EN 62133-1 TEST REPORT

For

Ni-MH Battery Pack

Model: 2/3AAA 300MAH

Prepared for: Shenzhen Huashengyuan Technology Co., LTD
No.17, Tianliao New Village, Gongming Street, Guangming New District,
Shenzhen City, Guangdong Province

Prepared by: Shenzhen NCT Testing Technology Co., Ltd.
B2A101/B2A201/B2A202, Fuqiao 6th Area, Xintian, Fuhai Subdistrict,
Bao'an District, Shenzhen, Guangdong, China

Report Number: NCT240021016XI1-1
Date of Test: 2024-01-02 to 2024-02-04
Date of Issue: 2024-02-05

Tested By: Miller Gao Reviewed By: Miya Li Approved By: Boris Lin

Miller Gao Miya Li Boris Lin

Seal of NCT:

The results detailed in this test report relate only to the specific sample(s) tested. This report is not to be reproduced except in full, without written approval from NCT Testing Technology.

TEST REPORT
EN 62133-1

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 1: Nickel systems

Report Number. ..... :	NCT240021016XI1-1
Date of issue ..... :	2024-02-05
Total number of pages	18 pages
Applicant's name ..... :	Shenzhen Huashengyuan Technology Co., LTD
Address ..... :	No.17, Tianliao New Village, Gongming Street, Guangming New District, Shenzhen City, Guangdong Province
Test specification:	
Standard ..... :	EN 62133-1:2017
Test procedure ..... :	Test Report
Non-standard test method ..... :	N/A
Test item description ..... :	Ni-MH Battery Pack
Trade Mark ..... :	N/A
Manufacturer ..... :	Same as applicant
Address ..... :	Same as applicant
Model/Type reference ..... :	2/3AAA 300MAH
Ratings ..... :	2.4V, 300mAh

Testing procedure and testing location:

Testing Laboratory:

Testing location/ address .....: Shenzhen NCT Testing Technology Co., Ltd.

B2A101/B2A201/B2A202, Fuqiao 6th Area, Xintian, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

List of Attachments:

Appendix 1: 3 pages of Photo Documentation

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**

cl.7.1 Charging procedure for test purposes (for Cells and Batteries);
cl.7.2.1 Continuous low-rate charging(cells);
cl.7.2.2 Vibration(cells and batteries);
cl.7.2.4 Temperature cycling(cells and batteries);
cl.7.3.1 Incorrect installation(cells);
cl.7.3.2 External short circuit(cells and batteries);
cl.7.3.3 Free fall(cells and batteries);
cl.7.3.4 Mechanical shock(cells and batteries);
cl.7.3.5 Thermal abuse(cells);
cl.7.3.6 Crushing of cells;
cl.7.3.7 Low pressure(cells);
cl.7.3.8 Overcharge(cells and batteries);
cl.7.3.9 Forced discharge(cells)
Tests are made with the number of cells and batteries specified in EN 62133-1: 2017 Table 1.
	Shenzhen NCT Testing Technology Co., Ltd.
	B2A101/B2A201/B2A202, Fuqiao 6th Area, Xintian, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

Summary of compliance with National Differences

N/A

☒ The product fulfils the requirements of IEC 62133-1: 2017

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.

Ni-MH Battery Pack 2HRMT10/29

Model: 2/3AAA 300MAH

Rated: 2.4V 300mAh

+ Charge: 0.1C/16h -

Shenzhen Huashengyuan Technology Co., LTD

YYYYMMDD

Test item particulars .....:	
Classification of installation and use .....:	Portable battery
Supply connection .....:	DC Contact
Recommend charging method declared by the manufacturer ..... :	Charging at 30mA constant current for 16 hours at ambient 20°C±5°C
Discharge current (0,2 I_t A) ..... :	60mA
Specified final voltage ..... :	2.0V
Chemistry ..... :	nickel systems
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 ..... :	2024-01-02
Date (s) of performance of tests..... :	2024-01-02 to 2024-02-04

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) .....:	Same as applicant

General product information:

EUT in this report are Ni-MH packs which intend for portable use.

