
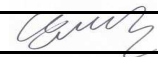



문서번호	QAE-EF02-150304-PKASM PN SB10H45071, ASM PN SB10H45072	
Prepared	남익현	
	장승현	
Reviewed	남대호	
	박해나	
Approved	김병수	

SolutionPartner

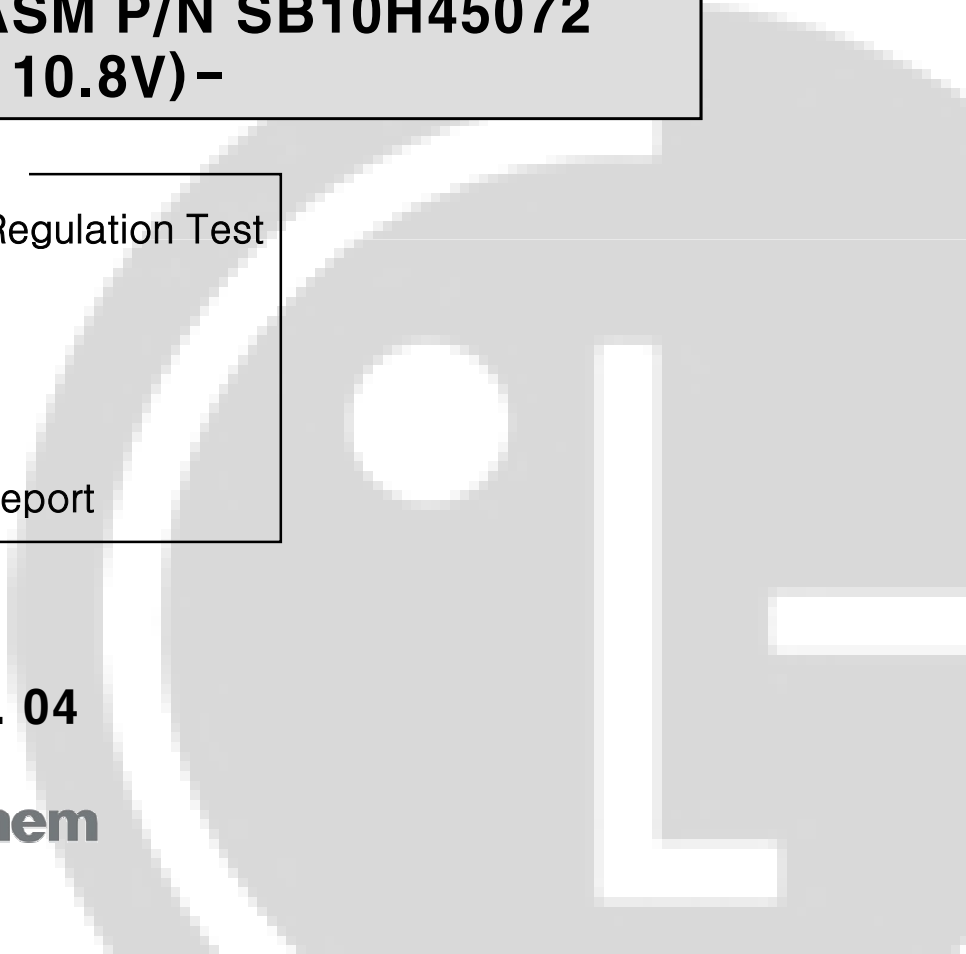
UN Test Report

-ASM P/N SB10H45071, ASM P/N SB10H45072 (Nom.48Wh, 10.8V)-

