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. ..... :	230600765SHA-001
Date of issue ..... :	2023-07-06
Total number of pages ..... :	21
Name of Testing Laboratory preparing the Report ..... :	Intertek Testing Services Shanghai
Applicant's name ..... :	BATTERLUTION LTD
Address ..... :	2203 HongXuan Building Shixia North 1st Street Futian District Shen Zhen City, Guangdong P.R. China
Test specification:	
Standard ..... :	IEC 62619: 2017
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC62619A
Test Report Form(s) Originator .... :	UL(Demko)
Master TRF ..... :	Dated 2018-06-07

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

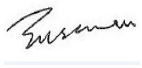
General disclaimer:

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

This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description ..... :	Rechargeable Li-ion Battery
Trade Mark ..... :	Batterlution
Manufacturer :	Same as applicant
Model/Type reference ..... :	LFPWall 10K
Ratings ..... :	51.2V 200Ah 10240Wh

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

☒	**CB Testing Laboratory:**	Intertek Testing Services Shanghai	
Testing location/ address.....:		Building No.86, 1198 Qinzhou Road (North), 200233 Shanghai, China	
Tested by (name, function, signature).....:		Sybil Shu (Engineer)	
Approved by (name, function, signature)...:		Susanna Xu (Mandated 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):

No.	Content	Page
1	Photos of product	19 to 22

Summary of testing:

The results indicate that the specimen complies with standard “IEC 62619: 2017”.

Tests performed (name of test and test clause):

Drop test	7.2.3
Overcharge control of voltage (battery system only)	8.2.2
Overcharge control of current (battery system only)	8.2.3
Overheating control (battery system only)	8.2.4

Testing location:

Intertek Testing Services Shanghai

Building No.86, 1198 Qinzhou Road (North), 200233 Shanghai, China.

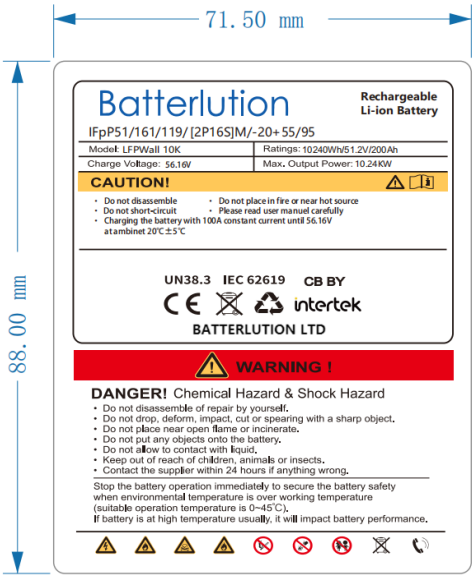
Summary of compliance with National Differences (List of countries addressed):

None.

☒ **The product fulfils the requirement of EN 62619:2017**

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Test item particulars.....:	Rechargeable Li-ion Battery
Classification of installation and use.....:	To be defined in final product
Supply Connection.....:	---
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 .....:	2023-2-10
Date (s) of performance of tests.....:	2023-2-17 to 2023-3-24

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.

"(See appended table)" refers to a table appended to the report.

Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

There is only one complete protection in product. The other protection shall be considered in end product.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

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 Lithium Valley Energy Co., Ltd. Fuzhu 4th Street, Zhangyang community, Zhangmutou town , Dongguan City, 523637 Guangdong P.R. China

General product information and other remarks:
The product covered by this report is Rechargeable Li-ion Battery. The battery is equipped with 32 cells(16S2P), cell model no. is IFP50160116A-102Ah
The voltage control: First U7 pin 35-51 to get signal acquisition, then through pin 60 and pin 62 of UM2 control Mosfet to cut-off, second pin 57-58 of UM2 to operate dry contact.
The current control: First U7 pin 53 and pin 55 to get signal acquisition, then through pin 60 and pin 62 of UM2 control Mosfet to cut-off, second pin 57-58 of UM2 to operate dry contact.
The heating control: First U7 pin 8-11 to get signal acquisition, then through pin 60 and pin 62 of UM2 control Mosfet to cut-off,second pin 57-58 of UM2 to operate dry contact.
The battery shall be charged per specification provided by the manufacturer.

