

# UN38.3 Test Report

## Recommendations on the TRANSPORT OF

## **DANGEROUS GOODS**

(Manual of Tests and Criteria, Fifth revised edition)

**Customer: Lenovo Model: L11M6F01** 

> **ASM P/N 45N1052** FRU P/N 45N1053 LC P/N 121500053

Rating: 11.1V, 62Wh / 5.6Ah

Approved By	Checked By	Prepared By
Szmh	Tu-long.	Betlynn

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### 1. Purpose of the Test:

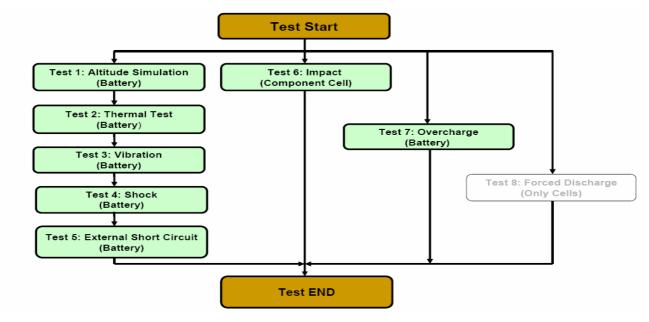
To test each cell/battery is of the type proved to meet the requirements in the Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Fifth revised edition.

### 2. Test Quantity:

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





#### 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

- 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

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



### 5. Test Equipment:

SMP SIMPLO TECHNOLOGY CO., LTD. Revised date: 2011-08-11

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Project No.: L11M6F01 3S2P TEL: +886-3-5695920; FAX: +886-3-5695931

#### Test Instruments Reference List

				Tamonto Itolorono				
Used	Instrument	Instrument Name	Type	Range Used	Manufacturer	Calibration	Calibration	Remarks
Oseu	ID	ilistrament ivalle	Туре	range osed	Mandiacturei	Date_Last	Date_Next	Hemarks
	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	e Simulation						
٧	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 °C;30~80 %RH	CENTER	2010/12/21	2011/12/21	
٧	T.2 Therma		010	13-33 (,30-00 /8111	OLIVILIT	2010/12/21	2011/12/21	
٧	ML-018	Thermal Shock	WSF-602	T. 40 to 400°C	WIT	2010/9/21	2011/9/21	
	ML-018 ML-257			T:-40 to 120℃		2010/8/31	2011/8/31	<del> </del>
		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	on						
v	ML-233	Vibration	KD-9636-EM-	F:5~2000Hz	King Design	2010/12/10	2011/12/10	
٧	WIL-233	VIDIATION	300F2K-30N80	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 °C; 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 °C;30~80 %RH	CENTER	2010/12/21	2011/12/21	
		al Short Circuit		, , , , , , , , , , , , , , , , , , , ,				
٧	ML-534	mΩ Hitester	3540	1mΩ ~ 30kΩ	YEOW LONG	2010/12/2	2011/12/2	
	ML-339	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2011/7/1	2012/7/1	
V	ML-521	Chamber	WIT IPC-1000(3F)	-20 to 150°C	WIT	2010/12/2	2011/12/2	
		(Component cell)						
	ML-340	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2011/5/26	2012/5/26	
		Impact Tester			JYI SHENG	2011/3/11	2012/3/11	
	T.7 Overch		GGS0 20F	0.501.04.00	LOCK	0044/01	0040/01	
	ML-139	Power Supply	GC50-30D	0~50V 0.1~30A	LOCK	2011/3/4	2012/3/4	
	ML-140	Power Supply Power Supply	GC50-30D GC50-30D	0~50V 0.1~30A	LOCK LOCK	2011/3/4 2011/3/4	2012/3/4	
V	ML-141 ML-142	Power Supply Power Supply	GC50-30D GC50-30D	0~50V 0.1~30A 0~50V 0.1~30A	LOCK	2011/3/4	2012/3/4	
	ML-142 ML-143	Power Supply Power Supply	GC50-30D GC50-30D	0~50V 0.1~30A 0~50V 0.1~30A	LOCK	2011/3/4	2012/3/4	<del>                                     </del>
	ML-143 ML-549	Data Logger	313	15~35 °C;30~80 %RH	CENTER	2010/12/21	2012/3/4	<b>—</b>
-	040	Data Loggor		.0 00 0,00 00 /01111	CLIVIEI	2010/12/21	2011/12/21	
					i	i e	i	i e
							1	
			•				•	-

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.