— 목 차 —

1. UN Transportation Regulation Test
 2. Test Procedure
 3. Test Result
 4. Sample Image
- Appendix. Drop Test Report

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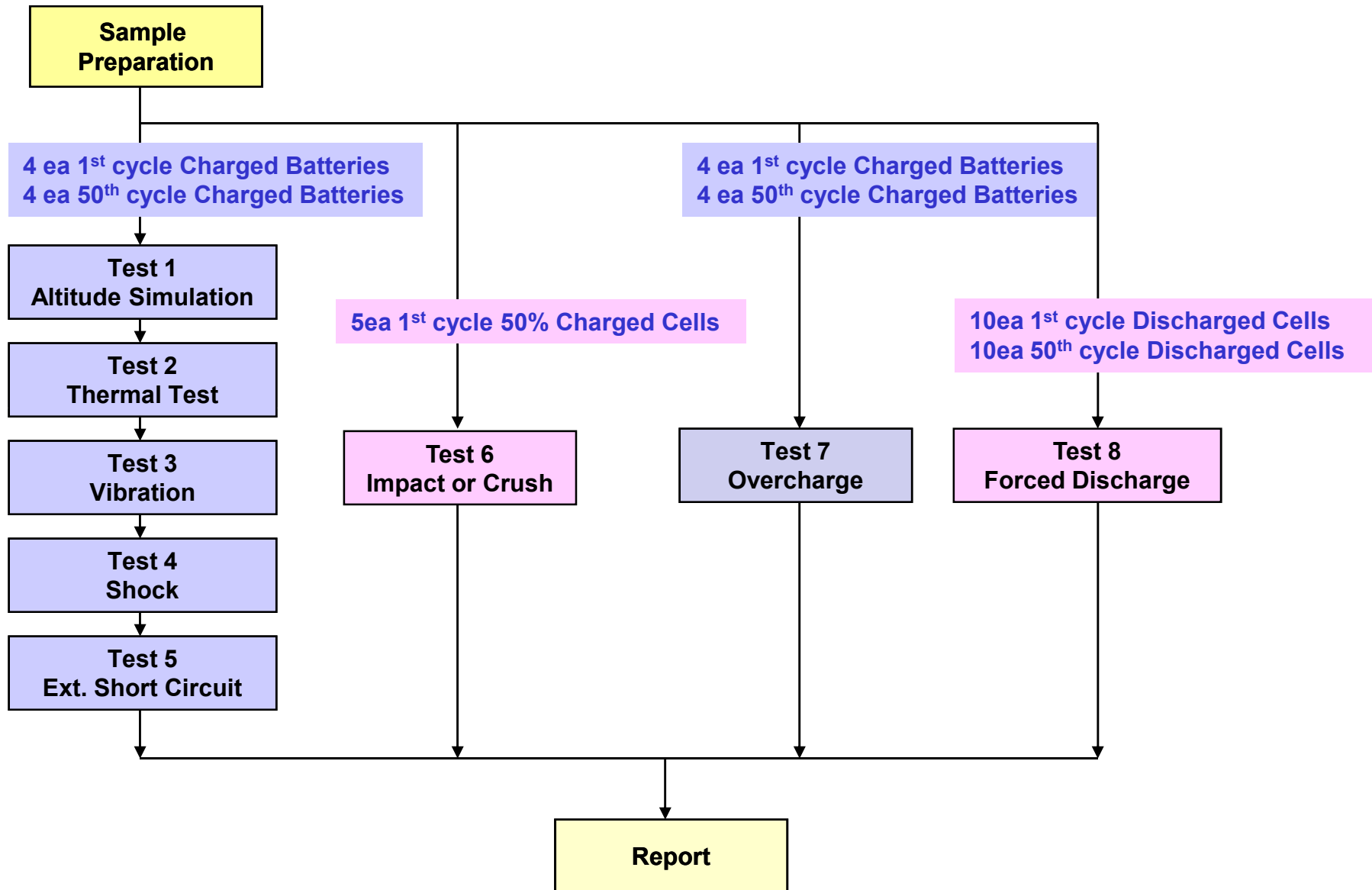
1. UN Transportation Regulation Test

