



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-13-11-21

# UN38.3 Test Report

## Recommendations on the TRANSPORT OF DANGEROUS GOODS

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

**Customer: Lenovo**  
**Model: ASM P/N 45N1132**  
**FRU P/N 45N1736**  
**Rating: 10.8V, 4.4Ah, 48Wh**  
**Test duration: 2013/10/28~2013/11/20**

Approved By	Checked By	Prepared By

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### 1. Purpose of the Test:

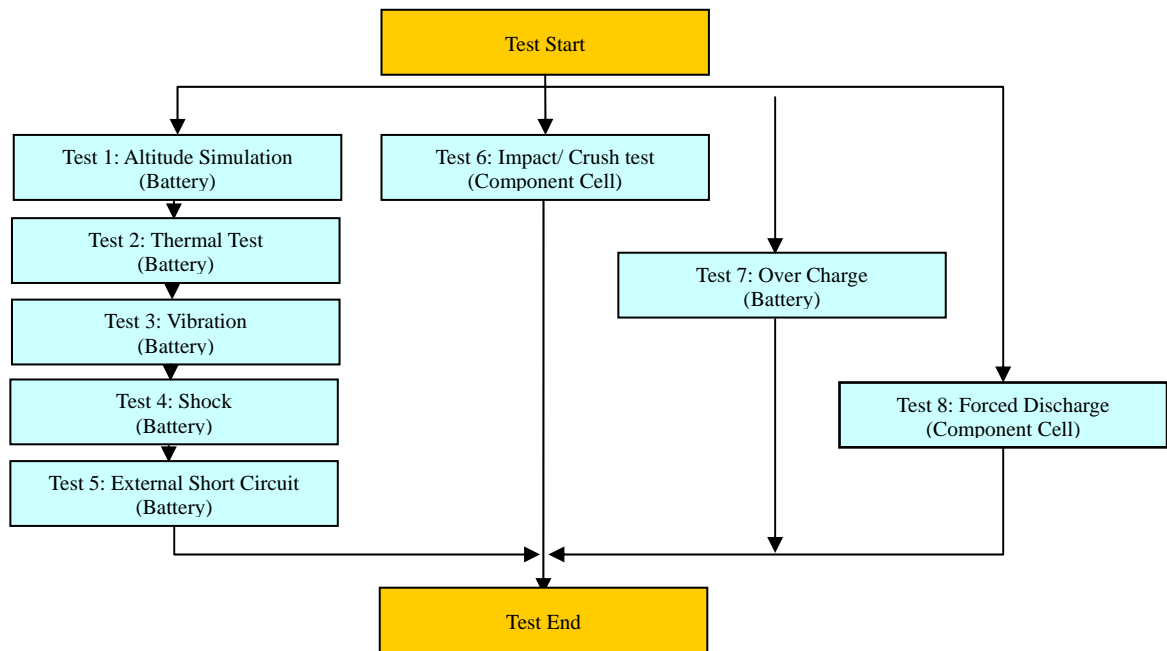
To test each cell/battery is of the type proved to meet the requirements in the Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Fifth revised edition, Amend 1.

