



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	CNDQ-ESH-P25100502
Date of issue.....	2025-10-23
Total number of pages	35 Pages
Name of Testing Laboratory preparing the Report.....	LCIE CHINA COMPANY LIMITED Building 4, No. 518, Xin Zhuan Road, CaoHejing Songjiang High-Tech Park, Shanghai P.R.C (201612)
Applicant's name	Shenzhen OLiPower Energy & Automation Technology Co., Ltd.
Address	1001, Block A, Building 2, SEZ ConstrutionWisdom Park, No. 380 Guangming Avenue,Tangwei Community, Fenghuang Street.Guangming District, Shenzhen City,Guangdong Province, 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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Test item description..... :	Ampaura Air-cooled lithium Battery Integrated cabinet	
Trademark(s)..... :		
Manufacturer..... :	Same as Applicant	
Model/Type reference..... :	OLP-EB-V309_E63-AO01, OLP-EB-V386_E79-AO01, OLP-EB-V463_E95-AO01, OLP-EB-V540_E111-AO01	
Ratings..... :	OLP-EB-V309_E63-AO01: 309,12V, 206Ah, 63,67kWh OLP-EB-V386_E79-AO01: 386,4V, 206Ah, 79,59kWh OLP-EB-V463_E95-AO01: 463,68V, 206Ah, 95,51kWh OLP-EB-V540_E111-AO01: 540,96V, 206Ah, 111,43kWh	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	LCIE CHINA COMPANY LIMITED
Testing location/ address.....:		Building 4, No. 518, Xin Zhuan Road, CaoHejing Songjiang High-Tech Park, Shanghai P.R.C (201612)
Tested by (name, function, signature).....:		Alter Qiu (Project Manager) 
Approved by (name, function, signature)....:		Robin Wu (Project 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): Attachment 1 (Pictures for product): Page 27 to Page 35, total of 9 pages	
Summary of testing:	
Tests performed (name of test, test clause and date test performed): - 5.9 Quality plan - 7.2.3 Drop test (battery system) 7.2.3.3 Edge and corner drop test (battery system) - 8.2.2 Overcharge control of voltage (battery system) - 8.2.3 Overcharge control of current (battery system) - 8.2.4 Overheating control (battery system)	Testing location: (CBTL, SPTL, CTF, Subcontractor) LCIE CHINA COMPANY LIMITED Building 4, No. 518, Xin Zhuan Road, CaoHejing Songjiang High-Tech Park, Shanghai P.R.C (201612)
Summary of compliance with National Differences (List of countries addressed): N/A ☒ The product fulfils the requirements of <u>EN IEC 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.

OLP-EB-V540_E111-AO01	
	
Name	OLP Air Cooled Integrated Energy Cabinet
Battery Type	LiFePO ₄
Cell capacity	3.22V/206Ah
Rated Battery Capacity	206Ah, 111.43kWh
Rated Battery Voltage	540.96Vdc
Battery Operation Voltage Range	470.4-604.8Vdc
Standard Charge/Discharge Current	103A/103A
Maximum Charge/Discharge Current	200A/200A
Operating Temperature Range	0~45°C
Discharge Temperature	-20~45°C
Fire Protection	Heat Detector/Smoke Detector/Aerosol
IP Grade	IP54
Altitude	≤3000 m
Dimension (W×D×H)	700×1310×2200 mm
Weight	1310kg
Protective Class	I
Overvoltage Category	II
For Cooling System	
AC Input Voltage Range	220~240Vac
AC Input Frequency	50/60Hz
Max.Input Current	12A
Importer's Name	
Contract Address	
DISPOSAL OF BATTERIES SHOULD FOLLOW LOCAL REGULATIONS Charge the battery at constant current 103A until voltage reaches 604.8V then charge at constant voltage 604.8V till charge current is 10.3A. Production Date:2025/05 MADE IN CHINA IFpP55/176/208/[1P168S]M/-20+45/90	
ADDR: 1001, Block A, Building 2, SEZ Construction Wisdom Park, No.380 Guangming Avenue, Tangwei Community, FenghuangStreet, Guangming District, Shenzhen, Guangdong, China	