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
5.2	**Insulation and wiring**		**P**
	Voltage, current, altitude, and humidity requirements		P
	Adequate clearances and creepage distances between connectors		P
	The mechanical integrity of internal connections		P
5.3	**Venting**		**P**
	Pressure relief function	Pressure relief mechanism existing	P
	Encapsulation used to support cells within an outer casing		N/A
5.4	**Temperature/voltage/current management**		**P**
	The design prevents abnormal temperature-rise		P
	Voltage, current, and temperature limits of the cells	Overcharge, overcurrent and overheating proof circuit used in this battery. See tests of clause 8	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
	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 by the cell manufacturer	Battery system has independent control and protective functions, and BMS is integrated into battery system	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
	The voltage control for series-connected batteries		P
5.7	**Operating region of lithium cells and battery systems for safe use**		**P**
	The cell operating region..... :	Charging: 0~60°C 102A/3.9V Max Maximum discharging current :255A Final discharge voltage :2.0V	P
	Designation of battery system to comply with the cell operating region	Charging: 0~55°C 200A/56.16V Max Maximum discharging current :200A Final discharge voltage :45.6V	P
5.8	**Quality plan**		**P**
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :	Self-declaration 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 IEC62619)		P
	Capacity confirmation of the cells or batteries	Performed by factory	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..... :	The method mentioned in manufacturer's specifications	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)		N/A
	Short circuit with total resistance of 30 mΩ ± 10 mΩ at 25 °C ± 5 °C		N/A
	Results: no fire, no explosion		N/A
7.2.2	Impact test (cell or cell block)		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..... :	Battery module	—
	Mass of the test unit (kg)..... :	91.04kg	—
	Height of drop (cm)..... :	5cm	—
	Results: no fire, no explosion		P
7.2.4	Thermal abuse test (cell or cell block)		N/A
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)		N/A
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion..... :	See Table 7.2.5	N/A
7.2.6	Forced discharge test (cell or cell block)		N/A
	Upper limit charge voltage of the cell..... :		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 It ..... :		N/A
	Discharging time, t = (1 It / I_m) x 90 (min.) ..... :		N/A
	Results: no fire, no explosion ..... :		N/A
7.3	**Considerations for internal short-circuit – Design evaluation**		**N/A**
7.3.1	General		N/A
7.3.2	Internal short-circuit test (cell)		N/A
	Samples preparation procedure: a), in accordance with 8.3.9 of IEC62133:2012; or b), the nickel particle inserted before charging, or c), the nickel particle was inserted before electrolyte filling ..... :		N/A
	Tested according to Cl. 8.3.9 of IEC 62133:2012 test method, except all tests were carried out in an ambient temperature of 25 °C ± 5 °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, no explosion ..... :		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 or 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		P
	Conduct of a process hazard, 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
	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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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) ..... :		P
	Results: no fire, no explosion ..... :	See Table 8.2.2	P
	The BMS interrupted the overcharging before reaching 110% of 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 ..... :	60°C	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	**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
10	**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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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		P
A.6	Low temperature range		P
A.7	Discharging conditions for safe use		P
A.8	Example of operating region		P

ANNEX B	**PROCEDURE OF 7.3.3 PROPAGATION TEST**		**N/A**
B.1	General		N/A
B.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..... :		—
B.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 C	**PACKAGING**		**P**
	The materials and pack design chosen in such a way as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants		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)]**
BMS (Main board, bottom board)	Dongguan Lithium Valley Energy Co., Ltd.	SST22-1083-1.1	Software ID: 16S200A-21849-1.0 Version: V1.0	IEC 62619	Test with appliance
- PCB material	KINGBOARD LAMINATES HOLDINGS LTD UL (E123995)	KB-6160A	Fire rating: V-0 Max temperature: 130℃ Min. thickness: 2mm	IEC 62619	Test with appliance
- MCU (UM2)	Nuvoton	M483KGCAE	1.8V~3.6V 256K LQFP128-0.4-14X14	IEC 62619	Test with appliance
- IC for AFE (U7)	SINO WEALTH ELECTRONIC LTD.	KA49503A	VVBAT=-0.3 ～ 99 V TA=-40~125°C	IEC 62619	Test with appliance
- MOSFET for charge (QP2,QP4,QP6,QP8,QP10,QP12,QP14,QP16,QP18,QP20,QP22,QP24,QP26,QP28,QP30,QP32,QP34,QP36,QP38,QP40,QP44,QP46,QP48,QP72,QP74)	CRMICRO	CRSS028N10N	VDS=100V, VGS=±20V D=120A, TJ=-55~150°C ID=2.5mΩ	IEC 62619	Test with appliance
- MOSFET for discharge (QP1,QP3,QP5,QP7,QP9,QP11,QP13,QP15,QP17,QP19,QP21,QP23,QP25,QP27,QP29,QP31,QP33,QP35,QP37,QP39,QP41,QP45,QP47,QP73,)	CRMICRO	CRSS028N10N	VDS=100V, VGS=±20V D=120A, TJ=-55~150°C ID=2.5mΩ	IEC 62619	Test with appliance
- Balanced resistance (R428,R430,R432,R434,R436,R438,R440,R442,R444,R446,R448,R450,R452,R454,R456,R458)	Uniroyal Electronics Global Co., Ltd	LMP25MF3P0R002	1W, 43Ω±5%	IEC 62619	Test with appliance

