



Test Report issued under the responsibility of:



TEST REPORT

IEC 62619

Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for secondary lithium cells and batteries, for use in industrial applications

Report Number.....: 6164874.50

Date of issue.....: 2024-01-11

Total number of pages.....: 27

Name of Testing Laboratory

preparing the Report.....: DEKRA Testing and Certification (Shanghai) Ltd.

Applicant's name: You Tai Xi Electronic Technology (Ningbo) Co., LTD

Address: No. 99, Majia, Dajiahe Town, Ninghai County, 315000 Ningbo Zhejiang, China

Test specification:

Standard: IEC 62619:2022

Test procedure: CB Scheme

Non-standard test method: N/A

TRF template used: IECEE OD-2020-F1:2022, Ed.1.5

Test Report Form No.....: IEC62619B

Test Report Form(s) Originator: UL Solutions (Demko)

Master TRF: Dated 2023-02-24

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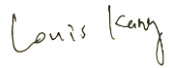
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General disclaimer:

The test results presented in this report relate only to the object tested.

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Test item description..... :	Rechargeable Li-ion battery	
Trademark(s)..... :	 尤泰熙 YOUTAISII	
Manufacturer..... :	Same as applicant	
Model/Type reference..... :	YTX-LV-5K(S)	
Ratings..... :	51,2 V, 100 Ah, 5,12 kWh	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	DEKRA Testing and Certification (Shanghai) Ltd.
Testing location/ address.....:		3F #250 Jiangchangsan Road Building 16 Headquarter Economy Park Shibei Hi-Tech Park, Jing'an District Shanghai 200436 China
Tested by (name, function, signature).....:		Stanly Zhang Engineer 
Approved by (name, function, signature)....:		Louis Kang, Reviewer 
☐	Testing procedure: CTF Stage 1:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature)....:		
☐	Testing procedure: CTF Stage 2:	
Testing location/ address.....:		
Tested by (name + signature)		
Witnessed by (name, function, signature)..:		
Approved by (name, function, signature)....:		
☐	Testing procedure: CTF Stage 3:	
☐	Testing procedure: CTF Stage 4:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		
Witnessed by (name, function, signature)..:		
Approved by (name, function, signature)....:		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment): Photos (3 pages)	
Summary of testing:	
Tests performed (name of test, test clause and date test performed): Tests conducted on Rechargeable Li-ion battery: YTX-LV-5K(S) —7.1 Charging procedures for test purposes. —7.2.3.3 Edge and corner drop test (battery system)-2024-01-05. —8.2.2 Overcharge control of voltage (battery system)-2024-01-05. —8.2.3 Overcharge control of current (battery system)-2024-01-04. —8.2.4 Overheating control (battery system)-2024-01-04. The cell model: IFP27175200A-105Ah had been tested in CB test report no. 211-282060195-100 issued on 2021-08-10 by TUV SUD Certification and Testing (China) Co., Ltd Shenzhen Branch. with CB certificate SG PSB-BT-02185M1 issued by TUV SUD PSB Pte Ltd. on date 2021-08-24 and complied with the requirement of IEC 62619:2017. The cell is considered comply with the requirement of IEC 62619: 2022 by engineering judgement.	Testing location: (CBTL, SPTL, CTF, Subcontractor) All tests by subcontractor: CQC Intime Testing Technology Co., Ltd. East Taihu Hi-Tech & Finance Town, No.1368, Wuzhong Road, Wuzhong Economic Development Zone, Suzhou, China.
Summary of compliance with National Differences (List of countries addressed): ☒ The product fulfils the requirements of <u>EN 62619:2022</u>	

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other: ... (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:

The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

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.



Rechargeable Li-ion battery
IFP29/176/208[1P16S]E/-20+50/90

Product model	YTX-LV-5K(S)
Battery type	LiFePO4
Rated voltage	51.2V
Rated capacity	100Ah
Battery pack energy	5.12kWh
Standard charge Voltage	57.6V
Standard charge current	50A
Maximum charge current	90A
Charge temperature range	15°C-50 °C
Discharge temperature range	15°C-50 °C
Size (W*D*H)	680*230*1310
IP rating	IP65







YOUTAIXI ELECTRONIC TECHNOLOGY (NINGBO) CO., LTD

ADD: No. 99, Majia, Dajia He Town, Ninghai
County, Ningbo City, Zhejiang Province

HTTP://www.youtaixi.com
E-mail: joseph@youtaixi.com
Phone: 0574-65238017



Polarity:

marked on the terminal connector.

