




문서번호	QAE-EF02-141001-PKASM PN SB10F46454	
Prepared	남익현	
	장승현	
Reviewed	남대호	
	박해나	
Approved	김병수	

SolutionPartner

UN Test Report

- ASM P/N SB10F46454(Nom.32Wh, 7.6V) -

목 차

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

2014. 10. 01



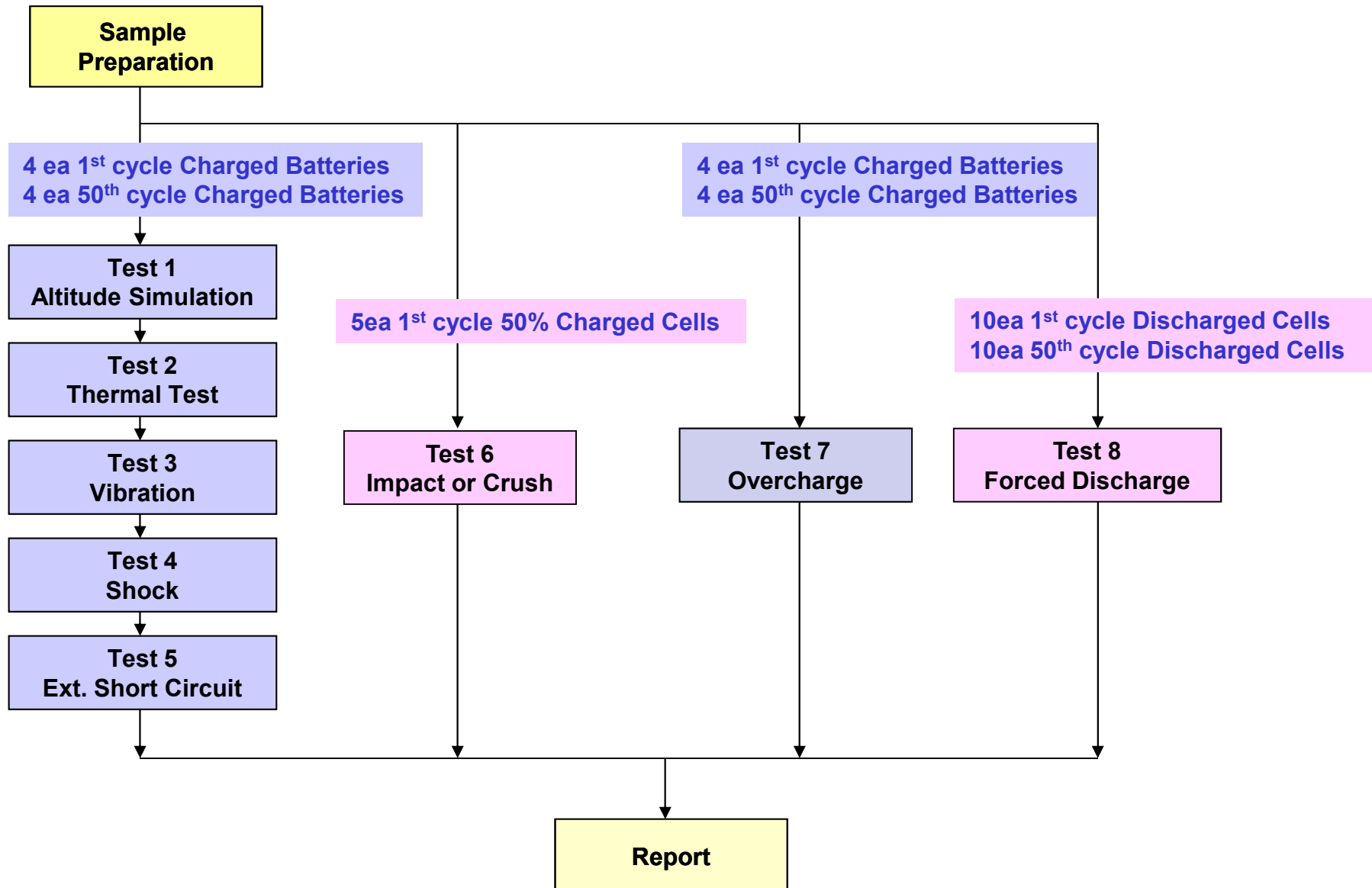
1. UN Transportation Regulation Test

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	8.675	144.25	8.661	144.24	99.84	0.007	Pass	8.548	144.24	98.70	0.000	Pass	8.545	144.22	99.96	0.014	Pass	8.543	144.22	99.98	0.000	Pass
	2	8.655	144.45	8.644	144.44	99.87	0.007	Pass	8.529	144.43	98.67	0.007	Pass	8.529	144.41	100.00	0.014	Pass	8.526	144.41	99.96	0.000	Pass
	3	8.655	144.19	8.640	144.19	99.83	0.000	Pass	8.523	144.17	98.65	0.014	Pass	8.520	144.17	99.96	0.000	Pass	8.517	144.17	99.96	0.000	Pass
	4	8.658	144.34	8.648	144.34	99.88	0.000	Pass	8.547	144.33	98.83	0.007	Pass	8.547	144.33	100.00	0.000	Pass	8.546	144.32	99.99	0.007	Pass
	Ave.	8.661	144.31	8.648	144.30	99.86	0.003	-	8.537	144.29	98.71	0.007	-	8.535	144.28	99.98	0.007	-	8.533	144.28	99.97	0.002	-

B. 50th cycle fully state

Charge	5	8.661	144.70	8.646	144.70	99.83	0.000	Pass	8.543	144.69	98.81	0.007	Pass	8.540	144.68	99.96	0.007	Pass	8.537	144.68	99.96	0.000	Pass
	6	8.656	144.37	8.641	144.37	99.83	0.000	Pass	8.523	144.37	98.63	0.000	Pass	8.521	144.35	99.98	0.014	Pass	8.520	144.35	99.99	0.000	Pass
	7	8.669	144.27	8.658	144.26	99.87	0.007	Pass	8.545	144.25	98.69	0.007	Pass	8.544	144.24	99.99	0.007	Pass	8.543	144.24	99.99	0.000	Pass
	8	8.668	144.53	8.656	144.52	99.86	0.007	Pass	8.552	144.51	98.80	0.007	Pass	8.551	144.49	99.99	0.014	Pass	8.550	144.48	99.99	0.007	Pass
	Ave.	8.664	144.47	8.650	144.46	99.85	0.003	-	8.541	144.46	98.73	0.005	-	8.539	144.44	99.98	0.010	-	8.538	144.44	99.98	0.002	-

Requirement	<ul style="list-style-type: none"> - 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	8.543	56.68	Pass
