



新普科技股份有限公司
新世電子(常熟)有限公司
新普科技(重慶)有限公司
華普電子(常熟)有限公司

Control Number: SLEU-2007011

Rechargeable Li-ion Battery UN38.3 Test Report

Recommendations on the TRANSPORT OF DANGEROUS GOODS

(Manual of Tests and Criteria, Sixth revised edition, Amend 1)

Customer: Lenovo

Model: L20M3P71

Rating/ Mass: 11.58V, Typical Capacity 4570mh/ 52.9Wh

Rated Capacity 4475mAh/ 51.8Wh /196 (g)

Issue date: 2020/07/14

Approved By	Checked By	Prepared By
Project Manager	Authorized Signatory	Test Engineer
<i>Sing Sin</i>	<i>Zongbao Huang</i>	<i>Jay Lin</i>

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	SIMPLO TECHNOLOGY (CHONGQING) INC. ADD : No.2 Zongbao Avenue, Shapingba District, ChongQing, China TEL: +86-23-61718899 FAX: +86-23-61210488	
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Email : Test_Lab@simplo.com.tw

Website : <http://www.simplo.com.tw/>

Form No. : W11-002-B05

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Control Number: SLEU-2007011

1. Purpose of the Test :

To test each cell/battery is of the type proved to meet the requirements in United Nations Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Sixth revised edition, Amend 1, Section 38.3.

2. Test Result :

Test results of the UN Recommendations on the Transport of Dangerous Goods

No.	Test Item	Test results
T.1	Altitude simulation	PASS
T.2	Thermal test	PASS
T.3	Vibration test	PASS
T.4	Shock test	PASS
T.5	External short circuit	PASS
T.6	Impact, Crush test	PASS
T.7	Overcharge	PASS
T.8	Forced discharge	PASS

3. Test Lab: Email : Test_Lab@simplo.com.tw Website : <http://www.simplo.com.tw/>

●	SIMPLO (Taiwan) Laboratory ADD : No. 471 Pa Teh Rd, Sec 2 Hu Kou, Hsinchu Hsien, 303 Taiwan TEL: +886-3-5695920 FAX: +886-3-5695931
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Control Number: SLEU-2007011

4. Product manufacturer : Email : Test_Lab@simplo.com.tw Website : <http://www.simplo.com.tw/>

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5. Test Quantity :

- 5.1 Four batteries, at first cycle, in fully charged states. (For T.1~T.5)
- 5.2 Four batteries, after 25 cycles ending in fully charged states. (For T.1~T.5)
- 5.3 Five component cells, at first cycle at 50% of the design rated capacity. (For T.6)
- 5.4 Five component cells, after 25 cycles at 50% of the design rated capacity. (For T.6)
- 5.5 Four batteries, at first cycle, in fully charged states. (For T.7)
- 5.6 Four batteries, after 25 cycles ending in fully charged states. (For T.7)
- 5.7 Ten component cells, at first cycle in fully discharge states. (For T.8)
- 5.8 Ten component cells, after 25 cycles ending in fully discharged states. (For T.8)

