



**TEST REPORT**  
**EN 62133**  
**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 Number**..... : WL19J0203-T  
**Project Number**..... : WL19J0203  
**Date of issue**..... : 2019-11-08  
**Total number of pages** ..... : 25



**Name of Testing Laboratory preparing the Report** ..... : Wendell Electrical Testing Lab.  
 5F., No.4, Ln. 7, Baogao Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)

**Applicant's name** ..... : Elite Screens Visual & Sound Co., Ltd.  
**Address**..... : 3F., No. 88, Wugong Rd., Xinzhuang Dist., New Taipei City 242, Taiwan (R.O.C.)

**Test specification:**  
**Standard** ..... : EN 62133:2013  
**Test procedure** ..... : Type test  
**Non-standard test method** ..... : N/A

<b>Test item description</b> ..... :	Rechargeable Li-ion Battery Pack
<b>Trade Mark</b> ..... :	--
<b>Manufacturer</b> ..... :	Formosa Electronic Industries., Inc. 5F, No8, Lane 130, Ming Chuan Rd. Hsin Tien City, Taipei Hsien, Taiwan R.O.C
<b>Model/Type reference</b> ..... :	10PB-MG10001-AA
<b>Ratings</b> ..... :	14.52Vdc, 10500mAh


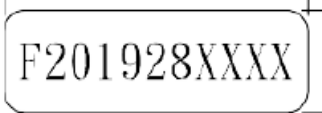
**Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):**

<input checked="" type="checkbox"/>	<b>Testing Laboratory:</b>	Wendell Electrical Testing Lab.
	<b>Testing location/ address</b> .....	5F., No.4, Ln. 7, Baogao Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)
	<b>Tested by (name, function, signature)..... :</b>	Albert Wang (Project Handler) 
	<b>Approved by (name, function, signature) .. :</b>	Ken Wu (Reviewer) 



## Report release record

Report No.	Description	Issue date
WL19J0203-T	Original	2019-11-08

<b>Summary of testing:</b>	
<b>Tests performed (name of test and test clause):</b> The sample(s) tested complies with the requirements of EN 62133:2013	<b>Testing location:</b> Wendell Electrical Testing Lab. 5F., No.4, Ln. 7, Baogao Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)
<b>Copy of marking plate:</b> 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. (Representative)	
<p style="text-align: center;"> <b>ReChargeable Li-ion Battery Pack</b>  <b>10PB-MG10001-AA</b>  <b>DC 14.52V/10500mAH/135Wh</b>  <b>Caution:</b>  <b>Use only specified charger</b>  <b>Do not short-circuit battery</b>  <b>Do not dispose of in fire</b>  <b>Do not expose above 40°C</b> </p> <div style="text-align: right;">  </div> <div style="text-align: center; margin-top: 20px;">  </div>	
<b>Note:</b> 1. Date Code: F201928XXXX is production code. The “F” means the manufacturer name Formosa, The “2019” means the production YEAR, The “28” means the production WEEK of the year, ex. The “28” means the 28 <sup>th</sup> week of the year, The “XXXX” means the serial number, ex. 0001~9999.	



<b>Test item particulars</b> .....:	
<b>Recommend charging method declared by the manufacturer</b> .....	CC/CV
<b>Discharge current (0,2 I<sub>t</sub> A)</b> .....	1860mA
<b>Specified final voltage</b> .....	11.2Vdc
<b>Chemistry</b> .....	<input type="checkbox"/> nickel systems ..... <input checked="" type="checkbox"/> lithium systems
<b>Recommend of charging limit for lithium system</b>	
<b>Upper limit charging voltage per cell</b> .....	4.25Vdc
<b>Maximum charging current</b> .....	4875mA
<b>Charging temperature upper limit</b> .....	45 °C
<b>Charging temperature lower limit</b> .....	0 °C
<b>Polymer cell electrolyte type</b> .....	<input type="checkbox"/> gel polymer ..... <input type="checkbox"/> solid polymer
<b>Possible test case verdicts:</b>	
- 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)
<b>Testing</b> .....:	
<b>Date of receipt of test item</b> .....	2019-10-02
<b>Date (s) of performance of tests</b> .....	2019-10-02 – 2019-11-04
<b>General remarks:</b>	
<p>"(See Enclosure #)" refers to additional information appended to the report.          "(See appended table)" refers to a table appended to the report.          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.          The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with OD-5014 recommendations, and is traceable to recognized national standards.          Therefore, the measurement uncertainty is not used in determining the Pass/Fail results at this report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
<b>General product information and other remarks:</b>	
<p>Rechargeable Li-ion battery, including four sets of three parallel connected cells connected in series and protective circuit.</p> <p>The cell type INR18650F1L was tested according to IEC62133 2nd in CB test report: BA-4786864948-A-1, issue on 2015-03-25, issued by Underwrites Laboratories Taiwan Co. Ltd., CB certificate: DK-44360-UL, issued on 2015-03-26, issued by UL(Demko)</p>	