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

- Current Sensing Resistor (RS1,RS2,RS3,RS4,RS5,RS6,RS7,RS8,RS9,RS11,RS10,RS12,RS13,RS14,RS15,RS16,RS17,RS18,RS19,RS20,RS21,RS22,RS23,RS24,RS25)	PROSEMI	RLP25FEGMR002	2mR ±1% 50PPM/℃ 3W R2512 -55 to +170° C	IEC 62619	Test with appliance
Relay (SR1,SR2)	Ningbo Jieying Electrical Technology Co. ,Ltd UL（E492371）	JY23F-S-DC12V-C	Max Switching Current: 3A Max Switching Voltage: 250VAC Max Switching Power: 750VA/90W Operation temperature: -40~70°C Rated coil voltage: 12VDC Nominal Current:12.5mA	IEC 62619	Test with appliance
NTC Resistor for power MOS (RT1)	SHENZHEN SUNLORD ELECTRONICS CO LTD UL（E352242）	SNGR1103F3435FB	R25 =10KΩ±1%, B25/85=3435K±1%, Topr: -40°C～125°C	IEC 62619	Test with appliance
NTC Resistor for environment RT2	SHENZHEN SUNLORD ELECTRONICS CO LTD UL (E352242)	SDNT1608X103|ga3450βTF	R25 =10KΩ±1%, B25/50=3435K±1%, Topr: -40°C～125°C	IEC 62619	Test with appliance
PPTC （R317,R318,R522）	SHENZHEN JINKE SPECIAL MATERIALS CO LTD UL (E217453)	JK-nSMD005	Ih: 50A Itrip: 100A Vmax: 60V	IEC 62619	Test with appliance
PPTC F4	SHENZHEN JINKE SPECIAL MATERIALS CO LTD	JK60-500	5A 60V DC 40/85/21	IEC/EN 60738-1	TUV R 50254784
Fuse FPX3, FPX4	SHENZHEN LANSON ELECTRONICS CO., LTD. UL（E221465）	24E	15A 125V 6.1*2.6mm	IEC 62619	Test with appliance
Fuse FU1	SHENZHEN LANSON ELECTRONICS CO., LTD. UL（E221465）	24E	7A250V 6.1*2.6	IEC 62619	Test with appliance

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

Wiring for Connector (J30(B+))	Various	1015	600V 16AWG 105℃	IEC 62619	Test with appliance
Cell(BT1)	Shenzhen Lidea Battery Co Ltd UL (MH60145)	CR1220	3V 40mAH Φ12.5mm H=2.0mm	IEC 62619	Test with appliance
IC U6,U8,U14	Suzhou Novosense Microelectronics Co.,Ltd UL (E500602)	NIRS21N1	2.5V~5.5V 150M 2 5KV SOP-8	IEC 62619	Test with appliance
Optocoupler ISO2,ISO3,ISO5,ISO6,ISO7,ISO8,ISO9,ISO10	LITE-ON TECHNOLOGY CORP UL (E113898)	LTV-217	Reverse Voltage：6V Forward Current:50mA Topr:-55 ~ +110° C	IEC 62619	Test with appliance
Wiring B+/P+	DONGGUAN HAODE WIRE & CABLE TECHNOLOGY CO LTD UL (E364036)	3239	4AWG,200℃,600V	IEC 62619	Test with appliance
Wiring B-/P-	DONGGUAN HAODE WIRE & CABLE TECHNOLOGY CO LTD UL (E364036)	3239	8AWG,200℃,600V	IEC 62619	Test with appliance
Insulation Sleeving	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD UL (E203950)	RSFR	600V, 125° C	IEC 62619	Test with appliance
Connector P+/P-	General Connectivity System Co., Ltd.	PSR8XBB50	Rated voltage: 1000V; rated current: 200A; rated temperature:-40 ℃ 125 ℃; IP:67	IEC/EN 61984	TUV R 50425010
Enclosure	DongGuan XinCheng Metal Product Co., Ltd.	LV-BAT-W10.24Ac	PCC, Thickness min.: 1.5mm; Dimensions: 800*590*142 mm	---	Test with appliance
Cell	Hefei Guoxuan Hi-tech Power Energy Co., Ltd.	IFP50160116A-102Ah	3.2Vd.c. ,102Ah	IEC 62619	Dekra DK-127535-UL
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)				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 (K)**	**Results**