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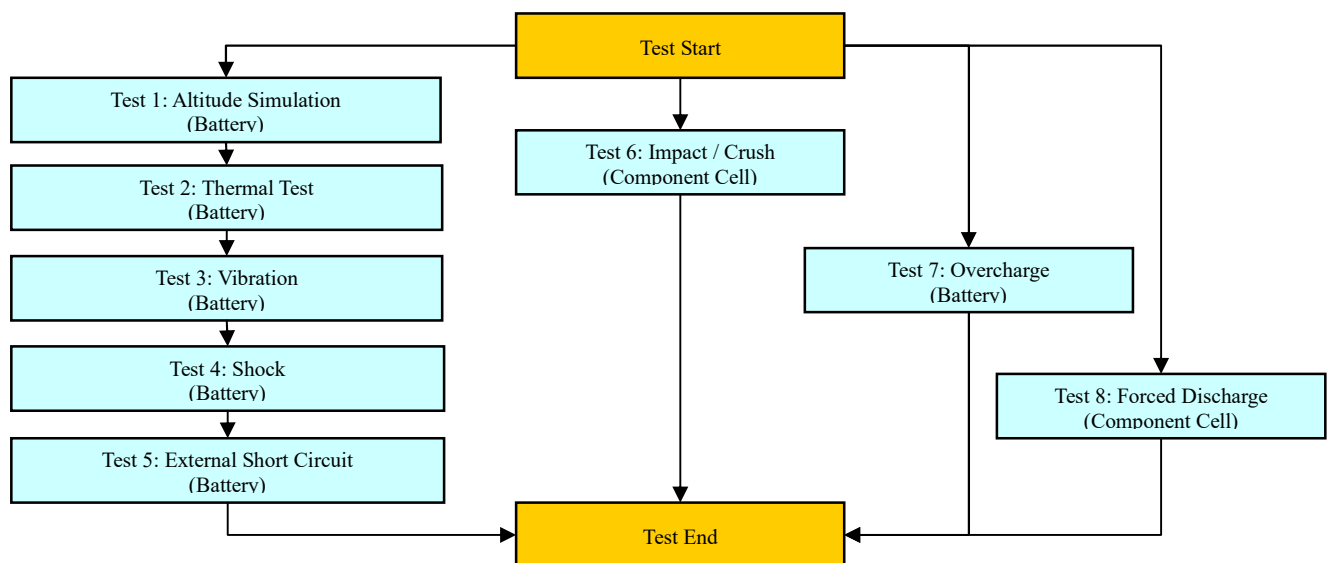
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6. Test Procedure :

6.1 All detailed test procedures must be based on United Nations Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Sixth revised edition, Amend 1, Section 38.3.

6.2 Test flow shall be followed as below.



Conclusion: The samples had passed the test items of UN38.3.

7. Comment :

7.1 Due to the change of label, the sample picture need to modify, this report have been updated.
(The control number of old report: SLEU-2007001)



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8. Test Equipment :

SMP SIMPLO TECHNOLOGY CO., LTD.

