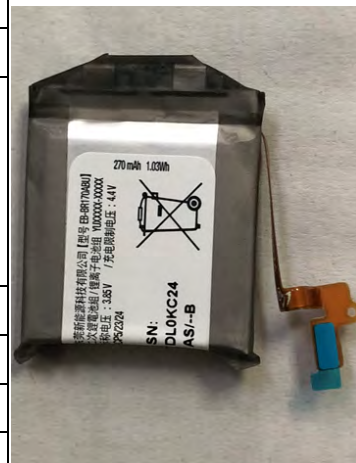


RoHS FREE

HFR PVC Pht Sb Be CoCl2

APPROVAL SHEET (ver2.0)

PRODUCT NAME	BATTERY PACK			
MODEL CODE(SKU)	EB-BR170ABU			
SEC CODE	68%	GH43-04905A	30%	GH43-04906A
MAKER PART CODE	68%	GB-S10-472324	30%	GB-S10-472324
APPLIED MODEL	SM-R170			
PACKAGE TYPE	Main			
PRODUCT SPECIFICATION	CELL : P/N(, ATL), 270mAh, 3.85V, 1EA, 1S1P Protection IC : 1 st MD1421E54CPAL-R			
Reliability Test Version	Version 4.0			
REMARK				
WEIGHT (g)	NET	4.95±0.25g		
	GROSS			
	INNER BOX			
	MASTER BOX			
SIZE (mm) (T*W*L,(Max)) T : SOC 68%(MAX)	NET(max)	4.75*22.6*27		
	GROSS			
	INNER BOX			
	MASTER BOX			



VENDOR APPROVAL			
	DRAFT	AGREEMENT	APPROVAL
SIGN			
NAME	Tank Wang	PT Zhao	Nicole Fu
DATE	2019.11.6	2019.11.6	2019.11.6

All items in this approval sheet have to be periodically controlled and maintained for assurance and quality of mass product as cell was approved

We are not supposed to ask the partners to provide a technical document without valid reasons.

The acquired technical document should not be used elsewhere.

Comply with the threshold of substances which are specified in OQA-2049

MAKER	ATL	Tel.	+852-2498-0908
ADDRESS	3503 Wharf Cable TV Tower, Tsuen Wan, N.T., Hong Kong		

Manufacture Site

1. Cell Maker

FACTORY	ATL(DG)	VENDOR CODE	
ADDRESS	North Zone of SSL S&T Industry Park, Dongguan, GuangDong, PRC 523808	TEL	+86-769-8898-9338
Line	Refer cell approvalsheet	VENDOR CODE	
ADDRESS		TEL	

2. Pack Maker

FACTORY	NVT(DG)	VENDOR CODE	
ADDRESS	No.8, XinGuo Road, JiaoShe Village, Dongkeng, Dongguan, Guangdong, PRC	TEL	+86-769-38826188
Line	6404 /6409/ 6310	VENDOR CODE	
ADDRESS		TEL	

Mass Production Quality Management Guide

The company, as a sub-contractor of SEC, submits this approval sheet that was written with guideline show below to guarantee steady quality and supply of the product.

1. Specification, inspection, management standard and other terms that are required for the quality management should be included in this approval sheet.
2. After beginning mass production, quality management and steady supply of the product must be guaranteed by sub-contractor and product quality must be provided at acceptable levels
3. If any changes, that may affect the quality (reliability, expected life, etc.), are made, sub-contractor must notify about the change and receive approval from SEC.
4. The sub-contractor should have mass production management standard so all the products meet the required standard, and test results certificate of each lot must be provided to SEC.
5. Sub-contractor must guarantee the quality of the product and not allow any defect, even if the information, including trade secret, related to the corresponding defect is not included in the approval sheet.
6. If there are any requests or issues that are required to obtain the quality level of the product, sub-contractor should contact SEC reliability to revise and make modification.

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1. DEVELOPMENT HISTORY
 - 1.1 Development History
 - 1.2 Revision History
 - 1.3 CTF (CRITICAL TO FACTOR/FUNCTION)
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 - 2.2 Warranty Period
 - 2.3 General Specification
 - 2.4 Reliability Test
 - 2.5 X-ray Test
 - 2.6 Pack ORT Plan
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 - 3.2 PCM Schematic
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 - 5.4 Nomex Drawing
 - 5.5 Adhesive tape Drawing
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1. DEVELOPMENT HISTORY

1.1 Development History

1.1.1 APPLIED SET : SM-R170

1.1.2 BATTERY MODEL : (Global)EB-BR170ABU(SEC Code : GH43-04905A(68%), GH43-04906A (30%))

1.1.3 CELL MODEL : GC-SDC-472324(Vendor, SEC Code : GH96-12519A)

1.1.4 Development Start date : 2018.06.01

1.1.5 Approval History

Approval Date	Responsible Person : Jang Kiyoun	
	Problem / Countermeasure	
By	Problems	Countermeasure

1.2 Revision History

[illegible]

1.3 CTF (CRITICAL TO FACTOR/FUNCTION)

1.3.1 Electrical Performance * n=32 above, Cpk: 1.33 above

ITEM	SPEC			Cpk	Remark
	MIN	TYP	MAX		
OCV(V)	3.73	3.76	3.80	7.09	SOC 30%
	3.90	3.95	3.99	2.21	SOC 68%
IR (mΩ)	150	180	210	3.56	
1 st Over Charge Protection(V)	4.405	4.425	4.445	2.03	Pack : not available for functional test, replace with PCM measurement (spec) value
1 st Over Discharge Protection(V)	2.6	2.7	2.8	4.52	
2 nd Over Charge Protection(V)	-	-	-	-	
2 nd Over Discharge Protection(V)	-	-	-	-	

1.3.1 Battery Dimension (unit: mm)/ Service Technician Change Type * n=32 above, Cpk: 1.00 above

ITEM	SPEC			Cpk	Drawing & Remark
	MIN	TYP	MAX		
Length	25.3	26.3	27	1.16	
Width	21.6	22.1	22.6	1.14	
Thickness (Ex-factory)	4.35	4.65	4.75	1.12	

1.3.2 PCM Dimension (unit: mm) * n=32 above, Cpk: 1.00 above

ITEM	SPEC			Cpk	Drawing & Remark
	MIN	TYP	MAX		
FPC Thickness	0.12	0.15	0.18	1.56	
FPC Length	43.04	43.24	43.44	1.89	
FPC Width	11.51	11.71	11.91	1.35	

1.3.3 Welding items: (unit: kgf)

ITEM	SPEC			Cpk	Remark
	MIN	TYP	MAX		
Ni Tab (pull strength)	2.0			1.3	Laser welding
Al Tab (pull strength)	0.8			1.33	Laser welding

1.3.4 Other

No.	Item	Check
1	Pad printing: Print spec (language, spec, country, S/N)	OK
2	PARTS LIST: supplier spec (New supplier /new part)	OK
3	Construction review	OK
4	The management of molding burr	OK

2. PRODUCT SPECIFICATION

2.1 Scope

This specification shall be applied to , which is manufactured by ATL.

Statement (1): Unless otherwise specified, all tests stated in this Product Specification are conducted at below conditions:

Temperature: 23 °C ("Temperature Condition");

Humidity: 65 ± 20% RH ("Humidity Condition")

Statement (2): Throughout this specification, numeric criteria annotated by "*" means such criteria are only applicable to fresh unused Product within 30 days from manufacture by ATL. Products either have been used or stored for a period longer than 30 days by Customer and/or its customer may exhibit an inferior numeric parameter than such criteria. Customer agrees that such occurrence does not constitute nonconformance of specification.

Statement (3): ΔT, means thickness change.

