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# MATERIAL SAFETY DATA SHEET

# 材料安全数据表

| | |
|---|---|
| **Product**<br>产品 | Tapo Battery Pack<br>锂离子电池组 |
| **Type/Model**<br>型号 | Tapo A100 |
| **Issue Date**<br>签发日期 | 2023-07-05 |
| **Validity**<br>有效期 | 2023-07-05 ～ 2023-12-31 |
| **Compiler**<br>编写 | Guangwei Li |
| **Reviewer**<br>审核 | Albert Yip |
| **Approver**<br>批准 | Hongbin Xu |



广州邦禾检测技术有限公司

**Guangzhou MCM Certification & Testing Co., Ltd.**

# *Material Safety Data Sheet*
# *材料安全数据表*

## SECTION 1 - CHEMICAL AND COMPANY IDENTIFICATION
## 第1节—化学品和公司标识

| | |
|---|---|
| **Product**<br>**产品** | Tapo Battery Pack<br>锂离子电池组 |
| **Type/Model:**<br>**型号** | Tapo A100 |
| **Parameter**<br>**参数** | 3.7V, 5200mAh, 19.24Wh |
| **Usage**<br>**用途** | ☐ Used in Portable Equipment 用于便携式设备<br>☐ Used in Electric Vehicle 用于电动车辆<br>☐ Used in Energy Storage System 用于储能系统<br>☒ Others 其他 |
| **Company**<br>**公司** | TP-Link Corporation Limited |
| **Address**<br>**地址** | Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong |
| **Fax 传真** | / |
| **Zip code 邮编** | / |
| **E-mail 电子邮箱** | cert@tp-link.com |
| **Emergency Telephone 紧急联系电话**<br>0755-26504400 | |

## SECTION 2 - HAZARDS IDENTIFICATION
## 第2节—危害识别

**Classification 分类：**

This chemical is not considered hazardous by the Regulation (EC) No 1272/2008 (CLP). This product is an article which is a sealed battery and as such does not require an SDS per the Regulation (EC) No 1272/2008 (CLP) unless ruptured. The hazards indicated are for a ruptured battery.

该化学品不被法规(EC)No.1272/2008(CLP)认为是危险的。本产品为密封电池，因此，除非破裂，不需要SDS (EC) No.1272/2008 (CLP)。以下提到的危险是电池破裂造成的。

| | |
|---|---|
| Acute toxicity – Oral<br>急性毒性-口服 | Category 4<br>第4类 |
| Acute toxicity - Dermal<br>急性毒性-皮肤 | Category 4<br>第4类 |
| Skin corrosion/irritation<br>皮肤腐蚀/刺激 | Category 1B<br>第1B类 |
| Serious eye damage/eye irritation<br>严重眼睛损失/眼睛刺激 | Category 2<br>第2类 |
| Skin sensitization<br>皮肤致敏 | Category 1<br>第1类 |
| Carcinogenicity<br>致癌性 | Category 2<br>第2类 |
| Specific target organ toxicity (repeated exposure)<br>特异性靶器官毒性(重复暴露) | Category 1<br>第1类 |

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**Label elements 标签要素：**

Signal Word信号词:

**Danger 危险**

Hazard Statements 风险声明

| | |
|---|---|
| H302 | Harmful if swallowed.<br>吞食有害 |
| H312 | Harmful in contact with skin.<br>与皮肤接触有害 |
| H332 | Harmful if inhaled.<br>吸入有害 |
| H318 | Causes serious eye damage.<br>对眼睛造成严重损害 |
| H317 | May cause an allergic skin reaction.<br>可能导致皮肤过敏反应 |
| H350 | May cause cancer.<br>可能致癌 |
| H371 | May cause damage to organs.<br>可能对器官造成损害 |
| H335 | May cause respiratory irritation.<br>可能引起呼吸道刺激 |

Symbol标志

GHS08 GHS05 GHS07

This product is an article which contains a chemical substance. Safety information is given for exposure to the article as solid. Intended use of the product should not result in exposure to the chemical substance, This is a battery. In case of rupture: the above hazards exist.

这个产品是一种含有化学物质的物品。安全信息是为了固体物质的暴露而提供。这是一个电池，本产品的预期用途不应导致化学物质暴露。万一破裂，上述危害存在。

**Precautionary Statements – Prevention**
**预防说明—预防**

| | |
|---|---|
| P201 | Obtain special instructions before use.<br>在使用前获得特殊说明 |
| P202 | Do not handle until all safety precautions have been read and understood.<br>阅读和理解安全注意事项后再操作 |
| P281 | Use personal protective equipment as required.<br>按要求使用个人防护装备 |
| P264 | Wash face, hands and any exposed skin thoroughly after handling.<br>处理后彻底清洗脸、手和任何暴露的皮肤 |
| P272 | Contaminated work clothing should not be allowed out of the workplace.<br>不应让受污染的工作服离开工作场 |
| P210 | Keep away from heat/sparks/open flames/hot surfaces –no smoking.<br>远离热源/火花/明火/热表面——禁止吸烟 |
| P270 | Do not eat, drink or smoke when using this product.<br>使用本品时请勿吃、喝、吸烟 |

**Precautionary Statements – Response**
**预防声明—响应**
P301+ P330+ P308
If exposed or connected: Get medical advice/attention. Specific treatment(see supplemental first aid/instruction on this label).
如果暴露或接触：求医/就医。特殊治疗（见标签上的补充急救/说明)
Skin: If on skin: wash with plenty of soap and water. Take off contaminated clothing and water before reuse, if skin irritation or rash occurs: get medical advice/attention if feel unwell.
皮肤：如果皮肤:用大量的肥皂和水清洗。如果出现皮肤刺激或皮疹，在重复使用前脱下受污染的衣服和水:如果感觉不适，请就医/就诊。
Eye: If in eyes: Rinse cautiously with water for several minutes, remove contact lenses, if present and easy to do, Continue rinsing. Call a POISON CENTER or doctor/physician if you feel unwell.
眼睛：如果进入眼睛：小心用水冲洗几分钟，取下隐形眼镜，如果存在且容易做到，继续冲洗；如果你感觉不舒服，打电话给中毒中心或医生/医生
Inhalation: If inhalation: if breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician if you feel unwell.
吸入：如果吸入，如果呼吸困难，将患者转移到空气新鲜的地方，保持一个适合呼吸的姿势休息；如果出现呼吸道症状，如果感觉不适，呼叫解毒中心或医生/内科医生。
Ingestion: If swallowed: rinse mouth, do not induce vomiting, Call a POISON CENTER or doctor/physician if you feel unwell.
食入：如吞下：漱口，不要催吐。如果感觉不适，呼叫解毒中心或医生/内科医生。

**Precautionary Statements – Storage**
**预防声明—存储**

| | |
|---|---|
| P405 | Store locked up<br>加锁存储 |

**Precautionary Statements – Disposal**
**预防声明—处置**

| | |
|---|---|
| P501 | Dispose of contents/container to an approved waste disposal plant.<br>内容物/容器处理到经批准的废物处理工厂 |

**Hazards not otherwise classified (HNOC) 未分类的危险**
Not applicable 不适用

**Other information 其他信息**

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
对水生生物有害，可能对水生环境造成长期不利影响。

**Interactions with other chemicals与其他化学物质的相互作用**

Use of alcoholic beverages may enhance toxic effect.
使用酒精饮料可能会增强毒性作用

## SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENT
## 第3节—成分信息

| Ingredient<br>成分 | Molecular formula<br>分子式 | CAS No.<br>CAS 号 | Weigh<br>含量 |
|---|---|---|---|
| LITHIUM NICKEL COBALT MANGANESE OXIDE/ 镍钴锰酸锂 | $LiNi_xCo_yMn_{1-x-y}O_2$ | 346417-97-8 | 36.30% |
| Polyvinylidene fluoride/ 聚偏氟乙烯树脂 | $(C_2H_2F_2)_n$ | 24937-79-9 | 0.48% |
| Aluminium/ 铝 | Al | 7429-90-5 | 2.68% |
| Graphite/ 石墨 | $C_{24}X_{12}$ | 7782-42-5 | 19.38% |
| Styrene Butadiene Rubber/ 聚苯乙烯丁二烯共聚物 | $C_{36}H_{42}X_2$ | 9003-55-8 | 0.27% |
| Carboxy Methylated Cellulose/ 羧甲基纤维素 | $(C_2H_4O_3)_x$ | 9000-11-7 | 0.22% |
| Copper/ 铜 | Cu | 7440-50-8 | 6.66% |
| Nickel/ 镍 | Ni | 7440-02-0 | 0.33% |
| Lithium hexafluorophosphate/ 六氟磷酸锂 | $LiPF_6$ | 21324-40-3 | 1.79% |
| Polyethlyene/ 聚乙烯 | $(C_2H_4)_n$ | 9002-88-4 | 2.00% |
| Poly(oxy-1,2-ethanediyloxycarbonyl-1, 4-phenylenecarbonyl) / 高粘聚对苯二甲酸乙二醇酯树脂 | $(C_{10}H_8O_4)_n$ | 25038-59-9 | 0.90% |
| Ethylene carbonate/ 碳酸乙烯酯 | $C_3H_4O_3$ | 96-49-1 | 2.80% |
| Iron/ 铁 | Fe | 7439-89-6 | 17.00% |
| Other/ 其他 | -- | -- | 9.19% |