	2	8.526	55.09	Pass
	3	8.517	55.38	Pass
	4	8.546	55.02	Pass
	MAX.	8.546	56.68	-

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	8.641	25.25	Pass
	10	8.642	24.44	Pass
	11	8.644	25.02	Pass
	12	8.643	24.48	Pass
	MAX.	8.644	25.25	-

Test Condition
- Max. Charge Current : 3312mA - CC/CV 2Imax(6624mA) 17.4V cut-off 24Hr

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

B. 50th cycle fully state

Charge	5	8.537	55.73	Pass
	6	8.520	55.29	Pass
	7	8.543	56.60	Pass
	8	8.550	54.95	Pass
	MAX.	8.550	56.60	-

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	8.623	24.50	Pass
	14	8.622	24.86	Pass
	15	8.624	23.95	Pass
	16	8.629	25.16	Pass
	MAX.	8.629	25.16	-

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

3-3. T6/T8 Test Result (ICP3458140L1)

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

A. 1st cycle 50% charged state (Direction :Flat)

Flat	C-1	3.782	23.09	Pass
	C-2	3.812	23.04	Pass
	C-3	3.795	23.05	Pass
	C-4	3.810	23.13	Pass
	C-5	3.866	23.09	Pass
MAX.		3.866	23.13	-

Test Condition
- Crushing rate :1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation

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	3.012	46.32	Pass
C-7	3.010	45.74	Pass
C-8	3.009	44.21	Pass
C-9	3.015	47.13	Pass
C-10	3.009	48.21	Pass
C-11	3.014	47.56	Pass
C-12	3.008	47.46	Pass
C-13	3.014	47.20	Pass
C-14	3.010	46.49	Pass
C-15	3.014	47.32	Pass
MAX.	3.015	48.21	-

B. 50th cycle fully discharged state

C-16	3.121	44.84	Pass
C-17	3.122	44.26	Pass
C-18	3.118	43.21	Pass
C-19	3.120	44.56	Pass
C-20	3.117	45.26	Pass
C-21	3.123	45.52	Pass
C-22	3.119	46.79	Pass
C-23	3.120	44.52	Pass
C-24	3.122	44.62	Pass
C-25	3.116	42.69	Pass
MAX.	3.123	46.79	-

Test Condition
- Discharge at max. discharge current (with 12V DC power supply) : 4140mA Duration time: rated capacity (60.0min)

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

4. Sample Image