Date code:

YTX-LV-5K(S)



The manufacturer's date code in the Barcode.

YYMMDD represents the day, month, year, for example, 20230920 represents September 20th, 2023.
The actual production date is updated with shipment.

Test item particulars : Rechargeable Li-ion battery	
Classification of installation and use..... : To be defined in final product.	
Supply Connection : DC connector:	
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 : 2024-01-03 to 2024-01-08	
General remarks:	
"(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. ☐ This Test Report Form contains requirements according to IEC/ISO Standard dated and includes Corrigendum dated (Note: The above text maybe removed if not applicable)	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC60060-2:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)..... : Same as applicant.	

General product information and other remarks:

1. Product covered by this report is Rechargeable Li-ion battery: YTX-LV-5K(S), 1P/16S, Details specification of the Battery as following:

Product name	Rechargeable Li-ion battery
Type/model	YTX-LV-5K(S)
Nominal voltage (Vdc)	51,2
Rated capacity (Ah)	100
Recommended charging voltage by manufacturer (V)	57,6
Upper limit charging voltage (V)	58,4
Recommended charging current by manufacturer (A)	50
Maximum continuous charging current (A)	90
Recommended discharging current by manufacturer (A)	50
Maximum continuous discharging current (A)	90
Upper charge temperature (°C)	50
Lower charge temperature (°C)	15
Upper discharge temperature (°C)	50
Lower discharge temperature (°C)	15
Discharging cut off voltage (V)	44,8
Dimension (mm)	680*230*500
Weight (kg)	62

2. The cell model: IFP27175200A-105Ah had been tested in CB test report no. 211-282060195-100 issued on 2021-08-10 by TUV SUD Certification and Testing (China) Co., Ltd Shenzhen Branch. with CB certificate SG PSB-BT-02185M1 issued by TUV SUD PSB Pte Ltd. on date 2021-08-24 and complied with the requirement of IEC 62619:2017. The cell is considered comply with the requirement of IEC 62619: 2022 by engineering judgement.

3. Battery system fulfil EMC requirements of the end-device application Intended to be tested in the end use application.

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
4	PARAMETER MEASUREMENT TOLERANCES		P
	Parameter measurement tolerances		P

5	GENERAL SAFETY CONSIDERATIONS		P
5.1	General		P
	Cells and batteries are safe under conditions of both intended use and reasonably foreseeable misuse.... :	Clause 6, Clause 7, 8.1, and 8.2. See also table 5.1 for Critical components information	P
	Reduce the risk of injuries from moving parts		N/A
5.2	Insulation and wiring		P
	Voltage, current, altitude, and humidity requirements		P
	Adequate clearances and creepage distances between connectors and live parts at different voltages or between live parts and non-current-carrying accessible parts		P
	Protect from hazardous live parts, including during installation		P
	The mechanical integrity of internal connections		P
5.3	Venting		P
	Pressure relief function		P
	Encapsulation used to support cells within an outer casing		P
5.4	Temperature/voltage/current management		P
	The design prevents abnormal temperature-rise		P
	Voltage, current, and temperature limits of the cells		P
	Specifications and charging instructions for equipment manufacturers		P
5.5	Terminal contacts of the battery pack and/or battery system		P
	Polarity marking(s)		P
	Polarity marking not provided for keyed external connector		P
	Capability to carry the maximum anticipated current		P
	External terminal contact surfaces		P
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	Assembly of cells, modules, or battery packs into battery systems		P
5.6.1	General		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Independent control and protection method(s)		P
	Recommendations of cell operating limits, mounting advice, storage conditions and other design recommendations by the cell manufacturer		P
	Batteries designed for the selective discharge of a portion of their series connected cells		N/A
	Protective circuit component(s) and consideration to the end-device application		P
5.6.2	Battery system design		P
	The voltage control function		P
	Maximum charging/discharging current of the cell are not exceeded		P
5.7	Operating region of lithium cells and battery systems for safe use		P
	The cell operating region..... :		P
	Designation of battery system to comply with the cell operating region		P
5.8	System lock (or system lock function)		P
	Non-resettable function to stop battery operation		P
	Manual with procedure for resetting of battery operation		P
	Emergency battery final discharge		P
5.9	Quality plan		P
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :	ISO9001:2015 Certificate provided.	P
	The process capabilities and the process controls		P

