

UN38.3 Lithium Battery Test Summary for GreenTech Tablet Model No. T54321

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4	Test Report Number H04121029021D-1																																
5	Date of Test Report Apr-28-2013																																
6	Description of Cell or Battery Product : Secondary LI-Ion Battery Appearance : Prismatic type Cell or Battery Type: Lithium ion Model Name: EB485159LU Watt-hour rating or Lithium Content: 3.80V, 1700mAh, 6.46Wh Completed Cell or Battery Weight: 31.20g																																
7	UN38.3 Tests Performed and Successfully Passed <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ITEM</th> <th>SAMPLE NUMBER</th> <th>STANDARD</th> <th>CONCLUSION</th> </tr> </thead> <tbody> <tr> <td>Altitude simulation</td> <td rowspan="5" style="text-align: center;">N1-N10</td> <td>UN38.3-T1</td> <td>Pass</td> </tr> <tr> <td>Thermal test</td> <td>UN38.3-T2</td> <td>Pass</td> </tr> <tr> <td>Vibration</td> <td>UN38.3-T3</td> <td>Pass</td> </tr> <tr> <td>Shock</td> <td>UN38.3-T4</td> <td>Pass</td> </tr> <tr> <td>External short circuit</td> <td>UN38.3-T5</td> <td>Pass</td> </tr> <tr> <td>Crush</td> <td>N11-N15</td> <td>UN38.3-T6</td> <td>Pass</td> </tr> <tr> <td>Overcharge</td> <td>N16-N19&C1-C4</td> <td>UN38.3-T7</td> <td>Pass</td> </tr> <tr> <td>Forced discharge</td> <td>N20-N29&C5-C14</td> <td>UN38.3-T8</td> <td>Pass</td> </tr> </tbody> </table>	ITEM	SAMPLE NUMBER	STANDARD	CONCLUSION	Altitude simulation	N1-N10	UN38.3-T1	Pass	Thermal test	UN38.3-T2	Pass	Vibration	UN38.3-T3	Pass	Shock	UN38.3-T4	Pass	External short circuit	UN38.3-T5	Pass	Crush	N11-N15	UN38.3-T6	Pass	Overcharge	N16-N19&C1-C4	UN38.3-T7	Pass	Forced discharge	N20-N29&C5-C14	UN38.3-T8	Pass
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8	Assembled Battery Testing Requirements Not Applicable																																
9	Edition of UN Manual of Tests and Criteria Used The submitted battery and component cell were complied with the UN Manual of Tests and Criteria, Part III, sub-section 38.3.																																
10	Name and Title of Signatory Prepared by: <i>Xu Dapeng</i> Checked by: <i>Wang Sun</i> Approved by: <i>yangguanyu</i>																																



Pony Testing International Group

H04121029021D-1

报告编号(Report ID):

锂电池 UN38.3 测试报告

Lithium Battery UN38.3 Test Report

样品名称
(Sample)

EB485159LU

委托单位
(Client)

TIANJIN JINPING ELECTRONICS CO.,LTD

生产单位
(Manufacturer)

TIANJIN JINPING ELECTRONICS CO.,LTD

PONY 普尼国际

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www.ponytest.com

Code: e69kbz

I. SAMPLE DESCRIPTION

Sample Name	EB485159LU		Battery Type	EB485159LU	
Client	TIANJIN JINPING ELECTRONICS CO.,LTD				
Manufacturer	TIANJIN JINPING ELECTRONICS CO.,LTD				
Nominal Voltage	3.8V	Rated Capacity	6.46Wh	Limited Charge Voltage	4.35V
Charge Current	850mA	Maximum Continuous Charge Current	1700mA	End Charge Current	85 mA
Cut-off Voltage	2.75V	Maximum Discharge Current	3400mA	Use	phone
Cells Number	1	Cell Model	UF465156SX	Rated Capacity	1700mAh
Manufacturer of cell	Sanyo				
Chemical component	Lithium Ion				
Client date	Apr -12-2013		Finished date	Apr-28-2013	

II. REFERENCE METHOD

United Nations Recommendations On Transport Of Dangerous Goods, Manual Of Tests And Criteria. ST-SG-AC10-11-Rev5-Amend1e

III. TEST ITEM

- | | |
|------------------------|---------------------------|
| 1. Altitude simulation | 5. External short circuit |
| 2. Thermal test | 6. Crush |
| 3. Vibration | 7. Overcharge |
| 4. Shock | 8. Forced discharge |

IV. CONCLUSION

ITEM	SAMPLE NUMBER	STANDARD	CONCLUSION
Altitude simulation	N1~N10	UN38.3-T1	Pass
Thermal test		UN38.3-T2	Pass
Vibration		UN38.3-T3	Pass
Shock		UN38.3-T4	Pass
External short circuit		UN38.3-T5	Pass
Crush	N11~N15	UN38.3-T6	Pass
Overcharge	N16~N19&C1~C4	UN38.3-T7	Pass
Forced discharge	N20~N29&C5~C14	UN38.3-T8	Pass

The submitted battery and component cell were complied with the UN Manual of Tests and Criteria, Part III, sub-section 38.3.

