



新普科技股份有限公司
新世電子(常熟)有限公司
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Control Number : SLEU1107002

UN38.3 Test Report


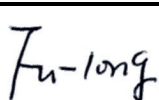

Recommendations on the TRANSPORT OF DANGEROUS GOODS

(Manual of Tests and Criteria, Fifth revised edition)

Customer : Lenovo

Model : L09M8Y21

Rating : 14.4V , 63Wh / 4400mAh

Approved By	Checked By	Prepared By
		

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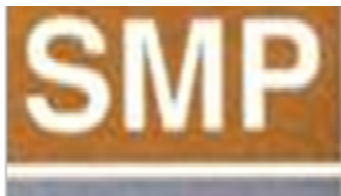
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1. Purpose of the Test :

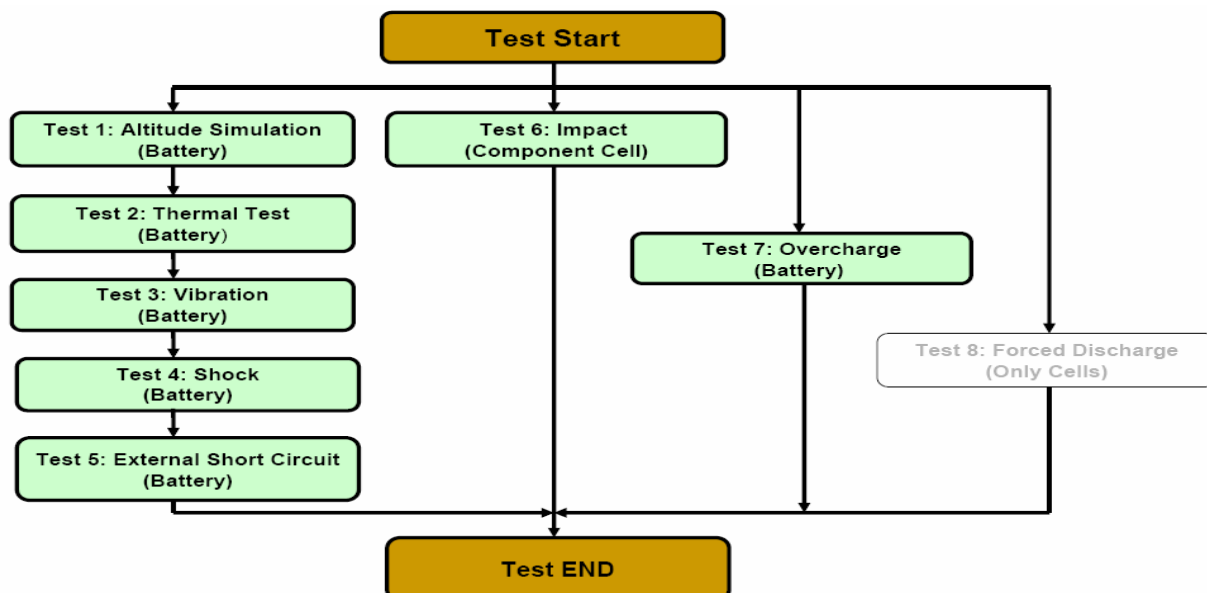
To test each cell/battery is of the type proved to meet the requirements in the Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Fifth revised edition.

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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Control Number : SLEU1107002

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.

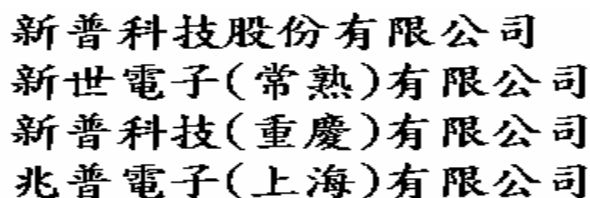
4.3 T.6 Test results: **Pass**

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.