6	TYPE TEST CONDITIONS		P
6.1	General		P
6.2	Test items		P
	Cells or batteries that are not more than six months old (See Table 1 of IEC 62619)		P
	Capacity confirmation of the cells or batteries		P
	Default ambient temperature of test, 25 °C ± 5 °C		P

7	SPECIFIC REQUIREMENTS AND TESTS		P
7.1	Charging procedure for test purposes		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The battery discharged to a specified final voltage prior to charging		P
	The cells or batteries charged using the method specified by the manufacturer		P
7.2	Reasonably foreseeable misuse		P
7.2.1	External short-circuit test (cell or cell block)	Refer to cell Report	N/A
	Short circuit with total resistance of $30\text{ m}\Omega \pm 10\text{ m}\Omega$ at $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$		N/A
	Results: no fire, no explosion	Refer to cell Report	N/A
7.2.2	Impact test (cell or cell block)	Refer to cell Report	N/A
	Cylindrical cell, longitudinal axis impact		N/A
	Prismatic cell, longitudinal axis and lateral axis impact		N/A
	Results: no fire, no explosion.	Refer to cell Report	N/A
7.2.3	Drop test (cell or cell block, and battery system)		P
7.2.3.1	General		P
7.2.3.2	Whole drop test (cell or cell block, and battery system)		N/A
	Description of the Test Unit.....		—
	Mass of the test unit (kg).....		—
	Height of drop (m).....		—
	Results: no fire, no explosion		N/A
7.2.3.3	Edge and corner drop test (cell or cell block, and battery system)		P
	Description of the Test Unit.....	Battery module	—
	Mass of the test unit (kg).....	50,00	—
	Height of drop (m).....	0,05	—
	Results: no fire, no explosion		P
7.2.4	Thermal abuse test (cell or cell block)	Refer to the CB report of cell	N/A
	Results: no fire, no explosion	Refer to the CB report of cell	N/A
7.2.5	Overcharge test (cell or cell block)	Refer to the CB report of cell	N/A
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion	Refer to the CB report of cell	N/A
7.2.6	Forced discharge test (cell or cell block)	Refer to the CB report of cell	N/A
	Cells connected in series in the battery system.....		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Redundant or single protection for discharge voltage control provided in battery system		N/A
	Target Voltage.....		N/A
	Maximum discharge current of the cell, I_m		N/A
	Discharge current for forced discharge, 1.0 I_t		N/A
	Discharging time, $t = (1 I_t / I_m) \times 90$ (min.).....		N/A
	Results: no fire, no explosion	See Table 7.2.6.	N/A
7.3	Considerations for internal short-circuit – Design evaluation		P
7.3.1	General	Test conducted with compliant result.	P
7.3.2	Internal short-circuit test (cell)	Refer to the CB report of cell	N/A
	Samples preparation procedure: In accordance with Clause A.5 and A.6 of IEC 62133-2:2017		N/A
	Tested per 7.3.2 b) in an ambient temperature of $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.		N/A
	The appearance of the short-circuit location recorded by photograph or other means.....		—
	The pressing was stopped - When a voltage drop of 50 mV was detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) was reached		N/A
	Results: no fire	Refer to the CB report of cell	N/A
7.3.3	Propagation test (battery system)		N/A
	Method to create a thermal runaway in one cell ...	See Annex B and C	N/A
	Results: No external fire from the battery system, no battery case rupture.....	See results in Table 7.3.3	N/A