Supplementary information:
A - No fire or Explosion

7.2.5	TABLE: Overcharge test (cell)					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

7.2.6	TABLE: Forced discharge test (cell)				N/A
Sample No.	**OCV before applying reverse charge, (V dc)**	**Target Voltage (V dc)**	**Measured Reverse Charge Current It, (A)**	**Total Time for Reversed Charge Application (min)**	**Results**

Supplementary information:
Results:
A - No fire or Explosion

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.2	TABLE: Internal short-circuit test (cell)			N/A
Sample No.	**OCV at start of test, (V dc)**	**Particle location [1)]**	**Maximum applied pressure, (N)**	**Results**

Supplementary information:

[1)] Identify one of the following**:**

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

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

Results:

A - No fire or explosion

E – Test concluded when 400 N pressure was reached

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)**	
heat		-		---	

Supplementary information:

1) Cell can be failed through 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

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**
2	2.884-2.938	200	55.751	3.470-3.501	P
			Charge Voltage Applied Battery System: 1)		

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

	Whole	Part
	68.64V	---

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
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): ___

Note: 200A current is applied during the test, and the product is protected at 55.75V

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**
3	46.745V	240A	48.656V	P

Supplementary information:

Results:
A – No fire or 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.
Note: 240A current is applied during the test, and the product is protected immediately.

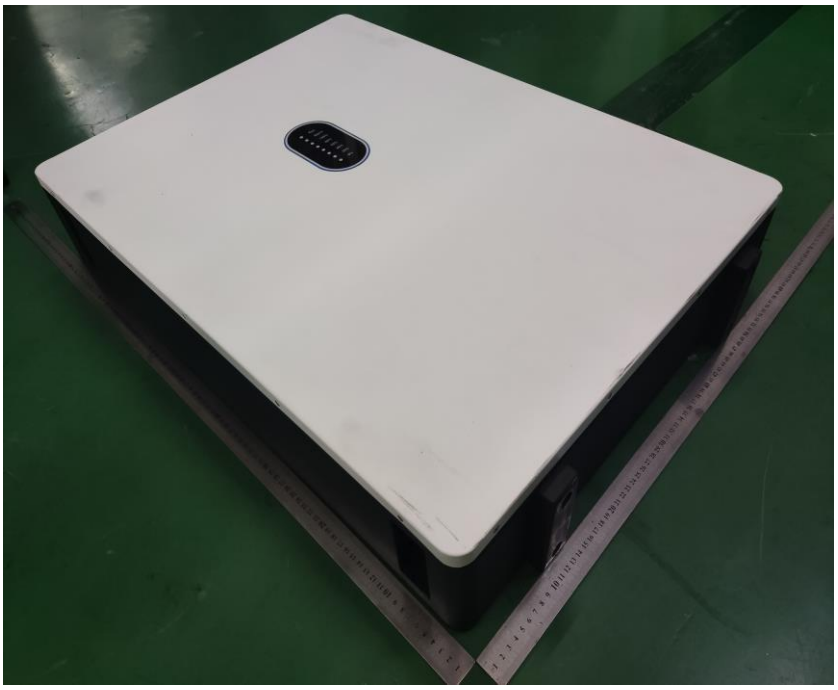
8.2.4	TABLE: Overheating control (battery system)		P
Model No.	**OCV at start(SOC 50%) of test, V dc**	**Maximum Charging Current, A**	**Maximum Charging Voltage, V dc**
4	52.851	0	52.851
Maximum Specified Temperature of Battery System, °C		**Maximum Measured Cell Case Temperature, °C**	**Results**
55		54.9	P

Supplementary information:

Results:
A – No fire or Explosion
D - Temperature sensing function of BMU did operate and then charging stopped
F - All function of battery system did operate as intended during the test.

