



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
華普電子(常熟)有限公司

Control Number: SACU-1703003

Lithium-ion Battery UN38.3 Test Report

Recommendations on the TRANSPORT OF DANGEROUS GOODS

(Manual of Tests and Criteria, Sixth revised edition)

Customer: Acer

Model: AC14B7K

Rating: 15.28V , TYP 3320mAh / 50.7Wh

MIN 3200mAh / 48.8Wh

Approved By	Checked By	Prepared By
Max Lu	Sam	Seying

SIMPLO TECHNOLOGY CO., LTD.

ADD : No.471, Sec.2, Pa Teh Rd., Hu Kou, Hsin Chu Hsien 303, Taiwan

TEL: +886-3-5695920

FAX: +886-3-5695931



SIMPLO ELECTRONICS (Changshu), LTD.

ADD : No.2 Dong Nan Avenue, Changshu, Jiangsu Province, China

TEL: +86-512-52302255

FAX: +86-512-52302277



SIMPLO ELECTRONICS (CHONGQING), LTD.

ADD : No.2 Zongbao Avenue, Shapingba District, ChongQing, China

TEL: +86-23-61718899

FAX: +86-23-61210488



HUAPU TECHNOLOGY (Changshu) CO., LTD.

ADD : No.2 Dong Nan Avenue, Changshu, Jiangsu Province, China

TEL: +86-512-52302255

FAX: +86-512-52302277



Form No. : W11-002-B04

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1. Purpose of the Test :

To test each cell/battery is of the type proved to meet the requirements in United Nations Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Sixth revised edition, Section 38.3.

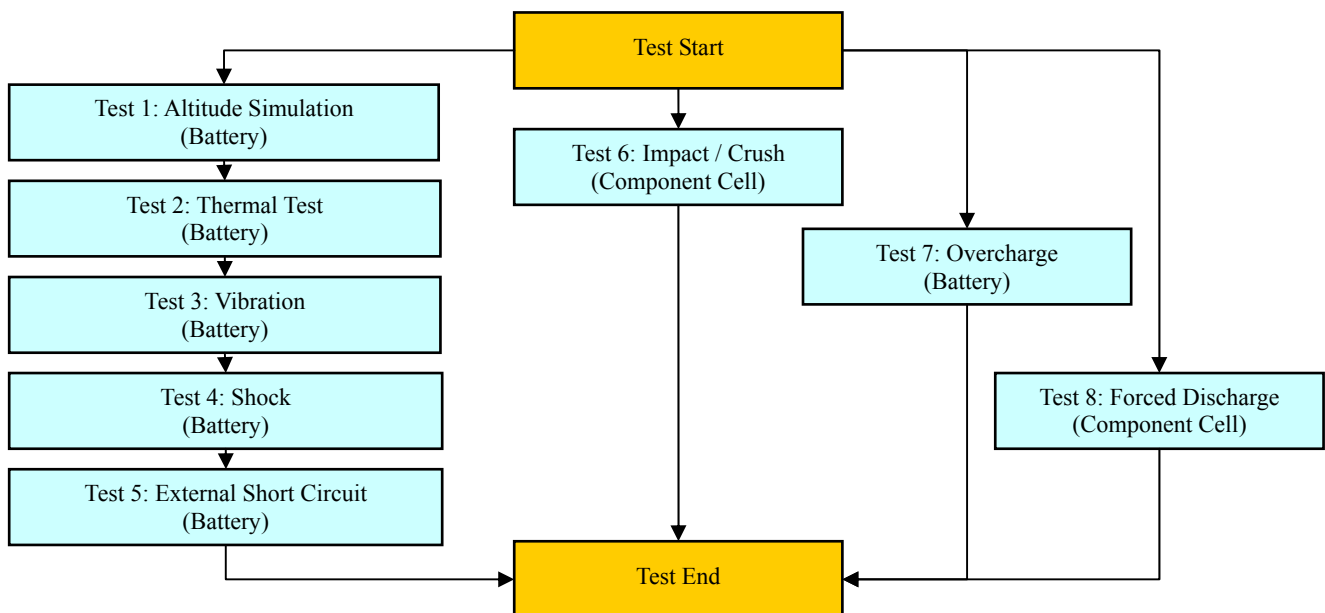
2. Test Quantity :

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

3. Test Procedure :

3.1 All detailed test procedures must be based on United Nations Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Sixth revised edition, Section 38.3.

