



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-2009005

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)

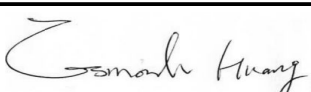
Customer: Lenovo

Model: L18M3P71

Rating/ Mass: 11.52V, Typical Capacity 4950mAh/ 57Wh

Rated Capacity 4830mAh/ 55Wh /221 (g)

Issue date: 2020/09/22

Approved By	Checked By	Prepared By
Project Manager	Authorized Signatory	Test Engineer
		

●	SIMPLO TECHNOLOGY CO., LTD. ADD : No. 471 Pa Teh Rd, Sec 2 Hu Kou, Hsinchu Hsien, 303 Taiwan TEL: +886-3-5695920 FAX: +886-3-5695931	
	SIMPLO TECHNOLOGY (CHANGSHU) INC. ADD : No.888 Dongnan Avenue, Changshu New & Hi-Tech Industrial Development Zone, Changshu, Jiangsu, China TEL: +86-512-52302255 FAX: +86-512-52302277	
	SIMPLO TECHNOLOGY (CHONGQING) INC. ADD : No.2 Zongbao Avenue, Shapingba District, ChongQing, China TEL: +86-23-61718899 FAX: +86-23-61210488	
	HUAPU TECHNOLOGY (CHANGSHU) INC. ADD : No.888 Dongnan Avenue, Changshu New & Hi-Tech Industrial Development Zone, Changshu, Jiangsu, China TEL: +86-512-52302255 FAX: +86-512-52302277	

Email : Test_Lab@simplo.com.tw

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

Form No. : W11-002-B05

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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-2009005

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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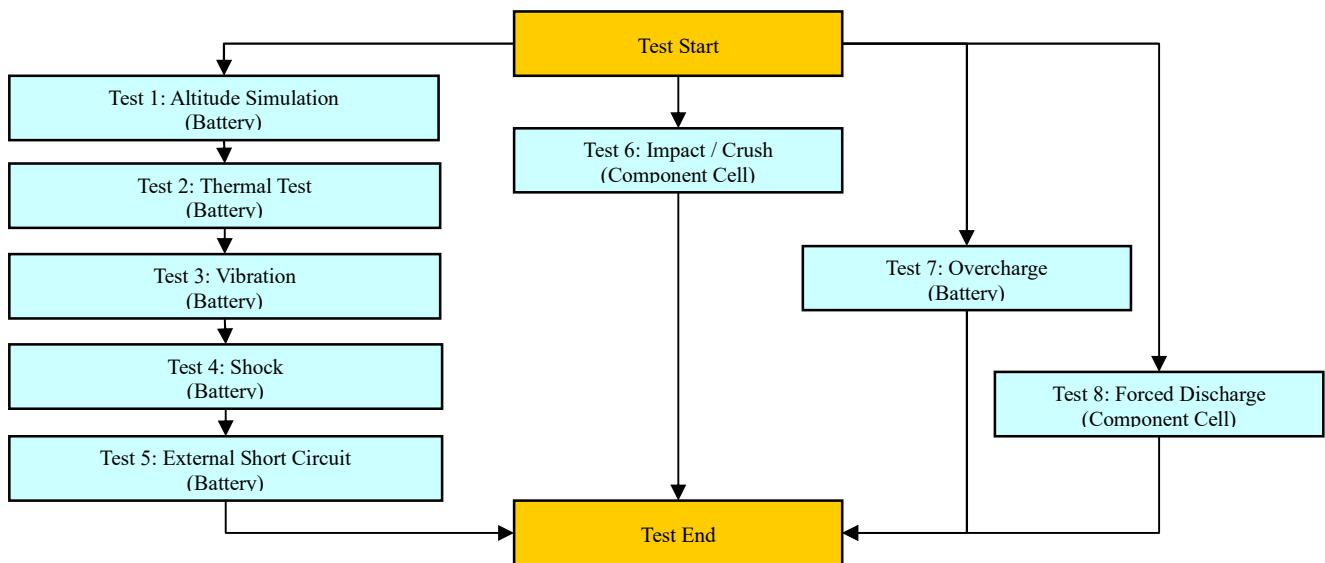
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6. Test Procedure :

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 Follow the requirement of “TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Sixth revised edition, Amend 1, Section 38.3”, this report was updated. (The control number of old report: SLEU-1807008)