5. Test Equipment :

Project No.: L09M8Y21 4S2P

Used	Instrument ID	Instrument Name	Type	Range Used	Manufacturer	Calibration Date_Last	Calibration Date_Next	Remarks
	Pretest							
V	ML-052	Learning	711	0~18V 0~8A	SMP	2011/3/11	2012/3/11	
V	ML-053	Learning	711	0~18V 0~8A	SMP	2011/3/14	2012/3/14	
V	ML-055	Learning	711	0~18V 0~8A	SMP	2011/3/14	2012/3/14	
	T.1 Altitude Simulation							
V	ML-522	Altitude		Kpa:30~90	新匠	2010/10/29	2011/10/29	
V	ML-257	Multimeter	HP 34401A	Note 1	Agilent	2011/7/4	2012/7/4	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2010/10/29	2011/10/29	
V	ML-550	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2010/12/21	2011/12/21	
	T.2 Thermal Test							
V	ML-018	Thermal Shock	WSF-602	T:-40 to 120℃	WIT	2010/8/31	2011/8/31	
V	ML-257	Multimeter	HP 34401A	Note 1	Agilent	2011/7/4	2012/7/4	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2010/10/29	2011/10/29	
	T.3 Vibration							
V	ML-233	Vibration	KD-9636-EM-300F2K-30N80	F:5~2000Hz G:0.2~20G	King Design	2010/12/10	2011/12/10	
V	ML-257	Multimeter	HP 34401A	Note 1	Agilent	2011/7/4	2012/7/4	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2010/10/29	2011/10/29	
V	ML-552	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2010/12/21	2011/12/21	
	T.4 Shock							
V	ML-056	Shock	DP-1200-25	G:10~600G	King Design	2010/12/24	2011/12/24	
V	ML-257	Multimeter	HP 34401A	Note 1	Agilent	2011/7/4	2012/7/4	
V	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2010/10/29	2011/10/29	
V	ML-551	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2010/12/21	2011/12/21	
	T.5 External Short Circuit							
V	ML-534	mΩ Hitester	3540	1mΩ ~ 30kΩ	YEOW LONG	2010/12/2	2011/12/2	
V	ML-339	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2011/7/1	2012/7/1	
V	ML-521	Chamber	WIT IPC-1000(3F)	-20 to 150℃	WIT	2010/12/2	2011/12/2	
	T.6 Impact (Component cell)							
V	ML-340	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2011/5/26	2012/5/26	
V	ML-076	Impact Tester			JYI SHENG	2011/3/11	2012/3/11	
	T.7 Overcharge							
V	ML-139	Power Supply	GC50-30D	0~50V 0.1~30A	LOCK	2011/3/4	2012/3/4	
V	ML-140	Power Supply	GC50-30D	0~50V 0.1~30A	LOCK	2011/3/4	2012/3/4	
V	ML-141	Power Supply	GC50-30D	0~50V 0.1~30A	LOCK	2011/3/4	2012/3/4	
V	ML-142	Power Supply	GC50-30D	0~50V 0.1~30A	LOCK	2011/3/4	2012/3/4	
V	ML-143	Power Supply	GC50-30D	0~50V 0.1~30A	LOCK	2011/3/4	2012/3/4	
V	ML-549	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2010/12/21	2011/12/21	

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 : SLEU1107002

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

Control No.: SLEU-1107002

UN 38.3 Test Datasheet

Customer: Lenovo

Model name: L09M8Y21 4S2P

Test duration: 2011/06/15~2011/07/07

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: 06 / 29 / 08 : 36
Finish time: 06 / 29 / 15 : 24

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)	390.6	390.6	Mass loss %	0.00%	P	Mass (g)	390.2	390.1	Mass loss %	0.03%	P
OCV (V)	16.64	16.64	Remained OCV%	100.00%		OCV (V)	16.64	16.64	Remained OCV%	100.00%	
Sample No.: 02					Sample No.: 06						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	390.5	390.5	Mass loss %	0.00%	P	Mass (g)	390.5	390.4	Mass loss %	0.03%	P
OCV (V)	16.64	16.64	Remained OCV%	100.00%		OCV (V)	16.63	16.63	Remained OCV%	100.00%	
Sample No.: 03					Sample No.: 07						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	390.3	390.3	Mass loss %	0.00%	P	Mass (g)	390.3	390.3	Mass loss %	0.00%	P
OCV (V)	16.64	16.64	Remained OCV%	100.00%		OCV (V)	16.64	16.64	Remained OCV%	100.00%	
Sample No.: 04					Sample No.: 08						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	390.2	390.2	Mass loss %	0.00%	P	Mass (g)	390.6	390.6	Mass loss %	0.00%	P
OCV (V)	16.63	16.63	Remained OCV%	100.00%		OCV (V)	16.64	16.63	Remained OCV%	99.94%	

T.2 Thermal Test

Start time: 06 / 29 / 15 : 43
Finish time: 07 / 05 / 11 : 27

Ambient temp.: 24.7 °C

Operator: Betty

Reviewer: Esmond

Sample No.: 01					Sample No.: 05						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	390.6	390.5	Mass loss %	0.03%		Mass (g)	390.1	390.0	Mass loss %	0.03%	
OCV (V)	16.64	16.42	Remained OCV%	98.70%		OCV (V)	16.64	16.41	Remained OCV%	98.64%	
Sample No.: 02					Sample No.: 06						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	390.5	390.5	Mass loss %	0.00%		Mass (g)	390.4	390.3	Mass loss %	0.03%	
OCV (V)	16.64	16.46	Remained OCV%	98.92%		OCV (V)	16.63	16.42	Remained OCV%	98.74%	
Sample No.: 03					Sample No.: 07						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	390.3	390.2	Mass loss %	0.03%		Mass (g)	390.3	390.2	Mass loss %	0.03%	
OCV (V)	16.64	16.46	Remained OCV%	98.92%		OCV (V)	16.64	16.42	Remained OCV%	98.70%	
Sample No.: 04					Sample No.: 08						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	390.2	390.2	Mass loss %	0.00%		Mass (g)	390.6	390.5	Mass loss %	0.03%	
OCV (V)	16.63	16.42	Remained OCV%	98.74%		OCV (V)	16.63	16.41	Remained OCV%	98.66%	

