

Battery Pack Test Report ***(Package Drop & UN38.3)***

Customer: ASUS

Pack Model: C11-ME370TG

Nominal voltage: 3.75V dc

Nominal capacity: 4270mAh / 16Wh

Configuration: 1S1P

Customer P/N: 0B200-00280100

Celxpert P/N: 920100138

Cell Type: Coslight CA4568D0 4400mAh

Aug. 02, 2012

Approved by 薛振凡

Reviewed by _____

Prepared by 谷林



Figure photo of the pack.



1. Package Drop Test Report

Test Period	2012/7/2		Test Spec.	IATA A53 & QS-3Q-043	
Sample Level	Mass Production	Sample Mode	Finished Product	Quantity	64PCS

1.1 DESCRIPTION OF TEST EQUIPMENTS

1.2

Kingdom Technology KD-128AS drop tester. Description of performance:

Payload capacity: 160 lbs. (72.6 kg)

Payload dimensions: Length: 61 cm / Width: 76 cm / Height: 90cm

Drop height range: 30 - 180 cm

Base Plate Material: Solid Steel (Std.)

Base Plate Size: 76.2x114.3x1.3cm

1.2 TEST CONDITION

Drop height: 120cm

Drop weight: 9.3 Kg

Drop position: One corner, three edges and three faces with 1 time. (Total: 7 drops).

Drop Position and sequence: Ref. attachment 1

1.3 SUMMARY OF TEST

Concluding the follow check items, the result of the test is **pass**.

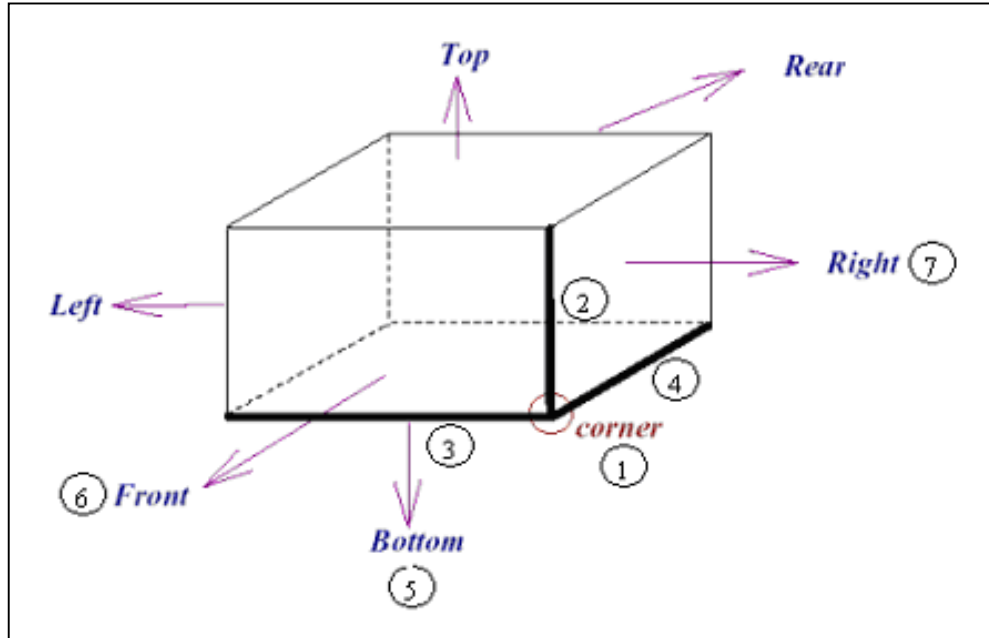
Check items	Before	After
Battery pack function	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Fail
Battery pack appearance	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Fail	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Fail
Battery pack contact and released from the package	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Test photographs please refer to Attachment 2

Function Check details please refer to Attachment 3

Attachment 1:

DROP POSITION









DROP SEQUENCE

<i>DROP</i>	<i>IMPACT SURFACE</i>
1	Corner
2	Edge 1
3	Edge 2
4	Edge 3
5	Bottom
6	Front
7	Right

Attachment 2:

Drop Sequence	Test Setup	Test Result
1		
2		
3		
4		

Drop Sequence	Test Setup	Test Result
5		
6		
7		

Open Package check for contact after drop test



2. UN38.3 Test Report

Test Period	2012/7/9~2012/8/2		Test Spec.	ST/SG/AC.10/11/Rev.5	
Parts Name	Battery Pack	Application	NB	Quantity	16PCS

2.1 Test Summary

Item	Test Item	Test Result	Details
T1	Altitude simulation test (UN38.3-1)	Pass	Page 9
T2	Thermal test (UN38.3-2)	Pass	Page 10
T3	Vibration test (UN38.3-3)	Pass	Page 11
T4	Shock test (UN38.3-4)	Pass	Page 12
T5	Short Circuit test (UN38.3-5)	Pass	Page 13
T6	Impact Test (UN38.3-6)	Pass	Page 13
T7	Overcharge test (UN38.3-7)	Pass	Page 14

The battery pack passes UN38.3 test.

