

リチウムイオン電池認証書 (類似機種用) Lithium-ion (polymer) rechargeable cell or battery Certification for Similar Models

No. :QA-AVG4071

Date: 2014/12/09

1. 単電池/cell (シングルセル/single cell シングルセルバッテリー/single cell battery)
組電池/battery(pack) (セル構成/composition of cell : 2P5S)
2. 機種名/customer model name : BL1850B Sony model name : LIPW011
3. 顧客名/customer : Makita Corporation
4. 定格/rated

| 項目/item | 規格値/specification | 備考/remarks |
|----------------------------------|-------------------|------------|
| 公称電圧/nominal voltage | 18 V | |
| 定格容量/rated capacity | 5000 mAh | |
| ワット時定格値(Wh) /Watt-hour rating | 90 Wh | |

5. 類似機種及び試験結果/Similar Model and Test Result

1) 類似機種名/Similar Model (Sony model name) : LIPW008 (18 V 5000 mAh 90 Wh)

2) 試験結果/Test Result

国連勧告テスト結果/Test results of the UN Recommendations on the Transport of Dangerous Goods

| 国連勧告テスト及び判定基準 (38.3 リチウム電池) | | テスト結果/ test results | 備考/remarks |
|-----------------------------|----------------------------------|------------------------|--------------------------|
| NO | テスト項目 test item | | |
| T1 | 高度シミュレーション (Altitude simulation) | OK | |
| T2 | 温度試験 (Thermal test) | OK | |
| T3 | 振動 (Vibration) | OK | |
| T4 | 衝撃 (Shock) | OK | |
| T5 | 外部短絡 (External short circuit) | OK | |
| T6 | 圧壊 (Crush) | OK | |
| T7 | 過充電 (Overcharge) | OK | 単電池は対象外/for battery only |
| T8 | 強制放電 (Forced discharge) | OK | |

試験実施日/Tested Date : 2013/06/24~2013/07/23 (T6:2013/09/27)

梱包試験類似機種/Sony's similar model name for packing: LIPW005

梱包試験実施日/Tested Date for Package : 2012/12/07~2012/12/10

上記テスト結果は国連勧告試験(UN Manual of Tests and Criteria 5th revised edition Amendment 1, Part III, subsection 38.3)に従い確認した結果であることを証明いたします。

We, Sony Energy Devices Corporation, hereby certify that above results are confirmed in accordance with the Manual of Tests and Criteria of the UN Recommendations on the Transport of Dangerous Goods, 5th revised edition Amendment 1, Part III, subsection 38.3.

3) 類似機種とのワット時定格値 (Wh)、電圧比率/Ratios for Watt-hour rating, Voltage
 類似機種に対して、ワット時定格値(Wh)の変化が20%以内、且つ電圧の増加が20%以内であることを証明します。

We certify the change of the subject model to the similar model is in Watt-hour rating of less than 20% and the increase in voltage of less than 20%.

LIPW011/LIPW008 : ワット時定格値 (Wh) 比/Watt-hour rating Ratio=100%、
 電圧比/Voltage Ratio=100%



Koichi Miyota
 Quality Assurance Department
 Sony Energy Devices Corporation



A : Checklist for Judging New Type Cell or not

When there is no change in all items, it is NOT considered to be a New Type Cell.

(Change ⇒ ○, No change ⇒ -)

Battery Pack Model : LIPW011 Component Cell Model : US18650VTC5

| Check item | The element which is given influence | Presence of change |
|--|--|--------------------|
| Safety parts and mechanical components | Are the safety parts and mechanical components of this cell the same as those of the test completion cell? | - |
| Cathode material system | Is cathode material system of this cell the same as that of the test completion cell? | - |
| Anode material system | Is anode material system of this cell the same as that of the test completion cell? | - |
| Electrolyte material system | Is electrolyte material system of this cell the same as that of the test completion cell? | - |
| Mass of cathode material | Is mass difference of the design center of each cell concerning cathode less than 20%? | - |
| Mass of anode material | Is mass difference of the design center of each cell concerning anode less than 20%? | - |
| Mass of electrolyte | Is mass difference of the design center of each cell concerning electrolyte less than 20%? | - |
| Mass of cell | Is mass difference of the cell less than 20%? | - |
| Judgment result | New Type or not | Not new |

B : Checklist for Judging New Type Battery or not

Confirmation of presence of change in "The element which is given influence"

(Change ⇒ ○, No change ⇒ -)

When there is no change in all items, it is NOT considered to be a New Type Battery.

