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TEST REPORT
IEC 62133-2
Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications –
Part 2: Lithium systems

Report Number. ..... :	220301525SHA-001
Date of issue ..... :	2022-04-29
Total number of pages ..... :	30 pages
Name of Testing Laboratory preparing the Report ..... :	Intertek Testing Services Shanghai
Applicant's name ..... :	CBQ Auto and Leisure (Aust) Pty Ltd
Address ..... :	9, 83 Burnside Road, Stapylton, QLD, 4207, Australia
Test specification:	
Standard ..... :	IEC 62133-2:2017
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC62133_2A
Test Report Form(s) Originator .... :	DEKRA
Master TRF ..... :	Dated 2017-08-10

Test item description ..... :	Secondary Li-ion Battery
Trade Mark ..... :	HARD KORR
Manufacturer ..... :	CBQ Auto and Leisure (Aust) Pty Ltd 9, 83 Burnside Road, Stapylton, QLD, 4207, Australia
Model/Type reference ..... :	HKPBATL135BH, HKPBATL135B
Ratings ..... :	12.8V, 135Ah

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**Testing Laboratory:**	Intertek Testing Services Shanghai	
Testing location/ address ..... :		Building No.86, 1198 Qinzhou Road (North), 20033 Shanghai, China	
Tested by (name, function, signature) ..... :		Tommy Xia (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	24-29
2	CENELEC Group Modification and National Difference	30

Summary of testing:

The results indicate that the specimen complies with standard "IEC62133-2:2017".

Tests performed (name of test and test clause):

Name of test	Test clause
Case stress at high ambient temperature (battery)	7.2.2
External short-circuit (battery)	7.3.2
Free fall	7.3.3
Over-charging of battery	7.3.6
Mechanical tests(batteries)	7.3.8

Testing location:

Intertek Testing Services Shanghai

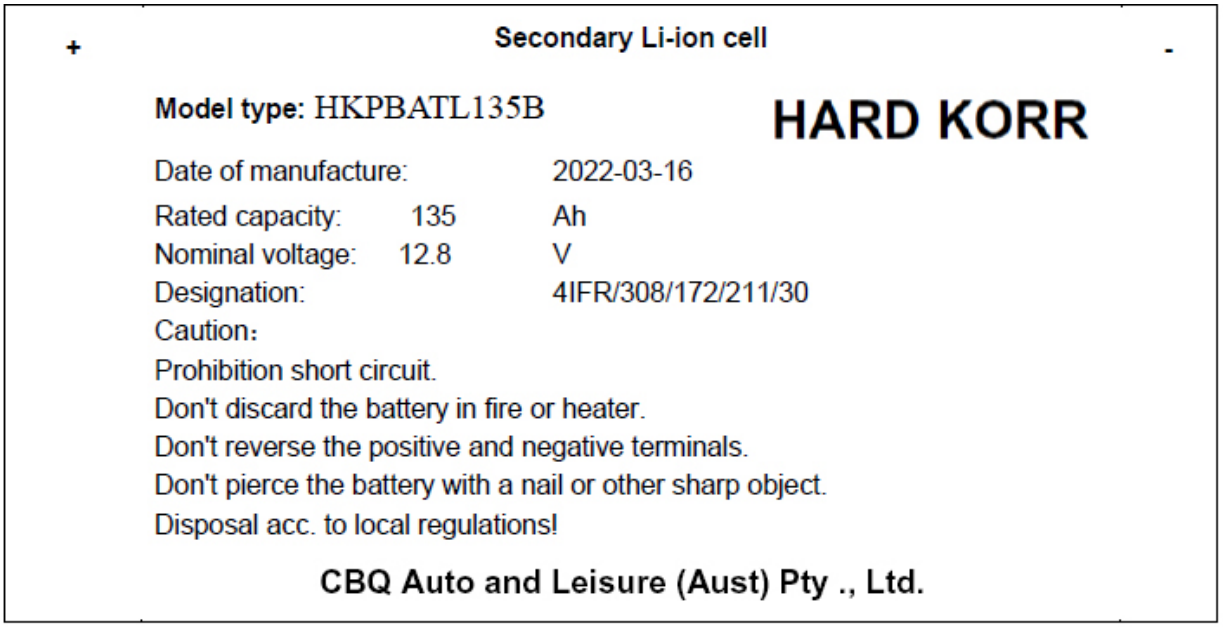
Building No.86, 1198 Qinzhou Road (North), 20033 Shanghai, China