Prepared by: *Xu Dapeng* Checked by:

Wang Jun Approved by:

Approval Date:



Notes:

- Batteries of N1~N10&N16~N19 are full charged after one cycle;
- Component cells of N11~N15 are 50% charged after one cycle;
- Batteries of N20~N29 are full discharge after one cycle;
- Batteries of C1~C4 are full charged after fifty cycles;
- Batteries of C5~C14 are full discharge after fifty cycles.

V. PHOTO OF THE SAMPLE



(Authenticate the photo on original report only)

VI. TEST METHOD

Tests T.1 to T.5 shall be conducted in sequence on the same cell or battery. Tests T.6 and T.8 shall be conducted using not otherwise tested cells or batteries. Test T.7 may be conducted using undamaged batteries previously used in tests T.1 to T.5 for purposes of testing on cycled batteries.

In order to quantify the mass loss, the following procedure is provided:

$$\text{Mass loss(\%)} = (M_1 - M_2) / M_1 \times 100$$

Where M_1 is the mass before the test and M_2 is the mass after the test. When mass loss does not exceed the values in Table blow, it shall be considered as “no mass loss”.

Mass M of cell or battery	Mass loss limit
$M < 1g$	0.5%
$1g \leq M \leq 75g$	0.2%
$M > 75g$	0.1%

T.1 Altitude simulation

Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature ($20 \pm 5 \text{ }^\circ\text{C}$).

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

T.2 Thermal test

Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72 ± 2 °C, followed by storage for at least six hours at a test temperature equal to -40 ± 2 °C. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20 ± 5 °C). For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

T.3 Vibration

Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz 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 three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.

The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12 kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries).

For cells and small batteries: from 7 Hz a peak acceleration of $1 g_n$ is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of $8 g_n$ occurs (approximately 50 Hz).

A peak acceleration of $8 g_n$ is then maintained until the frequency is increased to 200 Hz.

For large batteries: from 7 Hz to a peak acceleration of $1 g_n$ is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of $2 g_n$ occurs (approximately 25 Hz). A peak acceleration of $2 g_n$ is then maintained until the frequency is increased to 200 Hz.

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire during the test and after the test and if the open circuit voltage of each test cell or battery directly after testing in its third perpendicular mounting position is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

T.4 Shock

Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each cell or battery shall be subjected to a half-sine shock of peak acceleration of $150 g_n$ and pulse duration of 6 milliseconds. Each cell or battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.

However, large cells and large batteries shall be subjected to a half-sine shock of peak acceleration of $50 g_n$ and pulse duration of 11 milliseconds. Each cell or battery is subjected to three shocks in the positive direction followed by three shocks in the negative direction of each of three mutually perpendicular mounting positions of the cell for a total of 18 shocks.

Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

T.5 External short circuit

The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 55 ± 2 °C and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm at 55 ± 2 °C. This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 55 ± 2 °C.

Cells and batteries meet this requirement if their external temperature does not exceed 170 °C and there is no disassembly, no rupture and no fire during the test and within six hours after the test.

T.6 Impact / Crush

Impact (applicable to cylindrical cells greater than 20 mm in diameter)

The sample cell or component cell is to be placed on a flat smooth surface. A 15.8 mm \pm 0.1mm diameter, at least 6 cm long, or the longest dimension of the cell, whichever is greater, Type 316 stainless steel bar is to be placed across the centre of the sample. A 9.1 kg \pm 0.1 kg mass is to be dropped from a height of 61 \pm 2.5 cm at the intersection of the bar and sample in a controlled manner using a near frictionless, vertical sliding track or channel with minimal drag on the falling mass. The vertical track or channel used to guide the falling mass shall be oriented 90 degrees from the horizontal supporting surface.

The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8 mm \pm 0.1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact.

Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells not more than 20 mm in diameter)

A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached.

- (a) The applied force reaches 13 kN \pm 0.78 kN;
- (b) The voltage of the cell drops by at least 100 mV; or
- (c) The cell is deformed by 50% or more of its original thickness.

Once the maximum pressure has been obtained, the voltage drops by 100 mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.

A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis.

Each test cell or component cell is to be subjected to one crush only. The test sample shall be observed for a further 6 h. The test shall be conducted using test cells or component cells that have not previously been subjected to other tests.

