrity of internal connections is sufficient to accommodate conditions of reasonably foreseeable misuse.	See tests of clause 8.	P
5.3	Venting		P
	Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition.	Venting mechanism exists on narrow side of the pouch cell.	P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation no inhibit pressure relief.		P
5.4	Temperature/voltage/current management		P
	The batteries are designed such that abnormal temperature rise conditions are prevented.	Overcharge, overdischarge, over current and short-circuit proof circuit used in this battery. See tests of clause 8.	P
	Means is provided to limit current to safe levels during charge and discharge.	See above.	P
	The batteries are designed such that within temperature, voltage and current limits specified by the cell manufacturer.		P

IEC 62133: 2012			
Clause	**Requirement – Test**	**Result - Remark**	**Verdict**
	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 charging limits specified in the manufacturer's specifications.	P
5.5	Terminal contacts		P
	Terminals have a clear polarity marking on the external surface of the battery	The "Red +" and "Black -" polarity explicitly marked on surface of the battery.	P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current.	DC connector contacts complied with the requirements.	P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance.	Complied.	P
	Terminal contacts are arranged to minimize the risk of short circuits.	Complied.	P
	Note: the external connector prevents reverse polarity connections, Battery packs with keyed external connectors designed for connection to specific end products need not be marked with polarity marking;		N/A
5.6	Assembly of cells into batteries		N/A
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		N/A
	Each battery shall have an independent control and protection.		N/A
	Manufacturers of cells make recommendations about current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly		N/A
	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		N/A
	Protective circuit components are added as appropriate and consideration given to the end-device application		N/A
	When testing a battery, the manufacturer of the battery provides a test report confirming the compliance according to this standard		N/A
	The battery incorporates separate circuitry to prevent cell reversal from uneven charges as the		N/A

IEC 62133: 2012			
Clause	**Requirement – Test**	**Result - Remark**	**Verdict**
	pack is designed for the selective discharge of a portion of its series connected cells.		
5.6.2	Design recommendation for lithium system only		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	Single cell	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.	Single cell	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		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		N/A
	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		N/A
	- 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 cell or the single cellblocks		N/A
5.7	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.	Complied. Quality plan provided.	P

6	**Type test conditions**		P
	Tests were conducted with the number of cells or batteries as outlined in Table 2 of IEC 62133 with cells or batteries that were not more than six	Complied. Lithium system.	P

IEC 62133: 2012			
Clause	**Requirement – Test**	**Result - Remark**	**Verdict**
	months old.		
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.	Tests are carried out at 20°C-25°C.	P

7	**Specific requirements and tests(nickel systems)**		N/A
7.1	Charging procedure for test purpose	Lithium system.	N/A

7.2	Intended use		N/A
7.2.1	Continuous Low-rate charging (cells)		N/A
	Result: No fire, No explosion	(See Table 7.2.1)	N/A
7.2.2	Vibration		N/A
	Result: No fire, No explosion, No leakage	(See Table 7.2.2)	N/A
7.2.3	Moulded case stress at high ambient temperature		N/A
	Oven temperature(℃)……………………………..:		N/A
	Results: No physical distortion of the battery casing resulting in exposure if internal components		N/A
7.2.4	Temperature cycling		N/A
	Result: No fire, No explosion, No leakage		N/A

7.3	Reasonably foreseeable misuse		N/A
7.3.1	Incorrect installation cell		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		N/A
	- A stabilized dc power supply.		N/A
	Result: No fire, No explosion………………………:	(See Table 7.3.1)	N/A
7.3.2	External short circuit		N/A
	The cells or batteries were tested until one of the following occurred: -24 hours elapsed; or		N/A
	- the case temperature declined by 20% of the maximum temperature rise		N/A