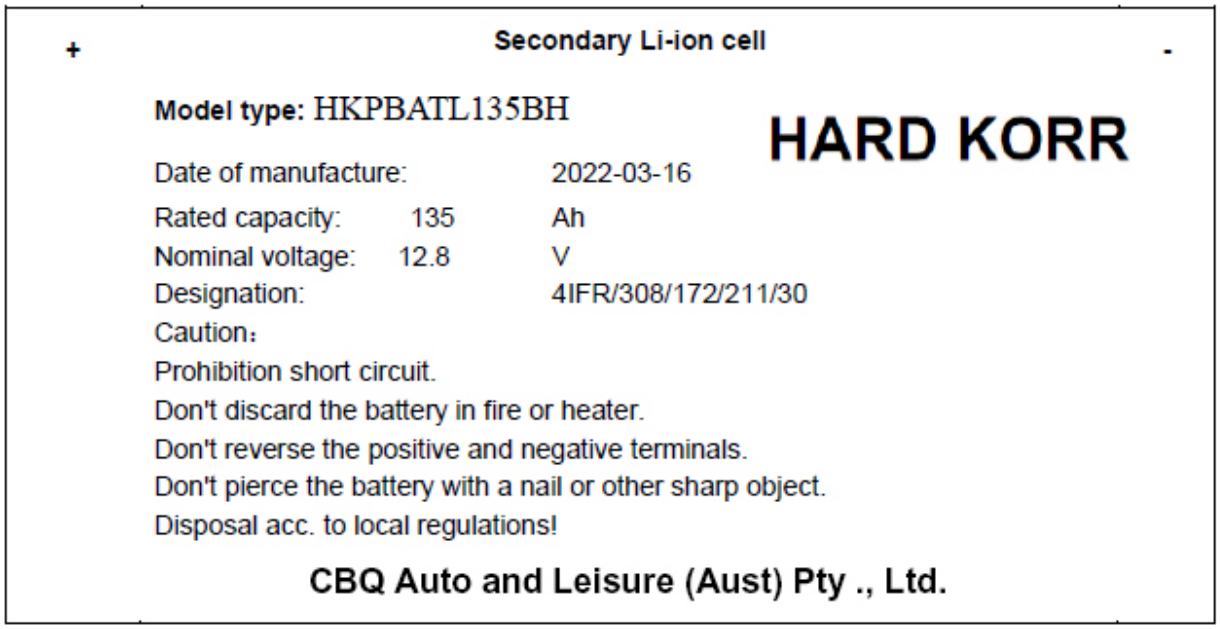
Summary of compliance with National Differences (List of countries addressed):

Group differences for CENELEC countries are considered.

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 .....:	
Classification of installation and use .....:	Battery packs for special final products
Supply Connection .....:	---
Recommend charging method declared by the manufacturer .....:	CC/CV: 67.5A/14.6V
Discharge current (0,2 It A) .....:	27A
Specified final voltage.....:	9.2V
Upper limit charging voltage per cell.....:	3.65V
Maximum charging current .....:	67.5A
Charging temperature upper limit .....:	55°C
Charging temperature lower limit.....:	-20°C(HKPBATL135BH) / 0℃(HKPBATL135B)
Polymer cell electrolyte type.....:	☐ gel polymer ☐ solid polymer ☒ N/A
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 .....:	2022-03-17
Date (s) of performance of tests.....:	2022-03-23 to 2022-04-18

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.
HKPBATL135BH as a typical model**.**

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

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) .....:	Same as manufacturer

General product information and other remarks:

The product covered by this report are Secondary Li-ion Battery, model no are HKPBATL135BH and HKPBATL135B. The battery pack consists of 4S30P, cell model no. ITR26/70-46E.

Model no. HKPBATL135BH battery pack has more heating functions than model no. HKPBATL135B battery pack. As described in the specification, when the ambient temperature is lower than 0°C and the charging current is greater than 5A, the heating function of HKPBATL135BH will be turned on to ensure that the working temperature range of HKPBATL135BH is 0°C to 55°C. Below 0°C, if the product does not meet this condition, the product will be protected. And there is no difference in other functional structures.

IEC 62133-2			
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 so designed and constructed that they are safe under conditions of both intended use and reasonably foreseeable misuse		P
5.2	**Insulation and wiring**		P
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ	No non-electrical contact metal surfaces.	N/A
	Insulation resistance (MΩ) ..... :		—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		P
	Orientation of wiring maintains adequate clearance and creepage distances between conductors		P
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse		P
5.3	**Venting**		P
	Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition		P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief		N/A
5.4	**Temperature, voltage and current management**		P
	Batteries are designed such that abnormal temperature rise conditions are prevented		P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer		P
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that specified chargers are designed to maintain charging within the temperature, voltage and current limits specified		P
5.5	**Terminal contacts**		P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		P
	Terminal contacts are arranged to minimize the risk of short-circuit		P
5.6	**Assembly of cells into batteries**		P
5.6.1	General		P
	Each battery have an independent control and protection for current, voltage, temperature and any other parameter required for safety and to maintain the cells within their operating region		P
	This protection may be provided external to the battery such as within the charger or the end devices		P
	If protection is external to the battery, the manufacturer of the battery provide this safety relevant information to the external device manufacturer for implementation		N/A
	If there is more than one battery housed in a single battery case, each battery have protective circuitry that can maintain the cells within their operating regions		N/A
	Manufacturers of cells specify current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly		P
	Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate circuitry to prevent operation of cells outside the limits specified by the cell manufacturer		N/A
	Protective circuit components added as appropriate and consideration given to the end-device application		N/A
	The manufacturer of the battery provide a safety analysis of the battery safety circuitry with a test report including a fault analysis of the protection circuit under both charging and discharging conditions confirming the compliance		P
5.6.2	Design recommendation		P
	For the battery consisting of a single cell or a single cellblock, it is recommended that the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 2		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that the voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Table 2, by monitoring the voltage of every single cell or the single cellblocks		P
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that charging is stopped when the upper limit of the charging voltage is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks		N/A
	For batteries consisting of series-connected cells or cell blocks, nominal charge voltage not be counted as an overcharge protection		P
	For batteries consisting of series-connected cells or cell blocks, cells have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer		P
	It is recommended that the cells and cell blocks not discharged beyond the cell manufacturer's specified final voltage		P
	For batteries consisting of series-connected cells or cell blocks, cell balancing circuitry incorporated into the battery management system		P
5.6.3	Mechanical protection for cells and components of batteries		P
	Mechanical protection for cells, cell connections and control circuits within the battery provided to prevent damage as a result of intended use and reasonably foreseeable misuse		P
	The mechanical protection can be provided by the battery case or it can be provided by the end product enclosure for those batteries intended for building into an end product		N/A
	The battery case and compartments housing cells designed to accommodate cell dimensional tolerances during charging and discharging as recommended by the cell manufacturer		N/A
	For batteries intended for building into a portable end product, testing with the battery installed within the end product considered when conducting mechanical tests		N/A
5.7	**Quality plan**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The manufacturer prepares and implements a quality plan that defines procedures for the inspection of materials, components, cells and batteries and which covers the whole process of producing each type of cell or battery	ISO 9001: certificate of manufacturer provided.	P
5.8	**Battery safety components**		N/A
	According annex F	A single fault was considered.	N/A