Cells and component cells meet this requirement if their external temperature does not exceed 170 °C and there is no disassembly and no fire during the test and within six hours after this test.

T.7 Overcharge

The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:

- (a) When the manufacturer'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.

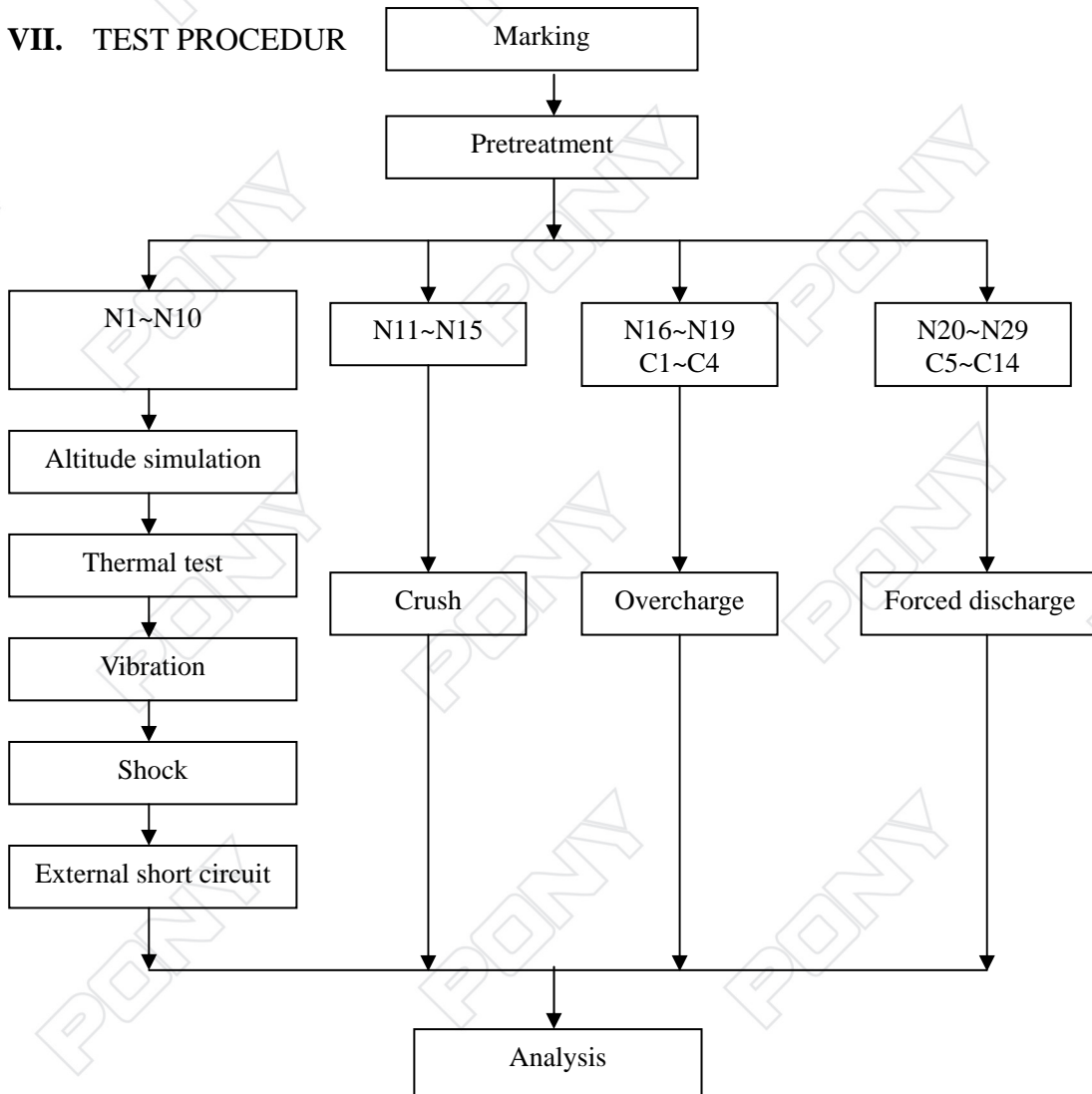
(b) When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage.
Tests are to be conducted at ambient temperature; the duration of the test shall be 24 hours.
Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

T.8 Forced discharge

Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer.
The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).

