Test Report issued under the responsibility of:

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. ..... :	MH16707-4789503308-1 Original
Date of issue ..... :	2020-09-16
Total number of pages ..... :	22
Name of Testing Laboratory preparing the Report ..... :	Underwriters Laboratories Taiwan Co., Ltd. 260 Da-Yeh Road 112 Peitou Taipei City, Chinese Taipei
Applicant's name ..... :	VARTA MICROBATTERY PTE LTD
Address ..... :	#05-01, 300 Tampines Ave 5, Tampines Junction, 529653, Singapore
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

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.
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Test item description ..... :	Rechargeable Li-Polymer Battery
Trade Mark ..... :	VARTA
Manufacturer ..... :	VARTA MICROBATTERY PTE LTD #05-01, 300 Tampines Ave 5, Tampines Junction, Singapore 529653 Singapore
Model/Type reference ..... :	EZPack XL, 1ICP5/35/60-2
Ratings ..... :	3.7V, 2400mAh (min 2300mAh), 8.9Wh

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	Underwriters Laboratories Taiwan Co., Ltd.	
Testing location/ address.....:		260 Da-Yeh Road 112 Peitou Taipei City, Chinese Taipei	
Tested by (name, function, signature).....:		Joy Shen/ Project Handler	
Approved by (name, function, signature)...:		Richard Lin/ 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) :			

<table>
<tr><td colspan="2">List of Attachments (including a total number of pages in each attachment):

National Differences (0 pages)
Enclosures (11 pages)</td></tr>
<tr><td colspan="2">Summary of testing:</td></tr>
<tr><td>Tests performed (name of test and test clause):
Original

- 7.2.2 Moulded case stress at high ambient temperature
- 7.3.3 Free fall</td><td>Testing location:

Underwriters Laboratories Taiwan Co., Ltd.
260 Da-Yeh Road 112 Peitou Taipei City, Chinese Taipei</td></tr>
<tr><td>New

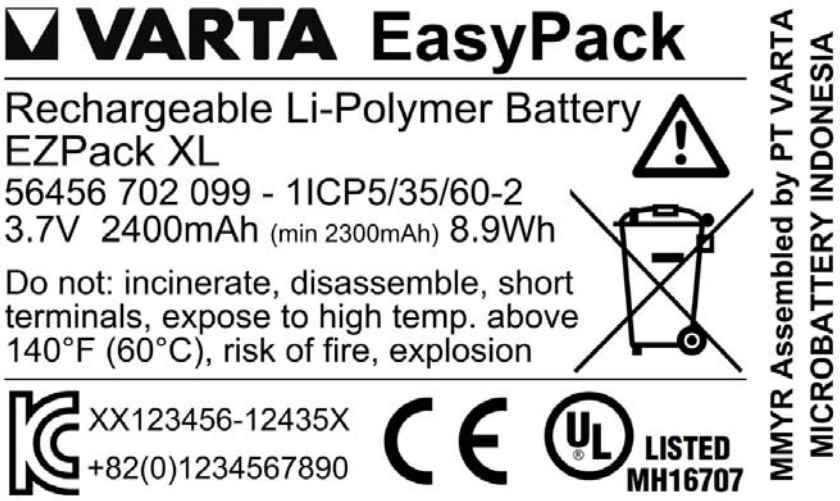
- 7.3.2 External short circuit (battery)
- 7.3.6 Over-charging of battery
- 7.3.8.1 Vibration
- 7.3.8.2 Mechanical shock
- 8.2 Determine of small cell or battery</td><td>
Underwriters Laboratories Taiwan Co., Ltd.
260 Da-Yeh Road 112 Peitou Taipei City, Chinese Taipei</td></tr>
<tr><td colspan="2">Summary of compliance with National Differences (List of countries addressed):

No National Differences or Group Differences.

☒ The product fulfils the requirements of EN 62133-2: 2017</td></tr>
</table>

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.



Date Code:

MMYR, where:

MM=month

Y=year

R=Week Identification (A and 1= day to 7, B and 2= day 8 to 15, C and 3= day 16 to 23, D and 4= day 24 to 30/31; A until D = Batam production; 1 until 4 = Shanghai production)

Test item particulars.....:	
Classification of installation and use.....:	N/A
Supply Connection.....:	N/A
Recommend charging method declared by the manufacturer.....:	CC/CV
Discharge current (0,2 It A).....:	0.48 A
Specified final voltage.....:	3.0 Vdc
Upper limit charging voltage per cell.....:	Pack: 4.2 Vdc; Cell: 4.25 Vdc
Maximum charging current.....:	2300 mA
Charging temperature upper limit.....:	45 degree C
Charging temperature lower limit.....:	0 degree C
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 .....:	2015-11-10; 2020-07-21
Date (s) of performance of tests.....:	2015-12-03 to 2015-12-04; 2020-08-05 to 2020-08-06

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.

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).....:	PT. VARTA MICROBATTERY INDONESIA BATAM INDUSTRIAL PARK, JALAN GAHARU LOT 23, JALAN ANGSANA LOT 307, 308, 309 & 310, MUKAKUNING, PULAU BATAM RIAU 29433 INDONESIA

General product information and other remarks:

Product Description:
- Electronic components mounted on PWB, 1S/2P cell, in plastic enclosure and secured together by ultrasonic welding.

