

Presentation (客户): _____

PRODUCTION SPECIFICATION

锂离子电池产品规格书

Rechargeable Lithium Ion Cell

Model: U463446AR-820mAh

| Customer Approval(Date) 客户确认(日期) |
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| Prepared 拟定 | Checked 审核 | Approved 批准 |
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Revision History

变更记录

| Revision 版本 | Date 日期 | Originator 拟定 | Description 描述 |
|----------------|------------|---------------------------|---|
| 00 | 2020/08/08 | Engineering Center 工程部 | Original Release 初版制定 |
| 01 | 2020/08/27 | Engineering Center 工程部 | The expansion thickness after 500 cycles was added and PCM related parameters were updated 增加了 500 次循环后的膨胀厚度和更新了 PCM 的相关参数 |
| 02 | 2020/09/15 | Engineering Center 工程部 | Correct the width parameter 纠正宽度参数 |
| 03 | 2022/04/29 | Engineering Center 工程部 | Drawings to increase the size of the surface pad 面垫尺寸增加到图纸内 |
| 04 | 2024/03/15 | Engineering Center 工程部 | 优化储存温度及定义容量衰减标准 4.10 Optimize storage temp.and define capacity decay 4.10 |
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1. Scope

This Specification is applied to AYAArechargeable lithium ion battery of the following mentioned type for various applications in mobile communication devices and portable power systems.

范围

本规格书描述了由深圳市爱雅科技有限公司提供的铝壳锂离子二次电池的有关参考要求。

2. Battery Classification and Type

2.1 Battery Classification:

AYAA Lithium Ion Battery

2.2 Battery Type:
U463446AR

电芯类型及型号

2.1 电芯类型: 锂离子二次电池

2.2 电池型号: U463446AR

3. Standard

The specification is based on the technical specification of GB/T18287-2013、UL1642 and IEC61960.

引用标准

本标准参考国标 GB/T18287-2013、UL1642 以及 IEC61960 等技术标准规范编制而成。

4. Nominal Specification 额定规格

PRODUCTION SPECIFICATION
铝壳电池产品规格书
 SHENZHEN UTILITY POWER SOURCE CO., LTD
 JI'AN UTILITY TECHNOLOGY CO., LTD

File No: AYAA-SPE-A-656
 Version: 04
 Date: 2024/03/15

| Item 项目 | | Specification 规格 | Remarks 备注 | | |
|---|--------------------------------------|---------------------------------------|---|--------------------------------|------|
| 4.1 Nominal capacity (Minimum capacity) 标称容量 (最小容量) | | 820mAh | 0.2 C ₅ A discharge 0.2 C ₅ A 放电 | | |
| 4.2 Typical Capacity 典型容量 | | 840mAh | 0.2 C ₅ A discharge 0.2 C ₅ A 放电 | | |
| 4.3 Nominal Voltage 额定电压 | | 3.7V | | | |
| 4.4 Discharging Voltage (Min) 放电终止电压 (最小) | | 3.0V | | | |
| 4.5 Charging Voltage (Max.) 充电电压 (最大) | | 4.2±0.03V | | | |
| 4.6 Charging Current 充电电流 | | 820mA | 1.0 C ₅ A Max to 4.2V, then CV to 0.02C; (0~ +45°C) | | |
| | | 410mA | 0.5 C ₅ A Max to 4.1V, then CV to 0.02C; (45~ +60°C) | | |
| 4.7 Shipping voltage (出货电压) | | 3.80-3.95V | | | |
| 4.8 Discharging Current 放电电流 | | 164mA | Max0.2 C ₅ A to 3.0V; (-20~15°C) | | |
| | | 1230mA | Max1.5 C ₅ A 至 3.0V; (15~45°C) | | |
| | | 410mA | Max0.5 C ₅ A to 3.0V; (45~60°C) | | |
| 4.9 | Discharge temperature 放电温度 | -20°C | 0°C | 25°C | 60°C |
| | 0.2C Discharge capacity 0.2C 放电容量 | 40% | 80% | 100% | 90% |
| 4.10 Storage temperature and after stored capacity 储存温度和储存后的容量 | | Storage temp. | -10°C~45°C | at the shipment state | |
| | | For after stored capacity (25±2°C) | Stored period (month) | Recovery capacity/Min capacity | |
| | | | 3 | ≥98% (803mAh) | |
| | | | 6 | ≥97% (795mAh) | |
| | | | 9 | ≥96% (787mAh) | |
| | | | 12 | ≥95% (779mAh) | |
| 15 | ≥94% (770mAh) | | | | |
| 4.11 Internal Impedance 内阻 | | ≤80mΩ | AC Impedance 1kHz | | |

| | | | |
|---|--------------|-------------|------------------|
| 4.12 Weight 重量 | | About 17.0g | |
| 4.13 OAYAAine dimension) (see figure 外形尺寸 (见附图)) | Thickness 厚度 | Max 4.6mm | 500cycles ≤4.9mm |
| | Width 宽度 | Max 34mm | |
| | Length 高度 | Max 46mm | |