Address : No.471, Sec.2, Pa Teh Rd., Hu Kou, Hsin Chu Hsien 303, Taiwan

TEL: +886-3-5695920; FAX: +886-3-5695931

Revised Date: 2020-07-14

Test Instruments Reference List								
Used	Instrument ID	Instrument Name	Type	Range of use	Manufacturer	Calibration Date_Last	Calibration Date_Next	Remarks
	Pretest							
V	ML-761	Learning	715C	0~18V 0~8A	SMP	2020/2/19	2021/3/19	
V	ML-762	Learning	715C	0~18V 0~8A	SMP	2020/1/2	2021/2/2	
V	ML-763	Learning	715C	0~18V 0~8A	SMP	2020/2/19	2021/3/19	
V	ML-764	Learning	715C	0~18V 0~8A	SMP	2020/1/2	2021/2/2	
	ML-925	Learning	750C8	0~60V 0~30A	SMP	2020/1/2	2021/2/2	
	T.1 Altitude Simulation							
V	ML-522	Altitude	SVT-120	kPa:30~90	HSIN JIANG	2019/7/17	2020/8/17	
V	ML-257	Multimeter	34401A	Note 1	Agilent	2019/9/2	2020/10/2	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1220 gf	PRECISA	2019/7/17	2020/8/17	
	ML-523	Electronic Balance	MTW-30K	30*0.005kg		2019/8/16	2020/9/16	
V	ML-550	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2019/8/15	2020/9/15	
V	ML-964	Barometric Air Pressure	MP55	750 to 1100 mbar	KIMO	2019/8/6	2020/9/6	
	T.2 Thermal Test							
V	ML-789	Thermal Shock	GTST-080-65-AW	T:-40 to 100°C	GF	2019/7/2	2020/8/2	
V	ML-257	Multimeter	34401A	note 1	Agilent	2019/9/2	2020/10/2	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1220 gf	PRECISA	2019/7/17	2020/8/17	
	ML-523	Electronic Balance	MTW-30K	30*0.005kg		2019/8/16	2020/9/16	
V	ML-551	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2019/8/15	2020/9/15	
	T.3 Vibration							
V	ML-233	Vibration	KD-9636-EM-300F2K-30N80	F:5~2000Hz G:0.2~20G	King Design	2019/8/7	2020/9/7	
V	ML-257	Multimeter	34401A	note 1	Agilent	2019/9/2	2020/10/2	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1220 gf	PRECISA	2019/7/17	2020/8/17	
	ML-523	Electronic Balance	MTW-30K	30*0.005kg		2019/8/16	2020/9/16	
V	ML-552	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2019/8/15	2020/9/15	
	T.4 Shock							
V	ML-056	Shock	DP-1200-25	G:10~600G	King Design	2019/8/7	2020/9/7	
V	ML-257	Multimeter	34401A	note 1	Agilent	2019/9/2	2020/10/2	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1220 gf	PRECISA	2019/7/17	2020/8/17	
	ML-523	Electronic Balance	MTW-30K	30*0.005kg		2019/8/16	2020/9/16	
V	ML-551	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2019/8/15	2020/9/15	
	T.5 External Short Circuit							
V	ML-894	Battery Hitester	BT3562	1mΩ ~ 30kΩ	HIOKI	2020/6/9	2021/7/9	
V	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 200°C	Yokogawa	2019/8/16	2020/9/16	
V	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 200°C	Yokogawa	2019/8/16	2020/9/16	
V	ML-521	Oven	9031	30~80 °C	YEOW LONG	2019/8/16	2020/9/16	
V	ML-952	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2019/7/24	2020/8/24	
	T.6 Impact / Crush							
V	ML-458	Data Acquisition	XL122-D	1-100 Vdc, -50 to 150°C	Yokogawa	2020/6/3	2021/7/3	
	ML-076	Impact Tester			JYI SHENG	2020/1/6	2021/2/6	
	ML-553	Crush Tester	BCT-01		Simplo	2020/4/8	2021/5/8	
V	ML-866	Crush Tester	M0654		JYI SHENG	2020/4/8	2021/5/8	
	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 200°C	Yokogawa	2019/8/16	2020/9/16	

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Control Number: SLEU-2007011

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Revised Date: 2020-07-14

Test Instruments Reference List								
Used	Instrument ID	Instrument Name	Type	Range of use	Manufacturer	Calibration Date_Last	Calibration Date_Next	Remarks
	T.7 Overcharge							
	ML-482	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2020/5/7	2021/6/7	
	ML-483	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2020/5/7	2021/6/7	
	ML-484	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2020/5/7	2021/6/7	
	ML-486	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2020/5/7	2021/6/7	
	ML-487	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2020/5/7	2021/6/7	
V	ML-952	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2019/7/24	2020/8/24	
	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 200℃	Yokogawa	2019/8/16	2020/9/16	
	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 200℃	Yokogawa	2019/8/16	2020/9/16	
V	ML-918	Overcharge & Forced discharge tester	T901	3~30 Vdc, Charge: 0.05~20A Discharge: 0.02~10A	SMP	2020/5/7	2021/6/7	
	T.8 Forced Discharge							
	ML-132	Electronic Load	3311C	60V,60A, 300W	Prodigit	2020/2/20	2021/3/20	
	ML-133	Electronic Load	3311C	60V,60A, 300W	Prodigit	2020/2/20	2021/3/20	
	ML-136	Electronic Load	3311C	60V,60A, 300W	Prodigit	2020/2/20	2021/3/20	
	ML-192	Electronic Load	3311C	60V,60A, 300W	Prodigit	2020/2/20	2021/3/20	
	ML-269	Electronic Load	3311C	60V,60A, 300W	Prodigit	2020/2/20	2021/3/20	
	ML-532	DC Electronic Load	33511-01	120V, 240A, 3600W	Prodigit	2019/7/17	2020/8/17	
	ML-482	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2020/5/7	2021/6/7	
	ML-483	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2020/5/7	2021/6/7	
	ML-484	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2020/5/7	2021/6/7	
	ML-486	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2020/5/7	2021/6/7	
	ML-487	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2020/5/7	2021/6/7	
V	ML-952	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2019/7/24	2020/8/24	
	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 200℃	Yokogawa	2019/8/16	2020/9/16	
	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 200℃	Yokogawa	2019/8/16	2020/9/16	
V	ML-918	Overcharge & Forced discharge tester	T901	3~30 Vdc, Charge: 0.05~20A Discharge: 0.02~10A	SMP	2020/5/7	2021/6/7	
Note 1: DC Voltage: 0.1-1000V; AC Voltage: 0.5-700V at 60Hz, 1kHz; Resistance: 10Ω-10MΩ; DC Current: 0.1mA-3A; AC Current: 0.01-3A at 60Hz, 0.01-1A, at 1kHz.								

