



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 NO: LE-CU-13-10-011

UN38.3 Test Report

Recommendations on the TRANSPORT OF DANGEROUS GOODS

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

Customer: Lenovo
Model: L13M4A01
Rating: 14.4V, 32Wh, 2200mAh
Test duration: 2013/9/9~2013/10/6

Approved By	Checked By	Prepared By

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1. Purpose of the Test:

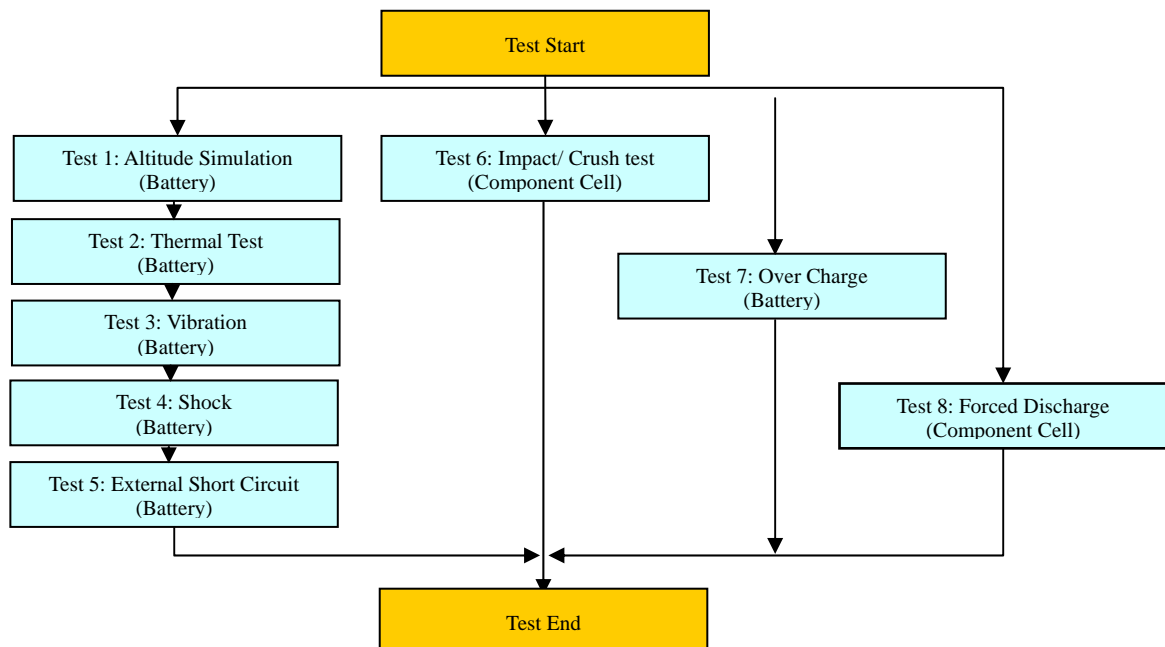
To test each cell/battery is of the type proved to meet the requirements in the Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Fifth revised edition, Amend 1.

2. Test Quantity:

- 2.1 Four batteries, at first cycle, in fully charged states. (T.1~T.5 test only)
- 2.2 Four batteries, after fifty cycles ending in fully charged states. (T.1~T.5 test only)
- 2.3 Five component cells, at first cycle at 50% of the design rated capacity. (T.6 test only)
- 2.4 Four batteries, at first cycle, in fully charged states. (T.7 test only)
- 2.5 Four batteries, after fifty cycles ending in fully charged states. (T.7 test only)
- 2.6 Ten component cells, at first cycle in fully discharge states. (T.8 test only)
- 2.7 Ten component cells, after fifty cycles ending in fully discharged states. (T.8 test only)

3. Test procedure:

- 3.1 All detail related test procedure shall be follow Standard Operation Procedure of SMP subjected CW01-5916 Rev.4 issue documentation.
- 3.2 Test flow shall be follow below statement.





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Control NO: LE-CU-13-10-011

4. Test Result:

4.1 T.1 ~T4 Test results: **Pass**

4.1.1 Batteries meet requirement regard mass loss was less then 0.1% and voltage loss less 10% relating original situation.

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

4.2 T.5 Test result: **Pass**

4.2.1 All Batteries can meet requirement subjected external temperature does not exceed 170 .

4.2.2 All Batteries no disassembly, no rupture and no fire within six hours.

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

4.3.1 All cells can meet requirement subjected external temperature does not exceed 170 .

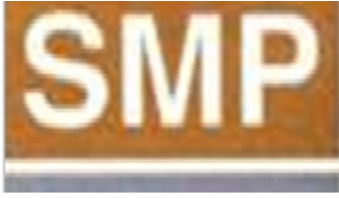
4.3.2 All cells no disassembly and no fire within six hours of this test.

4.4 T.7 Test results: **Pass**

4.4.1 All batteries can meet no disassembly and no fire within seven days of the test.

4.5 T.8 Test results: **Pass**

4.5.1 All rechargeable cells can meet no disassembly and no fire within seven days of the test.



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Control NO: LE-CU-13-10-011

5. Test Equipment:

SMP 新世電子(常熟)有限公司
 SIMPLO TECHNOLOGY(CHANGSHU) INC.

Address : No.2 Dong Nan Avenue, Changshu, Jingsu Province, China
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Revised date: 2013/10/09

Page:1

Date:2013/9/9~2013/10/6

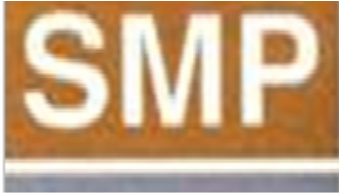
Model name: L13M4A01

Test Instruments Reference List

Used	Instrument ID	Instrument Name	Type	Range Used	Manufacturer	CalibrationDate_Last	CalibrationDate_Next	Remarks
Pretest								
V	C602M00/S1053	Learning	GWT-2010-24	0~20V 0~10A	GW INSTR	2013/10/09	2014/10/8	
V	C602M00/S1054	Learning	GWT-2010-24	0~20V 0~10A	GW INSTR	2013/10/09	2014/10/8	
Low Pressure Test								
V	C602M00/0462	Altitude	SVT-110	Kpa: 0~99Kpa	HSIN JIANG	2013/9/26	2013/9/25	
V	C602M00/0293	mΩ Hitester	3561	R:-10~310mΩ V:-20~20V	HIOKI	2013/10/09	2014/10/8	
V	C602M00/C0482	Electronic Balance	XS1220M-SCS	1220g±0.001g	CHENGZHUN	2013/9/26	2013/9/25	
V	C602M00/T0412	Thermo Meter	TA218	T: -10℃~70℃ RH: 25%~98%	KTJ	2013/9/26	2013/9/25	
Thermal Test								
V	C602M00/0150	Thermal Shock	KSKB-415TBS	T:-65℃ to 150℃	KSON	2013/9/26	2013/9/25	
V	C602M00/0293	mΩ Hitester	3561	R:-10~310mΩ V:-20~20V	HIOKI	2013/10/09	2014/10/8	
V	C602M00/C0482	Electronic Balance	XS1220M-SCS	1220g±0.001g	CHENGZHUN	2013/9/26	2013/9/25	
V	C602M00/T0412	Thermo Meter	TA218	T: -10℃~70℃ RH: 25%~98%	KTJ	2013/9/26	2013/9/25	