5. Electrical Characteristics 电性能

| Item 项目 | Test Method 测试方法 | Performances 标 |
|---|---|---|
| 5.1 The rated charge 额定充电 | At ambient temperature of 20±5 °c, the battery is charged at 1.0 C ₅ A. When the terminal voltage of the battery reaches 4.2V, the battery is charged at constant voltage until the charging current is less than or equal to 0.02 C ₅ A about 3 hours. 在环境温度 20±5°C 的条件下, 以 1.0C ₅ A, 恒流恒压充电至 4.2V, 截止电流 0.02C ₅ A, 约 3h。 | |
| 5.2 Capacity 容量 | ① Within 1 hour after fully charged, discharged at 0.2C ₅ A continuously down to 3.0V. ①在完全充电后 1 小时内, 以 0.2C ₅ A 电流连续放电至 3.0V 终止电压。 ② Within 1 hour after fully charged, discharge at 1C ₅ A continuously down to 3.0V. ②在完全充电后 1 小时内, 以 1C ₅ A 电流连续放电至 3.0V 终止电压。 | More than 300min 超过 300 分钟。 More than 54min 超过 54 分钟。 |
| 5.3 Charge-discharge cycle characteristics 充放电循环特性 | ① Charging: 0.2C to 4.2V and then to CV and the cut-off current was 0.02C and placed 5min; ② Discharging: 0.2C to 3.0V and placed 5min ③ Cycled the above mentioned 2 steps for 500cycles 常温循环 Cycle Life Test at RT ①充电: 0.2C 恒流恒压充电至到 4.2V, 截止电流 0.02C, 搁置 5min ②放电: 0.2C 恒流放电到 3.0V, 搁置 5min; ③循环以上两步 500 次 | Capacity retention rate for 500cycles ≥80% 500 次循环容量保持率 ≥80% |

| | | |
|---|---|---|
| 5.4 Capacity retention 荷电保持能力 | After fully charged, stored for 28 days at 20 °C, then for 1 hour at normal temperature and continuously discharge at 1C ₅ A to 3.0V. 电池按 5.1 充电后在 20±5°C、45%~75%RH 环境下, 存放 28 天, 以 0.2C ₅ A 电流连续放电至 3.0V 终止电压 | Capacity retention rate ≥ 85% 容量保持率≥85% |
|---|---|---|

※Nominal Capacity 额定容量

The minimum capacity in the specifications table. The term refers to the capacity when the charged batteries are discharged to the cut-off voltage for 0.2C₅A at 20°C±5°C. It is indicated by C₅ (The unit is Ah or mAh).

指产品规格表标明的电池最小容量, 表示电池在 20±5°C 温度下, 以 0.2C₅A 电流放电至终止电压 (3.0V) 时所应提供的电量, 用 C₅ 表示, 单位为 Ah 或 mAh。

※Typical Capacity 典型容量

Typical capacity refers to the median value of the capacity when a battery is discharged to the cut-off voltage with the current of 0.2 C₅ mA at 20°C±5°C.

指电池在 20±5°C 温度下, 以 0.2C₅A 电流放电至终止电压 (3.0V) 时所对应的容量典型值。

※Limit Charge Voltage 充电限制电压

Refers to the battery charging from constant current charge to constant voltage charge when the voltage value of 4.2±0.03V.

指电池在充电过程中由恒流充电转入恒压充电时的电压值, 其值为 4.2±0.03 V。

※Cut-off Voltage 终止电压

The final voltage of the battery at discharge termination, The value is 3.0V.

指规定放电终止时电池的负载电压, 其值为 3.0V。

6. Temperature Adaptability 环境适应性

| Item 项目 | Test Method 测试方法 | Performances 标准 |
|----------------------------|---|--------------------------------------|
| 6.1 HT performance 高温性能 | The cell was fully charging at 0.2C ₅ A constant current to 4.2V and then constant voltage to cut-off current 0.02C; Placed at 55 °C ± 2 °C environment 4h at constant temperature and discharged to 3.0V with 0.2C ₅ A constant current. After finished and placed at RT for 2h 0.2C ₅ A 恒流恒压充到 4.2V, 截止电流 0.02C; 置于 55°C±2°C 的环境下恒温 4h; 0.2C ₅ A 恒流放电到 3.0V 后, 在常温下搁置 2h | More than 300 mins 超过 300 分钟。 |

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| 6.2 LT performance 低温性能 | The cell was fully charging at 0.2C ₅ A constant current to 4.2V and then constant voltage to cut-off current 0.02C; Placed at -10 °C ± 2 °C environment 4h at constant temperature and discharged to 3.0V with 0.2C ₅ A constant current. After finished and placed at RT for 2h 0.2C ₅ A 恒流恒压充到 4.2V, 截止电流 0.02C; 置于 -10°C ± 2°C 的环境下恒温 4h; 0.2C ₅ A 恒流放电到 3.0V 后, 在常温下搁置 2h | Discharge capacity ≥65% nominal capacity 放电容量 ≥65% 标称容量 |
| 6.3 Constant temperature /humidity 恒定湿热 | Percentage as an index of the capacity compared with 100% at 20°C. Keep the battery at 40°C and 90%RH for 48hrs and then charge at 1C ₅ A to 3.0V Cut-off Voltage. 按 5.1 充电后, 将电池放入 40 ± 2°C 及相对湿度为 90%~95% 的恒温恒湿箱中 48 小时后, 将电池取出在室温搁置 2h, 目测电池外观, 再以 1C ₅ A 放电至 3.0V 终止电压。 | The battery shall not rupture, smoke, catch fire, vent or leak. The time of discharge is no less than 36 min. 无明显变形、冒烟或爆炸, 放电时间不低于 36min。 |