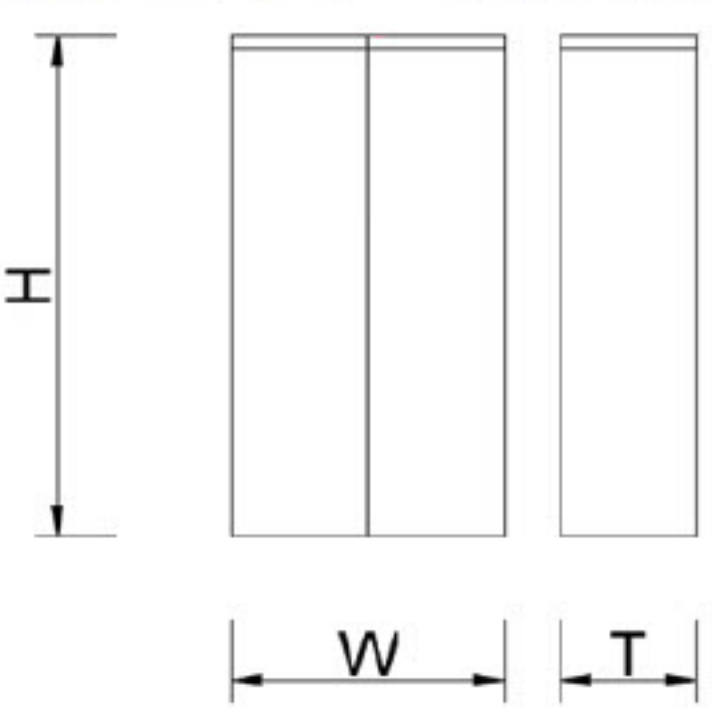
The main features of the cells in the battery pack are shown as below:

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
2/3AAA 300MAH 1.2V (Cell)	300mAh	1.2V	60mA	60mA	300mA	300mA	---	1.0V

The main features of the battery pack are shown as below:

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
2/3AAA 300MAH	300mAh	2.4V	60mA	60mA	300mA	300mA	---	2.0V

Construction:



H: 29.2mm, W: 19.2mm, T: 9.6mm

Battery Pack

Circuit Diagram:

N/A

EN 62133-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	**Parameter measurement tolerances**		**P**
	Parameter measurement tolerances		P
5	**General safety considerations**		**P**
5.1	General		P
5.2	Insulation and wiring		P
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ		N/A
	Insulation resistance (MΩ) ..... :		—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		P
	Orientation of wiring maintains adequate creepage and clearance distances between conductors		P
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse		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 top side of cylindrical cell.	P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief		N/A
5.4	Temperature, voltage and current management		P
	Batteries are designed such that abnormal temperature-rise conditions are prevented		N/A
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	See above.	P
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that associated chargers are designed to maintain charging within the temperature, voltage and current limits specified	The charging limits specified in the battery specifications.	P
5.5	Terminal contacts		P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current		P

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Clause	Requirement + Test	Result - Remark	Verdict
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		P
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	Assembly of cells into batteries		P
5.6.1	If there is more than one battery housed in a single battery case, cells used in the assembly of each battery have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer	Complied, 2S1P.	P
	Battery has some type of safety device or feature for charging.		N/A
	Manufacturers of cells specify current, voltage and temperature limits so that the battery manufacturer /designer may ensure proper design and assembly		P
	Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate circuitry to prevent operation of cells outside the limits specified by the cell manufacturer		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 document		N/A
5.7	Quality plan		P
	The manufacturer prepares and implements a quality plan that defines procedures for the inspection of materials, components, cells and batteries and which covers the whole process of producing each type of cell or battery	Quality plan provided.	P

6	**Type test and sample size**		**P**
	Tests were made with the number of cells or batteries specified in Table 1 using cells or batteries that are not more than six months old	Complied.	P
	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 ± 5°C	P

7	**Specific requirements and tests**		**P**
7.1	Charging procedure for test purposes	Test is carried out at 20℃±5℃.	P

