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CNAS L13807

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..... :	CMC241122006
Date of issue ..... :	2025-01-03
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Tested by (name, signature)..... :	Sago Su
Reviewed by (name, signature).... :	Meiko Ma
Approved by (name, signature).... :	Dylan Dou
Name of Testing Laboratory preparing the Report ..... :	**CMC Testing International (Shenzhen) Co., Ltd.**
Address..... :	101&104, Building B, Kaihuimao Industrial Park, Liyuan Road, Heping Community, Fuhai Street, Baoan District, Shenzhen, Guangdong, China
Applicant's name ..... :	**Zhengzhou Datou Hardware Products Co., Ltd.**
Address..... :	Room 101, Building 30, Xingyang Equipment Manufacturing Industrial Park, No. 1 Keji 2nd Road, Wulong Industrial Cluster District, Xingyang City, Zhengzhou City, Henan Province, China
Manufacturer's name..... :	**Zhengzhou Datou Hardware Products Co., Ltd.**
Address..... :	Room 101, Building 30, Xingyang Equipment Manufacturing Industrial Park, No. 1 Keji 2nd Road, Wulong Industrial Cluster District, Xingyang City, Zhengzhou City, Henan Province, China
Test specification:	
Standard ..... :	IEC 62619: 2022
Test procedure..... :	Type approved
Non-standard test method..... :	N/A
Test result..... :	Pass
Test item description..... :	$LiFePO_4$ Battery
Trade Mark..... :	N/A
Model/Type reference..... :	12V100Ah
Ratings..... :	12.8V, 100Ah, 1280Wh

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 CMC. The authenticity of this Test Report and its contents can be verified by contacting the CMC, responsible for this Test Report.

List of Attachments (including a total number of pages in each attachment):

Attachment 1: Photo documentation (4 pages).

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
cl.7.2.3.2 Whole Drop test (battery system) cl.8.2.2 Overcharge control of voltage (battery system); cl.8.2.3 Overcharge control of current (battery system); cl.8.2.4 Overheating control (battery system) The component cell (LF100LA) was evaluated according to IEC 62619-2022 by TÜV SÜD test report No.: 64.280.22.60432.01 Tests are made with the number of batteries specified in IEC 62619: 2022.	**CMC Testing International (Shenzhen) Co., Ltd.** 101&104, Building B, Kaihuimao Industrial Park, Liyuan Road, Heping Community, Fuhai Street, Baoan District, Shenzhen, Guangdong, China

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

☒ **The product fulfils the requirements of EN 62619: 2022.**

Copy of marking plate:

$LiFePO_4$ Battery

12V100Ah

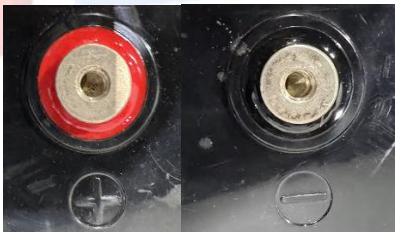
12.8V, 100Ah, 1280Wh (IFpP51/161/120[4S1P]/M/0+60/90)

Recommend charge method: Charge at constant current 20A until voltage reaches 14.6V, then charge at constant voltage 14.6V till current reduced to 0.1A.

Zhengzhou Datou Hardware Products Co., Ltd.

Date: YYYYMMDD Made in China

Risk of Fire and Burns. Do Not Open, Crush, Heat Above 60°C/140°F or Incinerate. Follow Manufacturer's Instructions.



Remark:
Date code: YYYYMMDD

YYYY=Year, MM=Month, DD=Day

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.

Test item particulars..... :	
Classification of installation and use ..... :	To be defined in final system.
Supply Connection..... :	Not directly connected mains.
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..... :	2024-11-22
Date (s) of performance of tests..... :	2024-11-23 to 2024-12-11
Test Environment Condition ..... :	Ambient temperature: 22.2ºC~23.7ºC
Sample No. ..... :	SN241122005B001

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
“(CXXX)” refers to sample number of cells, “X” is 0~9;
"(See Enclosure)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.
Due to color of sample label changed, the report have change sample photo in original report information in this report were based on the original report No. CMC241122005, dated 2024-12-25.