2.2 Test sample list

No.	Pack S/N	Test item	No.	Cell Num.	Test item
1	Sample No. 1/16	38.3.1~38.3.5	1	20W205620355	38.3.6
2	Sample No. 2/16	38.3.1~38.3.5	2	20W205620081	38.3.6
3	Sample No. 3/16	38.3.1~38.3.5	3	20W205620291	38.3.6
4	Sample No. 4/16	38.3.1~38.3.5	4	20W205620337	38.3.6
5	Sample No. 5/16	38.3.1~38.3.5	5	20W205620294	38.3.6
6	Sample No. 6/16	38.3.1~38.3.5	6		
7	Sample No. 7/16	38.3.1~38.3.5	7		
8	Sample No. 8/16	38.3.1~38.3.5	8		
9	Sample No. 9/16	38.3.7	9		
10	Sample No. 10/16	38.3.7	10		
11	Sample No. 11/16	38.3.7			
12	Sample No. 12/16	38.3.7			
13	Sample No. 13/16	38.3.7			
14	Sample No. 14/16	38.3.7			
15	Sample No. 15/16	38.3.7			
16	Sample No. 16/16	38.3.7			

2.3 Test result

Item	Test Item	Test specification	Judge criteria	Sample(s)								
T1	Altitude Simulation (UN38.3-1)	<p>1-1. 4 batteries are standard charged. 4 batteries are 1C cycled 50 times, ending in fully charged state. All batteries weight is measured. The charged batteries voltage are measured and recorded.</p> <p>1-2. Batteries shall be stored at a pressure of 11.6Kpa or less for at least six hours at ambient temperature 20+/-5 °C.</p> <p>1-3. Vacuum is released. All cells weight is measured. The charged cell voltage are measured and recorded.</p>	<p>No mass loss (<0.1%), no leakage, no venting, no disassembly, no rupture and no fire. Battery voltage drop < 10%.</p> <p>Battery resistance change < ±10%.</p>	<p>4 packs are standard charged (Pack#1~4)</p> <p>4 packs 50 cycled ending in fully charged states (Pack#5~8)</p>								
Test Period		Start: 2012/07/9 End: 2012/07/9										
Test Equipment		數位電表 Q153, 真空烘箱 Q146, 天平 Q090										
Major Problem		-										
Warning Point		-										
Recommendation		The battery packs pass the altitude simulation test.										
Raw Data		Altitude Simulation Test on Charged Packs										
		No.	Before			After			Difference			Result
			OCV (V)	Resistance (mΩ)	Weight (g)	OCV (V)	Resistance (mΩ)	Weight (g)	Volt (%)	Resistance (%)	Weight (%)	
		1	4.178	72.2	83.86	4.169	72.6	83.86	-0.22%	0.55%	0.00%	Pass
		2	4.177	71.9	83.86	4.169	72.4	83.85	-0.19%	0.70%	0.00%	Pass
		3	4.178	72.1	83.87	4.171	72.7	83.87	-0.17%	0.83%	0.00%	Pass
		4	4.176	70.9	83.88	4.168	71.4	83.87	-0.19%	0.71%	0.00%	Pass
		5	4.176	72.4	83.85	4.169	72.9	83.84	-0.17%	0.69%	0.00%	Pass
		6	4.177	72.6	83.85	4.169	73.0	83.85	-0.19%	0.55%	0.01%	Pass
		7	4.175	72.1	83.87	4.167	72.6	83.86	-0.19%	0.69%	0.01%	Pass
8	4.178	72.4	83.87	4.169	73.0	83.87	-0.22%	0.83%	0.00%	Pass		