Model Differences:
- Model 1ICP5/35/60-2 is the marking of IEC 62133-2 requirement for Model EZPack XL.

Additional Information:
- Cell source is investigated to IEC 62133-2: 2017 (CBTR 4363871.50 issued on 2020-06-17, CBTC NL-66309 issued on 2020-06-17).
- The battery pack is also investigated to EN 62133-2: 2017.

Report Summary:
- This test report is Re-Issued from BATT-4787003360-A-1 Am2 issued on 2020-01-02, with CB Certificate No. DK-51023-M2-UL, issued on 2020-01-07.

- This report has been to reissue, due to
1. Upgrade IEC 62133: 2012 standard to IEC 62133-2: 2017.

- Based on the previously conducted testing and the review of product technical documentation including photos, schematics, wiring diagrams and similar, has been determined that the product continues to comply with the standard. Only limit tests were considered as below:
(1) 7.3.2 External short circuit (battery)
(2) 7.3.6 Over-charging of battery
(3) 7.3.8.1 Vibration
(4) 7.3.8.2 Mechanical shock
(5) 8.2 Determine of small cell or battery

For statement of conformity, accuracy method (Section 8.2.4 and 8.2.5 of ISO Guide 98-4) was applied as decision rule for measurement in this test report.
- Pass - the measured value is below the acceptance limit, AL = TL.
- Fail - the measured value is above the acceptance limit, AL = TL.
- AL: Acceptance Limit.
- TL: Tolerance Limit (Specification Limit).
- Level of risk: PFA (Probability of False Accept) less than 50 %.

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
4	**PARAMETER MEASUREMENT TOLERANCES**		**Pass**
	Parameter measurement tolerances		Pass
5	**GENERAL SAFETY CONSIDERATIONS**		**Pass**
5.1	**General**		Pass
	Cells and batteries so designed and constructed that they are safe under conditions of both intended use and reasonably foreseeable misuse		Pass
5.2	**Insulation and wiring**		Pass
	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		N/A
	Insulation resistance (MΩ) ..... :		N/A
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		Pass
	Orientation of wiring maintains adequate clearance and creepage distances between conductors		Pass
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse		Pass
5.3	**Venting**		Pass
	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	Pack enclosure will not inhibit pressure relief.	Pass
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief	Pack enclosure will not inhibit pressure relief.	Pass
5.4	**Temperature, voltage and current management**		Pass
	Batteries are designed such that abnormal temperature rise conditions are prevented		Pass
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	Batteries follow cell's charging limits.	Pass
	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	Battery specification is provided. See Enclosure ID 05.	Pass
5.5	**Terminal contacts**		Pass
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current		Pass

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Clause	Requirement + Test	Result - Remark	Verdict
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		Pass
	Terminal contacts are arranged to minimize the risk of short-circuit		Pass
5.6	**Assembly of cells into batteries**		Pass
5.6.1	General		Pass
	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		Pass
	This protection may be provided external to the battery such as within the charger or the end devices		N/A
	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	No multi batteries in one case, and only one cell source was used.	N/A
	Manufacturers of cells specify current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly	Pack follow the recommendations in cell spec.	Pass
	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	No selective discharge.	N/A
	Protective circuit components added as appropriate and consideration given to the end-device application	See Critical components information Table for details.	Pass
	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		N/A
5.6.2	Design recommendation		Pass
	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		Pass

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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		N/A
	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		N/A
	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		N/A
	It is recommended that the cells and cell blocks not discharged beyond the cell manufacturer's specified final voltage		Pass
	For batteries consisting of series-connected cells or cell blocks, cell balancing circuitry incorporated into the battery management system		N/A
5.6.3	Mechanical protection for cells and components of batteries		Pass
	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		Pass
	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		Pass
	The battery case and compartments housing cells designed to accommodate cell dimensional tolerances during charging and discharging as recommended by the cell manufacturer		Pass
	For batteries intended for building into a portable end product, testing with the battery installed within the end product considered when conducting mechanical tests	Considered in end products.	N/A
5.7	**Quality plan**		Pass

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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 was provided.	Pass
5.8	**Battery safety components**		N/A
	According annex F		N/A

6	**TYPE TEST AND SAMPLE SIZE**		**Pass**
	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		Pass
	Coin cells with resistance ≤ 3 Ω (measured according annex D) are tested according table 1	This is not a coin cell.	N/A
	Unless otherwise specified, tests are carried out in an ambient temperature of 20 °C ± 5 °C		Pass
	The safety analysis of 5.6.1 identify those components of the protection circuit that are critical for short-circuit, overcharge and overdischarge protection		Pass
	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		Pass