OLP-EB-V463_E95-AO01	
	
Name	OLP Air Cooled Integrated Energy Cabinet
Battery Type	LiFePO ₄
Cell capacity	3.22V/206Ah
Rated Battery Capacity	206Ah, 95.51kWh
Rated Battery Voltage	463.68Vdc
Battery Operation Voltage Range	403.2-518.4Vdc
Standard Charge/Discharge Current	103A/103A
Maximum Charge/Discharge Current	200A/200A
Operating Temperature Range	0~45°C
Discharge Temperature	-20~45°C
Fire Protection	Heat Detector/Smoke Detector/Aerosol
IP Grade	IP54
Altitude	≤3000 m
Dimension (W×D×H)	700×1310×2200 mm
Weight	1190kg
Protective Class	I
Overvoltage Category	II
For Cooling System	
AC Input Voltage Range	220~240Vac
AC Input Frequency	50/60Hz
Max.Input Current	12A
Importer's Name	
Contract Address	
DISPOSAL OF BATTERIES SHOULD FOLLOW LOCAL REGULATIONS Charge the battery at constant current 103A until voltage reaches 518.4V then charge at constant voltage 518.4V till charge current is 10.3A. Production Date:2025/05 MADE IN CHINA IFpP55/176/208/[1P144S]M/-20+45/90	
ADDR: 1001, Block A, Building 2, SEZ Construction Wisdom Park, No.380 Guangming Avenue, Tangwei Community, FenghuangStreet, Guangming District, Shenzhen, Guangdong, China	

OLP-EB-V386_E79-AO01	
	
Name	OLP Air Cooled Integrated Energy Cabinet
Battery Type	LiFePO ₄
Cell capacity	3.22V/206Ah
Rated Battery Capacity	206Ah, 79.59kWh
Rated Battery Voltage	386.4Vdc
Battery Operation Voltage Range	336-432Vdc
Standard Charge/Discharge Current	103A/103A
Maximum Charge/Discharge Current	200A/200A
Operating Temperature Range	0~45°C
Discharge Temperature	-20~45°C
Fire Protection	Heat Detector/Smoke Detector/Aerosol
IP Grade	IP54
Altitude	≤3000 m
Dimension (W×D×H)	700×1310×2200 mm
Weight	1070kg
Protective Class	I
Overvoltage Category	II
For Cooling System	
AC Input Voltage Range	220~240vac
AC Input Frequency	50/60Hz
Max.Input Current	12A
Importer's Name	
Contract Address	
DISPOSAL OF BATTERIES SHOULD FOLLOW LOCAL REGULATIONS Charge the battery at constant current 103A until voltage reaches 432V then charge at constant voltage 432V till charge current is 10.3A. Production Date:2025/05 MADE IN CHINA IFpP55/176/208/[1P120S]M/-20+45/90	
ADDR: 1001, Block A, Building 2, SEZ Construction Wisdom Park, No.380 Guangming Avenue, Tangwei Community, FenghuangStreet, Guangming District, Shenzhen, Guangdong, China	

OLP-EB-V309_E63-AO01	
	
Name	OLP Air Cooled Integrated Energy Cabinet
Battery Type	LiFePO ₄
Cell capacity	3.22V/206Ah
Rated Battery Capacity	206Ah, 63.67kWh
Rated Battery Voltage	309.12Vdc
Battery Operation Voltage Range	268.8-345.6Vdc
Standard Charge/Discharge Current	103A/103A
Maximum Charge/Discharge Current	200A/200A
Operating Temperature Range	0~45°C
Discharge Temperature	-20~45°C
Fire Protection	Heat Detector/Smoke Detector/Aerosol
IP Grade	IP54
Altitude	≤3000 m
Dimension (W×D×H)	700×1310×2200 mm
Weight	950kg
Protective Class	I
Overvoltage Category	II
For Cooling System	
AC Input Voltage Range	220~240Vac
AC Input Frequency	50/60Hz
Max.Input Current	12A
Importer's Name	
Contract Address	
DISPOSAL OF BATTERIES SHOULD FOLLOW LOCAL REGULATIONS Charge the battery at constant current 103A until voltage reaches 345.6V then charge at constant voltage 345.6V till charge current is 10.3A. Production Date:2025/05 MADE IN CHINA IFpP55/176/208/[1P96S]M/-20+45/90	
ADDR: 1001, Block A, Building 2, SEZ Construction Wisdom Park, No.380 Guangming Avenue, Tangwei Community, FenghuangStreet, Guangming District, Shenzhen, Guangdong, China	