7.2 Due to the change of label, the sample picture need to modify, this report have been updated. (The control number of old report: SLEU-1807008)



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8. Test Equipment :

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

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Revised Date: 2018-07-24

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	2018/2/26	2019/2/26	
V	ML-762	Learning	715C	0~18V 0~8A	SMP	2018/1/3	2019/1/3	
V	ML-763	Learning	715C	0~18V 0~8A	SMP	2018/2/26	2019/2/26	
V	ML-764	Learning	715C	0~18V 0~8A	SMP	2018/1/3	2019/1/3	
	ML-925	Learning	750C8	0~60V 0~30A	SMP	2018/1/3	2019/1/3	
	T.1 Altitude Simulation							
V	ML-522	Altitude	SVT-120	Kpa:30~90	HSIN JIANG	2018/7/18	2019/7/18	
V	ML-257	Multimeter	HP 34401A	Note 1	Agilent	2018/3/1	2019/3/1	
	ML-494	Electronic Balance	XS1220M-SCS	1-1200 gf	CHUANHUA	2018/7/18	2019/7/18	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2017/9/13	2018/9/13	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2017/9/13	2018/9/13	
V	ML-550	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	T.2 Thermal Test							
V	ML-789	Thermal Shock	GTST-080-65-AW	T:-40 to 120℃	GF	2018/1/3	2019/1/3	
V	ML-257	Multimeter	HP 34401A	note 1	Agilent	2018/3/1	2019/3/1	
	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2018/7/18	2019/7/18	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2017/9/13	2018/9/13	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2017/9/13	2018/9/13	
V	ML-551	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	T.3 Vibration							
V	ML-233	Vibration	KD-9636-EM-300F2K-30N80	F:5~2000Hz G:0.2~20G	King Design	2017/8/29	2018/8/29	
V	ML-257	Multimeter	HP 34401A	note 1	Agilent	2018/3/1	2019/3/1	
	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2018/7/18	2019/7/18	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2017/9/13	2018/9/13	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2017/9/13	2018/9/13	
V	ML-552	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	T.4 Shock							
V	ML-056	Shock	DP-1200-25	G:10~600G	King Design	2017/8/29	2018/8/29	
V	ML-257	Multimeter	HP 34401A	note 1	Agilent	2018/3/1	2019/3/1	
	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2018/7/18	2019/7/18	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2017/9/13	2018/9/13	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2017/9/13	2018/9/13	
V	ML-551	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	T.5 External Short Circuit							
V	ML-534	mΩ Hitester	3540	1mΩ ~ 30kΩ	HIOKI	2017/9/18	2018/9/18	
V	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2017/9/13	2018/9/13	
V	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2017/9/13	2018/9/13	
V	ML-521	Oven	9031	30~80 ℃	YEOU LONG	2017/9/13	2018/9/13	
V	ML-549	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	T.6 Impact / Crush							
V	ML-339	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2018/5/17	2019/5/17	
	ML-076	Impact Tester			JYI SHENG	2018/1/3	2019/1/3	
	ML-553	Crush Tester	BCT-01		Simplo	2018/5/16	2019/5/16	
V	ML-866	Crush Tester	M0654		JYI SHENG	2018/4/9	2019/4/9	
	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2017/9/13	2018/9/13	

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Control Number: SLEU-2009005