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Clause	Requirement + Test	Result - Remark	Verdict
7.2	Intended use	See tests below.	P
7.2.1	Continuous low-rate charging (cells)		P
	Results: No fire. No explosion	No fire. No explosion. (See Table 7.2.1)	P
7.2.2	Vibration		P
	Results: No fire. No explosion. No leakage	No fire. No explosion. No leakage. (See Table 7.2.2)	P
7.2.3	Case stress at high ambient temperature(batteries)	No such moulded case.	N/A
	Oven temperature (°C)..... :		—
	Results: No physical distortion of the battery case resulting in exposure of internal protective components and cells		N/A
7.2.4	Temperature cycling	Tested and complied.	P
	Results: No fire. No explosion. No leakage.	No fire. No explosion. No leakage.	P
7.3	Reasonably foreseeable misuse		P
7.3.1	Incorrect installation (cells)		P
	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		P
	- A stabilized dc power supply.		N/A
	Results: No fire. No explosion..... :	No fire. No explosion. (See Table 7.3.1)	P
7.3.2	External short circuit	See below.	P
	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		P
	Results: No fire. No explosion..... :	No fire. No explosion. (See Table 7.3.2)	P
7.3.3	Free fall		P
	Results: No fire. No explosion.	No fire. No explosion.	P
7.3.4	Mechanical shock (crash hazard)		P
	Results: No fire. No explosion. No leakage.	No fire. No explosion. No leakage.	P
7.3.5	Thermal abuse (cells)		P
	Oven temperature (°C)..... :	130°C	—

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Clause	Requirement + Test	Result - Remark	Verdict
	Results: No fire. No explosion.	No fire. No explosion.	P
7.3.6	Crushing of cells		P
	The crushing force was released upon: - The maximum force of 13 kN ± 0.78 kN has been applied; or		P
	- 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..... :	No fire. No explosion. (See Table 7.3.6)	P
7.3.7	Low pressure (cells)		P
	Chamber pressure (kPa)..... :	11.6kPa	—
	Results: No fire. No explosion. No leakage.	No fire. No explosion. No leakage.	P
7.3.8	Overcharge		P
	Results: No fire. No explosion..... :	No fire. No explosion. (See Table 7.3.8)	P
7.3.9	Forced discharge		P
	Results: No fire. No explosion..... :	No fire. No explosion. (See Table 7.3.9)	P

8	**Information for safety**		**P**
8.1	General		P
	The manufacturer of secondary cells ensures that information is provided about current, voltage and temperature limits of their products.	Complied.	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
	Guidance is provided in IEC TR 62188 on the design are provided for information in Annex A and Annex B.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.2	Small cell and battery safety information	Small cells and batteries.	P
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:	Information for safety mentioned on equipment's package.	P
	-Keep small cells and batteries which are considered swallowable out of the reach of children.		P
	-Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2h of ingestion.		P
	-In case of ingestion of a cell or battery, seek medical assistance promptly.		P
9	**Marking**		**P**
9.1	Cell marking		N/A
	Cells marked as specified in the applicable cell standards: IEC 61951-1 or IEC 61951-2.	The final product is battery.	N/A
	By agreement between the cell manufacturer and the battery and/or end product manufacturer, component cells used in the manufacture of a battery need not be marked.		N/A
	However, cell marking can be indicated with the battery, the instructions and/or the specifications.		N/A
9.2	Battery marking		P
	Batteries marked as specified in the applicable cell standards: IEC 61951-1 or IEC 61951-2.	The battery is marked in accordance with IEC 61951-2, also see page 3.	P
	Batteries marked with an appropriate caution statement.		N/A
	Terminals have clear polarity marking on the external surface of the battery.	The "+" and "-" polarity explicitly marked on surface of the battery.	P
	Batteries with keyed external connector need not be marked with polarity markings if the design of the external connector prevents reverse polarity connections		N/A
9.3	Caution for ingestion of small cells and batteries		N/A
	Small cells and batteries determined to be small are including a caution statement regarding the hazards of ingestion in accordance with 8.2.	Not coin cells	N/A

