for Lithium ion battery passed UN tes e that this battery passed UN tes e that this battery passed UN tes number of test I Number of test I hully charged first cycle first cycle. Fully charged 4 batteries First cycle. Fully discharged 10 cells *The test data may contain additional m ion battery Specification 11.55 V 1.87 g following manual.							E1724407 Feb. 16. 2017	2017
mer Model : SB10K97576 al Code : BJ-J630001AA ict Name : 3CGA583864-1-T1354 ret Name : 3CGA583864-1-T1354 Me declare that this battery passed UN tes Me declare that this battery passed UN tes and Criteria results Note Number of test results Note Pass Note Number of test Altitude simulation Pass Note Pass Note Pass Altitude simulation Pass Note Pass Note Pass Note Pass Pass Pass Pass Pass Pass Pass Pas			Cert	ificate		thium ion battery	21. Hursela	
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of Tests and Criteria     Test lest     Number of test       Test item     Test ults     Note     Number of test       Test item     Pass     Number of test       Altitude simulation     Pass     First cycle       Thermal test     Pass     First cycle       Shock     Pass     4 batteries       Shock     Pass     First cycle       Shock     Pass     4 batteries       Shock     Pass     First cycle       Shock     Pass     First cycle       Shock     Pass     A batteries       Shock     Pass     First cycle       Shock     Pass     First cycle       Stock     Pass     First cycle       Stock     Pass     First cycle       Crush     Pass     First cycle       Stock     Pat						this battery passed UN tes	it.	
Altitude simulation     Pass     First cycle       Thermal test     Pass     First cycle       Thermal test     Pass     First cycle       Vibration     Pass     A batteries       Shock     Pass     A batteries       Shock     Pass     A batteries       Shock     Pass     First cycle. Fully charged       Shock     Pass     First cycle. Fully discharged       Crush     Pass     First cycle. Fully discharged       Overcharge     Pass     First cycle. Fully discharged       Forced discharge     Pass     First cycle. Fully discharged	Manua (38.3 No.	al of Tests and Cri Lithium batteries Test item		Test results	Note	Number of test	batteries/cells	
Internal test         Pass         First cycle           Vibration         Pass         First cycle           Vibration         Pass         4 batteries           Shock         Pass	+	Altitude simulat	ion	Pass				
VibrationPassImplementationShockPassImplementationShockPassImplementationExternal short circuitPassImplementationExternal short circuitPassImplementationCrushPassImplementationOverchargePassImplementationOverchargePassImplementationForced dischargePassImplementationForced dischargeImplementationImplementationForced dischargeImplementationImplementationForced dischargeImplementationImplementationForced dischargeImplementationImplementationForced dischargeImplementationImplementationForced dischargeImplementationImplementationForced dischargeImplementationI	Τ2			Pass		First cycle	After 50 cycles	
Shock       Pass       4 batteries         External short circuit       Pass       4 batteries         External short circuit       Pass       First cycle.Fully charged 4 batteries         Overcharge       Pass       First cycle.Fully discharged 10 cells         Overcharge       Pass       *The test data may contain additional         Forced discharge       Pass       *The inst cycle.Fully discharged 10 cells         Forced discharge       Pass       *The test data may contain additional         Matt-hour       Item       Nominal value         Matt-hour rating       Nominal value       Item         Matt-hour rating       11.55 V       Lithium equivalent content         Lithium equivalent content       1.87 g       Lithium equivalent content	ТЗ			Pass		fully charged	fully charged	
External short circuit     Pass     First cycle. Fully charged 4 batteries       Crush     Pass     First cycle. Fully charged 4 batteries       Overcharge     Pass     First cycle. Fully discharged 10 cells       Forced discharge     Pass     *The test data may contain additional       Forced discharge     Pass     *The test data may contain additional       Forced discharge     Pass     *The inst cycle. Fully discharged 10 cells       Forced discharge     Pass     *The test data may contain additional       Matt-hour rating     Nominal value     11.55 V       Matt-hour rating     11.55 V     Inthium equivalent content       Above test procedures are compliant to the following manual.     1.87 g				Pass		4 batteries	4 batteries	
Crush     Pass     First cycle, Fully charged 4 batteries       0vercharge     Pass     First cycle, Fully charged 4 batteries       0vercharge     Pass     First cycle, Fully discharged 10 calls       Forced discharge     Pass     *The test data may contain additional       Forced discharge     Pass     *The itest data may contain additional       Forced discharge     Pass     *The itest data may contain additional       Matt-hour     Item     Nominal value       Matt-hour     11     24 Wh       Nominal voltage     11.55 V       Lithium equivalent content     1.87 g       Above test procedures are compliant to the following manual.			ircuit	Pass				
Overcharge         Pass         First cycle.Fully charged 4 batteries           Forced discharge         Pass         First cycle.fully discharged 10 cells           Forced discharge         Pass         *The test data may contain additional           *The test data may contain additional         Nominal voltain additional           Item         Nominal value         24 Mh           Nominal voltage         11.55 V         11.55 V           Above test procedures are compliant to the following manual.         1.87 g	Τ6			Pass		First 50% 5 ce	: cycle harged Is	
8     Forced discharge     Pass     First cycle.fully discharged 10 cells       *The test data may contain additional       Lithium ion battery Specification       Natt-hour rating     Nominal value       Nominal voltage     11.55 V       Lithium equivalent content     1.87 g       Above test procedures are compliant to the following manual	Τ7			Pass		First cycle, Fully charged 4 batteries	After 50 cycles, Fully charged 4 batteries	
<pre>*The test data may contain additional m ion battery Specification Nominal value 24 Wh 1.55 V 1.87 g following manual.</pre>				Pass		First cycle, fully discharged 10 cells	After 50 cycles, fully discharged 10 cells	
m ion battery Specification Nominal value 24 Wh 11.55 V 1.87 g following manual					*The t	est data may contain additional	test result other than above table.	9
Nominal value24 Wh24 Wh11.55 V1.87 gfollowing manual.						battery Specification		
24 Wh 11.55 V 1.87 g following manual.			Item			Nominal value	Note	
11.55 V 1.87 g following manual.		Watt-	hour r	ating		24 Wh		
1.87 g following manual.		Nomir	nal vo	ltage		11.55 V		
following manual.		Lithium e	quival	ent cont	ent			
Rev.5A2 for cell.		Above test pro (Manual of Test	cedure ts and	s are co Criteria		g manual. sub-section 38.3.	r cell. Rev.5A2 for battery)	