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Clause	**Requirement – Test**	**Result - Remark**	**Verdict**
	Result: No fire, No explosion……………………….:	(See Table 7.3.2)	N/A
7.3.3	Free fall		N/A
	Result: No fire, No explosion.		N/A
7.3.4	Mechanical shock (crash hazard)		N/A
	Result: No fire, No explosion, No leakage.		N/A
7.3.5	Thermal abuse		N/A
	Oven temperature(℃)…………………………….:		N/A
	Result: No fire, No explosion		N/A
7.3.6	Crushing of cells		N/A
	The crushing force was released upon: - The maximum force of 13kN±1 kN has been applied; or		N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained		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		N/A
	Results: No fire, No Explosion……………………..:	(See Table 7.3.6)	N/A
7.3.7	Low pressure		N/A
	Chamber pressure (kPa)…………………………..:		N/A
	Result: No fire, No explosion, No leakage.		N/A
7.3.8	Overcharge		N/A
	Results: No fire, No explosion……………………..:	(See Table 7.3.8)	N/A
7.3.9	Forced discharge		N/A
	Results: No fire, No explosion…………………..:	(See Table 7.3.9)	N/A
8	**Specific requirements and tests**		**P**
8.1	Charging procedure for test purposes	Complied.	P
8.1.1	First procedure: This charging procedure applied to tests other than those specified in 8.1.2		-
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		-
	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	Charge temperature 0-45°C declared. -5°C used for lower limit tests.	P

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Clause	**Requirement – Test**	**Result - Remark**	**Verdict**
	plus 5 °C for the upper limit and minus 5 °C for the lower limit	50°C used for upper limit tests.	
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1) .... :		P
	For a different upper limit charging voltage (i.e. other than for lithium cobalt oxide systems at 4,25V), the applied upper limit charging voltage and upper limit charging temperatures were adjusted accordingly	Lithium cobalt oxide system only.	N/A
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1) .... :	8.5V applied.	P

8.2	Intended use		P
8.2.1	Continuous charging at constant voltage (cells)	Tested complied.	N/A
	Fully charged cells are subjected for 7 days to a charge as specified by the manufacturer.		N/A
	Results:: No fire, no explosion, no leakage	(See Table 8.2.1)	N/A
8.2.2	Moulded case stress at high ambient temperature (battery)		P
	Fully charged batteries according to the first procedure in 8.1.1, the batteries were placed in an air-circulating oven at a temperature of 75°C ± 2°C for 7 hours. Afterwards, they are removed and allowed to return to room temperature.		P
8.3	Reasonably foreseeable misuse		P
8.3.1	External short circuit (cell)	Tested complied.	N/A
	The cells were tested until one of the following occurred: - 24 hours elapsed; or		N/A
	- The case temperature declined by 20% of the maximum temperature rise		N/A
	Results: No fire. No explosion .... :	(See Table 8.3.1)	
8.3.2	External short circuit (battery)		P
	The batteries were tested until one of the following occurred: - 24 hours elapsed; or		N/A
	- The case temperature declined by 20% of the maximum temperature rise		P
	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		P

IEC 62133: 2012			
Clause	**Requirement – Test**	**Result - Remark**	**Verdict**
	steady state condition		
	Results: No fire. No explosion .... :	(See Table 8.3.2)	
8.3.3	Free fall	Tested complied.	P
	Ambient temperature of 20±5℃		P
	Fully charged cells or batteries were dropped 3 times from a height of 1.0 m onto a concrete floor.	Three times	P
	After the test, the cell or battery shall be put on rest for a minimum of one hour and then a visual inspection shall be performed.		P
	Results: No fire, No explosion	No fire. No explosion.	P
8.3.4	Thermal abuse (cells)		N/A
	The cells were held at 130°C ± 2°C for: - 10 minutes; or	Tested complied.	N/A
	- 30 minutes for large cells (gross mass of more than 500 g as defined in IEC 62281)		N/A
	Oven temperature (°C) .... :	130°C	--
	Gross mass of cell (g) .... :	0.248Kg	--
	Results: No fire. No explosion.	No fire. No explosion.	N/A
8.3.5	Crush (cells)	Tested complied.	N/A
	Each fully charged cell, charged according to the second procedure at the upper limit charging temperature in 8.1.2, is immediately transferred and crushed between two flat surfaces in an ambient temperature.		N/A
	The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied; or		N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained; or		N/A
	- 10% of deformation has occurred compared to the initial dimension		N/A
	Results: No fire. No explosion .... :	No fire. No explosion.	N/A
8.3.6	Over-charging of battery	Tested complied.	P
	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		P
	Results: No fire. No explosion .... :	(See Table 8.3.6)	P

