황형우/hwoo.ham/천안사업장|복합동,용역동|품질)Cell개발품질그룹/179147140/20160201154845

Model name : EB-BG930ABE

Revision 08

Executive Div.	Safety Center	Confidential

	Name / Title	Signature	Date
Reported by	Ham Hyung Woo		2016.2.1
Approved by	Lee Keun Sang		2016. 2. 1

Test report; UN Manual of Tests and Criteria, Part III, Subsection 38.3

2013, Rev.5, Amend.2

Document No : SDI-UN-160201-01

SAMSUNG SDI
Energy Business Division

본 정보는 삼성SDI 정보자산으로 관리책임자의 허가없이 출력, 배포, 반출을 할 수 없으며, 위규시 관련 법령에 의거하여 민사상 불이익을 받을 수 있습니다.

Product Information

1. Model name: **EB-BG930ABE**

2. Product classification: **Li rechargeable battery pack (Single cell battery)**

3. Nominal voltage: 3.85 V

4. Rated capacity: 3000 mAh

5. Wh Capacity: 11.55 Wh

6. Weight of product: 42.00 g

7. Test Date: 2015/12/04 ~ 2015/12/31

8. Test Location: SAMSUNG SDI Safety Center, 508 Sungsungdong, Cheonan Chungcheongnamdo, Korea

Test summary

Test No.	Test item	Relating Std.	Test begins on (YYYY/MM/DD)	Test Completed on (YYYY/MM/DD)	Judgment (Pass/Fail)
T1	Altitude simulation	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.1	2015/12/04	2015/12/04	Pass
T2	Thermal test	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.2	2015/12/06	2015/12/12	Pass
T3	Vibration	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.3	2015/12/15	2015/12/15	Pass
T4	Shock	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.4	2015/12/17	2015/12/17	Pass
T5	External short circuit	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.5	2015/12/18	2015/12/18	Pass
T6	Impact / Crush	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.6	2015/12/18	2015/12/18	Pass
T7	Overcharge	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.7	2015/12/23	2015/12/31	Pass
T8	Forced discharge	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.8	2015/12/24	2015/12/31	Pass
Total Judgment(Pass/Fail)					Pass

■ Tests T-1 through T-5 shall be conducted in sequence with the same cell/pack/single cell battery.
■ For test 6, test should be conducted for Li-ion cells or component cell contained in a battery.
■ T7 shall be performed only for Li-ion rechargeable battery or rechargeable single cell battery not cell.
■ T8 should be conducted for Li-ion cells or component cell contained in a battery.

T-1~T-5) Transportation Test (Test Result: Pass)

Fresh Pack 100% SOC												
Initial							T1					
No.	Weight(g)	OCV(V)					Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result
1	41.901	4.37					41.900	4.37	0.00	100.00	O	PASS
2	41.882	4.37					41.881	4.37	0.00	100.00	O	PASS
3	41.884	4.37					41.884	4.37	0.00	100.00	O	PASS
4	41.794	4.37					41.792	4.37	0.00	100.00	O	PASS
5	41.925	4.37					41.925	4.37	0.00	100.00	O	PASS
6	41.850	4.37					41.850	4.37	0.00	100.00	O	PASS
7	41.706	4.37					41.705	4.37	0.00	100.00	O	PASS
8	41.913	4.37					41.913	4.37	0.00	100.00	O	PASS
9	41.941	4.37					41.941	4.37	0.00	100.00	O	PASS
10	41.874	4.37					41.874	4.37	0.00	100.00	O	PASS
T2							T3					
No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result
1	41.896	4.28	0.01	97.94	O	PASS	41.897	4.28	0.00	100.00	O	PASS
2	41.871	4.28	0.02	97.94	O	PASS	41.871	4.28	0.00	100.00	O	PASS
3	41.880	4.28	0.01	97.94	O	PASS	41.881	4.28	0.00	100.00	O	PASS
4	41.790	4.28	0.00	97.94	O	PASS	41.790	4.28	0.00	100.00	O	PASS
5	41.918	4.28	0.02	97.94	O	PASS	41.919	4.28	0.00	100.00	O	PASS
6	41.845	4.28	0.01	97.94	O	PASS	41.847	4.28	0.00	100.00	O	PASS
7	41.701	4.28	0.01	97.94	O	PASS	41.701	4.28	0.00	100.00	O	PASS
8	41.908	4.28	0.01	97.94	O	PASS	41.907	4.28	0.00	100.00	O	PASS
9	41.931	4.28	0.02	97.94	O	PASS	41.931	4.28	0.00	100.00	O	PASS
10	41.868	4.28	0.01	97.94	O	PASS	41.869	4.28	0.00	100.00	O	PASS
T4							T5					
No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result	Max T(℃)	Appearance				Result
1	41.896	4.28	0.00	100.00	O	PASS	55	O				PASS
2	41.871	4.28	0.00	100.00	O	PASS	56	O				PASS
3	41.883	4.28	0.00	100.00	O	PASS	55	O				PASS
4	41.791	4.28	0.00	100.00	O	PASS	56	O				PASS
5	41.919	4.28	0.00	100.00	O	PASS	55	O				PASS
6	41.848	4.28	0.00	100.00	O	PASS	55	O				PASS
7	41.701	4.28	0.00	100.00	O	PASS	55	O				PASS
8	41.907	4.28	0.00	100.00	O	PASS	56	O				PASS
9	41.928	4.28	0.00	100.00	O	PASS	56	O				PASS
10	41.868	4.28	0.00	100.00	O	PASS	56	O				PASS
[Appearance] O-No Leakage, No Venting, No Disassembly, No Rupture, No Fire / L-Leakage / V-Venting / D-Disassembly / R-Rupture / F-Fire												
[Criteria] T1~T4: No Leakage / No Venting / No Disassembly / No Rupture / No Fire / Residual OCV not less than 90% T5: External temperature does not exceed 170℃, no disassembly, no rupture, and no fire within 6 hours of this test												