7	**SPECIFIC REQUIREMENTS AND TESTS**		**Pass**
7.1	**Charging procedure for test purposes**		Pass
7.1.1	First procedure		Pass
	This charging procedure applies to subclauses other than those specified in 7.1.2	Pack: 4.2 Vdc, 2300 mA.	Pass
	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		Pass
	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		Pass
7.1.2	Second procedure		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**		Pass
7.2.1	Continuous charging at constant voltage (cells)	Invested in cell CB Report.	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)		Pass
	Oven temperature (°C).....:	70	--
	Results: No physical distortion of the battery case resulting in exposure of internal protective components and cells		Pass
7.3	**Reasonably foreseeable misuse**		Pass
7.3.1	External short-circuit (cell)		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)		Pass
	The batteries were tested until one of the following occurred:		Pass
	- 24 hours elapsed; or		N/A
	- The case temperature declined by 20 % of the maximum temperature rise		Pass
	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	Single fault: PTC, Q1 short.	Pass
	A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor	Single fault: PTC, Q1 short.	Pass
	Results: No fire. No explosion.....:	See appended table 7.3.2	Pass
7.3.3	Free fall	Pack was subjected to this test.	Pass
	Results: No fire. No explosion	No fire. No explosion.	Pass
7.3.4	Thermal abuse (cells)	Invested in cell CB Report.	N/A
	Oven temperature (°C).....:		--

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Clause	Requirement + Test	Result - Remark	Verdict
	Results: No fire. No explosion		N/A
7.3.5	Crush (cells)	Invested in cell CB Report.	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		Pass
	The supply voltage which is:		Pass
	- 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	Supply Voltage: 5.95 Vdc.	Pass
	- 1,2 times the upper limit charging voltage resented in Table A.1 per cell for series connected multi-cell batteries, and		N/A
	- Sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached		Pass
	Test was continued until the temperature of the outer casing:		Pass
	- Reached steady state conditions (less than 10 °C change in 30-minute period); or		N/A
	- Returned to ambient		Pass
	Results: No fire. No explosion..... :	See appended table 7.3.6	Pass
7.3.7	Forced discharge (cells)	Invested in cell CB Report.	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)		Pass
7.3.8.1	Vibration		Pass
	Results: No fire, no explosion, no rupture, no leakage or venting. ..... :	See appended table 7.3.8.1	Pass
7.3.8.2	Mechanical shock		Pass
	Results: No leakage, no venting, no rupture, no explosion and no fire ..... :	See appended table 7.3.8.2	Pass

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Clause	Requirement + Test	Result - Remark	Verdict
7.3.9	Design evaluation – Forced internal short-circuit (cells)		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**		**Pass**
8.1	**General**		Pass
	Manufacturers of secondary cells ensure that information is provided about current, voltage and temperature limits of their products		Pass
	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	Refer to enclosure ID 08.	Pass
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product		N/A
	As appropriate, any information relating to hazard avoidance resulting from a system analysis provided to the end user		N/A
	Do not allow children to replace batteries without adult supervision	Refer to enclosure ID 08.	Pass
8.2	**Small cell and battery safety information**		N/A
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:	Battery cannot fit into ingestion gauge.	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**		**Pass**
9.1	**Cell marking**		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**		Pass
	Batteries marked as specified in IEC 61960, except for coin batteries	Pack designation 1ICP5/35/60-2	Pass
	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	The clear polarity marking on the casing. See Enclosure ID-01.	Pass
	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		N/A
9.3	**Caution for ingestion of small cells and batteries**	Not a small cell or 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**		Pass
	Storage and disposal instructions	See label for recycle marking and enclosure ID 08 instruction.	Pass
	Recommended charging instructions	See enclosure ID 05 for recommend charging instructions.	Pass
10	**PACKAGING AND TRANSPORT**		Pass
	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	Refer to enclosure ID 07.	Pass

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Clause	Requirement + Test	Result - Remark	Verdict

ANNEX A	**CHARGING AND DISCHARGING RANGE OF SECONDARY LITHIUM ION CELLS FOR SAFE USE**		**Pass**
A.1	**General**		Pass
A.2	**Safety of lithium ion secondary battery**		Pass
A.3	**Consideration on charging voltage**		Pass
A.3.1	General		Pass
A.3.2	Upper limit charging voltage	The upper limit charging voltage is 4.25Vdc for cell, 4.2Vdc for Pack.	Pass
A.3.2.1	General		Pass
A.3.2.2	Explanation of safety viewpoint		Pass
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied		Pass
A.4	**Consideration of temperature and charging current**		Pass
A.4.1	General		Pass
A.4.2	Recommended temperature range		Pass
A.4.2.1	General		Pass
A.4.2.2	Safety consideration when a different recommended temperature range is applied	Low limit temperature is 0℃. High limit temperature is 45℃.	Pass
A.4.3	High temperature range		Pass
A.4.3.1	General		Pass
A.4.3.2	Explanation of safety viewpoint		Pass
A.4.3.3	Safety considerations when specifying charging conditions in the high temperature range		Pass
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		Pass
A.4.4.1	General	See A.4.2.2	Pass
A.4.4.2	Explanation of safety viewpoint		Pass
A.4.4.3	Safety considerations, when specifying charging conditions in the low temperature range		Pass
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	No AC 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

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Clause	Requirement + Test	Result - Remark	Verdict
A.4.6.3	Discharge current and temperature range		N/A
A.4.6.4	Scope of application of the discharging current	No AC current.	N/A
A.5	**Sample preparation**		N/A
A.5.1	General		N/A
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**		**Pass**
ANNEX C	**RECOMMENDATIONS TO THE END-USERS**		**Pass**
ANNEX D	**MEASUREMENT OF THE INTERNAL AC RESISTANCE FOR COIN CELLS**		**N/A**
D.1	**General**		N/A
D.2	**Method**		N/A
	A sample size of three coin cells is required for this measurement..... :		N/A