Polarity:**Remark:**

The Series Number: 0001250321, code rule shows below:

- 1) The "25" digits represent the year, eg "2024=24, 2025=25...";
- 2) The "03" digits represent the month, eg "January=01, February=02, March=03...";
- 3) The "21" digits represent the day, eg "19th=19, 20th=20, 21th=21...";

Test item particulars	
Classification of installation and use..... : To be defined in final product	
Supply Connection : Terminals	
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..... : 2025-10-11	
Date (s) of performance of tests : 2025-10-11 to 2025-10-16	
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 IEC 60068-2-1:	
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)..... : Dongguan Olipower New Energy Co., Ltd. No. 2 Qianmei Road, Dongkeng Town, Dongguan City, Guangdong Province, PRC	

General product information and other remarks:

The product covered by this report is Lithium ion Rechargeable Battery System. The maximum stacking level is by 7 battery modules. The single battery module is equipped with 24 cells in 24S1P, cell model no. is EC-AU206-NAH3LO. Only one High voltage box is in battery system.

All series models OLP-EB-V309_E63-AO01, OLP-EB-V386_E79-AO01, OLP-EB-V463_E95-AO01, OLP-EB-V540_E111-AO01 used the same control box which is stacked by the same modules, only the number of modules is different (note: series stacking). The tested model OLP-EB-V309 E63-AO01 is representative of all models.

Module: OLP-HP-V76_E15_I200-AO01

Hv box: OLP-HVB-V1000_I200-AO01

The main features of the battery are shown as below:

Cell and battery	Cell	Battery modules
Model Name	EC-AU206-NAH3LO	OLP-HP-V76_E15_I200-AI01
Rated capacity (Ah)	206	206
Nominal voltage (V)	3,22	77,28
Standard Charge Current (A)	103	103
Standard Discharge Current (A)	103	103
Maximum continuous charge current (A)	206	200
Maximum continuous discharge current (A)	206	200
Charge temperature Range (°C)	0~55	0~45
Discharge temperature Range (°C)	-20~55	-20~45
Standard Charge Voltage (V)	3,65	86,4
Upper limit Charging Voltage (V)	3,80	86,4
End-of-discharge Voltage (V)	2,5	67,2
Weight (kg)	4,00±0,2	120±1
Recommend charging method declared by the manufacturer	Charge at constant current 103A until the voltage reaches 3,65V. then charge at 3,65V till charge current is 10,3A	Charge at constant current 103A until the voltage reaches 86,4V. then charge at 86,4V till charge current is 10,3A

Battery System Rating:

Model No.	OLP-EB-V309 _E63-AO01	OLP-EB-V386 _E79-AO01	OLP-EB-V463 _E95-AO01	OLP-EB-V540 _E111-AO01
Configuration:	96S1P	120S1P	144S1P	168S1P
Rated capacity (Ah)	206			
Nominal voltage(V)	309,12	386,4	463,68	540,96
Standard charge current (A)	103			
Maximum charge current (A)	200			
End of Charging Current (A)	10,3			
Standard Charge voltage(V)	345,6	432	518,4	604,8
Max. Charge voltage(V)	345,6	432	518,4	604,8
Standard discharge current (A)	103			
Maximum discharge current (A)	200			
Final discharge voltage(V)	268,8	336	403,2	470,4
Charging Temperature Range (°C)	0 to 45			
Discharging Temperature Range (°C)	-20 to 45			
Weight k (g)	510±5	630±5	750±5	870±5
Recommend charging method declared by the manufacturer	Charge at constant current 103A until the voltage reaches 345.6V. then charge at 345.6V till charge current is 10,3A	Charge at constant current 103A until the voltage reaches 432V. then charge at 432V till charge current is 10,3A	Charge at constant current 103A until the voltage reaches 518.4V. then charge at 518.4V till charge current is 10,3A	Charge at constant current 103A until the voltage reaches 604.8V. then charge at 604.8V till charge current is 10,3A

