



UN TEST REPORT

Test Summary

Report Number: SDI-UN-200720-01			
Date of issue.....: 2020.07.20			
Test period: 2020.06.18 ~ 2020.07.10			
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/ lian55.kim@samsung.com			
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/ lian55.kim@samsung.com			
Test Standard Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria, section 38.3 Sixth revised edition Amendment 1			
Physical description..... Mobile phone battery			
Assembled Battery Testing Requirements..... Not Applicable			
Description..... Lithium ion battery (1S -1P)			
Model Name EB-BG781ABY			
Ratings	3.86V	4370mAh (16.87Wh)	Mass 59.15g

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	position	Signature	Date
Reported by	Hanhyungwoo	Engineer		2020.7.20
Approved by	Yoo Seung Woo	Principal Engineer		2020.7.20

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"/> No voltage drop (Residual OCV not less than 90%) See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Residual OCV(%)	Percent of Weight Loss(%)
1	A	4.389	58.979	4.388	58.979	99.98	0.00
2	A	4.388	58.892	4.386	58.892	99.95	0.00
3	A	4.388	58.967	4.386	58.967	99.95	0.00
4	A	4.388	59.043	4.385	59.042	99.93	0.00
5	A	4.388	59.084	4.386	59.084	99.95	0.00
6	B	4.388	59.086	4.385	59.085	99.93	0.00
7	B	4.388	59.060	4.386	59.061	99.95	0.00
8	B	4.389	59.145	4.387	59.145	99.95	0.00
9	B	4.388	58.909	4.387	58.909	99.98	0.00
10	B	4.388	58.923	4.386	58.923	99.95	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"/> No voltage drop (Residual OCV not less than 90%) See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Residual OCV(%)	Percent of Weight Loss(%)
1	A	4.388	58.979	4.308	58.976	98.18	0.01
2	A	4.386	58.892	4.306	58.890	98.18	0.00
3	A	4.386	58.967	4.306	58.965	98.18	0.00
4	A	4.385	59.042	4.305	59.041	98.18	0.00
5	A	4.386	59.084	4.306	59.081	98.18	0.01
6	B	4.385	59.085	4.305	59.081	98.18	0.01
7	B	4.386	59.061	4.304	59.058	98.13	0.01
8	B	4.387	59.145	4.305	59.142	98.13	0.01
9	B	4.387	58.909	4.305	58.906	98.13	0.01
10	B	4.386	58.923	4.305	58.921	98.15	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"/> No voltage drop (Residual OCV not less than 90%) See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Residual OCV(%)	Percent of Weight Loss(%)
1	A	4.308	58.976	4.307	58.977	99.98	0.00
2	A	4.306	58.890	4.305	58.890	99.98	0.00
3	A	4.306	58.965	4.306	58.965	100.00	0.00
4	A	4.305	59.041	4.305	59.042	100.00	0.00
5	A	4.306	59.081	4.306	59.081	100.00	0.00
6	B	4.305	59.081	4.304	59.081	99.98	0.00
7	B	4.304	59.058	4.303	59.057	99.98	0.00
8	B	4.305	59.142	4.305	59.142	100.00	0.00
9	B	4.305	58.906	4.304	58.906	99.98	0.00
10	B	4.305	58.921	4.305	58.921	100.00	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"/> No voltage drop (Residual OCV not less than 90%) See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Residual OCV(%)	Percent of Weight Loss(%)
1	A	4.307	58.977	4.305	58.976	99.95	0.00
2	A	4.305	58.890	4.302	58.890	99.93	0.00
3	A	4.306	58.965	4.304	58.963	99.95	0.00
4	A	4.305	59.042	4.303	59.042	99.95	0.00
5	A	4.306	59.081	4.301	59.081	99.88	0.00
6	B	4.304	59.081	4.301	59.080	99.93	0.00
7	B	4.303	59.057	4.301	59.057	99.95	0.00
8	B	4.305	59.142	4.302	59.142	99.93	0.00
9	B	4.304	58.906	4.302	58.905	99.95	0.00
10	B	4.305	58.921	4.304	58.921	99.98	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	3.775	22	O
T6-2	C	3.775	22	O
T6-3	C	3.774	22	O
T6-4	C	3.775	22	O
T6-5	C	3.775	22	O
T6-6	D	3.774	22	O
T6-7	D	3.775	22	O
T6-8	D	3.775	22	O
T6-9	D	3.774	22	O
T6-10	D	3.774	22	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	4.388	O
T7-2	A	4.388	O
T7-3	A	4.387	O
T7-4	A	4.388	O
T7-5	B	4.388	O
T7-6	B	4.388	O
T7-7	B	4.389	O
T7-8	B	4.388	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 : 8.86V, Charge current : 11.362A, 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	E	O	T8-11	F	O
T8-2	E	O	T8-12	F	O
T8-3	E	O	T8-13	F	O
T8-4	E	O	T8-14	F	O
T8-5	E	O	T8-15	F	O
T8-6	E	O	T8-16	F	O
T8-7	E	O	T8-17	F	O
T8-8	E	O	T8-18	F	O
T8-9	E	O	T8-19	F	O
T8-10	E	O	T8-20	F	O