EN 62133-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion are given on the immediate package.	Not intended for direct sale.	N/A
9.4	Other information		P
	Storage and disposal instructions marked on or supplied with the battery.	Information for storage and disposal instructions mentioned in manufacturer's specifications.	P
	Recommended charging instructions marked on or supplied with the battery.	Information for recommended charging instructions mentioned in manufacturer's specifications.	P
10	**Packaging**		**P**
	Packaging for button cells are not be small enough to fit within the limits of the ingestion gauge of Figure 2	Complied.	P
	Annex C for information regarding packaging		P
Annex A (informative)	**Recommendations to equipment manufacturers and battery assemblers**		N/A
Annex B (informative)	**Recommendations to the end-users**		N/A
Annex C (informative)	**Packaging**		N/A

5.1 – 5.6	TABLE: Critical components information				P
Object/part no.	**Manufacturer/ trademark**	**Type/model**	**Technical data**	**Standard**	**Mark(s) of conformity**
Cell	Shenzhen Huashengyuan Technology Co., LTD	2/3AAA 300MAH 1.2V	300mAh, 1.2V	EN 62133-1: 2017	Test with compliance
-Positive electrode	--	--	Nickel (56.5%)+Zinc (4.0%) + Cobalt(1.5%) +Oxyhydrogen (38.0%)	--	--
-Negative electrode	--	--	Nickel (55.0%)+Cobalt (61%)+Manganese (4.8%)+Aluminium (1.9%)+Rare earth (32.2%)	--	--
-Separator	--	--	PP100%, Shutdown temperature: 120°C.	--	--
-Electrolyte	--	--	KOH: 18.4%, NaOH: 15.4%, LiOH: 1.7%, H2O: 64.5%	--	--
Supplementary information: N/A					

7.2.1	TABLE: Continuous low rate charge (Cells)				P
Model	**Recommended charging method, (CC, CV, or CC/CV)**	**Recommended charging voltage V_c, (Vdc)**	**Recommended charging current I_{rec}, (A)**	**OCV at start of test, (Vdc)**	**Results**
Cell #1	CC	--	0.06	1.41	P
Cell #2	CC	--	0.06	1.42	P
Cell #3	CC	--	0.06	1.41	P
Cell #4	CC	--	0.06	1.42	P
Cell #5	CC	--	0.06	1.41	P

Supplementary information:
- No fire or explosion

7.2.2	TABLE: Vibration (Cells)		P
Model	**OCV at start of test, (Vdc)**	**Results**	
Cell #1	1.42	P	
Cell #2	1.41	P	
Cell #3	1.42	P	
Cell #4	1.41	P	
Cell #5	1.42	P	

Supplementary information:
- No fire or explosion
- No leakage

7.2.2	TABLE: Vibration (Batteries)		P
Model	**OCV at start of test, (Vdc)**	**Results**	
Battery #1	2.84	P	
Battery #2	2.85	P	
Battery #3	2.84	P	
Battery #4	2.85	P	
Battery #5	2.85	P	

Supplementary information:
- No fire or explosion
- No leakage

7.3.1	TABLE: Incorrect installation (Cells)	P

Model	OCV of reversed cell, (Vdc)	Results
Cell #1	1.41	P
Cell #2	1.42	P
Cell #3	1.42	P
Cell #4	1.41	P
Cell #5	1.42	P

Supplementary information:
- No fire or explosion

7.3.2	TABLE: External short circuit (Cells)	P

Model	Ambient (at 20°C ± 5°C or 55°C ± 5°C)	OCV at start of test, (Vdc)	Resistance of circuit, (Ω)	Maximum case temperature ~~rise~~ ΔT, (°C)	Results
Cell #1	23.0	1.42	0.079	106.9	P
Cell #2	23.0	1.41	0.076	111.7	P
Cell #3	23.0	1.42	0.083	113.3	P
Cell #4	23.0	1.41	0.078	109.5	P
Cell #5	23.0	1.41	0.079	106.8	P
Cell #6	56.0	1.42	0.077	108.2	P
Cell #7	56.0	1.41	0.082	105.4	P
Cell #8	56.0	1.42	0.078	107.8	P
Cell #9	56.0	1.41	0.085	109.7	P
Cell #10	56.0	1.42	0.080	106.9	P