Vibration Test								
V	C602M00/0197	Vibration	EM-200F2K-25N50	F:3~2000Hz G:0.2~55G	King Design	2013/3/15	2014/3/14	
V	C602M00/0052	Vibration	EM-200F2K-25N50	F:3~2000Hz G:0.2~55G	King Design	2013/3/15	2014/3/14	
V	C602M00/0293	mΩ Hitester	3561	R:-10~310mΩ V:-20~20V	HIOKI	2013/10/09	2014/10/08	
V	C602M00/C0482	Electronic Balance	XS1220M-SCS	1220g±0.001g	CHENGZHUN	2013/9/26	2014/9/25	
Shock Test								
V	C602M00/0570	Shock	HS 15/45	G:10~2000G	Lansmont	2013/9/14	2014/9/13	
V	C602M00/0293	mΩ Hitester	3561	R:-10~310mΩ V:-20~20V	HIOKI	2013/10/09	2013/10/08	
V	C602M00/C0482	Electronic Balance	XS1220M-SCS	1220g±0.001g	CHENGZHUN	2013/9/26	2014/9/25	
External Short Circuit Test								
V	C602M00/0293	mΩ Hitester	3561	R:-10~310mΩ V:-20~20V	HIOKI	2013/10/09	2013/10/08	
V	C602M00/0207	Data logger	34970A	V: 0~ 300V, T: -150℃~1200℃	Agilent	2013/9/26	2014/9/25	
V	C602M00/0518	chamber	WIT TH-2P-E	-40℃ to 150℃	WIT	2013/9/26	2014/9/25	
V	C602M00/T0412	Thermo Meter	TA218	T: -10℃~70℃ RH: 25%~98%	KTJ	2013/9/26	2014/9/25	
Impact Test/Cursh Test								
V	C602M00/0743	Cursh Test	BE-6047	1.0KN~15.0KN	BELL	2013/10/8	2014/10/07	
V	C602M00/0589	Data logger	34970A	V: 0~ 300V, T: -150℃~1200℃	Agilent	2013/9/26	2014/9/25	
V	C602M00/1204	Impact test	100-372	H:60~80cm	JYI SHENG	Note1		
V	C602M00/T0412	Thermo Meter	TA218	T: -10℃~70℃ RH: 25%~98%	KTJ	2013/9/26	2014/9/25	
Overcharge Test								
V	C602M00/P0779	Power Supply	DS6024	0~60V 0~24A	MOTECH	2013/1/12	2014/1/11	
V	C602M00/P0777	Power Supply	DS6024	0~60V 0~24A	MOTECH	2013/1/12	2014/1/11	
V	C602M00/P0775	Power Supply	DS6024	0~60V 0~24A	MOTECH	2013/1/12	2014/1/11	
V	C602M00/P0781	Power Supply	DS6024	0~60V 0~24A	MOTECH	2013/1/12	2014/1/11	
V	C602M00/T0412	Thermo Meter	TA218	T: -10℃~70℃ RH: 25%~98%	KTJ	2013/9/26	2013/9/25	
Froced Discharge Test								
V	C602M00/0207	Data logger	34970A	V: 0~ 300V, T: -150℃~1200℃	Agilent	2013/9/28	2013/9/27	
V	C602M00/L0762	Electronic LOAD	3311F	60V/60A, 300W	PRODIGIT	2013/5/14	2014/5/13	
V	C602M00/P0481	Power Supply	E3633A	0~8V, 20A/ 0~20V, 10A	AGILENT	2013/4/20	2014/4/19	
Note 1: DC Voltage: 0.1~1000V; AC Voltage: 0.5~700V at 60Hz, 1kHz; Resistance: 10 Ω~10MΩ; DC current:0.1mA~3A; AC current: 0.01mA~3A at 60Hz, 0.01mA~1A, at 1kHz								