2.2 Warranty Period

*The Battery has been guaranteed for 15 months since battery pack is completely assembled"

2.3 General Specification

No.	Item	Definition	Specifications
2.3.1	Used Cell	Lithium-Ion Polymer cell	GC-SDC-472324
2.3.2	Cell E/D	(Min capacity X Nominal Voltage) / max Volume X1000 (Without side tape) ※Standard E/D : 1 st Vendor	431Wh/L
2.3.3	Min. capacity	Common capacity, and criterion of C-rate	270mAh
2.3.4	Nominal voltage	Mean operation voltage during standard discharge after standard charge	3.85V
2.3.5	OQC capacity	OQC capacity is SEC cell capacity, which use Standard discharge after Standard charge, and criterion of judgment.	Inner Pack ≥ 104% Embedded Pack ≥ 101% (min capacity)
2.3.6	Standard charge	Charge voltage Charge current Cutoff condition	4.4V 54mA 5.4mA
2.3.7	Standard discharge	Discharge current Cutoff voltage	54mA 2.75V
2.3.8	Max charge current	Maximum continuous charge current	216mA
2.3.9	Max discharge current	Maximum continuous discharge current to 2.75V	270mA
2.3.10	Life Cycle Condition	- Charge: 4.4V, 0.8C & 0.1C Cut-off - Discharge: 1.0C, 3.0V Cut-off - Cycle counts : 400cycle (23°C)	- Higher than 88% of min. capacity - T ≤5.13mm
2.3.11	Acceleration Life Cycle Condition	- Charge: 4.4V, 0.8C & 0.1C Cut-off - Discharge: 1.0C, 3.0V Cut-off - Cycle counts : 300cycle (45°C)	- Higher than 88% of min. capacity - T ≤5.13mm
2.3.12	Dimension	Measure with calipers which measuring resolution is	Refer to PACK drawing

		0.01mm after standard charge. ※Thickness : 500g, PPG	
2.3.13	Net Weight	Measure with scale which measuring resolution is 1mg.	4.82±0.2g
2.3.14	Appearance	Defects, such as scratches, flaws, dirty spots, rust, deformation, discoloration, leakage, etc., which damage commercial values shall not be presented.	Refer to Appearance defect limited
2.3.15	Ex-factory OCV	Measure with 0.01V resolution voltmeter	SOC 68% : 3.9~3.99 V SOC 30% : 3.73~3.80V
2.3.16	Shipping	Measure with 0.1 mΩ resolution ohmmeter	SOC 68% : 150~210mΩ SOC 30% : 150~210mΩ
2.3.17	ΔOCV	When discharge at normal condition. OCV drop rate per day under shipping SOC Pack OCV drop < 4mV/day	[4*(X/24hr) + 6] mV
2.3.18	Operating Temperature	When Standard charge	-5~5 °C, 0.3C to 4.2V 5~12 °C, 0.3C to 4.4V 12 ~ 45 °C, 0.8C to 4.4V 45 ~ 60 °C, 0.8C to 4.2V
		When standard or set discharge	-20~60°C
2.3.19	Storage temperature	Storage range with 1 month	-20 ~ 60°C
		Storage range with 3 months	-20 ~ 45°C
		Storage range with 1 year	-20 ~ 25°C
2.3.20	Standard test environment	Standard temperature 5class and standard humidity 20class specified KS A 0006 (standard condition for test and measurement)	Temp : 23 ± 2°C Humidity:65 ± 20%
2.3.21	PCM Characteristic (25°C)	1 st Overcharge protection voltage	4.405~4.445V
		2 nd Overcharge protection voltage	V
		1 st Over discharge protection voltage	2.600~2.800V
		2 nd Over discharge protection voltage	V
		1 st Charge overcurrent protection	0.65~2.25A
		2 nd Charge overcurrent protection	A
		1 st Discharge overcurrent protection	2.0~3.75A
		2 nd Discharge overcurrent protection	A
		Operating current consumption	5.2uA max

※ Standard/Safety/Limitation is managed by CTF

2.4 Reliability Test

This battery is tested according to 'Battery Reliability Test Version' that is marked at the approval sheet cover.

Service Technician Change Type (*RT : 23 ± °C)

Items	Details	Condition	SPEC
Initial Condition	Δ OCV	1st ΔOCV Measurement after 12hr Storage → 2nd ΔOCV Measurement after 24hr Storage	[4*(X/24hr) + 6] mV

	X-Ray	Electrode, Alignment, Tab and Jell Roll Shape	Deflection Angle $<30^{\circ}$, Electrode overhang $>0.1\text{mm}$
Mass complex cycle test		SOC 100% (RT) $\rightarrow$ Storage(60°C 100Hr) $\rightarrow$ 100 Cycle (RT)	$\Delta\text{OCV} < 0.05\text{V}$, Swelling $<8\%$
	Complex (after 100Cycles)	① Safety Test; 8 tasks (Cell)	Satisfy Allowance
		② Tear down (Separator break, Electrode crack, laminate bulge, cathode ending point at Rounded side)	Satisfy Allowances
Capacity	Min. Capacity	Standard capacity Measurement: Charge at 0.2C(CC/CV mode), Discharge at 0.2C,	$>101\%$ of min capacity
Environmental	HT operation	Charge at 45°C , Discharge at 60(60Cycles) $\rightarrow$ Measure ΔOCV and , RT Capacity	Capacity: 0.2C; $>90\%$, 1C; $>80\%$ $\Delta\text{IR} < 115\text{m}\Omega$, Swelling $<8\%$, $\Delta\text{OCV} < 0.05\text{V}$
	HTHH Acceleration	Temp : 60°C , Humidity : 90% (SOC 100 % , 14 days), $\rightarrow$ Measure ΔOCV	$\Delta\text{OCV} < 0.05\text{V}$, $\text{IR} < 115\text{m}\Omega$, Swelling $<8\%$
	Complex (After 10 days)	Extensive Test –Ref.	
		② Capacity : 5 ea	0.2C $>80\%$, max. discharge $>70\%$
	Thermal cycle	$-40^{\circ}\text{C}30\text{min} \leftrightarrow 85^{\circ}\text{C}30\text{min}$, 96 Cycle, 4.25V $\rightarrow$ Measure ΔOCV	$\Delta\text{OCV} < 0.05\text{V}$, $\Delta\text{IR} < 115\text{m}\Omega$, Swelling $<8\%$
	Complex (after 96Cycle)	Extensive Test –Ref.	
		② Capacity: 5 ea	0.2C $>80\%$, max. discharge $>70\%$
	Complex Condition	Zig Drop 200 times at SOC (Ex-Factory %) $\rightarrow$ Thermal Impact	No leakage, No Fire
	Low T Storage	-20°C , SOC 100%	$\Delta\text{OCV} < 0.2\text{V}$, $\Delta\text{IR} < 30\text{m}\Omega$, Swelling $<8\%$
Transport (Handling)	rubbing	Rubbing force : 500gf, , Pad print: 10 times, ink jet print: 5 times	Allowance: possible 2D barcode reading, Vision recognizing
	Transport	Vibration, box drop	Follow X-ray inspection and appearance allowance”
Safety	Short & Recovery	External short circuit by resistor($200\text{m}\Omega$) : repeating 20 times $\rightarrow$ holding short circuit for 12 hr	$\Delta\text{OCV} < 0.1\text{V}$, $\Delta\text{IR} < 20\text{m}\Omega$
	High temperature storage	SOC 100% : 70°C , 7hr)	$< \text{C0}$
PCM	High temperature operation	Over charge/discharge/current and current consumption test at different Temperatures : -20, 25, 60°C	Follow the PCM spec in approval sheet

2.6 X-ray Test

- Standard of Inspection item

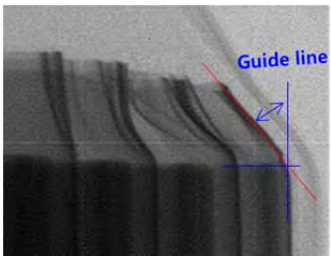
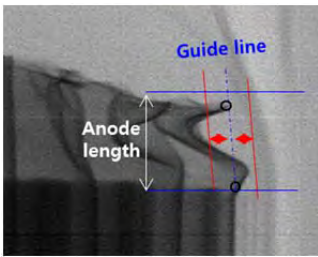
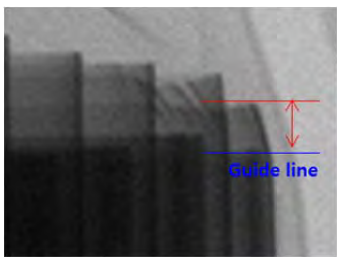
Measurement position: 4 corner/Cell, Outlier 1 turn (except comb shape)

