




문서번호	QAE-EF02-140312-PKAC14B18J	
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UN Test Report

- AC14B18J(Nom. 3220mAh, 11.4V) -

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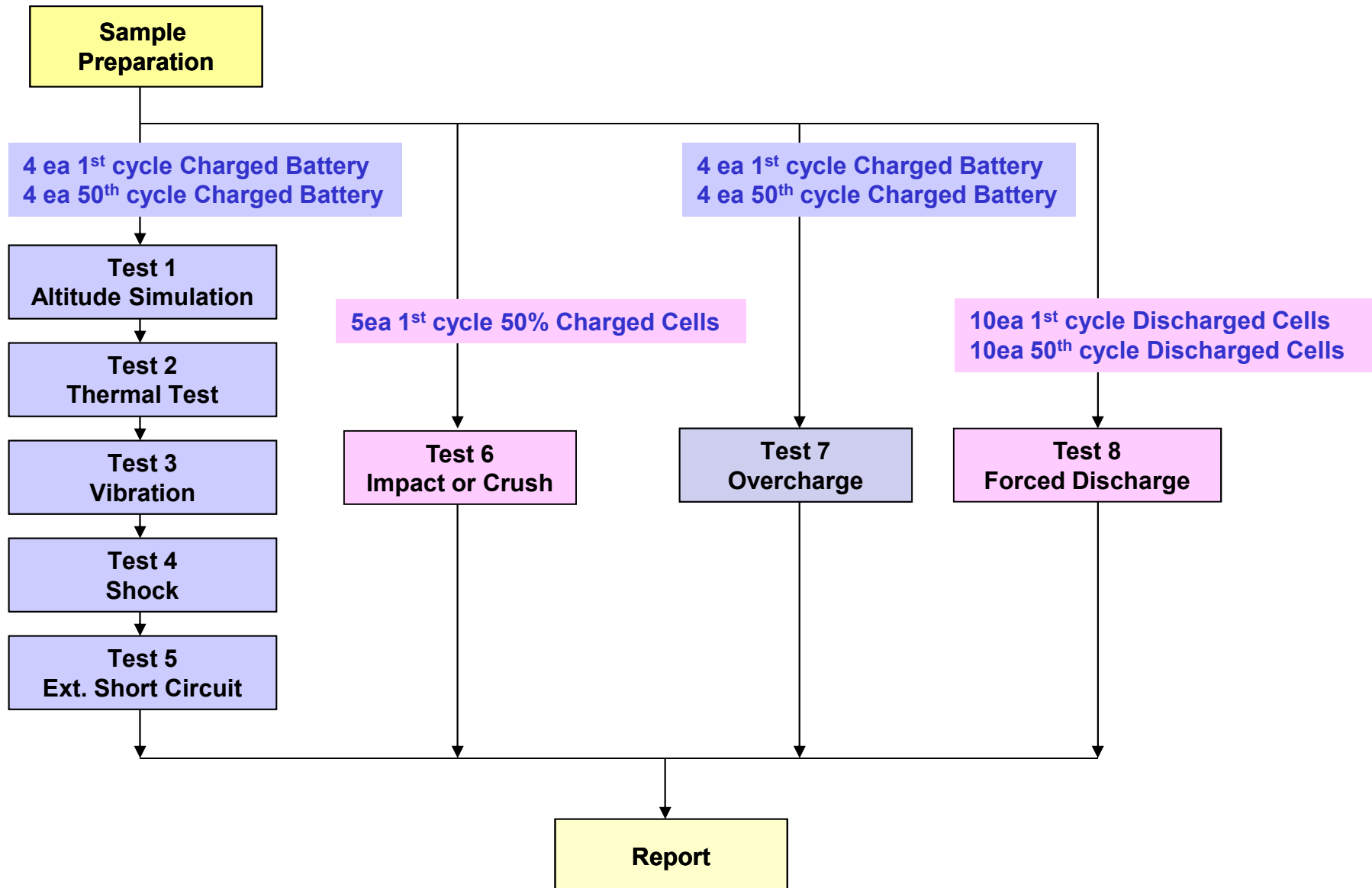
1. UN Transportation Regulation Test

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 (> 20mm 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 (≤ 20mm 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 battery.

* 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.1)

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	12.843	169.005	12.821	168.981	99.83	0.014	Pass	12.698	168.967	99.04	0.008	Pass	12.673	168.967	99.80	0.000	Pass	12.652	168.950	99.84	0.010	Pass
	2	12.841	168.831	12.819	168.826	99.83	0.003	Pass	12.696	168.801	99.04	0.015	Pass	12.674	168.787	99.82	0.008	Pass	12.660	168.767	99.89	0.012	Pass
	3	12.844	169.207	12.824	169.192	99.84	0.009	Pass	12.704	169.179	99.06	0.008	Pass	12.689	169.154	99.88	0.014	Pass	12.669	169.129	99.84	0.015	Pass
	4	12.850	169.547	12.828	169.538	99.83	0.005	Pass	12.704	169.527	99.03	0.006	Pass	12.683	169.511	99.84	0.010	Pass	12.663	169.497	99.84	0.008	Pass
	Ave.	12.845	169.147	12.823	169.134	99.83	0.008	-	12.700	169.118	99.04	0.009	-	12.680	169.105	99.84	0.008	-	12.661	169.086	99.85	0.011	-

