



SAMSUNG SDI

Ver.00

UN TEST REPORT

Report Number	SDI-UN-181002-01
Date of issue	2018.10.02
Test period	2018.09.13 ~ 2018.10.01
Testing Laboratory	Samsung SDI Co., Ltd
Address	467, Beonyeong-ro, Seobuk-gu, Cheonan-si, Chungcheongnam-do, Korea
Contact	+82-41-560-3114 / http://samsungsdi.co.kr/
Manufacturer's name	Samsung SDI Co., Ltd
Address	467, Beonyeong-ro, Seobuk-gu, Cheonan-si, Chungcheongnam-do, Korea
Contact	+82-41-560-3114 / http://samsungsdi.co.kr/
Test Standard	Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria, section 38.3 Sixth revised edition Amendment 1
Description	Lithium ion battery (1 S- 1 P)
Model Name	EB-BG973ABU
Ratings	3.85V 3300mAh (12.71 Wh)
Mass	46.842g

Test Result

No.	Test item	Result	Remark
T-1	Altitude	PASS	
T-2	Thermal Cycling	PASS	
T-3	Vibration	PASS	
T-4	Shock	PASS	
T-5	External Short Circuit	PASS	
T-6	Impact / Crush	PASS	
T-7	Overcharge	PASS	
T-8	Forced Discharge	PASS	

	Name	Signature	Date
Reported by	Ham hyung Woo		2018.10.2
Approved by	Hong Jong Pil		2018.10.2

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T1	ALTITUDE SIMULATION TEST	Results
Requirements	No mass loss, 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.	<input checked="" type="checkbox"/> No leakage, <input checked="" type="checkbox"/> No venting, <input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> No rupture, <input checked="" type="checkbox"/> No fire, <input checked="" type="checkbox"/> No mass loss, (Less than 0.2%) <input checked="" type="checkbox"/> voltage drop (Less than 10%) See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Percent of Voltage Drop(%)	Percent of Weight Loss(%)
1	A	4.329	46.824	4.328	46.821	100.0	0.01
2	A	4.325	46.805	4.324	46.804	100.0	0.00
3	A	4.329	46.782	4.329	46.782	100.0	0.00
4	A	4.328	46.915	4.328	46.915	100.0	0.00
5	A	4.331	46.878	4.331	46.878	100.0	0.00
6	B	4.320	46.841	4.320	46.841	100.0	0.00
7	B	4.330	46.955	4.330	46.955	100.0	0.00
8	B	4.325	46.890	4.324	46.890	100.0	0.00
9	B	4.330	46.849	4.330	46.849	100.0	0.00
10	B	4.330	46.746	4.330	46.746	100.0	0.00

Supplementary Information:

Sample Condition A : at first cycle, in fully charged states(5 pcs)

Sample Condition B : after 25th cycles ending in fully charged states(5 pcs)

T2	THERMAL TEST	Results
Requirements	No mass loss, 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.	<input checked="" type="checkbox"/> No leakage, <input checked="" type="checkbox"/> No venting, <input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> No rupture, <input checked="" type="checkbox"/> No fire, <input checked="" type="checkbox"/> No mass loss, (Less than 0.2%) <input checked="" type="checkbox"/> Voltage drop (Less than 10%) See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Percent of Voltage Drop(%)	Percent of Weight Loss(%)
1	A	4.328	46.821	4.248	46.820	98.2	0.00
2	A	4.324	46.804	4.244	46.804	98.1	0.00
3	A	4.329	46.782	4.249	46.782	98.2	0.00
4	A	4.328	46.915	4.247	46.911	98.1	0.01
5	A	4.331	46.878	4.252	46.878	98.2	0.00
6	B	4.320	46.841	4.240	46.841	98.1	0.00
7	B	4.330	46.955	4.250	46.952	98.2	0.01
8	B	4.324	46.890	4.245	46.890	98.2	0.00
9	B	4.330	46.849	4.251	46.847	98.2	0.00
10	B	4.330	46.746	4.250	46.746	98.2	0.00

Supplementary Information:

Sample Condition A : at first cycle, in fully charged states(5 pcs)