Supplementary information:
- No fire or explosion

7.3.2	TABLE: External short circuit (Batteries)	P

Model	Ambient (at 20°C ± 5°C or 55°C ± 5°C)	OCV at start of test, (Vdc)	Resistance of circuit, (Ω)	Maximum case temperature ~~rise~~ ΔT, (°C)	Results
Battery #1	23.0	2.84	0.083	107.8	P
Battery #2	23.0	2.83	0.078	105.2	P
Battery #3	23.0	2.83	0.083	108.6	P
Battery #4	23.0	2.83	0.077	106.7	P
Battery #5	23.0	2.84	0.085	109.3	P

Battery #6	56.0	2.83	0.079	107.5	P
Battery #7	56.0	2.84	0.077	105.8	P
Battery #8	56.0	2.83	0.084	104.7	P
Battery #9	56.0	2.84	0.078	108.5	P
Battery #10	56.0	2.83	0.080	106.2	P

Supplementary information:
- No fire or explosion

7.3.6	TABLE: Crush (Cells)		P
Model	**OCV at start of test, (Vdc)**	**OCV at removal of crushing force, (Vdc)**	**Results**
Cell #1	1.41	0.58	P
Cell #2	1.42	0.57	P
Cell #3	1.42	0.62	P
Cell #4	1.41	0.56	P
Cell #5	1.42	0.60	P

Supplementary information:
- No fire or explosion

7.3.8	TABLE: Overcharge (Cells)			P
Model	**OCV prior to charging, (Vdc)**	**Maximum charge current, (A)**	**Time for charging, (hours)**	**Results**
Cell #1	1.14	0.75	1.0	P
Cell #2	1.15	0.75	1.0	P
Cell #3	1.16	0.75	1.0	P
Cell #4	1.15	0.75	1.0	P
Cell #5	1.14	0.75	1.0	P

Supplementary information:
- No fire or explosion

7.3.8	TABLE: Overcharge (Batteries)			P
Model	**OCV prior to charging, (Vdc)**	**Maximum charge current, (A)**	**Time for charging, (hours)**	**Results**
Battery #1	2.28	0.75	1.0	P
Battery #2	2.29	0.75	1.0	P

Battery #3	2.28	0.75	1.0	P
Battery #4	2.30	0.75	1.0	P
Battery #5	2.28	0.75	1.0	P

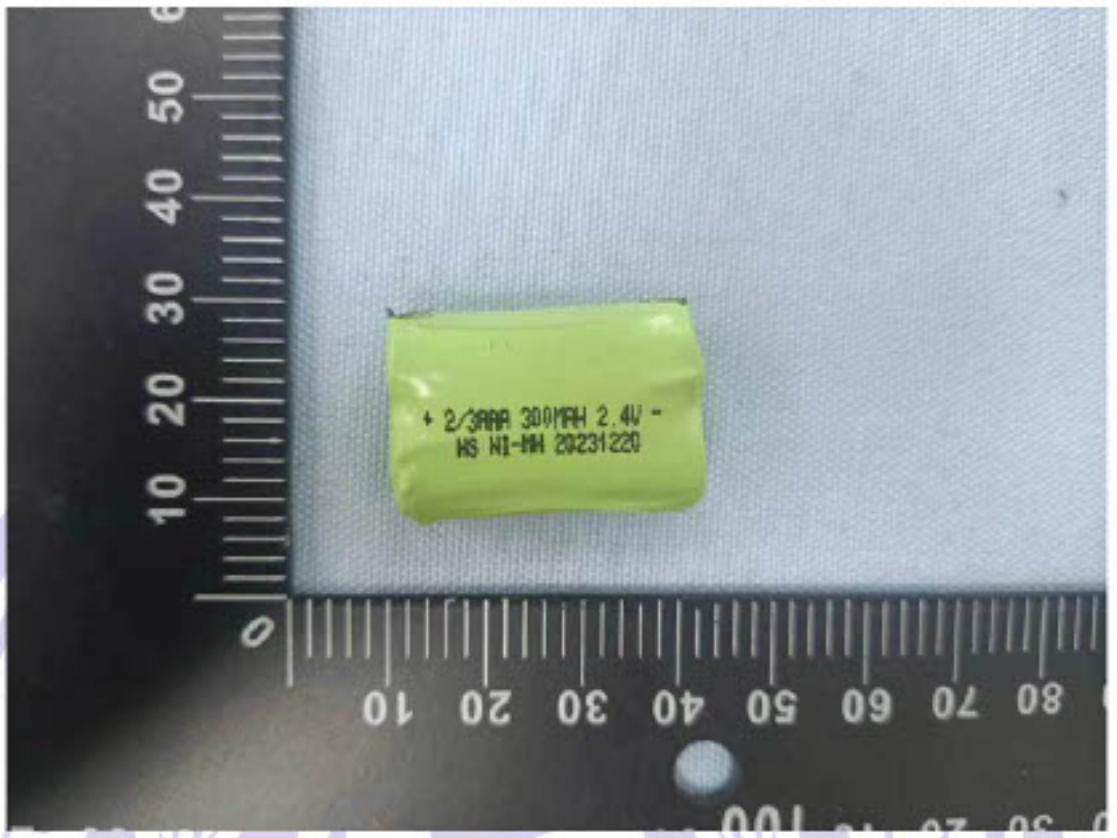
Supplementary information:
- No fire or explosion