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

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

	TABLE: Critical components information				Pass
Object / part No.	**Manufacturer / trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
01. Plastic Enclosure	Sabic Japan LLC	BPL1000(C)	Overall 64.5±0.2 by 36.6±0.2 by 11.4±0.2 mm. 0.4 mm thick minimum, V-2 80 degree C. (Passed V-1 Flammability test in IEC60950-1, Annex A.2)	UL94, 6th edition; UL746C, 7th edition	UL
02. Cell	Springpower Technology (Shenzhen) Co., Ltd.	503562	Li-Ion. 3.7 Vdc, 1200 mAh	IEC 62133-2: 2017	DEKRA (CBTC NL-66309 issued on 2020-06-17)
03. PCB	Interchangeable	Interchangeable	Min. V-1, Min.115 degree C.	UL796, 11th edition	UL
04. Polyswitch (PTC) (Attached near each cell terminal.)	Tyco Electronics Corp.	PSR-25091	32 Vdc, Ih: 2.1 A, It: 4.7 A.	UL1434, 1st edition	UL
05. MOSFET (Q1)	AOS	AON5802BG	--	--	--
06. Protection IC (U1)	HYCON	HY2110-GB	--	--	--
07. Double side Tape (secure cell and enclosure)	Interchangeable	Interchangeable	105 degree C minimum, except for the volume is less than or equal to 2 cm^3	UL510, 11th edition	UL
Supplementary information: 1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

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

7.3.2	TABLE: External short-circuit (battery)					Pass
Sample no.	**Ambient T (℃)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature rise ΔT (K)**	**Component single fault condition**	**Results**
3207577-S10	22.6	4.200	92.1	1.3	Normal	A, E
3207577-S11	23.2	4.190	85.6	-1.0	PTC short	A, C
3207577-S12	22.6	4.179	90.9	24.9	Q1 short	A, E
3207577-S13	22.6	4.197	88.4	23.6	Q1 short	A, E
3207577-S14	22.6	4.195	87.7	27.1	Q1 short	A, E

Supplementary information:

A - No fire or explosion

B - Fuse open

C - Others : Shut down Immediately and remain on test for an additional one hour

D - The battery pack remain on test for an additional one hour after the current reaches a low end steady state condition

E - The test was completed after the cell casing cooled to 20% of the maximum temperature rise.

7.3.5	TABLE: Crush (cells)	N/A

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

7.3.6	TABLE: Over-charging of battery			Pass
Constant charging current (A) ..... :		4.8		—
Supply voltage (Vdc) ..... :		5.95		—
Sample no.	**OCV before charging (Vdc)**	**Total charging time (minute)**	**Maximum outer case temperature (℃)**	**Results**
3207577-S1	3.308	244	20.8	A
3207577-S2	3.335	244	21.1	A
3207577-S3	3.323	244	21.3	A
3207577-S4	3.328	244	20.9	A
3207577-S5	3.319	244	20.8	A
3207577-S6	3.354	244	20.5	A, *

Supplementary information:

A - No fire or explosion
B - Others (please explain)

*: Test with 4.6A. (for min. 2300mAh)

7.3.7	TABLE: Forced discharge (cells)	N/A

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

7.3.8.1	TABLE: Vibration				Pass
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
3207577-S7	4.183	4.181	47.75	47.73	A, B, C, D
3207577-S8	4.187	4.182	47.96	47.94	A, B, C, D
3207577-S9	4.186	4.184	47.77	47.76	A, B, C, D

Supplementary information:

A - No fire or explosion
B - No rupture
C - No leakage
D - No venting
E - Others (please explain)

7.3.8.2	TABLE: Mechanical shock				Pass
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
3207577-S7	4.174	4.174	47.96	47.95	A, B, C, D
3207577-S8	4.203	4.203	47.98	47.96	A, B, C, D
3207577-S9	4.189	4.189	47.77	47.77	A, B, C, D

Supplementary information:

A - No fire or explosion
B - No rupture
C - No leakage
D - No venting
E - Others (please explain)

7.3.9	TABLE: Forced internal short circuit (cells)	N/A

D.2	TABLE: Internal AC resistance for coin cells	N/A

List of test equipment used:

A completed list of used test equipment shall be provided in the Test Reports when a Customer's Testing Facility according to CTF stage 1 or CTF stage 2 procedure has been used.
Note: This page may be removed when CTF stage 1 or CTF stage 2 are not used. See also clause 4.8 in OD 2020 for more details.