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

Name and address of factory (ies) ..... :	Same as applicant

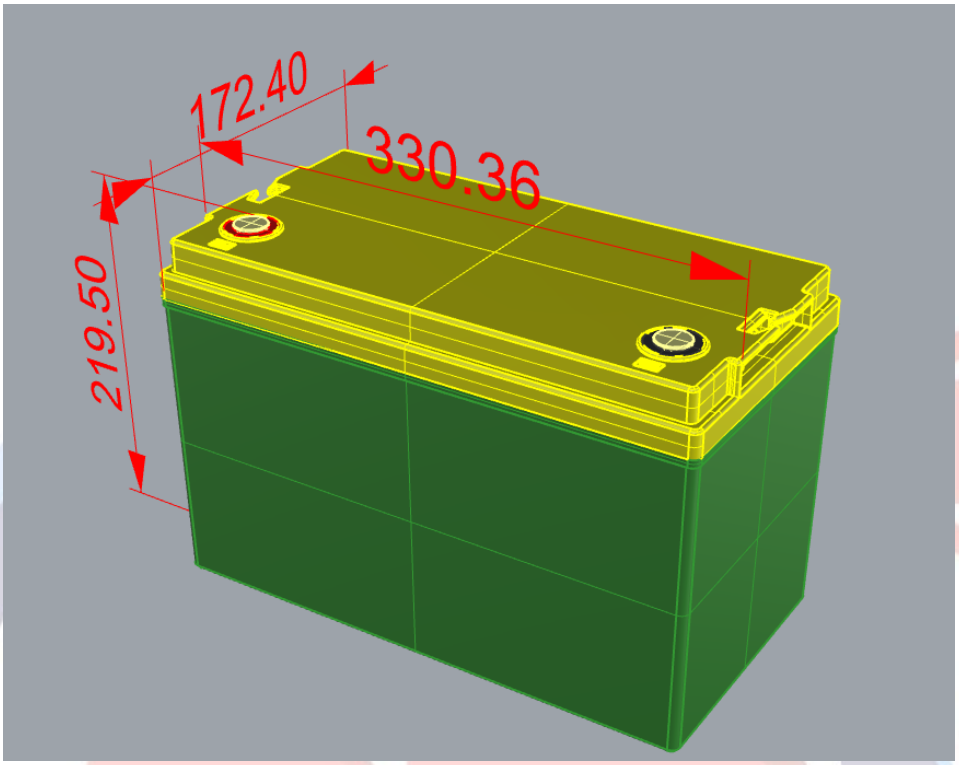
General product information and other remarks:

The Battery System is composed of a 1 battery packs. It contains electrochemical batteries, battery management units, signal terminals.
The battery consists of 4 Lithium Iron Phosphate cells connected in a 4S1P formation.
Not considered safety analysis, risk assessment or similar on battery system of cl 8.1 as client's request in this test report.

The main features of the battery are shown as below:

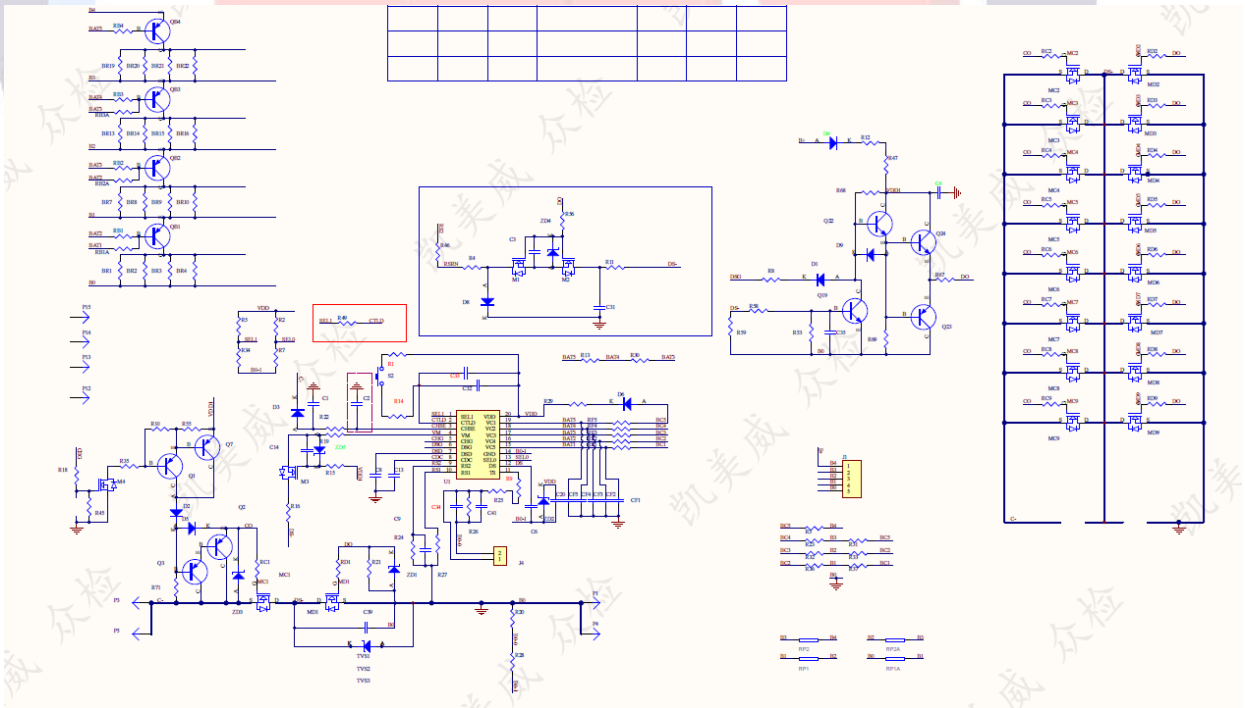
Product name	Component Cell used inside	$LiFePO_4$ Battery
Model Designation	LF100LA	12V100Ah
Rated capacity (Ah)	102	100
Nominal voltage (V)	3.2	12.8
Maximum Charging Current (A)	100	100
Maximum Discharging Current (A)	250	100
Charge temperature Range (°C)	-10~60	0 to 60
Discharge temperature Range (°C)	-30~60	-20 to 45
Standard Fully Charge Voltage (V)	3.65	14.6
Maximum Charging Voltage (V)	3.9	14.6
End of discharge voltage (V)	2.0	10
Weight (Kg)	(1.98±0.1)kg	10.16kg
Battery configuration		
Cell in connection	4S1P	
Recommend charging method declared by the manufacturer	Charge at constant current 20A until voltage reaches 14.6V, then charge at constant voltage 14.6V till current reduced to 0.1A. (Battery system)	
Recommend discharging method declared by the manufacturer	Discharge at constant current 50A until voltage reaches 10V (Battery system)	

