



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-13-03-061

UN38.3 Test Report

Recommendations on the TRANSPORT OF DANGEROUS GOODS

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

Customer: Lenovo
Model: L12M4F02
Rating: 15V,48Wh,3200mAh
Test duration: 2013/02/25~2013/3/27

Approved By	Checked By	Prepared By
<i>Mike Chen</i>	<i>Evil</i>	<i>Happy-Gin</i>

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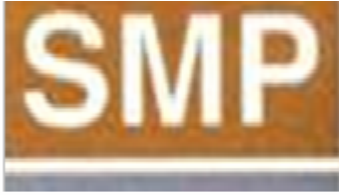
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1. Purpose of the Test:

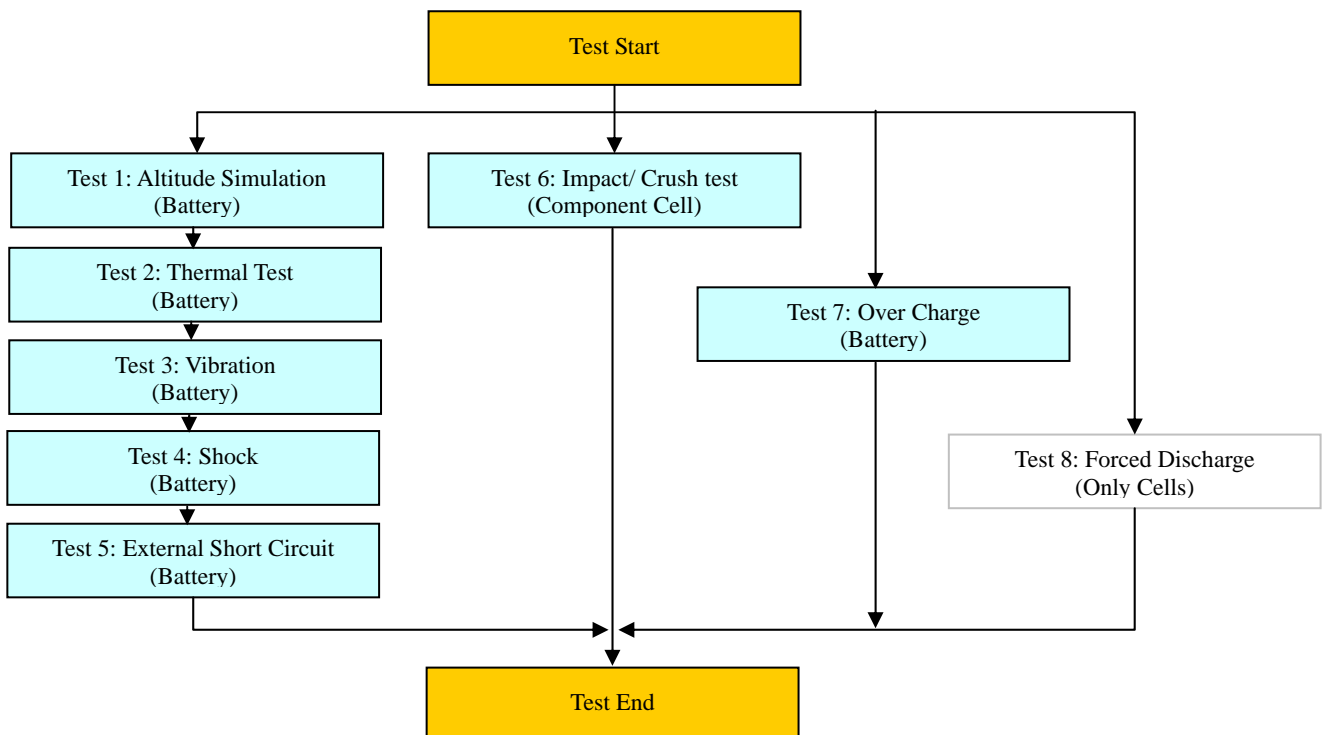
To test each cell/battery is of the type proved to meet the requirements in the Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Fifth revised edition, Amend 1.

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)

3. Test procedure:

- 3.1 All detail related test procedure shall be follow Standard Operation Procedure of SMP subjected CW01-5916 Rev.3 issue documentation.
- 3.2 Test flow shall be follow below statement.