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Clause	**Requirement – Test**	**Result - Remark**	**Verdict**
8.3.7	Forced discharge (cells)	Tested complied.	N/A
	A discharged cell is subjected to a reverse charge at 1 It A for 90 min.		N/A
	Results: No fire. No explosion .... :	(See Table 8.3.7)	N/A
8.3.8	Transport test	Tested complied.	P
	Regulations concerning international transport of lithium ion batteries are based on the UN Recommendations on the Transport of Dangerous Goods. Testing requirements are defined in the UN Manual of Tests & Criteria.	The battery had passed ST/SG/AC.10/11 Rev.5/Amend.2 Section 38.3 test	P
	Testing laboratory		P
8.3.9	Design evaluation Forced internal short circuit (cells)	Only applicable to France, Japan, Korea and Switzerland;	N/A
	1) Number of samples		N/A
	This test shall be carried out on five secondary (rechargeable) lithium-ion cells.		N/A
	2) Charging procedure		N/A
	i) Conditioning charge and discharge		N/A
	ii) Storage procedure		N/A
	iii) Ambient temperature		N/A
	iv) Charging procedure for forced internal short test		N/A
	3) Pressing the winding core with nickel particle		N/A
	Results: No fire.. :	(See Table 8.3.9)	N/A

9	**Information for safety**		P
	The manufacturer of secondary cells ensures that information is provided about current, voltage and temperature limits of their products.	Information for safety mentioned in manufacturer's specifications.	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.	Information for safety mentioned in manufacturer's specifications.	P
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product		N/A
	As appropriate, information relating to hazard avoidance resulting from a system analysis is provided to the end user…………………………..:		N/A

IEC 62133: 2012			
Clause	**Requirement – Test**	**Result - Remark**	**Verdict**

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.	The final product is battery.	N/A
10.2	Battery marking		P
	Batteries marked in accordance with the requirements for the cells from which they are assembled.	The battery is marked in accordance with IEC 61960, also see page 5.	P
	Batteries marked with an appropriate caution statement.		P
10.3	Other information		P
	Disposal instructions are marked on the battery or supplied in the information packaged with the battery.	See Specification book	P
	Recommended charging instruction are marked on the battery or supplied in the information packaged with the battery.	See Specification book	P

11	**Packaging**		P
	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

Annex A	**Charging range of secondary lithium ion cells for safe use**		P
A.1	General		P
A.2	Safety of lithium-ion secondary battery		P
A.3	Consideration on charging voltage		P
A.3.1	General		P
A.3.2	Upper limit charging voltage		P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		N/A
A.3.2.3	Safety requirements, when different upper limit		N/A