Item	Test Item	Test specification	Judge criteria	Sample(s)								
T2	Thermal test (UN38.3-2)	2-1. Packs are stored for 6 hours at 75±2°C, followed by storage for 6 hours at -40±2°C. The maximum time interval between test temperature extremes is 30 minutes. 2-2.Repeat 2-1 for 10 times. Then store the packs at ambient for 24 hours. All packs weight are measured. The charged battery voltage are measured and recorded.	No mass loss (<0.1%), no leakage, no venting, no disassembly, no rupture and no fire. Battery voltage drop < 10%. Battery resistance change < ±10%.	4 packs are standard charged (Pack#1~4) 4 packs 50 cycled ending in fully charged states (Pack#5~8)								
Test Period		Start: 2012/07/10 End: 2012/07/17										
Test Equipment		數位電表 Q153, 冷熱衝擊機 Q155, 天平 Q090										
Major Problem		-										
Warning Point		-										
Recommendation		The battery packs pass the thermal test.										
Raw Data		The mal Test on Charged Packs										
		No.	Before			After			Difference			Result
			OCV (V)	Resistance (m Ω)	Weight (g)	OCV (V)	Resistance (m Ω)	Weight (g)	Volt (%)	Resistance(%)	Weight (%)	
		1	4.169	72.6	83.86	3.992	73.2	83.76	-4.25%	0.83%	0.12%	Pass
		2	4.169	72.4	83.85	4.006	73.1	83.74	-3.91%	0.97%	0.13%	Pass
		3	4.171	72.7	83.87	4.002	73.5	83.75	-4.05%	1.10%	0.14%	Pass
		4	4.168	71.4	83.87	3.996	71.9	83.75	-4.13%	0.70%	0.14%	Pass
		5	4.169	72.9	83.84	3.996	73.7	83.73	-4.15%	1.10%	0.13%	Pass
		6	4.169	73.0	83.85	3.995	73.8	83.74	-4.17%	1.10%	0.13%	Pass
		7	4.167	72.6	83.86	3.995	73.2	83.76	-4.13%	0.83%	0.12%	Pass
8	4.169	73.0	83.87	4.000	73.5	83.75	-4.05%	0.68%	0.14%	Pass		

Item	Test Item	Test specification	Judge criteria	Sample(s)								
T3	Vibration test (UN38.3-3)	3-1. Packs are firmly secured to the platform of the vibration machine without distorting the packs in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of 3 mutually perpendicular to the terminal face. 3-2. The logarithmic frequency sweep is as follows: 7-18 Hz \hat{e} 1gn 18-50 Hz \hat{e} 0.8mm amplitude 50-200 Hz \hat{e} 8gn 3-3. All packs weight are measured. The charged packs voltage are measured and recorded.	No mass loss (<0.1%), no leakage, no venting, no disassembly, no rupture and no fire. Battery voltage drop < 10%. Battery resistance change < $\pm 10\%$	4 packs are standard charged (Pack#1~4) 4 packs 50 cycled ending in fully charged states (Pack#5~8)								
Test Period		Start: 2012/07/18 End: 2012/07/19										
Test Equipment		數位電表 Q153, 振動測試機 Q156, 天平 Q090										
Major Problem		-										
Warning Point		-										
Recommendation		The battery packs pass the vibration test.										
Raw Data		Vibration Test on Charged Packs										
		No.	Before			After			Difference			Result
			OCV (V)	Resistance (m Ω)	Weight (g)	OCV (V)	Resistance (m Ω)	Weight (g)	Volt (%)	Resistance (%)	Weight (%)	
		1	3.992	73.2	83.76	3.984	73.8	83.72	-0.20%	0.82%	0.05%	Pass
		2	4.006	73.1	83.74	3.997	73.6	83.70	-0.22%	0.68%	0.05%	Pass
		3	4.002	73.5	83.75	3.991	73.9	83.70	-0.27%	0.54%	0.06%	Pass
		4	3.996	71.9	83.75	3.989	72.3	83.71	-0.18%	0.56%	0.05%	Pass
		5	3.996	73.7	83.73	3.988	74.3	83.69	-0.20%	0.81%	0.05%	Pass
		6	3.995	73.8	83.74	3.988	74.4	83.70	-0.18%	0.81%	0.05%	Pass
		7	3.995	73.2	83.76	3.986	73.9	83.71	-0.23%	0.96%	0.05%	Pass
8	4.000	73.5	83.75	3.993	74.0	83.71	-0.18%	0.68%	0.05%	Pass		