6	**TYPE TEST AND SAMPLE SIZE**		P
	Tests are made with the number of cells or batteries specified in Table 1 using cells or batteries that are not more than six months old		P
	Coin cells with resistance ≤ 3 Ω (measured according annex D) are tested according table 1		N/A
	Unless otherwise specified, tests are carried out in an ambient temperature of 20 °C ± 5 °C		P
	The safety analysis of 5.6.1 identify those components of the protection circuit that are critical for short-circuit, overcharge and overdischarge protection		P
	When conducting the short-circuit test, consideration given to the simulation of any single fault condition that is likely to occur in the protecting circuit that would affect the short-circuit test		P

7	**SPECIFIC REQUIREMENTS AND TESTS**		P
7.1	**Charging procedure for test purposes**		P
7.1.1	First procedure		P
	This charging procedure applies to subclauses other than those specified in 7.1.2		P
	Unless otherwise stated in this document, the charging procedure for test purposes is carried out in an ambient temperature of 20 °C ± 5 °C, using the method declared by the manufacturer		P
	Prior to charging, the battery have been discharged at 20 °C ± 5 °C at a constant current of 0,2 It A down to a specified final voltage		P
7.1.2	Second procedure	Battery Pack.	N/A
	This charging procedure applies only to 7.3.1, 7.3.4, 7.3.5, and 7.3.9		N/A
	After stabilization for 1 h and 4 h, respectively, at ambient temperature of highest test temperature and lowest test temperature, as specified in Table 2, cells are charged by using the upper limit charging voltage and maximum charging current, until the charging current is reduced to 0,05 It A, using a constant voltage charging method		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.2	**Intended use**		P
7.2.1	Continuous charging at constant voltage (cells)	Battery Pack.	N/A
	Fully charged cells are subjected for 7 days to a charge using the charging method for current and standard voltage specified by the cell manufacturer		N/A
	Results: No fire. No explosion. No leakage ..... :		N/A
7.2.2	Case stress at high ambient temperature (battery)		P
	Oven temperature (°C) ..... :		—
	Results: No physical distortion of the battery case resulting in exposure of internal protective components and cells		P
7.3	**Reasonably foreseeable misuse**		P
7.3.1	External short-circuit (cell)	Battery Pack.	N/A
	The cells were tested until one of the following occurred:		N/A
	- 24 hours elapsed; or		N/A
	- The case temperature declined by 20 % of the maximum temperature rise		N/A
	Results: No fire. No explosion..... :		N/A
7.3.2	External short-circuit (battery)		P
	The batteries were tested until one of the following occurred:		P
	- 24 hours elapsed; or		P
	- The case temperature declined by 20 % of the maximum temperature rise		N/A
	In case of rapid decline in short circuit current, the battery pack remained on test for an additional one hour after the current reached a low end steady state condition		N/A
	A single fault in the discharge protection circuit conducted on one to four (depending upon the protection circuit) of the five samples before conducting the short-circuit test		P
	A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor		P
	Results: No fire. No explosion..... :	(See appended table 7.3.2)	P
7.3.3	Free fall	Battery pack tested only.	P
	Results: No fire. No explosion		P
7.3.4	Thermal abuse (cells)	Battery pack	N/A
	Oven temperature (°C) ..... :		—
	Results: No fire. No explosion		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.3.5	Crush (cells)	Battery pack	N/A
	The crushing force was released upon:		N/A
	- The maximum force of 13 kN ± 0,78 kN has been applied; or		N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained		N/A
	Results: No fire. No explosion..... :		N/A
7.3.6	Over-charging of battery		P
	The supply voltage which is:		P
	- 1,4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6,0 V) for single cell/cell block batteries or		N/A
	- 1,2 times the upper limit charging voltage resented in Table A.1 per cell for series connected multi-cell batteries, and		P
	- Sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached		P
	Test was continued until the temperature of the outer casing:		P
	- Reached steady state conditions (less than 10 °C change in 30-minute period); or		N/A
	- Returned to ambient		P
	Results: No fire. No explosion..... :	(See appended table 7.3.6)	P
7.3.7	Forced discharge (cells)	Battery pack	N/A
	If the discharge voltage reaches the negative value of upper limit charging voltage within the testing duration, the voltage is maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration		N/A
	If the discharge voltage does not reach the negative value of upper limit charging voltage within the testing duration, the test is terminated at the end of the testing duration		N/A
	Results: No fire. No explosion..... :		N/A
7.3.8	Mechanical tests (batteries)		P
7.3.8.1	Vibration		P
	Results: No fire, no explosion, no rupture, no leakage or venting. ..... :	(See appended table 7.3.8.1)	P
7.3.8.2	Mechanical shock		P
	Results: No leakage, no venting, no rupture, no explosion and no fire ..... :	(See appended table 7.3.8.2)	P

