

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  
兆普電子(上海)有限公司

Control Number : SLEU1210002

## UN38.3 Test Report


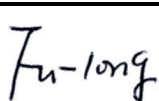

### Recommendations on the TRANSPORT OF DANGEROUS GOODS

(Manual of Tests and Criteria, Fifth revised edition)

**Customer : Lenovo**

**Model : L12M4A02**

**Rating : 14.4V , 2200mAh / 32Wh**

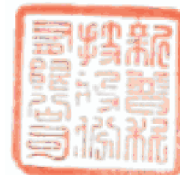
Approved By	Checked By	Prepared By
		

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## 1. Purpose of the Test :

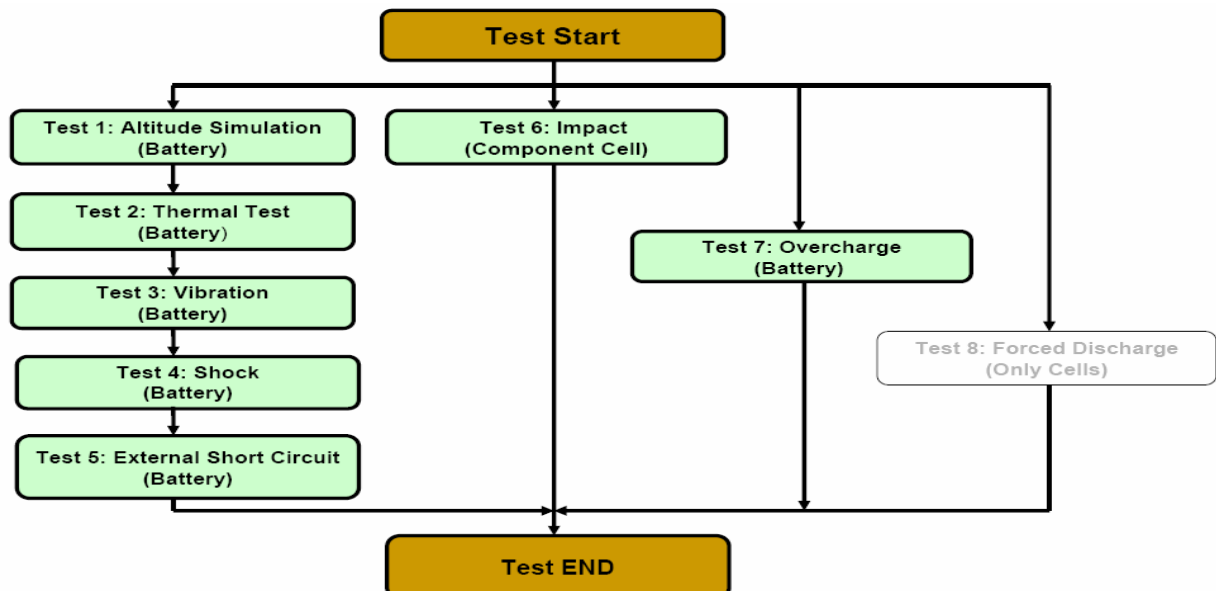
To test each cell/battery is of the type proved to meet the requirements in the Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Fifth revised edition.

## 2. Test Quantity :

- 2.1 Four batteries, at first cycle, in fully charged states. (for T.1~T.5 test)
- 2.2 Four batteries, after fifty cycles ending in fully charged states. (for T.1~T.5 test)
- 2.3 Five component cells, at first cycle at 50% of the design rated capacity. (for T.6 test)
- 2.4 Four batteries, at first cycle, in fully charged states. (for T.7 test)
- 2.5 Four batteries, after fifty cycles ending in fully charged states. (for T.7 test)

## 3. Test Procedure :

- 3.1 All detail related test procedure shall be follow TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Fifth revised edition.
- 3.2 Test flow shall be follow below statement.