T.3 Vibration

Start time: 07 / 05 / 11 : 52
Finish time: 07 / 06 / 11 : 16

Ambient temp.: 24.1 °C

Operator: Betty

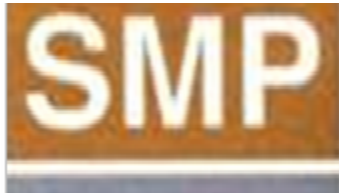
Reviewer: Esmond

Sample No.: 01					Sample No.: 05						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	390.5	390.4	Mass loss %	0.03%	P	Mass (g)	390.0	389.9	Mass loss %	0.03%	P
OCV (V)	16.42	16.41	Remained OCV%	99.94%		OCV (V)	16.41	16.41	Remained OCV%	100.00%	
Sample No.: 02					Sample No.: 06						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	390.5	390.4	Mass loss %	0.03%	P	Mass (g)	390.3	390.3	Mass loss %	0.00%	P
OCV (V)	16.46	16.46	Remained OCV%	100.00%		OCV (V)	16.42	16.42	Remained OCV%	100.00%	
Sample No.: 03					Sample No.: 07						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	390.2	390.2	Mass loss %	0.00%	P	Mass (g)	390.2	390.1	Mass loss %	0.03%	P
OCV (V)	16.46	16.46	Remained OCV%	100.00%		OCV (V)	16.42	16.41	Remained OCV%	99.94%	
Sample No.: 04					Sample No.: 08						
	Before	After	Variation		Results		Before	After	Variation		Results
Mass (g)	390.2	390.1	Mass loss %	0.03%	P	Mass (g)	390.5	390.5	Mass loss %	0.00%	P
OCV (V)	16.42	16.41	Remained OCV%	99.94%		OCV (V)	16.41	16.41	Remained OCV%	100.00%	

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Control Number : SLEU1107002

T.4 Shock

Start time: 07 / 06 / 13 : 16
Finish time: 07 / 06 / 14 : 43

Ambient temp.: 24.8 ℃

Operator: Betty

Reviewer: Esmond

Sample No.: 01					Sample No.: 05				
	Before	After	Variation	Results		Before	After	Variation	Results
Mass (g)	390.4	390.4	Mass loss %	0.00%	Mass (g)	389.9	389.9	Mass loss %	0.00%
OCV (V)	16.41	16.41	Remained OCV%	100.00%	OCV (V)	16.41	16.41	Remained OCV%	100.00%
Sample No.: 02					Sample No.: 06				
	Before	After	Variation	Results		Before	After	Variation	Results
Mass (g)	390.4	390.4	Mass loss %	0.00%	Mass (g)	390.3	390.2	Mass loss %	0.03%
OCV (V)	16.46	16.45	Remained OCV%	99.94%	OCV (V)	16.42	16.42	Remained OCV%	100.00%
Sample No.: 03					Sample No.: 07				
	Before	After	Variation	Results		Before	After	Variation	Results
Mass (g)	390.2	390.1	Mass loss %	0.03%	Mass (g)	390.1	390.0	Mass loss %	0.03%
OCV (V)	16.46	16.45	Remained OCV%	99.94%	OCV (V)	16.41	16.40	Remained OCV%	99.94%
Sample No.: 04					Sample No.: 08				
	Before	After	Variation	Results		Before	After	Variation	Results
Mass (g)	390.1	390.1	Mass loss %	0.00%	Mass (g)	390.5	390.4	Mass loss %	0.03%
OCV (V)	16.41	16.41	Remained OCV%	100.00%	OCV (V)	16.41	16.41	Remained OCV%	100.00%

T.5 External Short Circuit

Start time: 07 / 06 / 16 : 27
Finish time: 07 / 07 / 08 : 13

Ambient temp.: 24.3 ℃

Operator: Betty

Reviewer: Esmond

	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)	53.6		52.5		51.7		53.3		52.8		56.9		57.4		56.3	
OCV before test/ after short circuit(V)	16.41	0.00	16.45	0.00	16.45	0.00	16.41	0.00	16.41	0.00	16.42	0.00	16.40	0.00	16.41	0.00
Max Temp. (< 170℃)	55.3		55.3		55.1		55.2		55.2		55.3		55.0		55.2	
Results	P		P		P		P		P		P		P		P	

T.6 Impact (Component cell)

Start time: 07 / 04 / 15 : 17
Finish time: 07 / 05 / 08 : 42

Ambient temp.: 25.7 ℃

Operator: Betty

Reviewer: Esmond

	Sample No.: 01C	Sample No.: 02C	Sample No.: 03C	Sample No.: 04C	Sample No.: 05C
OCV before test(V)	3.59	3.60	3.60	3.59	3.60
Max Temp. (< 170℃)	91.7	93.6	94.5	92.3	91.7
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: 06 / 29 / 10 : 34
Finish time: 07 / 07 / 15 : 21

Ambient temp.: 24.2 ℃

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)	16.64	16.64	16.63	16.64	16.64	16.63	16.64	16.64
Results	P	P	P	P	P	P	P	P

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7. Equipment for Test:



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