7. Safety Characteristics 安全性能

| Item 项目 | Test Method 测试方法 | Performances 标准 |
|----------------------------|---|--|
| 7.1 Short Circuit 短路 | The battery is to be short-circuited by connecting the positive and negative terminals of the battery with an external load of 80 ± 20mΩ. 额定充电后, 使用 80 ± 20 mΩ 电阻连接正负极, 使其短路, 放置 1 小时。 | no explosion, no rupture, no fire. 无爆炸、破裂、起火。 |

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|-----------------------------|---|--|
| 7.2 振动 Vibration | <p>The cell must be vibrated 3times at equal quantity. The vibration test must be performed at three orthogonal directions. If there were only 2 axes, tested for 2 directions. Each the cell. Each vibration way was as following intial 3 mms, the minimum average acceleration was 75g(g was the local acceleration). The peak acceleration was between125 to 127g. The test temperature was$20\pm 5^{\circ}\text{C}$</p> <p>电芯须进行同等数量级的 3 次震动。震动测试需在三个相互垂直的方向进行，若只有两个对称轴就对两个方向进行测试。每次震动的方向是电芯的正面每个电池震动的方式如下：最初的 3 毫秒，最小的平均加速度是 75g(g 是当地的加速度)。峰值加速度须在 125 到 175g 之间。测试温度为 $20\pm 5^{\circ}\text{C}$</p> | <p>No explosion or firing or leakaging</p> <p>电池应不起火、不爆炸，不漏液漏气</p> |
| 7.3 Over charge 过充 | <p>The battery charged completely will be charged continuously for 8hrs with the external power supply of the limit voltage of 4.6V and the current of 1C₅A.</p> <p>电池以 0.2C₅A 进行放电至终止电压，然后将电池置于通风厨中，连接电池正负极与电源，调节电流至 3C₅A, 充电时电压不低于 4.6V，直至电压达到最大值后，电池持续充电时间达到 7h 或者电池温度下降到比值低 20%。</p> | <p>no explosion 、 no rupture, no fire.</p> <p>无爆炸、破裂、起火。</p> |
| 7.4 Over discharge 过放 | <p>After rated charging, discharge current (equivalent to 0.1c) for 24 hours continuously. Then visually inspect the appearance.</p> <p>额定充电后，以放电电流(相当于 0.1C)24 小时连续放电。然后目视观察外观。</p> | <p>no explosion 、 no rupture, no fire.</p> <p>无爆炸、破裂、起火。</p> |

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|--------------------------------------|--|---|
| <p>7.5 Heating 热冲击</p> | <p>After rated charging, Place the battery in an oven. The temperature of the oven is to be raised at a rate of 5°C/min to a temperature of 130°C, and remain for 1 hour at that temperature. Then visually inspect the appearance.</p> <p>额定充电后, 电池包, 5°C/分钟的温度梯度在加热到 130°C, 保持 1 小时 130°C 的状态。之后目视观察外观</p> | <p>no explosion , no rupture, no fire. 无爆炸、破裂、起火。</p> |
| <p>7.6 Extrusion 挤压</p> | <p>Test is to be continued until a pressure reading of 17.2Mpa is reached on the hydraulic ram, applied force of 13kN. Once the maximum pressure has been obtained it is to be released. 放在 2 个平板中间。挤压测试的力是用带有直径为 1.25 英寸长的活塞的液压油缸获得的。挤压测试一直继续到液压油缸上的读数是 17.2MPa, 13KN, 一旦获得最大压力就停止测试。</p> | <p>no explosion , no rupture, no fire. 无爆炸、破裂、起火。</p> |
| <p>7.6 Depression 低压</p> | <p>After rated charging at room temperature, the battery pack is placed in this environment 6 hours under absolute pressure of 11.6kPa.</p> <p>常温下额定充电后, 在此环境下将电池置于绝对压力 11.6kPa 以下 6 小时。</p> | <p>no explosion , no rupture, no fire. 无爆炸、破裂、起火。</p> |
| <p>7.8 Strike 撞击</p> | <p>Place a stainless steel round rod weighing 9.1 kg (15.8 mm diameter) vertically on the battery To drop the round rod from a height of 610±25mm to the center of the battery.</p> <p>将重量为 9.1 公斤的不锈钢圆棒(15.8 毫米直径)垂直放置在电池上方的中央部, 使圆棒从 610±25mm 的高度掉落到电池的中心部。</p> | <p>no explosion , no rupture, no fire. 无爆炸、破裂、起火。</p> |
| <p>7.9 Mechanical shock 机械冲击</p> | <p>The impact of initial minimum average acceleration of 75g and peak acceleration of 125g ~175g is applied to the XYZ direction of the right Angle intersection within 3ms.</p> <p>将起始最小平均加速度为 75g、峰值加速度在 125g ~175g 之间的冲击, 在 3ms 内施加到直角相交的 XYZ 方向。</p> | <p>no explosion , no rupture, no fire. 无爆炸、破裂、起火。</p> |

8. Standard Test Conditions 标准测试条件

8.1 Test Condition 测试条件

Unless otherwise specified, all tests stated in this Product Specifications shall be conducted under the following atmosphere condition:
用于上述测试的电池必须是一个月内交货的电池。除非另有规定,本规格中各项试验应在下列大气条件下进行:

Temperature 温度: 15°C – 35°C;

Relative Humidity 相对湿度: 45% – 75%;

Atmospheric Pressure 大气压力: 86kPa – 106kPa.