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date

ENCLOSURE

Supplement Id	Description
01	Overall view
02	Internal view
03	PCB view
04	Casing
05	Specification
06	PCB layout
07	Packaging drawing
08-01~08-02	Safety instructions
09	IEC 62133-2 CBTC of cell Model 503562

ID 01

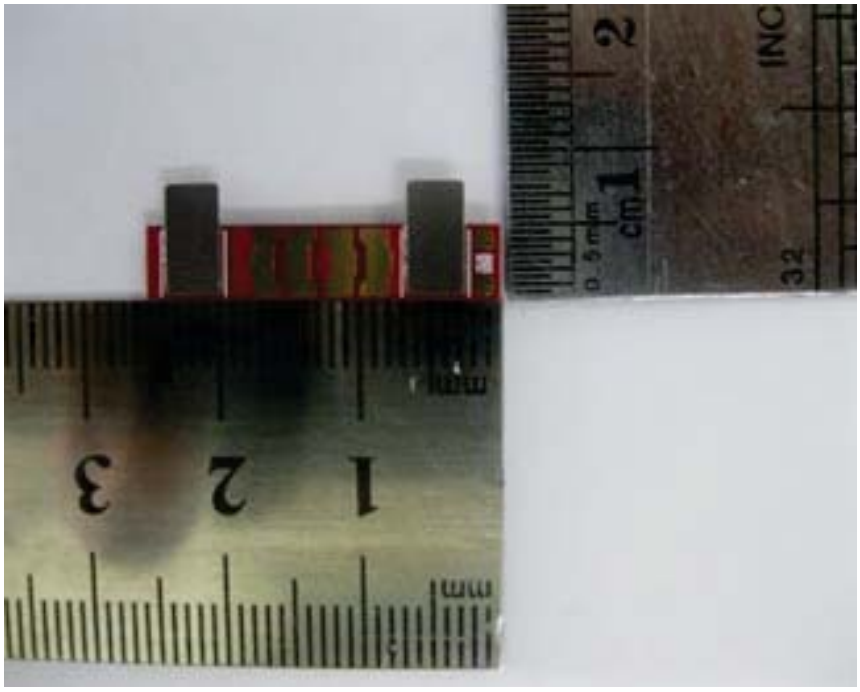

VARTA EasyPack
Rechargeable Li-Polymer Battery
EZPack XL
56456 702 099 - 1ICP5/35/60-2
3.7V 2400mAh 8.9Wh
Do not: incinerate, disassemble, short terminals, expose to high temp. above 140°F (60°C), risk of fire, explosion
VARTA Storage GmbH
070B
Assembled in Indonesia
LISTED MH16707