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...:	See also table 5.1 for Critical components information	P
	Reduce the risk of injuries from moving parts		P
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		N/A
	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
	Independent control and protection method(s)		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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		N/A
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.....:	Listed in the specification of cell.	P
	Designation of battery system to comply with the cell operating region	Information mentioned in manufacturer's specifications.	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		N/A
5.9	Quality plan		P
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented.....:	ISO 9001 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
	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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
7.2	Reasonably foreseeable misuse		P
7.2.1	External short-circuit test (cell or cell block)	CB approved cell used.	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		N/A
7.2.2	Impact test (cell or cell block)	CB approved cell used.	N/A
	Cylindrical cell, longitudinal axis impact		N/A
	Prismatic cell, longitudinal axis and lateral axis impact		N/A
	Results: no fire, no explosion.		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.....:	High voltage box and Battery modules	—
	Mass of the test unit (kg).....:	High voltage box: 27,0kg Battery modules: 120,0kg	—
	Height of drop (m).....:	High voltage box: 0,1m Battery modules: 0,025m	—
	Results: no fire, no explosion		P
7.2.4	Thermal abuse test (cell or cell block)	CB approved cell used.	N/A
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)	CB approved cell used.	N/A
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion		N/A
7.2.6	Forced discharge test (cell or cell block)	CB approved cell used.	N/A
	Cells connected in series in the battery system		N/A
	Redundant or single protection for discharge voltage control provided in battery system		N/A
	Target Voltage.....:		N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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 :		N/A
7.3	Considerations for internal short-circuit – Design evaluation		P
7.3.1	General		P
7.3.2	Internal short-circuit test (cell)	Cell level according to 7.3.2 internal short-circuit test, Ref. Certif. No. SG PSB-BT-05066	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 $25\text{ °C} \pm 5\text{ °C}$.		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 :		N/A
7.3.3	Propagation test (battery system)		N/A
	Method to create a thermal runaway in one cell ... :		N/A
	Results: No external fire from the battery system, no battery case rupture..... :		N/A

8	BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)		P
8.1	General requirements		P
	Functional safety analysis for critical controls	Relevant documents provided by the client which indicate analysis for function safety meet the requirement of the IEC 60730-1 Annex H.	P
	Conduct of a process hazard analysis for both the cell manufacturing process and the battery system manufacturing process		P
	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		P
	The safety integrity level (SIL) target of the BMS		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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	No cooling system	N/A
	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		P
	Battery system fulfil EMC requirements of the end-device application..... :	The test report has been provided. The test report No. CNDQ-ESH-P25051451B	P

10	INFORMATION FOR SAFETY		P
	The cell manufacturer provides information about current, voltage and temperature limits of their products		P
	The battery system manufacturer provides information regarding how to mitigate hazards to equipment manufacturers or end-users.		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
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	See marking.	P
	Battery structure formulation		P

12	PACKAGING AND TRANSPORT		P
	Refer to Annex D		P

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

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..... :		—
	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..... :		—

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Target cell to be laser irradiated		—
	The irradiation point on the target cell same or similar as that on the cell test		N/A
	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		N/A
	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		N/A
	Regulations concerning international transport of secondary lithium batteries		N/A

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⁾	
Battery modules						
Cell	Wuhu ETC Battery Limited	EC-AU206-NAH3LO	3,22V, 206Ah	Ref. Certif. No. SG PSB-BT-05066	Ref. Certif. No. SG PSB-BT-05066	
Metal Enclosure	Shenzhen OLiPower Energy & Automation Technology Co., Ltd.	SGCC	Thickness min.: 1,5mm, Dimensions: 464*230*880mm	IEC 62619: 2022	Test with appliance	
Connector (B+)	Shanghai Futronics Electronic Technology Co.,Ltd.	PSR8XABM6	1000V, 200A	IEC 61984:2008 EN 61984:2009 IEC 60947-7-1:2009 EN 60947-7-1:2009	TÜVRheinland R 50630017	
Connector (B-)	Shanghai Futronics Electronic Technology Co.,Ltd.	PSR8XABM6	1000V, 200A	IEC 61984:2008 EN 61984:2009 IEC 60947-7-1:2009 EN 60947-7-1:2009	TÜVRheinland R 50630017	
Internal Signal Wire	Zhejiang Huabo Cable Co Ltd	1007	22AWG, 125°C, 300V	UL 758	UL E529974	
Black plastic sheet	NANTONG HUAPU PHOTOELECTRIC MATERIAL CO.,LTD	HPC-EFR87X	Thickness min.: 0,25mm, V-0, 80°C	UL 94	UL E508063	
PCB	HuBei GongMing Circuits Co.,Ltd	GF212	V-0, 130°C	UL 796	UL E365663	