Construction:



Battery(Unit:mm)

Circuit diagram:



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		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		N/A
	The mechanical integrity of internal connections		P
5.3	**Venting**		**P**
	Pressure relief function	Explosion-proof safety valve for venting exists, and vent design in cell.	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)	Marking near the terminal.	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
	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	No such design.	N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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	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	No such design.	N/A
5.9	**Quality plan**		**P**
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented.....:	Complied. Quality control plan 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		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.....:	See page 5.	P
7.2	**Reasonably foreseeable misuse**		**N/A**
7.2.1	External short-circuit test (cell or cell block)	Approved Cell	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)	Approved Cell	N/A
	Cylindrical cell, longitudinal axis impact		N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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)		P
	Description of the Test Unit ..... :	Battery system	—
	Mass of the test unit (kg) ..... :	10.16kg	—
	Height of drop (m)..... :	0.1m	—
	Results: no fire, no explosion		P
7.2.3.3	Edge and corner 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
7.2.4	Thermal abuse test (cell or cell block)	Approved Cell	N/A
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)	Approved 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 ..... :		N/A
7.2.6	Forced discharge test (cell or cell block)	Approved 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 ..... :		-
	Maximum discharge current of the cell, Im..... :		-
	Discharge current for forced discharge, 1.0 It ..... :		-
	Discharging time, t = (1 It / Im) x 90 (min.) ..... :		-
	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)	Approved 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 °C ± 5 °C.		N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	The appearance of the short-circuit location recorded by photograph or other means .....:		N/A
	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**	Not considered safety analysis	**N/A**
	Functional safety analysis for critical controls		N/A
	Conduct of a process hazard analysis for both the cell manufacturing process and the battery system manufacturing process		N/A
	Conduct of risk assessment and mitigation of the battery system		N/A
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		N/A
	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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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	Complied.	P

9	**EMC**		**N/A**
	Battery system fulfil EMC requirements of the end-device application		N/A

10	**MARKING AND DESIGNATION (REFER TO CLAUSE 5 OF IEC 62620)**		**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

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	The final product is battery	N/A
	Battery designation	IFpP51/161/120[4S1P]/M/0+65/90	P
	Battery structure formulation		P

12	**PACKAGING AND TRANSPORT**		N/A
	Refer to Annex D	Informative.	N/A

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**

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
B.1	**General**		N/A
B.2	**Test conditions:**		N/A
	The cell fully charged according to the manufacturer recommended conditions ..... :		—
	Laser irradiation point on the cell ..... :		—
	Output power of laser irradiation..... :		—
	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 ..... :		N/A
	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

5.1	TABLE: Critical components information	P

Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity [1)]
Cell	EVE Power Co., Ltd.	LF100LA	3.2V, 102Ah	IEC 62619: 2022	TUV SUD Test Report No.: 64.280.22.60432.01
PCB	SHENZHEN CHENGZHIYI PCB CO LTD	CZY-R002	V-0, 130°C	UL 796	UL E354470
IC (U1)	SINOWEALTH Electronic Ltd.	SH367005	V_{IN}: -3~26V, V_{DO}: 0.025V - 0.25V Topr: -40°C~+85°C	--	--
MOSFET (MC2~MC9,MD2~MD9)	Lonten Semiconductor Co., Ltd	LSGE085R023	V_{DSS}: 85V, V_{GS}: ±20V I_D: 180A R_{DS}:2.35mΩ T_J, T_{STG}: -55 ~150°C	--	--
Internal wire	Dongguan Zelongkang Wire Co., Ltd	3266	24AWG, 125°C, 300Vac	UL 758	UL E330488
Plastic enclosure	DONGGUAN HONOUR EP LTD	H2212(#)	PC, Min. thickness: 1.5mm, V-0, 80°C	UL 94	UL E341783

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance.