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#### 4. Test Result :

##### 4.1 T.1 ~T.4 Test results: **Pass**

4.1.1 All batteries could meet the requirement, mass loss less than 0.1% and voltage drop less than 10% after the test.

4.1.2 No leakage, no venting, no disassembly, no rupture and no fire.

##### 4.2 T.5 Test results: **Pass**

4.2.1 All batteries could meet the requirement, external temperature did not exceed 170°C.

4.2.2 All batteries were no disassembly, no rupture and no fire during the test and within six hours after the test.

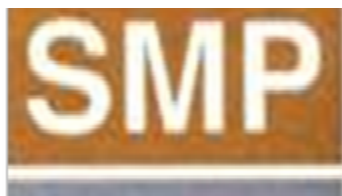
##### 4.3 T.6 Test results: **Pass**

4.3.1 All component cells could meet the requirement, external temperature did not exceed 170°C.

4.3.2 All component cells were no disassembly and no fire during the test and within six hours after the test.

##### 4.4 T.7 Test result: **Pass**

4.4.1 All batteries could meet no disassembly and no fire during the test and within seven days after the test.



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## 5. Test Equipment :

**SMP** SIMPLO TECHNOLOGY CO., LTD.

Revised date: 2012-10-24

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Date: 2012-10-24

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Project No.: L12M4A02 4S1P

**Test Instruments Reference List**

Used	Instrument ID	Instrument Name	Type	Range Used	Manufacturer	Calibration Date_Last	Calibration Date_Next	Remarks
	<b>Pretest</b>							
V	ML-761	Learning	715C	0~18V 0~8A	SMP	2012/5/25	2013/5/25	
V	ML-762	Learning	715C	0~18V 0~8A	SMP	2012/6/5	2013/6/5	
V	ML-763	Learning	715C	0~18V 0~8A	SMP	2012/6/13	2013/6/13	
	<b>T.1 Altitude Simulation</b>							
V	ML-522	Altitude		Kpa:30~90	新匠	2012/8/31	2013/8/31	
V	ML-257	Multimeter	HP 34401A	Note 1	Agilent	2012/7/6	2013/7/6	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2012/8/31	2013/8/31	
V	ML-550	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2012/10/19	2013/10/19	
	<b>T.2 Thermal Test</b>							
V	ML-018	Thermal Shock	WSF-602	T:-40 to 120°C	WIF	2012/1/31	2013/1/31	
V	ML-257	Multimeter	HP 34401A	Note 1	Agilent	2012/7/6	2013/7/6	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2012/8/31	2013/8/31	
	<b>T.3 Vibration</b>							
V	ML-233	Vibration	KD-9636-EM-300F2K-30N80	F:5~2000Hz G:0.2~20G	King Design	2012/10/17	2013/10/17	
V	ML-257	Multimeter	HP 34401A	Note 1	Agilent	2012/7/6	2013/7/6	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2012/8/31	2013/8/31	
V	ML-552	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2012/10/19	2013/10/19	
	<b>T.4 Shock</b>							
V	ML-056	Shock	DP-1200-25	G:10~600G	King Design	2012/10/17	2013/10/17	
V	ML-257	Multimeter	HP 34401A	Note 1	Agilent	2012/7/6	2013/7/6	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2012/8/31	2013/8/31	
V	ML-551	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2012/10/19	2013/10/19	
	<b>T.5 External Short Circuit</b>							
V	ML-534	mΩ Hltester	3540	1mΩ ~ 30kΩ	YEOW LONG	2012/10/5	2013/10/5	
V	ML-339	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2012/6/27	2013/6/27	
V	ML-521	Chamber	WIT IPC-1000(3F)	-20 to 150°C	WIT	2011/11/11	2012/11/11	
	<b>T.6 Impact ( Component cell )</b>							
V	ML-340	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2012/4/26	2013/4/26	
V	ML-076	Impact Tester			JYI SHENG	2012/1/31	2013/1/31	
	<b>T.7 Overcharge</b>							
V	ML-481	Power Supply	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2012/6/27	2013/6/27	
V	ML-482	Power Supply	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2012/6/27	2013/6/27	
V	ML-483	Power Supply	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2012/6/27	2013/6/27	
V	ML-484	Power Supply	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2012/6/27	2013/6/27	
V	ML-485	Power Supply	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2012/6/27	2013/6/27	
V	ML-486	Power Supply	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2012/6/27	2013/6/27	
V	ML-487	Power Supply	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2012/6/27	2013/6/27	
V	ML-488	Power Supply	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2012/6/27	2013/6/27	
V	ML-489	Power Supply	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2012/6/27	2013/6/27	
V	ML-490	Power Supply	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2012/6/27	2013/6/27	
V	ML-549	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2012/10/19	2013/10/19	
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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Control Number : SLEU1210002

## 6. T.1~T.7 Detail Reports:

Control No.: SLEU-1210002

UN 38.3 Test Datasheet

Customer: Lenovo

Model name: L12M4A02 4S1P

Test duration: 2012/10/02~2012/10/24

Reviewer: Esmond

Test Sample Identification:

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	50 Cycle, Fully charged			25Cycle, Fully charged
V	09~12	1 Cycle, Fully charged	V	13~16	50 Cycle, Fully charged			25Cycle, Fully charged
V	01C~05C	1 Cycle, 50% charged			1 Cycle, 50% charged			

### T.1 Altitude Simulation

Start time: 10 / 15 / 08 : 42

Finish time: 10 / 15 / 15 : 36

Ambient temp.: 24.1 °C

Operator: Betty

Reviewer: Esmond

Sample No.: 01						Sample No.: 05					
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.6	206.5	Mass loss %	0.05%	P	Mass (g)	206.4	206.4	Mass loss %	0.00%	P
OCV (V)	16.72	16.72	Remained OCV%	100.00%		OCV (V)	16.72	16.72	Remained OCV%	100.00%	
Sample No.: 02						Sample No.: 06					
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.5	206.5	Mass loss %	0.00%	P	Mass (g)	206.6	206.6	Mass loss %	0.00%	P
OCV (V)	16.71	16.70	Remained OCV%	99.94%		OCV (V)	16.71	16.70	Remained OCV%	99.94%	
Sample No.: 03						Sample No.: 07					
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.5	206.5	Mass loss %	0.00%	P	Mass (g)	206.6	206.5	Mass loss %	0.05%	P
OCV (V)	16.72	16.72	Remained OCV%	100.00%		OCV (V)	16.72	16.72	Remained OCV%	100.00%	
Sample No.: 04						Sample No.: 08					
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.4	206.4	Mass loss %	0.00%	P	Mass (g)	206.4	206.3	Mass loss %	0.05%	P
OCV (V)	16.72	16.72	Remained OCV%	100.00%		OCV (V)	16.71	16.71	Remained OCV%	100.00%	

### T.2 Thermal Test

Start time: 10 / 15 / 15 : 58

Finish time: 10 / 22 / 10 : 37

Ambient temp.: 24.1 °C

Operator: Betty

Reviewer: Esmond

Sample No.: 01					Sample No.: 05						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.5	206.4	Mass loss %	0.05%	P	Mass (g)	206.4	206.3	Mass loss %	0.05%	P
OCV (V)	16.72	16.53	Remained OCV%	98.86%		OCV (V)	16.72	16.51	Remained OCV%	98.74%	
Sample No.: 02					Sample No.: 06						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.5	206.5	Mass loss %	0.00%	P	Mass (g)	206.6	206.5	Mass loss %	0.05%	P
OCV (V)	16.70	16.50	Remained OCV%	98.80%		OCV (V)	16.70	16.49	Remained OCV%	98.74%	
Sample No.: 03					Sample No.: 07						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.5	206.4	Mass loss %	0.05%	P	Mass (g)	206.5	206.4	Mass loss %	0.05%	P
OCV (V)	16.72	16.53	Remained OCV%	98.86%		OCV (V)	16.72	16.52	Remained OCV%	98.80%	
Sample No.: 04					Sample No.: 08						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.4	206.4	Mass loss %	0.00%	P	Mass (g)	206.3	206.2	Mass loss %	0.05%	P
OCV (V)	16.72	16.54	Remained OCV%	98.92%		OCV (V)	16.71	16.52	Remained OCV%	98.86%	

### T.3 Vibration

Start time: 10 / 22 / 11 : 31

Finish time: 10 / 23 / 10 : 40

Ambient temp.: 24.5 °C

Operator: Betty

Reviewer: Esmond

Sample No.: 01					Sample No.: 05						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.4	206.4	Mass loss %	0.00%	P	Mass (g)	206.3	206.3	Mass loss %	0.00%	P
OCV (V)	16.53	16.52	Remained OCV%	99.94%		OCV (V)	16.51	16.50	Remained OCV%	99.94%	
Sample No.: 02					Sample No.: 06						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.5	206.5	Mass loss %	0.00%	P	Mass (g)	206.5	206.4	Mass loss %	0.05%	P
OCV (V)	16.50	16.50	Remained OCV%	100.00%		OCV (V)	16.49	16.48	Remained OCV%	99.94%	
Sample No.: 03					Sample No.: 07						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.4	206.4	Mass loss %	0.00%	P	Mass (g)	206.4	206.3	Mass loss %	0.05%	P
OCV (V)	16.53	16.52	Remained OCV%	99.94%		OCV (V)	16.52	16.52	Remained OCV%	100.00%	
Sample No.: 04					Sample No.: 08						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	206.4	206.4	Mass loss %	0.00%	P	Mass (g)	206.2	206.2	Mass loss %	0.00%	P
OCV (V)	16.54	16.54	Remained OCV%	100.00%		OCV (V)	16.52	16.52	Remained OCV%	100.00%	

