UN TEST REPORT

Test Summary

Report Number. .....:	SDI-UN-200211-01		
Date of issue.....:	2020.02.11		
Test period .....:	2020.01.14 ~ 2020.02.04		
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-BA217ABY		
Ratings	3.85V 4900mAh (18.87Wh)	Mass	68.95±3.45g

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	Hanhyung Woo	Engineer		2020. 2. 11
Approved by	Hong Jung Pil	Engineer		2020. 2. 11

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.	☒No leakage, ☒No venting, ☒No disassembly, ☒No rupture, ☒No fire, ☒No mass loss, (Less than 0.2%) ☒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	4.360	69.001	4.358	69.000	99.95	0.00
2	A	4.362	69.236	4.361	69.235	99.98	0.00
3	A	4.359	69.086	4.359	69.084	100.00	0.00
4	A	4.359	69.141	4.357	69.140	99.95	0.00
5	A	4.360	69.112	4.357	69.112	99.93	0.00
6	B	4.361	68.962	4.358	68.960	99.93	0.00
7	B	4.361	69.080	4.361	69.078	100.00	0.00
8	B	4.359	68.953	4.359	68.951	100.00	0.00
9	B	4.361	69.182	4.360	69.182	99.98	0.00
10	B	4.358	69.050	4.358	69.050	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)

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.	☒No leakage, ☒No venting, ☒No disassembly, ☒No rupture, ☒No fire, ☒No mass loss, (Less than 0.2%) ☒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	4.358	69.000	4.293	68.990	98.51	0.01
2	A	4.361	69.235	4.295	69.227	98.49	0.01
3	A	4.359	69.084	4.295	69.079	98.53	0.01
4	A	4.357	69.140	4.309	69.136	98.90	0.01
5	A	4.357	69.112	4.293	69.103	98.53	0.01
6	B	4.358	68.960	4.288	68.952	98.39	0.01
7	B	4.361	69.078	4.289	69.070	98.35	0.01
8	B	4.359	68.951	4.298	68.944	98.60	0.01
9	B	4.360	69.182	4.306	69.174	98.76	0.01
10	B	4.358	69.050	4.293	69.041	98.51	0.01

□ 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.	☒No leakage, ☒No venting, ☒No disassembly, ☒No rupture, ☒No mass loss, (Less than 0.2%) ☒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	4.293	68.990	4.291	68.991	99.95	0.00
2	A	4.295	69.227	4.294	69.226	99.98	0.00
3	A	4.295	69.079	4.293	69.079	99.95	0.00
4	A	4.309	69.136	4.306	69.136	99.93	0.00
5	A	4.293	69.103	4.291	69.101	99.95	0.00
6	B	4.288	68.952	4.285	68.952	99.93	0.00
7	B	4.289	69.070	4.287	69.070	99.95	0.00
8	B	4.298	68.944	4.295	68.942	99.93	0.00
9	B	4.306	69.174	4.304	69.174	99.95	0.00
10	B	4.293	69.041	4.293	69.041	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.	☒No leakage, ☒No venting, ☒No disassembly, ☒No rupture, ☒No fire, ☒No mass loss, (Less than 0.2%) ☒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	4.291	68.991	4.290	68.990	99.98	0.00
2	A	4.294	69.226	4.292	69.226	99.95	0.00
3	A	4.293	69.079	4.291	69.076	99.95	0.00
4	A	4.306	69.136	4.304	69.136	99.95	0.00
5	A	4.291	69.101	4.290	69.101	99.98	0.00
6	B	4.285	68.952	4.282	68.950	99.93	0.00
7	B	4.287	69.070	4.285	69.070	99.95	0.00
8	B	4.295	68.942	4.291	68.940	99.91	0.00
9	B	4.304	69.174	4.302	69.171	99.95	0.00
10	B	4.293	69.041	4.290	69.041	99.93	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.	☒No disassembly, ☒No rupture ☒No fire. ☒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	☐ Impact / ☒ Crush	Results
Requirements	Cells and component cells meet this requirement if their external temperature does not exceed 170℃ and there is no disassembly and no fire during the test and within six hours after this test.	☒External temperature did not exceed 170℃, ☒no disassembly, ☒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	3.774	21	O
T6-3	C	3.775	22	O
T6-4	C	3.775	22	O
T6-5	C	3.775	21	O
T6-6	D	3.775	22	O
T6-7	D	3.775	22	O
T6-8	D	3.775	21	O
T6-9	D	3.773	22	O
T6-10	D	3.775	23	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.	☒No disassembly, ☒no rupture, ☒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	4.361	O
T7-2	A	4.360	O
T7-3	A	4.361	O
T7-4	A	4.361	O
T7-5	B	4.360	O
T7-6	B	4.360	O
T7-7	B	4.361	O
T7-8	B	4.361	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 : 5.88A, 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.	☒No disassembly, ☒no rupture, ☒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:

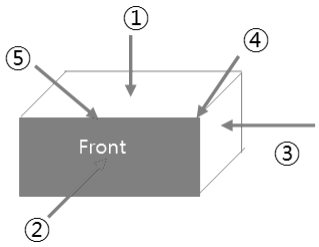
Sample Condition E : at first cycle, in fully discharged states (10 pcs)

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 : 2.94A, Test duration : 100Min

P1	Package Drop Test	Results
Procedure	IATA Dangerous Goods Regulations Each package must be capable of withstanding a 1.2m drop test in any orientation 	☒ 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 See below photo

Battery Qty per box	Battery weight (kg)	Net weight per box (kg)
104	0.069	7.18

	Before Test	After Test
Weight (kg)	9.42	9.42
Test result		

Sample Photo

front	back

- End of Report -