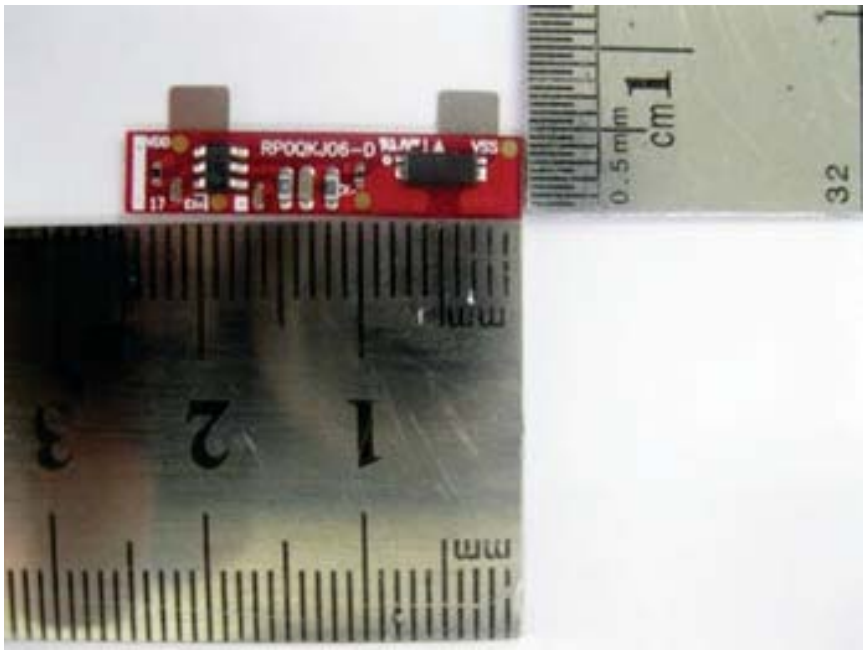
ID 02


ICP5/35/60
Li-ion
3 4 5 6 7 8 9 10 11 12

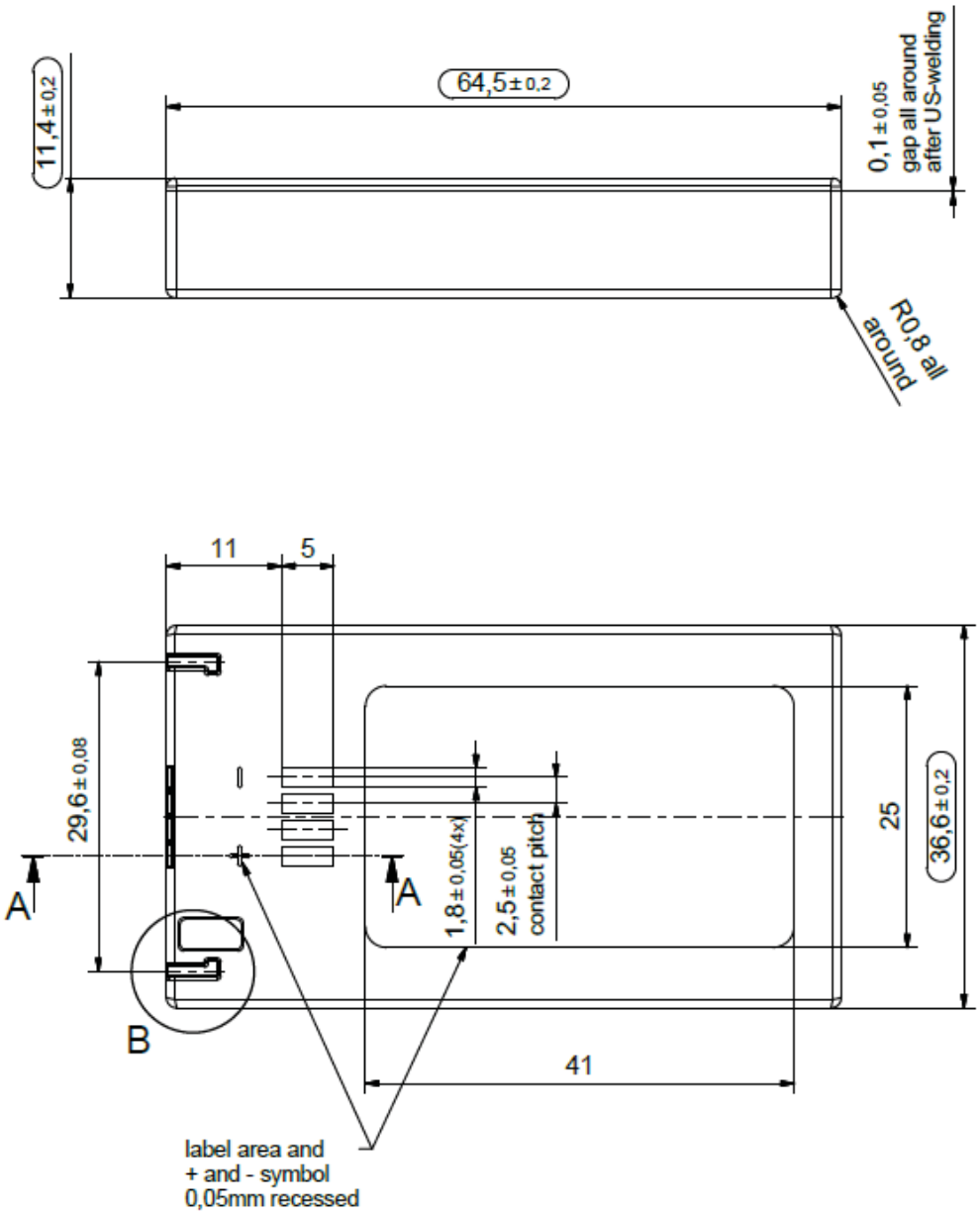

ICP5/35/60
Li-ion
MICAA
7 8 9 10 11 12 13 14 15 16 17 18 19

ID 03





ID 04

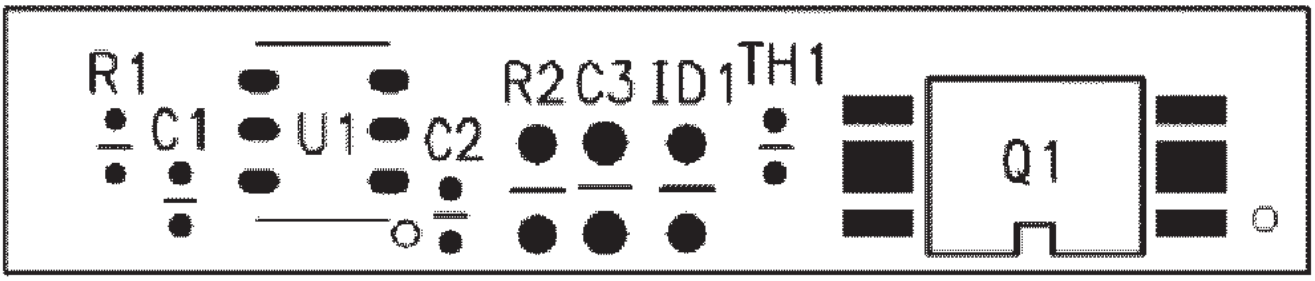

11,4±0,2
64,5±0,2
0,1±0,05
gap all around
after US-welding
R0,8 all
around
11
5
29,6±0,08
A
A
B
1,8±0,05(4x)
2,5±0,05
contact pitch
25
36,6±0,2
41
label area and
+ and - symbol
0,05mm recessed