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Clause	Requirement + Test	Result - Remark	Verdict
7.3.9	Design evaluation – Forced internal short-circuit (cells)	Battery pack	N/A
	The cells complied with national requirement for .....:		—
	The pressing was stopped upon:		N/A
	- A voltage drop of 50 mV has been detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached		N/A
	Results: No fire ..... :		N/A
8	**INFORMATION FOR SAFETY**		P
8.1	**General**		P
	Manufacturers of secondary cells ensure that information is provided about current, voltage and temperature limits of their products	Battery pack	N/A
	Manufacturers of batteries ensure that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards	Information is mentioned in the battery pack specification	P
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product	Information is mentioned in the battery pack specification	P
	As appropriate, any information relating to hazard avoidance resulting from a system analysis provided to the end user	Information is mentioned in the battery pack specification	P
	Do not allow children to replace batteries without adult supervision	Information is mentioned in the battery pack specification	P
8.2	**Small cell and battery safety information**	Not small battery.	N/A
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:		N/A
	- Keep small cells and batteries which are considered swallowable out of the reach of children		N/A
	- Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion		N/A
	- In case of ingestion of a cell or battery, seek medical assistance promptly		N/A
9	**MARKING**		P
9.1	**Cell marking**	Battery pack.	N/A
	Cells marked as specified in IEC 61960, except coin cells		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Coin cells whose external surface area is too small to accommodate the markings on the cells show the designation and polarity		N/A
	By agreement between the cell manufacturer and the battery and/or end product manufacturer, component cells used in the manufacture of a battery need not be marked		N/A
9.2	**Battery marking**		P
	Batteries marked as specified in IEC 61960, except for coin batteries		P
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity. Batteries also marked with an appropriate caution statement		N/A
	Terminals have clear polarity marking on the external surface of the battery		N/A
	Batteries with keyed external connectors designed for connection to specific end products need not be marked with polarity markings if the design of the external connector prevents reverse polarity connections		P
9.3	**Caution for ingestion of small cells and batteries**	Not small battery.	N/A
	Coin cells and batteries identified as small batteries according to 8.2 include a caution statement regarding the hazards of ingestion in accordance with 8.2		N/A
	When small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion given on the immediate package		N/A
9.4	**Other information**		P
	Storage and disposal instructions	Information is mentioned in the battery pack specification	P
	Recommended charging instructions	Information is mentioned in the battery pack specification	P
10	**PACKAGING AND TRANSPORT**		P
	Packaging for coin cells not small enough to fit within the limits of the ingestion gauge of Figure 3		N/A
	The materials and packaging design are chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants		P
ANNEX A	**CHARGING AND DISCHARGING RANGE OF SECONDARY LITHIUM ION CELLS FOR SAFE USE**		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
A.1	**General**	Battery Pack	N/A
A.2	**Safety of lithium ion secondary battery**		N/A
A.3	**Consideration on charging voltage**		N/A
A.3.1	General		N/A
A.3.2	Upper limit charging voltage		N/A
A.3.2.1	General		N/A
A.3.2.2	Explanation of safety viewpoint		N/A
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied		N/A
A.4	**Consideration of temperature and charging current**		N/A
A.4.1	General		N/A
A.4.2	Recommended temperature range		N/A
A.4.2.1	General		N/A
A.4.2.2	Safety consideration when a different recommended temperature range is applied		N/A
A.4.3	High temperature range		N/A
A.4.3.1	General		N/A
A.4.3.2	Explanation of safety viewpoint		N/A
A.4.3.3	Safety considerations when specifying charging conditions in the high temperature range		N/A
A.4.3.4	Safety considerations when specifying a new upper limit in the high temperature range		N/A
A.4.4	Low temperature range		N/A
A.4.4.1	General		N/A
A.4.4.2	Explanation of safety viewpoint		N/A
A.4.4.3	Safety considerations, when specifying charging conditions in the low temperature range		N/A
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range		N/A
A.4.5	Scope of the application of charging current		N/A
A.4.6	Consideration of discharge		N/A
A.4.6.1	General		N/A
A.4.6.2	Final discharge voltage and explanation of safety viewpoint		N/A
A.4.6.3	Discharge current and temperature range		N/A
A.4.6.4	Scope of application of the discharging current		N/A
A.5	**Sample preparation**		N/A
A.5.1	General		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
A.5.2	Insertion procedure for nickel particle to generate internal short		N/A
A.5.3	Disassembly of charged cell		N/A
A.5.4	Shape of nickel particle		N/A
A.5.5	Insertion of nickel particle in cylindrical cell		N/A
A.5.5.1	Insertion of nickel particle in winding core		N/A
A.5.5.2	Marking the position of the nickel particle on both ends of the winding core of the separator		N/A
A.5.6	Insertion of nickel particle in prismatic cell		N/A
A.6	**Experimental procedure of the forced internal short-circuit test**		N/A
A.6.1	Material and tools for preparation of nickel particle		N/A
A.6.2	Example of a nickel particle preparation procedure		N/A
A.6.3	Positioning (or placement) of a nickel particle		N/A
A.6.4	Damaged separator precaution		N/A
A.6.5	Caution for rewinding separator and electrode		N/A
A.6.6	Insulation film for preventing short-circuit		N/A
A.6.7	Caution when disassembling a cell		N/A
A.6.8	Protective equipment for safety		N/A
A.6.9	Caution in the case of fire during disassembling		N/A
A.6.10	Caution for the disassembling process and pressing the electrode core		N/A
A.6.11	Recommended specifications for the pressing device		N/A
ANNEX B	**RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS**		N/A
ANNEX C	**RECOMMENDATIONS TO THE END-USERS**		P
ANNEX D	**MEASUREMENT OF THE INTERNAL AC RESISTANCE FOR COIN CELLS**		N/A
D.1	**General**	Battery pack	N/A
D.2	**Method**		N/A
	A sample size of three coin cells is required for this measurement..... :		N/A
	Coin cells with an internal resistance of less than or equal to 3 Ω are subjected to the testing according to Clause 6 and Table 1		N/A
	Coin cells with an internal resistance greater than 3 Ω require no further testing		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX E	**PACKAGING AND TRANSPORT**		**P**
ANNEX F	**COMPONENT STANDARDS REFERENCES**		**N/A**

