

Murata Energy Device Wuxi Co., Ltd.

No.27, Changjiang Road, New District, Wuxi, Jiangsu Province, 214028 P.R.C

Phone: 86-510-8523-9120

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リチウムイオン電池認証書（類似機種用）

Lithium-ion cell or battery
Certification for Similar Models

No: MDW-AVG1909

Date: 2019.05.27

1. ☐単電池 / ☐single cell ☐single cell battery

■組電池 / battery(pack) (セル構成 / composition of cell : 1P2S)

2. 機種名 / customer model name : EN-EL15c Murata model name : LIP2228

3. 顧客名 / customer : Nikon

4. 定格 / rated

項目 / item	規格値 / specification	備考 / remarks
公称電圧 / nominal voltage	7.0V	
定格容量 / rated capacity	2280mAh	
ワット時定格値(Wh) / Watt-hour rating	16Wh	単電池/cells ≤20Wh 組電池/batteries ≤100Wh

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

1) 類似機種名 / Similar Model (Murata model name) : LIP2215(7.2V, 2280mAh, 16.4Wh)

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	衝突 (Impact) / 圧壊 (Crush)	OK	
T7	過充電 / Overcharge	OK	single cell は対象外
T8	強制放電 / Forced discharge	OK	

試験実施日 / Tested Date : 2019/03/22~2019/04/24

梱包試験実施日 / Tested Date for Package : 2019/05/20~2019/05/23

上記テスト結果は国連勧告試験(UN Manual of Tests and Criteria 6th revised edition Amendment 1, Part III, sub-section 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, Murata Energy Device Wuxi Co., Ltd., 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, 6th revised edition Amendment 1, Part III, sub-section 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, 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%.

LIP2228 / LIP2215 : ワット時定格値(Wh)比 / Watt-hour Ratio = 97%、

電圧比 / Voltage Ratio = 97%

Weiwei Tang / Manager
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Murata Energy Device Wuxi Co., Ltd.

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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 : LIP2228

Component Cell Model : US18500VC7

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%?	—
Judgment result	New Type or not	Not new

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B : Checklist for Judging New Type Battery or not

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

(Change ⇒ O、 No change ⇒ -)

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

Battery Pack Model : LIP2228

Test Item (Function)	The element which is given influence	Presence of change
T1 : Altitude Simulation (Decompression load)	• 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.)	• 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)	• 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)	• 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)	• Over-voltage Protection • Current Control Device • Safety Device of cell (Cell) • Lead Tab	—
T6(Cell) : Impact / Crush (Crash load)	• Separator (Cell) • Insulation State in a cell (Cell)	—
T7(Pack) : Overcharge (Charge load)	• Overcharge Protection • Thermal Device • Safety Device of cell (Cell)	—
T8(Cell) : Forced Discharge (Over discharge load)	• Finished state of Wound Electrodes (Cell)	—
Judgment result	New Type or not	Not new

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国联劝告 结果 1

Test Result of UN Recommendations Part 1

机种名/Murata Model Name	LIP2215PIPC		
cell使用/Cell Model Name	US18500VC7	构成/Configuration	1P 2S
试验场所/Test Company	村田新能源(无锡)有限公司		
地址/ Address	中国江苏省无锡市新区长江路27号	电话/Tel	86-510-8523-9120
试验室/Test Room	MDW国联劝告试验室	试验期间/Test Dates	2019.03.22~2019.04.24
判定基准/Criterion	UN Manual of Tests and Criteria 6th revised edition Amendment1, Part III, sub-section 38.3		

试验名称/Test Name		T1: 高度模拟试验 Altitude Simulation						
番号 No.	电池状态 Conditions	试验前/Before		试验后/After		质量减少率/ Mass Loss (0.1%以下)	OCV维持率/ Residual OCV (90%以上)	现象确认/ Occurrence
		Mass (g)	OCV (V)	Mass (g)	OCV (V)			
1	初回满充电/ First cycle, fully charged	82.548	8.393	82.546	8.370	0.00%	99.7%	N
2		82.534	8.418	82.533	8.392	0.00%	99.7%	N
3		82.412	8.391	82.408	8.368	0.00%	99.7%	N
4		82.573	8.391	82.570	8.368	0.00%	99.7%	N
5	25次循环后满充 电/ After 25 cycles, fully charged	82.359	8.412	82.356	8.383	0.00%	99.7%	N
6		82.623	8.399	82.620	8.373	0.00%	99.7%	N
7		82.699	8.408	82.697	8.381	0.00%	99.7%	N
8		82.557	8.401	82.553	8.374	0.00%	99.7%	N