Battery Pack Model : LIPW011

| Test Item (Function) | The element which is given influence | Presence of change |
|---|--|--------------------|
| T1 : Altitude Simulation (Decompression load) | <ul style="list-style-type: none"> • Crimped part, Gasket (Cell) • Gas Release Vent, Cell Case (Cell) • Pack (Plastic) Case • Holding Member (Insulator, Insulation Tape, Both Sides Tape) • Coating materials | - |
| T2 : Thermal Shock (Repetition of high temp. and low temp.) | <ul style="list-style-type: none"> • Crimped part, Gasket (Cell) • Gas Release Vent, Cell Case (Cell) • Finished state of Wound Electrodes (Cell) • Pack (Plastic) Case • Holding Member (Insulator, Insulation Tape, Both Sides Tape) • Coating materials | - |
| T3 : Vibration (Vibration load) | <ul style="list-style-type: none"> • Finished state of Wound Electrodes (Cell) • Electric wiring member • Electronic Parts on a circuit board • Cell Holding Member (Adhesive, Both Sides Tape, Lib of Plastic Case) | - |
| T4 : Shock (Shock load) | <ul style="list-style-type: none"> • Wiring Member • Electronic Parts on a circuit board • Cell Holding Member (Adhesive, Both Sides Tape, Lib of Plastic Case) • Finished state of Wound Electrodes (Cell) | - |
| T5 : External Short Circuit (Short current) | <ul style="list-style-type: none"> • Over-voltage Protection • Current Control Device • Safety Device of cell (Cell) • Lead Tab | - |
| T6(Cell) : Impact/Crush (Crash load) | <ul style="list-style-type: none"> • Separator (Cell) • Insulation State in a cell (Cell) | - |
| T7(Pack) : Overcharge (Charge load) | <ul style="list-style-type: none"> • Overcharge Protection • Thermal Device • Safety Device of cell (Cell) | - |
| T8(Cell) : Forced Discharge (Over discharge load) | <ul style="list-style-type: none"> • Finished state of Wound Electrodes (Cell) | - |
| Mass of battery pack | Is mass difference of the battery pack less than 20%? | - |
| Judgment result | New Type or not | Not new |

国連勧告試験 結果 1

Test Result of UN Recommendations Part 1

| | | | |
|----------------------|--|------------------|--|
| 機種名/Sony Model Name | LIPW008 | | |
| 使用セル/Cell Model Name | US18650VTC5 | 構成/Configuration | 2P5S |
| 試験場所/Test Company | ソニーエナジー・デバイス 株式会社 郡山事業所 | | |
| 住所/ Address | 〒963-0531 福島県郡山市日和田町高倉下杉下1-1 | 電話/Tel | +81-24-958-3811 |
| 試験室/Test Room | 安全性試験室/野外試験室 | 試験期間/Test Dates | T1~T5, T7, T8: 2013/06/24~2013/07/23 T6: 2013/09/27 |
| 判定基準/Criterion | UN Manual of Tests and Criteria 5th revised edition Amendment 1, Part III, subsection 38.3 | | |

| 試験名称/Test Name | | T1: 高度シミュレーション試験 Altitude Simulation | | | | | | |
|----------------|--|--------------------------------------|---------|-----------|---------|-------------------------|------------------------------|------------------|
| 番号 No. | サンプル状態 Conditions | 試験前/Before | | 試験後/After | | 質量減少率 / Mass Loss <%以下> | OCV維持率/ Residual OCV <90%以上> | 現象確認/ Occurrence |
| | | Mass(g) | OCV (V) | Mass(g) | OCV (V) | | | |
| 1 | 初回サイクル 満充電/ First cycle, fully charged | 629.2 | 20.64 | 629.2 | 20.62 | 0.00 | 99.9 | N |
| 2 | | 629.5 | 20.63 | 629.5 | 20.62 | 0.00 | 100.0 | N |
| 3 | | 629.1 | 20.63 | 629.1 | 20.62 | 0.00 | 100.0 | N |
| 4 | | 629.2 | 20.63 | 629.2 | 20.62 | 0.00 | 100.0 | N |
| 5 | 50回サイクル 満充電/ After 50 cycles, fully charged | 628.9 | 20.73 | 628.9 | 20.70 | 0.00 | 99.9 | N |
| 6 | | 628.9 | 20.74 | 628.9 | 20.71 | 0.00 | 99.9 | N |
| 7 | | 629.2 | 20.74 | 629.2 | 20.71 | 0.00 | 99.9 | N |
| 8 | | 628.9 | 20.74 | 628.9 | 20.71 | 0.00 | 99.9 | N |