NG Judgment

1) Angle: Bending of outlier anode

2) Depression NG: Anode flection with S shape

3) Cathode/Anode Align: Distance between cathode and anode

Criteria	Angle	Depression	Cathode/Anode alignment
		*The machine will judge it's NG or OK according to the big historic test data base. Inspection area (Anode length)	
NG	$\geq 30^\circ$	NA.	$\leq 0.1\text{mm}$
Photo			
Occurrence Reason	Overlap design (Interference of pouch)	Interference of Machine	Winding condition

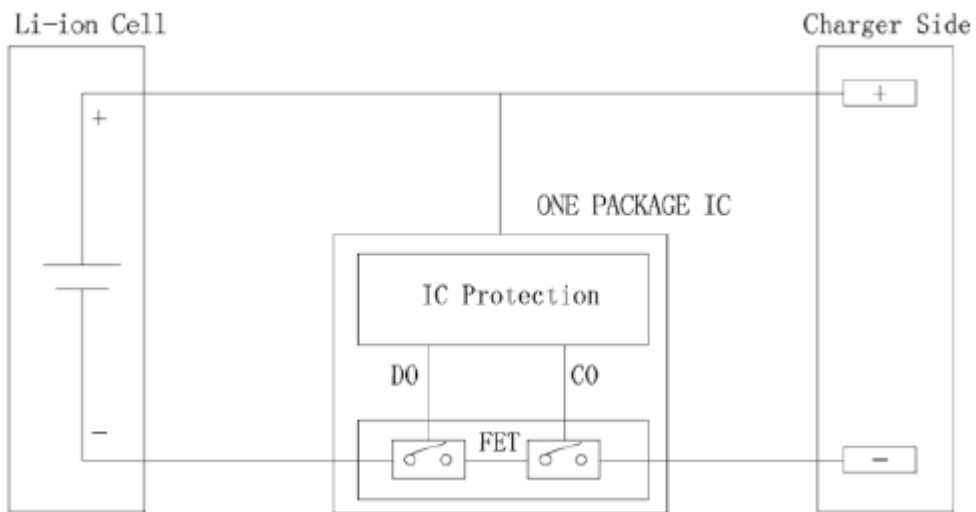
2.8 Pack ORT Plan

Test	Test Condition	Quantity	S
Capacity	□ GB/T : 22±1℃ Charge 1C 0.02C cutoff Discharge 0.2C 2.75V cutoff □ Min. Capacity : 23±2℃, Charge 0.2C 0.02C cutoff Discharge 0.2C 2.75V cutoff	3EA (EachLot)	Inner Pack ≥ 104% Embedded Pack ≥ 101% (Minimum capacity)
High Temperature High humidity	Full Charge 60℃, 90% Customer Change : 14days Technician Change: 14days Use proved HTHH jig	5EA (Each Lot)	- T≤5.13mm (after 2hrs at RT)
Thermal cycle	80% Charge -40℃(30min) ~ 85℃(30min) 96Cycle Use thermal impact test wooden box	5EA (Each Lot)	- T≤5.13mm (after 2hrs at RT)

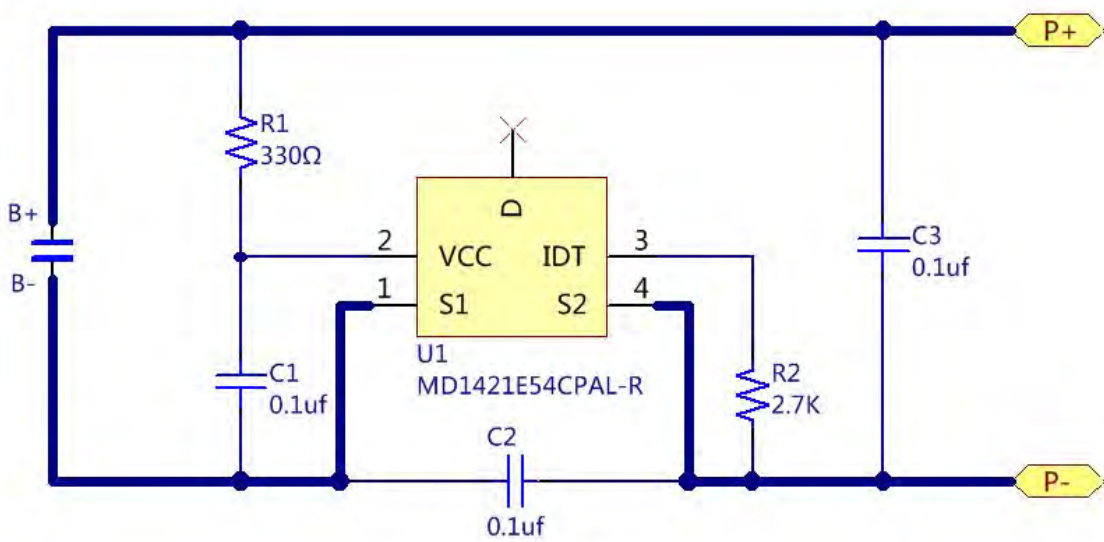
- ※ Mass production lot is sampled on a line-by-line basis, and on multiple lines, sampling is performed alternately
- ※ Each mass production lot must be tested by SEC approval specification and satisfy all qualifications
- ※ All tested data have to be provided and continuously updated to SEC IQC
- ※ Mass production lot is sampled on a line-by-line basis, and on multiple lines, sampling is performed alternately

3. ELECTRICAL SPEC

3.1 PCM Block diagram



3.2 PCM Schematic



4. BATTERY PICTURE

Site 1

Front	Back
	
Package	Battery connector
	

5. DRAWING

5.1 Battery Pack Drawing

5.2 PCM Drawing

5.3 Mylar Drawing

5.4 Nomex Drawing

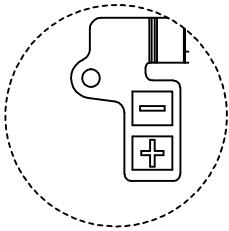
5.5 Adhesive tape Drawing

5.6 Label Printing& Label S/N Defination & Barcode system

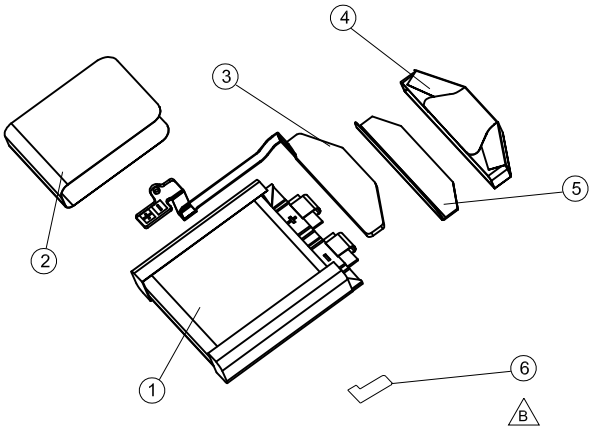
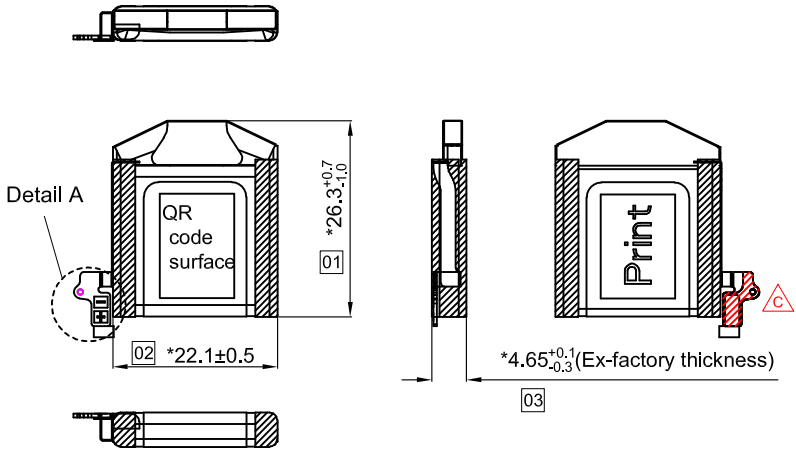
5.7 Package Drawing