Panasonic

1.Test Item: Altitude simulation (T1)

2. Test Purpose: This test simulates air transport under low-pressure conditions.

3.Test Procedure:

Test cells and batteries shall be stored at a pressure of 11.6kPa or less for at least six hours at ambient temperature( $20\pm5^{\circ}C$ ).

SANYO Internal Procedure:

As above.

**4.Test Requirements:** 

No mass loss, no leakage,no venting, no disassembly, no rupture and no fire, and the voltage retention is not less than 90%.

5.Test Date: 2016/05/18

6.Test Data

Battery No.		Mass(g)		Mass Voltage(V)		ge(V)	Voltage		Result	Indecomont
Dattery NO	•	Before test	After test	loss (%) (=<0.1%)	Before test	After test	Retention( %)(=>90%	avont	Result	Judgement
At first	1	132.08	132.09	0.01	13.08	13.07	99.9	0	PASS	
	2	131.46	131.45	0.01	13.04	13.04	99.9	0	PASS	
cycle,in fully charged states	3	131.85	131.87	0.02	13.07	13.06	99.9	0	PASS	
	4	132.12	132.14	0.02	13.08	13.06	99.9	0	PASS	PASS
After 50 evalue	5	133.49	133.47	0.01	13.11	13.10	99.9	0	PASS	PASS
After 50 cycles	6	132.87	132.78	0.07	13.10	13.09	99.9	0	PASS	
ending in fully	7	132.73	132.75	0.02	13.10	13.09	99.9	0	PASS	
charged states	8	134.01	133.99	0.01	13.10	13.09	99.9	0	PASS	

Notes: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire,

1.Test Item: Thermal Test (T2)

2. Test Purpose: This test assesses cell and battery seal integrity and internal electrical connections. The test is conducted using rapid and extreme temperature changes.

**3.Test Procedure:** 

Test cells and batteries are to be stored for at least six hours at a test temperature equal to  $72\pm2^{\circ}C$ , followed by storage for at least six hours at a test temperature equal to  $-40\pm2^{\circ}C$ . The maximum time internal between test temperature extremes is 30 minutes. This procedure is to be repeated 10 times, after which all test cells and batteries are to be stored for 24 hours at ambient temperature ( $20\pm5^{\circ}C$ ). For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours. SANYO Internal Procedure:

As above.

4.Test Requirements:

No mass loss, no leakage, no venting, no disassembly, no rupture and no fire, and the voltage retention is not less than 90%.