## SECTION 4 - FIRST AID MEASURES
## 第4节—急救措施

**Eye Exposure 眼睛接触:**

In case of contact with eyes, flush with copious of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.
如果与眼睛接触，用大量的水冲洗至少15分钟。用手指分开眼睑，确保充分的冲洗。寻求医生。

**Skin Exposure 皮肤接触:**

If the internal battery materials of an opened battery cell come into contact with skin, immediately flush with plenty of water or soap.
如果打开的电池的内部电池材料接触到皮肤，立即用大量的水或肥皂冲洗。

**Inhalation Exposure 吸入:**

If inhaled the internals of battery vomiting. Seeking Immediate medical attention.
如果吸入电池内部呕吐。立即就医。

**Ingestion Exposure 吞咽:**

If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.
如果吞咽，请就医。除非医务人员指示，否则不要催吐。

## SECTION 5 - FIRE FIGHTING MEASURES
## 第5节—消防措施

**Danger characteristic 危险特性:**

Exposure to excessive heat can cause venting of the liquid electrolyte.
暴露在过热的环境中会导致液体电解质的释放。
Battery may burst and release hazardous decomposition products when exposed to a fire situation.
当暴露在火灾环境中时，电池可能会爆裂并释放出危险的分解产物。

**Hazardous combustion products 有害危险产物:**

Corrosive and toxic gas may be emitted during fire.
着火期间可能会排放腐蚀性和有毒气体。

**Fire-Fighting method 灭火措施:**

The staff must equip with filtermask (full mask) or isolated breathing apparatus.
员工必须配备过滤器面罩或隔离式呼吸器。
The staff must wear the clothes which can defense the fire in the upwind direction.
工作人员必须穿能在逆风方向防火的衣服。
Remove the container to the open space as soon as possible.
尽快将容器移到空地上。
Spray water on the containers in the fireplace to keep them cool until finish extinguishment.
把水喷在壁炉里的容器上，使其降温，直到熄灭。

**Fire-Fighting media 灭火介质:**

Plenty of water, dry chemical powder or carbon dioxide.
大量的水，干粉或二氧化碳。

## SECTION 6 - ACCIDENTAL RELEASE MEASURES
## 第6节—意外泄漏措施

**Emergency treatment 紧急处理:**

If the battery material is released, remove personnel from area until the batteries cool down and fumes dissipate.
如果电池材料被释放，请将人员从该区域撤离，直到电池冷却和烟雾消散。
Provide maximum ventilation to clear out hazardous gases and avoid skin and eye contact or inhalation of vapors.
提供最大的通风以清除有害气体和避免皮肤和眼睛接触或吸入蒸汽。
Remove spilled liquid with absorbent and incinerate waste.
用吸收剂除去溢出的液体并焚烧废物。

## SECTION 7 - HANDLING AND STORAGE
## 第7节—处理和储存

**Handling 处理:**

1. Do not allow battery terminates to contact each other, or contact with other metals.
   不要让电池端子相互接触或与其他金属接触。
2. Do not put the cell or battery into a fire or heat it. Do not solder the cell directly. Do not use or leave the cell or battery in a place near fire or heaters.
   不要将电芯或电池放入火中或加热。不要直接焊接电池。不要将电芯或电池放在靠近火源或加热器等地方。
3. Do not expose the battery to excessive physical shock or vibration.
   不要让电池受到过度的物理冲击或振动。
4. Do not immerse, throw, and wet a battery in water.

不要将电池浸入水中、投掷或弄湿。

5. Short-circuiting should be avoided. Short circuit will reduce the life of the battery and can lead to ignition of surrounding materials. Physical contact with to short- circuited battery can cause skin burn.
   应避免短路。短路会降低蓄电池的寿命，并可能导致周围材料着火。与短路电池的物理接触会导致皮肤灼伤。
6. The batteries should not be opened, destroyed or incinerate, since they may leak or rupture and release to the environment the ingredients that they contain in the hermetically sealed container.
   不应打开、销毁或焚烧电池，因为电池可能泄漏或破裂，并将密封容器中的成分释放到环境中。
7. Place the cell beyond the child packing and container.
   将电池放置在儿童触及不到的地方。
8. Do not connect the battery directly to an electric outlet or cigarette socket in a car.
   不要将电池直接连接到汽车的电源插座或香烟插座上。
9. Be sure to use the specified charger for battery, and follow the charging instructions correctly.
   请务必使用指定的蓄电池充电器，并正确遵循充电说明。
10. Do not mix old and new batteries together, neither with Ni-Cd, dry batteries or another manufacturer batteries or product.
    不要将新旧电池混合在一起使用，也不要与镍镉电池、干电池或其他制造商的电池或产品混合使用。

**Storage 储存:**

1. Batteries should be separated from other materials and stored in a noncombustible, well ventilated, sprinkler-protected structure with sufficient clearance between walls and battery stacks.
   电池应与其他材料分开，并存放在不燃、通风良好、有洒水装置保护的结构中，墙壁和电池堆之间应有足够的间隙。
2. Keep the sample in the cool, dry and well-ventilated place (temperature: -20~30 ºC, humidity: 45~85%). Do not exposure to direct sunlight for long periods. Keep away from fire and heating sources. Don't keep the samples with oxidizer and acid.
   将样品置于阴凉、干燥、通风良好的地方（温度-20~30℃，湿度：45~85%）。不要长时间暴露在阳光直射下。远离火源和热源。不要用氧化剂和酸保存样品。
3. Equip with relevant types and quantities of the extinguishment instruments. The storage place should be equipped with suitable shelter materials for divulgence handling.
   配备相应种类和数量的灭火器材。储存场所应配备适当的掩蔽材料，以便进行泄漏处理。
4. For rechargeable battery, charge the battery every 6 months to the amount specified by the manufacture, even if the battery is not used.
   对于可充电电池，即使不使用电池，也应每6个月将电池充电至制造商规定的电量。

## SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION
## 第8节—暴露控制与个人防护措施

**Engineering Control 工程控制:**

Keep away from heat and open flame. Supply with sufficient partial air exhaust. Store in a cool, dry place.
远离热源和明火。提供足够的局部排气。存放在阴凉干燥的地方。

**Respiratory Protection 呼吸保护:**

Not necessary under conditions of normal use. Wear self-contained breathing filtermask if the density exceed in the air. Wear breathing apparatus under the condition of emergency rescue or evacuation.
在正常使用条件下不需要。如果环境内气体密度超过空气中的密度，请佩戴自给式呼吸过滤器。在紧急救援或疏散的情况下，佩戴呼吸器。

**Eyes Protection 眼睛保护:**

Not necessary under conditions of normal use. Wear protective glasses if handling a leaking or ruptured battery.
在正常使用条件下不需要。如果处理泄漏或破裂的电池，请戴上防护眼镜。

**Skin and Body Protection 皮肤和身体保护**:
Not necessary under conditions of normal use. Wear fireproofing, gas defense clothes in case of handling a leaking or ruptured battery.
在正常使用条件下不需要。在处理泄漏或破裂的电池时，穿上防火防毒服。

**Hands Protection 手部保护:**
Not necessary under conditions of normal use. Wear chemical resistant rubber glove.
在正常使用条件下不需要。耐磨耐化学腐蚀橡胶手套。

**Other Protections 其他保护:**
No smoking, dining and drinking water in the workplace. Keep good habit of hygiene.
工作场所禁止吸烟、就餐和饮水。保持良好的卫生习惯。

## SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES
## 第9节—理化性质

| | |
|---|---|
| **Appearance 外观:** | Black 黑色 |
| **Physical state 状态:** | Solid 固体 |
| **Form 形状:** | Nearly prismatic 近棱柱形 |
| **Odor 气味:** | Odorless 无味 |
| **Solubility 溶解度:** | Insoluble in water 不溶于水 |

## SECTION 10 - STABILITY AND REACTIVITY
## 第10节—稳定性与反应性

**Stability 稳定性:**
Stable under normal temperature and pressure.
常温常压下稳定。

**Distribution of Ban 禁配物:**
Explosives, inflammables, strong oxidants and corrosives.
爆炸品、易燃物、强氧化剂和腐蚀剂。

**Conditions to Avoid 应避免的条件:**
Fire source, heating source, disassemble, external short circuit, crushes, deformation, high temperature above 100°C, direct sunlight and high humidity, immerse in water or overcharge.
火源、热源、拆卸、外部短路、压碎、变形、100°C 以上高温、阳光直射、高湿度、浸水或过充。