Test	Condition	Requirements	
Test 1. Altitude Simulation	Storing at (low pressure)11.6kPa for 6hr at 20+/-5℃	- Measuring mass before/ after each test (If $M < 1g$, less than 0.5%, If $1g \leq M \leq 75g$, less than 0.2%, If $M > 75g$, less than 0.1%) - Measuring voltage before/ after each test (more than 90%) - No leakage, no venting, no disassembly, no rupture, no fire	
Test 2. Thermal Test	[72±2℃,6hr ↔ -40 ± 2℃,6hr,interval max. 30min] x 10cycle Storing at 20±5℃ for 24h		
Test 3. Vibration	[7Hz↔200Hz↔7Hz, in 15min] x 12 times x 3 direction 1) sinusoidal waveform with a logarithmic sweep 2) 7Hz 18Hz (maintaining 1gn) app. 50Hz (until 8gn) 200Hz (maintaining 8gn), 1.6mm total excursion		
Test 4. Shock	Half sine shock (peak acceleration : 150gn, pulse duration : 6msec) x 6 (±x, y, z), direction x 3 cycle		
Test 5. External Short Circuit	100mΩ ext. short-circuit at 55±2℃ 1hr continue after returning at 55±2℃		- No disassembly, no rupture, no fire within 6 hours after the test - Temp. monitoring (max. 170℃)
Test 6. Impact for cylindrical cells (> 18mm diameter)	Φ=15.8mm bar, 9.1kg mass, 61±2.5cm height		- No disassembly, no fire within 6 hours after the test - Temp. monitoring (max. 170℃)
Test 6. Crush for cylindrical cells (≤ 18mm diameter) for prismatic, pouch, coin/button cells	Crushing rate :1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation		
Test 7. Overcharge	Current = Manufacturer's recommended max. continuous charge current X 2 Voltage 1.If charge voltage ≤ 18V, V (min.) = 2 x (max. charge voltage) or V (min.) = 22V. 2.If charge voltage > 18V, V (min.) = 1.2 x (max. charge voltage)		- No disassembly, no fire within 7 days after the test
Test 8. Forced Discharge	Discharge at max. discharge current (with 12V DC power supply), Duration time = rated capacity/initial test current		

* Tests through T1-T5 shall be conducted in sequence with the same samples.

* We declare that the above-mentioned test is the result of being checked according to UN Test (Manual of Test and Criteria ST/SG/AC.10/11/Rev.5/Amd.2)

2. Test Procedure



3-1. T1-T4 Test Result

Before			Altitude (T1)					Thermal (T2)					Vibration (T3)					Shock (T4)					
	NO.	OCV	Mass	OCV	Mass	Residual OCV(%)	Mass Loss(%)	Result	OCV	Mass	Residual OCV(%)	Mass Loss(%)	Result	OCV	Mass	Residual OCV(%)	Mass Loss(%)	Result	OCV	Mass	Residual OCV(%)	Mass Loss(%)	Result

A. 1st cycle fully state

Charge	1	12.574	330.57	12.561	330.57	99.90	0.000	Pass	12.428	330.53	98.94	0.012	Pass	12.288	330.52	98.87	0.003	Pass	12.287	330.50	99.99	0.006	Pass
	2	12.531	330.49	12.508	330.48	99.82	0.003	Pass	12.387	330.35	99.03	0.039	Pass	12.248	330.34	98.88	0.003	Pass	12.239	330.33	99.93	0.003	Pass
	3	12.535	330.94	12.519	330.92	99.87	0.006	Pass	12.391	330.59	98.98	0.100	Pass	12.246	330.58	98.83	0.003	Pass	12.239	330.57	99.94	0.003	Pass
	4	12.537	330.71	12.515	330.70	99.82	0.003	Pass	12.399	330.54	99.07	0.048	Pass	12.258	330.53	98.86	0.003	Pass	12.250	330.52	99.93	0.003	Pass
	Ave.	12.544	330.68	12.526	330.67	99.85	0.003	-	12.401	330.50	99.01	0.050	-	12.260	330.49	98.86	0.003	-	12.254	330.48	99.95	0.004	-

B. 50th cycle fully state

Charge	5	12.555	330.58	12.534	330.57	99.83	0.003	Pass	12.408	330.56	98.99	0.003	Pass	12.266	330.55	98.86	0.003	Pass	12.263	330.54	99.98	0.003	Pass
	6	12.559	330.68	12.544	330.68	99.88	0.000	Pass	12.415	330.67	98.97	0.003	Pass	12.276	330.64	98.88	0.009	Pass	12.265	330.63	99.91	0.003	Pass
	7	12.566	330.20	12.551	330.20	99.88	0.000	Pass	12.421	330.19	98.96	0.003	Pass	12.275	330.17	98.82	0.006	Pass	12.264	330.16	99.91	0.003	Pass
	8	12.561	330.34	12.548	330.33	99.90	0.003	Pass	12.415	330.32	98.94	0.003	Pass	12.273	330.31	98.86	0.003	Pass	12.265	330.31	99.93	0.000	Pass
	Ave.	12.560	330.45	12.544	330.45	99.87	0.002	-	12.415	330.44	98.97	0.003	-	12.273	330.42	98.85	0.005	-	12.264	330.41	99.93	0.002	-