8	BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)		P
8.1	General requirements		P
	Functional safety analysis for critical controls	Functional safety analysis according to annex H of IEC 60730-1 was considered. Refer to 6164874.51QS and 6164874.52QS software report issued by DEKRA Testing and Certification (Shanghai) Ltd	P
	Conduct of a process hazard analysis for both the cell manufacturing process and the battery system manufacturing process		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Conduct of risk assessment and mitigation of the battery system		P
8.2	Battery management system (or battery management unit)		P
8.2.1	Requirements for the BMS	Safety function see software report for more details.	P
	The safety integrity level (SIL) target of the BMS	Software class B	P
	The charge control evaluated by tests in clauses 8.2.2 to 8.2.4		P
8.2.2	Overcharge control of voltage (battery system)		P
	The exceeded charging voltage applied to the whole battery system		P
	The exceeded charging voltage applied to only a part of the battery system, such as the cell(s) :		N/A
	Results: no fire, no explosion :	See Table 8.2.2.	P
	The BMS terminated the charging before exceeding the upper limit charging voltage		P
8.2.3	Overcharge control of current (battery system)		P
	Results: no fire, no explosion :	See Table 8.2.3	P
	The BMS detected the overcharging current and controlled the charging to a level below the maximum charging current		P
8.2.4	Overheating control (battery system)		P
	The cooling system, if provided, was disconnected		P
	Elevated temperature for charging, 5 °C above maximum operating temperature..... :		P
	Results: no fire, no explosion :	See Table 8.2.4	P
	The BMS detected the overheat temperature and terminated charging		P
	The battery system operated as designed during test		P
9	EMC		N/A
	Battery system fulfil EMC requirements of the end-device application..... :	Considered in end product	N/A
10	INFORMATION FOR SAFETY		P
	The cell manufacturer provides information about current, voltage and temperature limits of their products		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	The battery system manufacturer provides information regarding how to mitigate hazards to equipment manufacturers or end-users.		P

11	MARKING AND DESIGNATION (REFER TO CLAUSE 5 OF IEC 62620)		P
	The marking items shown in Table 1 in IEC 62620 indicated on the cell, battery system or instruction manual.		P
	Cell or battery system has clear and durable markings		P
	Cell designation		N/A
	Battery designation		P
	Battery structure formulation		P

12	PACKAGING AND TRANSPORT		P
	Refer to Annex D		P

ANNEX A	OPERATING REGION OF CELLS FOR SAFE USE		P
A.1	General		P
A.2	Charging conditions for safe use		P
A.3	Consideration on charging voltage		P
A.4	Consideration on temperature		P
A.5	High temperature range		N/A
A.6	Low temperature range		N/A
A.7	Discharging conditions for safe use		P
A.8	Example of operating region		P

ANNEX B	PROCEDURE OF 7.3.3 PROPAGATION TEST BY LASER IRRADIATION		N/A
B.1	General		N/A
B.2	Test conditions		N/A
B.2.1	Cell test (preliminary test)		N/A
	The cell fully charged according to the manufacturer recommended conditions.....:		—
	Laser irradiation point on the cell.....:		—
	Output power of laser irradiation.....:		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Tested in an ambient temperature of 25 °C ± 5 °C		N/A
	Repeat of cell test for 3 times		N/A
B.2.2	Battery system test (main test)		N/A
	The battery system fully charged according to the manufacturer recommended conditions..... :		—
	Target cell to be laser irradiated :		—
	The irradiation point on the target cell same or similar as that on the cell test		
	Output power of laser irradiation..... :		—
	Tested in an ambient temperature of 25 °C ± 5 °C		N/A

ANNEX C	PROCEDURE OF 7.3.3 PROPAGATION TEST BY METHODS OTHER THAN LASER		N/A
C.1	General		N/A
C.2	Test conditions:		N/A
	– The battery fully charged according to the manufacturer recommended conditions..... :		—
	– Target cell forced into thermal runaway :		—
	– A specially prepared sample (e.g. a heater or a hole for nail penetration provided) used for ease of testing..... :		—
C.3	Method used for initiating the thermal runaway. 1) Heater (Heater, Burner, Laser, Inductive heating 2) Overcharge 3) Nail penetration of the cell 4) Combination of above methods 5) Other methods :		—

ANNEX D	PACKAGING AND TRANSPORT		P
	The materials and pack design chosen in a way as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants		P
	Regulations concerning international transport of secondary lithium batteries		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