### 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-13-11-21

#### 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-13-11-21

## 5. Test Equipment:

SMP 新世電子(常熟)有限公司

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

Page:1

Date:2013/10/28-2013/11/20

Model name: ASM P/N 45N1132

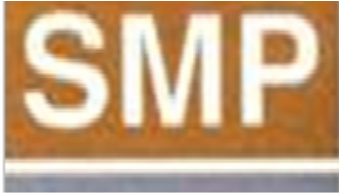
FRU P/N 45N1736

Test Instruments Reference List

Used	Instrument ID	Instrument Name	Type	Range Used	Manufacturer	CalibrationDate_Last	CalibrationDate_Need	Remarks
Pretest								
V	C602M00/S1053	Learning	GWT-2010-24	0~20V 0~10A	GW INSTR	2013/10/09	2014/10/08	
V	C602M00/S1054	Learning	GWT-2010-24	0~20V 0~10A	GW INSTR	2013/10/09	2014/10/08	
Low Pressure Test								
V	C602M00/0462	Altitude	SVT-110	Kpa: 0~99Kpa	HSIN JIANG	2013/9/26	2014/9/25	
V	C602M00/I0293	mΩ Hitester	3561	RC=10~310mΩ V=20~300V	HIOKI	2013/10/09	2014/10/08	
V	C602M00/C0482	Electronic Balance	XS1220M-SCS	1220g±0.001g	CHENGZHUN	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	
Thermal Test								
V	C602M00/0150	Thermal Shock	KSKB-415TBS	T:-65℃ to 150℃	KSON	2013/9/26	2014/9/25	
V	C602M00/I2093	mΩ Hitester	3561	RC=10~310mΩ V=20~300V	HIOKI	2013/10/09	2014/10/08	
V	C602M00/C0482	Electronic Balance	XS1220M-SCS	1220g±0.001g	CHENGZHUN	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	
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	RC=10~310mΩ V=20~300V	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 1545	G:10~2000G	Lansmont	2013/9/14	2014/9/13	
V	C602M00/I2093	mΩ Hitester	3561	RC=10~310mΩ V=20~300V	HIOKI	2013/10/09	2014/10/08	
V	C602M00/C0482	Electronic Balance	XS1220M-SCS	1220g±0.001g	CHENGZHUN	2013/9/26	2014/9/25	
External Short Circuit Test								
V	C602M00/I2093	mΩ Hitester	3561	R:10~310mΩ V:0~300V	HIOKI	2013/10/09	2014/10/08	
V	C602M00/0207	Data logger	34970A	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	2013/1/15	2014/1/14	
V	C602M00/P0777	Power Supply	DS6024	0~60V 0~24A	MOTECH	2013/1/15	2014/1/14	
V	C602M00/P0775	Power Supply	DS6024	0~60V 0~24A	MOTECH	2013/1/15	2014/1/14	
V	C602M00/P0781	Power Supply	DS6024	0~60V 0~24A	MOTECH	2013/1/15	2014/1/14	
V	C602M00/T0412	Thermo Meter	TA218	T: -10℃~70℃ RH: 25%~98%	KTJ	2013/9/26	2014/9/25	
Froced Discharge Test								
V	C602M00/0207	Data logger	34970A	V: 0~300V, T: -150℃~1200℃	Agilent	2013/9/26	2014/9/27	
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: 1Ω~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-13-11-21

## 6. T.1~T8 detail reports:

Control No.: LE-CU-13-11-21

UN 38.3 Test Datasheet

Customer: LENOVO

Model name: ASM P/N 45N1132

Test duration: 2013/10/28~2013/11/20

Reviewer: Evil\_Xu

Test Sample identification:

FRU P/N 45N1736

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:2013/11/11 08:40

Finish time:2013/11/11 15:50

Ambient temp.: 22.3°C

Operator:Mingya\_Wang Reviewer:Evil\_Xu

Sample No.: 1					Sample No.: 2					
	Before	After	variation	Results		Before	After	variation	Results	
Mass (g)	297.145	297.130	Mass loss %	0.01%	P	Mass (g)	297.178	297.170	Mass loss %	0.00%
OCV (V)	12.476	12.470	Remained OCV%	99.95%		OCV (V)	12.475	12.470	Remained OCV%	99.96%
Sample No.: 3					Sample No.: 4					
Mass (g)	296.287	296.283	Mass loss %	0.00%	P	Mass (g)	296.833	296.833	Mass loss %	0.01%
OCV (V)	12.477	12.471	Remained OCV%	99.95%		OCV (V)	12.474	12.470	Remained OCV%	99.97%
Sample No.: 5					Sample No.: 6					
Mass (g)	296.445	296.420	Mass loss %	0.01%	P	Mass (g)	296.636	296.625	Mass loss %	0.00%
OCV (V)	12.478	12.468	Remained OCV%	99.92%		OCV (V)	12.477	12.470	Remained OCV%	99.94%
Sample No.: 7					Sample No.: 8					
Mass (g)	296.560	296.540	Mass loss %	0.01%	P	Mass (g)	296.255	296.246	Mass loss %	0.00%
OCV (V)	12.480	12.473	Remained OCV%	99.94%		OCV (V)	12.482	12.475	Remained OCV%	99.94%