T-6) Impact/Crush Test (Test Result: Pass)

■ Cell type

[ ] Cylindrical cells not less than 18.0 mm in diameter

[X] Prismatic, Pouch, Cylindrical cells less than 18.0 mm in diameter

■ Test procedure

[ ] Impact

[X] Crush

Fresh Pack 50% SOC				
	Initial	T6		
No.	OCV(V)	Max Temp(℃)	Appearance	Result
1	3.95	23	O	PASS
2	3.95	23	O	PASS
3	3.95	23	O	PASS
4	3.95	23	O	PASS
5	3.95	23	O	PASS
[Appearance] O-No Disassembly, No Fire / D-Disassembly / F-Fire				
[Criteria] External temperature does not exceed 170℃, no disassembly, and no fire within 6 hours of this test.				

T-7) Over charge Test (Test Result: Pass)

■ Test condition: 8.8V / 6A / 24Hr

Fresh pack 100% SOC			50 cycled pack 100% SOC	
No.	Appearance	Result	Appearance	Result
1	O	PASS	O	PASS
2	O	PASS	O	PASS
3	O	PASS	O	PASS
4	O	PASS	O	PASS
[Appearance] O-No Disassembly, No Fire / D-Disassembly / F-Fire				
[Criteria] No disassembly and no fire within 7 days of the test				

T-8) Forced discharge Test (Test Result: Pass)

■ Test condition:

- Initial test current: 3 A
- Time interval: 60 MIN

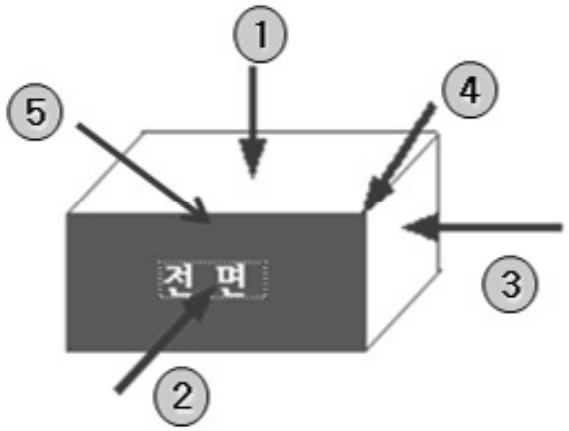
Fresh Pack 0% SOC				50 cycled Pack 0% SOC		
No.	Max. tempe(℃)	Appearance	Result	Max. temp(℃)	Appearance	Result
1	28	O	PASS	31	O	PASS
2	28	O	PASS	29	O	PASS
3	31	O	PASS	29	O	PASS
4	30	O	PASS	29	O	PASS
5	29	O	PASS	31	O	PASS
6	31	O	PASS	29	O	PASS
7	31	O	PASS	29	O	PASS
8	33	O	PASS	32	O	PASS
9	31	O	PASS	33	O	PASS
10	32	O	PASS	31	O	PASS
[Appearance] O-No Disassembly, No Fire / D-Disassembly / F-Fire						
[Criteria] No disassembly and no fire within 7 days of the test						

Annex 1 - 1.2m Packaging Drop Test

■ Test Summary

Test No.	Test item	Relating Std.	Test begins on (YYYY/MM/DD)	Test Completed on (YYYY/MM/DD)	Judgment (Pass/Fail)
P1	Packaging Drop	2015 IATA Dangerous Goods Regulations 56th Edition	2015/12/31	2015/12/31	Pass
Total Judgment(Pass/Fail)					Pass

■ Test Method



P-1 1.2m Packaging Drop Test (Test Result: Pass)

■ Sample Picture

	Front	Back
Sample Picture		

■ Test result

	Before Test	After Test
Weight (Kg)	0.595	0.595
Test Result		
Remark	Outer packaging is damaged but samples inside the package remain intact and no damage, no shifting, no release of contents for samples inside the package.	
Criteria	- Without damage to cells or batteries contained therein. - Without shifting of the contents so as to allow battery to battery(or Cell to cell) contact. - Without release of contents.	