3.2 Test flow shall be followed as below.



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4. Test Result :

4.1 T.1 ~T.4 Test result: **Passed**

4.1.1 All batteries could meet the requirement of Table 38.3.1 Mass loss limit ($M < 1g$: 0.5% ; $1g \leq M \leq 75g$: 0.2% ; $M > 75g$: 0.1%) and residual OCV not less than 90% after the test.

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

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

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 result: **Passed**

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: **Passed**

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

4.5 T.8 Test result: **Passed**

4.5.1 All component cells could meet the requirement, no disassembly and no fire during the test and within seven days after the test.

Conclusion: The samples had passed the test items of UN38.3.



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5. Test Equipment :

SMP SIMPLO TECHNOLOGY CO., LTD.

Address : No.471, Sec.2, Pa Teh Rd., Hu Kou, Hsin Chu Hsien 303, Taiwan

TEL: +886-3-5695920; FAX: +886-3-5695931

Revised Date: 2017-03-01

Test Instruments Reference List								
Used	Instrument ID	Instrument Name	Type	Range of use	Manufacturer	Calibration Date_Last	Calibration Date_Next	Remarks
	Pretest							
V	ML-761	Learning	715C	0~18V 0~8A	SMP	2016/3/2	2017/3/2	
V	ML-762	Learning	715C	0~18V 0~8A	SMP	2017/1/4	2018/1/4	
V	ML-763	Learning	715C	0~18V 0~8A	SMP	2016/3/2	2017/3/2	
V	ML-764	Learning	715C	0~18V 0~8A	SMP	2017/1/4	2018/1/4	
	ML-514	Learning	750R	0~60V 0~60A	SMP	2017/2/6	2018/2/6	
	T.1 Altitude Simulation							
V	ML-522	Altitude	SVT-120	Kpa:30~90	HSIN JIANG	2016/7/28	2017/7/28	
V	ML-257	Multimeter	HP 34401A	Note 1	Agilent	2016/3/4	2017/3/4	
	ML-494	Electronic Balance	XS1220M-SCS	1-1200 gf	CHUANHUA	2016/7/28	2017/7/28	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2016/9/21	2017/9/21	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2016/9/21	2017/9/21	
V	ML-550	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2016/9/21	2017/9/21	
	T.2 Thermal Test							
V	ML-789	Thermal Shock	GTST-080-65-AW	T:-40 to 120℃	GF	2017/1/4	2018/1/4	
V	ML-257	Multimeter	HP 34401A	note 1	Agilent	2016/3/4	2017/3/4	
	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2016/7/28	2017/7/28	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2016/9/21	2017/9/21	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2016/9/21	2017/9/21	
	T.3 Vibration							
V	ML-233	Vibration	KD-9636-EM-300F2K-30N80	F:5~2000Hz G:0.2~20G	King Design	2016/9/2	2017/9/2	
V	ML-257	Multimeter	HP 34401A	note 1	Agilent	2016/3/4	2017/3/4	
	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2016/7/28	2017/7/28	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2016/9/21	2017/9/21	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2016/9/21	2017/9/21	
V	ML-552	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2016/9/21	2017/9/21	
	T.4 Shock							
V	ML-056	Shock	DP-1200-25	G:10~600G	King Design	2016/9/2	2017/9/2	
V	ML-257	Multimeter	HP 34401A	note 1	Agilent	2016/3/4	2017/3/4	
	ML-494		XS1220M-SCS	1-1000 gf	CHUANHUA	2016/7/28	2017/7/28	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2016/9/21	2017/9/21	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2016/9/21	2017/9/21	
V	ML-551	Data Logger	313	15~35 ℃; 30~80 %RH	CENTER	2016/9/21	2017/9/21	
	T.5 External Short Circuit							
V	ML-534	mΩ Hister	3540	1mΩ ~ 30kΩ	HIOKI	2016/9/23	2017/9/23	
V	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2016/9/21	2017/9/21	
V	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2016/9/21	2017/9/21	
V	ML-521	Oven	9031	30~80 ℃	YEOW LONG	2016/9/21	2017/9/21	
	T.6 Impact / Crush							
V	ML-339	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2016/5/19	2017/5/19	
	ML-076	Impact Tester			JYI SHENG	2017/1/3	2018/1/3	
	ML-553	Crush Tester	BCT-01		Simplo	2016/6/1	2017/6/1	
V	ML-866	Crush Tester	M0654		JYI SHENG	2016/4/28	2017/4/28	
	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150℃	Yokogawa	2016/9/21	2017/9/21	