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9. T.1~T.8 Detail Reports:

UN 38.3 Test Datasheet UN38.3/ST/SG/AC.10/11/Rev.6/Amend.1

Control Number: SLEU-2007011	Customer: Lenovo	Model Name: L20M3P71	SMP Project Name: Lynx
Pack P/N: 931QA188H (A)(B) 931QA189H (A)(B)	Configuration: 3S1P	Test Duration: 2020/06/24~2020/07/13	Reviewer: Esmond
Cell Vendor: ATL	Cell Model: 457970	N/A	N/A

Test Sample Identification: ☐ Large Battery ☒ Small Battery ☐ Single-cell Battery

Battery Pack						Component Cell		
Used	Sample No.	Sample State	Used	Sample No.	Sample State	Used	Sample No.	Sample State
V	01~04	1 Cycle, Fully charged	V	05~08	25 Cycles, Fully charged	V	01C~05C	1 Cycle, 50% SOC
V	09~12	1 Cycle, Fully charged	V	13~16	25 Cycles, Fully charged	V	06C~10C	25 Cycles, 50% SOC
						V	11C~20C	1 Cycle, Fully discharged (0% SOC)
						V	21C~30C	25 Cycles, Fully discharged (0% SOC)

T.1 Altitude Simulation

Start time: 2020/07/02 09:10		Ambient temp.: 24.9 °C					Operator: Jay		
Finish time: 2020/07/02 16:10		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	12.870	12.875	12.871	12.868	12.874	12.878	12.866	12.870
	After	12.855	12.862	12.859	12.852	12.864	12.864	12.854	12.856
	Residual OCV %	99.88%	99.90%	99.91%	99.88%	99.92%	99.89%	99.91%	99.89%
Mass (g)	Before	196.591	196.405	196.232	196.368	196.540	196.297	196.441	196.330
	After	196.586	196.402	196.226	196.364	196.534	196.294	196.436	196.326
	Mass loss %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Results		P	P	P	P	P	P	P	P

T.2 Thermal Test

Start time: 2020/07/02 16:30		Ambient temp.: 25.0 °C					Operator: Jay		
Finish time: 2020/07/09 08:44		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	12.855	12.862	12.859	12.852	12.864	12.864	12.854	12.856
	After	12.717	12.720	12.719	12.713	12.720	12.723	12.716	12.713
	Residual OCV %	98.93%	98.90%	98.91%	98.92%	98.88%	98.90%	98.93%	98.89%
Mass (g)	Before	196.586	196.402	196.226	196.364	196.534	196.294	196.436	196.326
	After	196.571	196.383	196.209	196.348	196.521	196.276	196.421	196.309
	Mass loss %	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Results		P	P	P	P	P	P	P	P

T.3 Vibration

Start time: 2020/07/09 09:10		Ambient temp.: 25.1 °C					Operator: Jay		
Finish time: 2020/07/10 09:30		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	12.717	12.720	12.719	12.713	12.720	12.723	12.716	12.713
	After	12.706	12.707	12.712	12.699	12.710	12.710	12.707	12.704
	Residual OCV %	99.91%	99.90%	99.94%	99.89%	99.92%	99.90%	99.93%	99.93%
Mass (g)	Before	196.571	196.383	196.209	196.348	196.521	196.276	196.421	196.309
	After	196.566	196.376	196.203	196.341	196.513	196.270	196.414	196.302
	Mass loss %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Results		P	P	P	P	P	P	P	P