ID 05

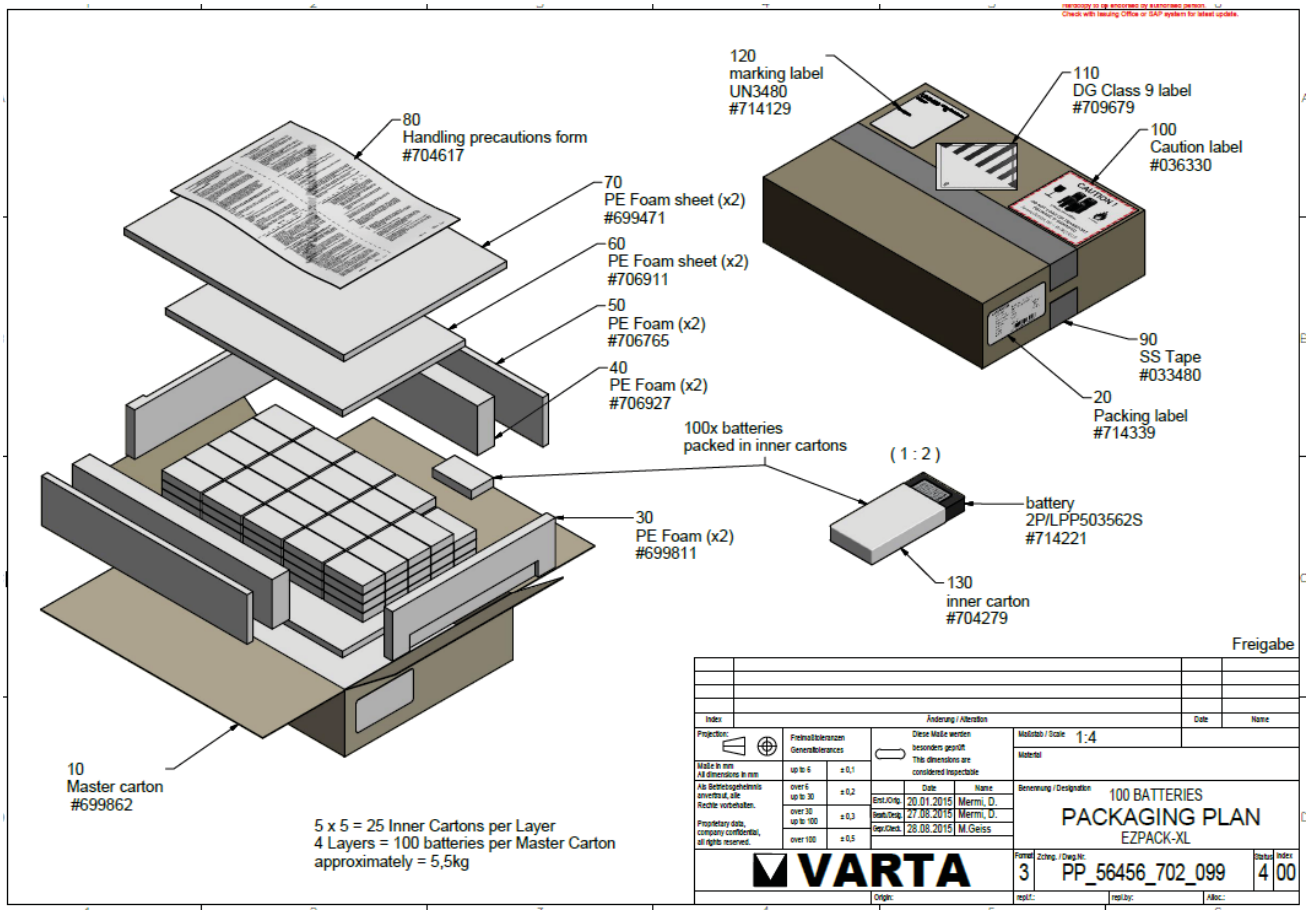
Electrical Characteristics

No.	Item	Specification
1	Capacity	2300 mAh (min), 2400 mAh (typical)
2	Nominal Voltage	3.7 V
3	Watt-hour Rating	8.9 Wh
4	Charging Method	Constant Current + Constant Voltage
5	Max. Charge Voltage	4.20 V
6	Max. Continuous Charge Current	2300 mA
7	Rec. Charge cut-off	By current 23 mA or time 3.5h
8	Max. Continuous Discharge Current	3200 mA (limited by PCM)
9	Rec. Discharge cut-off	3 V
10	Operating Temperature	Charging: 0 °C to + 45 °C Discharging: - 20°C to + 60 °C

ID 06



ID 07


120
marking label
UN3480
#714129
110
DG Class 9 label
#709679
100
Caution label
#036330
80
Handling precautions form
#704617
70
PE Foam sheet (x2)
#699471
60
PE Foam sheet (x2)
#706911
50
PE Foam (x2)
#706765
40
PE Foam (x2)
#706927
90
SS Tape
#033480
20
Packing label
#714339
100x batteries
packed in inner cartons
(1 : 2)
battery
2P/LPP503562S
#714221
30
PE Foam (x2)
#699811
130
inner carton
#704279
10
Master carton
#699862
5 x 5 = 25 Inner Cartons per Layer
4 Layers = 100 batteries per Master Carton
approximately = 5,5kg
Freigabe
100 BATTERIES
PACKAGING PLAN
EZPACK-XL
VARTA
PP_56456_702_099

ID 08-01

4.1 User replaceable appliances

VARTA LiIon batteries can be used as user replaceable batteries if the following conditions are fulfilled:

a) The end product must be designed to prevent reverse polarity installation of the battery, or if the battery is reversed, the short or open circuiting of any protective component, one component at a time, shall not result in forced discharge of the battery.

b) The end product shall contain a permanent marking adjacent to the battery stating the following or equivalent:

"Replace battery with (Battery Manufacturer's name or endproduct manufacturer's name), Part No. ( ) only. Use of another battery may present a risk of fire or explosion. See owner's manual for safety instructions" or "The battery used in the (End Product Name) must be replaced at (End product manufacturers) service center only."