**Hazardous Polymerization 危险聚合:**
Will not occur.
不会发生。

**Hazardous Decomposition Products 有害分解产物:**
Metal oxides, carboxyl compound such as CO, $CO_2$, etc.
金属氧化物，碳化合物例如一氧化碳、二氧化碳，等等。

## SECTION 11 - TOXICOLOGICAL INFORMATION
## 第11节—毒理学信息

**Acute Toxicity 急性毒性:**
No information is available.
没有可用的信息。

**Sub-acute and Chronic Toxicity 亚急性和慢性毒性:**
No information is available.
没有可用的信息。

**Irritation Data 刺激性数据:**
The internal battery materials may cause irritation to eyes and skin.
电池内部材料可能会对眼睛和皮肤造成刺激。

**Sensitization 致敏作用:**
The liquid in the battery may cause sensitization to some person.
电池中的液体可能会对某些人造成敏化。

**Mutagenicity 致突变性:**
No information is available.
没有可用的信息。

**Carcinogenicity 致癌性:**
Cobalt and Cobalt compounds are considered to be possible human carcinogen(s).
钴及其钴的化合物有致癌的风险。

**Others 其他:**
Since the materials in this battery are sealed in the can, the potential for exposure to the components of the battery is negligible, when the battery is used as directed. However technical or electrical abuse of the battery may result in the release of battery contents.
由于该电池中的材料密封在罐体中，当按照指示使用电池时，接触电池组件的可能性可以忽略不计。但是，电池的技术或电气滥用可能会导致蓄电池内容物的释放。

## SECTION 12 - ECOLOGICAL INFORMATION
## 第12节—生态信息

**Eco-toxicity 生态毒性:**
No information is available.
没有可用的信息。

**Biodegradable 生物降解性:**
No information is available.
没有可用的信息。

**Mobility in soil 土壤流动性:**
No information is available.
没有可用的信息。

**Bioconcentration or biological accumulation 生物浓缩或生物积累:**
No information is available.
没有可用的信息。

**Other harmful effects 其他有害影响:**
Don't abandon the battery into environment, may cause water or soil pollution.
不要将电池扔进环境中，可能造成水或土壤污染。

## SECTION 13 - DISPOSAL CONSIDERATIONS
## 第13节—处置注意事项

**Appropriate Method of Substance 物质处理方法:**
The battery should be completely discharged prior to disposal in order to prevent short circuit.
为了防止短路，在处理前应将蓄电池完全放电。
The battery contains recyclable materials, and it is suggested recycle.
电池含有可回收材料，建议回收利用。
Refer to National or Local regulations before handling.
操作前请参阅国家或地方法规。
Disposal of the battery should be performed by permitted, professional disposal firms knowledgeable in National or Local regulations of hazardous waste treatment and hazardous waste transportation.
电池的处理应由获得国家或地方法规的许可的具有危险废物处理和危险废物运输的专业处理公司进行。

## SECTION 14 - TRANSPORT INFORMATION
## 第14节—运输信息

The battery has passed the test items of UN Manual of Test and Criteria Section 38.3, and Report No.: SZLZ20220517U01-1.
电池已通过联合国《试验和标准手册》第38.3节的测试项目，报告编号：SZLZ20220517U01-1。

**General packaging requirement 一般包装要求:**

1. The cells or batteries must be protected so as to prevent short circuits.
电芯或电池必须加以保护，以防止短路。
2. The cells or batteries or equipment must be packed in suitable strong outer packaging.
电芯或电池或设备必须包装在合适的坚固的外包装中。
3. If batteries contained in equipment, equipment must be secured against movement within the outer packaging and be packed so as to prevent accidental activation.
如果电池包含在设备中，设备必须在外包装内固定，防止移动，并进行包装，以防止意外激活。

| | |
|---|---|
| **Air transportation, according to IATA-DGR 64th Edition (Effective 1 January-31December 2023)**<br>**空运，依据IATA-DGR第64版（2023年1月1日至12月31日生效）** | |
| UN Number + PSN<br>UN编号+运输专用名 | **UN 3480, LITHIUM ION BATTERIES**<br>**UN 3480，锂离子电池** |
| Hazard Class<br>危险等级 | Class 9<br>第九类危险品 |
| Packaging requirement<br>包装要求 | Strong package, packaging according to PACKING INSTRUCTION 965, section IB<br>坚固包装，按照包装说明965 IB部分要求打包 |
| UN Number + PSN<br>UN编号+运输专用名 | **UN 3481, LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, or**<br>**UN 3481, LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT**<br>**UN 3481，锂离子电池与设备一起包装，或 UN 3481，锂离子电池安装在设备中** |
| Hazard Class<br>危险等级 | Not restricted<br>不受限制 |
| Packaging requirement<br>包装要求 | Strong package, packaging according to PACKING INSTRUCTION 966-967, section II<br>坚固包装，按照包装说明966-967 II部分要求打包 |
| **Sea transportation, according to IMO IMDG Code (Amend 41-2022)**<br>**海运，依据IMO IMDG Code (Amend 41-2022)** | |
| UN Number + PSN<br>UN编号+运输专用名 | **UN 3480, LITHIUM ION BATTERIES, or**<br>**UN 3481, LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, or**<br>**UN 3481, LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT**<br>**UN 3480，锂离子电池 或**<br>**UN 3481，锂离子电池与设备一起包装，或 UN 3481，锂离子电池安装在设备中** |
| Hazard Class<br>危险等级 | Not restricted, according to sp188<br>不受限制，根据特殊条款188 |
| Package instruction<br>包装说明 | Strong package, Packaging in accordance to corresponding requirements of sp188<br>坚固包装，按照sp188相应要求进行包装 |
| EmS No.<br>应急措施编号 | F-A, S-I |
| **Road transportation, according to ADR-2023**<br>**公路运输，依据ADR-2023** | |
| UN Number + PSN<br>UN编号+运输专用名 | **UN 3480, LITHIUM ION BATTERIES, or**<br>**UN 3481, LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, or**<br>**UN 3481, LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT**<br>**UN 3480，锂离子电池 或**<br>**UN 3481，锂离子电池与设备一起包装，或 UN 3481，锂离子电池安装在设备中** |
| Hazard Class<br>危险等级 | Not restricted, according to sp188<br>不受限制，根据特殊条款188 |

| | |
|---|---|
| Package instruction<br>包装说明 | Strong package, Packaging in accordance to corresponding requirements of sp188<br>坚固包装，按照sp188相应要求进行包装 |

## SECTION 15 - REGULATORY INFORMATION
## 第15节—监管信息

*Dangerous Goods Regulation (DGR)*
*Recommendations on the Transport of Dangerous Goods Model Regulations*
*International Maritime Dangerous Goods (IMDG)*
*Occupational Safety and Health Act (OSHA)*
*Toxic Substances Control Act (TSCA)*
*Code of Federal Regulations (CFR)*
*Technical Instructions for the Safe Transport of Dangerous Goods*
*California Proposition 65*
*Superfund Amendments and Reauthorization Act Title III (302/311/312/313) (SARA)*
*Globally Harmonized System of Classification and Labeling of Chemicals(GHS)*
In accordance with all Federal, State and local laws. 符合所有联邦、州和地方法律。

## SECTION 16 - ADDITIONAL INFORMATION
## 第16节—附加信息

**According standard 标准依据:**

*GB/T 16483-2008 Safety data sheet for chemical products Content and order of sections*
*ISO 11014:2009(E) Safety data sheet for chemical products – Content and order of sections*

**Editing date 编辑日期:**

2022-12-23

**Department 编写机构:**

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**Other Information 其他信息:**

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. We make no warranty of merchantability or any other warranty express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigation to determine the suitability of the information for their particular purposes. In no way shall we be liable for any claims, losses, or damage of any third party or for last profits or any special, indirect, consequential or exemplary damages arising from using the above information.