8.2 Measuring meters & Instruments 测量仪表与设备要求

8.2.1 Voltmeter should be up to grade 0.5 in precision. Its internal impedance should not be less than 10kΩ/V.

测量电压的仪表准确度应不低于 0.5 级,内阻应不小于 10kΩ/V。

8.2.2 Ammeter should be up to grade 0.5 in precision.

测量电流的仪表准确度应不低于 0.5 级。

8.2.3 Hour-meter should have a precision of ±0.1% or higher.

测量时间用的仪表准确度不低于 ±0.1%。

8.2.4 Thermometer should have a precision of ±0.5°C or higher.

测量温度的仪表准确度应不低于 ±0.5°C。

8.2.5 The current of a constant-current supply should be stable and adjustable. Its variation shall be within ±1% during the charging and discharging process.

恒流源的电流恒定可调,在充电或放电过程中,其电流变化应在 ±1% 范围内。

8.2.6 The voltage of a constant-voltage supply should be stable and adjustable. Its variation shall be within ±0.5%.

恒压源电压可调,其电压变化范围为 ±0.5%。

9. Design and Construction 外形结构及尺寸

The design, structure and dimension of the battery are shown on the above drawing (see figure).

电池的外形结构尺寸(见附图)。

10. Appearance 外观

There shall be no practical damage such as conspicuous liquid electrolyte leakage, flaw electrolyte leakage. Flaw, rust, dirt, and deformation. The battery must have marketability.

电池外表面应清洁,无机械损伤,触点无锈蚀,电池表面应有产品标识。

11. Packing and Shipping cells 包装与运输

① Inspection Before Shipment of the battery pack 电池装运前的检查

- Inspect voltage, internal impedance and capacity and protection circuit function before shipment.

对于所有电池,在装运前需检查其电压、内阻。

② Packing and Shipping cells 包装与运输电池

- When cells are re-shipped to assembling factory, make enough attention the packing to avoid stress by shipping. AYAA recommends the same package, when re-shipping, use the same parts and materials from AYAA for re-packing.

当电池在运输时，要特别注意包装，以避免运输时产生应力。建议客户在再运输时，使用同优特利运输时同样的包装。

- The battery should be shipped with half-charged state and during transportation, there shall avoid shock, crush, under sun and shower and shall be shipped by truck, train, ship or airplane etc.

电池应在半荷电状态包装成箱进行运输，在运输过程中，防止剧烈振动、冲击、挤压，防止日晒雨淋，应使用汽车、火车、轮船、飞机等交通工具运输。

③ Abnormal cell 电池异常

- Don't use abnormal cell which has damages by shipping stress, drop, short or something else, and which gives off electrolyte.

不要使用由于运输中应力、跌落、短路或其它原因被损害并发出电解液异味的异常电池。

12. Precautions on Charge use 电池充放电使用注意事项

① Charge 充电

- A battery must be charged with constant current-constant voltage.

电池充电时必须具有恒定电流与恒定电压，才能完全充电。

- Charge current must be below $1C_5A$ /cell.

充电电流必须低于 $1C_5A$ /电池。

- Charge voltage must be up to 4.23V/cell.

充电电压不得超过 4.23V/电池。

② Discharge 放电

- Discharge current must be below $1.5C_5A$ /cell.

放电电流必须低于 $1.5C_5A$ /电池。

- Discharge temperature range should be $-20\sim 60^\circ C$.

放电温度范围应为 $-20\sim 60^\circ C$ 。

- Discharge end voltage must be over 3.0V/cell.

放电终止电压为 3.0V/电池。

③ Required protection functions 必要保护线路

Have protection circuit function which is described below inside battery pack, to insure safety of battery in case of misuse. 为确保安全，充电器和保护线路应符合以下要求：

| NO 序号 | Device 单元 | Items 项目 | Requirements 要求 |
|----------|---|---|-----------------|
| 1 | Charger 充电器 | Charge termination voltage 充电端电压 | 4.200±0.049V |
| 2 | Protection Functions (For reference) 保护线路 (供参考) | Excess Charge detection voltage.过充探测 电压 | 4.28±0.025V |
| 3 | | Excess Charge release voltage.过充释放电 压 | 4.08±0.050V |
| 4 | | Excess discharge detection voltage.过放探 测电压 | 2.3±0.050V |
| 5 | | Excess discharge release voltage 过放释放 电压 | 2.3±0.050V |

④ Precautions 注意事项

- In case the battery pack is struck by hard shock or vibration, the battery pack has possibility to cause leakage, smoke, and explosion.

如果电池组受到硬冲击或振动，电池组可能会引起泄漏、冒烟、爆炸等现象。

- Add the protection device PTC (e.g. VTP210.VTP170) or thermal fuse (e.g. TA1, TA2) for fear the trouble of the battery caused by the abnormality of equipment. The protection device must put on the battery properly in order that the protection device may get the accurate temperature of the batter.

增加防护设备 PTC（如 VTP210.VTP170）或热熔丝（如 TA1, TA2），以防止由于设备异常而使电池产生故障。防护设备必须置于电池的适当位置，以便防护设备能够获得电池的准确温度。

13. Storage Condition 贮存条件

① Storage Temperature and Humidity 贮存温度与湿度

- Store the battery at temperature range $-5^{\circ}\text{C}\sim+35^{\circ}\text{C}$, relative humidity of less than 75% and no corrosive gas atmosphere. Keep far away from fire or heat.