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: - No fire or Explosion					

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: - No fire or Explosion						

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 It, (A)**	**Total Time for Reversed Charge Application (min)**	**Results**
Supplementary information: **-** No fire or Explosion					

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:

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:

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
SN241122005B001	2.65~2.75	100	14.62	3.74	P

Charge Voltage Applied Battery System: 1)	
Whole	Part
17.16	N/A

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:

– No Fire or Explosion

– The voltage of the measured cells or cell blocks did not exceed the upper limit charging voltage

– All function of battery system did operate as intended during the test

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**
SN241122005B001	11.04	120	11.18	P

Supplementary information:
Results:
– No fire or Explosion
– Overcurrent sensing function of BMU did operate and then charging stopped
– All function of battery system did operate as intended during the test

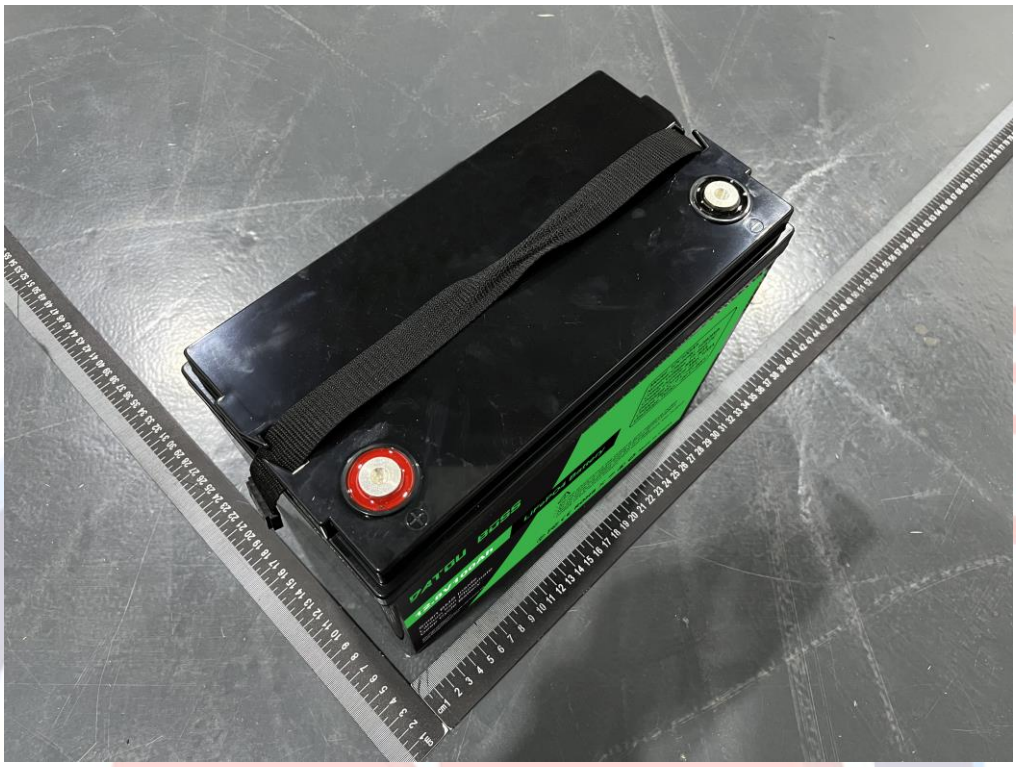
8.2.4	TABLE: Overheating control (battery system)		P
Model No.	**OCV at start(SOC 50%) of test, V dc**	**Maximum Charging Current, A**	**Measured maximum Charging Voltage, V dc**
SN241122005B001	13.23	100	13.55
Maximum Specified Temperature of Battery System, °C		**Maximum Measured Cell Case Temperature, °C**	**Results**
60		65.0	P

Supplementary information:
– No fire or Explosion
– Temperature sensing function of BMU did operate and then charging stopped
– All function of battery system did operate as intended during the test