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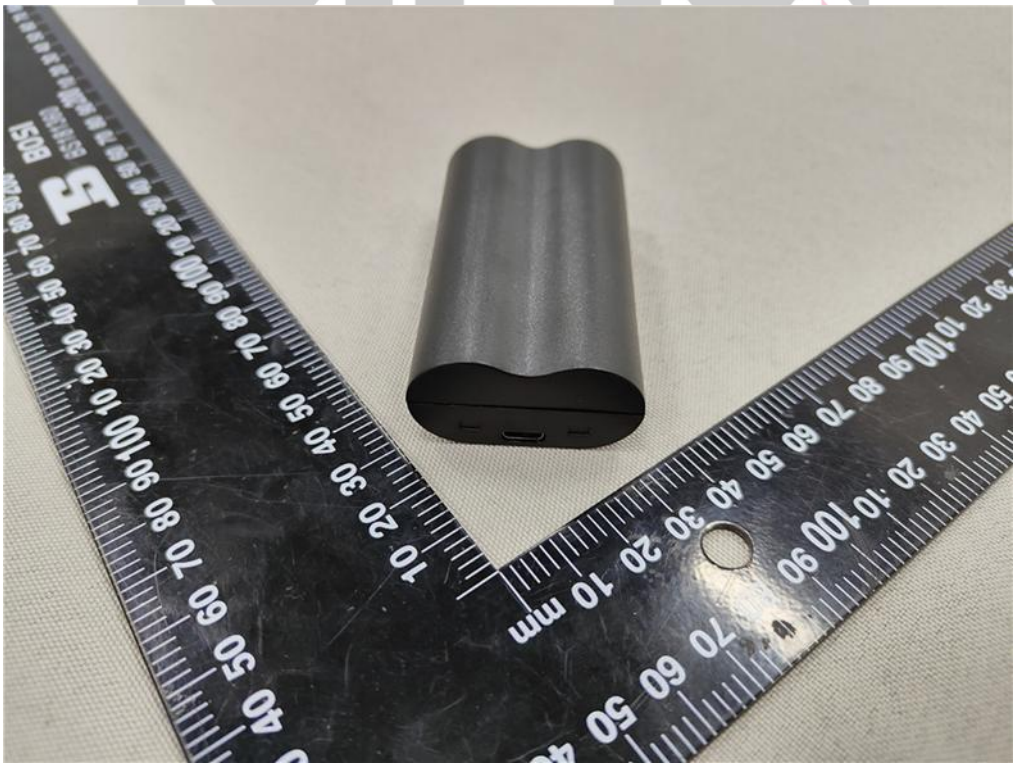
Revision 修改

Replaced the original Report SZLZ20221216MSDS07-1, 2023-04-28 Issued:

取代原报告 SZLZ20221216MSDS07-1，2023-04-28 签发

# Sample Reference Photo
# 样品照片

**Model: Tapo A100**



**--End of the report--**

中国认可
国际互认
检测
TESTING
CNAS L4065

Report No.:
报告编号：SZLZ20220517U01-1

# UN38.3 TEST REPORT
# UN38.3 检 测 报 告

| | |
|---|---|
| **Product Name:** 产品名称： | Tapo Battery Pack 锂离子电池组 |
| **Model and Parameters:** 型号参数： | Tapo A100, 3.7V, 5200mAh, 19.24Wh |
| **Test Classification:** 检测类别： | Commission test 委托检测 |
| **Issue Date:** 签发日期： | 2023-07-05 |



| Tested by/测试 | Reviewed by/审核 | Approved by/批准 |
|---|---|---|
| XiaoZang Xing | Albert Yip | Ku Hongbin |
| Test Engineer | Audit Engineer | Approval Engineer |

**Guangzhou MCM Certification & Testing Co., Ltd.**

**广州邦禾检测技术有限公司**

# General Information
# 基本信息

| | |
|---|---|
| **Application Information/申请信息：** | |
| Applicant:<br>申请单位： | TP-Link Corporation Limited |
| Address:<br>申请单位地址： | Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong |
| Contact Information:<br>联系方式： | Tel: 0755-26504400<br>E-mail: cert@tp-link.com<br>Website: / |
| **General Information/基本信息：** | |
| Product Name:<br>产品名称： | Tapo Battery Pack<br>锂离子电池组 |
| Product Classification:<br>产品分类： | Rechargeable Lithium Ion Battery<br>可充电锂离子电池 |
| Trade Mark:<br>商标名称： | -- |
| Model and Parameters:<br>型号参数： | Tapo A100, 3.7V, 5200mAh, 19.24Wh |
| Manufacturer:<br>制造单位： | TP-Link Corporation Limited |
| Address:<br>制造单位地址： | Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong |
| Contact Information:<br>联系方式： | Tel: 0755-26504400<br>E-mail: cert@tp-link.com<br>Website: / |
| Factory:<br>生产单位： | TP-LINK international shenzhen Co.,Ltd. Guangming Branch<br>深圳市联洲国际技术有限公司光明分公司 |
| Address:<br>生产单位地址： | TP-LINK international factory -101,1F-8F,C901/C1001/C1101/C1201,No.198, Kelian Road, Tianliao Community, Yutang Street, Guangming District, Shenzhen City, Guangdong Province, P.R. China<br>深圳市光明区玉塘街道田寮社区科联路 198 号普联外销厂房-101、1 层-8 层、C901、C1001、C1101、C1201 |
| **Testing Laboratory/测试实验室：** | |
| Laboratory:<br>测试单位： | Guangzhou MCM Certification & Testing Co., Ltd.<br>广州邦禾检测技术有限公司 |
| Address:<br>测试单位地址： | Building 2 No. 45 Zhong Er Section of Shiguang Road, Zhongcun Street, Panyu District, Guangzhou City, Guangdong Province, China.<br>中国 广东省广州市番禺区钟村街市广路钟二路段 45 号 2 栋 |
| Testing Location:<br>测试实验室地址： | No. 13, Zhongsan Section, Shiguang Road, Zhongcun Street, Panyu District, Guangzhou City, Guangdong Province, China.<br>中国 广东省广州市番禺区市广路钟三路段 13 号之一 |
| **Test Standard/测试标准：** | |
| Standard Used:<br>使用标准： | Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3<br>《试验和标准手册》 ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 |
| Deviation Description:<br>偏差描述： | None |

**Product Information/产品信息：**

This battery is constructed with two lithium ion cells through 1S2P and has overcharge, over-discharge, over current and short-circuits proof circuit.
电池由 2 个电芯通过 1 串 2 并组成，含有过充、过放、过流和短路的保护线路。

**Label/标签：**


**Technical Parameters/技术参数：**

| | | Cell | Battery |
|---|---|---|---|
| Model 型号 | | CMICR18650F8 | Tapo A100 |
| Rated Capacity 额定容量 | (mAh) | 2600 | 5200 |
| Nominal Voltage 标称电压 | (V) | 3.7 | 3.7 |
| Standard Charge Current 标准充电电流 | (mA) | 510 | Input: 1000 |
| Standard Discharge Current 标准放电电流 | (mA) | 510 | 1000 |
| Maximum Charge Current 最大充电电流 | (mA) | 2550 | Input: 1500 |
| Maximum Discharge Current 最大放电电流 | (mA) | 2550 | 2000 |
| Maximum Charge Voltage 最大充电电压 | (V) | 4.25 | Input: 5.0V |
| Cut-Off Voltage 放电截止电压 | (V) | 3.0 | 3.0 |

**Remark/备注：**

修改：取代原报告 SZLZ20220517U01，2022.07.25 签发的

| Test Conclusion<br>测试结论 | | | | |
|---|---|---|---|---|
| **Clause<br>条款** | **Test item<br>测试项目** | **Sample No.<br>样品编号** | **Test Result<br>测试结论** | **Remark<br>备注** |
| 38.3.4.1 | Altitude simulation<br>高度模拟 | B1#~B8# | P | / |
| 38.3.4.2 | Thermal test<br>温度循环测试 | | P | / |
| 38.3.4.3 | Vibration<br>振动 | | P | / |
| 38.3.4.4 | Shock<br>冲击 | | P | / |
| 38.3.4.5 | External short circuit<br>外部短路 | | P | / |
| 38.3.4.6 | Impact<br>撞击 | C1#～C10# | P | / |
| | Crush<br>挤压 | / | N/A | / |
| 38.3.4.7 | Overcharge<br>过度充电 | B9#~B16# | P | / |
| 38.3.4.8 | Forced discharge<br>强制放电 | C11#～C30# | P | / |

Ambient Temperature:
环境温度：
20 ± 5°C

Receipt Date:
接收日期：
2022-05-17

Test Date:
测试时间：
2022-05-17 ～ 2022-06-10

**Test Conclusion/测试结论：**

The samples submitted by TP-Link Corporation Limited have passed the test items of Manual of Test and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3.

由 TP-Link Corporation Limited 送检的样品符合《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 的要求。