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Address : No.471, Sec.2, Pa Teh Rd., Hu Kou, Hsin Chu Hsien 303, Taiwan

TEL: +886-3-5695920; FAX: +886-3-5695931

Revised Date: 2017-03-01

Test Instruments Reference List								
Used	Instrument ID	Instrument Name	Type	Range of use	Manufacturer	Calibration Date_Last	Calibration Date_Next	Remarks
	T.7 Overcharge							
V	ML-482	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2016/5/19	2017/5/19	
V	ML-483	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2016/5/19	2017/5/19	
V	ML-484	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2016/5/19	2017/5/19	
V	ML-486	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2016/5/19	2017/5/19	
V	ML-487	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2016/5/19	2017/5/19	
V	ML-488	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2016/5/19	2017/5/19	
V	ML-550	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2016/9/21	2017/9/21	
V	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2016/9/21	2017/9/21	
V	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2016/9/21	2017/9/21	
	T.8 Forced Discharge							
V	ML-132	Electronic Load	3311C	60V,55A, 300W	Prodigit	2016/3/4	2017/3/4	
V	ML-133	Electronic Load	3311C	60V,55A, 300W	Prodigit	2016/3/4	2017/3/4	
V	ML-136	Electronic Load	3311C	60V,55A, 300W	Prodigit	2016/3/4	2017/3/4	
V	ML-192	Electronic Load	3311C	60V,55A, 300W	Prodigit	2016/3/4	2017/3/4	
V	ML-269	Electronic Load	3311C	60V,55A, 300W	Prodigit	2016/3/4	2017/3/4	
V	ML-532	DC Electronic Load	33511-01	120V, 240A, 3600W	Prodigit	2016/7/29	2017/7/29	
V	ML-482	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2016/5/19	2017/5/19	
V	ML-483	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2016/5/19	2017/5/19	
V	ML-484	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2016/5/19	2017/5/19	
V	ML-486	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2016/5/19	2017/5/19	
V	ML-487	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2016/5/19	2017/5/19	
V	ML-488	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2016/5/19	2017/5/19	
V	ML-550	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2016/9/21	2017/9/21	
V	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2016/9/21	2017/9/21	
V	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2016/9/21	2017/9/21	
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: SACU-1703003

6. T.1~T.8 Detail Reports:

UN 38.3 Test Datasheet

UN38.3/ST/SG/AC.10/11/Rev.6

Control Number: SACU-1703003	Customer: Acer	Model Name: AC14B7K	SMP Project Name: Roxy
Pack P/N: 934T/Q2116H (A)(B)	Configuration: 4S1P	Test Duration: 2017/02/02~2017/03/01	Reviewer: Esmond

Test Sample Identification: ☐ Large Battery ☒ Small Battery ☐ Single-cell Battery

Battery Pack						Component Cell		
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 Cycles, Fully charged	V	01C~05C	1 Cycle, 50% charged
V	09~12	1 Cycle, Fully charged	V	13~16	50 Cycles, Fully charged	V	06C~15C	1 Cycle, 0% discharged
		25Cycles, Fully charged			25 Cycles, Fully charged	V	16C~25C	50 Cycles, 0% discharged

T.1 Altitude Simulation

Start time: 2017/02/15 09:00		Ambient temp.: 20.1 °C					Operator: Stephy		
Finish time: 2017/02/15 15:20		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	17.216	17.214	17.219	17.220	17.216	17.217	17.218	17.218
	After	17.211	17.209	17.215	17.216	17.211	17.212	17.213	17.213
	Residual OCV %	99.97%	99.97%	99.98%	99.98%	99.97%	99.97%	99.97%	99.97%
Mass (g)	Before	227.869	227.682	228.124	227.942	227.576	228.204	227.842	228.206
	After	227.869	227.679	228.124	227.942	227.571	228.204	227.842	228.204
	Mass loss %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Results		P	P	P	P	P	P	P	P

T.2 Thermal Test

Start time: 2017/02/15 15:40		Ambient temp.: 22.0 °C					Operator: Stephy		
Finish time: 2017/02/22 08:40		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	17.211	17.209	17.215	17.216	17.211	17.212	17.213	17.213
	After	17.013	17.014	17.012	17.008	17.017	17.012	17.022	17.011
	Residual OCV %	98.85%	98.87%	98.82%	98.79%	98.87%	98.84%	98.89%	98.83%
Mass (g)	Before	227.869	227.679	228.124	227.942	227.571	228.204	227.842	228.204
	After	227.838	227.655	228.096	227.916	227.544	228.176	227.822	228.174
	Mass loss %	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Results		P	P	P	P	P	P	P	P