Primary or rechargeable cells meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

VII. TEST PROCEDUR



VIII. TEST APPARATUS

Rechargeable battery test system
 DC regulated power supply
 Vacuum chamber
 Battery extrusion needling machine
 Temperature circulation chamber
 Electronic balance

Vibration test instrument
 Digital multimeter
 Shock test instrument
 Thermoelectric pair
 Battery anti-explosion chamber

IX. DATA

1. Altitude simulation

No.	Pre-test		After test		Mass loss (%)	Voltage loss (%)	Status
	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)			
N1	31.1432	4.17	31.1428	4.17	0.001	0.00	OK
N2	31.1250	4.17	31.1250	4.17	0.000	0.00	OK
N3	31.1615	4.17	31.1613	4.17	0.001	0.00	OK
N4	31.1895	4.17	31.1892	4.17	0.001	0.00	OK
N5	31.1290	4.17	31.1287	4.17	0.001	0.00	OK
N6	31.1503	4.17	31.1502	4.17	0.000	0.00	OK
N7	31.1916	4.17	31.1916	4.17	0.000	0.00	OK
N8	31.2021	4.17	31.2019	4.17	0.001	0.00	OK
N9	31.1598	4.17	31.1596	4.17	0.001	0.00	OK
N10	31.1661	4.17	31.1657	4.17	0.001	0.00	OK

2. Thermal test

No.	Pre-test		After test		Mass loss (%)	Voltage loss (%)	Status
	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)			
N1	31.1428	4.17	31.1402	4.14	0.008	0.72	OK
N2	31.1250	4.17	31.1227	4.14	0.007	0.72	OK
N3	31.1613	4.17	31.1586	4.14	0.009	0.72	OK
N4	31.1892	4.17	31.1864	4.14	0.009	0.72	OK
N5	31.1287	4.17	31.1256	4.14	0.010	0.72	OK
N6	31.1502	4.17	31.1473	4.14	0.009	0.72	OK
N7	31.1916	4.17	31.1885	4.14	0.010	0.72	OK
N8	31.2019	4.17	31.1990	4.14	0.009	0.72	OK
N9	31.1596	4.17	31.1571	4.14	0.008	0.72	OK
N10	31.1657	4.17	31.1628	4.14	0.009	0.72	OK

3 . Vibration

No.	Pre-test		After test		Mass loss (%)	Voltage loss (%)	Status
	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)			
N1	31.1402	4.14	31.1400	4.14	0.001	0.00	OK
N2	31.1227	4.14	31.1227	4.14	0.000	0.00	OK
N3	31.1586	4.14	31.1583	4.14	0.001	0.00	OK
N4	31.1864	4.14	31.1860	4.14	0.001	0.00	OK
N5	31.1256	4.14	31.1255	4.14	0.000	0.00	OK
N6	31.1473	4.14	31.1473	4.14	0.000	0.00	OK
N7	31.1885	4.14	31.1883	4.14	0.001	0.00	OK
N8	31.1990	4.14	31.1988	4.14	0.001	0.00	OK
N9	31.1571	4.14	31.1567	4.14	0.001	0.00	OK
N10	31.1628	4.14	31.1625	4.14	0.001	0.00	OK

4 .Shock

NO.	Pre-test		After test		Mass loss (%)	Voltage loss (%)	Status
	Mass (g)	Voltage (V)	Mass (g)	Voltage (V)			
N1	31.1400	4.14	31.1397	4.14	0.001	0.00	OK
N2	31.1227	4.14	31.1225	4.14	0.001	0.00	OK
N3	31.1583	4.14	31.1583	4.14	0.000	0.00	OK
N4	31.1860	4.14	31.1859	4.14	0.000	0.00	OK
N5	31.1255	4.14	31.1255	4.14	0.000	0.00	OK
N6	31.1473	4.14	31.1473	4.14	0.000	0.00	OK
N7	31.1883	4.14	31.1881	4.14	0.001	0.00	OK
N8	31.1988	4.14	31.1988	4.14	0.000	0.00	OK
N9	31.1567	4.14	31.1564	4.14	0.001	0.00	OK
N10	31.1625	4.14	31.1625	4.14	0.000	0.00	OK

5. External short circuit

No.	Peak temperature(°C)	Status
N1	55	OK
N2	55	OK
N3	55	OK
N4	55	OK
N5	57	OK
N6	55	OK
N7	57	OK
N8	55	OK
N9	56	OK
N10	56	OK

6. Crush

No.	Peak temperature(°C)	Status
N11	23	OK
N12	23	OK
N13	22	OK
N14	23	OK
N15	23	OK

7. Overcharge

No.	Status
N16	OK
N17	OK
N18	OK
N19	OK
C1	OK
C2	OK
C3	OK
C4	OK

8. Forced discharge

No.	Status
N20	OK
N21	OK
N22	OK
N23	OK
N24	OK
N25	OK
N26	OK
N27	OK
N28	OK
N29	OK
C5	OK
C6	OK
C7	OK
C8	OK
C9	OK
C10	OK
C11	OK
C12	OK
C13	OK
C14	OK

*** End of report ***