5.1 Battery Pack Drawing

CHANGE NO.	REV.	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
	A	2018.12.07	New released	Gan.JW	Li.CP
S-ECN-181214-006	B	2018.12.13	add Adhesive	Gan.JW	Li.CP
S-ECN-190111-002	C	2019.01.11	Update FPC stiffener appearance	Gan.JW	Li.CP



Detail A
Scale 3:1



Item	Dimension	Size name	Controll
01	26.30 ^{+0.7} _{-1.0}	Pack Length	CTF
02	22.10±0.5	Pack Width	CTF
03	4.65 ^{+0.1} _{-0.3}	Thickness(EX-factory thickness)	CTF

PARTS LIST							
Item	Part name	Amount	Unit	Item	Part name	Amount	Unit
1	Cell	1	PCS	6	Adhesive tape	1	PCS
2	Label	1	PCS				
3	PCBA	1	PCS				
4	Mylar	1	PCS				
5	Nomex	1	PCS				

不含任何OQA-2049指定的有害物质
Do not contain any substances which are specified in (OQA-2049)

技术要求:
Technical Requirements:
1.环保要求:RoHS+HF+REACH;
Environment requirements: RoHS+HF+REACH;
2.带"*"尺寸为重点管控尺寸;
The dimensions marked with "*" are key dimensions;
3.带"()"尺寸为参考尺寸;
The dimensions marked with () are reference dimensions;

 DO NOT SCALE THIS DRAWING ALL DIMENSIONS IN MILLIMETERS	PROJECTION 	TITLE Pack drawing-成品图	REV. C	DESIGN 甘家文	DATE
	TABLE OF LIMITS - REFERENCE	MODEL SSEWU68	QTY. 1	CHECKED 甘承宏	DATE
		MATERIAL	SCALE 1:1	APPROVED 李超鹏	DATE
 东莞新能德科技有限公司 Dongguan NVT Technology Co., Ltd.		FINISHING	SIZE A4		
		DWG. NO. SSEWU68-G01	COMPARISON		

5.2 PCM Drawing

Item	Dimension	Size name	Control
01	20.6±0.15	Stiffener Length	CTF
02	5.50±0.10	Stiffener Width	CTF
03	0.80±0.10	Stiffener Thickness	CTF
04	0.15±0.03	FPC Thickness	CTF
05	43.24±0.20	FPC Length	CTF
06	11.71±0.20	FPC Width	CTF

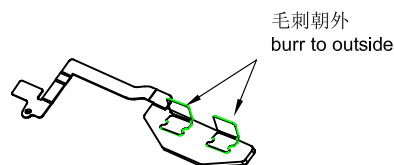
CHANGE NO.	REV.	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
	A	2018.12.17	New released	Gan.jiawen	Li.CP
S-ECN-190111-002	B	2019.01.08	Update stiffener size and appearance	Gan.jiawen	Li.CP



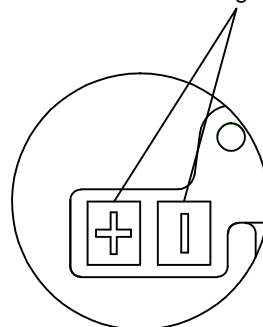
Bending area



FR-4 stiffener

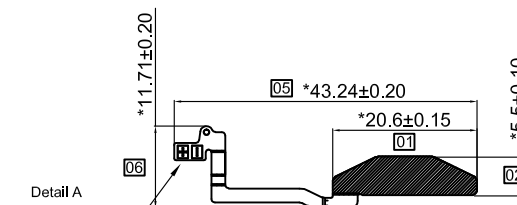


毛刺朝外
burr to outside



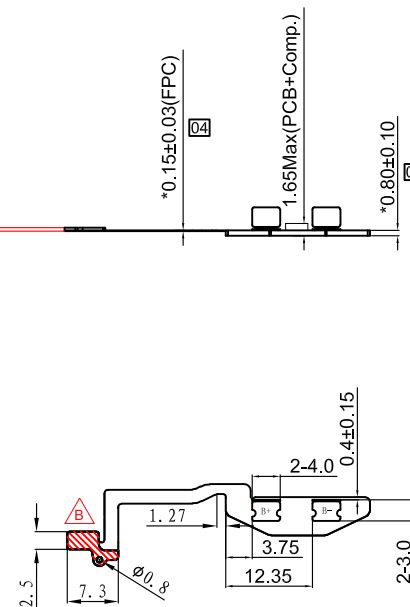
Detail A
Scale 5:1

金手指需镀金，厚度大于 0.10μm
Gold fingers shall be plated with gold, with a thickness of more than 0.10μm



Detail A

0.4±0.04(With stiffener)



技术要求:

Technical Requirements:

- FPC材质: PI; 补强材质: FR-4, transparent;
FPC Material: PI; Stiffener Material: FR-4, transparent;
- 环保要求: RoHS+HF+REACH;
Environment requirements: RoHS+HF+REACH;
- 防火要求: 符合UL94 V-0;
Fireproof requirement: Meet UL94 V-0;
- 带"***"尺寸为重点管控尺寸;
The dimensions marked with "***" are key dimensions.
- 未注尺寸公差为±0.15mm; 带 () 尺寸为参考尺寸;
The tolerance without any marks is ±0.15mm;
The dimensions marked with () are reference dimensions;
- 产品边缘无破损。
Parts shall be free of frayed/ragged edges.

不含任何OQA-2049指定的有害物质

Do not contain any substances which are specified in (OQA-2049)

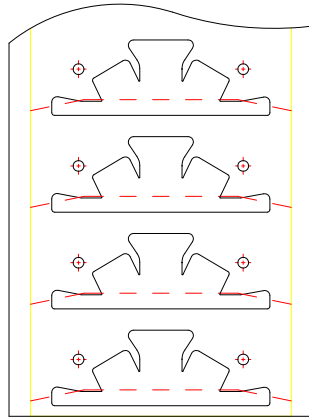
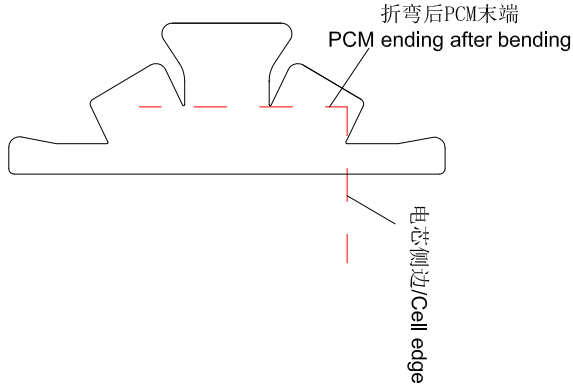
 DO NOT SCALE THIS DRAWING ALL DIMENSIONS IN MILLIMETERS 东莞新能德科技有限公司 Dongguan NVT Technology Co., Ltd.	PROJECTION TABLE OF LIMITS - REFERENCE	TITLE	PCBA	REV.	B	DESIGN	甘家文	DATE
		MODEL	SSEWU68	QTY.	1	CHECKED	李春利	DATE
		MATERIAL		SCALE	1:1	APPROVED	李超鹏	DATE
		FINISHING		SIZE	A4			
		DWG. NO.	SSEWU68-F01	COMPARISON				

5.3 Maylar Drawing

Test item(Test report when material coming)

Material(材质)		SPEC
Insulation Resistance (表面绝缘电阻)		Min(10 ⁹ Ω/8cm*8cm)
Tensile Force (拉力)	MD(纵向)	Min(2.3Kg/15mm*150mm)
Elongation- (延伸率)	MD(纵向)	Min(101%/15mm*150mm)

Item	Demension	Size name	Control
01	40.8±0.20	Length	CTF
02	14.1±0.15	Width	CTF
03	Max0.05	Thickness	CTF



