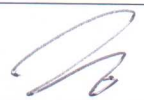


UN TEST REPORT**Test Summary**

Report Number.	: SDI-UN-200714-03
Date of issue.....	: 2020.07.14
Test period	: 2018.11.27~2018.12.29
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
Description.....	Lithium Ion Cell
Physical description	Cylindrical Cell
Model Name	INR21700-50E
Ratings	3.63V 4900mAh (17.78Wh)
Mass	Max 69.5g

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	N/A	Battery only
T-8	Forced Discharge	PASS	

	Name	position	Signature	Date
Reported by	An Jong Ho	Engineer		2020.07.14
Approved by	Kim Jong Pil	Technical Engineer		2020.07.14

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	4.137	69.283	4.136	69.280	99.98	0.00
2	A	4.136	69.126	4.135	69.126	99.98	0.00
3	A	4.137	69.221	4.136	69.221	99.98	0.00
4	A	4.136	69.169	4.135	69.165	99.98	0.01
5	A	4.136	69.185	4.135	69.182	99.98	0.00
6	B	4.137	69.253	4.136	69.253	99.98	0.00
7	B	4.137	69.065	4.136	69.065	99.98	0.00
8	B	4.137	69.169	4.136	69.166	99.98	0.00
9	B	4.137	69.238	4.136	69.238	99.98	0.00
10	B	4.136	69.011	4.135	69.011	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)							

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	4.136	69.280	4.037	69.281	97.61	0.00
2	A	4.135	69.126	4.037	69.115	97.63	0.02
3	A	4.136	69.221	4.036	69.213	97.58	0.01
4	A	4.135	69.165	4.035	69.162	97.58	0.00
5	A	4.135	69.182	4.036	69.177	97.61	0.01
6	B	4.136	69.253	4.036	69.251	97.58	0.00
7	B	4.136	69.065	4.035	69.067	97.56	0.00
8	B	4.136	69.166	4.037	69.163	97.61	0.00
9	B	4.136	69.238	4.036	69.233	97.58	0.01
10	B	4.135	69.011	4.036	69.010	97.61	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.	☒ 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	4.037	69.281	4.036	69.277	99.98	0.01
2	A	4.037	69.115	4.036	69.115	99.98	0.00
3	A	4.036	69.213	4.035	69.213	99.98	0.00
4	A	4.035	69.162	4.035	69.162	100.00	0.00
5	A	4.036	69.177	4.036	69.173	100.00	0.01
6	B	4.036	69.251	4.035	69.251	99.98	0.00
7	B	4.035	69.067	4.035	69.062	100.00	0.01
8	B	4.037	69.163	4.036	69.163	99.98	0.00
9	B	4.036	69.233	4.035	69.228	99.98	0.01
10	B	4.036	69.010	4.036	69.010	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	4.036	69.277	4.036	69.277	100.00	0.00
2	A	4.036	69.115	4.036	69.115	100.00	0.00
3	A	4.035	69.213	4.035	69.213	100.00	0.00
4	A	4.035	69.162	4.035	69.162	100.00	0.00
5	A	4.036	69.173	4.036	69.169	100.00	0.01
6	B	4.035	69.251	4.035	69.251	100.00	0.00
7	B	4.035	69.062	4.035	69.062	100.00	0.00
8	B	4.036	69.163	4.036	69.163	100.00	0.00
9	B	4.035	69.228	4.035	69.221	100.00	0.01
10	B	4.036	69.010	4.036	69.010	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)							

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

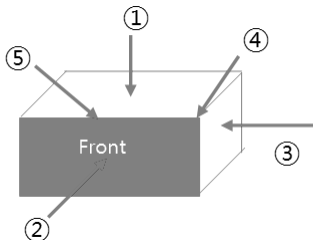
Sample No.	Sample Condition	Maximum Temperature(°C)	Test result
1	A	103	O
2	A	96	O
3	A	105	O
4	A	99	O
5	A	112	O
6	B	103	O
7	B	95	O
8	B	92	O
9	B	106	O
10	B	114	O
☐ Supplementary Information: Sample Condition A : at first cycle, in fully charged states(5 pcs) Sample Condition B : after 25th cycles ending 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

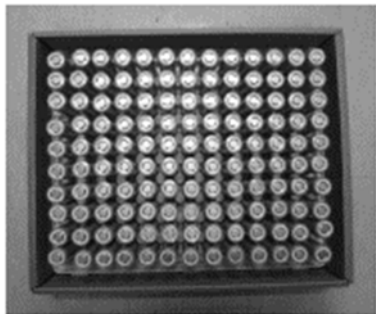
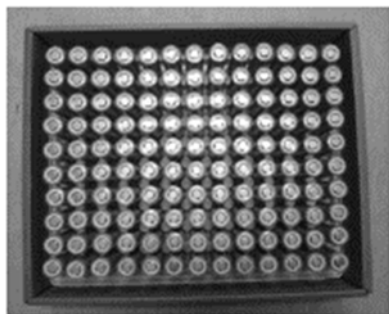
Sample No.	Sample Condition	Voltage Before Test(V)	Maximum Temperature(℃)	Test result
T6-1	C	3.732	21	O
T6-2	C	3.732	22	O
T6-3	C	3.734	21	O
T6-4	C	3.731	22	O
T6-5	C	3.731	22	O
T6-6	D	3.732	21	O
T6-7	D	3.731	21	O
T6-8	D	3.733	21	O
T6-9	D	3.732	22	O
T6-10	D	3.731	21	O
☐ Supplementary Information: Sample 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				

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 : 4A, Test duration : 1Hr					

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

Cell Qty per box	Cell weight (kg)	Net weight per box (kg)
130	0.069	8.97

	Before Test	After Test
Weight (kg)	9.63	9.63
Test result		

Sample Photo

front	back
	

- End of Report -