Item	Test Item	Test specification	Judge criteria	Sample(s)								
T4	Shock test (UN38.3-4)	4-1. Packs shall be secured to the testing machine by means of a rigid mount, which will support all mounting surfaces. 4-2. Packs shall be subjected to a half-sine shock of peak acceleration 150gn and pulse duration of 6 milliseconds. Each pack shall be subjected to 3 shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicularly mounting positions of the pack for a total of 18 shocks. 4-3. All batteries weight are measured. The charged cell voltage are measured and recorded.	No mass loss (<0.1%), no leakage, no venting, no disassembly, no rupture and no fire. Battery voltage drop < 10%. Battery resistance change < ±10%.	4 packs are standard charged (Pack#1~4) 4 packs 50 cycled ending in fully charged states (Pack#5~8)								
Test Period		Start: 2012/07/20 End: 2012/07/20										
Test Equipment		數位電表 Q153, 衝擊測試機 Q154, 天平 Q090										
Major Problem		-										
Warning Point		-										
Recommendation		The battery packs pass the shock test.										
Raw Data		Shock Test on Charged Packs										
		No.	Before			After			Difference			Result
			OCV (V)	Resistance (mΩ)	Weight (g)	OCV (V)	Resistance (mΩ)	Weight (g)	Volt (%)	Resistance (%)	Weight (%)	
		1	3.984	73.8	83.72	3.979	74.1	83.71	-0.13%	0.41%	0.01%	Pass
		2	3.997	73.6	83.70	3.993	74.0	83.69	-0.10%	0.54%	0.01%	Pass
		3	3.991	73.9	83.70	3.985	74.4	83.69	-0.15%	0.68%	0.01%	Pass
		4	3.989	72.3	83.71	3.983	72.8	83.70	-0.15%	0.69%	0.01%	Pass
		5	3.988	74.3	83.69	3.983	74.9	83.68	-0.13%	0.81%	0.01%	Pass
		6	3.988	74.4	83.70	3.982	74.9	83.69	-0.15%	0.67%	0.01%	Pass
		7	3.986	73.9	83.71	3.981	74.3	83.71	-0.13%	0.54%	0.01%	Pass
8	3.993	74.0	83.71	3.988	74.3	83.70	-0.13%	0.41%	0.01%	Pass		

Item	Test Item	Test specification	Judge criteria	Sample(s)	
T5	Short Circuit Test (UN38.3-5)	5-1.Packs are placed in to a 55±2°C oven, and exterior packs temperature are monitored 5-2.When packs exterior reach 55±2°C, they are shorted by connecting terminals with a copper wire of resistance less than 100m Ohm. 5-4. The short was continued for more than 1hour or the cell temperature return to 55°C. The packs are observed for a further 6 hours.	No rupture, no disassembly, no explosion, no fire, no smoke. Packs exterior peak temperature <170°C.	4 packs are standard charged (Pack#1~4) 4 packs 50 cycled ending in fully charged states (Pack#5~8)	
Test Period		Start: 2012/07/23 End: 2012/07/23			
Test Equipment		數位電表 Q153, 資料收集器 Q151, 烘箱 Q171			
Recommendation		The battery packs pass the short test.			
Raw Data		Short Circuit Test on Charged Packs			
		No.	Max. Temp.(°C)	Visual	Result
		1	57.2	OK	Pass
		2	56.9	OK	Pass
		3	57.5	OK	Pass
		4	57.4	OK	Pass
		5	57.8	OK	Pass
		6	57.4	OK	Pass
		7	57.8	OK	Pass
8	57.6	OK	Pass		
T6	Impact test (UN38.3-6)	6-1. The test sample is to be placed on a flat surface. A 15.8mm diameter bar is to be placed across the center of the sample. A 9.1 Kg mass is to be dropped from a height of 61±2.5cm onto the sample. 6-2. A cylindrical or prismatic cell is to be impacted with its longitudinal axis parallel to the flat surface.	External temperature of cell does not exceed 170°C and there is no disassembly and no fire within 6 hours of the test.	5 cells are 50% charged (Cell #1~5) For prismatic cell, The amount double	
Test Period		Start: 2012/07/24 End: 2012/07/25			
Test Equipment		數位電表 Q153, 資料收集器 Q151, 撞擊試驗機 Q231			
Recommendation		The cells pass the impact test.			
Raw Data		Impact Test on 50% Charged Cells			
		No.	Max. Temp.(°C)	Visual	Result
		1	95.60	OK	Pass
		2	87.50	OK	Pass
		3	97.60	OK	Pass
		4	86.30	OK	Pass
5	84.20	OK	Pass		

Item	Test Item	Test specification	Judge criteria	Sample(s)			
T7	Overcharge test (UN38.3-7)	7-1. The charge current shall be twice the Spec's recommended maximum continuous charge current. 7-2. The minimum voltage of the test shall be as follows: (a) When the Spec's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V. (b) When the Spec's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage. 7-3. Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.	No disassembly, no fire within seven days of the test.	4 packs are fully charged (Pack#9~12) 4 packs are 50 times cycled ending in fully charged state (Pack #13~16)			
Test Period		Start: 2012/07/26 End: 2012/08/02					
Test Equipment		數位電表 Q153, 資料收集器 Q151, 電源供應器 Q147					
Major Problem		-					
Warning Point		-					
Recommendation		The battery packs pass the overcharge test.					
Raw Data		Overcharge Test on Charged Packs					
		No.	Charge Voltage(V)	Charge Current(A)	Max. Temp.(°C)	Visual	Result
		9	8.4 V	4.25 A	25.6	OK	Pass
		10			25.6	OK	Pass
		11			25.3	OK	Pass
		12			25.7	OK	Pass
		13			25.1	OK	Pass
		14			25.3	OK	Pass
		15			25.6	OK	Pass
		16			25.4	OK	Pass