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Control NO: LE-CU-13-10-011

6. T.1~T7 detail reports:

Control No.: LE-CU-13-10-011

UN 38.3 Test Datasheet

Customer:Lenovo

Model name: L13M4A01

Test duration:2013/9/9~2013/10/6

Reviewer:Evil_Xu

Test Sample identification:

Used	Sample No.	Sample state	Used	Sample No.	Sample state	Used	Sample No.	Sample state
V	1~4	1 Cycle, Fully charged	V	5~8	50 Cycle, Fully charged			25Cycle, Fully charged
V	9~12	1 Cycle, Fully charged	V	13~16	50 Cycle, Fully charged			25Cycle, Fully charged
V	1~5C	1 Cycle, 50% charged	V	06~15C	1 Cycle, 0% charged	V	16~25C	50 Cycle, 0% charged

T.1 Altitude Simulation

Start time:2013/9/23 08:20
 Finish time:2013/9/24 08:40

Ambient temp.: 18.5 ℃

Operator :Happy_Gu

Reviewer: Evil_Xu

Sample No.: 1					Sample No.: 2					
	Before	After	variation	Results		Before	After	variation	Results	
Mass (g)	204.429	204.406	Mass loss %	0.01%	P	Mass (g)	205.085	205.061	Mass loss %	0.01%
OCV(V)	16.678	16.651	Remained OCV%	99.84%		OCV(V)	16.669	16.648	Remained OCV%	99.87%
Sample No.: 3					Sample No.: 4					
Mass (g)	204.246	204.221	Mass loss %	0.01%	P	Mass (g)	203.879	203.860	Mass loss %	0.01%
OCV(V)	16.666	16.638	Remained OCV%	99.83%		OCV(V)	16.657	16.636	Remained OCV%	99.87%
Sample No.: 5					Sample No.: 6					
Mass (g)	204.079	204.057	Mass loss %	0.01%	P	Mass (g)	204.316	204.301	Mass loss %	0.01%
OCV(V)	16.681	16.653	Remained OCV%	99.83%		OCV(V)	16.652	16.627	Remained OCV%	99.85%
Sample No.: 7					Sample No.: 8					
Mass (g)	205.157	205.138	Mass loss %	0.01%	P	Mass (g)	205.216	205.202	Mass loss %	0.01%
OCV(V)	16.664	16.642	Remained OCV%	99.87%		OCV(V)	16.658	16.634	Remained OCV%	99.86%

T.2 Thermal Test

Start time:2013/9/24 08:20
 Finish time:2013/10/1 09:50

Ambient temp.: 19.3 ℃

Operator :Happy_Gu

Reviewer: Evil_Xu

Sample No.: 1					Sample No.: 2					
	Before	After	variation	Results		Before	After	variation	Results	
Mass (g)	204.406	204.387	Mass loss %	0.01%	P	Mass (g)	205.061	205.034	Mass loss %	0.01%
OCV(V)	16.651	16.386	Remained OCV%	98.41%		OCV(V)	16.648	16.380	Remained OCV%	98.39%
Sample No.: 3					Sample No.: 4					
Mass (g)	204.221	204.204	Mass loss %	0.01%	P	Mass (g)	203.860	203.838	Mass loss %	0.01%
OCV(V)	16.638	16.381	Remained OCV%	98.46%		OCV(V)	16.636	16.365	Remained OCV%	98.37%
Sample No.: 5					Sample No.: 6					
Mass (g)	204.057	204.042	Mass loss %	0.01%	P	Mass (g)	204.301	204.288	Mass loss %	0.01%
OCV(V)	16.653	16.396	Remained OCV%	98.46%		OCV(V)	16.627	16.381	Remained OCV%	98.40%
Sample No.: 7					Sample No.: 8					
Mass (g)	205.138	205.115	Mass loss %	0.01%	P	Mass (g)	205.202	205.187	Mass loss %	0.01%
OCV(V)	16.642	16.379	Remained OCV%	98.42%		OCV(V)	16.634	16.374	Remained OCV%	98.44%

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Control NO: LE-CU-13-10-011

T.3 Vibration

Start time:2013/10/1 10:10
 Finish time:2013/10/2 08:50

Ambient temp.: 18.8 °C

Operator :Happy_Gu Reviewer:Evil_Xu

Sample No.: 1					Sample No.: 2						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	204.387	204.362	Mass loss %	0.01%		P	Mass (g)	205.034	205.012	Mass loss %	
OCV (V)	16.386	16.359	Remained OCV%	99.84%	OCV (V)		16.380	16.357	Remained OCV%	99.86%	
Sample No.: 3					Sample No.: 4						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	204.204	204.182	Mass loss %	0.01%		P	Mass (g)	203.838	203.824	Mass loss %	
OCV (V)	16.381	16.350	Remained OCV%	99.81%	OCV (V)		16.365	16.344	Remained OCV%	99.87%	
Sample No.: 5					Sample No.: 6						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	204.042	204.021	Mass loss %	0.01%		P	Mass (g)	204.288	204.267	Mass loss %	
OCV (V)	16.396	16.374	Remained OCV%	99.87%	OCV (V)		16.361	16.338	Remained OCV%	99.86%	
Sample No.: 7					Sample No.: 8						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	205.115	205.097	Mass loss %	0.01%		P	Mass (g)	205.187	205.171	Mass loss %	
OCV (V)	16.379	16.353	Remained OCV%	99.84%	OCV (V)		16.374	16.352	Remained OCV%	99.87%	