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
IC (U10)	GigaDevice	GD32F303RCT6	VDD: 3,6V Max, I _{VDD} : 150mA Max, Temperature rang: -40°C ~85°C	IEC 62619: 2022	Test with appliance
IC (U18, U20)	ADI	ADBMS1818ASWZ	Supply Voltage: 16-90V, Battery Monitor: 18ch, The cell measurement range: 0-5V, Temperature rang: -40°C ~85°C	IEC 62619: 2022	Test with appliance
IC (U1)	MPS	MP2456GJ	V _{IN} : 4,5-50V, I _O : 0,5A Max, Temperature rang: -40°C ~ 125°C	IEC 62619: 2022	Test with appliance
PTC (F1)	Littelfuse	2016L050MR	Protection Voltage ≤60VDC, I _{hold} : 0.55A, I _{trip} : 1.1A, Temperature rang: -40°C ~85°C	UL 1413	UL E183209
Relay (K1, K2)	Xiamen Hongfa Electroacoustic Co., Ltd.	HF49FD-005-1H11	Contact Resistance ≤100mΩ(1A, 6VDC), Rated load: 0,5 125VAC/ 5A, 30VDC	UL 508	UL E133481
High voltage box					
Metal Enclosure	Shenzhen OLiPower Energy & Automation Technology Co., Ltd.	SGCC	Thickness min.: 1,5mm, Dimensions: 464*230*720mm	IEC 62619: 2022	Test with appliance
Connector (P+)	Shanghai Futronics Electronic Technology Co., Ltd.	PSR8XABM6	1000V, 200A	IEC 61984:2008 EN 61984:2009 IEC 60947-7-1:2009 EN 60947-7-1:2009	TÜVRheinland R 50630017

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
Connector (P-)	Shanghai Futronics Electronic Technology Co.,Ltd.	PSR8XABM6	1000V, 200A	IEC 61984:2008 EN 61984:2009 IEC 60947-7-1:2009 EN 60947-7-1:2009	TÜVRheinland R 50630017
Circuit breaker	Zhejiang Benyi Electrical Co., Ltd.	BH-250-2P	1500V, 250A	EN IEC 60947-3:2021	TÜVRheinland AN 50562644 0001
Fuse	GUANGDON G EUGARD CO.,LTD	ESH3071	1000V, 315A	EN 60269-1:2007+A1+A2 EN 60269-4:2009+A1+A2	TÜVRheinland R 50596890
Relay	Join Electric (ShangHai) Co., Ltd	EVHB250A-24B	500V, 250A	EN IEC 60947-4-1:2019 EN 60947-1:2007/A2:2014 EN 60947-5-1:2017	TÜV SUD N8A109076 0001
Precharge Relay	Join Electric (ShangHai) Co., Ltd	EVH50-24S	24V, 50A	UL 60947-4-1	UL E514589
Switching power supply	MEAN WELL Enterprises Co., Ltd.	DDRH-240-24	Input:250~1500Vdc Output:24V/10A/240W /-40~80°C	IEC 62109-1:2010	Ref. Certif. No. NL-86430
PCB	HuBei GongMing Circuits Co.,Ltd	GF212	V-0, 130°C	UL 796	UL E365663
IC (U6)	ST	STM32F407ZGT6	VDD: 4V Max, I _{VDD} : 150mA Max, Temperature rang: -40°C ~85°C	IEC 62619: 2022	Test with appliance
IC (U1, U3)	HTC	LM2576R-ADJ	V _{DD} -V _{SS} : 45V Max, V _{IN} : 24V, I _O : 1A Max, Temperature rang: -40°C ~ 125°C	IEC 62619: 2022	Test with appliance

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
PTC (F1)	Littelfuse	2016L050MR	Protection Voltage ≤60VDC, I _{hold} :0,55A, I _{trip} :11A, Temperature rang: -40°C ~85°C	UL 1413	UL E183209
Relay (K1, K2, K3, K4)	Xiamen Hongfa Electroacousti c Co.,Ltd.	HFD23-005-1ZS	Contact Resistance≤100mΩ(0, 1A,6VDC, Rated load: 0,5,125VAC/ 1A, 30VDC	UL 508	UI E133481
Supplementary information:					
1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