Attachment 1: Photos of product

Overall View 1

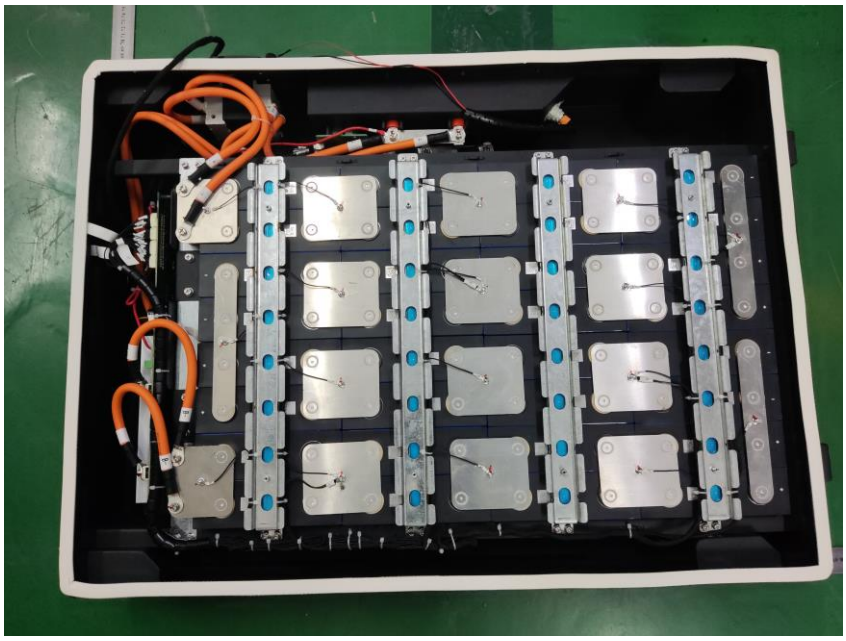


Overall View 2

Overall View 3

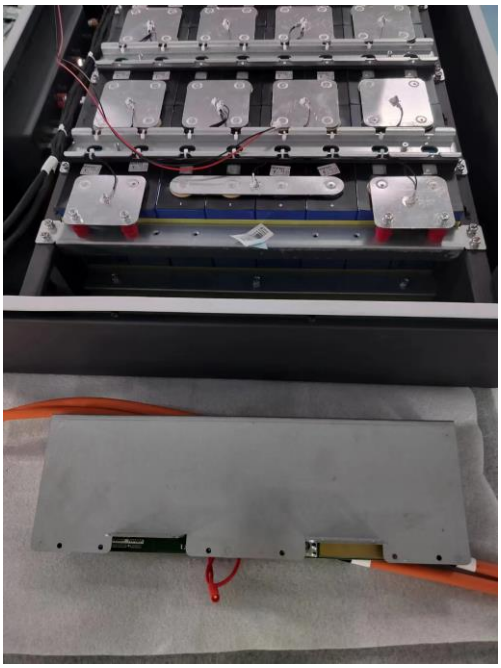
Internal View 1

Internal View 2

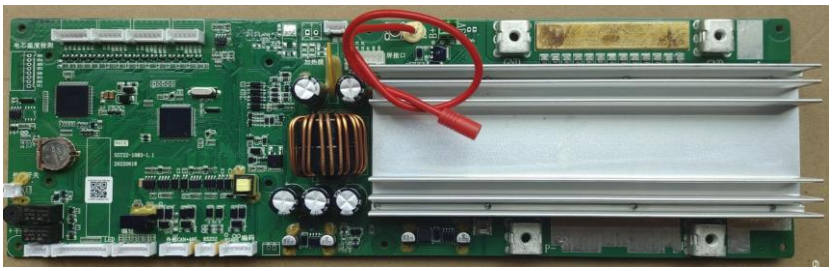


Internal View 3

Internal View 4



PCB TOP 1



PCB BOT 2