Sample Condition B : after 25th cycles ending in fully charged states(5 pcs)

T3	VIBRATION TEST	Results
Requirements	No mass loss, 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.	<input checked="" type="checkbox"/> No leakage, <input checked="" type="checkbox"/> No venting, <input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> No rupture, <input checked="" type="checkbox"/> No mass loss, (Less than 0.2%) <input checked="" type="checkbox"/> voltage drop (Less than 10%) See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Percent of Voltage Drop(%)	Percent of Weight Loss(%)
1	A	4.248	46.820	4.248	46.821	100.0	0.00
2	A	4.244	46.804	4.244	46.804	100.0	0.00
3	A	4.249	46.782	4.248	46.782	100.0	0.00
4	A	4.247	46.911	4.247	46.910	100.0	0.00
5	A	4.252	46.878	4.252	46.876	100.0	0.00
6	B	4.240	46.841	4.240	46.841	100.0	0.00
7	B	4.250	46.952	4.250	46.952	100.0	0.00
8	B	4.245	46.890	4.244	46.891	100.0	0.00
9	B	4.251	46.847	4.251	46.845	100.0	0.00
10	B	4.250	46.746	4.250	46.746	100.0	0.00

Supplementary Information:

Sample Condition A : at first cycle, in fully charged states(5 pcs)

Sample Condition B : after 25th cycles ending in fully charged states(5 pcs)

T4	SHOCK	Results
Requirements	No mass loss, 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.	<input checked="" type="checkbox"/> No leakage, <input checked="" type="checkbox"/> No venting, <input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> No rupture, <input checked="" type="checkbox"/> No fire, <input checked="" type="checkbox"/> No mass loss, (Less than 0.2%) <input checked="" type="checkbox"/> voltage drop (Less than 10%) See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Percent of Voltage Drop(%)	Percent of Weight Loss(%)
1	A	46.821	100.0	4.248	46.821	100.0	0.00
2	A	46.804	100.0	4.243	46.802	100.0	0.00
3	A	46.782	100.0	4.248	46.782	100.0	0.00
4	A	46.910	100.0	4.246	46.910	100.0	0.00
5	A	46.876	100.0	4.252	46.876	100.0	0.00
6	B	46.841	100.0	4.240	46.840	100.0	0.00
7	B	46.952	100.0	4.250	46.952	100.0	0.00
8	B	46.891	100.0	4.242	46.891	100.0	0.00
9	B	46.845	100.0	4.251	46.844	100.0	0.00
10	B	46.746	100.0	4.250	46.746	100.0	0.00

Supplementary Information:

Sample Condition A : at first cycle, in fully charged states(5 pcs)

Sample Condition B : after 25th cycles ending in fully charged states(5 pcs)

T5	EXTERNAL SHORT-CIRCUIT	Results
Requirements	External temperature does not exceed 170 °C and there is no disassembly, no rupture and no fire within six hours of this test.	<input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> No rupture <input checked="" type="checkbox"/> No fire. <input checked="" type="checkbox"/> External Temperature did not exceed 170 °C. see below table

Sample No.	Sample Condition	Maximum Temperature(°C)	Test result
1	A	57	O
2	A	57	O
3	A	57	O
4	A	57	O
5	A	57	O
6	B	57	O
7	B	57	O
8	B	57	O
9	B	57	O
10	B	57	O

Supplementary Information:

Sample Condition A : at first cycle, in fully charged states(5 pcs)

Sample Condition B : after 25th cycles ending in fully charged states(5 pcs)

Test result : O-No Disassembly, No Rupture, No Fire / D-Disassembly / R-Rupture / F-Fire

T6	<input type="checkbox"/> Impact / <input checked="" type="checkbox"/> Crush	Results
Requirements	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.	<input checked="" type="checkbox"/> External temperature did not exceed 170°C, <input checked="" type="checkbox"/> no disassembly, <input checked="" type="checkbox"/> no fire during test and within 6 hours after test See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Maximum Temperature(°C)	Test result
T6-1	C	3.770	24	O
T6-2	C	3.770	24	O
T6-3	C	3.770	24	O
T6-4	C	3.770	24	O
T6-5	C	3.770	24	O
T6-6	D	3.770	24	O
T6-7	D	3.770	24	O
T6-8	D	3.770	24	O
T6-9	D	3.770	24	O
T6-10	D	3.770	24	O