Seal:
检测专用章：

| Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3<br>《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 | | | |
|---|---|---|---|
| **Clause<br>条款** | **Requirement + Test<br>要求+测试方法** | **Result - Remark<br>备注-结果** | **Verdict<br>判断** |
| **38.3.2** | **Scope 范围** | | **P** |
| | All cell types shall be subjected to tests T.1 to T.6 and T.8.<br>所有电芯类型应该进行 T.1 到 T.6 和 T.8。 | | N/A |
| | All non-rechargeable battery types, including those composed of previously tested cells, shall be subjected to tests T.1 to T.5.<br>所有不可充电电池，包括由测试合格的电芯组成的电池应该进行 T.1 到 T.5。 | | N/A |
| | All rechargeable battery types, including those composed of previously tested cells, shall be subjected to tests T.1 to T.5 and T.7.<br>所有可充电电池，包括由测试合格的电芯组成的电池应该进行 T.1 到 T.5，以及 T.7 的测试。 | | P |
| | In addition, rechargeable single cell batteries with overcharge protection shall be subjected to test T.7.<br>另外，有过充保护的可充单电芯电池应该进行 T.7 的测试。 | | N/A |
| | A component cell that is not transported separately from the battery it is part of needs only to be tested according to tests T.6 and T.8.<br>不单独运输的作为配件的电芯进行 T.6 和 T.8 的测试。 | | P |
| | A component cell that is transported separately from the battery it is part of needs only to be tested according to tests T.1 to T.6 and T.8.<br>单独运输的作为配件的电芯进行 T.1 到 T.6，以及 T.8 的测试。 | | N/A |
| | A cell or battery that is an integral part of the equipment it is intended to power that is transported only when installed in the equipment may be in accordance with the applicable tests when installed in the equipment.<br>作为设备组成部分的用作设备电源的电芯或电池，如果只能在设备中运输，可按照装在设备中的适用测试要求进行试验。 | Batteries may be shipped separately<br>电池可能单独运输 | N/A |
| **38.3.3(d)** | Batteries or single cell batteries not equipment with battery overcharge protection that are design for use only as a component in another battery or in equipment, which affords such protection, are not subjected to the requirement of T.7.<br>未安装过充电保护装置、按设计要求只能在另一个带过充保护装置的电池组或设备中的电芯或单电芯电池，无需 T.7 试验。 | With overcharge protection<br>带过充电保护装置 | N/A |
| **38.3.3(f)** | When testing a battery assembly in which the aggregate lithium content of all anodes when fully charged, is not more than 500g, or in the case of a lithium battery, with a Watt-hour rating of not more than 6200Wh, that is assembled from batteries that have passed all applicable tests, one assembled battery in a fully charged state shall be tested under tests T3, T4 and T5, and in addition, test T7 in the case of a rechargeable battery.<br>当试验集成电池时，如果集成电池在完全充电时所有阳极的合计锂含量不大于 500g，或在锂离子电池组的情况下，额定瓦特-小时不超过 6200Wh 时，并且是用通过所有试验的电池集合而成的，须对一个完全充电状态的集成电池做试验 T.3、T.4 和 T5，另外，如果是可充电电池，则还需进行 T.7 试验。 | Not battery assembly<br>非集成电池 | N/A |

| Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3<br>《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 | | | |
|---|---|---|---|
| **Clause<br>条款** | **Requirement + Test<br>要求+测试方法** | **Result - Remark<br>备注-结果** | **Verdict<br>判断** |
| **38.3.3(g)** | When batteries that have passed all applicable tests are electrically connected to form battery in which the aggregate lithium content of all anodes, when fully charged more than 500g, or in the case of a lithium ion battery, with a Watt-hour rating of more than 6200Wh, the assembled battery does not need to be tested if the assembled battery is of a type that has been verified as preventing:<br>- Overcharge;<br>- Short circuits; and<br>- Over discharge between the batteries.<br>对于已通过所有适用试验的若干电池组成的集成电池，如在完全充电时所有阳极的总锂含量超过 500g，或在锂离子电池的情况下，如额定的瓦特-小时数超过 6200Wh 时，当集成电池如经过验证属于可防止下列情况，即无需进行试验：<br>- 过充电；<br>- 短路；且<br>- 电池之间的过放。 | Not battery assembly<br>非集成电池 | N/A |
| | For an assembled battery not equipped with overcharge protection that is designed for use only as a component in another battery, in equipment, or in a vehicle, which affords such protection:<br>- the overcharge protection shall be verified at the battery, equipment or vehicle level, as appropriate, and<br>- the use of charging systems without overcharge protection shall be prevented through a physical system or process controls.<br>用于未配备过充保护装置的集成电池，该集成电池仅作为提供过充保护的另一电池、设备或车辆的组件使用<br>-过充保护应在电池、设备或车辆级别进行验证<br>-应通过物理系统或过程控制来防止使用无过充保护的充电系统。 | | N/A |
| **38.3.4** | **Procedure 程序** | | **P** |
| | Test T.1 to T.5 shall be conducted in sequence on the same cell or battery.<br>小型电芯或电池应按顺序进行试验 T.1 至 T.5。<br>Test T.6 and T.8 shall be conducted using not otherwise tested cells or batteries.<br>试验 T.6 和 T.8 应使用未试验过的电芯或电池。<br>Test T.7 may be conducted using undamaged batteries previously used in tests T.1 to T.5 for purpose of testing on cycled batteries.<br>试验 T.7 可以使用原先在试验 T.1 至 T.5 中使用过的未损坏电池进行。 | Complied.<br>符合 | P |
| **38.3.4.1** | **Altitude Simulation 高度模拟** | | **P** |
| | Test samples shall be stored at a pressure of 11.6kPa or less for at least six hour at ambient temperature (20±5°C).<br>试验电芯和电池在环境温度(20±5°C)下，储存在小于等于 11.6kPa 的压力下至少 6 小时。 | | P |

| Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3<br>《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 | | | |
|---|---|---|---|
| **Clause<br>条款** | **Requirement + Test<br>要求+测试方法** | **Result - Remark<br>备注-结果** | **Verdict<br>判断** |
| | Results: no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90%.<br>试验结果：无泄漏、无排气、无解体、无破裂、无着火和开路电压降不低于 90%。 | See the TABLE: 38.3.4.1 | P |
| | The requirement relating to voltage is not applicable to test cells and batteries at fully discharge states.<br>测试电压的要求不适用于完全放电的电芯和电池。 | | N/A |
| **38.3.4.2** | **Thermal Test 温度试验** | | **P** |
| | Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72±2°C, followed by storage for at least six hours at a test temperature equal to -40±2°C, The maximum time interval between test temperature extremes is 30 minutes, This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20±5°C).<br>For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12hours.<br>将电芯和电池在温度为 72±2°C 的条件下贮存不少于 6 个小时；然后，在温度-40±2°C 条件下贮存不少于 6 个小时；两个温度间的间隔最长为 30min,重复操作上述步骤到 10 次；然后，在环境温度为 20±5°C 的条件下放置 24 个小时。<br>大电芯和大电池储存时间至少 12h。 | 6h applied on 72±2°C and -40±2°C | P |
| | Results: no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90%.<br>试验结果：无泄漏、无排气、无解体、无破裂、无着火和开路电压降不低于 90%。 | See the TABLE: 38.3.4.2 | P |
| | The requirement relating to voltage is not applicable to test cells and batteries at fully discharge states.<br>测试电压的要求不适用于完全放电的电芯和电池。 | | N/A |
| **38.3.4.3** | **Vibration 振动** | | **P** |
| | For cells and small batteries: from 7 Hz a peak acceleration of 1gn is maintained until 18 Hz reached. The amplitude is then maintained at 0.8mm (1.6mm total excursion) and the frequency increased until a peak acceleration of 8gn occurs (approximately 50Hz). A peak acceleration of 8gn is then maintained until the frequency is increased to 200Hz.<br>对于电芯和小电池：保持峰值加速度 1gn，从 7Hz 到 18Hz。然后振幅保持在 0.8mm（总偏移量为 1.6mm），增加频率，直到峰值加速度达到 8gn（约 50Hz）。然后保持 8gn 的峰值加速度，直到频率增加到 200Hz。 | | P |

| Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3<br>《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 | | | |
|---|---|---|---|
| **Clause<br>条款** | **Requirement + Test<br>要求+测试方法** | **Result - Remark<br>备注-结果** | **Verdict<br>判断** |
| | For large batteries: from 7 Hz to a peak acceleration of 1gn is maintained until 18 Hz reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 2gn occurs (approximately 25 Hz). A peak acceleration of 2gn is then maintained until the frequency is increased to 200 Hz.<br>对于大电池：保持峰值加速度 1gn，从 7Hz 到 18Hz。然后振幅保持在 0.8mm（总偏移量为 1.6mm），增加频率，直到峰值加速度达到 2gn（约 25Hz）。然后保持 2gn 的峰值加速度，直到频率增加到 200Hz。 | | N/A |
| | Results: no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90%.<br>试验结果：无泄漏、无排气、无解体、无破裂、无着火和开路电压降不低于 90%。 | See the TABLE: 38.3.4.3 | P |
| | The requirement relating to voltage is not applicable to test cells and batteries at fully discharge states.<br>测试电压的要求不适用于完全放电的电芯和电池。 | | N/A |
| **38.3.4.4** | **Shock 冲击** | | **P** |
| | Each cell shall be subjected to a half-sine shock of peak acceleration of 150gn and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of 50gn and pulse duration of 11 milliseconds.<br>每一个电芯应承受峰值加速度为 150gn、脉宽为 6 毫秒的半正弦冲击。或者，大电芯可以按峰值加速度为 50gn、脉宽为 11 毫秒的半正弦冲击。 | | N/A |
| | Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the battery. The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries.<br>每个电池应承受的峰值加速度取决于电池的质量。小电池的脉宽应为 6 毫秒，大电池的脉宽应为 11 毫秒。 | 6ms applied. | P |
| | - For small battery, smaller one of 150gn or $\sqrt{100850/mass}$ | 150gn applied. | P |
| | - For large battery, smaller one of 50gn or $\sqrt{30000/mass}$ | | N/A |
| | Each cell or battery shall be subjected to three shocks in the positive direction and to three shocks in the negative direction in each of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.<br>每一个电芯或电池在安装位置的 3 个垂直的轴向的正方向和负方向各进行 3 次冲击，总共 18 次。 | | P |
| | Results: no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90%.<br>试验结果：无泄漏、无排气、无解体、无破裂、无着火和开路电压降不低于 90%。 | See the TABLE: 38.3.4.4 | P |
| | The requirement relating to voltage is not applicable to test cells and batteries at fully discharge states.<br>测试电压的要求不适用于完全放电的电芯和电池。 | | N/A |

| Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3<br>《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 | | | |
|---|---|---|---|
| **Clause<br>条款** | **Requirement + Test<br>要求+测试方法** | **Result - Remark<br>备注-结果** | **Verdict<br>判断** |
| **38.3.4.5** | **External Short Circuit 外部短路** | | **P** |
| | The cell or battery to be tested shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of 57±4°C, measured on the external case.<br>待测电芯或电池应加热一段时间，以稳定均衡在 57±4°C 的温度，并测量外壳上的温度。 | | P |
| | The exposure time shall be at least 6 hours for small cells and small batteries, and 12 hours for large cells and large batteries.<br>小电芯或小电池的暴露/加热时间应至少为 6 小时，大电芯或大电池的暴露/加热时间应至少为 12 小时。 | | P |
| | Then the cell or battery at 57± 4°C shall be subjected to one short circuit condition with a total external resistance of less than 0.1 ohm.<br>然后，在 57±4°C 下的电芯或电池应经受一次短路，外部线路总的电阻小于 0.1 欧姆。 | See the TABLE: 38.3.4.5 | P |
| | This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 57 ± 4°C, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value.<br>在电芯或电池外部外壳温度恢复到 57±4°C 后，短路状态继续持续至少一小时，或对于大电池的情况下，降至试验期间观察到的最大温升的一半，并保持在该值以下。 | | P |
| | The short circuit and cooling down phases shall be conducted at least at ambient temperature.<br>短路和冷却阶段应至少在环境温度下进行。 | | P |
| | Results: external case temperature does not exceed 170°C and there is no disassembly, no rupture and no fire during the test and within six hours after the test.<br>试验结果：外部温度不超过 170°C，试验期间和试验后 6 小时内，无解体、破裂或起火现象。 | See the TABLE: 38.3.4.5 | P |
| **38.3.4.6** | **Test T.6: Impact, Crush 撞击，挤压** | | **P** |
| **38.3.4.6.2** | **Impact 撞击** | | **P** |
| | Applicable to cylindrical cells not less than 18.0 mm in diameter.<br>适用于直径不小于 18.0 mm 的圆柱形电芯。 | Cylindrical cell, diameter is not less than 18.0mm<br>圆柱形电芯，且直径不小于 18.0mm | P |
| | The test cell is placed on a flat smooth surface. A stainless steel bar (type 316 or equivalent) (Ø 15.8 mm ±0.1mm, length: ≥60 mm or of the longest dimension of the cell, whichever is greater) is placed across the centre of the test sample.<br>试验电芯放置平坦表面上。一根直径为 15.8± 0.1 毫米，长度至少 6 厘米（或该电芯的最大尺寸，以较大者为准）的 316 型不锈钢棒横放在样品的中心。 | | P |

| Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3<br>《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 | | | |
|---|---|---|---|
| **Clause<br>条款** | **Requirement + Test<br>要求+测试方法** | **Result - Remark<br>备注-结果** | **Verdict<br>判断** |
| | A mass of 9.1 kg ±0.1 kg is dropped from a height of 61cm± 2.5cm at the intersection of the bar and the test sample in a controlled manner using a near frictionless, vertical sliding track or channel with minimal drag on the falling mass.<br>一个重达 9.1 ± 0.1 千克的铁锤从 61±2.5 厘米高处以几乎无摩擦和零拉力的姿态沿垂直轨道或通道跌落至不锈钢棒与样品的交结点上。 | | P |
| | The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the steel bar lying across the centre of the test sample. Each sample is to be subjected to only a single impact.<br>被撞击的测试样品的长轴平行于平面，并与横放在样品中心的不锈钢棒垂直，每只样品只经受一次撞击。 | | P |
| **38.3.4.6.3** | **Crush 挤压** | | **N/A** |
| | Applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter.<br>适用于棱柱形、袋形、硬币/纽扣式电池和直径小于 18.0 mm 的圆柱形电芯。 | Cylindrical cell, diameter is not less than 18.0mm<br>圆柱形电芯，且直径不小于 18.0mm | N/A |
| | A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5cm/s at the first point of contact.<br>在两个平面间对电芯或元件电芯进行挤压，挤压在第一个接触点的速度约为 1.5cm/s 。 | | N/A |
| | The crushing is to be continued until the first of the three options below is reached.<br>(a) The applied force reaches 13kN±0.78kN;<br>(b) The voltage of the cell drops by at least 100 mV; or<br>(c) The cell is deformed by 50% or more of its original thickness.<br>Once the maximum pressure has been obtained, the voltage drops by 100mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.<br>直到发生下述三个条件中的任一条件：<br>(a) 作用力达到 13kN±0.78kN；<br>(b) 电芯电压下降至少 100mV；或<br>(c) 电芯厚度和最初比较变形 50%以上。<br>一旦达到最大压力，电压降超过 100 mV 或者电芯变形至少 50%，压力应该解除。 | | N/A |
| | A prismatic or pouch cell shall be crushed by applying the force to the widest side.<br>棱形或袋装电芯应该在宽面施加挤压力<br>A button/coin cell shall be crushed by applying the force on its flat surface.<br>纽扣/硬币电芯应该在平面施加挤压力<br>For cylindrical cells, the crush force shall be applied perpendicular to longitudinal axis.<br>圆柱型电芯应该在长轴的垂直方向施加挤压力。 | | N/A |

| Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3<br>《试验和标准手册》ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3 | | | |
|---|---|---|---|
| **Clause<br>条款** | **Requirement + Test<br>要求+测试方法** | **Result - Remark<br>备注-结果** | **Verdict<br>判断** |
| | Each test cell or component cell is to be subjected to one crushed only. The test sample shall be observed for a further 6h. The test shall be conducted using test cell or component cells that have not previously been subjected to others tests.<br>每一个测试的电芯或元件电芯只进行一次挤压，测试后再观察6h。用于测试的电芯或元件电芯之前没有进行过其它的测试。 | | N/A |
| **38.3.4.6.4** | **Result of Impact and Crush /撞击和挤压试验结果** | | **P** |
| | Results: External temperature does not exceed 170°C and there is no disassembly and no fire during the test and within six hours after this test.<br>试验结果：外部温度不超过 170°C，试验期间和试验后 6 小时内，无解体或起火现象。 | See the TABLE: 38.3.4.6 | P |
| **38.3.4.7** | **Overcharge 过度充电** | | **P** |
| | Applicable to rechargeable lithium cell/battery with overcharge protection.<br>适用于具有过充电保护功能的可充电锂电芯/电池。 | With overcharge protection<br>带过充保护装置 | P |
| | The charge current shall be twice the manufacturers' recommended maximum continuous charge current.<br>充电电流应为制造商推荐的最大持续充电电流的两倍。 | 3.0A applied. | P |
| | - When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V.<br>制造商建议的充电电压不大于 18 伏时，实验的最小电压应是电池组最大充电电压的两倍或 22 伏两者中的较小者。 | 10.0V applied. | P |
| | - When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times maximum charge voltage.<br>制造商建议的充电电压大于 18 伏时，实验的最小电压应是最大充电电压的 1.2 倍。 | | N/A |
| | Tests are to be at ambient temperature. The duration of the test shall be 24 hours.<br>测试在室温下进行，测试时间为 24h。 | | P |
| | Results: there is no disassembly and no fire during the test and within seven days after this test.<br>试验结果：试验期间和试验后 7 天内，无解体或起火现象。 | See the TABLE: 38.3.4.7 | P |
| **38.3.4.8** | **Forced Discharge 强制放电** | | **P** |
| | Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C, power supply at an initial current equal to the maximum discharge current specified by the manufacturer.<br>在环境温度下，将单个电芯连接在 12V 的直流电源上进行强制放电，此直流电源提供给每个电芯的初始电流为制造厂指定的最大放电电流。 | | P |
| | Results: there is no disassembly and no fire during the test and within seven days after this test.<br>试验结果：试验期间和试验后 7 天，无解体或起火现象。 | See the TABLE: 38.3.4.8 | P |