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Revised Date: 2018-07-24

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	2018/5/17	2019/5/17	
	ML-483	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2018/5/17	2019/5/17	
	ML-484	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2018/5/17	2019/5/17	
	ML-486	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2018/5/17	2019/5/17	
	ML-487	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2018/5/17	2019/5/17	
V	ML-549	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2017/9/13	2018/9/13	
	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2017/9/13	2018/9/13	
V	ML-918	Overcharge & Forced discharge tester	T901	3~30 Vdc, Charge: 0.05~20A Discharge: 0.02~10A	SMP	2018/5/17	2019/5/17	
	T.8 Forced Discharge							
	ML-132	Electronic Load	3311C	60V,55A, 300W	Prodigit	2018/3/1	2019/3/1	
	ML-133	Electronic Load	3311C	60V,55A, 300W	Prodigit	2018/3/1	2019/3/1	
	ML-136	Electronic Load	3311C	60V,55A, 300W	Prodigit	2018/3/1	2019/3/1	
	ML-192	Electronic Load	3311C	60V,55A, 300W	Prodigit	2018/3/1	2019/3/1	
	ML-269	Electronic Load	3311C	60V,55A, 300W	Prodigit	2018/3/1	2019/3/1	
	ML-532	DC Electronic Load	33511-01	120V, 240A, 3600W	Prodigit	2018/7/18	2019/7/18	
	ML-482	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2018/5/17	2019/5/17	
	ML-483	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2018/5/17	2019/5/17	
	ML-484	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2018/5/17	2019/5/17	
	ML-486	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2018/5/17	2019/5/17	
	ML-487	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2018/5/17	2019/5/17	
V	ML-549	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2017/9/13	2018/9/13	
	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2017/9/13	2018/9/13	
V	ML-918	Overcharge & Forced discharge tester	T901	3~30 Vdc, Charge: 0.05~20A Discharge: 0.02~10A	SMP	2018/5/17	2019/5/17	
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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	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.6 Impact / Crush							
V	ML-458	Data Acquisition	XL122-D	1-100 Vdc, -50 to 150℃	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		Simple	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℃	Yokogawa	2020/8/11	2021/9/11	

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Control Number: SLEU-2009005

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-2009005	Customer: Lenovo	Model Name: L18M3P71	SMP Project Name: Ironhide_gen3
Pack P/N: 931QA207H (A)(B)	Configuration: 3S1P	Test Duration: 2018/06/25~2018/07/23 2020/09/14~2020/09/21	Reviewer: Esmond
Cell Vendor: ATL	Cell Model: 478769	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: 2018/07/09 08:40		Ambient temp.: 23.6 °C						Operator: Rasner	
Finish time: 2018/07/09 15:00		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	13.053	13.050	13.055	13.049	13.052	13.048	13.053	13.051
	After	13.042	13.038	13.044	13.038	13.040	13.036	13.042	13.040
	Residual OCV %	99.92%	99.91%	99.92%	99.92%	99.91%	99.91%	99.92%	99.92%
Mass (g)	Before	221.325	221.028	221.468	221.287	221.068	221.401	221.304	221.195
	After	221.322	221.028	221.468	221.287	221.064	221.401	221.302	221.195
	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: 2018/07/09 15:20		Ambient temp.: 24.8 °C						Operator: Rasner	
Finish time: 2018/07/16 08:40		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	13.042	13.038	13.044	13.038	13.040	13.036	13.042	13.040
	After	12.874	12.864	12.867	12.862	12.873	12.861	12.874	12.861
	Residual OCV %	98.71%	98.67%	98.64%	98.65%	98.72%	98.66%	98.71%	98.63%
Mass (g)	Before	221.322	221.028	221.468	221.287	221.064	221.401	221.302	221.195
	After	221.300	221.011	221.445	221.262	221.044	221.382	221.280	221.175
	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: 2018/07/16 09:00		Ambient temp.: 23.5 °C						Operator: Rasner	
Finish time: 2018/07/16 08:40		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	12.874	12.864	12.867	12.862	12.873	12.861	12.874	12.861
	After	12.854	12.843	12.847	12.842	12.854	12.842	12.854	12.841
	Residual OCV %	99.84%	99.84%	99.84%	99.84%	99.85%	99.85%	99.84%	99.84%
Mass (g)	Before	221.300	221.011	221.445	221.262	221.044	221.382	221.280	221.175
	After	221.300	221.011	221.440	221.260	221.040	221.382	221.280	221.172
	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: 2018/07/17 09:00		Ambient temp.: 24.3 °C						Operator: Rasner	
Finish time: 2018/07/17 11:10		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	12.854	12.843	12.847	12.842	12.854	12.842	12.854	12.841
	After	12.853	12.840	12.846	12.841	12.853	12.840	12.853	12.840
	Residual OCV %	99.99%	99.98%	99.99%	99.99%	99.99%	99.98%	99.99%	99.99%
Mass (g)	Before	221.300	221.011	221.440	221.260	221.040	221.382	221.280	221.172
	After	221.300	221.009	221.440	221.258	221.040	221.382	221.280	221.168
	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

Form No. : W11-002-B05

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Control Number: SLEU-2009005