Supplementary Information:
 Sample Condition C : at first cycle, in 50% charged states(5 pcs)
 Sample Condition D : at 25th cycle, in 50% charged states(5 pcs)
 Test result : O-No Disassembly, No Fire / D-Disassembly / F-Fire

T7	OVERCHARGE	Results
Requirements	Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.	<input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> no rupture, <input checked="" type="checkbox"/> no fire during the test and within seven days after the test. See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Test result
T7-1	A	4.329	O
T7-2	A	4.329	O
T7-3	A	4.330	O
T7-4	A	4.329	O
T7-5	B	4.330	O
T7-6	B	4.331	O
T7-7	B	4.330	O
T7-8	B	4.330	O

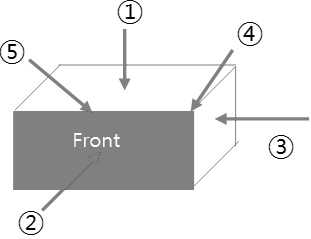
Supplementary Information:
 Sample Condition A : at first cycle, in fully charged states(4 pcs)
 Sample Condition B : after 25th cycles ending in fully charged states(4 pcs)
 Test result : O-No Disassembly, No Fire / D-Disassembly / F-Fire

Test Conditions
 Charge voltage : 8.8V, Charge current : 5.28A, Test time : 24Hr



T8	FORCED DISCHARGE	Results
Requirements	Rechargeable cells meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.	<input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> no rupture, <input checked="" type="checkbox"/> no fire during the test and within seven days after the test. See below table

Sample No.	Sample Condition	Test result	Sample No.	Sample Condition	Test result
T8-1	D	O	T8-11	E	O
T8-2	D	O	T8-12	E	O
T8-3	D	O	T8-13	E	O
T8-4	D	O	T8-14	E	O
T8-5	D	O	T8-15	E	O
T8-6	D	O	T8-16	E	O
T8-7	D	O	T8-17	E	O
T8-8	D	O	T8-18	E	O
T8-9	D	O	T8-19	E	O
T8-10	D	O	T8-20	E	O



<input checked="" type="checkbox"/> Supplementary Information: Sample Condition D : at first cycle, in fully discharged states (10 pcs) Sample Condition E : after 25th cycles ending in fully discharged states(10 pcs) Test result : O-No Disassembly, No Fire / D-Disassembly / F-Fire <input checked="" type="checkbox"/> Test Conditions Initial test current : 3.3A, Test duration : 1Hr

P1	Package Drop Test	Results
Procedure	<p>IATA Dangerous Goods Regulations Each package must be capable of withstanding a 1.2m drop test in any orientation</p> 	<p><input checked="" type="checkbox"/> Without damage to cells or batteries contained therein, <input checked="" type="checkbox"/> Without shifting of the contents so as to allow battery to battery(or Cell to cell) contact. <input checked="" type="checkbox"/> Without release of contents</p> <p>See below photo</p>

Battery Qty per box	Battery weight (kg)	Net weight per box (kg)
170	0.046	7.82

	Before Test	After Test
Weight (kg)	8.99	8.99
Test result		

Sample Photo

front	back
 <p>2018.08.10 PHAKHUS --B K NPS</p> <p>SAMSUNG ASSEMBLED IN VIETNAM</p> <p>Manufactured by Samsung SDI Co., Ltd. (Samsung SDI Vietnam) in Vietnam. Samsung SDI Vietnam: 111 Nguyen Van Thu Street, Hanoi, Vietnam. Samsung SDI Vietnam: 111 Nguyen Van Thu Street, Hanoi, Vietnam. Samsung SDI Vietnam: 111 Nguyen Van Thu Street, Hanoi, Vietnam.</p> <p>UN38.3 CE RoHS RECYCLE</p>	 <p>SAMSUNG SDI P2B0F534583A B07BB06 + B07B0F17S1F20063928</p>

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