5.Test Date: 2016/05/19~2016/05/24

6.Test Data

Battery No		Mass(g)		Mass Voltage(V)		Voltage	Other <sub>P</sub>	D. k	T. J. S. Market	
Battery No	•	Before test	After test	loss (%) (=<0.1%)	Before test	After test	Retention( %)(=>90%)	event	Result	Judgement
At first	1	132.09	132.11	0.02	13.07	12.80	97.9	0	PASS	
	2	131.45	131.45	0.00	13.04	12.78	98.0	0	PASS	
cycle,in fully charged states	3	131.87	131.86	0.01	13.06	12.79	98.0	0	PASS	
	4	132.14	132.11	0.02	13.06	12.79	97.9	0	PASS	DACC
After 50 evolution	5	133.47	133.43	0.03	13.10	12.84	98.1	0	PASS	PASS
After 50 cycles	6	132.78	132.74	0.03	13.09	12.85	98.1	0	PASS	
ending in fully	7	132.75	132.73	0.02	13.09	12.83	98.0	0	PASS	
charged states	8	133.99	133.88	0.08	13.09	12.84	98.1	0	PASS	

Notes: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire,

1.Test Item: Vibration (T3)

2. Test Purpose: This test simulates vibration during transport.

3.Test Procedure:

Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.

The logarithmic frequency sweep is as follows: from 7 Hz a peak acceleration of 1gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm(1.6 mm total excursion) and thefrequency increased until a peak acceleration of 8gn occurs (approximately 50Hz). A peak acceleration of 8 gn is then maintained until the frequency is increased to 200Hz. For large batteries, the peak acceleration of 2 gn is maintained. SANYO Internal Procedure:

As above.

**4.Test Requirements:** 

No mass loss, no leakage, no venting, no disassembly, no rupture and no fire, and the voltage retention is not less than 90%.

#### 5.Test Date: 2016/05/25~2016/05/26

6.Test Data

Battory No.		Mass(g)		Mass Voltage(V)		Voltage	Other	her De such	Tland	
Battery No	•	Before test	After test	loss (%) (=<0.1%)	Before test	After test	Retention( %)(=>90%)	event	Result	Judgement
At first	1	132.11	132.09	0.02	12.80	12.79	99.9	0	PASS	
cycle, in fully	2	131.45	131.45	0.00	12.78	12.77	99.9	0	PASS	
5 5	3	131.86	131.87	0.01	12.79	12.79	99.9	0	PASS	
charged states	4	132.11	132.11	0.00	12.79	12.78	99.9	0	PASS	PASS
After 50 cycles	5	133.43	133.41	0.01	12.84	12.83	99.9	0	PASS	TASS
•	6	132.74	132.72	0.02	12.85	12.84	99.9	0	PASS	
ending in fully	7	132.73	132.70	0.02	12.83	12.82	99.9	0	PASS	
charged states	8	133.88	133.90	0.01	12.84	12.83	99.9	0	PASS	

Notes: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire,

1.Test Item: Shock (T4)

2. Test Purpose: This test simulates possible impacts during transport.

3.Test Procedure:

Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each cell or battery shall be subjected to a half-sine shock of pack acceleration of 150 g<sub>n</sub> and pulse duration of 6 milliseconds. Each cell or battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.

However, large cells and large batteries shall be subjected to a half-sine shock of peak acceleration of 50 g<sub>n</sub> and pulse duration of 11 milliseconds. Each cell or battery is subjected to three shocks in the positive direction followed by three shocks in the negative direction of each of three mutually perpendicular mounting positions of the cell for a total of 18 shocks.

SANYO Internal Procedure:

As above.

**4.Test Requirements:** 

No mass loss, no leakage, no venting, no disassembly, no rupture and no fire, and the voltage retention is not less than 90%.

5.Test Date: 2016/05/	/26
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6.Test Data

Battery No.		Mass(g)		Mass	Volta		Voltage Retention(	Other	Result	Indoomont
Dattery NO		Before test	After test	loss (%) (=<0.1%)	Before test	After test	%)(=>90%)	event	Result	Judgement
At first	1	132.09	132.09	0.00	12.79	12.79	100.0	0	PASS	
cycle, in fully	2	131.45	131.45	0.00	12.77	12.76	100.0	0	PASS	
charged states	3	131.87	131.84	0.02	12.79	12.78	100.0	0	PASS	
	4	132.11	132.10	0.01	12.78	12.78	100.0	0	PASS	PASS
After 50 evalue	5	133.41	133.43	0.01	12.83	12.83	100.0	0	PASS	PASS
After 50 cycles	n	132.72	132.75	0.02	12.84	12.84	100.0	0	PASS	
ending in fully		132.70	132.72	0.02	12.82	12.82	100.0	0	PASS	]
charged states	8	133.90	133.90	0.00	12.83	12.83	100.0	0	PASS	

Notes: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire,

1.Test Item: External short circuit (T5)

2.Test Purpose: This test simulates an external short circuit.