T.5 External Short Circuit

Start time: 2018/07/17 11:30	Ambient temp.: 23.7 °C				Operator: Rasner			
Finish time: 2018/07/18 08:40	Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	12.853	12.840	12.846	12.841	12.853	12.840	12.853
	After	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Resistance (<100mΩ)		57.0	59.6	60.2	55.3	58.4	61.3	59.6
Max Temp. (< 170°C)		58.0	57.8	58.0	58.1	58.3	58.0	58.2
Results		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: 2020/09/21 13:06	Ambient temp.: 25.2 °C				Operator: Mia			
Finish time: 2020/09/21 17:50	Sample 01C	Sample 02C	Sample 03C	Sample 04C	Sample 05C	Sample 06C	Sample 07C	Sample 08C
Initial OCV (V)	3.793	3.797	3.805	3.801	3.794	3.800	3.795	3.808
Max Temp. (< 170°C)	23.8	23.4	24.0	24.8	24.3	23.6	24.2	23.5
Results	P	P	P	P	P	P	P	P
Sample No.	Sample 09C	Sample 10C	Sample 11C	Sample 12C	Sample 13C	Sample 14C	Sample 15C	Sample 16C
Initial OCV (V)	3.800	3.795	3.808	3.792	3.799	3.800	3.795	3.808
Max Temp. (< 170°C)	23.6	24.2	23.5	24.0	24.6	23.6	24.2	23.5
Results	P	P	P	P	P	P	P	P

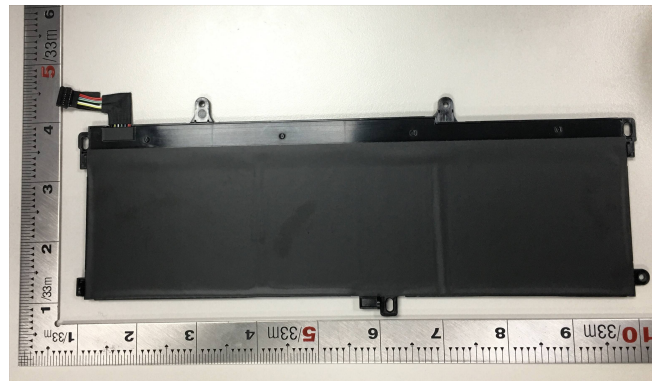
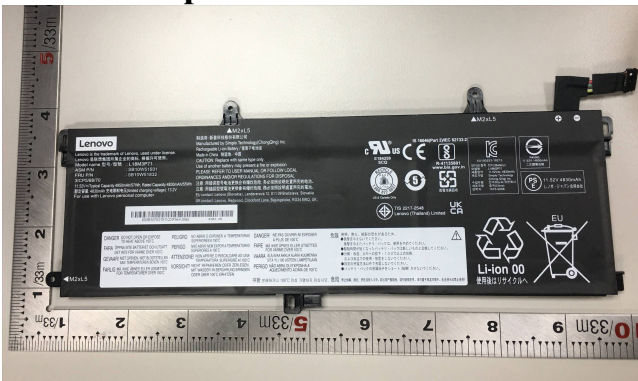
T.7 Overcharge

Start time: 2018/07/13 09:20	Ambient temp.: 23.8 °C				Operator: Rasner			
Finish time: 2018/07/23 10:40	Sample 09	Sample 10	Sample 11	Sample 12	Sample 13	Sample 14	Sample 15	Sample 16
Initial OCV (V)	13.051	13.048	13.056	13.047	13.051	13.047	13.055	13.050
Results	P	P	P	P	P	P	P	P

T.8 Forced Discharge (Component Cell)

Start time: 2018/07/12 09:30	Ambient temp.: 23.7 °C				Operator: Rasner			
Finish time: 2018/07/20 09:00	Sample 11C	Sample 12C	Sample 13C	Sample 14C	Sample 15C	Sample 16C	Sample 17C	Sample 18C
Initial OCV (V)	3.455	3.436	3.451	3.447	3.440	3.436	3.456	3.450
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)	3.435	3.448	3.443	3.456	3.446	3.451	3.437	3.442
Results	P	P	P	P	P	P	P	P
Sample No.	Sample 27C	Sample 28C	Sample 29C	Sample 30C				
Initial OCV (V)	3.439	3.450	3.444	3.448				
Results	P	P	P	P				

9. Test Sample:



Form No. : W11-002-B05

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