5.1	TABLE: Critical components information					P
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Cell	Hefei Gotion High-tech Power Energy Co.,Ltd.	IFP50160116 A-102Ah	102 Ah, 3,2 Vdc, 326,4 Wh	IEC 62619:2017	CB test report No.: 211- 282060195- 100 CB cert No.: SG PSB-BT- 02185M1	
Metal enclosure	You Tai Xi Electronic Technology (Ningbo) Co., LTD	Q235	Minimum 1,5 mm thickness. 680 mm*230 mm*500 mm	IEC 62619:2022	Tested with appliance	
Metal enclosure (Alternate)	Interchangeable	Q235	Minimum 1,5 mm thickness. 680 mm*230 mm*500 mm	IEC 62619:2022	Tested with appliance	
Power wiring	Kunshan Hermann Electronic Technology Co., LTD		7 AWG,1000 V,105 °C	UL 758	E330446	
Power wiring (Alternate)	Interchangeable	Interchangeable	7 AWG,1000 V,105 °C	IEC 62619:2022	Tested with appliance	
External power connector	XIAMEN WAIN ELECTRICAL CO LTD	WNHCPV-3	600 V,120 A -40°C ~+125°C	IEC 62619:2022	Tested with appliance	
External power connector (Alternate)	Interchangeable	Interchangeable	600 V,120 A -40°C ~+125°C	IEC 62619:2022	Tested with appliance	
DC miniature circuit breaker	CHNT	CB-125A	160V, DC(2P), 125A	IEC 62619:2022	Tested with appliance	
MCU	Atmel Corporation	ATxmega64A 3U-AU	Supply voltage: 3 V to 3,3 V, 105°C Core: ARM 8-bit Flash:64K bytes Package: LQFP64	IEC 62619:2022	Tested with appliance	
IC (AFE)	ROHM	ML5238	VDD: 7 to 80 V, Operating temperature: -40°C to 85°C	IEC 62619:2022	Tested with appliance	

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Clause	Requirement + Test		Result - Remark		Verdict
MOSFET for charge (CMS1, CMS2, CMS3, CMS4, CMS5, CMS6, CMS7, CMS8, CMS9, CMS10)	Fullwin Technology Co., Ltd	TCE10N170RH	VDS: 100V, VGS: $\pm 12V$, ID: 120A (TA=25°C), TJ: -55°C to 150°C	IEC 62619:2022	Tested with appliance
MOSFET for discharge (DMS1, DMS2, DMS3, DMS4, DMS5, DMS6, DMS7, DMS8, DMS9, DMS10)	Hunteck Semiconductor	HGB042N10A	VDS: 1000V, VGS: $\pm 12V$, ID: 167A (TA=25°C), TJ: -55°C to 150°C	IEC 62619:2022	Tested with appliance
PCB	GUANGDE YARSUN ELECTRONICS TECHNOLOGY CO LTD	BMS073S-V10	130°C, V-0	UL796	E253642
PCB (Alternate)	Interchangeable	Interchangeable	130°C, V-0	UL796	UL
Supplementary information: 1). Provided evidence ensures the agreed level of compliance. See OD-CB2039. 2). License available upon request.					

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: External short-circuit test (cell or cell block)					N/A
Sample No.	Ambient (at 25°C ± 5°C)	OCV at start of test (V dc)	Resistance of Circuit (mΩ)	Maximum Case Temperature Rise ΔT (°C)	Results	
Supplementary information: A – No fire or Explosion B – Fire C – Explosion D – The test was completed after 6 h E – The test was completed after the cell casing cooled to 20% of the maximum temperature rise F – Other (Please explain): ____						

7.2.5	TABLE: Overcharge test (cell or cell block)					N/A
Sample No.	OCV at start of test (V dc)	OCV at end of test (V dc)	Measured Maximum Charging Current (A)	Measured Maximum Charging Voltage (V dc)	Max. Cell Case Temperature, (°C)	Results
Supplementary information: Results: A – No fire or Explosion B – Fire C – Explosion D – Test concluded when temperature reached a steady state condition E – Test concluded when temperature returned to ambient F – Other (Please explain): ____						

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.6	TABLE: Forced discharge test (cell or cell block)				N/A
Sample No.	OCV before applying reverse charge, (V dc)	Target Voltage (V dc)	Measured Reverse Charge Current I_t , (A)	Total Time for Reversed Charge Application (min)	Results
Supplementary information: Results: A – No fire or Explosion B – Fire C – Explosion D – Other (Please explain): ____					

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

[illegible]

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.