| 試験名称/Test Name | | T2: 温度試験 Thermal | | | | | | |
|----------------|--|------------------|---------|-----------|---------|-------------------------|------------------------------|------------------|
| 番号 No. | サンプル状態 Conditions | 試験前/Before | | 試験後/After | | 質量減少率 / Mass Loss <%以下> | OCV維持率/ Residual OCV <90%以上> | 現象確認/ Occurrence |
| | | Mass(g) | OCV (V) | Mass(g) | OCV (V) | | | |
| 1 | 初回サイクル 満充電/ First cycle, fully charged | 629.2 | 20.62 | 629.2 | 20.48 | 0.00 | 99.3 | N |
| 2 | | 629.5 | 20.62 | 629.5 | 20.48 | 0.00 | 99.3 | N |
| 3 | | 629.1 | 20.62 | 629.1 | 20.48 | 0.00 | 99.3 | N |
| 4 | | 629.2 | 20.62 | 629.2 | 20.47 | 0.00 | 99.3 | N |
| 5 | 50回サイクル 満充電/ After 50 cycles, fully charged | 628.9 | 20.70 | 628.9 | 20.53 | 0.00 | 99.2 | N |
| 6 | | 628.9 | 20.71 | 628.9 | 20.55 | 0.00 | 99.2 | N |
| 7 | | 629.2 | 20.71 | 629.2 | 20.54 | 0.00 | 99.2 | N |
| 8 | | 628.9 | 20.71 | 628.9 | 20.55 | 0.00 | 99.2 | N |

| 試験名称/Test Name | | T3: 振動試験 Vibration | | | | | | |
|----------------|--|--------------------|---------|-----------|---------|-------------------------|------------------------------|------------------|
| 番号 No. | サンプル状態 Conditions | 試験前/Before | | 試験後/After | | 質量減少率 / Mass Loss <%以下> | OCV維持率/ Residual OCV <90%以上> | 現象確認/ Occurrence |
| | | Mass(g) | OCV (V) | Mass(g) | OCV (V) | | | |
| 1 | 初回サイクル 満充電/ First cycle, fully charged | 629.2 | 20.48 | 629.2 | 20.47 | 0.00 | 100.0 | N |
| 2 | | 629.5 | 20.48 | 629.5 | 20.47 | 0.00 | 100.0 | N |
| 3 | | 629.1 | 20.48 | 629.1 | 20.47 | 0.00 | 100.0 | N |
| 4 | | 629.2 | 20.47 | 629.2 | 20.42 | 0.00 | 99.8 | N |
| 5 | 50回サイクル 満充電/ After 50 cycles, fully charged | 628.9 | 20.53 | 628.9 | 20.48 | 0.00 | 99.8 | N |
| 6 | | 628.9 | 20.55 | 628.9 | 20.54 | 0.00 | 100.0 | N |
| 7 | | 629.2 | 20.54 | 629.2 | 20.53 | 0.00 | 100.0 | N |
| 8 | | 628.9 | 20.55 | 628.9 | 20.54 | 0.00 | 100.0 | N |

| | |
|-------------------------|--|
| 質量減少率/ Mass Loss (%) | <input type="checkbox"/> 電池質量 ≤ 1g: 0.5%以下 <input type="checkbox"/> 1g < 電池質量 ≤ 75g: 0.2%以下 <input checked="" type="checkbox"/> 75g < 電池質量 : 0.1%以下 |
| 現象/Occurrence | 破断:R <Rupture> 発火:F <Fire> 破裂:D <Disassembly> 弁作動:V <Venting> 漏液:L <Leakage> 異常なし:N <No rupture, No fire, No disassembly, No venting, No leakage> |