Requirement

- Measuring mass before/after each test (If $M > 75g$, less than 0.1%, $1g \leq M \leq 75$, less than 0.2%, $M < 1g$, less than 0.5%)
- Measuring voltage before/after each test (more than 90%, only charged samples)
- No leakage, no venting, no disassembly, no rupture, no fire

3-2. T5/T7 Test Result

EXT.Short Circuit (T5)				
	NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle fully state

Charge	1	12.287	55.49	Pass
	2	12.239	55.93	Pass
	3	12.239	55.42	Pass
	4	12.250	54.95	Pass
	MAX.	12.287	55.93	-

Test Condition
- 100mΩ ext. short-circuit at 55±2°C

Over Charge (T7)				
	NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle fully state

Charge	9	12.541	24.79	Pass
	10	12.547	24.69	Pass
	11	12.546	23.57	Pass
	12	12.541	23.78	Pass
	MAX.	12.547	24.79	-

Test Condition
- Max. Charge Current : 2800mA - CC/CV 2Imax(5600mA)22V cut-off 24Hr

EXT.Short Circuit (T5)				
	NO.	Initial OCV(V)	Max. Temp (°C)	Result

B. 50th cycle fully state

Charge	5	12.263	55.82	Pass
	6	12.265	55.82	Pass
	7	12.264	55.42	Pass
	8	12.265	55.07	Pass
	MAX.	12.265	55.82	-

Requirement
- Temperature ≤ 170 (°C) - No disassembly, no rupture, no fire within 6 hours after the test

Over Charge (T7)				
	NO.	Initial OCV(V)	Max. Temp (°C)	Result

B. 50th cycle fully state

Charge	13	12.523	23.73	Pass
	14	12.525	23.97	Pass
	15	12.520	24.13	Pass
	16	12.527	23.76	Pass
	MAX.	12.527	24.13	-

Requirement
- No disassembly, no fire within 7 day after the test

3-3. T6/T8 Test Result (ICR18650S3)

Impact (T6)				
Direction	NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle 50% charged state

Flat	C-1	3.647	17.86	Pass
	C-2	3.647	18.66	Pass
	C-3	3.647	19.22	Pass
	C-4	3.647	19.82	Pass
	C-5	3.647	19.49	Pass
MAX.		3.647	19.49	-

Test Condition
-- Φ=15.8mm bar, 9.1kg mass, 61±2.5cm height

Requirement
- Temperature ≤ 170 (°C)
- No disassembly, no fire within 6 hours after the test

Forced Discharge (T8)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle fully discharged state

C-6	3.435	95.86	Pass
C-7	3.435	91.43	Pass
C-8	3.436	104.99	Pass
C-9	3.436	98.50	Pass
C-10	3.436	93.10	Pass
C-11	3.437	99.91	Pass
C-12	3.437	97.06	Pass
C-13	3.435	97.02	Pass
C-14	3.436	103.25	Pass
C-15	3.435	99.42	Pass
MAX.	3.437	104.99	-

B. 50th cycle fully discharged state

C-16	3.435	94.44	Pass
C-17	3.436	93.95	Pass
C-18	3.436	98.90	Pass
C-19	3.435	102.69	Pass
C-20	3.436	95.74	Pass
C-21	3.436	95.66	Pass
C-22	3.436	93.42	Pass
C-23	3.437	98.34	Pass
C-24	3.437	96.99	Pass
C-25	3.436	100.33	Pass
MAX.	3.437	102.69	-

Test Condition
- Discharge at max. discharge current (with 12V DC power supply) : 4300mA Duration time: rated capacity (31min)

Requirement
- No disassembly, no fire within 7 days after the test

4. Sample Image(ASM P/N SB10H45071)



4. Sample Image(ASM P/N SB10H45072)