Results:

- A – No fire or explosion
B – Fire
C – Explosion
D – Test concluded when 50 mV voltage drop occurred prior to reaching force limit
E – Test concluded when 800/400 N pressure was reached and 50 mV voltage drop was not achieved
F – Test was concluded when fire or explosion occurred
G – Other (Please explain): _____

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.3	TABLE: Propagation test (battery system)					N/A
Sample No.	OCV of Battery System Before Test, (V dc)	OCV of Target Cell Before Test, (V dc)	Maximum Cell Case Temperature, (°C)	Maximum DUT Enclosure Temperature, (°C)	Results	
Method of cell failure ¹⁾		Location of target cell		Area for fire protection (m ²)		
Supplementary information:						
1) Cell can be failed through laser exposure, applied heat, overcharge, nail penetration or combinations of these failures or other acceptable methods. See supporting documentation for details on cell failure method						
2) If the battery system has no outer covering, the manufacturer is required to specify the area for fire protection.						
Results:						
A – No fire external to DUT enclosure or area for fire protection or no battery case rupture						
B – Fire external to DUT enclosure or area for fire protection						
C – Explosion						
D – Battery case rupture						
E – Other (Please explain): ____						

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

8.2.2	TABLE: Overcharge control of voltage (battery system)				P
Sample No.	OCV at start of test for Cell/Cell Blocks, (V dc)	Maximum Charging Current, (A)	Max. Charging Voltage, (V dc)	Max. Voltage of Cell/Cell Blocks, (V dc)	Results
B1	3,282	90	58,15	3,643	A, D, F
			Charge Voltage Applied Battery System: 1)		
			Whole	Part	
			64,24	-	
Supplementary information: 1) The exceeded voltage can be applied to only a part of the system such as the cell(s) in the battery system per Figure 6 of IEC 62619, if it is difficult to do it in using the whole battery system. Results: A – No Fire or Explosion B – Fire C – Explosion D – The voltage of the measured cells or cell blocks did not exceed the upper limit charging voltage E – The voltage of the measured cells or cell blocks did exceed the upper limit charging voltage F – All function of battery system did operate as intended during the test. G – All function of battery system did not operate as intended during the test. H – Other (Please explain): ____					

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

8.2.3	TABLE: Overcharge control of current (battery system)				P
Sample No.	OCV at start of test, (V dc)	Max. Charging Current, (A)	Max. Charging Voltage, (V dc)	Results	
B1	45,17	108	56,05	A, D, F	
Supplementary information: Results: A – No fire or Explosion B – Fire C – Explosion D – Overcurrent sensing function of BMU did operate and then charging stopped E – Overcurrent sensing function of BMU did not operate and then charging stopped F – All function of battery system did operate as intended during the test. G – All function of battery system did not operate as intended during the test. H – Other (Please explain): ____					

8.2.4	TABLE: Overheating control (battery system)			P
Model No.	OCV at start(SOC 50%) of test, V dc	Maximum Charging Current, A	Measured Maximum Charging Voltage, V dc	
B2	53,02	50	54,23	
Maximum Specified Temperature of Battery System, °C		Maximum Measured Cell Case Temperature, °C	Results	
50		54,1	A, D, F	
Supplementary information: Results: A – No fire or Explosion B – Fire C – Explosion D – Temperature sensing function of BMU did operate and then charging stopped E – Temperature sensing function of BMU did not operate and then charging stopped F – All function of battery system did operate as intended during the test. G – All function of battery system did not operate as intended during the test. H – Other (Please explain): ____				