If it is not feasible to include the above marking on the device, the marking may be included in the operating (or safety) instructions providing the battery compartment is marked with the following: "See operating (or safety) instructions for type of battery to be used."

c) The instruction manual supplied with the end product shall also contain the above warning notice along with instructions to the user as to where replacement batteries can be obtained. The instruction manual shall also contain the following additional warning notice and information:

- Caution: The battery used in this device may present a fire or chemical burn hazard if mistreated. Do not disassemble, heat above 100°C (212°F) or incinerate.

- Complete instructions as to how to replace the battery ending with the statement: "Dispose of used battery promptly. Keep away from children."

4.2 Technician replaceable appliances

If the conditions 4.1 a) - c) are not fulfilled VARTA LiIon batteries can be used only in devices where servicing of the battery circuit and replacement of the lithium battery will be done by a trained technician.

5. Storage

The cells shall be stored within a **proper temperature range** as specified in the Data Sheet. The state of charge shall be 50% of the nominal capacity; open circuit voltage OCV about 3,8 V. When stored for a long time, care has to taken that the battery voltage does not drop below the cut-off voltage due to self discharge (see 2.2).

ID 08-02

6. Others

6.1 Cell connection

Soldering of wires **directly to the cell** is strictly prohibited.
Tabs with presoldered wiring shall be welded to the cells. Direct soldering may cause damage of components, such as separator and insulator, by heat.

6.2 Ultrasonic Welding of Battery Pack Casing

Ultrasonic welding of plastic lid to the plastic casing can be applied. However, the welding shall be done **avoiding the application of ultrasonic wave power directly to the cells and the PCM electronic.** Otherwise it may cause serious damage to the cells and/or PCM electronics.

6.3 Prevention of short circuit within a Battery Pack

Enough **insulation layer(s)** between wiring and the cells shall be used to maintain multiple safety protection.
The battery pack shall be designed to prevent short circuits within the battery pack. This is because that short circuits within the pack may cause **generation of smoke or fire.**

6.4 Assembly

(1) Important!! Always avoid any possible contact of softpack/safety module with sharp objects, corners, or points which could puncture or damage it.

(2) Avoid applying mechanical stress (such as tension, pressure, or rubbing) to cell itself and softpack/safety module during assembly. Do not remove, disassemble any component from the original VARTA supply configuration.

(3) Assembly and finishing processes to be done only with ESD protection conditions.

(4) Do not subject softpack/safety module to higher temperatures than specified in datasheet provided.

(5) Do not subject softpack/safety module to ultrasonic weld process vibration or energy.

(6) Avoid accidental shortcircuit of softpack/safety module during assembly and finishing processes.

(7) Avoid accidental mechanical damage to softpack/safety module during assembly and finishing processes.

(8) Packaging for softpack/safety module assembly to be only with ESD-safe (anti-static) material.

6.5 Prohibition of Disassembly

(1) Never disassemble the cells.

(2) **Disassembling cells** may cause an internal short circuit in the cell, which could further ***cause gassing, fire, or other problems.***

ID 09

Ref. Certif. No.
NL-66309

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

CB TEST CERTIFICATE

Product	Rechargeable Li-ion Cell
Name and address of the applicant	Springpower Technology (Shenzhen) Co., Ltd. 101, No.2, Chaoshun Industrial Zone, 101 Building 6 and 101 Building 7, No. 221 on Renmin Road, Fumin Community, Fucheng Street, Longhua District, Shenzhen City, Guangdong Province China
Name and address of the manufacturer	Springpower Technology (Shenzhen) Co., Ltd. 101, No.2, Chaoshun Industrial Zone, 101 Building 6 and 101 Building 7, No. 221 on Renmin Road, Fumin Community, Fucheng Street, Longhua District, Shenzhen City, Guangdong Province China
Name and address of the factory *Note: When more than one factory, please report on page 2*	☐ Additional information on page 2 Springpower Technology (Shenzhen) Co., Ltd. 101, No.2, Chaoshun Industrial Zone, 101 Building 6 and 101 Building 7, No. 221 on Renmin Road, Fumin Community, Fucheng Street, Longhua District, Shenzhen City, Guangdong Province China
Ratings and principal characteristics	3,70 Vdc, 1200 mAh
Trademark (if any)	
Customer's Testing Facility (CTF) Stage used	CTF Stage 1
Model / Type Ref.	503562
Additional information (if necessary may also be reported on page 2)	☐ Additional information on page 2
A sample of the product was tested and found to be in conformity with	IEC 62133-2:2017
As shown in the Test Report Ref. No. which forms part of this Certificate	4363871.50

This CB Test Certificate is issued by the National Certification Body

DEKRA Certification B.V.
Meander 1051, NL-6825 MJ Arnhem, Netherlands

DEKRA

Date: 2020-06-17

Signature: Miranda Zhou

page 1 of 1