### T.2 Thermal Test

Start time:2013/11/11 16:30

Finish time:2013/11/18 20:00

Ambient temp.: 22.5 °C

Operator:Mingya\_Wang Reviewer:Evil\_Xu

Sample No.: 1					Sample No.: 2					
	Before	After	variation	Results		Before	After	variation	Results	
Mass (g)	297.130	297.090	Mass loss %	0.01%	P	Mass (g)	297.170	297.145	Mass loss %	0.01%
OCV (V)	12.470	12.451	Remained OCV%	99.85%		OCV (V)	12.470	12.450	Remained OCV%	99.84%
Sample No.: 3					Sample No.: 4					
Mass (g)	296.283	296.275	Mass loss %	0.00%	P	Mass (g)	296.833	296.825	Mass loss %	0.00%
OCV (V)	12.471	12.455	Remained OCV%	99.87%		OCV (V)	12.470	12.455	Remained OCV%	99.88%
Sample No.: 5					Sample No.: 6					
Mass (g)	296.420	296.415	Mass loss %	0.00%	P	Mass (g)	296.625	296.618	Mass loss %	0.00%
OCV (V)	12.468	12.443	Remained OCV%	99.80%		OCV (V)	12.470	12.451	Remained OCV%	99.85%
Sample No.: 7					Sample No.: 8					
Mass (g)	296.540	296.534	Mass loss %	0.00%	P	Mass (g)	296.246	296.240	Mass loss %	0.00%
OCV (V)	12.473	12.460	Remained OCV%	99.90%		OCV (V)	12.475	12.452	Remained OCV%	99.82%

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**T.3 Vibration**

Start time:2013/11/18 20:20 Ambient temp.: 23.7 °C Operator:Mingay\_WangReviewer:Evil\_Xu  
 Finsh time:2013/11/19 16:00

Sample No.: 1					Sample No.: 2								
	Before	After	variation		Results		Before	After	variation		Results		
Mass (g)	297.090	297.050	Mass loss %	0.01%		P	Mass (g)	297.145	297.141	Mass loss %		0.00%	P
OCV (V)	12.451	12.442	Remained OCV%	99.93%			OCV (V)	12.450	12.442	Remained OCV%		99.94%	
Sample No.: 3					Sample No.: 4								
	Before	After	variation		Results		Before	After	variation		Results		
Mass (g)	296.275	296.271	Mass loss %	0.00%		P	Mass (g)	296.825	296.820	Mass loss %		0.00%	P
OCV (V)	12.455	12.448	Remained OCV%	99.94%			OCV (V)	12.455	12.452	Remained OCV%		99.98%	
Sample No.: 5					Sample No.: 6								
	Before	After	variation		Results		Before	After	variation		Results		
Mass (g)	296.415	296.405	Mass loss %	0.00%		P	Mass (g)	296.618	296.610	Mass loss %		0.00%	P
OCV (V)	12.443	12.435	Remained OCV%	99.94%			OCV (V)	12.451	12.446	Remained OCV%		99.96%	
Sample No.: 7					Sample No.: 8								
	Before	After	variation		Results		Before	After	variation		Results		
Mass (g)	296.534	296.524	Mass loss %	0.00%		P	Mass (g)	296.240	296.238	Mass loss %		0.00%	P
OCV (V)	12.460	12.453	Remained OCV%	99.94%			OCV (V)	12.452	12.422	Remained OCV%		99.76%	

**T.4 Shock**

Start time:2013/11/19 16:40 Ambient temp.: 22.7 °C Operator:Mingay\_WangReviewer:Evil\_Xu  
 Finsh time:2013/11/20 08:50