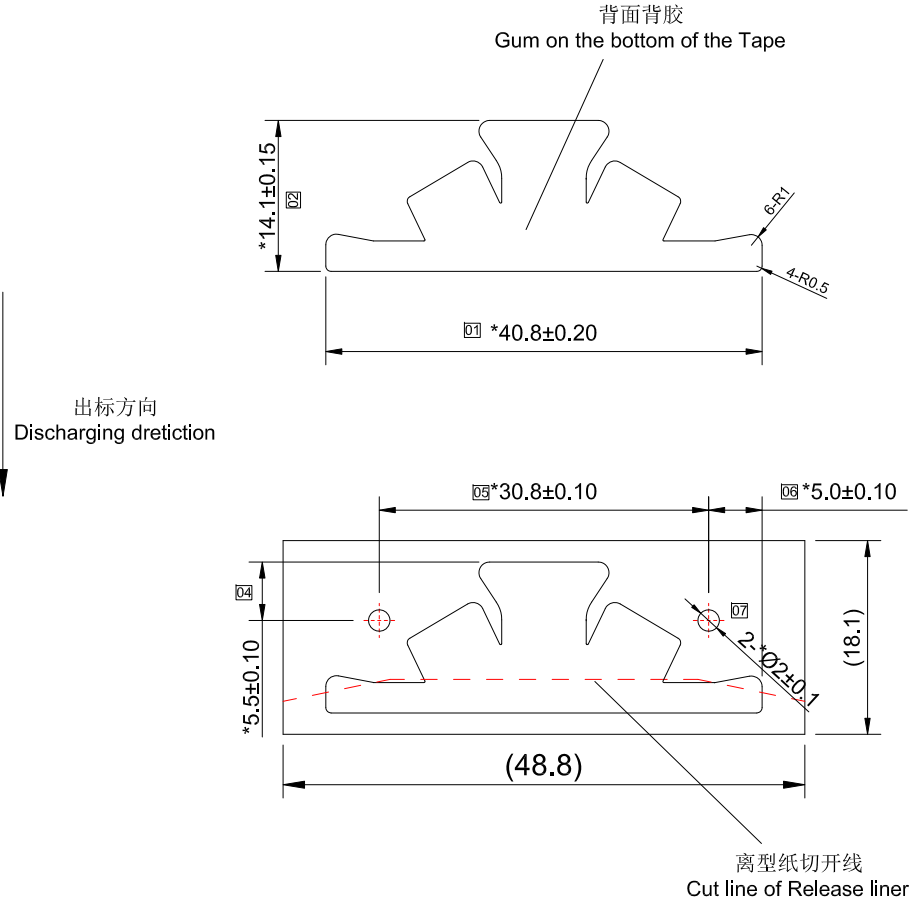
排状示意图 比例1:2
Row sketch map
Scale 1:2

技术要求:

Technical Requirements:

- 材质: PET, 雾黑透明, 基材厚度0.015mm, 带胶总厚度*Max0.05mm;
Material: PET, dump black and transportation, base material thickness0.015mm;
Thickness with glue is*Max 0.05mm;
- 粘力要求: 初粘力3号钢球或以上, 粘着力1.0kgf/in以上, 保持力24hr/kg*in²以上;
Adhesive requirements:initial adhesive force should≥3#steel ball,
adhesive force≥1.0kgf/in,retaining force≥24hr/kg*in²;
- 环保要求: RoHS+HF+REACH;
Environment requirements:RoHS+HF+REACH;
- 防火要求: 符合VTM-2及以上;
Fireproof requirement: Meet VTM-2 or higher;
- 产品表面的外观应平整, 色泽均匀, 无褶皱、撕裂、颗粒、气泡、针孔缺陷;
Good appearance and color on the surface,no drape,tear,particle,bubble,pinhole defect;
- 带***尺寸为重点管控尺寸;
The dimensions marked with "***" are key dimensions.
- 未注尺寸公差为±0.15mm; 带 () 尺寸为参考尺寸;
The tolerance without any marks is ±0.15mm;
The dimensions marked with () are reference dimensions;
- 来料方式:排装;
Incoming way:Row;

CHANGE NO.	REV.	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
	A	2018.6.26	New released	Cao.shun	Li.CP



Do not contain any substances which are specified in (OQA-2049)

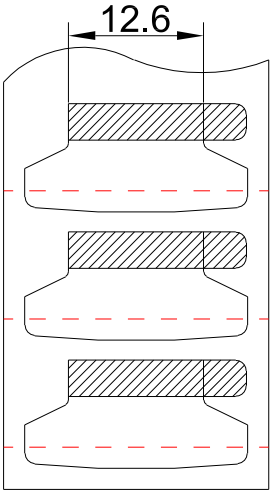
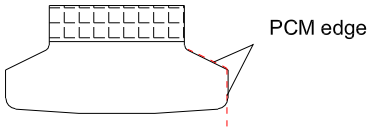
NVT	PROJECTION		TITLE	Mylar	REV.	A	DESIGN	曹顺	DATE
	TABLE OF LIMITS - REFERENCE		MODEL	SSEWS08	QTY.	1	CHECKED	李春利	DATE
DO NOT SCALE THIS DRAWING ALL DIMENSIONS IN MILLIMETERS			MATERIAL	SCALE		1:1	APPROVED	李超鹏	DATE
			FINISHING	SIZE		A5			
			DWG. NO.	SSEWS08-E01		COMPARISON			

5.4 Nomex Drawing

Test item(Test report when material coming)

Material(材质)		SPEC
Insulation Resistance（表面绝缘电阻）		Min($10^9\Omega/8\text{cm}^2$)
Tensile Force（拉力）	MD(纵向)	Min(2.3Kg/15mm*150mm)
Elongation-（延伸率）	MD(纵向)	Min(101%/15mm*150mm)

Item	Demension	Size name	Control
01	20.8±0.20	Length	CTF
02	10.1±0.15	Width	CTF
03	0.10±0.02	Thickness	CTF



排状示意图 比例1:1
Row sketch map
Scale 1:1

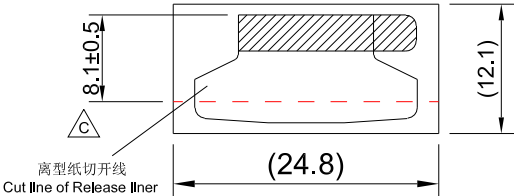
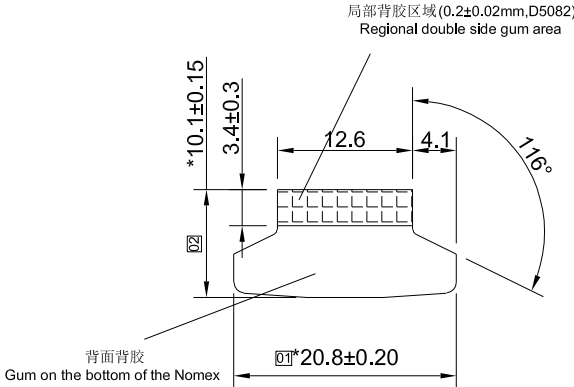
技术要求:

Technical Requirements :

- 材质：Nomex(T464)，基材厚度0.051mm，黑色，单面背胶 3M467，含背胶总厚度 $0.1\pm0.02\text{mm}$ ；
Material: Nomex(T464)，Base material thickness 0.051mm, Black , 3M467 back side glue,thickness with glue is $0.1\pm0.02\text{mm}$;
- 粘力要求：初粘力3号钢球或以上，粘着力1.2kgf/in 以上，保持24hr/kg*in² 以上；
Adhesive requirements:initial adhesive force $\geq 3\#$ steel ball, adhesive force $\geq 1.2\text{kgf/in}$,straining force $\geq 24\text{hr/kg}\cdot\text{in}^2$,
- 环保要求：RoHS+HF+REACH；
Environment requirements:RoHS+HF+REACH;
- 产品表面的外观应平整，色泽均匀，无褶皱、撕裂、颗粒、气泡、针孔缺陷；
Good appearance and color on the surface,no drape,tear,particle,bubble,pinhole defect;
- 带“*”尺寸为重点管控尺寸；
The dimensions marked with "*" are key dimensions.
- 未注尺寸公差为 $\pm0.20\text{mm}$ ；带（）尺寸为参考尺寸；
The tolerance without any marks is $\pm0.20\text{mm}$;
The dimensions marked with () are reference dimensions;
- 来料方式:排装；
Incoming way:Row;