IEC 62133: 2012			
Clause	**Requirement – Test**	**Result - Remark**	**Verdict**
	charging voltage is applied		
A.4	Consideration of temperature and charging current		P
A.4.1	General		P
A.4.2	Recommended temperature range		P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied		N/A
A.4.3	High temperature range		N/A
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
A.4.3.4	Safety consideration when specifying new upper limit in high temperature range		N/A
A.4.4	Low temperature range		N/A
A.4.4.1	General		N/A
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		N/A
A.4.5	Scope of the application of charging current		P
A.5	Sample preparation		N/A
A.5.1	General		N/A
A.5.2	Insertion procedure for nickel particle to generate internal short		N/A
	The insertion procedure carried out at 20℃±5℃ and under -25℃ of dew point		N/A
A.5.3	Disassembly of charged cell		N/A
A.5.4	Shape of nickel particle		N/A
A.5.5	Insertion of nickel particle to cylindrical cell		N/A
A.5.5.1	Insertion of nickel particle to winding core		N/A
A.5.5.2	Mark the position of nickel particle on the both end of winding core of the separator		N/A
A.5.6	Insertion of nickel particle to prismatic cell		N/A

	TABLE: Critical components information				P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity 1)
PCB	Interchangeable	Interchangeable	V-0, 130ºC	UL 796	UL approved
Lead wire	Interchangeable	Interchangeable	28AWG, VW-1, 80 ºC, 300V	UL 758	UL

7.2.1	TABLE: Continuous low rate charge (cells)					N/A
Sample No.	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

supplementary information:

- NF: No Fire
- NE: No Explosion
- NL: No Leakage
- Fire: the emission of flames from a cell or battery.
- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.
- Leakage: visible escape of liquid electrolyte.

7.2.2	TABLE: Vibration		N/A
Sample No.	Model	OCV at start of test, (Vdc)	Results

supplementary information:
- NF: No Fire
- NE: No Explosion
- NL: No Leakage
- Fire: the emission of flames from a cell or battery.
- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.
- Leakage: visible escape of liquid electrolyte.

7.3.1	TABLE: Incorrect installation (cells)		N/A
Sample No.	Model	OCV at reversed cell, (Vdc)	Results

supplementary information:
- NF: No Fire
- NE: No Explosion
- NL: No Leakage
- Fire: the emission of flames from a cell or battery.
- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.
- Leakage: visible escape of liquid electrolyte.

7.3.2	TABLE: External short circuit					N/A
Sample No.	Ambient temperature (At 20°C ± 5ºC or 55°C ± 5ºC)	OCV at start of test (Vdc)	Max. External Temperature (°C)	Resistance of Circuit (mΩ)	Charging temp. Upper limit (°C)	Results

supplementary information:
- NF: No Fire
- NE: No Explosion
- NL: No Leakage
- Fire: the emission of flames from a cell or battery.
- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.
- Leakage: visible escape of liquid electrolyte.

7.3.6	TABLE: Crush			N/A
Sample No.	Model	OCV at start of test (Vdc)	OCV at removal of crushing force, (Vdc)	Results

supplementary information:
- NF: No Fire
- NE: No Explosion
- NL: No Leakage
- Fire: the emission of flames from a cell or battery.
- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.
- Leakage: visible escape of liquid electrolyte.

7.3.8	TABLE: Overcharge				N/A
Sample No.	Model	OCV Prior to charging, (Vdc)	Maximum charge current, (A)	Time for charging, (Hours)	Results
supplementary information: - NF: No Fire - NE: No Explosion - NL: No Leakage - Fire: the emission of flames from a cell or battery. - Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled. - Leakage: visible escape of liquid electrolyte.					

7.3.9	TABLE: Forced discharge (cells)				N/A
Sample No.	Model	OCV before application of reverse charge (Vdc)	Measured Reverse Charge It (A)	Total Time for Reversed Charge Application (Min)	Results
supplementary information: - NF: No Fire - NE: No Explosion - NL: No Leakage - Fire: the emission of flames from a cell or battery. - Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled. - Leakage: visible escape of liquid electrolyte.					