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	
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--	--	--	--	--	--	
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
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--	--	--	--	--	--	--
--	--	--	--	--	--	--
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
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--	--	--	--	--	--
--	--	--	--	--	--
Supplementary information: Results: A – No fire or Explosion B – Fire C – Explosion D – 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	
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--	--	--	--	--	--	
--	--	--	--	--	--	
Method of cell failure ¹⁾		Location of target cell		Area for fire protection (m²)		
--		--		--		
--		--		--		
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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, (V dc)	Maximum Charging Current, (A)	Max. Charging Voltage, (V dc)	Max. Voltage of Cell/Cell Blocks, (V dc)	Results	
DUT1	2,576~3,041	200	336,6	3,653	A, D, F	
			Charge Voltage Applied Battery System: 1)			
			Whole		Part	
			401,28V		--	
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	
DUT1	301,2	240	308,5	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	
DUT1	317,5	200	320,9	
Maximum Specified Temperature of Battery System, °C		Maximum Measured Cell Case Temperature, °C	Results	
45		50	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
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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): ____					

Attachment 1(Pictures for product)

Overview of battery system



Overview of battery system



Opening view of battery system (Model: OLP-EB-V386 E79-AO01)



Opening view of battery system (Model: OLP-EB-V463 E95-AO01)



Opening view of battery system (Model: OLP-EB-V386 E79-AO01)



Opening view of battery system (Model: OLP-EB-V309 E63-AO01)