CHANGE NO.	REV.	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
	A	2018.06.26	New released	Cao.shun	Li.CP
S-ECN-180725-001	B	2018.07.30	Update location of cut line	Cao.shun	Li.CP
ECN-180910-000003	C	2018.09.10	将尺寸8.1增加公差 ±0.5	Gan.jiawen	Li.CP

出标方向
Discharging dretiction



Do not contain any substances which are specified in (OQA-2049)

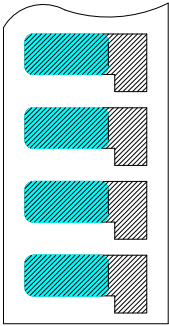
NVT	PROJECTION		TITLE	杜邦纸-Nomex	REV.	C	DESIGN	甘家文	DATE
	TABLE OF LIMITS - REFERENCE		MODEL	SSEWS08	QTY.	1	CHECKED	李春利	DATE
DO NOT SCALE THIS DRAWING ALL DIMENSIONS IN MILLIMETERS			MATERIAL	SCALE		1:1	APPROVED	李超鹏	DATE
			FINISHING	SIZE		A5			
			DWG. NO.		SSEWS08-Z01		COMPARISON		

5.5 Adhesive tape Drawing

Test item(Test report when material coming)

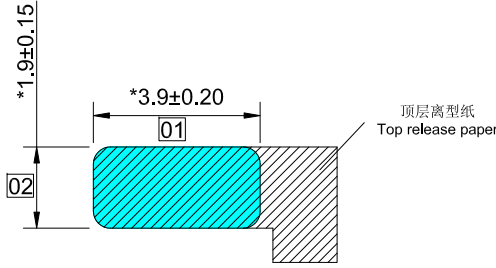
Material(材质)		SPEC
Insulation Resistance (表面绝缘电阻)		Min(10 ⁸ Ω/8cm*8cm)
Tensile Force (拉力)	MD(纵向)	Min(2.3Kg/15mm*150mm)
Elongation- (延伸率)	MD(纵向)	Min(101%/15mm*150mm)

Item	Demension	Size name	Control
01	3.90±0.20	Length	CTF
02	1.90±0.15	Width	CTF
03	0.10±0.01	Thickness	CTF

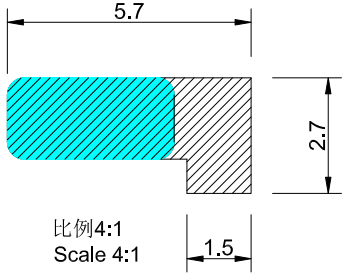


排状示意图 比例2:1
Row sketch map
Scale 2:1

出标方向
Discharging dretiction



比例4:1
Scale 4:1



比例4:1
Scale 4:1

- 技术要求:
Technical Requirements:
- 材质: BVPW80, 厚度 03*0.10±0.01mm;
Material: BVPW80, thickness is 03 *0.10±0.01mm;
 - 环保要求: RoHS+HF+REACH;
Environment requirements:RoHS+HF+REACH;
 - 带"*"尺寸为重点管控尺寸;
The dimensions marked with "*" are key dimensions.
 - 未注尺寸公差为±0.20mm; 带 () 尺寸为参考尺寸;
The tolerance without any marks is ±0.20mm;
The dimensions marked with () are reference dimensions;
 - 来料方式: 排装;
Incoming way: row;

Do not contain any substances which are specified in (OQA-2049)

 DO NOT SCALE THIS DRAWING ALL DIMENSIONS IN MILLIMETERS 东莞新能德科技有限公司 Dongguan NVT Technology Co., Ltd.	PROJECTION TABLE OF LIMITS - REFERENCE	TITLE	双面胶-Adhesive tape	REV.	A	DESIGN	曹顺	DATE
		MODEL	SSEWS09	QTY.	1	CHECKED	李春利	DATE
		MATERIAL		SCALE	1:1	APPROVED	李超鹏	DATE
		FINISHING		SIZE	A5			
		DWG. NO.	SSEWS09-Z02	COMPARISON				

5.6 Label Drawing & S/N Defination & Barcode information



(Type:Data matrix, Error code:ECC200,Size (5*5)mm,Scans revealed are case sensitive,Symbols should be displayed)

1	Customer model	GH43-04905A (Fixed 固定不变)
2	Sign	+
3	Supplier code	DL (Fixed 固定不变)
4	Pack version	1
5	Year code	2014→F,2015→G,2016→H,2017→J,2018→K,2019→M,2020→N
6	Month code	Jan→1,Feb→2,...,Oct→A,Nov→B,Dec→C
7	Day code	1→01,2→02,...,30→30,31→31
8	Production line	Line A01→A,Line A02→B,...,Line A13→M,Line A14→N
9	Customer code	S (Fixed 固定不变)
10	Sign	+
11	Serial number	000000-999999

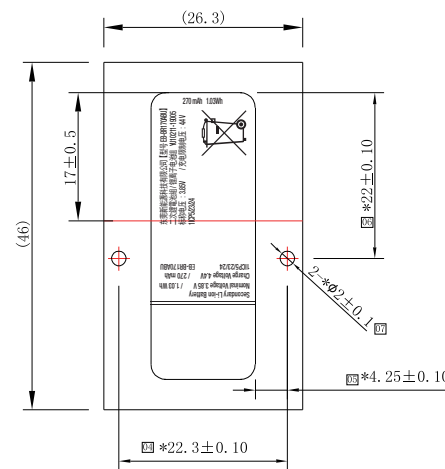
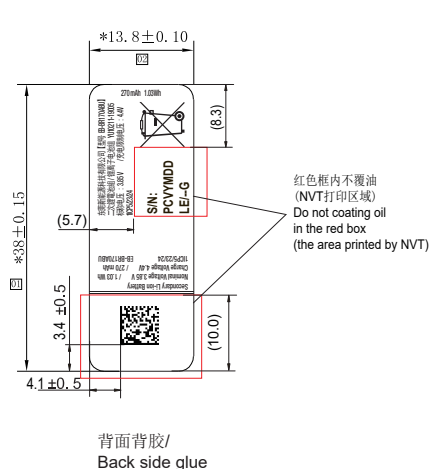
S/N code definition: S/N: PCVYMDDI E/- -G (Font: Arial, Height 1.2mm, bold font)

[illegible]

量产后 After MP: S/N:DL1F216MS/- -B

Incoming way: Roll;

(Date of manufacture indicate NVT production date, Non the label vendor production date.)