8.2.1	TABLE: Continuous charging at constant voltage (cells)					P
Sample No.	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
C01	YKCDB-D10	CC/CV	5	2.0	4.2	NF,NE,NL
C02	YKCDB-D10	CC/CV	5	2.0	4.2	NF,NE,NL
C03	YKCDB-D10	CC/CV	5	2.0	4.2	NF,NE,NL
C04	YKCDB-D10	CC/CV	5	2.0	4.1	NF,NE,NL
C05	YKCDB-D10	CC/CV	5	2.0	4.0	NF,NE,NL

supplementary information:

- NF: No Fire
- NE: No Explosion
- NL: No Leakage
- Fire: the emission of flames from a cell or battery.
- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.
- Leakage: visible escape of liquid electrolyte.

8.3.1	TABLE: External short circuit (cells)					P
Sample No.	Ambient temperature (At 20°C ± 5ºC)	OCV at start of test (Vdc)	Maximum case temperature rise DT, (°C)	Resistance of Circuit (mΩ)	Charging temp. Upper limit (°C)	Results
After the test (Charging temp. Upper limit 45°C)						
C06	25.0	4.0	88.7	99.98	45	NF,NE
C07	25.0	4.1	86.1	100.0	45	NF,NE
C08	25.0	4.0	88.6	100.0	45	NF,NE
C09	25.0	4.1	84.2	99.98	45	NF,NE
C10	25.0	4.0	85.8	99.96	45	NF,NE
After the test (Charging temp. Lower limit -5°C)						
Sample No.	Ambient temperature (At 20°C ± 5ºC)	OCV at start of test (Vdc)	Maximum case temperature rise DT, (°C)	Resistance of Circuit (mΩ)	Charging temp. Lower limit (°C)	Results
C11	25.0	4.0	88.5	100.0	5	NF,NE
C12	25.0	4.1	87.3	100.0	5	NF,NE
C13	25.0	4.1	90.1	100.0	5	NF,NE
C14	25.0	4.0	85.9	99.97	5	NF,NE
C15	25.0	4.1	87.4	99.99	5	NF,NE

supplementary information

- NF: No Fire
- NE: No Explosion
- Fire: the emission of flames from a cell or battery.
- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

8.3.2	TABLE: External short circuit (battery)					P
Sample No.	Ambient temperature (At 55°C ± 5ºC)	OCV at start of test (Vdc)	Maximum case temperature rise DT, (°C)	Resistance of Circuit (mΩ)	Charging temp. Upper limit (°C)	Results
After the test (Charging temp. Upper limit 45°C)						
B01	55℃	4.2	56.5	100	45	NF,NE

B02	55℃	4.2	56.6	100	45	NF,NE
B03	55℃	4.2	57.1	100	45	NF,NE
B04	55℃	4.2	55.7	100	45	NF,NE
B05	55℃	4.2	56.5	100	45	NF,NE
After the test (Charging temp. Lower limit 5°C)						
Sample No.	Ambient temperature (At 55°C ± 5ºC)	OCV at start of test (Vdc)	Maximum case temperature rise DT, (°C)	Resistance of Circuit (mΩ)	Charging temp. Lower limit (°C)	Results
B06	55℃	4.2	55.8	100	5	NF,NE
B07	55℃	4.2	56.3	100	5	NF,NE
B08	55℃	4.2	56.5	100	5	NF,NE
B09	55℃	4.2	55.7	100	5	NF,NE
B10	55℃	4.2	55.8	100	5	NF,NE
supplementary information - NF: No Fire - NE: No Explosion - Fire: the emission of flames from a cell or battery. - Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.						

8.3.6	TABLE: Over-charging of battery				P
Constant charging current (A) .... :			2.0		—
Supply voltage (Vdc) .... :			4.2		—
Sample No.	Model	OCV before charging, (Vdc)	Maximum outer casing temperature,(°C)	Results	
B11	YKCDB-D10	4.2	27.6	NF,NE	
B12	YKCDB-D10	4.2	27.4	NF,NE	
B13	YKCDB-D10	4.2	26.8	NF,NE	
B14	YKCDB-D10	4.2	27.4	NF,NE	
B15	YKCDB-D10	4.2	27.6	NF,NE	
Supplementary information: - No fire - No explosion					