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Clause	Requirement + Test	Result - Remark	Verdict
<b>4</b>	<b>Parameter measurement tolerances</b>		P
	Parameter measurement tolerances		P
<b>5</b>	<b>General safety considerations</b>		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	Considered	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/current management		P
	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
	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 user manual.	P
5.5	Terminal contacts	See below	P



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Clause	Requirement + Test	Result - Remark	Verdict
	Terminals have a clear polarity marking on the external surface of the battery	These terminals have its particular connector. No fear of polarity misuse.	P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	Checked	P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance	Checked	P
	Terminal contacts are arranged to minimize the risk of short circuits	Checked	P
5.6	Assembly of cells into batteries	See below	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		P
	Each battery has an independent control and protection	Check	P
	Manufacturers of cells make recommendations about current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly	Check	P
	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	Check	P
	When testing a battery, the manufacturer of the battery provides a test report confirming the compliance according to this standard	Check	P
5.6.2	Design recommendation for lithium systems only	See below	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		N/A
	- Charging voltage of the cell does not exceed the different upper limit of the charging voltage determined through Clause 8.1.2, NOTE 1.	Charging voltage of the cell does not exceed the upper limit of the charging voltage 4.25 V/cell	P



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Clause	Requirement + Test	Result - Remark	Verdict
	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 cellblocks by measuring the voltage of every single cell or the single cellblocks		N/A
5.7	Quality plan	See below	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	The manufacturer has provided an ISO 9001 certificate	P
<b>6</b>	<b>Type test conditions</b>		P
	Tests were made with the number of cells or batteries specified in Table 1 for nickel-cadmium and nickel-metal hydride systems and Table 2 for lithium systems, using cells or batteries that are not more than six months old		P
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.	Testing was conducted in an ambient of 20 ± 5 °C, unless otherwise specified	P
<b>7</b>	<b>Specific requirements and tests (nickel systems)</b>		N/A
7.1	Charging procedure for test purposes	The EUT is a lithium systems	N/A
7.2	Intended use		N/A
7.2.1	Continuous low-rate charging (cells)		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	Results: No fire. No explosion		N/A
7.2.2	Vibration		N/A
	Results: No fire. No explosion. No leakage		N/A
7.2.3	Moulded case stress at high ambient temperature		N/A
	Oven temperature (°C)..... :		—
	Results: No physical distortion of the battery casing resulting in exposure if internal components		N/A
7.2.4	Temperature cycling		N/A
	Results: 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
	Results: No fire. No explosion..... :		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
	Results: No fire. No explosion..... :		N/A
7.3.3	Free fall		N/A
	Results: No fire. No explosion.		N/A
7.3.4	Mechanical shock (crash hazard)		N/A
	Results: No fire. No explosion. No leakage.		N/A
7.3.5	Thermal abuse		N/A
	Oven temperature (°C)..... :		—
	Results: No fire. No explosion.		N/A
7.3.6	Crushing of cells		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		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	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..... :		N/A
7.3.7	Low pressure		N/A
	Chamber pressure (kPa)..... :		—
	Results: No fire. No explosion. No leakage.		N/A
7.3.8	Overcharge		N/A
	Results: No fire. No explosion..... :		N/A
7.3.9	Forced discharge		N/A
	Results: No fire. No explosion..... :		N/A
<b>8</b>	<b>Specific requirements and tests (lithium systems)</b>		P
8.1	Charging procedures for test purposes	See below	P
8.1.1	First procedure: This charging procedure applied to tests other than those specified in 8.1.2	Prior to charging, the EUT have been discharged at a constant current of 0.2 It A down to a specified final voltage	P
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	See below	P
	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 plus 5 °C for the upper limit and minus 5 °C for the lower limit	The EUT was charged at upper limit temperature 45 °C and lower limit temperature -5 °C	P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1)..... :	Checked	P
	For a different upper limit charging voltage (i.e. other than for lithium cobalt oxide systems at 4,25 V), the applied upper limit charging voltage and upper limit charging temperatures were adjusted accordingly		N/A
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1)..... :		N/A
8.2	Intended use	See below	P
8.2.1	Continuous charging at constant voltage (cells)	The EUT is battery type	N/A
	Results: No fire. No explosion..... :		N/A
8.2.2	Moulded case stress at high ambient temperature (battery)	See below	P