| TABLE: 38.3.4.1 Altitude simulation 高度模拟 | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Sample No. | Before Test | | After Test | | Mass loss (%) | Residual OCV (%) | Results |
| | Mass(g) | OCV(V) | Mass(g) | OCV(V) | | | |
| Fully charged at first cycle | | | | | | | |
| B1# | 108.770 | 4.17 | 108.770 | 4.17 | 0.000 | 100.00 | O |
| B2# | 108.619 | 4.18 | 108.619 | 4.18 | 0.000 | 100.00 | O |
| B3# | 108.836 | 4.18 | 108.836 | 4.18 | 0.000 | 100.00 | O |
| B4# | 109.024 | 4.17 | 109.024 | 4.17 | 0.000 | 100.00 | O |
| Fully charged after 25 cycles | | | | | | | |
| B5# | 108.679 | 4.17 | 108.679 | 4.17 | 0.000 | 100.00 | O |
| B6# | 108.904 | 4.18 | 108.904 | 4.18 | 0.000 | 100.00 | O |
| B7# | 108.807 | 4.17 | 108.807 | 4.17 | 0.000 | 100.00 | O |
| B8# | 108.753 | 4.17 | 108.753 | 4.17 | 0.000 | 100.00 | O |
| Results: O = no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90% | | | | | | | |

| TABLE: 38.3.4.2 Thermal test 温度试验 | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Sample No. | Before Test | | After Test | | Mass loss (%) | Residual OCV (%) | Results |
| | Mass(g) | OCV(V) | Mass(g) | OCV(V) | | | |
| Fully charged at first cycle | | | | | | | |
| B1# | 108.770 | 4.17 | 108.751 | 4.12 | 0.017 | 98.80 | O |
| B2# | 108.619 | 4.18 | 108.604 | 4.12 | 0.014 | 98.56 | O |
| B3# | 108.836 | 4.18 | 108.814 | 4.13 | 0.020 | 98.80 | O |
| B4# | 109.024 | 4.17 | 108.991 | 4.12 | 0.030 | 98.80 | O |
| Fully charged after 25 cycles | | | | | | | |
| B5# | 108.679 | 4.17 | 108.651 | 4.12 | 0.026 | 98.80 | O |
| B6# | 108.904 | 4.18 | 108.883 | 4.13 | 0.019 | 98.80 | O |
| B7# | 108.807 | 4.17 | 108.776 | 4.12 | 0.028 | 98.80 | O |
| B8# | 108.753 | 4.17 | 108.715 | 4.12 | 0.035 | 98.80 | O |
| Results: O = no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90% | | | | | | | |

| TABLE: 38.3.4.3 Vibration 振动 | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Sample No. | Before Test | | After Test | | Mass loss (%) | Residual OCV (%) | Results |
| | Mass(g) | OCV(V) | Mass(g) | OCV(V) | | | |
| Fully charged at first cycle | | | | | | | |
| B1# | 108.751 | 4.12 | 108.750 | 4.12 | 0.001 | 100.00 | O |
| B2# | 108.604 | 4.12 | 108.602 | 4.12 | 0.002 | 100.00 | O |
| B3# | 108.814 | 4.13 | 108.813 | 4.13 | 0.001 | 100.00 | O |
| B4# | 108.991 | 4.12 | 108.991 | 4.12 | 0.000 | 100.00 | O |
| Fully charged after 25 cycles | | | | | | | |
| B5# | 108.651 | 4.12 | 108.651 | 4.12 | 0.000 | 100.00 | O |
| B6# | 108.883 | 4.13 | 108.881 | 4.13 | 0.002 | 100.00 | O |
| B7# | 108.776 | 4.12 | 108.775 | 4.12 | 0.001 | 100.00 | O |
| B8# | 108.715 | 4.12 | 108.715 | 4.12 | 0.000 | 100.00 | O |
| Results: O = no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90% | | | | | | | |

| TABLE: 38.3.4.4 Shock 冲击 | | | | | | | P |
|---|---|---|---|---|---|---|---|
| Sample No. | Before Test | | After Test | | Mass loss (%) | Residual OCV (%) | Results |
| | Mass(g) | OCV(V) | Mass(g) | OCV(V) | | | |
| Fully charged at first cycle | | | | | | | |
| B1# | 108.750 | 4.12 | 108.749 | 4.12 | 0.001 | 100.00 | O |
| B2# | 108.602 | 4.12 | 108.601 | 4.12 | 0.001 | 100.00 | O |
| B3# | 108.813 | 4.13 | 108.811 | 4.13 | 0.002 | 100.00 | O |
| B4# | 108.991 | 4.12 | 108.990 | 4.12 | 0.001 | 100.00 | O |
| Fully charged after 25 cycles | | | | | | | |
| B5# | 108.651 | 4.12 | 108.651 | 4.12 | 0.000 | 100.00 | O |
| B6# | 108.881 | 4.13 | 108.881 | 4.13 | 0.000 | 100.00 | O |
| B7# | 108.775 | 4.12 | 108.775 | 4.12 | 0.000 | 100.00 | O |
| B8# | 108.715 | 4.12 | 108.714 | 4.12 | 0.001 | 100.00 | O |
| Results: O = no leakage, no venting, no disassembly, no rupture, no fire, and the open circuit voltage drop not less than 90% | | | | | | | |

| TABLE: 38.3.4.5 External Short-circuit 外部短路 | | | | P |
|---|---|---|---|---|
| **Sample No.** | **Ambient(ºC) (At 57± 4ºC )** | **Testing resistance (mΩ)** | **Max. External Temperature(ºC)** | **Results** |
| Fully charged at first cycle | | | | |
| B1# | 57.2 | 83.6 | 58.6 | O |
| B2# | 57.2 | 84.5 | 58.5 | O |
| B3# | 57.2 | 88.6 | 58.3 | O |
| B4# | 57.2 | 85.0 | 58.5 | O |
| Fully charged after 25 cycles | | | | |
| B5# | 57.3 | 82.3 | 58.3 | O |
| B6# | 57.3 | 86.4 | 58.4 | O |
| B7# | 57.3 | 87.2 | 58.6 | O |
| B8# | 57.3 | 85.9 | 58.1 | O |
| Results: O = no disassembly, no rupture, no fire during the test and within six hours after the test. | | | | |

| TABLE: 38.3.4.6 Impact 撞击 | | | | | P |
|---|---|---|---|---|---|
| **TABLE: 38.3.4.6 Crush 挤压** | | | | | **N/A** |
| **Sample No.** | **Max. External Temperature(ºC)** | **Results** | **Sample No.** | **Max. External Temperature(ºC)** | **Results** |
| 50% of the design rated capacity at first cycle | | | 50% of the design rated capacity after 25 cycles | | |
| C1# | 67.5 | O | C6# | 49.2 | O |
| C2# | 55.2 | O | C7# | 70.3 | O |
| C3# | 58.3 | O | C8# | 64.2 | O |
| C4# | 73.5 | O | C9# | 60.2 | O |
| C5# | 56.2 | O | C10# | 59.4 | O |
| Results: O = no disassembly, no fire during the test and within six hours after this test. | | | | | |

| TABLE: 38.3.4.7 Overcharge 过度充电 | | | | | P |
|---|---|---|---|---|---|
| The test current = 3.0A | | | | | - |
| The test voltage = 10.0V | | | | | - |
| **Sample No.** | **OCV(V)** | **Results** | **Sample No.** | **OCV(V)** | **Results** |
| Fully charged at first cycle | | | Fully charged after 25 cycles | | |
| B9# | 4.18 | O | B13# | 4.17 | O |
| B10# | 4.17 | O | B14# | 4.18 | O |
| B11# | 4.17 | O | B15# | 4.17 | O |
| B12# | 4.17 | O | B16# | 4.17 | O |
| Results: O = no disassembly, no fire during the test and within seven days after this test. | | | | | |

| TABLE: 38.3.4.8 Forced discharge 强制放电 | | | | | P |
|---|---|---|---|---|---|
| **Sample No.** | **OCV(V)** | **Results** | **Sample No.** | **OCV(V)** | **Results** |
| Fully discharged at first cycle | | | Fully discharged after 25 cycles | | |
| C11# | 3.243 | O | C21# | 3.222 | O |
| C12# | 3.238 | O | C22# | 3.250 | O |
| C13# | 3.219 | O | C23# | 3.245 | O |
| C14# | 3.234 | O | C24# | 3.233 | O |
| C15# | 3.209 | O | C25# | 3.227 | O |
| C16# | 3.241 | O | C26# | 3.216 | O |
| C17# | 3.251 | O | C27# | 3.230 | O |
| C18# | 3.239 | O | C28# | 3.231 | O |
| C19# | 3.242 | O | C29# | 3.228 | O |
| C20# | 3.235 | O | C30# | 3.234 | O |
| Results: O = no disassembly, no fire during the test and within seven days after this test. | | | | | |