Overall view for High voltage box



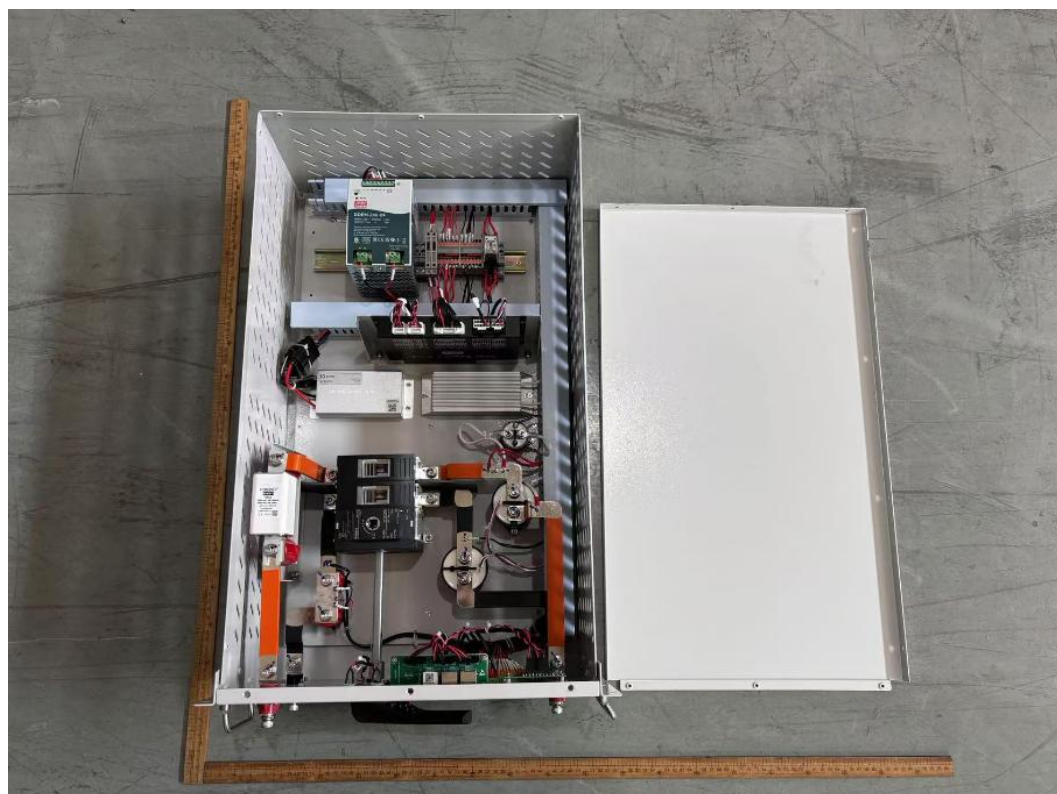
Overall view for High voltage box



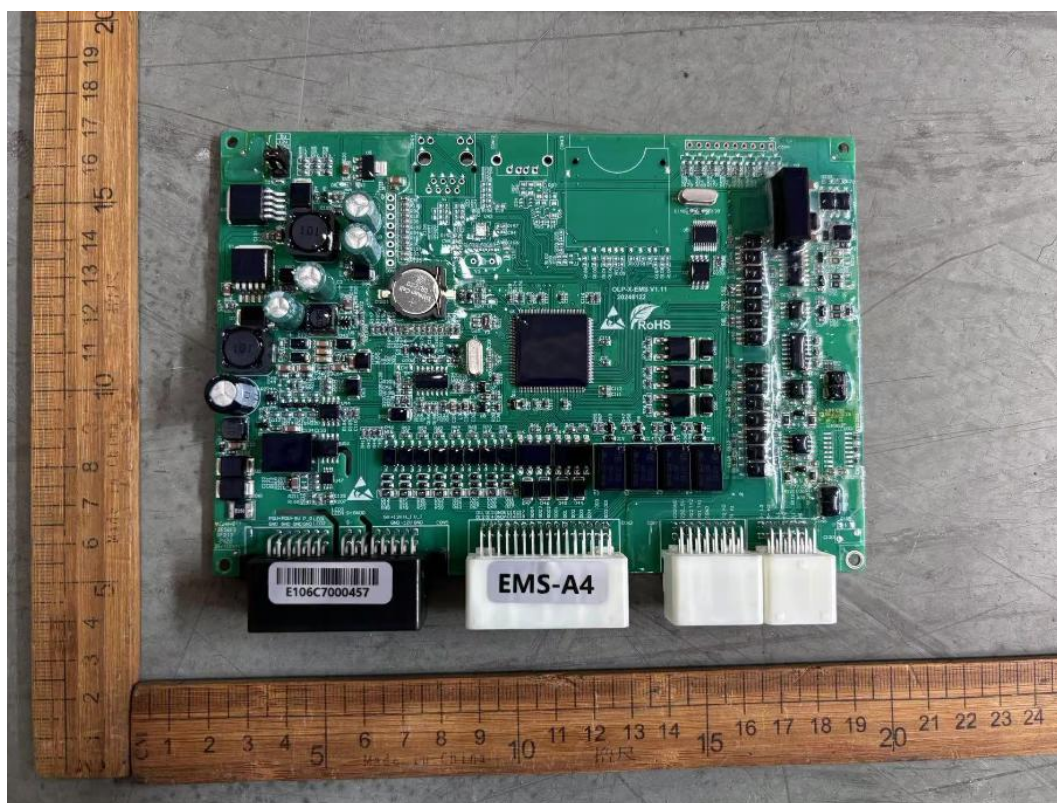
High voltage box connector view



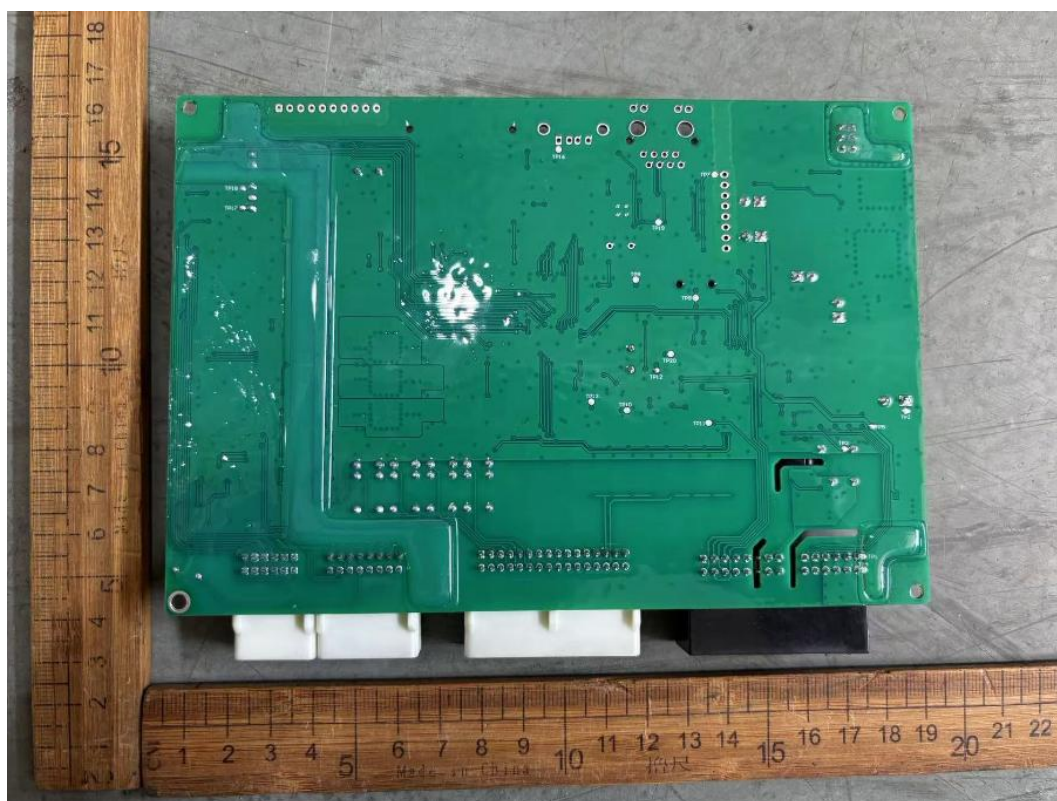
Internal view for High voltage box