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Clause	Requirement + Test	Result - Remark	Verdict
	Oven temperature (°C)..... :	70°C	—
	Results: No physical distortion of the battery casing resulting in exposure if internal components	No physical distortion of the battery casing resulting in exposure of internal components	P
8.3	Reasonably foreseeable misuse	See below	P
8.3.1	External short circuit (cell)	The EUT is battery type	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..... :		N/A
8.3.2	External short circuit (battery)	See below	P
	The cells were tested until one of the following occurred: - 24 hours elapsed; or	Comply with tested until 24 hours elapsed	P
	- The case temperature declined by 20% of the maximum temperature rise		N/A
	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 steady state condition		N/A
	Results: No fire. No explosion..... :	No fire or explosion occur (See table 8.3.2 for details)	P
8.3.3	Free fall	Comply with dropped three times from a height of 1.0 m onto a concrete floor	P
	Results: No fire. No explosion.	No fire or explosion occur (See table 8.3.3 for details)	P
8.3.4	Thermal abuse (cells)	The EUT is battery type	N/A
	The cells were held at 130°C ± 2°C for: - 10 minutes; or		N/A
	- 30 minutes for large cells (gross mass of more than 500 g as defined in IEC 62281)		N/A
	Oven temperature (°C)..... :		—
	Gross mass of cell (g) .....		—
	Results: No fire. No explosion.		N/A
8.3.5	Crush (cells)	The EUT is battery type	N/A



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Clause	Requirement + Test	Result - Remark	Verdict
	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..... :		N/A
8.3.6	Over-charging of battery	See below	P
	Test was continued until the temperature of the outer casing: - Reached steady state conditions (less than 10°C change in 30-minute period); or		N/A
	- Returned to ambient	Comply with the test continued until the temperature of the outer casing return to ambient	P
	Results: No fire. No explosion..... :	No fire or explosion occur (See table 8.3.6 for details)	P
8.3.7	Forced discharge (cells)		N/A
	Results: No fire. No explosion..... :		N/A
8.3.8	Transport tests	The EUT is battery type	N/A
	Manufacturer's documentation provided to show compliance with UN Recommendations on Transport of Dangerous Goods		N/A
8.3.9	Design evaluation – Forced internal short circuit (cells)	The EUT is battery type	N/A
	The cells complied with national requirement for .... :		—
	The pressing was stopped upon: - 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		N/A
	Results: No fire ..... :		N/A
<b>9</b>	<b>Information for safety</b>		P
	The manufacturer of secondary cells ensures that information is provided about current, voltage and temperature limits of their products.	Checked	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.	Checked	P



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Clause	Requirement + Test	Result - Remark	Verdict
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product	Checked	P
	As appropriate, information relating to hazard avoidance resulting from a system analysis is provided to the end user .....	Checked	P

<b>10</b>	<b>Marking</b>		P
10.1	Cell marking	The EUT is battery type	N/A
	Cells marked as specified in the applicable cell standards: IEC 61951-1, IEC 61951-2 or IEC 61960.		N/A
10.2	Battery marking	See below	P
	Batteries marked in accordance with the requirements for the cells from which they are assembled.	Batteries marked in accordance with the requirements for the cells from which they are assembled	P
	Batteries marked with an appropriate caution statement.	Appropriate caution statement is shown in the manual	P
10.3	Other information	See below	P
	Storage and disposal instructions marked on or supplied with the battery.	Storage and disposal instructions are supplied with the battery	P
	Recommended charging instructions marked on or supplied with the battery.	Recommended charging instructions are supplied with the battery	P

<b>11</b>	<b>Packaging</b>		P
	The materials and packaging design are chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants.	Checked	P

<b>Annex A</b>	<b>Charging range of secondary lithium ion cells for safe use</b>		P
A.1	General	See below	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	See below	P
A.3.2.1	General	The upper limit charging voltage of the EUT did not exceed 4.25 V	N/A