T.3 Vibration

Start time: 2017/02/22 09:00		Ambient temp.: 20.6 °C					Operator: Stephy		
Finish time: 2017/02/23 08:40		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	17.013	17.014	17.012	17.008	17.017	17.012	17.022	17.011
	After	16.993	16.995	16.993	16.989	16.998	16.989	16.999	16.988
	Residual OCV %	99.88%	99.89%	99.89%	99.89%	99.89%	99.86%	99.86%	99.86%
Mass (g)	Before	227.838	227.655	228.096	227.916	227.544	228.176	227.822	228.174
	After	227.835	227.655	228.094	227.916	227.540	228.176	227.819	228.174
	Mass loss %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Results		P	P	P	P	P	P	P	P

T.4 Shock

Start time: 2017/02/23 09:00		Ambient temp.: 20.8 °C					Operator: Stephy		
Finish time: 2017/02/23 11:00		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	16.993	16.995	16.993	16.989	16.998	16.989	16.999	16.988
	After	16.991	16.992	16.991	16.987	16.996	16.987	16.996	16.986
	Residual OCV %	99.99%	99.98%	99.99%	99.99%	99.99%	99.99%	99.98%	99.99%
Mass (g)	Before	227.835	227.655	228.094	227.916	227.540	228.176	227.819	228.174
	After	227.835	227.655	228.093	227.914	227.540	228.176	227.818	228.174
	Mass loss %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Results		P	P	P	P	P	P	P	P

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Control Number: SACU-1703003

T.5 External Short Circuit

Start time: 2017/02/23 11:20	Ambient temp.: 19.8 °C				Operator: Stephy			
Finish time: 2017/02/24 08:50	Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	16.991	16.992	16.991	16.987	16.996	16.987	16.996
	After	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Resistance (<100mΩ)		59.6	51.3	57.4	58.2	55.8	53.1	60.5
Max Temp. (< 170°C)		57.2	57.3	57.4	57.5	57.2	57.4	57.5
Results		P	P	P	P	P	P	P

T.6 Impact / Crush (Component Cell)

UN38.3/ST/SG/AC.10/11/Rev.6

☐ Impact - Cylindrical cells not less than 18.0 mm in diameter

☒ Crush - Prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter

Start time: 2017/02/16 09:40	Ambient temp.: 19.7 °C				Operator: Stephy			
Finish time: 2017/02/16 16:30	Sample 01C	Sample 02C	Sample 03C	Sample 04C	Sample 05C			
Initial OCV (V)	3.795	3.789	3.793	3.787	3.785			
Max Temp. (< 170°C)	20.0	19.8	20.0	19.9	19.8			
Results	P	P	P	P	P			

T.7 Overcharge

Start time: 2017/02/17 09:30	Ambient temp.: 19.6 °C				Operator: Stephy			
Finish time: 2017/03/01 15:40	Sample 09	Sample 10	Sample 11	Sample 12	Sample 13	Sample 14	Sample 15	Sample 16
Initial OCV (V)	17.214	17.216	17.220	17.219	17.218	17.214	17.219	17.217
Results	P	P	P	P	P	P	P	P

T.8 Forced Discharge (Component Cell)

Start time: 2017/02/20 09:40	Ambient temp.: 19.7 °C				Operator: Stephy			
Finish time: 2017/03/01 09:10	Sample 06C	Sample 07C	Sample 08C	Sample 09C	Sample 10C	Sample 11C	Sample 12C	Sample 13C
Initial OCV (V)	3.356	3.371	3.366	3.373	3.359	3.368	3.379	3.355
Results	P	P	P	P	P	P	P	P
Sample No.	Sample 14C	Sample 15C	Sample 16C	Sample 17C	Sample 18C	Sample 19C	Sample 20C	Sample 21C
Initial OCV (V)	3.373	3.356	3.366	3.367	3.371	3.360	3.352	3.367
Results	P	P	P	P	P	P	P	P
Sample No.	Sample 22C	Sample 23C	Sample 24C	Sample 25C				
Initial OCV (V)	3.361	3.369	3.374	3.376				
Results	P	P	P	P				

7. Test Sample:



Form No. : W11-002-B04

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