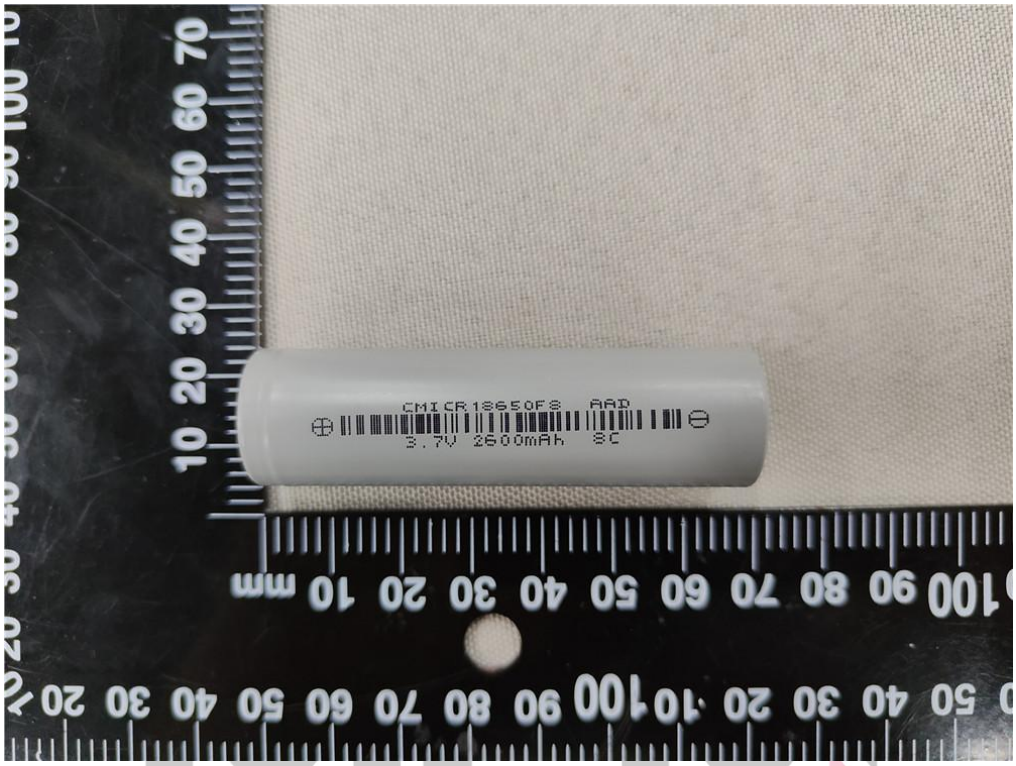
# Photos of the Battery
# 电池照片

**Front view /前视图**

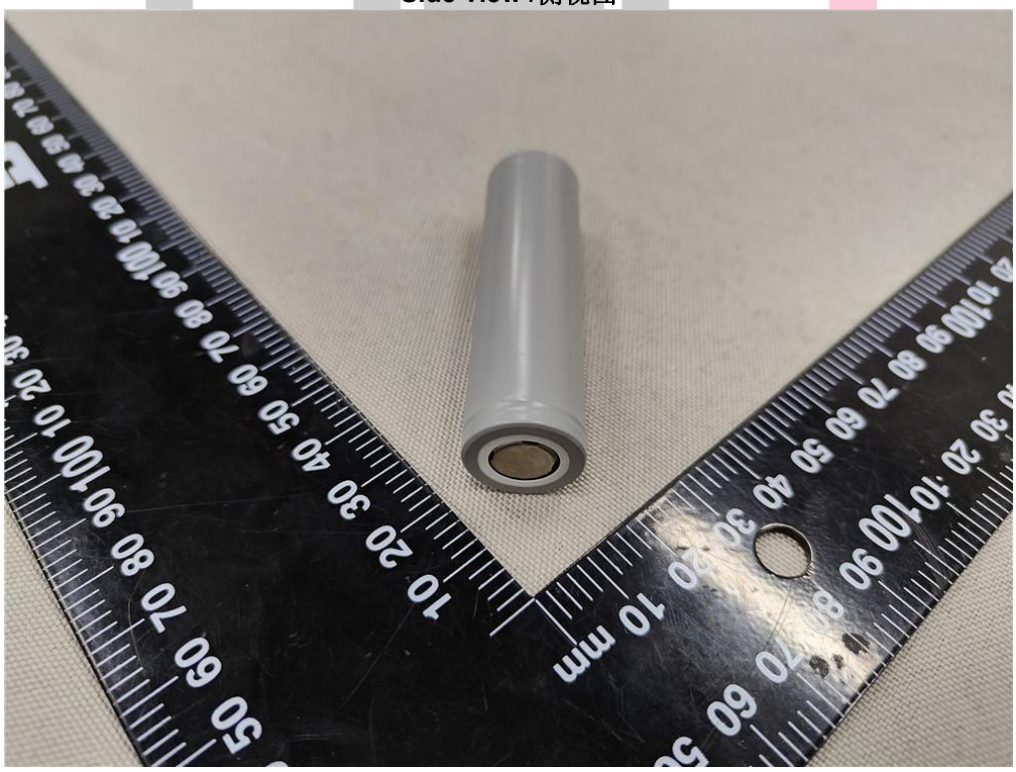
**Back view /后视图**

## Photos of the Cell
## 电芯照片

**Front view /前视图**




**Side view /侧视图**



**-- End of Report --**

## Important Note
## 注意事项

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4. This test report is invalid if altered.
   本检测报告涂改无效。
5. Objection to this test report must be submitted to Guangzhou MCM Certification & Testing Co., Ltd. within 15 days after the publication of the report.
   若对此检测报告有异议，必须在报告发布之日起十五天内向广州邦禾检测技术有限公司提出。
6. This test report is only responsible for the received samples.
   本检测报告仅对收到的样品负责。
7. The test items in this report are not in the scope of CMA. They do not have the impartial function.
   本报告检测项目不在 CMA 范围内，不具备对社会证明作用。
8. As for the test results, “N/A” means “Not applicable”, “P” means “Pass” and “F” means “Fail”.
   本检测结果中“N/A”表示“不适用”，“P”表示“通过”，“F”表示“不通过”。


| | |
|---|---|
| **Testing Lab.:** | Guangzhou MCM Certification & Testing Co., Ltd. |
| **检测单位：** | 广州邦禾检测技术有限公司 |
| **Address:** | Building 2 No. 45 Zhong Er Section of Shiguang Road, Zhongcun Street, Panyu |
| **地址：** | District, Guangzhou City, Guangdong Province, China. |
| | 中国 广东省广州市番禺区钟村街市广路钟二路段 45 号 2 栋 |
| **Tel/电话:** | 0086-20-34777662 |
| **Email/电子邮箱：** | service@mcmtek.com |
| **Web/公司网址：** | https://www.mcmtek.com |

# 锂电池 UN38.3 试验概要 Lithium Battery Test Summary

**项目编号：SZLZ20220517UG01-1**

| 单位信息 Company Information | |
|---|---|
| 委托单位<br>Consignor | TP-Link Corporation Limited<br>Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong<br>电话/Tel：0755-26504400　　邮箱/Mail：cert@tp-link.com<br>网址/Website: / |
| 生产单位<br>Manufacturer | TP-Link Corporation Limited<br>Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong<br>电话/Tel：0755-26504400　　邮箱/Mail：cert@tp-link.com<br>网址/Website: / |
| 测试单位<br>Test Lab | 广州邦禾检测技术有限公司<br>中国 广东省广州市番禺区钟村街市广路钟二路段 45 号 2 栋<br>电话/Tel：4008-368-355　　邮箱/Mail：service@mcmtek.com<br>网址/Website: https://www.mcmtek.com |

| 电池信息 Battery Information | | | |
|---|---|---|---|
| 名称<br>Name | 锂离子电池组<br>Tapo Battery Pack | 电池/电芯类别<br>Battery/Cell Classification | 锂离子电池<br>Li-ion Battery |
| 型号<br>Type | Tapo A100 | 商标<br>Trademark | / |
| 额定电压<br>Normal Voltage | 3.7V | 额定容量<br>Rated Capacity | 5200mAh |
| 额定能量<br>Watt-hour rating | 19.24Wh | 外观/Appearance | 黑色，近棱柱形<br>Black, Nearly prismatic |
| 质量/Mass | 109.0g | 锂含量/Li Content | 不适用 N/A |

| 测试信息 Test Information | | | | | |
|---|---|---|---|---|---|
| 测试报告编号<br>Test Report Number | SZLZ20220517U01-1 | | 测试报告签发日期<br>Date of Test Report | 2023-07-05 | |
| 测试标准<br>Edition of UN Manual of Tests and Criteria Used | 联合国《试验和标准手册》（第 7 版修订 1）38.3 节<br>UN "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend1/Subsection 38.3 | | | | |
| T.1：高度模拟<br>Altitude Simulation | 通过<br>Pass | T.2：温度试验<br>Thermal Test | 通过<br>Pass | T.3：振动<br>Vibration | 通过<br>Pass |
| T.4：冲击<br>Shock | 通过<br>Pass | T.5：外部短路<br>External Short Circuit | 通过<br>Pass | T.6：撞击/挤压<br>Impact/Crush | 通过<br>Pass |
| T.7：过度充电<br>Overcharge | 通过<br>Pass | T.8：强制放电<br>Forced Discharge | 通过<br>Pass | / | |
| UN38.3.3(f) | 不适用 N/A | | UN38.3.3(g) | 不适用 N/A | |
| 签名<br>Signatory<br>职务<br>Title | Albert Yip<br>检验员 | | 签发日期<br>Issued Date | 2023-07-05 | |