Item	Demendion	Part name	Control
01	38.0±0.15	Length	CTF
02	13.8±0.15	Width	CTF
03	0.05±0.01	Thickness	CTF

新增测试项目(来料时需附测试报告)

Material (材质)		SPEC
Insulation Resistance (表面绝缘电阻)		Min (10 ⁹ Ω /8cm*8cm)
Tensile Force (拉力)	MD (纵向)	Min (2.3Kg/15mm*150mm)
	TD (横向)	Min (1.3Kg/15mm*150mm)
Elongation- (延伸率)	MD (纵向)	Min (101%/15mm*150mm)
	TD (横向)	Min (101%/15mm*150mm)

Do not contain any substances which are specified in (OQA-2049) 不含任何OQA-2049指定的有害物质

NVT DO NOT SCALE THIS DRAWING ALL DIMENSIONS IN MILLIMETERS 东莞新能德科技有限公司 Dongguan NVT Technology Co., Ltd.	PROJECTION  TABLE OF LIMITS - REFERENCE	TITLE Product Label(产品贴纸) _(60% SOC-ABU)		REV. B	DESIGN 甘家文	DATE
		MODEL SSEWU68	QTY. 1	CHECKED	DATE	
		MATERIAL	SCALE 1:1	李春利		
		FINISHING	SIZE A4	APPROVED	DATE	
		DWG. NO. SSEWU68-E01	COMPARISON	李超鹏		

Black C

非印刷内容

二维码编码原则 Two-dimension code requirement:

(类型:Data matrix,Error code:ECC200,尺寸(5*5)mm,扫描显示需区分大小写,符号需显示出来)

(Type:Data matrix, Error code:ECC200,Size (5*5)mm,Scans revealed are case sensitive,Symbols should be displayed)

1	Customer model	GH43-04906A	(Fixed 固定不变)
2	Sign	+	(Fixed 固定不变)
3	Supplier code	DL	(Fixed 固定不变)
4	Pack version	1	
5	Year code	2014→F.2015→G.2016→H.2017→J.2018→K.2019→M.2020→N	
6	Month code	Jan→1.Feb→2...Oct→A.Nov→B.Dec→C	
7	Day code	1→01.2→02...30→30.31→31	
8	Production line	Line A01→A.Line A02→B...Line A13→M.Line A14→N	
9	Customer code	S	(Fixed 固定不变)
10	Sign	+	(Fixed 固定不变)
11	Serial number	000000-999999	

举例/For example:

量产前 Before MP: GH43-04906A+DL0F216AS+000001

量产 After MP: GH43-04906A+DL1F216MS+000001

S/N code 定义: S/N:PCVYMDDLE/-G (字体: Arial,高度1.2mm,黑体)

S/Ncode definition: S/N: PCVYMDDLE/- G (Font: Arial,Height 1.2mm,bold font)

Code	Explanation	
1	S/N: Serial Number	(Fixed 固定不变)
2	P Pack vendor	ATL code: D (Fixed 固定不变)
3	C Cell vendor	ATL code: L (Fixed 固定不变)
4	V Pack version	1
5	Y Year	2014→F.2015→G.2016→H.2017→J.2018→K.2019→M.2020→N
6	M Month	Jan.Feb.Mar.Apr.May.Jun.Jul.Aug.Sep.Oct.Nov.Dec
7	DD Day	1→01.2→02...30→30.31→31
8	L Production Line	Line A01→A.Line A02→B...Line A13→M.Line A14→N
9	E Ship to	SEC: S (Fixed 固定不变)
10	/	Sign (Fixed 固定不变)
11	- Cf value:kΩ	Sign (Fixed 固定不变)
12	-	Sign (Fixed 固定不变)
13	G Halogen Free	Br free→B (Fixed 固定不变)

举例/For example:

量产前 Before MP: S/N:DL0F216AS/-B

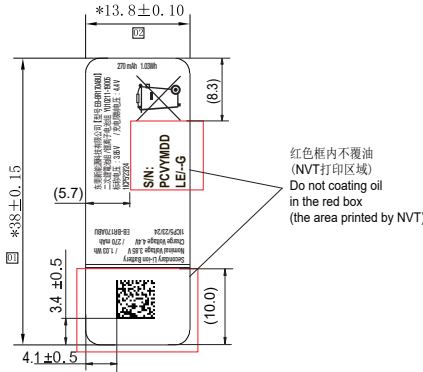
量产 After MP: S/N:DL1F216MS/-B

技术要求:

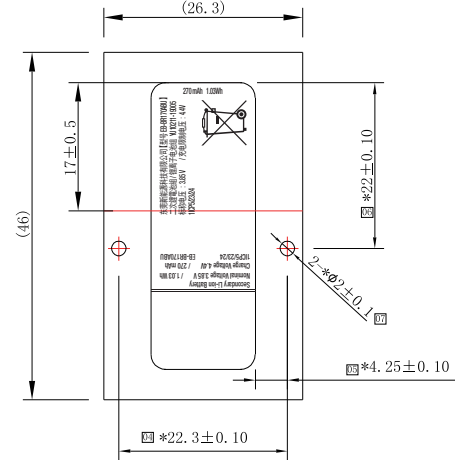
Technical Requirements:

- 材质: PET, 基材厚度0.025mm, 白色, 哑光雾面, 单面背网纹胶, 含背胶总厚度 0.05 ± 0.01 mm;
Material:PET,Baes material thickness 0.025mm, Whitematt oil on the surface,matte and mist surface, one side reticulated gum,thickness with gule is 0.05 ± 0.01 mm;
- 粘力要求: 初粘力 (初期力) 3号钢球或以上, 粘着力1.2kgf/in以上, 保持力24hr/kg*in"以上;
外表面附着力 ≥ 1.5 kgf/in
Adhesive requirements:Initial adhesive force should ≥ 3 steel ball,
Adhesive force ≥ 1.2 kgf/in,retaining force ≥ 24 hr/kg*in";
Outside surface adhesive force ≥ 1.5 kgf/in;
- 环保要求: RoHS+HF+REACH;
Environment requirements:RoHS+HF+REACH;
- 防火要求: 符合VTM-0;
Fireproof requirement: Meet VTM-0;
- 表面应平整, 色泽均匀, 不应有褶皱、撕裂、颗粒、气泡、针孔、脏污、刮切痕、凹点和外来杂质等缺陷, 边缘应整齐无破损、毛边;
Good appearance and color on the surface,no drape,tear,particle,bubble,pinhole,smudge,scratch,pits and other defects,no breakage and edge on margin;
- 带***尺寸为重点管控尺寸;
The dimensions marked with *** are key dimensions;
- 未注尺寸公差为 ± 0.20 mm; 带 () 尺寸为参考尺寸;
The tolerance without any marks is ± 0.20 mm; The dimensions marked with () are reference dimensions;
- 印刷内容、字体、位置、大小比例以印刷图为准;
The print content、font、position、size、scale must compliance to printing drawing;
- 来料方式: 卷装;
Incoming way: Roll;

生产日期 (字体为黑体;字高1.2mm;加粗)
Date of manufacture (Font,Boldface;Height 1.2mm;bold font)
1:"YYYY":年, 2013年==>2013,2014年==>2014
"YYYY":Year, In 2013==>2013,In 2014==>2014
2:"MM":月,5月==>05, 11月==>11
"MM":Month,In May==>05, In November==>11
3:"DD":日期,01==>01, 31==>31
"DD":Date,01==>01, 31==>31
(生产日期指NVT的生产日期, 非Label供应商的生产日期)
(Date of manufacture indicate NVT production date,Non the label vendor production date.)



背面背胶/
Back side glue



Item	Demendion	Part name	Control
01	38.0±0.15	Length	CTF
02	13.8±0.15	Width	CTF
03	0.05±0.01	Thickness	CTF

新增测试项目 (来料时需附测试报告)

Material (材质)	SPEC
Insulation Resistance (表面绝缘电阻)	Min (10 ⁹ Ω / 8cm*8cm)
Tensile Force (拉力)	MD (纵向) Min (2.3Kg/15mm*150mm) TD (横向) Min (1.3Kg/15mm*150mm)
Elongation- (延伸率)	MD (纵向) Min (101%/15mm*150mm) TD (横向) Min (101%/15mm*150mm)

Do not contain any substances which are specified in (OQA-2049) 不含任何OQA-2049指定的有害物质

 DO NOT SCALE THIS DRAWING ALL DIMENSIONS IN MILLIMETERS 东莞新能德科技有限公司 Dongguan NVT Technology Co., Ltd.	PROJECTION 	TITLE Product Label(产品贴纸) (30% SOC-ABU)	REV. B	DESIGN 甘家文	DATE
	TABLE OF LIMITS - REFERENCE	MODEL SSEWU68	QTY. 1	CHECKED 李春利	DATE
		MATERIAL	SCALE 1:1	APPROVED 李超鹏	DATE
		FINISHING	SIZE A4		
DWG. NO. SSEWU68-E02	COMPARISON				