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Clause	Requirement + Test	Result - Remark	Verdict
A.3.2.2	Explanation of safety viewpoint		N/A
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied		N/A
A.4	Consideration of temperature and charging current		P
A.4.1	General	Considered	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	A different recommended temperature range 0 °C to 40 °C is applied in the EUT. Tests that are specified in 8.2 to 8.3 were conducted by using batteries which are charged at -5 °C and 45 °C	P
A.4.3	High temperature range	The upper limit charging temperature 45 °C was applied in the EUT	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	A recommended lower temperature limit 0°C is applied in the EUT. Tests that are specified in 8.2 to 8.3 were conducted by using batteries which are charged at -5 °C	P
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		P
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range		P
A.4.5	Scope of the application of charging current	No alternative charging current applied to the EUT over 50 kHz	P
A.5	Sample preparation		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
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°C±5°C and under -25 °C 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



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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 <sup>1)</sup>	
IC(U1)	Texas Instruments Incorporated	bq40z50-R1	--	Applicable parts of IEC 62133	Test in the appliance	
IC(U2)	Neotec Semiconductor Ltd.	NT1742DS series	--	Applicable parts of IEC 62133	Test in the appliance	
MOSFET(Q2, Q3)	Jiangsu Changjiang Electronics Technology Co., Ltd	CJAB25N03	VDS= 30 V , ID= 25 A	Applicable parts of IEC 62133	Test in the appliance	
Thermistor (R3)	E WAY Technology Co., LTD.	ESTA4103 series	10 KΩ at 25 °C	Applicable parts of IEC 62133, UL 1434	Test in the appliance, UL Recognized	
Battery Cell	LG CHEM, LTD.	INR18650F1L or F1L / INR19/66	3.63 Vdc, 3350 mAh	IEC 62133: 2012	CB-UL	
PCB	Interchangeable	Interchangeable	Min. V-1, 105 °C	UL 796	UL Recognized	
Insulation tape	Interchangeable	Interchangeable	Min. 130 °C	UL 510	UL Recognized	
Wire	Interchangeable	Interchangeable	VW-1 or FT1, Min.105 °C	UL 758	UL Recognized	
All connector	Interchangeable	Interchangeable	Min. V-2, 80 °C	UL 94	UL Recognized	
<b>Supplementary information:</b>						
<sup>1)</sup> Provided evidence ensures the agreed level of compliance. See OD-CB2039.						



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Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: Continuous low rate charge (cells)					N/A
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	

**Supplementary information:**

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

7.2.2	TABLE: Vibration			N/A
Model	OCV at start of test, (Vdc)		Results	

**Supplementary information:**

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

7.3.1	TABLE: Incorrect installation (cells)			N/A
Model	OCV of reversed cell, (Vdc)		Results	

**Supplementary information:**

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)





EN 62133			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.2	TABLE: External short circuit					N/A
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	
<b>Supplementary information:</b> - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain)						

7.3.6	TABLE: Crush			N/A
Model	OCV at start of test, (Vdc)	OCV at removal of crushing force, (Vdc)	Results	
<b>Supplementary information:</b> - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain)				

7.3.8	TABLE: Overcharge				N/A
Model	OCV prior to charging, (Vdc)	Maximum charge current, (A)	Time for charging, (hours)	Results	
<b>Supplementary information:</b> - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain)					



EN 62133			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.9	TABLE: Forced discharge (cells)			N/A
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Model	OCV before application of reverse charge, (Vdc)	Measured reverse charge $I_t$ , (A)	Time for reversed charge, (minutes)	Results

**Supplementary information:**

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

8.2.1	TABLE: Continuous charging at constant voltage (cells)			N/A
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Model	Recommended charging voltage $V_c$ , (Vdc)	Recommended charging current $I_{rec}$ , (A)	OCV at start of test, (Vdc)	Results

**Supplementary information:**

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)



EN 62133			
Clause	Requirement + Test	Result - Remark	Verdict

8.3.1	TABLE: External short circuit (cell)					N/A
Model	Ambient, (°C)	OCV at start of test, (Vdc)	Resistance of circuit, ( $\Omega$ )	Maximum case temperature rise $\Delta T$ , (°C)	Results	
<b>Samples charged at charging temperature upper limit</b>						
<b>Samples charged at charging temperature lower limit</b>						
<b>Supplementary information:</b> <ul style="list-style-type: none"><li>- No fire or explosion</li><li>- No leakage</li><li>- Leakage</li><li>- Fire</li><li>- Explosion</li><li>- Bulge</li><li>- Others (please explain)</li></ul>						



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Clause	Requirement + Test	Result - Remark	Verdict

