

Model name : BL1815N

Revision 03

Executive Div.	Safety Center	Confidential	
	Name / Title	Signature	Date
Reported by	HW Ham / Assistant manager		2012.02.15
Approved by	SW Yoo / Senior manager		2012.02.15

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

2009, 5th Revision

Document No : MT0059172

SAMSUNG SDI
Energy Business Division



Product Information

1. Model name: **BL1815N**
2. Product classification: **Li rechargeable battery pack (5S-1P)**
3. Nominal voltage: **18V**
4. Rated capacity: **1500mAh**
5. Wh Capacity: **27Wh**
6. Weight of product: **≤ 360g**
7. Test Date: **2012. 01. 12 ~ 2012. 02. 10**
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	2012.01.12	2012.01.12	PASS
T2	Thermal test	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.2	2012.01.13	2012.01.19	PASS
T3	Vibration	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.3	2012.01.23	2012.01.23	PASS
T4	Shock	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.4	2012.02.07	2012.02.07	PASS
T5	External short circuit	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.5	2012.02.10	2012.02.10	PASS
T6	Impact	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.6	2012.02.10	2012.02.10	PASS
T7	Overcharge	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.7	2012.02.02	2012.02.10	PASS
T8	Forced discharge	UN Manual of Tests and Criteria, Part III, Subsection 38.3.4.8	N/A	N/A	N/A
P1	Packaging Drop	2012 IATA Dangerous Goods Regulations 53 rd Edition	2012.02.10	2012.02.10	PASS

- Tests T-1 through T-5 shall be conducted in sequence with the same cell/pack
- For test 6, test should be conducted for cells in a pack or applied cell for battery assembly.
- 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.

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

Frech pack 100% SOC							50 cycled pack 100% SOC						
Initial							Initial						
No.	Weight(g)	OCV(V)					No.	Weight(g)	OCV(V)				
1	351.72	20.54					1	353.99	20.55				
2	351.15	20.55					2	353.93	20.55				
3	351.02	20.55					3	351.10	20.55				
4	351.80	20.55					4	351.93	20.55				
T1							T1						
No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result	No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result
1	351.72	20.54	0.00	100.00	O	PASS	1	353.97	20.55	0.01	100.00	O	PASS
2	351.15	20.55	0.00	100.00	O	PASS	2	353.93	20.55	0.00	100.00	O	PASS
3	351.01	20.55	0.00	100.00	O	PASS	3	351.10	20.55	0.00	100.00	O	PASS
4	351.80	20.55	0.00	100.00	O	PASS	4	351.92	20.55	0.00	100.00	O	PASS
T2							T2						
No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result	No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result
1	351.66	20.29	0.02	98.78	O	PASS	1	353.96	20.29	0.00	98.73	O	PASS
2	351.04	20.21	0.03	98.35	O	PASS	2	353.89	20.29	0.01	98.73	O	PASS
3	350.96	20.19	0.01	98.25	O	PASS	3	351.07	20.28	0.01	98.69	O	PASS
4	351.76	20.29	0.01	98.73	O	PASS	4	351.90	20.29	0.01	98.73	O	PASS
T3							T3						
No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result	No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result
1	351.67	20.28	0.00	99.95	O	PASS	1	353.96	20.27	0.00	99.90	O	PASS
2	351.06	20.20	-0.01	99.95	O	PASS	2	353.90	20.28	0.00	99.95	O	PASS
3	350.99	20.17	-0.01	99.90	O	PASS	3	351.07	20.27	0.00	99.95	O	PASS
4	351.76	20.27	0.00	99.90	O	PASS	4	351.92	20.28	-0.01	99.95	O	PASS
T4							T4						
No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result	No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result
1	351.67	20.26	0.00	99.90	O	PASS	1	353.96	20.26	0.00	99.95	O	PASS
2	351.06	20.18	0.00	99.90	O	PASS	2	353.91	20.28	0.00	100.00	O	PASS
3	351.00	20.16	0.00	99.95	O	PASS	3	351.07	20.26	0.00	99.95	O	PASS
4	351.74	20.15	0.01	99.41	O	PASS	4	351.92	20.26	0.00	99.90	O	PASS
T5							T5						
No.	Max T(°C)	Appearance				Result	No.	Max T(°C)	Appearance				Result
1	68.3	O				PASS	1	74.2	O				PASS
2	73.2	O				PASS	2	69.9	O				PASS
3	70.9	O				PASS	3	70.3	O				PASS
4	68.3	O				PASS	4	71.8	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 mass loss(Not exceed 0.1%), no leakage, no venting, no disassembly, no rupture, no fire, voltage drop less than 90%.
 T5: External temperature does not exceed 170°C, no disassembly, no rupture, and no fire within 6 hours of this test

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

Frech Cell 50% SOC				
	Initial	T6		
No.	OCV(V)	Max Temp(°C)	Appearance	Result
1	3.81	22.0	0	PASS
2	3.81	21.0	0	PASS
3	3.81	21.0	0	PASS
4	3.81	22.0	0	PASS
5	3.81	21.0	0	PASS
[Appearance] O-No Disassembly, No Fire / D-Disassembly / F-Fire				
[Criteria] External temperature does not exceed 170°C, no disassembly,				

■ Test condition

Prismatic type cell;

- From sample no.1~5: Wide side impact
- From sample no.6~10: Narrow side impact

Other type cells:

- From sample no. 1~5: Wide side impact
- No additional test for other sides.

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

■ Test condition: 25.2V / 18A / 24Hr

Fresh pack 100% SOC			50 cycled pack 100% SOC	
No.	Appearance	Result	Appearance	Result
1	0	Pass	0	Pass
2	0	Pass	0	Pass
3	0	Pass	0	Pass
4	0	Pass	0	Pass

[Appearance] O-No Disassembly, No Fire / D-Disassembly / F-Fire
[Criteria] No disassembly and no fire within 7 days of the test

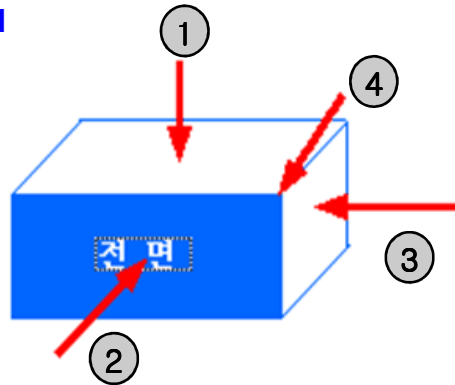
T-8) Forced discharge Test (Test Result: N/A)

■ Test condition: N/A

■ Criteria: No disassembly and no fire within 7 days of the test.

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

■ Test Method



■ Sample Picture

	Front	Back
Sample Picture		
	Before Test	After Test
Test Result		

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

■ Test Result

	Before test	After test
Test Result(Pass/Fail)	Pass	
Weight (Kg)	8.4	8.4
Criteria	<ul style="list-style-type: none">- 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.	
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.	