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Critical components information	P

Object / part No.	Manufacturer / trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Cell	Anhui Power Battery Co., Ltd.	ITR26/70-46E	3.2V-4600mAh	IEC 62133-2: 2017	TUV NORD Cert. No: DE 7-0566
BMS	Shen zhen Hanstar Technology	HS-031-4S-150A	HS-031-8S150A-VA-V3	IEC 62133-2: 2017	Tested with appliance
PCB	JIA LI CHUANG (CN) HOLDING LIMITED)	LT140	V-0, 130°C Min. thickness: 2mm	IEC 62133-2: 2017	UL E357246 and tested with appliance
IC for microcontrollers	SGS-THOMSON Microelectronics	STM32F030C8T6	-40℃~85℃, LQFP48	IEC 62133-2: 2017	Tested with appliance
IC for current and voltage sensing	Texas Instruments	BQ7692003PW	TI BQ7692003PW 3~~5 CELLS, 20-TSSOP	IEC 62133-2: 2017	Tested with appliance
IC for DC to DC Converter	Shanghai Xinlong Semiconductor Technology Co.,Ltd.	XL1509-ADJ	XLSEMI XL1509-ADJ,4.5V~40V, SOP8	IEC 62133-2: 2017	Tested with appliance
Voltage regulator	HOLTEK SEMICONDUCTOR INC	HT7533-3.3V	HT7533 3.3V ±5%100mA SOT-89	IEC 62133-2: 2017	Tested with appliance
IC for voltage sensor (Q22)	WUXI NCE POWER CO.,LTD	NCE4614	NCE4614, VDS: 40V, VGS: ±20V, ID:8A, TJ, TSTG: -55-150℃	IEC 62133-2: 2017	Tested with appliance
MOSFET (QC1-QC20)/(QD1-QD20)/Q24	China Resources Microelectronics Limited	NMOS(TO263)	VDS: 100V, VGS: ±20V, ID:120A, TJ, TSTG: -55-150℃	IEC 62133-2: 2017	Tested with appliance
Heating relay (Only use for HKPBATL135BH)	Xiamen Hongfa Electric Power Controls Co	JQX-102F	JQX-102F/12VDC	IEC 62133-2: 2017	Tested with appliance
Wire for main Circuit(P+/B-)	DONG GUAN SHENG PAI ELECTRIC WIRE&CABLE CO.LTD	3135	14AWG VW-1, 200°C, 600V	IEC 62133-2: 2017	UL E347603 and tested with appliance
Wire for main Circuit(P-)	DONG GUAN SHENG PAI ELECTRIC WIRE&CABLE CO.LTD	3135	8AWG VW-1, 200°C, 600V	IEC 62133-2: 2017	UL E347603 and tested with appliance

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

Fuse	DONG GUAN ANDU ELECTRONICS CO.LTD	ADS-D175	32V175A	IEC 62133-2: 2017	UL E512028 and tested with appliance

Supplementary information:

1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: Continuous charging at constant voltage (cells)			N/A
Sample no.	**Recommended charging voltage Vc (Vdc)**	**Recommended charging current I_{rec} (A)**	**OCV before test (Vdc)**	**Results**

Supplementary information:

- No fire or explosion
- No leakage
- Others (please explain)

7.3.1	TABLE: External short-circuit (cell)				N/A
Sample no.	**Ambient T (°C)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature rise ΔT (K)**	**Results**
Samples charged at charging temperature upper limit					
Samples charged at charging temperature lower limit					

Supplementary information:

- No fire or explosion
- Others (please explain)

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.2	TABLE: External short-circuit (battery)					P
Sample no.	**Ambient T (°C)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature rise ΔT (K)**	**Component single fault condition**	**Results**
1	21.3	13.30	97.15	No high temperature rise, protected at once	No	P
2		13.29	97.05		MOS(QC1) shorted	P
3		13.28	97.19		MOS(QC2) shorted	P
4		13.31	97.14		MOS(QC3) shorted	P
5		13.29	97.11		MOS(QC4) shorted	P

Supplementary information:
- No fire or explosion
- Others (please explain)

7.3.5	TABLE: Crush (cells)				N/A
Sample no.	**OCV before test (Vdc)**	**OCV at removal of crushing force (Vdc)**	**Maximum force applied to the cell during crush (kN)**	**Results**	
Samples charged at charging temperature upper limit					
Samples charged at charging temperature lower limit					

Supplementary information:
- No fire or explosion
- Others (please explain)

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.6	TABLE: Over-charging of battery			P
Constant charging current (A) ..... :		4		—
Supply voltage (Vdc) ..... :		10.2		—
Sample no.	**OCV before charging (Vdc)**	**Total charging time (minute)**	**Maximum outer case temperature (°C)**	**Results**
1	11.703	120	22.7	P
2	11.413		23.0	P
3	10.983		23.3	P
4	11.006		20.4	P
5	11.613		18.6	P

Supplementary information:

- No fire or explosion
- Others (please explain)

7.3.7	TABLE: Forced discharge (cells)			N/A
Sample no.	**OCV before application of reverse charge (Vdc)**	**Measured reverse charge I_t (A)**	**Lower limit discharge voltage (Vdc)**	**Results**

Supplementary information:

- No fire or explosion
- Others (please explain)

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.8.1	TABLE: Vibration				P
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
1	13.33	13.33	14280	14278	P
2	13.34	13.33	14286	14285	P
3	13.33	13.32	14284	14283	P

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting
- Others (please explain)

7.3.8.2	TABLE: Mechanical shock				P
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
1	13.34	13.33	14286	14286	P
2	13.33	13.32	14297	14296	P
3	13.33	13.33	14292	14290	P

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting
- Others (please explain)

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.9	TABLE: Forced internal short circuit (cells)				N/A
Sample no.	**Chamber ambient T (°C)**	**OCV before test (Vdc)**	**Particle location 1)**	**Maximum applied pressure (N)**	**Results**
Samples charged at charging temperature upper limit					
Samples charged at charging temperature lower limit					

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.