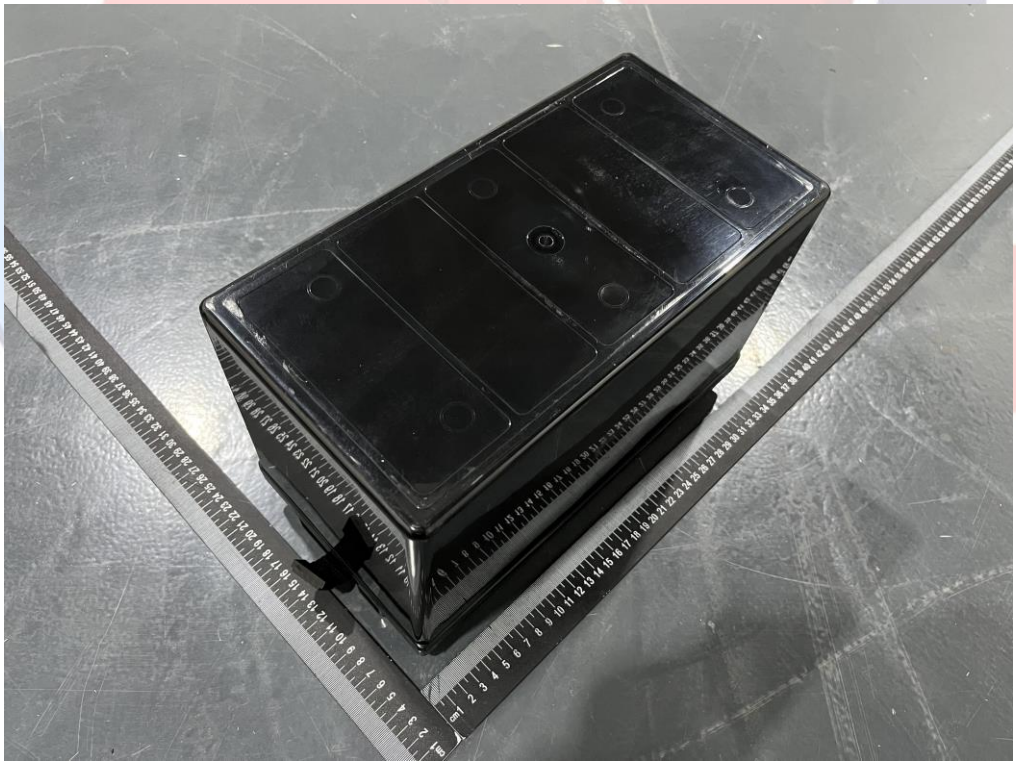
9	TABLE: EMC				N/A
Standard used for EMC test:					
Sample No.	**EMC Test Item**	**Battery Condition**	**EMC Test Level/ Parameters**	**Compliance Criteria**	**Results**

Supplementary information:

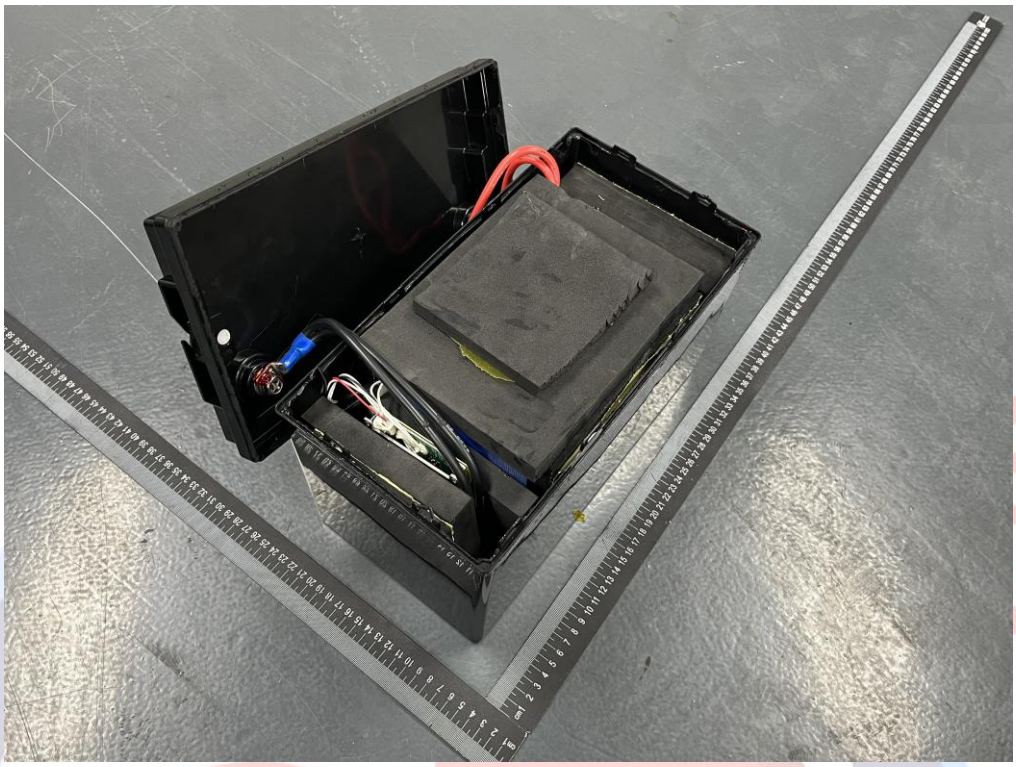
Attachment 1: Photo documentation



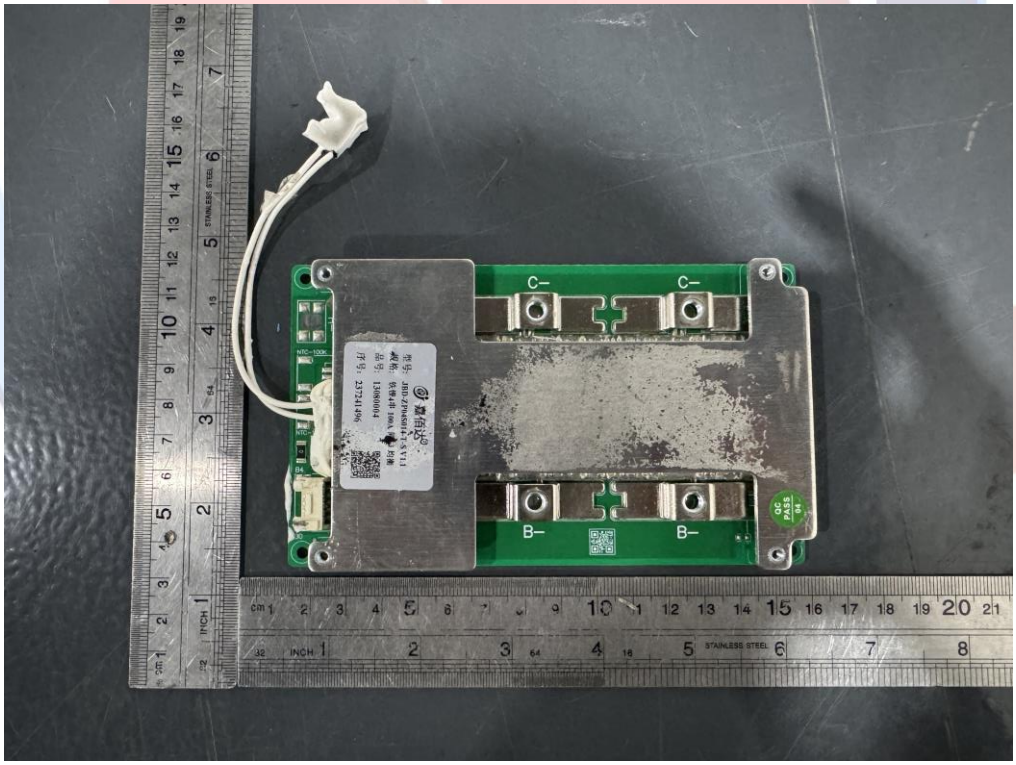
Picture 1. Front view of Battery



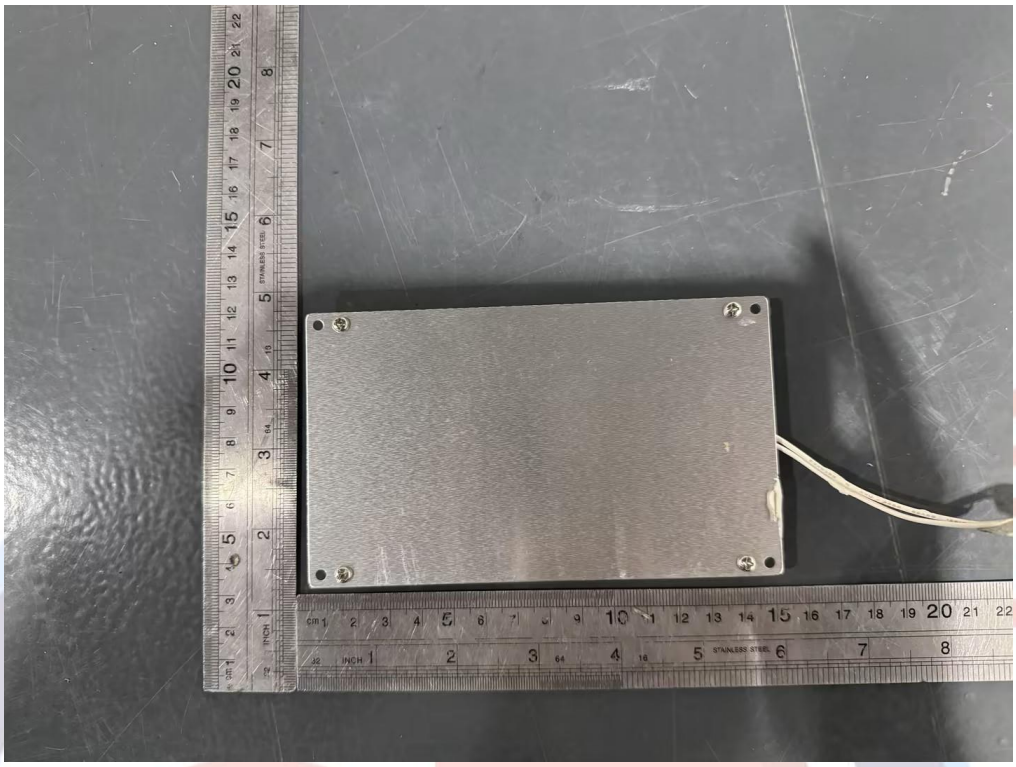
Picture 2. Back view of Battery



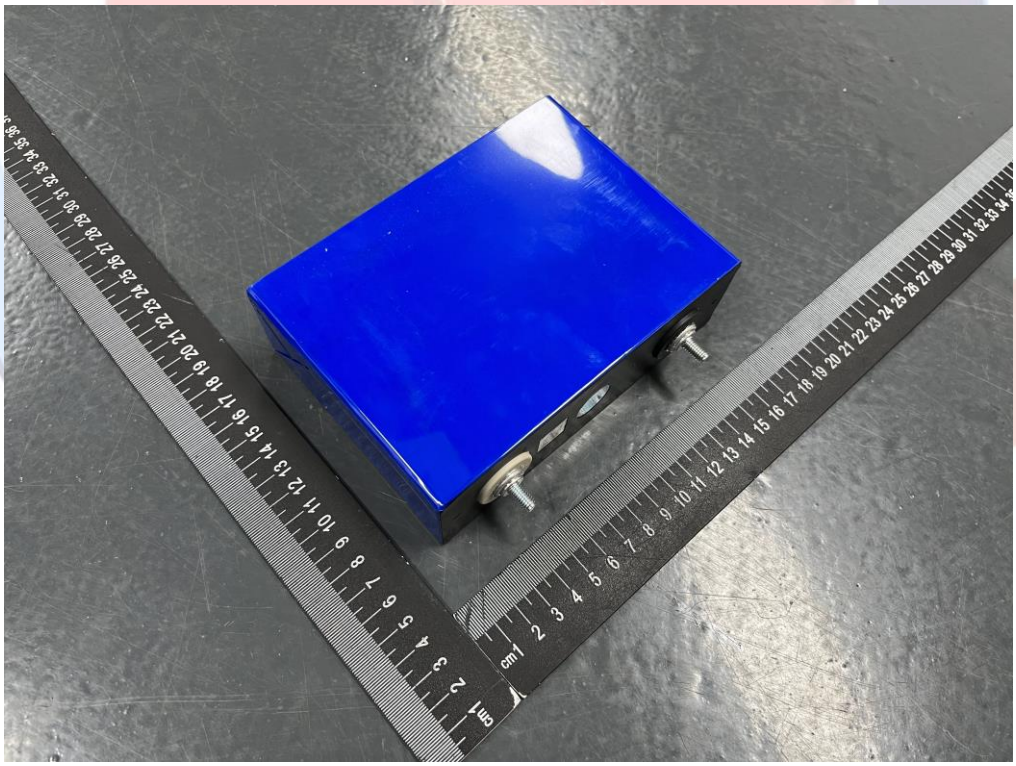
Picture 3. Internal view of Battery



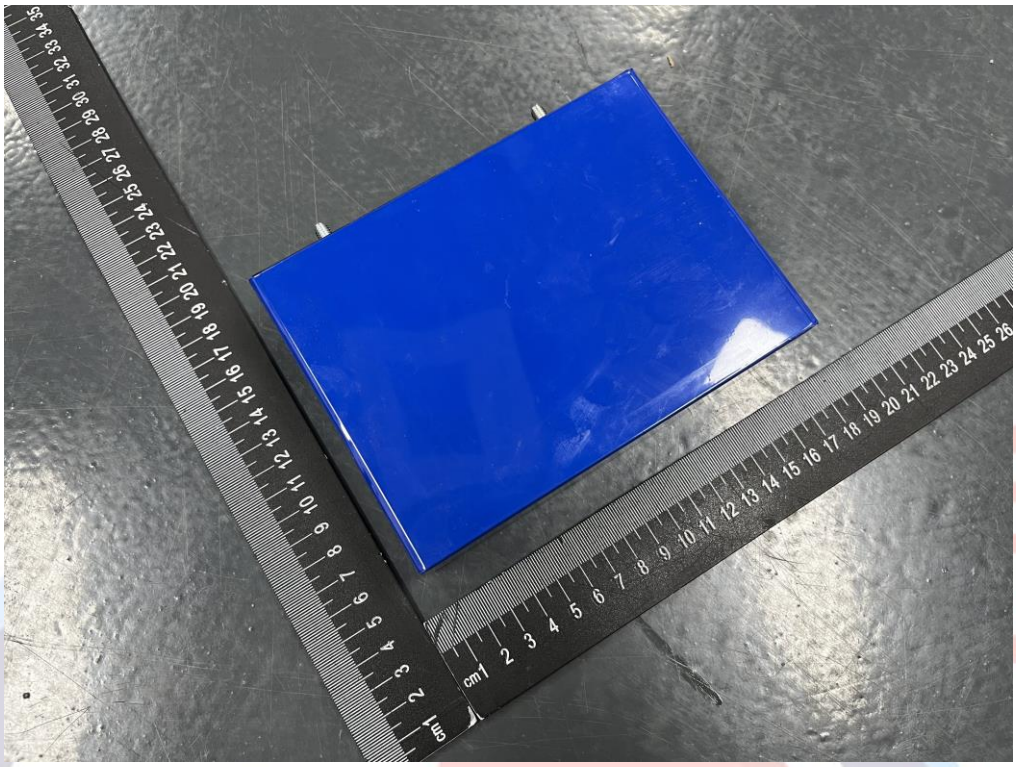
Picture 4. Front view of BMS board



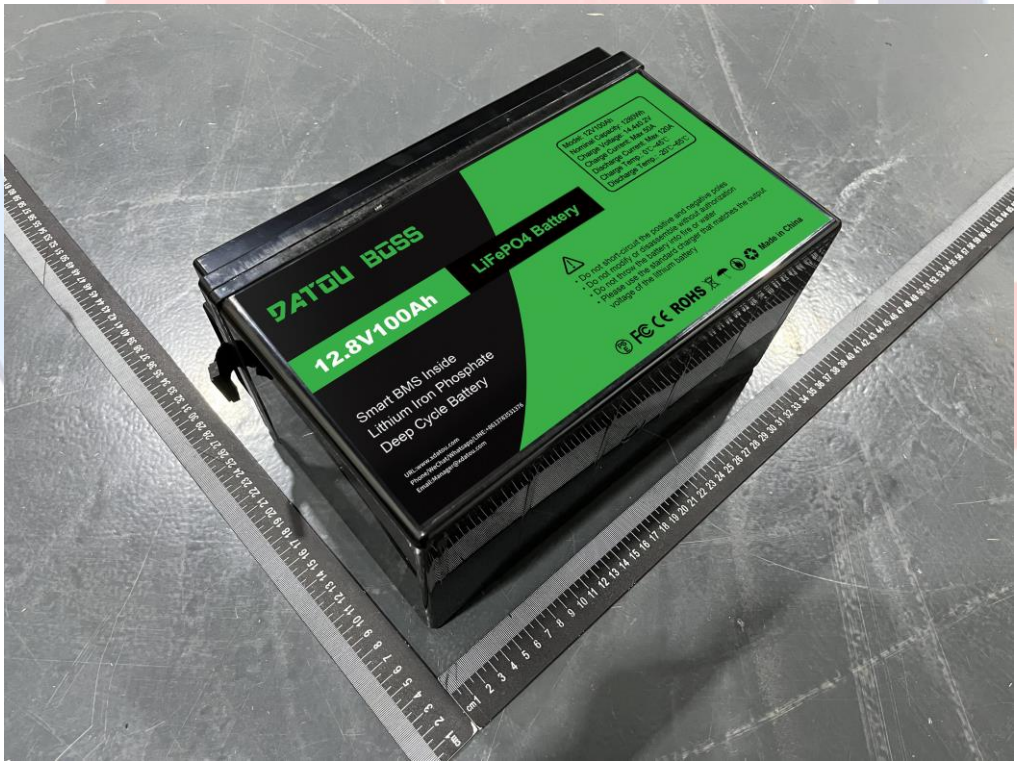
Pictur5. Back view of BMS board



Picture 6. Front view of cell



Picture 7. Back view of cell



Picture 8. Label

Important

1. The test report is invalid if it is not affixed the official seal of the laboratory to it.
2. Copies of the test report without the official seal of the laboratory are invalid.
3. It is forbidden to copy the test report partially without the written approval of the laboratory.
4. The test report is invalid without the signatures of Approver, Reviewer and Testing engineer.
5. The test report is invalid if it is blotted out.
6. Objections to the test report must be submitted to CMC within 15 days.
7. The test report is valid for the tested samples only.
8. As for the Verdict, "-" means "no need for judgement", "P" means "pass", "F" means "fail" and "N/A" means "not applicable".

Testing laboratory: CMC Testing International (Shenzhen) Co., Ltd.
Address: 101&104, Building B, Kaihuimao Industrial Park, Liyuan Road, Heping Community, Fuhai Street, Baoan District, Shenzhen, Guangdong, China
Tel: 400-1668-320
E-mail: info@cmczj-lab.com
http://www.cmczj-lab.com

-- End of Report –