8.3.7	TABLE: Forced discharge (cells)				P
Sample no.	Model	OCV before application of reverse charge (Vdc)	Measured Reverse Charge It (A)	Total Time for Reversed Charge Application (Min)	Results
C39	YKCDB-D10	4.0	2.0	90	NF,NE
C40	YKCDB-D10	4.1	2.0	90	NF,NE

C41	YKCDB-D10	4.1	2.0	90	NF,NE
C42	YKCDB-D10	4.0	2.0	90	NF,NE
C43	YKCDB-D10	4.1	2.0	90	NF,NE

supplementary information:

- NF: No Fire
- NE: No Explosion
- Fire: the emission of flames from a cell or battery.
- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

8.3.9	TABLE: Forced internal short circuit (cells)					P
Sample No.	Model	Chamber ambient (℃)	OCV at start of test, (Vdc)	Particle location [1)]	Maximum applied pressure, (N)	Results

Supplementary information:

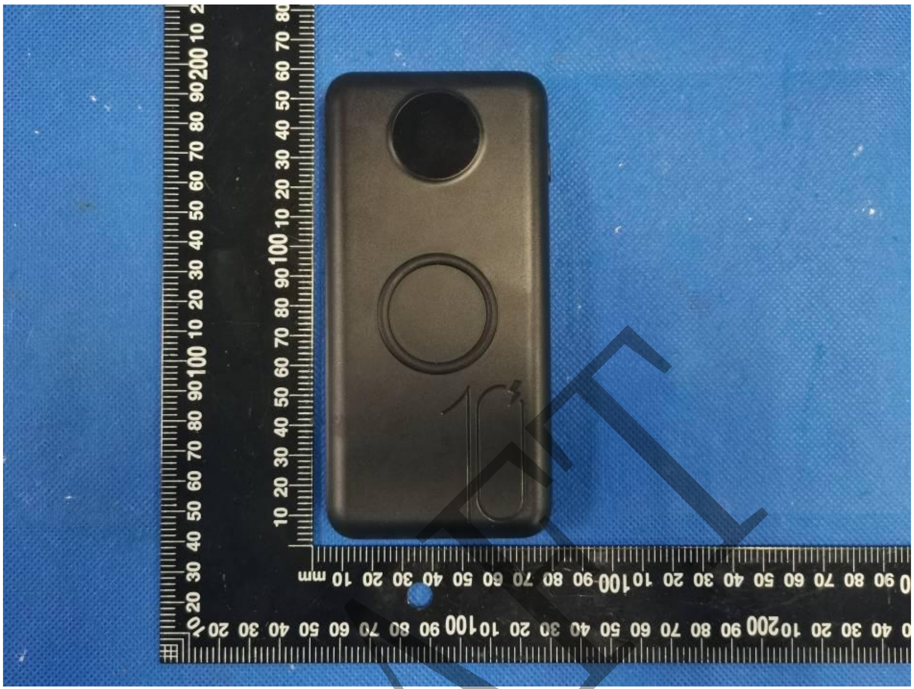
1) Identify one of the following:

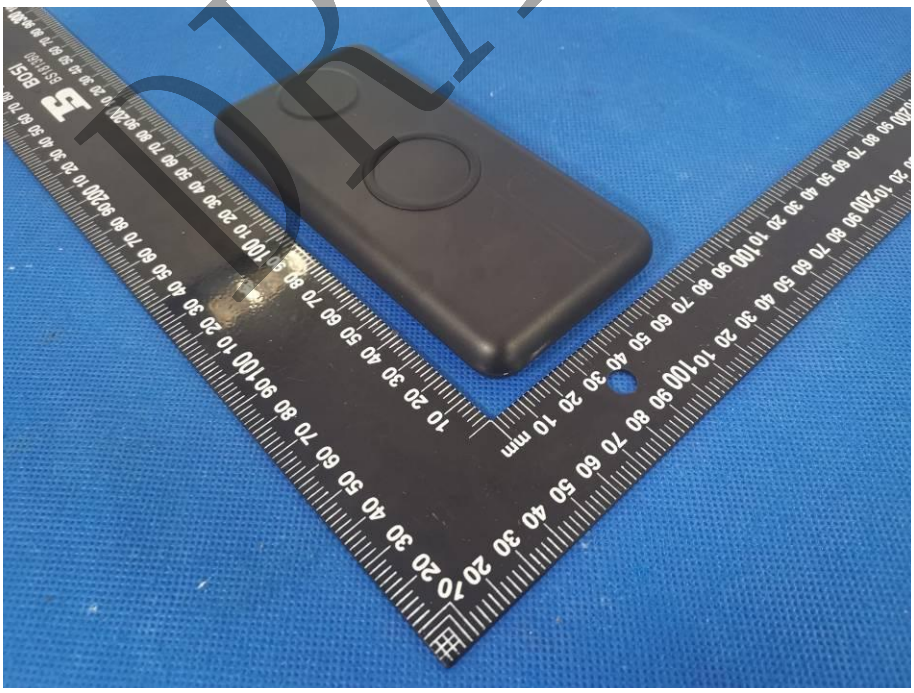
1: Nickel particle inserted between positive and negative (active material) coated area.

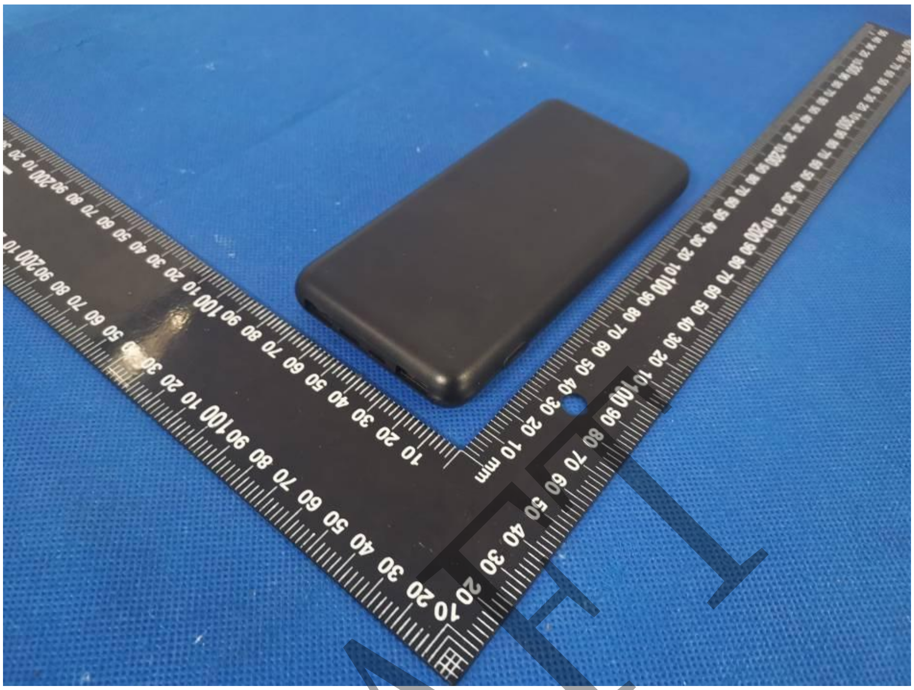
2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