Supplementary Information:

Sample Condition E : at first cycle, in fully discharged states (10 pcs)

Sample Condition F : after 25th cycles ending in fully discharged states(10 pcs)

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

Test Conditions

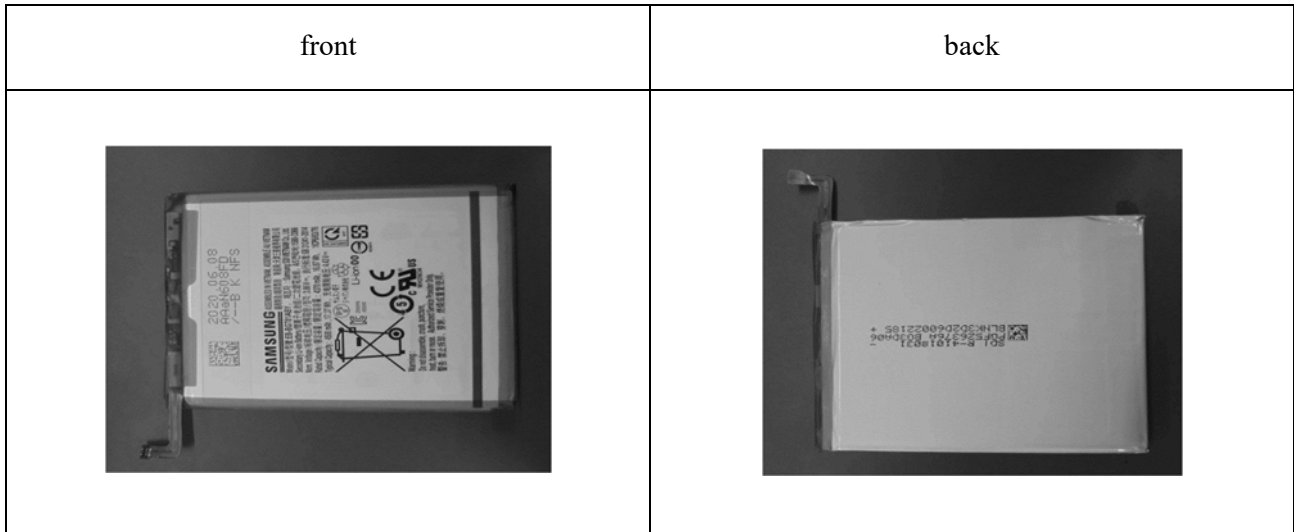
Initial test current : 4.37A, Test duration : 1Hr

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>	<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 See below photo

Battery Qty per box	Battery weight (kg)	Net weight per box (kg)
160	0.059	9.44

	Before Test	After Test
Weight (kg)	10.76	10.76
Test result		

Sample Photo



- End of Report -