T.4 Shock

Start time:2013/10/2 09:30
 Finish time:2013/10/2 17:20

Ambient temp.: 18.6 °C

Operator :Happy_Gu Reviewer:Evil_Xu

Sample No.: 1					Sample No.: 2						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	204.362	204.346	Mass loss %	0.01%		P	Mass (g)	205.012	205.003	Mass loss %	
OCV (V)	16.359	16.336	Remained OCV%	99.86%	OCV (V)		16.357	16.331	Remained OCV%	99.84%	
Sample No.: 3					Sample No.: 4						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	204.182	204.167	Mass loss %	0.01%		P	Mass (g)	203.824	203.808	Mass loss %	
OCV (V)	16.350	16.326	Remained OCV%	99.85%	OCV (V)		16.344	16.319	Remained OCV%	99.85%	
Sample No.: 5					Sample No.: 6						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	204.021	204.007	Mass loss %	0.01%		P	Mass (g)	204.267	204.248	Mass loss %	
OCV (V)	16.374	16.351	Remained OCV%	99.86%	OCV (V)		16.338	16.309	Remained OCV%	99.82%	
Sample No.: 7					Sample No.: 8						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	205.097	205.077	Mass loss %	0.01%		P	Mass (g)	205.171	205.154	Mass loss %	
OCV (V)	16.353	16.332	Remained OCV%	99.87%	OCV (V)		16.352	16.324	Remained OCV%	99.83%	

T.5 External Short Circuit

Start time:2013/10/2 17:40
 Finish time:2013/10/3 09:10

Ambient temp.: 20.9 °C

Operator :Happy_Gu Reviewer:Evil_Xu

	Sample No.: 1	Sample No.: 2	Sample No.: 3	Sample No.: 4	Sample No.: 5	Sample No.: 6	Sample No.: 7	Sample No.: 8
Resistance (<100mΩ)	57.7	56.1	58.3	55.9	55.6	54.9	56.1	55.2
OCV before test/ after short circuit(V)	16.336 16.335	16.331 16.329	16.326 16.326	16.319 16.317	16.351 16.350	16.309 16.307	16.332 16.332	16.324 16.323
Max Temp. (< 170°C)	52.5	56.4	51.6	53.7	56.1	56.8	54.7	55.6
Results	P	P	P	P	P	P	P	P

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Control NO: LE-CU-13-10-011

T.6 Impact /Crush (Component cell)

Impact-Cylindrical cells greater than 20mm in diameter

Crush- Prismatic, pouch, coin/button cells and cylindrical cells not more than 20mm in diameter

Start time:2013/9/12 08:20

Ambient temp.: 20.3 ℃

Operator :Happy_Gu

Reviewer: Evil_Xu

Finish time:2013/9/12 16:50

	Sample No.: 1C	Sample No.: 2C	Sample No.: 3C	Sample No.: 4C	Sample No.: 5C
OCV before test(V)	3.708	3.708	3.708	3.708	3.708
Max Temp. (< 170℃)	81.5	83.4	80.8	84.2	83.1
Results	P	P	P	P	P

T.7 Overcharge

Start time:2013/9/25 13:20

Ambient temp.: 19.2 ℃

Operator :Happy_Gu

Reviewer: Evil_Xu

Finish time:2013/10/5 15:20

	Sample No.: 9	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)	16.676	16.668	16.671	16.635	16.662	16.654	16.627	16.636
Results	P	P	P	P	P	P	P	P

T.8 Forced discharge

Start time:2013/9/13 09:10

Ambient temp.: 18.4 ℃

Operator :Happy_Gu

Reviewer: Evil_Xu

Finish time:2013/9/23 08:20

	Sample No.: 06C	Sample No.: 07C	Sample No.: 08C	Sample No.: 09C	Sample No.: 10C
OCV after test(V)	3.181	3.179	3.180	3.184	3.178
Results	P	P	P	P	P
	Sample No.: 11C	Sample No.: 12C	Sample No.: 13C	Sample No.: 14C	Sample No.: 15C
OCV before test(V)	3.175	3.179	3.177	3.184	3.181
Results	P	P	P	P	P
	Sample No.: 16C	Sample No.: 17C	Sample No.: 18C	Sample No.: 19C	Sample No.: 20C
OCV before test(V)	3.176	3.179	3.182	3.184	3.180
Results	P	P	P	P	P
	Sample No.: 21C	Sample No.: 22C	Sample No.: 23C	Sample No.: 24C	Sample No.: 25C
OCV before test(V)	3.180	3.181	3.180	3.183	3.178
Results	P	P	P	P	P

7. Test sample:



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