8.3.2	TABLE: External short circuit (battery)					P
Model	Ambient, (°C)	OCV at start of test, (Vdc)	Resistance of circuit, (Ω)	Maximum case temperature rise ΔT, (°C)	Results	
<b>Samples charged at charging temperature upper limit</b>						
10PB-MG10001-AA	55	16.83	0.088	0	No fire or explosion	
10PB-MG10001-AA	55	16.83	0.092	0	No fire or explosion	
10PB-MG10001-AA	55	16.83	0.091	0	No fire or explosion	
10PB-MG10001-AA	55	16.83	0.095	0	No fire or explosion	
10PB-MG10001-AA	55	16.83	0.086	0	No fire or explosion	
<b>Samples charged at charging temperature lower limit</b>						
10PB-MG10001-AA	55	16.80	0.090	0	No fire or explosion	
10PB-MG10001-AA	55	16.80	0.091	0	No fire or explosion	
10PB-MG10001-AA	55	16.80	0.089	0	No fire or explosion	
10PB-MG10001-AA	55	16.80	0.092	0	No fire or explosion	
10PB-MG10001-AA	55	16.80	0.095	0	No fire or explosion	
<b>Supplementary information:</b>						
<ul style="list-style-type: none"> <li>- No fire or explosion</li> <li>- No leakage</li> </ul>						



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Clause	Requirement + Test	Result - Remark	Verdict

8.3.5	TABLE: Crush					N/A
Model	OCV at start of test, (Vdc)	OCV at removal of crushing force, (Vdc)	Width/diameter of cell before crush, (mm)	Required deformation for crush, (mm)	Results	
<b>Samples charged at charging temperature upper limit</b>						
<b>Samples charged at charging temperature lower limit</b>						
<b>Supplementary information:</b>						
<ul style="list-style-type: none"> <li>- No fire or explosion</li> <li>- No leakage</li> <li>- Leakage</li> <li>- Fire</li> <li>- Explosion</li> <li>- Bulge</li> <li>- Others (please explain)</li> </ul>						

8.3.6	TABLE: Over-charging of battery				P
Model	OCV before charging, (Vdc)	Resistance of circuit, ( $\Omega$ )	Maximum outer casing temperature, ( $^{\circ}\text{C}$ )	Results	
Constant charging current (A) .....		18.6		—	
Supply voltage (Vdc) .....		20		—	
10PB-MG10001-AA	11.83	--	24.6	No fire or explosion	
10PB-MG10001-AA	11.85	--	24.0	No fire or explosion	
10PB-MG10001-AA	11.80	--	23.7	No fire or explosion	
10PB-MG10001-AA	11.79	--	25.3	No fire or explosion	
10PB-MG10001-AA	11.77	--	23.3	No fire or explosion	
<b>Supplementary information:</b>					
<ul style="list-style-type: none"> <li>- No fire or explosion</li> <li>- No leakage</li> </ul>					



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Clause	Requirement + Test	Result - Remark		Verdict
8.3.7	<b>TABLE: Forced discharge (cells)</b>			N/A
Model	OCV before application of reverse charge, (Vdc)	Measured Reverse charge $I_t$ , (A)	Time for reversed charge, (minutes)	Results
<b>Supplementary information:</b> - No fire or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain)				

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Clause	Requirement + Test	Result - Remark			Verdict
8.3.9	<b>TABLE: Forced internal short circuit (cells)</b>				N/A
Model	Chamber ambient, (°C)	OCV at start of test, (Vdc)	Particle location <sup>1)</sup>	Maximum applied pressure, (N)	Results
<b>Supplementary information:</b> <sup>1)</sup> 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 or explosion - No leakage - Leakage - Fire - Explosion - Bulge - Others (please explain)					