- No fire or explosion
- Others (please explain)

D.2	TABLE: Internal AC resistance for coin cells			N/A
Sample no.	**Ambient T (°C)**	**Store time (h)**	**Resistance Rac (Ω)**	**Results 1)**

Supplementary information:

1) Coin cells with internal resistance less than or equal to 3 Ω, see test result on corresponding tables

Attachment 1: photo of product

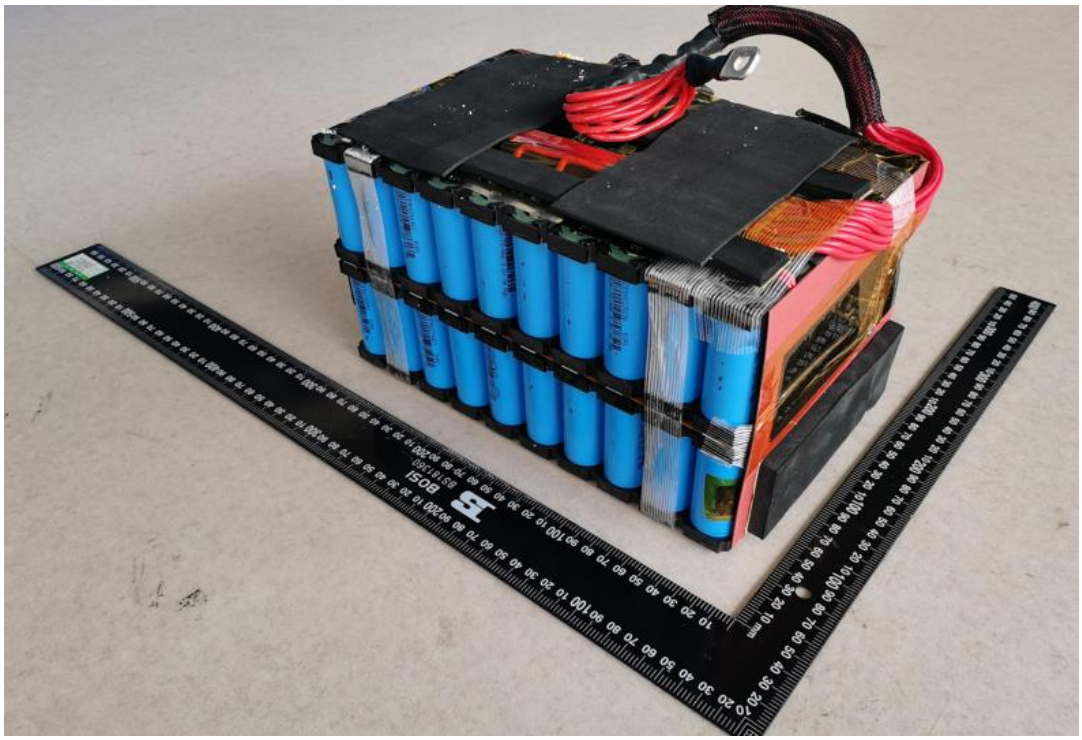
Overall view 1

Overall view 2

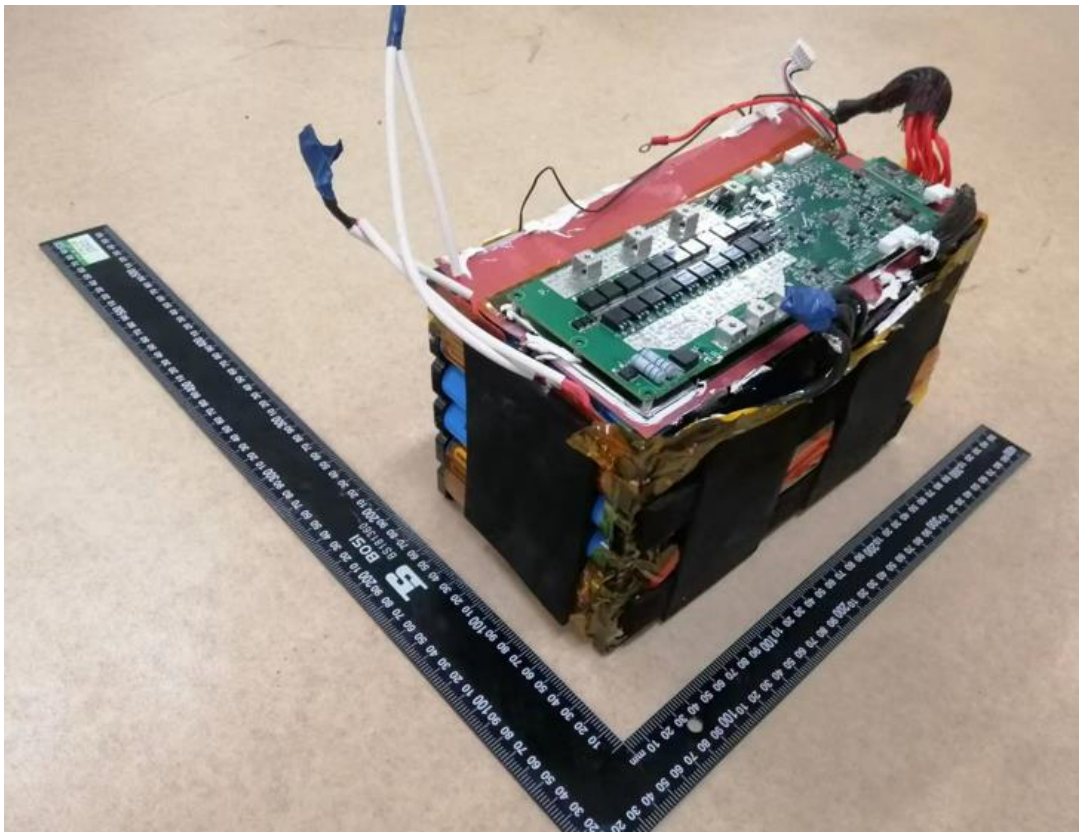
Overall view 3

Overall view 4

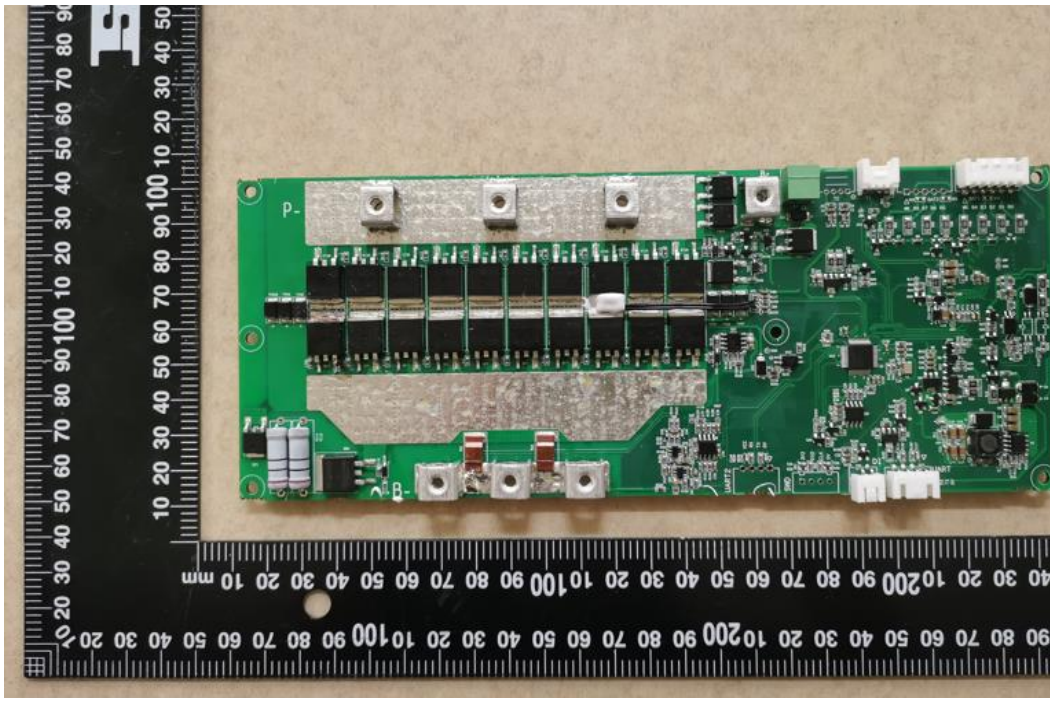
Internal view (Model No. HKPBATL135B)



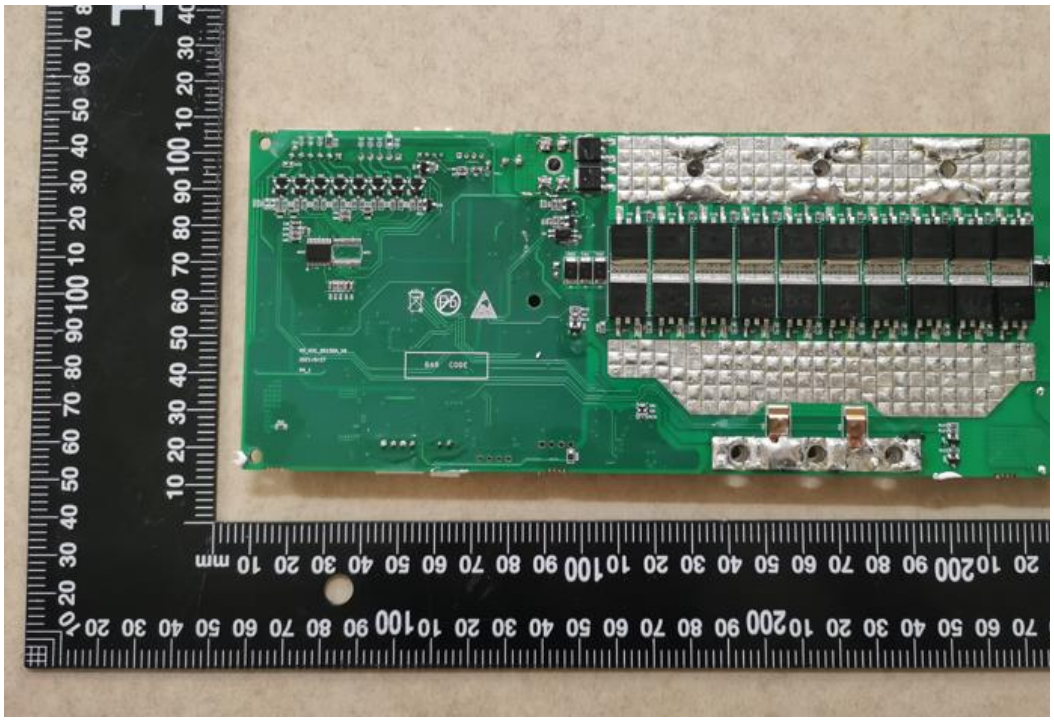
Internal view (Model No. HKPBATL135BH)