Sample No.: 1					Sample No.: 2								
	Before	After	variation		Results		Before	After	variation		Results		
Mass (g)	297.050	296.830	Mass loss %	0.07%		P	Mass (g)	297.141	297.135	Mass loss %		0.00%	P
OCV (V)	12.442	12.432	Remained OCV%	99.92%			OCV (V)	12.442	12.435	Remained OCV%		99.94%	
Sample No.: 3					Sample No.: 4								
	Before	After	variation		Results		Before	After	variation		Results		
Mass (g)	296.271	296.268	Mass loss %	0.00%		P	Mass (g)	296.820	296.808	Mass loss %		0.00%	P
OCV (V)	12.448	12.431	Remained OCV%	99.86%			OCV (V)	12.452	12.447	Remained OCV%		99.96%	
Sample No.: 5					Sample No.: 6								
	Before	After	variation		Results		Before	After	variation		Results		
Mass (g)	296.405	296.385	Mass loss %	0.01%		P	Mass (g)	296.610	296.580	Mass loss %		0.01%	P
OCV (V)	12.435	12.430	Remained OCV%	99.96%			OCV (V)	12.446	12.440	Remained OCV%		99.95%	
Sample No.: 7					Sample No.: 8								
	Before	After	variation		Results		Before	After	variation		Results		
Mass (g)	296.524	296.512	Mass loss %	0.00%		P	Mass (g)	296.238	296.226	Mass loss %		0.00%	P
OCV (V)	12.453	12.448	Remained OCV%	99.96%			OCV (V)	12.422	12.418	Remained OCV%		99.97%	

**T.5 External Short Circuit**

Start time:2013/11/20 09:30 Ambient temp.: 23.5 °C Operator:Mingay\_WangReviewer:Evil\_Xu  
 Finsh time:2013/11/20 18:

	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)	61.3	62.5	59.5	59.7	58.6	59.3	57.4	58.7
OCV before test/ after short circuit(V)	12.431	12.425	12.433	12.427	12.430	12.422	12.500	12.495
Max Temp. (< 170°C)	56.3	55.6	57.7	56.4	55.1	55.3	56.2	55.6
Results	P	P	P	P	P	P	P	P

**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:2013/11/4 8:30 Ambient temp.: 22.1 °C Operator:Mingay\_WangReviewer:Evil\_Xu  
 Finsh time:2013/11/4 14:30

	Sample No.: 1	Sample No.: 2	Sample No.: 3	Sample No.: 4	Sample No.: 5
OCV before test(V)	3.611	3.666	3.671	3.671	3.661
Max Temp. (< 170°C)	23.4	27.1	23.5	30.1	28.6
Results	P	P	P	P	P

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Control NO: LE-CU-13-11-21

**T.7 Overcharge**

Start time:2013/11/11 09:00  
 Finsh time:2012/11/20 10:00

Ambient temp.: 23.3 ℃

Operator:Mingay\_Wang Reviewer:Evil\_Xu

	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)	12.475	12.508	12.507	12.497	12.545	12.547	12.544	12.552
Results	P	P	P	P	P	P	P	P

**T.8 Forced discharge**

Start time:2013/11/06 08:40  
 Finsh time:2013/11/15 10:20

Ambient temp.: 19.4 ℃

Operator:Mingay\_Wang Reviewer:Evil\_Xu

	Sample No.: 06C	Sample No.: 07C	Sample No.: 08C	Sample No.: 09C	Sample No.: 10C
OCV after test(V)	3.187	3.180	3.181	3.184	3.183
Results	P	P	P	P	P
	Sample No.: 11C	Sample No.: 12C	Sample No.: 13C	Sample No.: 14C	Sample No.: 15C
OCV after test(V)	3.185	3.182	3.180	3.184	3.186
Results	P	P	P	P	P
	Sample No.: 16C	Sample No.: 17C	Sample No.: 18C	Sample No.: 19C	Sample No.: 20C
OCV after test(V)	3.184	3.181	3.184	3.183	3.182
Results	P	P	P	P	P
	Sample No.: 21C	Sample No.: 22C	Sample No.: 23C	Sample No.: 24C	Sample No.: 25C
OCV after test(V)	3.186	3.184	3.188	3.186	3.182
Results	P	P	P	P	P

**7. Test sample:**



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