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

Control No.: SLEU-1108002 **UN 38.3 Test Datasheet** 

Customer: Lenovo Model name: L11M6F01 3S2P Test duration:2011/07/19~2011/08/11 Reviewer: Esmond

Test Sample Identification:

Used	Sample No.	Sample State Used		Sample No.	Sample State	Used	Sample No.	Sample State
٧	01~04	1 Cycle, Fully charged	٧	05~08	50 Cycle, Fully charged			25Cycle, Fully charged
٧	09~12	1 Cycle, Fully charged	٧	13~16	50 Cycle, Fully charged			25Cycle, Fully charged
٧	01C~05C	1 Cycle, 50% charged			1 Cycle, 50% charged			

T.1 Altitud	de Simulation			3:11 ::26 Ambient	temp.: 24	.5 °C	Operator: Betty	Reviewer: Esmond		
		Sample N	lo.: 01				Sample N	lo.: 05		
	Before	After	Variation	Results		Before	After	Variation	Results	
Mass (g)	317.5	317.5	Mass loss % 0.00%	Р	Mass (g)	317.6	317.6	Mass loss % 0.00%	Р	
OCV (V)	12.84	12.84	Remained OCV% 100.00%		OCV (V)	12.85	12.85	Remained OCV% 100.00%	-	
		Sample N	lo.: 02		Sample No.: 06					
	Before	After	Variation	Results		Before	After	Variation	Results	
Mass (g)	317.6	317.6	Mass loss % 0.00%	Р	Mass (g)	317.5	317.4	Mass loss % 0.03%	Р	
OCV (V)	12.84	12.84	Remained OCV% 100.00%	1	OCV (V)	12.85	12.85	Remained OCV% 100.00%	P	
		Sample I	No.: 03	•			Sample N	No.: 07		
	Before	After	Variation	Results		Before	After	Variation	Results	
Mass (g)	317.5	317.5	Mass loss % 0.00%	Р	Mass (g)	317.5	317.5	Mass loss % 0.00%	Р	
OCV (V)	12.85	12.85	Remained OCV% 100.00%		OCV (V)	12.85	12.85	Remained OCV% 100.00%	-	
		Sample N	lo.: 04		Sample No.: 08					
	Before	After	Variation	Results		Before	After	Variation	Results	
Mass (g)	317.5	317.5	Mass loss % 0.00%	Р	Mass (g)	317.6	317.6	Mass loss % 0.00%	Р	
OCV (VA	12.84	12.84	Remained OCV% 100 00%	1 1	OCV (W	12.84	12.84	Remained OCV% 100 00%	Ρ	

T.2 Ther	mal Test			: 32 : 42 Ambien	temp.:	25.3 °C	Operator: Betty	Reviewer: Esmono	ı
		Sample N	lo.: 01		Sample No.: 05				
	Before	After	Variation	Results		Before	After	Variation	Results
Mass (g)	317.5	317.4	Mass loss % 0.03%	Р	Mass (g)	317.6	317.5	Mass loss % 0.03%	Р
OCV (V)	12.84	12.62	Remained OCV% 98.31%	r	OCV (V)	12.85	12.62	Remained OCV% 98.24%	r
		Sample N	lo.: 02				Sample N	lo.: 06	
	Before	After	Variation	Results		Before	After	Variation	Results
Mass (g)	317.6	317.6	Mass loss % 0.00%	Р	Mass (g)	317.4	317.3	Mass loss % 0.03%	Р
OCV (V)	12.84	12.66	Remained OCV% 98.60%	P	OCV (V)	12.85	12.64	Remained OCV% 98.37%	P
		Sample N	lo.: 03				Sample N	lo.: 07	
	Before	After	Variation	Results		Before	After	Variation	Results
Mass (g)	317.5	317.4	Mass loss % 0.03%	Р	Mass (g)	317.5	317.4	Mass loss % 0.03%	Р
OCV (V)	12.85	12.67	Remained OCV% 98.60%	P	OCV (V)	12.85	12.63	Remained OCV% 98.31%	r
		Sample N	lo.: 04				Sample N	lo.: 08	
	Before	After	Variation	Results		Before	After	Variation	Results
Mass (g)	317.5	317.5	Mass loss % 0.00%	Р	Mass (g)	317.6	317.5	Mass loss % 0.03%	Р
OCV (V)	12.84	12.63	Remained OCV% 98.36%	P	OCV (V)	12.84	12.62	Remained OCV% 98.26%	۲