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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**

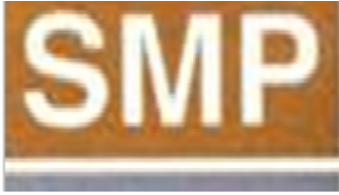
4.3.1 All cells can meet requirement subjected external temperature does not exceed 170 .

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.

All detail evidence will be confirmed follow appendix described.



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Control NO.:LE-CU-13-03-061

5. Test Equipment:

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

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Revised date: 2011/10/18 Page:

Date:2013/02/25

Model name: L12M4F02

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	2012/10/10	2013/10/09	
V	C602M00/S1054	Learning	GWT-2010-24	0~20V 0~10A	GW INSTR	2012/10/10	2013/10/09	
Low Pressure Test								
V	C602M00/0462	Altitude	SVT-110	Kpa: 0~99Kpa	HSIN JIANG	2012/9/28	2013/9/27	
V	C602M00/I0293	mΩ Hitester	3561	R:-10~310mΩ V:-20~20V	HIOKI	2012/10/10	2013/10/09	
V	C602M00/C0482	Electronic Balance	XS1220M-SCS	1220g±0.001g	CHENGZHUN	2012/9/28	2013/9/27	
V	C602M00/T0412	Thermo Meter	TA218	T: -10℃~70℃ RH: 25%~98%	KTJ	2012/9/28	2013/9/27	
Thermal Test								
V	C602M00/0150	Thermal Shock	KSKB-415TBS	T:-65℃ to 150℃	KSON	2012/9/28	2013/9/27	
V	C602M00/I2093	mΩ Hitester	3561	R:-10~310mΩ V:-20~20V	HIOKI	2012/10/10	2013/10/09	
V	C602M00/C0482	Electronic Balance	XS1220M-SCS	1220g±0.001g	CHENGZHUN	2012/9/28	2013/9/27	
V	C602M00/T0412	Thermo Meter	TA218	T: -10℃~70℃ RH: 25%~98%	KTJ	2012/9/28	2013/9/27	
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/I2093	mΩ Hitester	3561	R:-10~310mΩ V:-20~20V	HIOKI	2012/10/10	2013/10/09	
V	C602M00/C0482	Electronic Balance	XS1220M-SCS	1220g±0.001g	CHENGZHUN	2012/9/28	2013/9/27	
Shock Test								
V	C602M00/0570	Shock	HS 15/45	G:10~2000G	Lansmont	2012/8/24	2013/8/23	
V	C602M00/I2093	mΩ Hitester	3561	R:-10~310mΩ V:-20~20V	HIOKI	2012/10/10	2013/10/09	
V	C602M00/C0482	Electronic Balance	XS1220M-SCS	1220g±0.001g	CHENGZHUN	2012/9/28	2013/9/27	
External Short Circuit Test								
V	C602M00/I2093	mΩ Hitester	3561	R:-10~310mΩ V:-20~20V	HIOKI	2012/10/10	2013/10/09	
V	C602M00/0207	Data logger	34970A	V: 0~300V, T: -150℃~1200℃	Agilent	2012/9/28	2013/9/27	
V	C602M00/0518	chamber	WIT TH-2P-E	-40℃ to 150℃	WIT	2012/8/22	2013/8/21	
V	C602M00/T0412	Thermo Meter	TA218	T: -10℃~70℃ RH: 25%~98%	KTJ	2012/9/28	2013/9/27	
Impact Test								
V	C602M00/0589	Data logger	34970A	V: 0~300V, T: -150℃~1200℃	Agilent	2012/9/28	2013/9/27	
V	C602M00/1204	Impact tester	100-372	H:60~80cm	JYI SHENG			
V	C602M00/T0412	Thermo Meter	TA218	T: -10℃~70℃ RH: 25%~98%	KTJ	2012/9/28	2013/9/27	
Overcharge Test								
V	C602M00/P0779	Power Supply	DS6024	0~60V 0~24A	MOTECH	2013/1/13	2014/1/12	
V	C602M00/P0777	Power Supply	DS6024	0~60V 0~24A	MOTECH	2013/1/13	2014/1/12	
V	C602M00/P0775	Power Supply	DS6024	0~60V 0~24A	MOTECH	2013/1/13	2014/1/12	
V	C602M00/P0781	Power Supply	DS6024	0~60V 0~24A	MOTECH	2013/1/13	2014/1/12	
V	C602M00/T0412	Thermo Meter	TA218	T: -10℃~70℃ RH: 25%~98%	KTJ	2012/9/28	2013/9/27	
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-13-03-061