3.Test Procedure:

The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches  $55\pm2^{\circ}$ C and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0.10hm at  $55\pm2^{\circ}$ C. This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to  $55\pm2^{\circ}$ C. The cell or battery must be observed for a further six hours for the test to be concluded.

SANYO Internal Procedure:

As above.

4.Test Requirements:

External temperature of test batteries does not exceed  $170^{\circ}$ C and there is no disassembly, no rupture and no fire within six hours after this test.

Batte	ery No.	Maximum temperature (°C)	Other event	Result	Judgement
At first cycle, in	1	56.7	0	PASS	
fully charged	2	56.8	0	PASS	
states	3	56.5	0	PASS	
States	4	56.9	0	PASS	PASS
After 50 evolos	5	56.6	0	PASS	PASS
After 50 cycles	6	57.1	0	PASS	
ending in fully	7	56.9	0	PASS	
charged states	8	56.8	0	PASS	

5.Test Date: 2016/05/27

Notes: D-Disassembly, R-Rupture, F-Fire, 0-No disassembly, no rupture & no fire

1.Test Item:Crush (T6)

Applicable to prismatic, pouch, coin/button cells and cylindrical cells not more than 20 mm in diameter

2. Test Purpose: These tests simulate mechanical abuse from a crush that may result in an internal short circuit.

3.Test Procedure:

A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached.

- (a) The applied force reaches 13 kN  $\pm$  0.78 kN;
- (b) The voltage of the cell drops by at least 100 mV; or
- (c) The cell is deformed by 50% or more of its original thickness.

Once the maximum pressure has been obtained, the voltage drops by 100 mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.

A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis.

Each test cell or component cell is to be subjected to one crush only. The test sample shall be observed for a further 6 h. The test shall be conducted using test cells or component cells that have not previously been subjected to other tests.

#### 4.Test Requirements:

External temperature of test cells and component cell does not exceed  $170^{\circ}C$  and there is no disassembly, no rupture and no fire during the test and within six hours after the test.

5.Test Date: 2016/01/25

0.16St Data.					
Cell No.		Maximum temperature (°C)	Other event	Result	Judgement
	1	20. 7	0	PASS	
At first	2	20. 4	0	PASS	
cycle, 50% charged	3	19.9	0	PASS	PASS
states	4	20. 8	0	PASS	
	5	20.5	0	PASS	

6.Test Data:

Notes: D-Disassembly, F-Fire, 0-No disassembly & no fire

1.Test Item:Overcharged (T7)

2.Test Purpose: This test evaluates the ability of a rechargeable battery to withstand an overcharge condition. 3.Test Procedure:

The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:

- (a) when the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V.
- (b) when the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage.

Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.

SANYO Internal Procedure:

Min.Charge Voltage:	22 V
Charge Current:	4.84 A

4.Test Requirements:

There is no disassembly and no fire within seven days after the test.

5.Test Date: 2016/05/23~2016/06/07

6.Test Data

Battery N	lo.	Event	Result	Judgement
At first cycle in	1	0	PASS	
fully charged	2	0	PASS	
states	3	0	PASS	
states	4	0	PASS	PASS
After 50 cycles	5	0	PASS	PASS
	6	0	PASS	
ending in fully	7	0	PASS	
charged states	8	0	PASS	

Notes: D-Disassembly, F-Fire, O-No disassembly & no fire

1.Test Item:Forced discharge (T8)

#### 2.Test Purpose:

This test evaluates the ability of a primary or a rechargeable cell to withstand a forced discharge condition.

#### 3.Test Procedure:

Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initia current equal to the maximum discharge current specified by the manufacturer.

The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).

#### 4.Test Requirements:

No disassembly and no fire during the test and within seven days after the test.

#### 5.Test Date: 2016/02/01 - 2016/02/09

6.Test Data

Cell No.		Maximum Temperature(°C)	Other event	Result	Judgement
	1	75.3	0	PASS	
	2	80.4	0	PASS	
	3	74.1	0	PASS	
At first	4	78.7	0	PASS	
cycle, in fully	5	80. 2	0	PASS	
discharged	6	73.5	0	PASS	
states	7	76.3	0	PASS	
	8	78.0	0	PASS	
	9	78.0	0	PASS	
	10	79.6	0	PASS	PASS
	11 12	85. 1	0	PASS	ASS ASS
		87.1	0	PASS	
10 50	13	83. 2	0	PASS	
After 50 cycles	14	86.6	0	PASS	
ending, in	15	86.0	0	PASS	
fully	16	87.8	0	PASS	
discharged states	17	79.6	0	PASS	
SILLES	18	79.8	0	PASS	
	19	79.3	0	PASS	
	20	86.3	0	PASS	

Notes: D-Disassembly, R-Rupture, F-Fire, O-No disassembly, no rupture & no fire