T.3 Vibra	tion			09/ 11 10/ 10	Δmhiant	temp.:	24.6 ℃	Operator: Betty	Reviewer: Esmon	i	
		Sample N	No.: 01			Sample No.: 05					
	Before	After	Variation	_	Results		Before	After	Variation	Results	
Mass (g)	317.4	317.4	Mass loss %	0.00%	Р	Mass (g)	317.5	317.5	Mass loss % 0.00%	Р	
OCV (V)	12.62	12.62	Remained OCV%	100.00%	-	OCV (V)	12.62	12.61	Remained OCV% 99.92%	r	
		Sample N	No.: 02					Sample N	lo.: 06		
	Before	After	Variation	1	Results	П	Before	After	Variation	Results	
Mass (g)	317.6	317.6	Mass loss %	0.00%	Р	Mass (g)	317.3	317.3	Mass loss % 0.00%	Р	
OCV (V)	12.66	12.66	Remained OCV%	100.00%	P	OCV (V)	12.64	12.64	Remained OCV% 100.00%	P	
		Sample I	No.: 03					Sample N	lo.: 07		
	Before	After	Variation	1	Results	П	Before	After	Variation	Results	
Mass (g)	317.4	317.4	Mass loss %	0.00%	Р	Mass (g)	317.4	317.3	Mass loss % 0.03%	Р	
OCV (V)	12.67	12.66	Remained OCV%	99.92%	r	OCV (V)	12.63	12.63	Remained OCV% 100.00%	r	
		Sample N	No.: 04					Sample N	lo.: 08		
	Before	After	Variation	1	Results	П	Before	After	Variation	Results	
Mass (g)	317.5	317.4	Mass loss %	0.03%	Р	Mass (g)	317.5	317.5	Mass loss % 0.00%	Р	
OCV (V)	12.63	12.62	Remained OCV%	99.92%		OCV (V)	12.62	12.61	Remained OCV% 99.92%	,	



T.4 Shoc	k		Start time: 08 / 10 / Finish time: 08 / 10 /		temp.:	25.1 °C	Operator: Betty	Reviewer: Esmond		
		Sample N	lo.: 01				Sample N	o.: 05		
	Before	After	Variation	Results		Before	After	Variation	Results	
Mass (g)	317.4	317.3			Mass (g)	317.5	317.4	Mass loss % 0.03%	Р	
OCV (V)	12.62	12.62	Remained OCV% 100	0.00%	OCV (V)	12.61	12.61	Remained OCV% 100.00%	r	
		Sample N	lo.: 02				Sample N	o.: 06		
	Before	After	Variation	Results		Before	After	Variation	Results	
Mass (g)	317.6	317.6	Mass loss % 0.0	00% P	Mass (g)	317.3	317.2	Mass loss % 0.03%	Р	
OCV (V)	12.66	12.65	Remained OCV% 99,	.92%	OCV (V)	12.64	12.64	Remained OCV% 100.00%	•	
		Sample I	No.: 03		Sample No.: 07					
	Before	After	Variation	Results		Before	After	Variation	Results	
Mass (g)	317.4	317.4	Mass loss % 0.6	00% P	Mass (g)	317.3	317.2	Mass loss % 0.03%	Р	
OCV (V)	12.66	12.66	Remained OCV% 100	0.00%	OCV (V)	12.63	12.62	Remained OCV% 99.92%	r	
		Sample N	lo.: 04				Sample N	o.: 08		
	Before	After	Variation	Results		Before	After	Variation	Results	
Mass (g)	317.4	317.4	Mass loss % 0.6	00% P	Mass (g)	317.5	317.4	Mass loss % 0.03%	Р	
OCV (V)	12.62	12.61	Remained OCV% 99.		OCV (V)	12.61	12.61	Remained OCV% 100.00%	P	

T.5 External Shore	Fit External Short Circuit						: 12	Ambient	temp.:	25.2	t	Operator	: Betty		Reviewe	r: Esmono
	Sample	No.: 01	Sample	Sample No.: 02 Sample No.: 03		Sample	Sample No.: 04 Sample No.: 05		Sample No.: 06		Sample No.: 07		Sample No.: 08			
Resistance (<100mΩ)	56	6.3	54	.4	55	5.6	52	2.9	57	7.7	56	6.4	52	2.8	55	5.5
OCV before test/ after short circuit(V)	12.62	0.00	12.65	0.00	12.66	0.00	12.61	0.00	12.61	0.00	12.64	0.00	12.62	0.00	12.61	0.00
Max Temp. (< 170℃)	55	i.i	55	.0	55	i.2	55	ផ	55	.2	55	5.2	55	.2	55	.0
Results		Э	F			P	P		P		Р		Р		-	P P

T.6 Impact ( Com	ponent cell)	Start time: 08 / 03 / 17 Finish time: 08 / 04 / 09	Ambiont town .	25.3 ℃ Operato	: Betty Reviewer: Esmoi
	Sample No.: 01C	Sample No.: 02C	Sample No.: 03C	Sample No.: 04C	Sample No.: 05C
OCV before test(V)	3.72	3.73	3.73	3.72	3.73
Max Temp. (< 170℃)	96.7	98.4	99.3	95.6	94.3
Results	P	Р	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		Finish tir		6:27 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)	12.84	12.84	12.84	12.85	12.85	12.85	12.85	12.84
Results	P	P	P	P	Р	P	Р	P



### 7. Equipment for Test:



