



UN38.3 Test Summary

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Description		List of Test Completed	
Cell/Battery Type	Rechargeable Lithium Ion battery pack	Revised edition	Revision 7
Physical Description	Prismatic shape(pouch case)	Test 1. Altitude Simulation	Pass
Test Report Number	QDI-220318-SB-EB-BF936ABY L	Test 2. Thermal Test	Pass
Date of test report	2022.03.18	Test 3. Vibration	Pass
Model name	EB-BF936ABY L	Test 4. Shock	Pass
Nominal voltage (V)	3.88	Test 5. External Short Circuit	Pass
Capacity (mAh / Wh)	2005 / 7.77	Test 6. Crush	Pass
Mass (g)	27.370	Test 7. Overcharge	Pass
Reference to assembled battery testing requirements	Not applicable	Test 8. Forced Discharge	Pass

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Report number	QDI-220318-SB-EB-BF936ABY L	
Prepared by	Jie Ma	
Approved by	Kekang Xu	

UN38.3 Test Report

- EB-BF936ABY L
(3.88V, 2005mAh/7.77Wh) -

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2022. 03. 18

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1. UN38.3 Test Condition

Rev.7

Test item	Test Condition	Requirements	Etc.
Test 1. Altitude Simulation	Storing at (low pressure)11.6kPa for 6hr at 20+/-5°C	- After OCV (%) ≥ 90% - No leakage, no venting, no disassembly, no rupture, no fire - Mass loss limit (leakage) 1) If M<1g, less than 0.5%, 2) If 1g≤M≤75g, less than 0.2%, 3) If M>75g, less than 0.1%	T1~T5 : Sequence Tests <pre> graph TD T1[Test 1 Altitude Simulation] --> T2[Test 2 Thermal Test] T2 --> T3[Test 3 Vibration] T3 --> T4[Test 4 Shock] T4 --> T5[Test 5 Ext. Short Circuit] </pre>
Test 2. Thermal Test	[72±2°C,6hr ↔ -40±2°C,6hr, interval max. 30min] x 10cycle Storing at 20±5°C for 24h		
Test 3. Vibration	[7Hz↔200Hz↔7Hz, in 15min] x 12 times x 3 direction 1) sinusoidal waveform with a logarithmic sweep 2) 7Hz 18Hz (maintaining 1gn) app. 50Hz (until 8gn) 200Hz (maintaining 8gn), 1.6mm total excursion		
Test 4. Shock	Half sine shock 1) Peak acceleration - For cells & single cell batteries : 150gn - For batteries (whichever is smaller) : 150gn or $\sqrt{\frac{100850}{Mass(kg)}} gn$ 2) Pulse duration : 6msec 3) 6 direction (±x, y, z) x 3 cycle		
Test 5. External Short Circuit	1) Samples to be heated to 57±4°C in chamber (Measured on external case) 2) Less than 0.1Ω, ext. short-circuit at 57±4°C 3) 1hr continue after returning to 57±4°C		
Test 6. Impact	Φ=15.8±0.1mm bar, 9.1±0.1kg mass, 61±2.5cm height	- No disassembly, no fire within 6 hours after the test - Max. Temp ≤ 170°C	for cylindrical cells (dia ≥ 18mm)
Test 6. Crush	Crushing rate :1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation		for cylindrical cells (dia < 18mm) for prismatic, pouch, coin/button cells
Test 7. Overcharge	Current = Manufacturer's recommended max. continuous charge current X 2 Voltage 1.If charge voltage ≤ 18V, V (min.) = 2 x (max. charge voltage) or 22V. 2.If charge voltage > 18V, V (min.) = 1.2 x (max. charge voltage)	- No disassembly, no fire within 7 days after the test	Only for Single Cell Battery / Battery
Test 8. Forced Discharge	Discharge at max. discharge current (connecting in series with 12V DC power supply), Duration time = rated capacity/initial test current	- No disassembly, no fire within 7 days after the test	Resistance of Electric Loader $Rt = \frac{12V + Vc}{Max\ discharge\ current}$ - Rc-Rw

2-1. Test Result (T1-T4)

Before			T1. Altitude Simulation					T2. Thermal					T3. Vibration					T4. Shock				
NO.	OCV(V)	Mass(g)	After OCV(V)	Mass(g)	After OCV(%)	Mass Loss(%)	Result	After OCV(V)	Mass(g)	After OCV(%)	Mass Loss(%)	Result	After OCV(V)	Mass(g)	After OCV(%)	Mass Loss(%)	Result	After OCV(V)	Mass(g)	After OCV(%)	Mass Loss(%)	Result

A. 1st cycle fully charged state

1	4.4298	26.322	4.4277	26.322	99.95	0.000	Pass	4.3145	26.313	97.44	0.034	Pass	4.3144	26.313	100.00	0.000	Pass	4.3140	26.313	99.99	0.000	Pass
2	4.4300	26.318	4.4277	26.317	99.95	0.004	Pass	4.3140	26.309	97.43	0.030	Pass	4.3137	26.309	99.99	0.000	Pass	4.3131	26.309	99.99	0.000	Pass
3	4.4310	26.468	4.4287	26.467	99.95	0.004	Pass	4.3144	26.458	97.42	0.034	Pass	4.3143	26.459	100.00	0.000	Pass	4.3138	26.458	99.99	0.004	Pass
4	4.4306	26.386	4.4283	26.385	99.95	0.004	Pass	4.3138	26.376	97.41	0.034	Pass	4.3135	26.377	99.99	0.000	Pass	4.3130	26.376	99.99	0.004	Pass
5	4.4282	26.458	4.4259	26.458	99.95	0.000	Pass	4.3126	26.449	97.44	0.034	Pass	4.3123	26.449	99.99	0.000	Pass	4.3118	26.449	99.99	0.000	Pass

B. 25th cycle fully charged state

6	4.4403	26.434	4.4383	26.434	99.95	0.000	Pass	4.3261	26.425	97.47	0.034	Pass	4.3258	26.426	99.99	0.000	Pass	4.3253	26.425	99.99	0.004	Pass
7	4.4416	26.484	4.4395	26.483	99.95	0.004	Pass	4.3272	26.475	97.47	0.030	Pass	4.3269	26.475	99.99	0.000	Pass	4.3263	26.475	99.99	0.000	Pass
8	4.4392	26.370	4.4372	26.369	99.95	0.004	Pass	4.3252	26.362	97.48	0.027	Pass	4.3250	26.361	100.00	0.004	Pass	4.3244	26.361	99.99	0.000	Pass
9	4.4417	26.569	4.4399	26.569	99.96	0.000	Pass	4.3297	26.562	97.52	0.026	Pass	4.3294	26.562	99.99	0.000	Pass	4.3289	26.561	99.99	0.004	Pass
10	4.4419	26.516	4.4399	26.515	99.95	0.004	Pass	4.3283	26.508	97.49	0.026	Pass	4.3281	26.508	100.00	0.000	Pass	4.3275	26.508	99.99	0.000	Pass

2-2. Test Result (T5/T7)

T5. External Short Circuit			
NO.	Initial OCV(V)	Max. Temp(°C)	Result

A. 1st cycle fully charged state

1	4.3140	57.60	Pass
2	4.3131	57.80	Pass
3	4.3138	57.03	Pass
4	4.3130	57.19	Pass
5	4.3118	57.47	Pass

B. 25th cycle fully charged state

6	4.3253	57.77	Pass
7	4.3263	57.95	Pass
8	4.3244	57.24	Pass
9	4.3289	57.49	Pass
10	4.3275	57.69	Pass

T7. Overcharge			
NO.	Initial OCV(V)	Max. Temp(°C)	Result

A. 1st cycle fully charged state

11	4.4294	22.50	Pass
12	4.4300	22.60	Pass
13	4.4296	22.30	Pass
14	4.4300	22.70	Pass

B. 25th cycle fully charged state

15	4.4402	22.50	Pass
16	4.4406	22.70	Pass
17	4.4416	22.30	Pass
18	4.4393	22.90	Pass

2-3. Test Result (T6/T8) - P384467A1

T6. Crush			
NO.	Initial OCV(V)	Max. Temp(°C)	Result

A. 1st cycle 50% charged state

C-1	3.8770	22.64	Pass
C-2	3.8772	22.45	Pass
C-3	3.8773	22.68	Pass
C-4	3.8800	22.42	Pass
C-5	3.8780	22.45	Pass

B. 25th cycle 50% charged state

C-6	3.8906	22.41	Pass
C-7	3.8898	22.37	Pass
C-8	3.8911	22.21	Pass
C-9	3.8862	22.38	Pass
C-10	3.8888	22.30	Pass

T8. Forced Discharge							
NO.	Initial OCV(V)	Max. Temp(°C)	Result	NO.	Initial OCV(V)	Max. Temp(°C)	Result

A. 1st cycle fully discharged state

C-11	3.4128	57.62	Pass
C-12	3.4162	57.87	Pass
C-13	3.4087	56.17	Pass
C-14	3.4218	51.91	Pass
C-15	3.4251	55.27	Pass
C-16	3.4307	54.75	Pass
C-17	3.4294	52.09	Pass
C-18	3.4109	57.97	Pass
C-19	3.4106	54.29	Pass
C-20	3.3933	52.40	Pass

B. 25th cycle fully discharged state

C-21	3.4683	47.48	Pass
C-22	3.4836	52.80	Pass
C-23	3.4782	50.92	Pass
C-24	3.4584	51.20	Pass
C-25	3.4531	54.20	Pass
C-26	3.4374	49.93	Pass
C-27	3.4694	52.36	Pass
C-28	3.4688	52.40	Pass
C-29	3.4652	53.45	Pass
C-30	3.4729	52.43	Pass

3. Sample Image