国連勧告試験 結果 2

Test Result of UN Recommendations Part 2

| 試験名称/Test Name | | T4: 衝撃試験 Shock | | | | | | |
|-------------------------|--|--|---------|-----------|---------|-------------------------------|------------------------------------|---------------------|
| 番号 No. | サンプル状態 Conditions | 試験前/Before | | 試験後/After | | 質量減少率 / Mass Loss <%以下> | OCV維持率/ Residual OCV <90%以上> | 現象確認/ Occurrence |
| | | Mass (g) | OCV (V) | Mass (g) | OCV (V) | | | |
| 1 | 初回サイクル 満充電/ First cycle, fully charged | 629.2 | 20.47 | 629.2 | 20.47 | 0.00 | 100.0 | N |
| 2 | | 629.5 | 20.47 | 629.5 | 20.47 | 0.00 | 100.0 | N |
| 3 | | 629.1 | 20.47 | 629.1 | 20.47 | 0.00 | 100.0 | N |
| 4 | | 629.2 | 20.42 | 629.2 | 20.41 | 0.00 | 100.0 | N |
| 5 | 50回サイクル 満充電/ After 50 cycles, fully charged | 628.9 | 20.48 | 628.9 | 20.48 | 0.00 | 100.0 | N |
| 6 | | 628.9 | 20.54 | 628.9 | 20.54 | 0.00 | 100.0 | N |
| 7 | | 629.2 | 20.53 | 629.2 | 20.53 | 0.00 | 100.0 | N |
| 8 | | 628.9 | 20.54 | 628.9 | 20.54 | 0.00 | 100.0 | N |
| 質量減少率/ Mass Loss (%) | | □ 電池質量 ≤ 1g: 0.5%以下 □ 1g < 電池質量 ≤ 75g: 0.2%以下 ■ 75g < 電池質量 : 0.1%以下 | | | | | | |
| 現象/Occurrence | | 破断:R <Rupture> 発火:F <Fire> 破裂:D <Disassembly> 弁作動:V <Venting> 漏液:L <Leakage> 異常なし:N <No rupture, No fire, No disassembly, No venting, No leakage> | | | | | | |

| 試験名称/Test Name | | T5: 外部短絡試験 External Short Circuit | | | | | |
|----------------|---|---|---------------------|-----------|--|---|---------------------|
| 番号 No. | サンプル状態 Conditions | 最大表面温度/Max. Surface Temperature (°C) 170°C≥ | 現象確認/ Occurrence | 番号 No. | サンプル状態 Conditions | 最大表面温度/Max. Surface Temperature (°C) 170°C≥ | 現象確認/ Occurrence |
| 1 | 初回サイクル 満充電/ First cycle, fully charged | 64.4°C | N | 5 | 50回サイクル 満充電/ After 50 cycles, fully charged | 64.7°C | N |
| 2 | | 63.7°C | N | 6 | | 65.2°C | N |
| 3 | | 64.0°C | N | 7 | | 62.8°C | N |
| 4 | | 64.5°C | N | 8 | | 63.2°C | N |
| 現象/Occurrence | | 破断:R <Rupture> 発火:F <Fire> 破裂:D <Disassembly> 異常なし:N <No rupture, No fire, No disassembly> | | | | | |

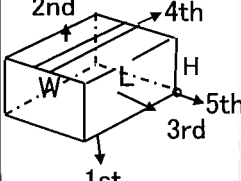
| 試験名称/Test Name | | T6: 衝突 (Impact) / 圧壊 (Crush) | |
|----------------|---|---|-----------------|
| 番号 No. | サンプル状態 Conditions | 最大表面温度/Max. Surface Temperature (°C) 170°C≥ | 現象確認/Occurrence |
| 1 | 初回サイクル 50%充電/ First cycle, 50% charged | 160°C以下* | N |
| 2 | | 160°C以下* | N |
| 3 | | 160°C以下* | N |
| 4 | | 160°C以下* | N |
| 5 | | 160°C以下* | N |
| 現象/Occurrence | | 発火:F <Fire> 破裂:D <Disassembly> 異常なし:N <No fire, No disassembly> | |

| 試験名称/Test Name | | T7: 過充電 Overcharge | | | |
|----------------|---|---|-----------|--|-----------------|
| 番号 No. | サンプル状態 Conditions | 現象確認/Occurrence | 番号 No. | サンプル状態 Conditions | 現象確認/Occurrence |
| 1 | 初回サイクル 満充電/ First cycle, fully charged | N | 5 | 50回サイクル 満充電/ After 50 cycles, fully charged | N |
| 2 | | N | 6 | | N |
| 3 | | N | 7 | | N |
| 4 | | N | 8 | | N |
| 現象/Occurrence | | 発火:F <Fire> 破裂:D <Disassembly> 異常なし:N <No fire, No disassembly> | | | |