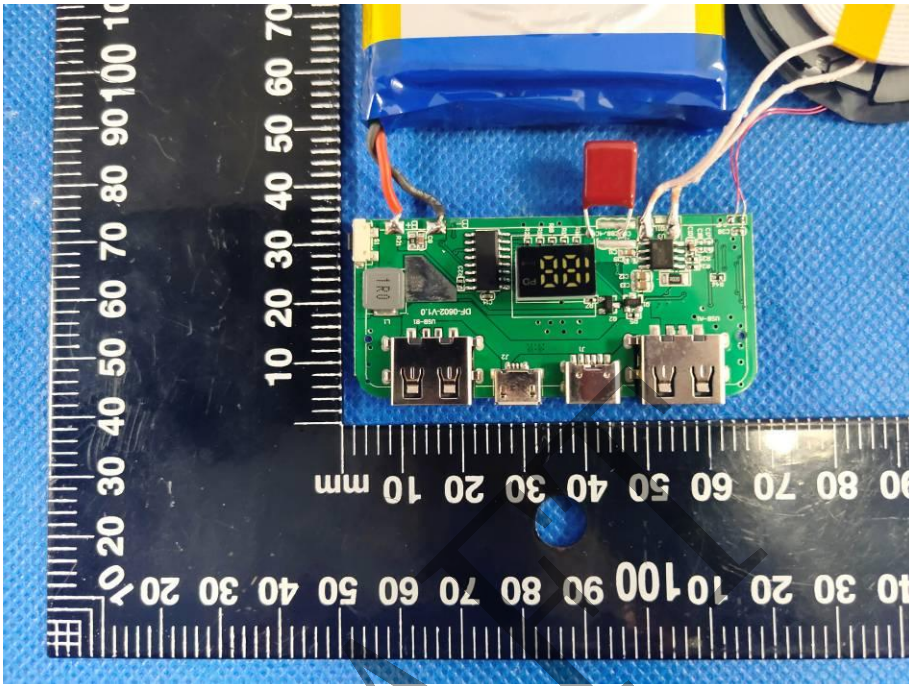
- No fire

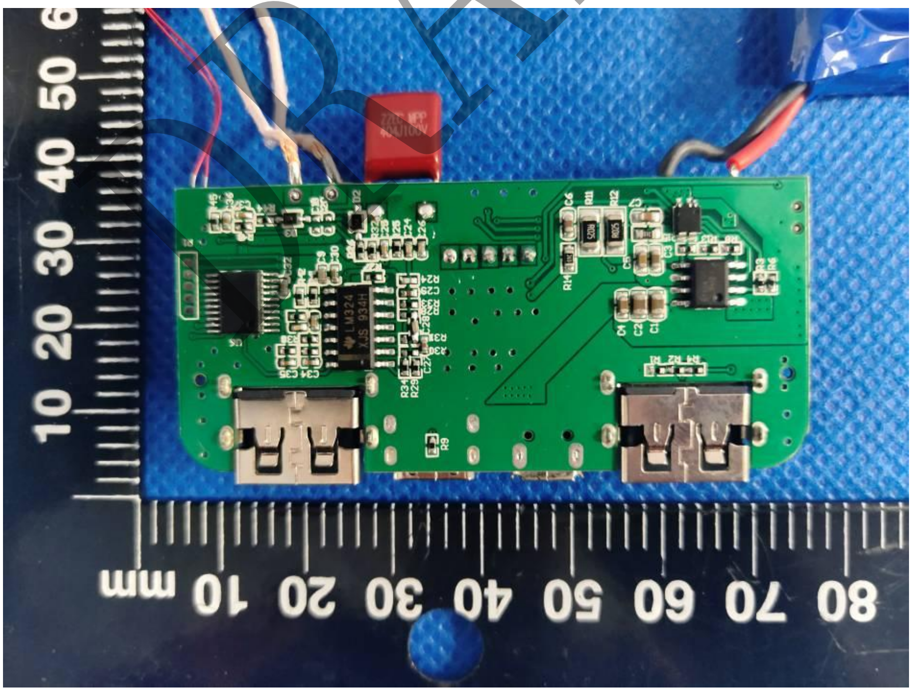
ANNEX A:
EUT PHOTOGRAPHS











***** End of Test Report *****