Overall view 1 of PCB

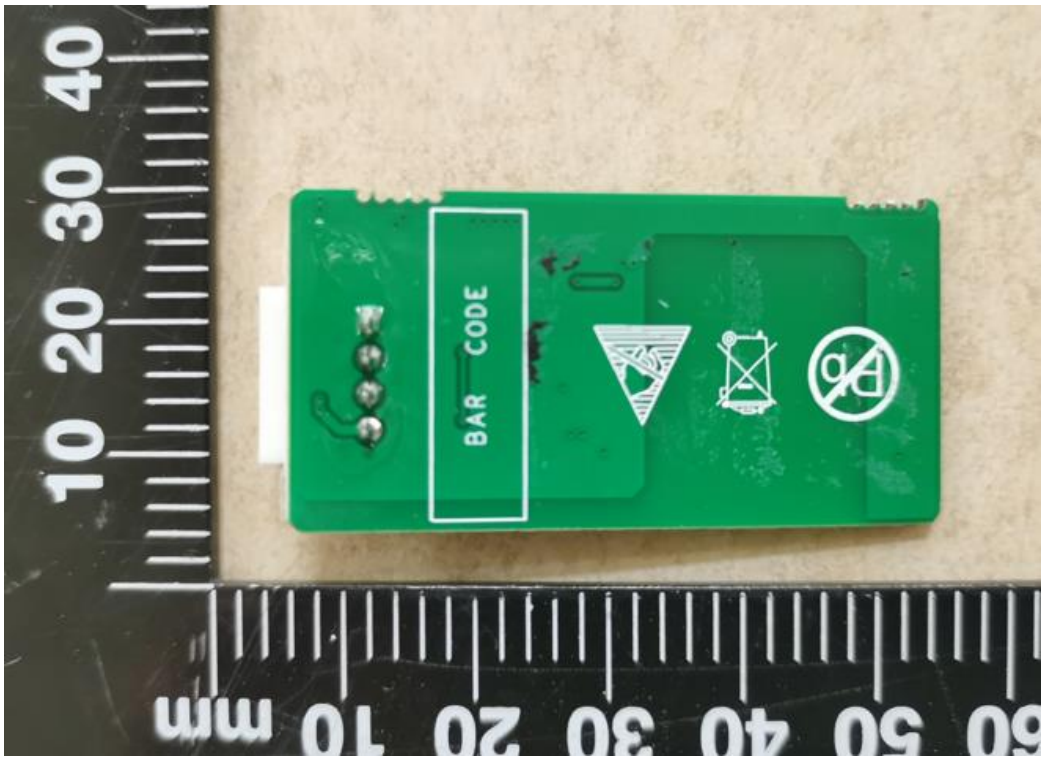


Overall view 2 of PCB

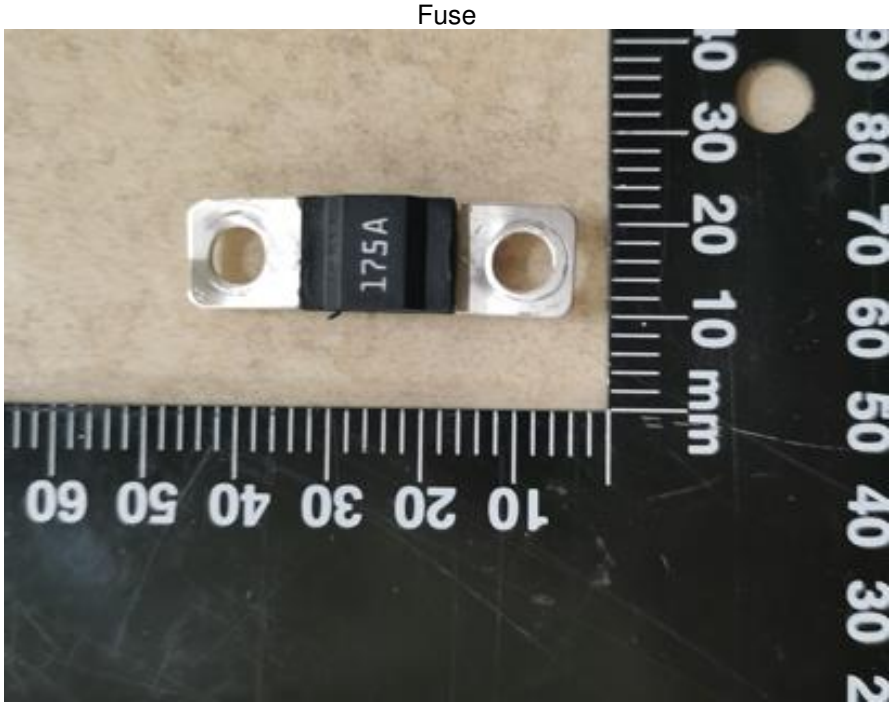


Overall view 3 of PCB

Overall view 4 of PCB



Fuse



Appendix No.2: CENELEC Group Modification and National Difference

Clause	Requirement + Test	Result - Remark	Verdict

Annex ZA	**Normative references to international publications with their corresponding European publications**	P