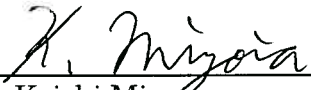
* Temperature Measurement by Thermolabel

| 試験名称/Test Name | | T8:強制放電 Forced Discharge | | | |
|----------------|--|---|-----------|---|-----------------|
| 番号 No. | サンプル状態 Conditions | 現象確認/Occurrence | 番号 No. | サンプル状態 Conditions | 現象確認/Occurrence |
| 1 | 初回サイクル 完全放電 / First cycle, fully discharged | N | 11 | 50回サイクル 完全放電 / After 50 cycles, fully discharged | N |
| 2 | | N | 12 | | N |
| 3 | | N | 13 | | N |
| 4 | | N | 14 | | N |
| 5 | | N | 15 | | N |
| 6 | | N | 16 | | N |
| 7 | | N | 17 | | N |
| 8 | | N | 18 | | N |
| 9 | | N | 19 | | N |
| 10 | | N | 20 | | N |
| 現象/Occurrence | | 破断:R <Rupture> 発火:F <Fire> 破裂:D <Disassembly> 異常なし:N <No rupture, No fire, No disassembly> | | | |

| | | | | | |
|---|---------------------------------|----------------------|-----------------------|---------------------------|------------|
| 試験場所/ Test Company | 索尼电子(无锡)有限公司 | | | | |
| 住所/ Address | 中国江苏省无锡市新区长江路27号 | | 電話/ Tel | 86-510-85239269 | |
| 試験室/ Test Room | SEW国联劝告試験室 | 試験期間/ Test Dates | 2012.12.07~2012.12.10 | 試験番号/ Test No | SEW-PT1302 |
| 機種名/ Sony Model Name | LIPW005 | | 梱包入り数/ Quantity | 10 pcs | |
| 使用セル/ Cell Model Name | US18650VT3 | 構成/ Configuration | 2P5S | 梱包製造所/ Package Factory | SEW |
| 包装等級/ Packing Group | 等級 II / Packing Group Number II | | | | |
| 寸法・質量 / Dimensions and Gross Weight | 長辺/Length (L) | 短辺 /Wide (W) | 高さ/Height (H) | 質量 /Gross Weight (kg) | |
| | 441 mm | 178 mm | 160 mm | 7.3 kg | |

| ■ 落下試験/Drop Test | | | | |
|---|--|------------------------------------|---|-------|
| 試験設備 | HORAD PD-315 | | | |
| 試験条件/ Test condition | 落下高さ /Drop height | 1. 2m | 試験結果 /Occurrence | |
| 落下姿勢(方向)/ Five (one for each drop)  | 1回目の落下試験 | 底面を水平に/ flat on the bottom | 著しい破損なし/No Leakage, No damege liable to affect safety during | |
| | 2回目の落下試験 | 天面を水平に / flat on the top | 著しい破損なし/No Leakage, No damege liable to affect safety during | |
| | 3回目の落下試験 | 長側面を水平に/ flat on the long side | 著しい破損なし/No Leakage, No damege liable to affect safety during | |
| | 4回目の落下試験 | 短側面を水平に/ flat on the short side | 著しい破損なし/No Leakage, No damege liable to affect safety during | |
| | 5回目の落下試験 | コーナー(角)※/ on a corner | 著しい破損なし/No Leakage, No damege liable to affect safety during | |
| ※コーナー: 容器が最も破損を受ける方向を選択 | | | | |
| 判定基準/ Criterion | 外装容器及び袋の場合、外装容器の最も外側の層に輸送中の安全を脅かすようないかなる破損が生じてはならない。 | | 判定/ Judgment | 合格/OK |

| ■ 積み重ね試験/Stacking Test | | | | |
|------------------------|--|------------------|---|-------|
| 試験条件/Test condition | No | 試験結果 /Occurrence | | |
| 試験荷重値/Weight Load | 135 kg | 1 | 漏洩・破損・歪みなし/No leakage, No distortion, No deterioration | |
| | | 2 | 漏洩・破損・歪みなし/No leakage, No distortion, No deterioration | |
| | | 3 | 漏洩・破損・歪みなし/No leakage, No distortion, No deterioration | |
| 判定基準/ Criterion | 試供品は漏洩があってはならない。試供品は、輸送の安全性を損なうような劣化、又はその強度を減じたり、又は輸送物の積重ねを不安定にするような歪みが生じてはならない。 | | 判定/ Judgment | 合格/OK |


 Koichi Miyota
 Quality Assurance Department
 Sony Energy Devices Corporation



総合判定
合格/OK