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Control Number : SLEU1210002

T.4 Shock

Start time: 10 / 23 / 11 : 25  
Finish time: 10 / 23 / 13 : 41

Ambient temp.: 24.3 ℃

Operator: Betty

Reviewer: Esmond

Sample No.: 01					Sample No.: 05				
Before	After	Variation		Results	Before	After	Variation		Results
Mass (g)	206.4	206.4	Mass loss %	0.00%	Mass (g)	206.3	206.3	Mass loss %	0.00%
OCV (V)	16.52	16.51	Remained OCV%	99.94%	OCV (V)	16.50	16.50	Remained OCV%	100.00%
P					P				
Sample No.: 02					Sample No.: 06				
Before	After	Variation		Results	Before	After	Variation		Results
Mass (g)	206.5	206.5	Mass loss %	0.00%	Mass (g)	206.4	206.3	Mass loss %	0.05%
OCV (V)	16.50	16.50	Remained OCV%	100.00%	OCV (V)	16.48	16.47	Remained OCV%	99.94%
P					P				
Sample No.: 03					Sample No.: 07				
Before	After	Variation		Results	Before	After	Variation		Results
Mass (g)	206.4	206.4	Mass loss %	0.00%	Mass (g)	206.3	206.3	Mass loss %	0.00%
OCV (V)	16.52	16.52	Remained OCV%	100.00%	OCV (V)	16.52	16.52	Remained OCV%	100.00%
P					P				
Sample No.: 04					Sample No.: 08				
Before	After	Variation		Results	Before	After	Variation		Results
Mass (g)	206.4	206.4	Mass loss %	0.00%	Mass (g)	206.2	206.2	Mass loss %	0.00%
OCV (V)	16.54	16.54	Remained OCV%	100.00%	OCV (V)	16.52	16.52	Remained OCV%	100.00%
P					P				

T.5 External Short Circuit

Start time: 10 / 23 / 14 : 33  
Finish time: 10 / 24 / 06 : 28

Ambient temp.: 25.2 ℃

Operator: Betty

Reviewer: Esmond

Finish time: 10:24:05:28																
	Sample No.: 01		Sample No.: 02		Sample No.: 03		Sample No.: 04		Sample No.: 05		Sample No.: 06		Sample No.: 07		Sample No.: 08	
Resistance (<100mΩ)	55.2		56.9		57.3		58.4		53.9		54.6		55.7		53.5	
OCV before test after short circuit(V)	16.51	0.00	16.50	0.00	16.52	0.00	16.54	0.00	16.50	0.00	16.47	0.00	16.52	0.00	16.52	0.00
Max Temp. (<170℃)	55.1		55.2		55.0		55.3		55.2		55.1		55.0		55.0	
Results	P		P		P		P		P		P		P		P	

T.6 Impact (Component cell)

Start time: 10 / 18 / 09 : 12  
Finish time: 10 / 19 / 20 : 41

Ambient temp.: 25.6 ℃

Operator: Betty

Reviewer: Esmond

Finish time: 10/19/2020 4:41					
	Sample No.: 01C	Sample No.: 02C	Sample No.: 03C	Sample No.: 04C	Sample No.: 05C
OCV before test(V)	3.60	3.59	3.59	3.59	3.60
Max Temp. (< 170℃)	94.5	92.1	94.6	93.7	92.3
Results	P	P	P	P	P
	Sample No.: 06C	Sample No.: 07C	Sample No.: 08C	Sample No.: 09C	Sample No.: 10C
OCV before test(V)					
Max Temp. (< 170℃)					
Results					

T.7 Overcharge

Start time: 10 / 15 / 08 : 22  
Finish time: 10 / 23 / 17 : 36

Ambient temp.: 24.3 ℃

Operator: Betty

Reviewer: Esmond

	Sample No.: 09	Sample No.: 10	Sample No.: 11	Sample No.: 12	Sample No.: 13	Sample No.: 14	Sample No.: 15	Sample No.: 16
OCV before test(V)	16.72	16.71	16.72	16.72	16.72	16.71	16.72	16.71
Results	P	P	P	P	P	P	P	P

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Control Number : SLEU1210002

## 7. Equipment for Test:



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