电池应贮存在环境温度范围为 $-20^{\circ}\text{C}\sim+25^{\circ}\text{C}$ ，相对湿度不大于75%的清洁、干燥、通风的室内，应避免与腐蚀性物质接触，应远离火源及热源。

- No condensation on the battery.
电池上不可有冷却液。

② Long Period Storage 长时间贮存

- If you want to store the battery for a long time, you must charge the battery to 3.8~3.9V(about 40%~70% power), the battery should be stored in the temperature range $-20\sim+25^{\circ}\text{C}$, low humidity and non-corrosive gas environment. More than three months, the battery should be fully charged and discharged cycle, and then the battery according to the requirements of long-term storage charge.如果要长时间贮存，必须将电池充电至3.8~3.9V(约40%~70%电量)，电池应在温度范围 $-20\sim+25^{\circ}\text{C}$ 、低潮湿和无腐蚀性气体环境中贮存。超过三个月时，应对电池进行一次完全充放电循环，再将电池按长时间贮存要求充电。

14. Exemption from Warrantee 免保范围

- AYAA will not be responsible for trouble occurred by handling outside of the precautions in this specification.

优特利将不对由于未按照本规格书要求使用电池而出现的任何故障负责。

- AYAA will not be responsible for trouble occurred by matching electric circuit, battery pack, charger.

优特利将不对由于匹配电路、电池组、充电器等不匹配而引起的故障负责。

•

~~AYAA will not be responsible for trouble occurred by failure of the above fitting of bottom of battery.~~

优特利将不对由于点焊导致压板脱落、不在电池侧面以及底部点焊操作而引起的故障负责。

15. Safety Instruction 安全指南

Prohibition Points and Handle

The battery includes the flammable objects such as the organic solvent. If the handling is missed there will be possibility that the battery rupture, flames or hot, or it will cause the deterioration or damage of battery. Please observe the following prohibitive matters. And also, add the protection device the equipment for fear that the trouble would affect the battery by the abnormality of equipment. In addition, mention the following matters as "Prohibition Points on Handle" in the instruction manual of the equipment.

电池使用时的禁止事项电池中有易燃物，如有机溶剂。如果使用不当，电池可能会发生发热，冒烟或爆炸起火，或者引起电池恶化或损害等。请遵守以下禁止事项，并在设备上也要加保护装置，以避免由于设备异常而影响电池。此外，在设备使用说明书上要注明电池使用的注意事项。

16. Warranty Period of Battery 电池保质期

The warranty period of a battery is for 6 months after shipment. However, even if a battery is unusual within this period,

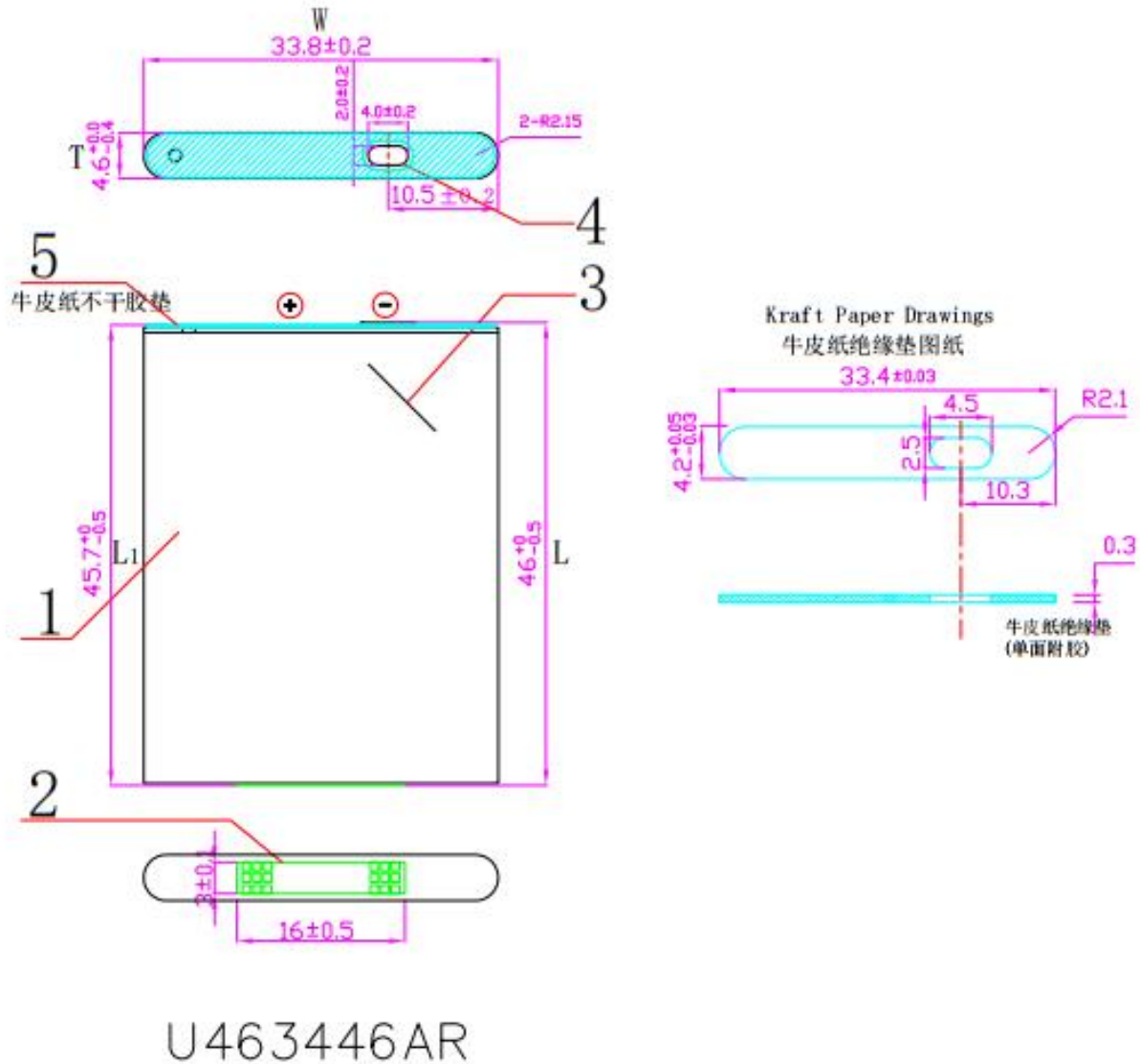
AYAA will replace a new battery for free as long as it is clear

that the problem is that failure of battery manufacturing process and the battery isn't used