试验名称/Test Name		T2: 温度试验 Thermal						
番号 No.	电池状态 Conditions	试验前/Before		试验后/After		质量减少率/ Mass Loss (0.1%以下)	OCV维持率/ Residual OCV (90%以上)	现象确认/ Occurrence
		Mass (g)	OCV (V)	Mass (g)	OCV (V)			
1	初回满充电/ First cycle, fully charged	82.546	8.370	82.566	8.231	0.00%	98.3%	N
2		82.533	8.392	82.555	8.237	0.00%	98.2%	N
3		82.408	8.368	82.429	8.230	0.00%	98.4%	N
4		82.570	8.368	82.592	8.230	0.00%	98.4%	N
5	25次循环后满充 电/ After 25 cycles, fully charged	82.356	8.383	82.379	8.236	0.00%	98.2%	N
6		82.620	8.373	82.639	8.234	0.00%	98.3%	N
7		82.697	8.381	82.721	8.236	0.00%	98.3%	N
8		82.553	8.374	82.569	8.235	0.00%	98.3%	N

试验名称/Test Name		T3: 振动试验 Vibration						
番号 No.	电池状态 Conditions	试验前/Before		试验后/After		质量减少率/ Mass Loss (0.1%以下)	OCV维持率/ Residual OCV (90%以上)	现象确认/ Occurrence
		Mass (g)	OCV (V)	Mass (g)	OCV (V)			
1	初回满充电/ First cycle, fully charged	82.566	8.231	82.560	8.228	0.01%	100.0%	N
2		82.555	8.237	82.549	8.233	0.01%	100.0%	N
3		82.429	8.230	82.425	8.226	0.00%	100.0%	N
4		82.592	8.230	82.583	8.227	0.01%	100.0%	N
5	25次循环后满充 电/ After 25 cycles, fully charged	82.379	8.236	82.366	8.232	0.02%	100.0%	N
6		82.639	8.234	82.632	8.231	0.01%	100.0%	N
7		82.721	8.236	82.722	8.233	0.00%	100.0%	N
8		82.569	8.235	82.565	8.231	0.00%	100.0%	N

现象/Occurrence	破裂: R <Rupture> 起火: F <Fire> 解体: D <Disassembly> 排气: V <Venting> 渗漏: L <Leakage> 无异常: N <No rupture, No fire, No disassembly, No venting, No leakage>
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国联劝告试验 结果 2

Test Result of UN Recommendations Part 2

试验名称/Test Name		T4: 冲击试验				Shock		
番号 No.	电池状态 Conditions	试验前/Before		试验后/After		质量减少率/ Mass Loss (0.1%以下)	OCV维持率/ Residual OCV (90%以上)	现象确认/ Occurrence
		Mass(g)	OCV (V)	Mass(g)	OCV (V)			
1	初回满充电/ First cycle, fully charged	82.560	8.228	82.552	8.225	0.01%	100.0%	N
2		82.549	8.233	82.542	8.230	0.01%	100.0%	N
3		82.425	8.226	82.420	8.223	0.01%	100.0%	N
4		82.583	8.227	82.586	8.224	0.00%	100.0%	N
5	25次循环后满充 电/ After 25 cycles, fully charged	82.366	8.232	82.366	8.229	0.00%	100.0%	N
6		82.632	8.231	82.632	8.228	0.00%	100.0%	N
7		82.722	8.233	82.721	8.230	0.00%	100.0%	N
8		82.565	8.231	82.565	8.228	0.00%	100.0%	N
现象/Occurrence		破裂:R <Rupture> 起火:F <Fire> 解体:D <Disassembly> 排气:V <Venting> 渗漏:L <Leakage> 无异常:N <No rupture, No fire, No disassembly, No venting, No leakage>						
试验名称/Test Name		T5: 外短路试验				External Short Circuit		
番号 No.	电池状态 Conditions	最大表面温度/Max. Surface Temperature (°C) 170°C	现象确认/ Occurrence	番号 No.	电池状态 Conditions	最大表面温度/Max. Surface Temperature (°C) 170°C	现象确认/ Occurrence	
1	初回满充电/ First cycle, fully charged	55.5°C	N	5	25次循环后满充电 / After 25 cycles, fully charged	55.3°C	N	
2		55.5°C	N	6		55.6°C	N	
3		55.5°C	N	7		55.6°C	N	
4		55.3°C	N	8		55.5°C	N	
现象/Occurrence		破裂:R <Rupture> 起火:F <Fire> 解体:D <Disassembly> 无异常:N <No rupture, No fire, No disassembly>						
试验名称/Test Name		T6: 撞击(impact)/挤压(crush) 试验						
番号 No.	电池状态 Conditions	最大表面温度/Max. Surface Temperature (°C) 170°C	现象确认/ Occurrence	番号 No.	电池状态 Conditions	最大表面温度/Max. Surface Temperature (°C) 170°C	现象确认/ Occurrence	
1	初回 50%充电 / First cycle, 50% charged	<160°C	N	6	25循环后 50%充电 / 25 cycle, 50% charged	<160°C	N	
2		<160°C	N	7		<160°C	N	
3		<160°C	N	8		<160°C	N	
4		<160°C	N	9		<160°C	N	
5		<160°C	N	10		<160°C	N	
现象/Occurrence		解体: D <Disassembly> 起火: F <Fire> 无异常: N <No fire, No disassembly>						
试验名称/Test Name		T7: 过充电试验						
		Overcharge						
番号 No.	电池状态 Conditions	现象确认/Occurrence		番号 No.	电池状态 Conditions	现象确认/Occurrence		
1	初回满充电/ First cycle, fully charged	N		5	25次循环后 满充电/ After 25 cycles, fully charged	N		
2		N		6		N		
3		N		7		N		
4		N		8		N		
现象/Occurrence		起火: F <Fire> 解体: D <Disassembly> 无异常: N <No fire, No disassembly>						