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

9	TABLE: EMC				N/A
Standard used for EMC test:					
Sample No.	EMC Test Item	Battery Condition	EMC Test Level/ Parameters	Compliance Criteria	Results
Supplementary information: Battery Condition During EMC test 1 – In Operation Mode, [] Supplied at ____, [] Load at ____ 2 – In non-operation Mode, Battery state of charge (SOC) before test at around ____ Compliance Criteria and Test Results: A – No fire or Explosion B – Fire C – Explosion D – Battery system did operate as intended during the test. E - All function of battery system did operate as intended after the test. F - All function of battery system did not operate as intended during the test, (Please explain): ____ G - Other (Please explain): ____					

Photos

Supplement Id	Description
01-1	Overall view
01-2	Overall view
01-3	Overall view
01-4	Internal view
01-5	Top view of BMS
01-6	Bottom view of BMS

01-1

view of battery module



01-2

view of battery module



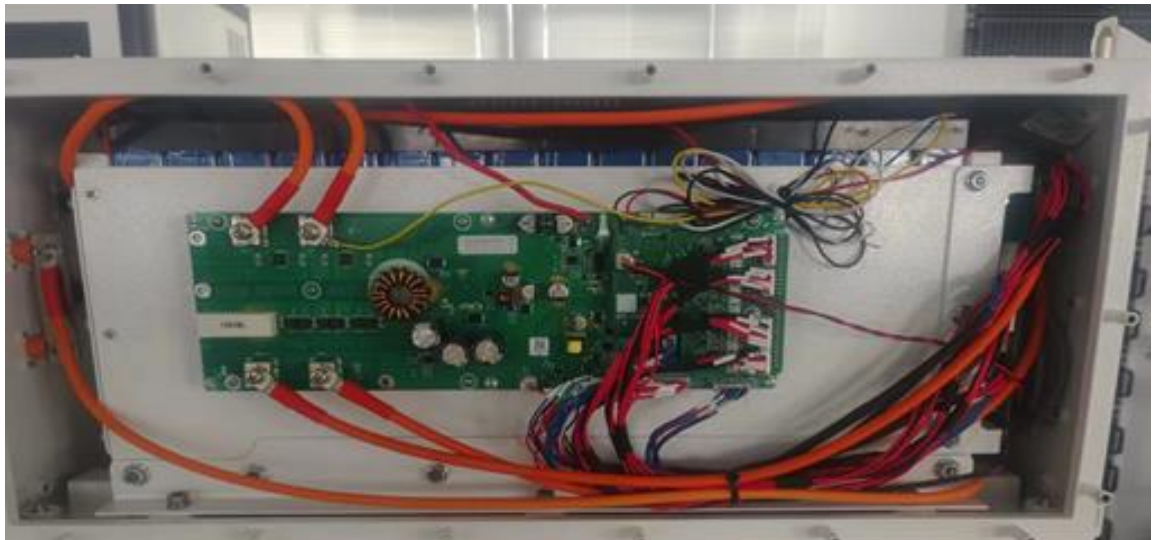
01-3

view of battery module



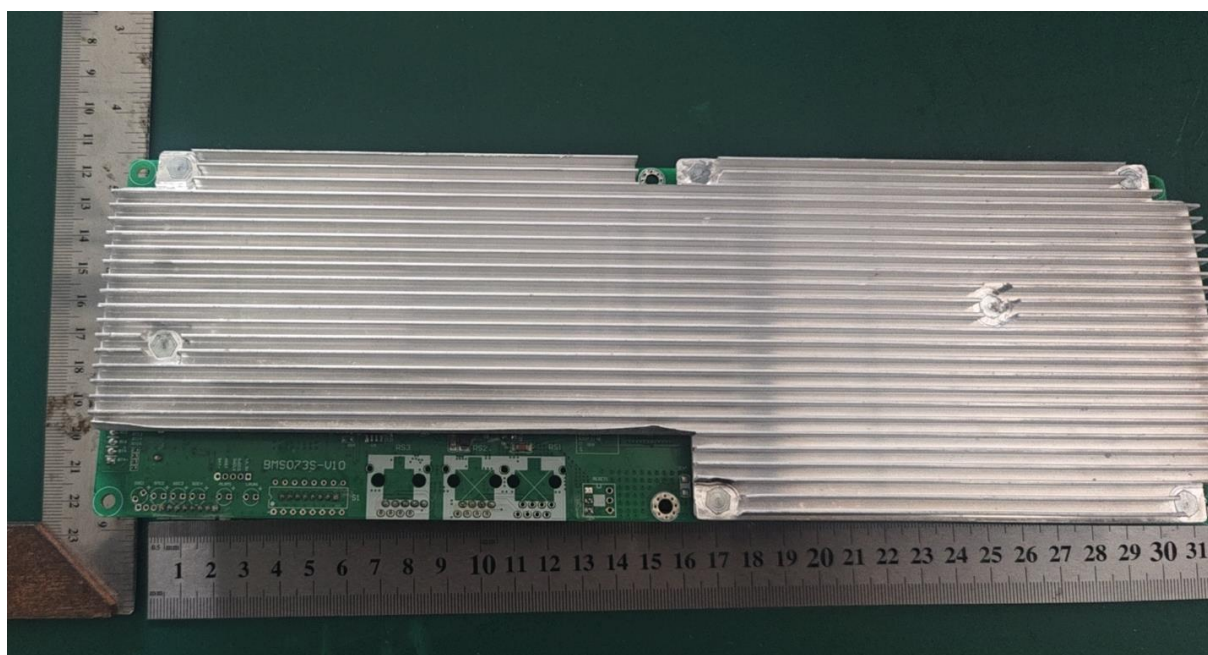
01-4

Internal view of battery module



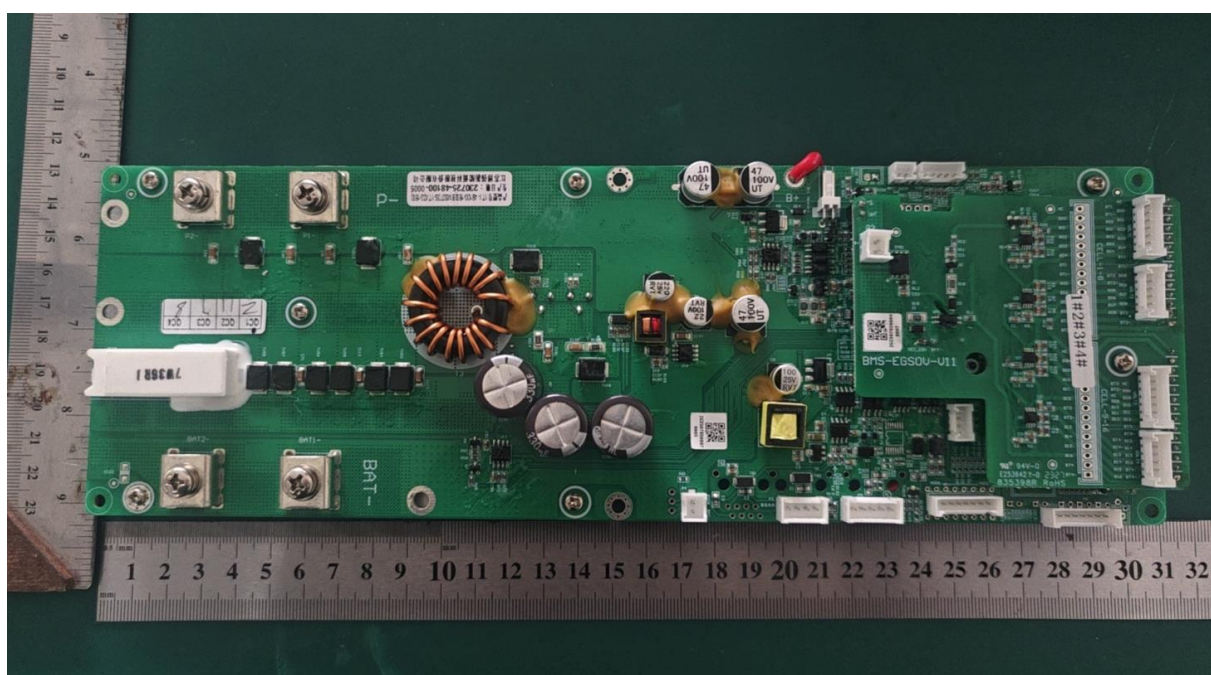
01-5

Top view of BMS



01-6

Bottom view of BMS



----- End of report -----