~~除约定外电池保质期为~~

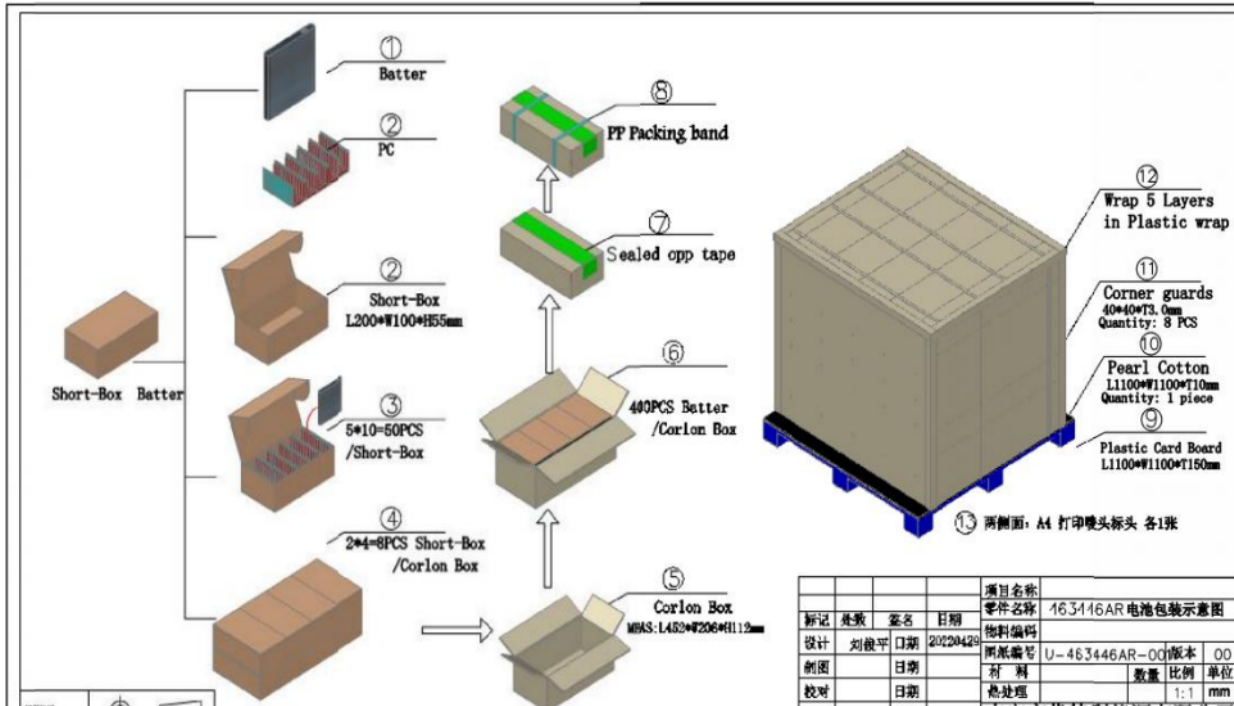
打码出厂后的 6 个月。若电池在此期间内出现异常情况，但必须是由于明显的制造工艺方面的问题，且在电池没有被异常使用的情况下，优特利才免费更换新电池。

17. OAYAAine Drawing 外形尺寸图



| T (mm) | W (mm) | L1 (mm) | L (mm) | 1 | 2 | 3 | 4 | 5 |
|------------|----------|-------------|-------------|------------|--------------------|--------------------|-------------|---------------------|
| 4.6+0/-0.4 | 33.8±0.2 | 45.7+0/-0.5 | 46.0+0/-0.5 | Cell 电芯 | Al-Ni tab 铝镍复合带 | Safety line 防爆线 | Rivet 铆钉 | Surface mat 不干胶垫 |

18. Packing Instructions. 包装示意图



Danger!

1. Disassemble and Reconstruction 拆装和改装

“Do not disassemble or reconstruct battery”

“不要拆装或改装电池”

The battery pack has safety function and protection circuit to avoid the danger. If they have serous damage, it will cause the generating heat, smoke, rupture or flame.

电池中有安全功能和保护电路，以防止危险，否则就容易发生冒烟、发热、爆炸或起火等现象。

2. Short-circuit 短路

“Don not short-circuit battery”

“不要使电池短路”

Do not connect + and – terminals with metals (such as wire). Do not carry or store the battery with metal objects (such as wire, chain reckless or hairpins). If the battery is short-circuited excessive large current will flow and then the generating heat, smoke, rupture or flame will occur. And also, it causes generating heat at metals.