* Temperature Measurement by Thermolabel

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国联劝告试验 结果 3

Test Result of UN Recommendations Part 3

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试验名称 /Test Name		T8: 强制放电 Forced Discharge			
番号 No.	电池状态 Conditions	现象确认 /Occurrence	番号 No.	电池状态 Conditions	现象确认 /Occurrence
1	初次循环 完全放电 / First cycle, fully discharged	N	11	25次循环后 完全放电 / After 25 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
现象 / Occurrence		起火:F <Fire> 解体:D <Disassembly> 无异常:N <No fire, No disassembly>			

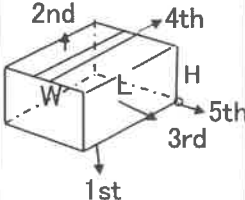
国連勧告試験 梱包結果

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Test Result of UN Recommendations for Package

試験場所/ Test Company	村田新能源(无锡)有限公司				
地址/ Address	中国江苏省无锡市新区长江路27号			電話/ Tel	86-510-8523-9120
試験室/ Test Room	MDW国联劝告試験室	試験期間/ Test Dates	2019.05.20~2019.05.23	試験番号 /Test No	MDW-K1909
机种名/ Murata Model Name	LIP2228NNPC		梱包入り数 /Quantity		100 pcs
使用セル/ Cell Model Name	US18500VC7	構成/ Configuration	1P2S	梱包製造所/ Package Factory	MDW
包装等级 / Packing Group	等級Ⅱ /Packing Group Number Ⅱ				
寸法・質量 / Dimensions and Gross Weight	长边/Length (L)	短边 /Wide (W)	高度/Height (H)	质量 /Gross Weight (kg)	
	300 mm	260 mm	160 mm	9.0 kg	

■ 落下試験/Drop Test

试验设备	虹创力 HD-S015		
试验条件/ Test condition	落下高度 /Drop height	1. 2m	試験結果 /Occurrence
落下姿势(方向)/ Five (one for each drop) 	第1回落下试验	底面水平向下/ flat on the bottom	著しい破損なし/No Leakage, No damage liable to affect safety during
	第2回落下试验	顶面水平向下 / flat on the top	著しい破損なし/No Leakage, No damage liable to affect safety during
	第3回落下试验	长侧面水平向下/ flat on the long side	著しい破損なし/No Leakage, No damage liable to affect safety during
	第4回落下试验	短侧面水平向下/ flat on the short side	著しい破損なし/No Leakage, No damage liable to affect safety during
	第5回落下试验	一角向下※/ on a corner	著しい破損なし/No Leakage, No damage liable to affect safety during
	※一角: 选择容器最易受损的方向		
判定基準/ Criterion	Each package must be capable of withstanding a 1.2m drop test in any orientation without : ・ Damage to cells or batteries contained therein; ・ Shifting of contents so as to allow battery(or cell to cell) contact ・ Release of contents		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		165 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	試供品は漏洩があつてはならない。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

WeiWei Tang / Manager
Quality Assurance Department
Murata Energy Device Wuxi Co., Ltd.

総合判定

合格/OK

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1. 2m落下試験写真／1. 2mDrop Test Photo

リチウムイオン電池／lithium-ion cell or battery

ムラタ機種名／Murata model name: LIP2228NNPC

Before



After



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積み重ね試験写真／/Stacking Test Photo

リチウムイオン電池／lithium-ion cell or battery

ムラタ機種名／Murata model name: LIP2228NNPC

Before



After