6. T.1~T7 detail reports:

Control No.:LE-CU-13-03-061

UN 38.3 Test Datasheet

Customer:Lenovo

Model name L12M4F02

Test duration: 2013/02/25~2013/3/27

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	1C~5C	1 Cycle, 50% charged			1 Cycle, 50% charged			

T.1 Altitude Simulation

Start time:2013/3/11 09:10
 Finsh time:2013/3/11 17:40

Ambient temp.:23.7°C

Operator :Happy Gu Reviewer: Evil_Xu

Sample No.: 1					Sample No.: 2					
	Before	After	variation	Results		Before	After	variation	Results	
Mass (g)	207.380	207.350	Mass loss %	0.01%	P	Mass (g)	207.670	207.620	Mass loss %	0.02%
OCV (V)	17.389	17.381	Remained OCV%	100.0%		OCV (V)	17.408	17.405	Remained OCV%	99.98%
Sample No.: 3					Sample No.: 4					
Mass (g)	207.360	207.330	Mass loss %	0.01%	P	Mass (g)	208.190	208.160	Mass loss %	0.01%
OCV (V)	17.374	17.372	Remained OCV%	99.99%		OCV (V)	17.383	17.379	Remained OCV%	99.98%
Sample No.: 5					Sample No.: 6					
Mass (g)	207.320	207.280	Mass loss %	0.02%	P	Mass (g)	207.840	207.810	Mass loss %	0.01%
OCV (V)	17.351	17.347	Remained OCV%	99.98%		OCV (V)	17.364	17.361	Remained OCV%	99.98%
Sample No.: 7					Sample No.: 8					
Mass (g)	208.680	208.660	Mass loss %	0.01%	P	Mass (g)	208.240	208.180	Mass loss %	0.03%
OCV (V)	17.397	17.396	Remained OCV%	99.99%		OCV (V)	17.371	17.367	Remained OCV%	99.98%

T.2 Thermal Test

Start time:2013/3/11 18:00
 Finsh time:2013/3/19 9:00

Ambient temp.:20.6°C

Operator :Happy Gu Reviewer: Evil_Xu

Sample No.: 1					Sample No.: 2					
	Before	After	variation	Results		Before	After	variation	Results	
Mass (g)	207.350	207.310	Mass loss %	0.02%	P	Mass (g)	207.620	207.570	Mass loss %	0.02%
OCV (V)	17.381	17.177	Remained OCV%	98.83%		OCV (V)	17.405	17.203	Remained OCV%	98.84%
Sample No.: 3					Sample No.: 4					
Mass (g)	207.330	207.290	Mass loss %	0.02%	P	Mass (g)	208.160	208.130	Mass loss %	0.01%
OCV (V)	17.372	17.169	Remained OCV%	98.83%		OCV (V)	17.379	17.188	Remained OCV%	98.90%
Sample No.: 5					Sample No.: 6					
Mass (g)	207.280	207.250	Mass loss %	0.01%	P	Mass (g)	207.810	207.760	Mass loss %	0.02%
OCV (V)	17.347	17.183	Remained OCV%	99.05%		OCV (V)	17.361	17.156	Remained OCV%	98.82%
Sample No.: 7					Sample No.: 8					
Mass (g)	208.660	208.620	Mass loss %	0.02%	P	Mass (g)	208.180	208.160	Mass loss %	0.01%
OCV (V)	17.396	17.194	Remained OCV%	98.84%		OCV (V)	17.367	17.154	Remained OCV%	98.77%