不要用金属（如电线）把正负极连接起来，不要用金属物（如电线，发夹，项链等）来携带或储存电池，如果电池短路，会在电池内部产生大电流，导致产生大量的热量，冒烟、爆炸或起火。

3. Incineration and Heating 焚烧与加热

“Do not incinerate or heat the battery”

“不要焚烧或加热电池”

These occur the melting of insulator, damage of gas release vent or safety function, or ignition on electrolyte. Above mentioned matters cause the generating heat, smoke, rupture or flame. 这会引起绝缘层熔化、气体释放口或安全功能受损或电解液着火。这样会产生热量、冒烟、爆炸或火焰。

4. Use nearby Heated Place 靠近热源使用

“Do not use or leave battery nearby fire, stove or heated place(more than 80°C)”

“不要在有火、炉子或其它热源（超过 60° C）的附近使用或放置电池”

In case that separator made of polymer is melted by high temperature, the internal short-circuit occurs in individual cells and then it causes the generating heat, smoke, rupture or flame. In addition, do not use the battery under the heated place(more than 80°C).

在高温下会熔化隔膜纸，造成内部短路，可能会使电池产生发热，冒烟，爆炸或起火等。

5. Immersion 浸没

“Do not immerse the battery in water or sea water, or get it wet”

“不要把电池浸在水中或海水中，或把它弄湿”

If the protection circuit included in the battery is broken, the battery will be charged at extreme current or voltage and the abnormal chemical reaction occurs in it. And then it causes the generating heat, smoke, rupture or flame.

如果电池中的保护电路失效，电池会在过度的电流或电压下充电，将会出现异常化学反应，产生发热，冒烟，爆炸或起火等现象。

6. Charge nearby Heated Place 靠近热源充电

“Do not charge battery nearby the fire or under the blazing sun”

“不要在火源附近或在强烈的日晒下给电池充电”

If the protection circuit to avoid the danger works under high temperature or it is broken, the battery will be charged at abnormal current (or voltage) and abnormal chemical reaction will occur. It causes the generating heat, smoke, rupture or flame.

在高温下，保护电路可能会失效，电池在异常电流（或电压）下充电，将会出现异常的化学反应，从而产生发热，冒烟，爆炸或起火等现象。

7. Charger and Charge Condition 充电器与充电条件

“Do use the specified charger and observe charging requirement”

“一定要使用专用的充电器，并遵守充电说明”

If the battery is charged with unspecified condition (under high temperature over the regulated value, excessive high voltage or current over regulated value, or remodeled charger), there are cases that it will be overcharged or the abnormal chemical reaction will occur in cells. It causes the generating heat, smoke, rupture or flame.

如果电池在非正常的条件下充电（超过规定的温度、电压或电流、或改装的充电器），电池这样会过度充电或在电池中有异常的化学反应出现，会产生发热，冒烟，爆炸或起火等现象。

8. Penetration 刺穿

“Don to drive a nail into the battery, stick it by hammer, or tread it”

“不要用钉子或其它利器刺穿电池，也不要锤子击打电池或用脚踩它”

As the battery might be broken or deformed and then it will be short-circuited, it causes the generating heat, smoke, rupture or flame.

这样电池可能会损坏或变形，然后产生短路，从而产生热量、冒烟、爆炸或起火等现象。

9. Impact 冲击

“Do not give battery impact or throw it”

“不要冲击电池或扔掷电池”

The impact might cause leakage, heat, smoke, rupture, and/or fire of cell in the battery. And also if the protection circuit in the battery is broken, the battery will be charged abnormal voltage or current, and abnormal chemical reaction might occur. It might cause leakage, heat, smoke, rupture, and/or fire.

冲击会引起电池泄漏，产生热量、冒烟、爆炸或起火，而且若此时电池中的保护电路失效，电池将在异常电压或电流下充电，可能会出现异常化学反应，引起泄漏、热量、冒烟、爆炸或起火。

10. Deformation 变形

“Do not use the battery with conspicuous damage or deformation”

“不要使用明显受损或变形的电池”

It causes the generating heat, smoke, rupture or flame.

这样电池会产生发热，冒烟，爆炸或起火等现象。

11. Soldering 焊锡

“Do not make the direct soldering on battery”

“不要直接在电池上焊锡”

As the insulator is melted by heat or the gas release vent (or safety function) is broken, it causes the generating heat, smoke, rupture or flame.

因为电池绝缘层会受热融化或气体释放口（或安全功能）坏掉，这样电池会产生热量、冒烟、爆炸或起火。

12. Reverse Charge and Over-discharge 反向充电或过放电

“Do not reverse polarity (and terminals)”

“不要使极性反向”

On charging, the battery is reverse-charged and abnormal chemical reaction occurs. And also, there may be case that unexpected large current flows on discharging. These cause the generating heat, smoke, rupture or flame.

充电时，电池被反向充电，会出现异常化学反应，这样在放电时可能有异常的大电流流动，产生热量、冒烟、爆炸或起火。

13. Reversed Polarity Use 反向连接

“Do not reverse-charge or reverse-connect”

“不要反向充电或反向连接”

The battery has polarity. In case the battery is not connected with charger or equipment smoothly, do not force them and do check polarity of battery. If the battery is connected to

opposite polarity with charger, it will be reverse-charged and abnormal chemical reaction will occur. It causes the generating heat, smoke, rupture or flame.

电池有极性。如果电池未能顺利地与充电器或设备连接，不要强迫其连接，一定要检查电池的极性。如果电池与充电器反向连接，会发生反向充电和异常化学反应，产生发热，冒烟，爆炸或起火。

14. Inappropriate Use For Other Equipment 不当地用于其它设备

“Do not use battery for other equipment”

“不要将电池用于不适当的其它设备”

If the battery is used for unspecified equipment, it will deteriorate its performance and cycle-life.