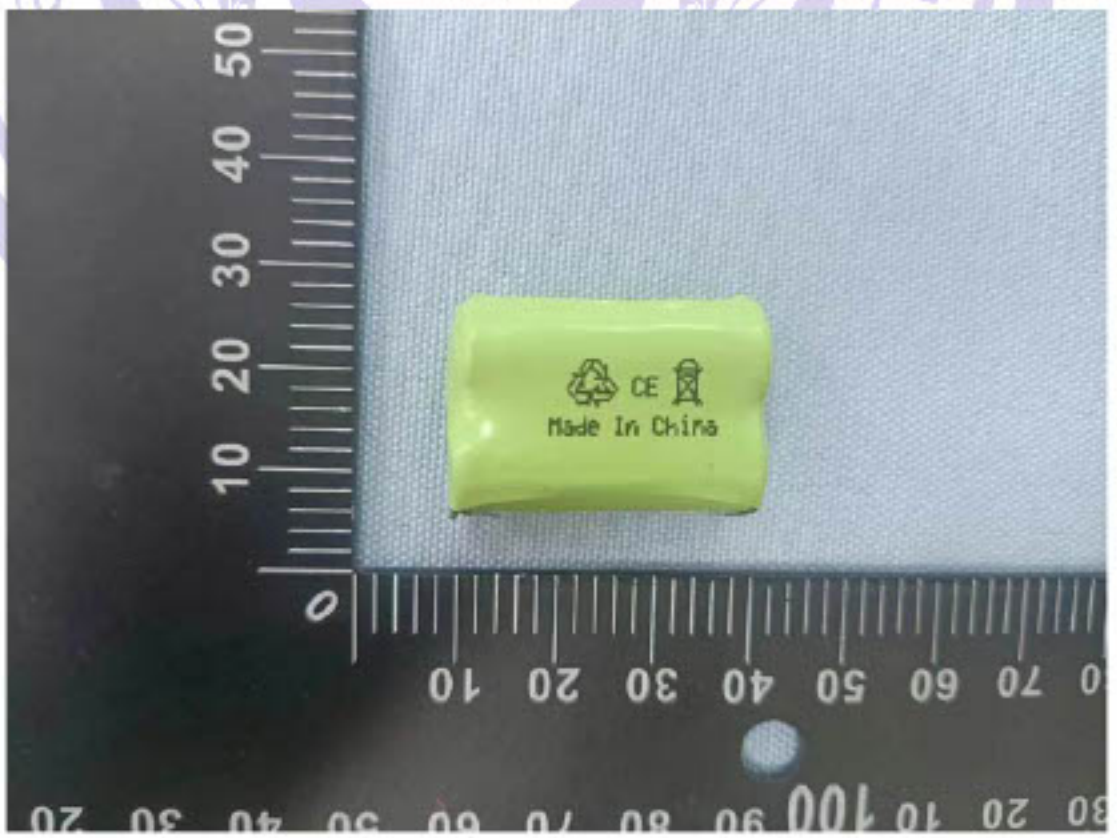
7.3.9	TABLE: Forced discharge (cells)			P
Model	**OCV before application of reverse charge, (Vdc)**	**Measured reverse charge I_t, (A)**	**Time for reversed charge, (minutes)**	**Results**
Cell #1	1.15	0.30	90	P
Cell #2	1.16	0.30	90	P
Cell #3	1.15	0.30	90	P
Cell #4	1.14	0.30	90	P
Cell #5	1.16	0.30	90	P