Circuit board view



Circuit board view



Overall view for Battery modules



Overall view for Battery modules



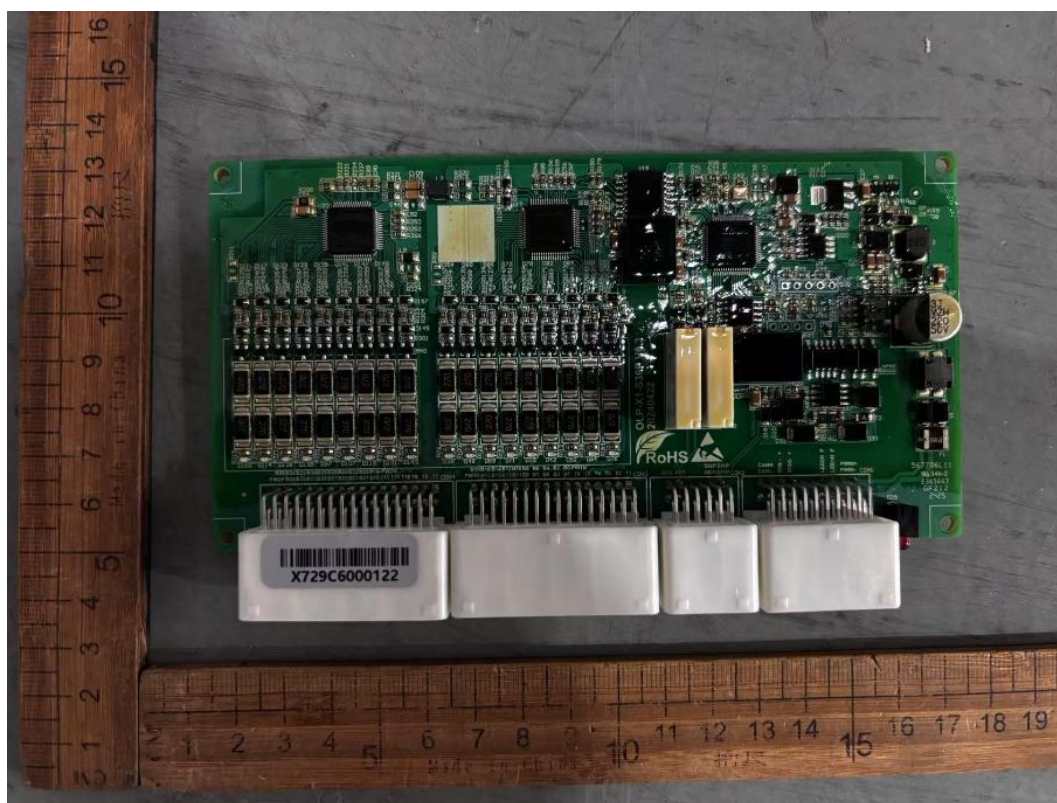
Internal view for Battery modules



Internal view for Battery modules



Circuit board view



Circuit board view