At worst, abnormal current will flow or battery may generate heat, smoke, rupture or flame.

如果电池用于未规定的设备，电池性能和循环寿命会变差。并在电池内部会产生异常电流，或者电池会产生发热，冒烟，爆炸或起火。

15. Leakage 泄漏

“Do not touch leaked battery”

“不要直接接触泄漏的电池”

Do not touch your eyes but wash them immediately and then see a doctor if leaked electrotype is into your eyes. If pay no attention to your eyes, it will cause eye disease.

如果有泄漏的电解液进入眼中，尽快用干净的自来水冲洗，不要揉眼，然后立刻就医。否则，会损害眼睛。

Warning!

1. Mixed Use 混合使用

“Do not use Lithium Ion battery in mixture” “不要混合使用锂离子电池”

Do not use Lithium Ion battery with the primary batteries or secondary batteries whose capacity or kinds or maker is different. If do that, the battery will be discharged or charged excessively in use. And it may cause the generating heat, smoke, rupture or flame because of the abnormal chemical reaction in cells.

不要把锂离子电池同容量、类型或制造商不同的一次电池或二次电池混用。否则，电池会在使用中过度充、放电。同时，由于电池中异常化学反应，会使电池产生热量、冒烟、爆炸或起火。

2. Ingestion 摄入

“Keep the battery away from babies” “使电池远离小孩”

Keep the little battery out of the reach of babies in order to avoid troubles by Swallowing. In case of swallowing the battery, see a doctor immediately.

使小电池远离小孩，以避免由于吞咽而产生问题。如果吞咽了电池，请立刻就医。

3. Charging Time 充电时间

“Do not continue to charge battery over specified time” “不要连续充电超过规定的时间”

If the battery is not finished charging over regulated time, let it stop charging. There is possibility that the battery might generate heat, smoke, rupture or flame.

如果超过规定的时间电池没有充完电，应停止充电，否则，电池可能会产生热量、冒烟、爆炸或起火。

4. Storage 贮存

“Do not get into a microwave or a high pressure container” “不要放入微波炉或高压容器中”

It causes the generating heat, smoke, rupture or flame because of a sudden heat or damage of sealing condition of battery.

由于电池突然受热或其密封条件受损，会使电池产生热量、冒烟、爆炸或起火。

5. Leakage 泄漏

“Do not use a leaked battery nearby fire” “不要在火源附近使用泄漏的电池”

If the liquid leaks from the battery (or the battery gives out bad smell), let the battery leave from flammable objects immediately. Unless do that, the electrolyte leaked from battery will catch fire and it will cause the smoke, flame or rupture of it.

如果液体从电池中泄漏出来（或者电池发出恶臭味），应使电池立刻离开易燃物。否则电池中泄漏的电解液会着火，引起冒烟或爆炸。

6. Rust, Charging color and Deformation 锈蚀、变色和变形

“Do not use an abnormal battery” “不要使用异常的电池”

In case the battery has bad smell or is generated its changing color or deformation or causes something wrong in using (includes charging and storage). Let it take out from equipment or charger and do not use it. If an abnormal battery is used, it will generate heat, smoke, rupture or flame.

如果电池有异味、变色或变形、或在使用过程中出现任何异常情况（包括充电和贮存），请立即将电池从用电装置或充电器中取出，停止使用。否则，电池会发热，冒烟，爆炸或起火。

Caution!

1. Use under strong sunshine 在强烈日照下使用

Do not use or leave the battery under the blazing sun (or in heated car by sunshine). The battery may generate heat, smoke or flame. And also, it might cause the deterioration of battery's characteristics or cycle life.

不要在强烈日照下（或由于日晒而受热的汽车中）使用或放置电池。否则，可能会引起电池发热，起火或功能失效。

2. Static Electricity 静电

The battery pack has the protection circuit to avoid the danger. Do not use nearby the place where generates static electricity (more than 100V) which gives damage to the protection circuit. If the protection circuit were broken, the battery would hide danger.

电池有保护电路装置。禁止在强静电（超过100V）或强磁场的地方使用，否则，易破坏电池的保护装置，带来不安全的隐患。

3. Charging Temperature Range 充电温度范围

Charging temperature range is regulated between 0°C and 40°C. Do not charge the battery out of recommended temperature range. Charging out of recommended range might cause the generating heat or serious damage of batter. And also, if might cause the deterioration of battery's characteristics and cycle life.

充电温度范围在 0° C 和 40° C 之间调节，不要在超出建议的温度范围内给电池充电。否则，会使电池发热或严重受损，并且会引起电池特性和循环寿命恶化。

4. Manual 说明书

Please read the manual before using the battery and let it keep after reading.

请在使用电池前阅读本规格书，读完以后保存好。而且，如果有必要，请重新阅读。

5. Charging method 充电方法

Please read the manual of specified charger about charging method.

有关充电方法，请阅读专用充电器的说明书。

6. First time use 第一次使用

When the battery has rust, bad smell or something abnormal at first-time using, do not use the equipment and go to bring the battery to the shop which it was bought.

当电池第一次使用时有锈蚀、异味或其它异常情况，请不要使用，并把电池退回给销售商。

7. Leakage 泄漏

If the skin or cloth is smeared with liquid form the battery, wash with fresh water. It may cause the skin inflammation.

如果电池发生泄露，使皮肤或服装上溅有电解液，请立即用干净的自来水清洗。否则，可能会引起皮肤发炎。