Supplementary information:
- No fire or explosion

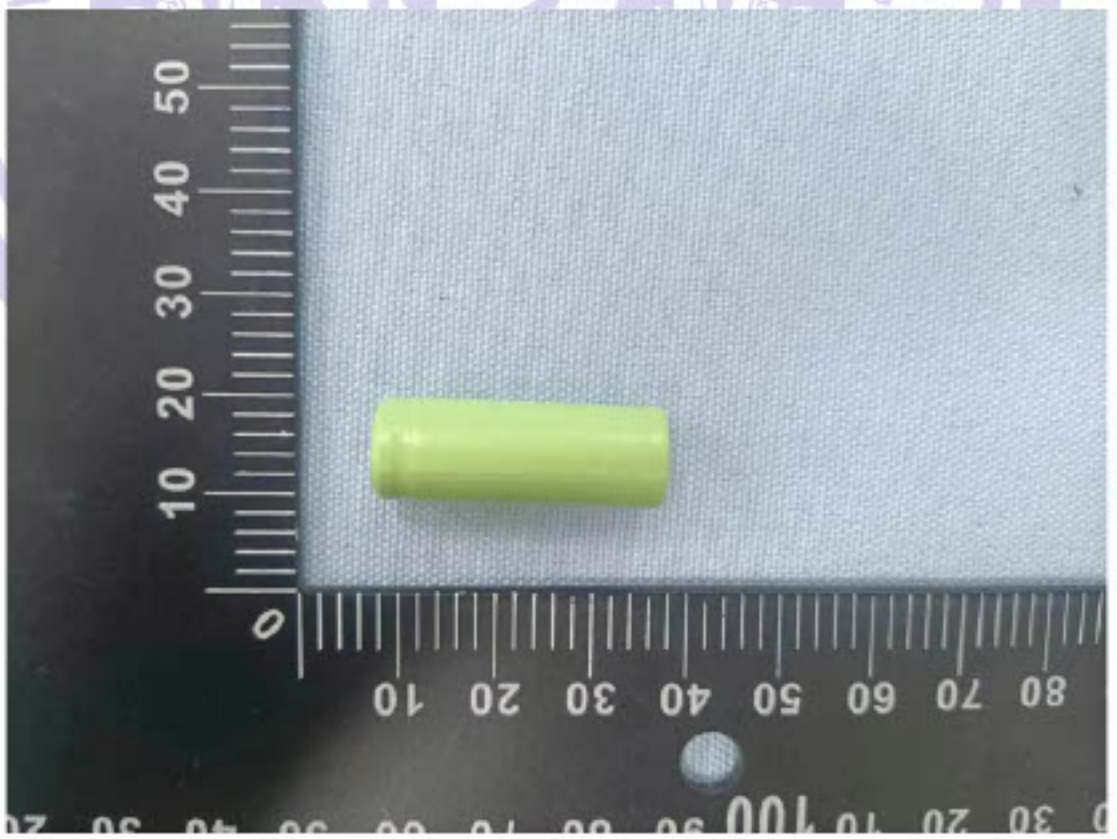
Appendix 1

Photo Documentation

Details of:	Fig.1–Front view of battery 2/3AAA 300MAH
	

Details of:	Fig. 2–Back view of battery 2/3AAA 300MAH
	

Details of:	Fig.3–Front view of cell 2/3AAA 300MAH 1.2V
	

Details of:	Fig.4– Back view of cell 2/3AAA 300MAH 1.2V
	

---End of Test Report---