B. 50th cycle fully state

Charge	5	12.838	168.996	12.818	168.972	99.85	0.014	Pass	12.702	168.951	99.09	0.013	Pass	12.684	168.934	99.86	0.010	Pass	12.669	168.920	99.89	0.008	Pass
	6	12.832	168.895	12.812	168.887	99.84	0.004	Pass	12.686	168.872	99.02	0.009	Pass	12.663	168.850	99.82	0.013	Pass	12.644	168.833	99.85	0.011	Pass
	7	12.825	169.556	12.810	169.538	99.88	0.010	Pass	12.694	169.521	99.10	0.010	Pass	12.678	169.497	99.87	0.014	Pass	12.660	169.486	99.86	0.007	Pass
	8	12.830	169.117	12.815	169.099	99.88	0.011	Pass	12.687	169.096	99.01	0.002	Pass	12.663	169.087	99.81	0.005	Pass	12.651	169.065	99.90	0.013	Pass
	Ave.	12.831	169.141	12.814	169.124	99.86	0.010	-	12.692	169.110	99.05	0.008	-	12.672	169.092	99.84	0.011	-	12.656	169.076	99.88	0.010	-

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)				
	Pack NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle fully state

Charge	1	12.652	55.63	Pass
	2	12.660	55.03	Pass
	3	12.669	55.95	Pass
	4	12.663	55.72	Pass
	MAX.	12.669	55.95	-

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

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

A. 1st cycle fully state

Charge	9	12.808	25.95	Pass
	10	12.876	25.10	Pass
	11	12.819	25.96	Pass
	12	12.872	25.41	Pass
	MAX.	12.876	25.96	-

Test Condition
- Max. Charge Current : 3220mA - CC/CV 2Imax(6440mA) 22V cut-off 24Hr

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

B. 50th cycle fully state

Charge	5	12.669	54.54	Pass
	6	12.644	54.72	Pass
	7	12.660	54.67	Pass
	8	12.651	54.39	Pass
	MAX.	12.669	54.72	-

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

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

B. 50th cycle fully state

Charge	13	12.709	25.61	Pass
	14	12.817	25.51	Pass
	15	12.812	25.56	Pass
	16	12.831	25.68	Pass
	MAX.	12.831	25.68	-

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

3-3. T6 Test Result (ICP485780A1)

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

A. 1st cycle 50% charged state

Flat	1	3.817	25.08	Pass
	2	3.817	23.32	Pass
	3	3.817	22.36	Pass
	4	3.816	23.87	Pass
	5	3.816	22.89	Pass
MAX.		3.817	25.08	-

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

1	3.267	91.85	Pass
2	3.277	94.84	Pass
3	3.265	97.52	Pass
4	3.266	102.96	Pass
5	3.262	92.61	Pass
6	3.237	90.33	Pass
7	3.306	105.69	Pass
8	3.258	103.29	Pass
9	3.266	109.14	Pass
10	3.508	100.81	Pass
MAX.	3.508	109.14	-

B. 50th cycle fully discharged state

1	3.459	95.59	Pass
2	3.444	109.79	Pass
3	3.492	99.03	Pass
4	3.403	109.82	Pass
5	3.427	111.33	Pass
6	3.428	112.17	Pass
7	3.463	102.45	Pass
8	3.605	107.98	Pass
9	3.616	111.88	Pass
10	3.416	108.63	Pass
MAX.	3.616	112.17	-

Test Condition
- Discharge at max. discharge current (with 12V DC power supply) : 4635mA Duration time: rated capacity (40.0min)

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

4. Sample Image



Appendix 1. 1.2m Drop Test Report

A. Test Result

No	Name of Test Items	Standard requirement or The Clause Number of Standard	Test Result		Conclusion
1	1.2m Drop Test	* UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Model Regulations(16 th) special provisions 188	3 Faces	The package is not cracked, the contents are not damaged and not shifted.	Passed
			3 Edges	The package is not cracked, the contents are not damaged and not shifted.	
			1 Angle	The package is not cracked, the contents are not damaged and not shifted.	
2	Gross Weight Measure	* UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Model Regulations(16 th) special provisions 188	437.79g		Passed

B. Sample Description

Dimensions	24.6×13.8×3.6cm	Net Weight of Batteries	360.77g	Battery Type	Rechargeable Li-ion Battery
Gross weight	437.79g	Battery number	2Pcs/Carton	** Description	Covered by air bag

C. Image After Test



* Recommendations on the transport of dangerous goods as below
Each package of cells or batteries, or the completed package must be capable of withstanding a 1.2 m drop test in any orientation without:

- 1) damage to cells or batteries contained therein
- 2) shifting of the contents so as to allow battery to battery (or cell to cell) contact
- 3) release of contents.

** Description: Description about the protection of short-circuit