Model name: BL1830

Executive Div.	Safety Center	Confidential		
	Name / Title	Signature	Date	
Reported by	HW Ham / Technician	200	2010.05.27	
Approved by	JH Kim / Senior manager	Alt	2010.05.27	

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

2009, 5th Revision

Document No: MT0023964

SAMSUNG SDI Energy Business Division



#### **Product Information**

1. Model name: BL1830

2. Product classification: Li rechargeable battery pack (5S-2P)

3. Nominal voltage: 18 V

4. Rated capacity: 3000 mAh

5. Wh Capacity: 54 Wh

6. Weight of product: ≤ 600g

7. Test Date: 2010. 05. 05 ~ 2010. 05. 22

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

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#### Test summary

Test No.	Test item	Relating Std.	Test begins on	Test Completed on	Judgment
T1	Altitude simulation	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.1	2010. 05. 05	2010. 05. 05	Pass
T2	Thermal test	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.2	2010. 05. 05	2010. 05. 11	Pass
Т3	Vibration	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.3	2010. 05. 17	2010. 05. 17	Pass
Т4	Shock	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.4	2010. 05. 21	2010. 05. 21	Pass
Т5	External short circuit	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.5	2010. 05.22	2010. 05. 22	Pass
Т6	Impact	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.6	2010. 05. 21	2010. 05. 21	Pass
Т7	Overcharge	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.7	2010. 05. 08	2010. 05. 16	Pass
Т8	Forced discharge	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.8	N/A	N/A	N/A
P1	Packaging Drop	2009 IATA Dangerous Goods Regulations 50 <sup>th</sup> Edition	2010. 05. 21	2010. 05. 21	Pass

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

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#### T-1~T-5) Transportation Test: Pass

	Frech battery pack 100% SOC										
	Init	ial	T1		T2		Т3		T4		T5
Sample No.	Weight(g)	OCV(V)	Weight(g)	OCV(V)	Weight(g)	OCV(V)	Weight(g)	OCV(V)	Weight(g)	ocv(v)	Max Temperature(℃)
1	595.92	20.73	595.89	20.72	595.81	20.41	595, 93	20,39	595, 93	20,38	57.9
2	596, 93	20.73	596.91	20.72	596.81	20.41	596,93	20,39	596,92	20,38	61.3
3	596.14	20.71	596.11	20.70	596.02	20.41	596.14	20.39	596.14	20.38	76.4
4	596,50	20.73	596.47	20.72	596, 38	20.42	596,52	20,39	596.51	20,38	92.7
Avg.	596, 3725	20.725	596, 345	20,715	596, 255	20,4125	596.38	20.39	596, 375	20.38	72.1
Max.	596,93	20.73	596.91	20.72	596.81	20.42	596.93	20.39	596.92	20.38	92.7
Min.	595, 92	20.71	595.89	20.7	595.81	20.41	595.93	20,39	595.93	20.38	57.9
	50 cycled battery pack 100% SOC										

	50 cycled battery pack 100% SOC										
	Init	tial	Т	1	Т	2	Т	3	Т	4	T5
Sample No.	Weight(g)	OCV(V)	Weight(g)	OCV(V)	Weight(g)	OCV(V)	Weight(g)	OCV(V)	Weight(g)	OCV(V)	Max Temperature(℃)
1	596.11	20.83	596.13	20.66	596.07	19.79	596.20	19.42	596.20	19.18	57.7
2	596, 29	20.84	596.30	20.82	596, 25	20.50	596, 36	20.47	596, 38	20.46	71.6
3	596.88	20.82	596.89	20.80	596.82	20.48	596, 94	20,45	596, 93	20.44	78.3
4	597.04	20.82	597.06	20.65	596, 98	19.78	597.13	19.40	597.12	19.18	76.1
Avg.	596,58	20.8275	596,595	20.7325	596,53	20,1375	596,6575	19,935	596,6575	19.815	70.9
Max.	597.04	20.84	597.06	20,82	596, 98	20.5	597.13	20.47	597.12	20.46	78.3
Min.	596,11	20.82	596,13	20,65	596.07	19.78	596.2	19.4	596.2	19.18	57.7

#### T-6) Impact Test (INR18650-15Q): Pass

		Initial	T6		
	Sample No.	OCV(V)	Max Temp		
	1	3,84	26.5		
F	2	3,84	26.5		
Fresh cell 50% SOC	3	3.84	25.8		
30% 300	4	3.84	26.4		
	5	3,84	24.8		
	6	2.93	24.3		
50 Cycled	7	2,93	24.8		
cell	8	2.93	25.1		
0% SOC	9	2,93	26.1		
	10	2.93	24.8		
A	vg.	3,39	25.51		
Max.		3,84	26,50		
Min.		2,93	24.30		

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- T1~T5: Tests were performed in sequence with same samples
- T6: Prismatic type cell test condition;
  - From sample no.1~5: Wide side impact
  - From sample no.6~10: Narrow side impact
    Other type cells
  - Only 5 samples shall be tested.

### T-7) Over charge Test: Pass

- Test Condition: 25.2V/24A/24Hr

	Fresh cell 100% SOC	50 Cycled cell 100% SOC
Sample No.	Max. temperature	Max. temperature
1	43.2	43.0
2	57.7	26.3
3	43.6	41.5
4	56.5	41.8
Avg.	50,25	38, 15
Max.	57.7	43
Min.	43.2	26.3

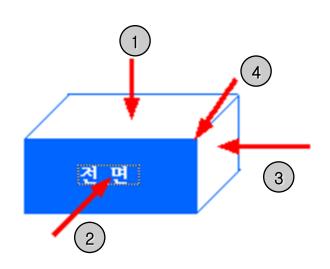
T-8) Forced discharge Test: N/A

- Test condition: N/A

# P-1) Packaging Drop Test: Pass

	Before test	After test		
Weight (Kg)	7.201	7.200		
Remark	Outer packaging is damaged but samples inside the package remain and no damage, no shifting, no release of contents for samples inside package.			

#### ■ Test Method



## **■** Sample picture



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