# Attachment to Test Report

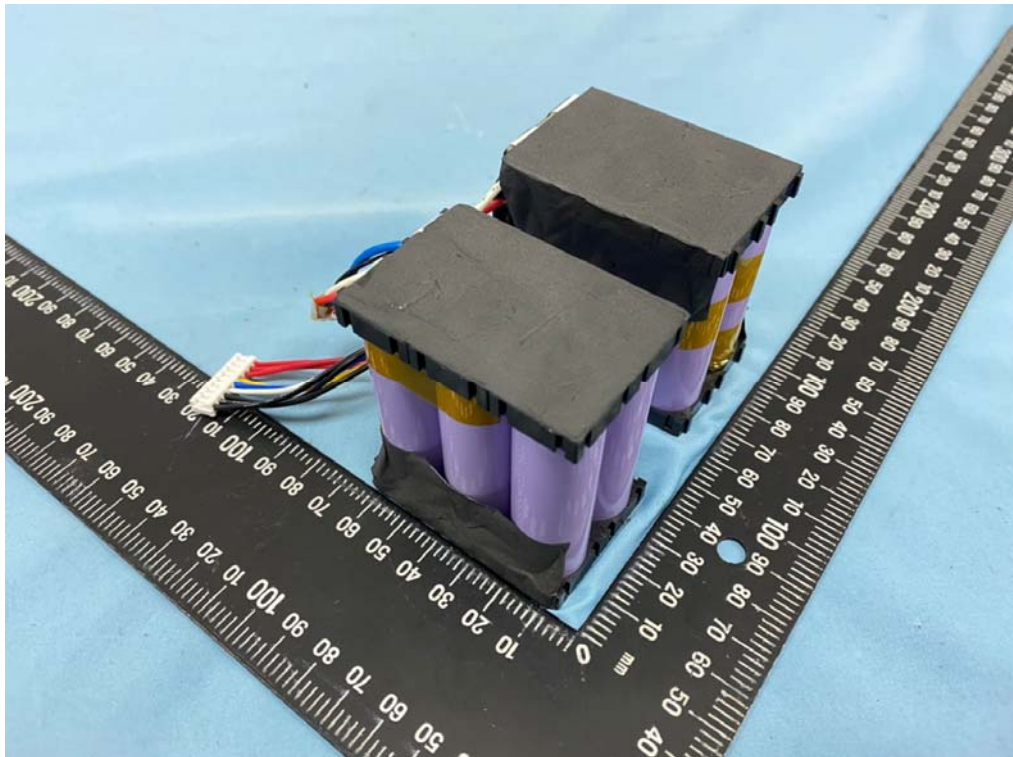
**List of Attachments:**

Photo Documentation

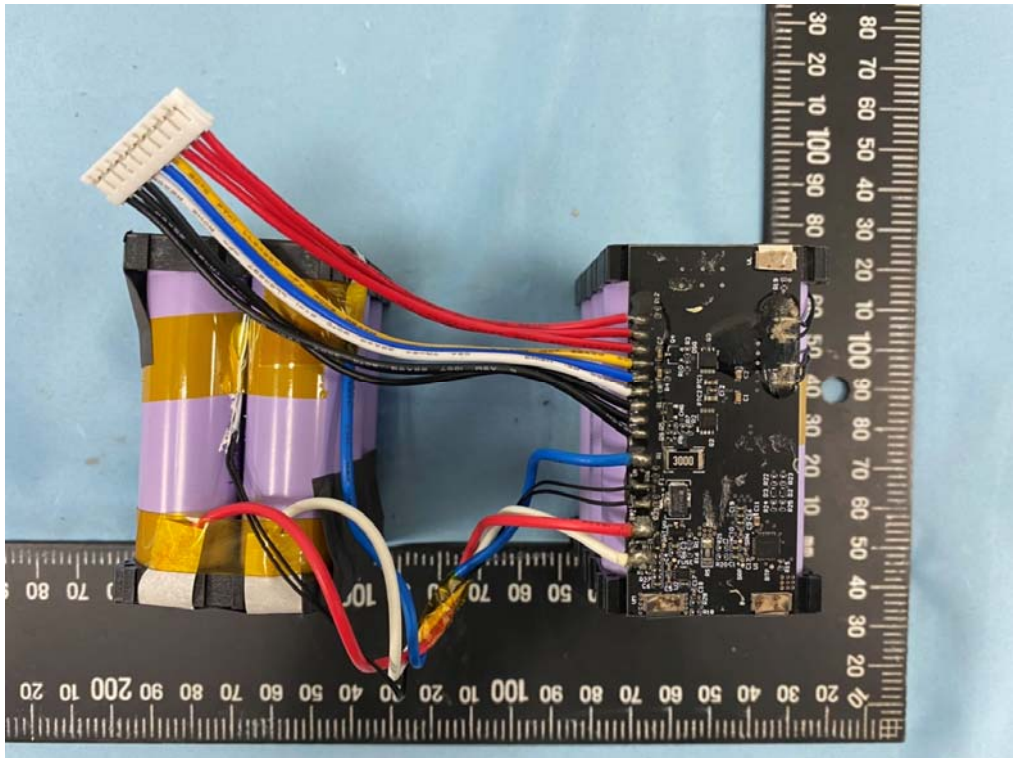
External view of EUT



External view of EUT







Top view of PCB