T.4 Shock

Start time: 2020/07/10 09:50		Ambient temp.: 25.3 °C					Operator: Jay		
Finish time: 2020/07/10 15:20		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	12.706	12.707	12.712	12.699	12.710	12.710	12.707	12.704
	After	12.700	12.698	12.708	12.689	12.702	12.699	12.701	12.699
	Residual OCV %	99.95%	99.93%	99.97%	99.92%	99.94%	99.91%	99.95%	99.96%
Mass (g)	Before	196.566	196.376	196.203	196.341	196.513	196.270	196.414	196.302
	After	196.563	196.371	196.199	196.337	196.510	196.265	196.411	196.297
	Mass loss %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Results		P	P	P	P	P	P	P	P

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新普科技(重慶)有限公司
華普電子(常熟)有限公司

Control Number: SLEU-2007011

T.5 External Short Circuit

Start time: 2020/07/13 09:20	Ambient temp.: 24.7 °C								Operator: Jay
Finish time: 2020/07/13 17:40	Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08	
OCV (V)	Before	12.682	12.679	12.689	12.672	12.683	12.681	12.684	12.683
	After	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Resistance (<100mΩ)		58.4	56.1	55.9	59.2	57.6	58.8	56.4	57.1
Max Temp. (< 170°C)		57.5	57.0	57.4	57.6	57.3	57.2	57.8	57.4
Results		P	P	P	P	P	P	P	P

T.6 Impact / Crush (Component Cell)

UN38.3/ST/SG/AC.10/11/Rev.6/Amend.1

☐ Impact - Cylindrical cells not less than 18.0 mm in diameter

☒ Crush - Prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter

Start time: 2020/07/03 13:16	Ambient temp.: 25.4 °C					Operator: Jay
Finish time: 2020/07/03 17:30	Sample 01C	Sample 02C	Sample 03C	Sample 04C	Sample 05C	
Initial OCV (V)	3.812	3.810	3.825	3.817	3.820	
Max Temp. (< 170°C)	23.7	23.4	24.3	24.6	23.8	
Results	P	P	P	P	P	
Sample No.	Sample 06C	Sample 07C	Sample 08C	Sample 09C	Sample 10C	
Initial OCV (V)	3.815	3.828	3.822	3.824	3.816	
Max Temp. (< 170°C)	24.7	23.9	23.6	24.1	24.3	
Results	P	P	P	P	P	

T.7 Overcharge

Start time: 2020/07/02 10:48	Ambient temp.: 25.1 °C								Operator: Jay
Finish time: 2020/07/10 12:50	Sample 09	Sample 10	Sample 11	Sample 12	Sample 13	Sample 14	Sample 15	Sample 16	
Initial OCV (V)	12.866	12.873	12.876	12.864	12.874	12.880	12.870	12.875	
Results	P	P	P	P	P	P	P	P	

T.8 Forced Discharge (Component Cell)

Start time: 2020/07/03 09:20	Ambient temp.: 25.0 °C								Operator: Jay
Finish time: 2020/07/13 08:50	Sample 11C	Sample 12C	Sample 13C	Sample 14C	Sample 15C	Sample 16C	Sample 17C	Sample 18C	
Initial OCV (V)	3.488	3.461	3.470	3.459	3.483	3.467	3.490	3.455	
Results	P	P	P	P	P	P	P	P	
Sample No.	Sample 19C	Sample 20C	Sample 21C	Sample 22C	Sample 23C	Sample 24C	Sample 25C	Sample 26C	
Initial OCV (V)	3.474	3.482	3.465	3.454	3.477	3.485	3.469	3.458	
Results	P	P	P	P	P	P	P	P	
Sample No.	Sample 27C	Sample 28C	Sample 29C	Sample 30C					
Initial OCV (V)	3.450	3.467	3.482	3.470					
Results	P	P	P	P					

9. Test Sample:



Form No. : W11-002-B05

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