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Control NO.:LE-CU-13-03-061

T.3 Vibration

Start time:2013/3/20 8:15
 Finish time:2013/3/21 8:10

Ambient temp.:23.2°C

Operator :Happy Gu Reviewer: Evil_Xu

Sample No.: 1					Sample No.: 2						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	207.310	207.290	Mass loss %	0.01%	P	Mass (g)	207.570	207.540	Mass loss %	0.01%	P
OCV (V)	17.177	17.173	Remained OCV%	99.98%		OCV (V)	17.203	17.200	Remained OCV%	99.98%	
Sample No.: 3					Sample No.: 4						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	207.290	207.260	Mass loss %	0.01%	P	Mass (g)	208.130	208.090	Mass loss %	0.02%	P
OCV (V)	17.169	17.166	Remained OCV%	99.98%		OCV (V)	17.188	17.185	Remained OCV%	99.98%	
Sample No.: 5					Sample No.: 6						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	207.250	207.210	Mass loss %	0.02%	P	Mass (g)	207.760	207.730	Mass loss %	0.01%	P
OCV (V)	17.183	17.178	Remained OCV%	99.97%		OCV (V)	17.156	17.152	Remained OCV%	99.98%	
Sample No.: 7					Sample No.: 8						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	208.620	208.570	Mass loss %	0.02%	P	Mass (g)	208.160	208.120	Mass loss %	0.02%	P
OCV (V)	17.194	17.191	Remained OCV%	99.98%		OCV (V)	17.154	17.151	Remained OCV%	99.98%	

T.4 Shock

Start time: 2013/03/21 13 : 40
 Finish time:2013/03/21 17 : 10

Ambient temp.: 22.8°C

Operator :Happy Gu Reviewer: Evil_Xu

Sample No.: 1					Sample No.: 2						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	207.290	207.260	Mass loss %	0.01%	P	Mass (g)	207.540	207.510	Mass loss %	0.01%	P
OCV (V)	17.173	17.170	Remained OCV%	99.98%		OCV (V)	17.200	17.196	Remained OCV%	99.98%	
Sample No.: 3					Sample No.: 4						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	207.260	207.220	Mass loss %	0.02%	P	Mass (g)	208.090	208.050	Mass loss %	0.02%	P
OCV (V)	17.166	17.163	Remained OCV%	99.98%		OCV (V)	17.185	17.182	Remained OCV%	99.98%	
Sample No.: 5					Sample No.: 6						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	207.210	207.180	Mass loss %	0.01%	P	Mass (g)	207.730	207.690	Mass loss %	0.02%	P
OCV (V)	17.178	17.174	Remained OCV%	99.98%		OCV (V)	17.152	17.147	Remained OCV%	99.97%	
Sample No.: 7					Sample No.: 8						
	Before	After	variation		Results		Before	After	variation		Results
Mass (g)	208.570	208.520	Mass loss %	0.02%	P	Mass (g)	208.120	208.070	Mass loss %	0.02%	P
OCV (V)	17.191	17.188	Remained OCV%	99.98%		OCV (V)	17.151	17.148	Remained OCV%	99.98%	

T.5 External Short Circuit

Start time: 2013/03/21 18 : 10
 Finish time: 2013/03/22 08 : 20

Ambient temp.:21.5°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	58.4	57.2	55.9	56.4	57.8	56.3	57.1
OCV before test/ after short circuit(V)	17.170 17.168	17.196 17.194	17.163 17.162	17.182 17.181	17.174 17.174	17.147 17.145	17.188 17.186	17.148 17.147
Max Temp. (< 170°C)	59.2	58.2	58.7	59.7	57.7	59.0	58.4	58.0
Results	P	P	P	P	P	P	P	P

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Control NO.:LE-CU-13-03-061

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: 2013/03/17 08 : 00

Ambient temp.:22.3℃

Operator :Happy Gu Reviewer: Evil_Xu

Finsh time: 2013/03/17 13 : 10

	Sample No.: 1C	Sample No.: 2C	Sample No.: 3C	Sample No.: 4C	Sample No.: 5C
OCV before test(V)	3.807	3.805	3.807	3.806	3.805
Max Temp. (< 170℃)	97.1	94.8	95.6	91.3	93.9
Results	P	P	P	P	P
	Sample No.: 6C	Sample No.: 7C	Sample No.: 8C	Sample No.: 9C	Sample No.: 10C
OCV before test(V)					
Max Temp. (< 170℃)					
Results					

T.7 Overcharge

Start time: 2013/03/17 14 : 00

Ambient temp.:23.9℃

Operator :Happy Gu Reviewer: Evil_Xu

Finsh time:2013/03/27 16 : 00

	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)	17.384	17.379	17.364	17.391	17.388	17.367	17.375	17.371
Results	P	P	P	P	P	P	P	P

7. Test sample:



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