5.7 Package drawing



技术要求：

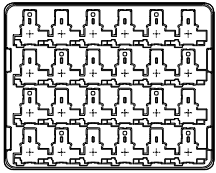
1. 材料 1.0mm厚黑色PET料 电阻率为 $10^6 - 10^9 \Omega \cdot \text{cm}$
2. 关键尺寸标注 *
3. 中心位壁厚不少于0.6mm
4. 未注倒角R0.5, 未注拔模斜度7° 未注尺寸按3D制作 未注表面轮廓度不大于0.5
5. 产品外观无污渍 无破损等不良
6. 符合ROHS环保要求 在温度5-40℃, 湿度不大于95%情况下 可放置36个月
7. 在不影响装货情况下 在盒子空白处刻上model号 472324-D



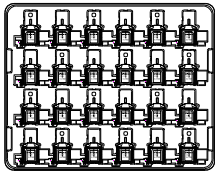
GENERAL TOLS UNLESS NOTED		DRAWN BY		DATE	 AMPEREX TECHNOLOGY LIMITED		
(X)	± 0.5	B Feng		2019.02.15	TITLE 472324-SHIPPING-TRAY		
(X.X)	± 0.2	CHECKED BY		DATE			
(X.XX)	± 0.10	GW Zhang		2019.02.15			
(X.XXX)	± 0.050	APPROVED BY		DATE			
(X°)	± 1°	W Ma		2019.02.15			
(X.X°)	± 0.5°	MODEL NO.			DRAWING NO.		SHEET NO.
 THIRD ANGLE PROJECTION	DIMS IN MM	472324					2 OF 2
	SCALE NONE	SIZE A3	THIS DRAWING CONTAINS INFORMATION THAT IS PROPRIETARY TO ATL INCORPORATED AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION				

CHANGE NO.	REV.	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
	A	2019.01.17	New released	Gan.JW	Li.CP

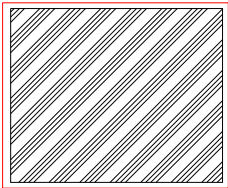
成品
Product



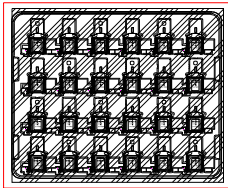
托盘
Tray



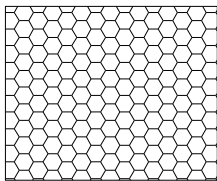
每个吸塑盘放入24个产品，二维码面朝上
24 products in each tray, barcode face front



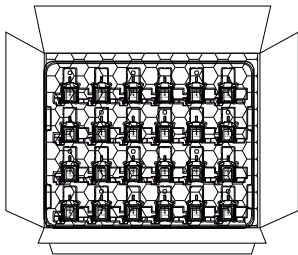
在PE袋内放入1张隔板将PE袋摊开
Spread the PE bag and put 1pcs partition in it



将托盘放在隔板上，放满25层，总共600个成品。再在最上面放1个空托盘，在空托盘中放2包干燥剂。将PE袋由下向上翻转上来打包托盘，在PE袋封口上封胶纸。(PE袋不允许有破损)
Put the trays on the partition, totally 25 layers of tray and 600 products. then put an empty tray on the top and put 1 pcs desiccants on the empty tray. Turn the PE bag from down to up to package the trays,then seal the PE bag with adhesive tape.(no breakage is allowed on the PE bag)



海绵垫
Sponge



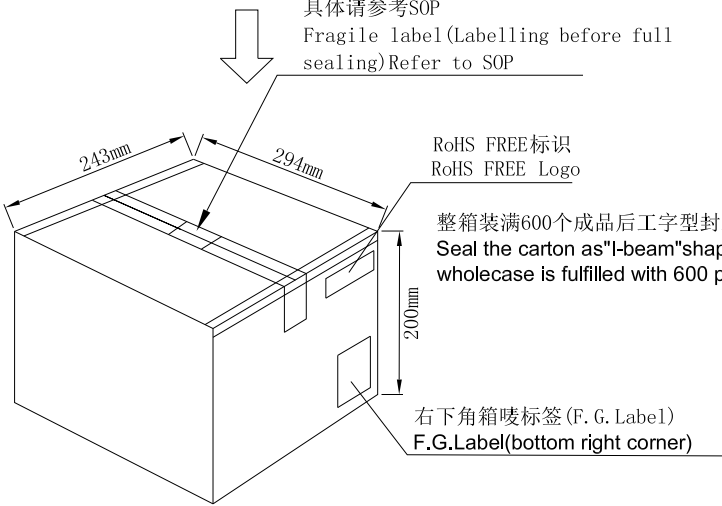
将打包好的产品放入纸箱后，在顶部放入若干海绵垫，以填满箱子为宜。
Put the packaged products into the carton and then put several sponges on the top(fullfill the carton).

整箱重量不超过10kg
Gross weight:no more than 10kg
一箱出货包装用量如下：
Please use the following information:

托盘：282*224mm	26pcs
纸箱：294*243*200mm	1pcs
隔板：280*230mm	1pcs
PE袋：490*315mm	1pcs
海绵垫：280*230mm	若干（满箱为宜）
干燥剂（1g/包）	2pcs
RoHS 标签：80*30*0.08mm	1pcs
易碎标签：25*15*0.08mm	1pcs
箱唛标签（通用辅料）：75*75mm	1pcs（绿色）
封箱胶带（带NVT Logo）	

Tray:282*224mm	26pcs
Carton:294*243*200mm	1pcs
Partition:280*230mm	1pcs
PE bag:490*315mm	1pcs
Sponge:280*230mm	(fullfill the carton)
Desiccant(1g/carton)	1pcs
RoHS FREE Logo: 80*30*0.08mm	1pcs
Fragile label 25*15*0.08mm	1pcs
F.G Label(general material):75*75mm	1pcs (green)
Sealing tape(with NVT logo)	

易碎标签(注意先贴易碎标签后封箱)
具体请参考SOP
Fragile label(Labelling before full sealing)Refer to SOP



不含任何0QA-2049指定的有害物质
Do not contain any substances which are specified in (0QA-2049)

 DO NOT SCALE THIS DRAWING ALL DIMENSIONS IN MILLIMETERS	PROJECTION  TABLE OF LIMITS - REFERENCE	TITLE	包装示意图-Package diagram	REV.	A	DESIGN	甘家文	DATE	
		MODEL	SSEWU68	QTY.	1	CHECKED	李春利	DATE	
		MATERIAL		SCALE	1:10	APPROVED	李超鹏	DATE	
		FINISHING		SIZE	A4				
		DWG. NO.	SSEWU68-D02	COMPARISON					

CHANGE NO.	REV.	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
ECN-190227-000003	A	2019.02.27	New release	Gan JW	Alan
	B1	2020.03.26	Update BIS Logo	Gan JW	Alan



01 *72±0.5mm

02 *64±0.5mm

1. 材质：铜版纸；单面背胶，含背胶总厚度0.1±0.02mm；
Material: Chrome paper,one side gum,thickness with gule is 0.1±0.02mm;
2. 粘力要求：0.8kgf/in以上（允许撕裂，取最大粘力值）；
Adhesive force requirement: more than 0.8kgf/in （Allow to tear and taking maximum adhesive force）;
3. 环保要求：RoHS+HF+REACH；
Environment requirements:RoHS+HF+REACH;
4. 表面应平整，色泽均匀，不应有褶皱、撕裂、颗粒、气泡、针孔、脏污、刮切痕、凹点和外来杂质等缺陷，边缘应整齐无破损、毛边；
Good appearance and color on the surface,no drape,tear,particle,bubble, pinhole,smudge,scratch,pits and other defects,no breakage and edge on margin;
5. 带 “*” 尺寸为重点管控尺寸；
The dimensions marked with "*" are key dimensions;
6. 未注尺寸公差为±0.2mm；带（）尺寸为参考尺寸；
The tolerance without any marks is ±0.20mm;
The dimensions marked with（） are reference dimensions;
7. 来料方式：片装；
Incoming way: Pieces;

	PROJECTION		TITLE	安规标签	REV.	B1	DESIGN	甘家文	DATE	
	TABLE OF LIMITS - REFERENCE		MODEL	SSEWU68	QTY.	1	CHECKED		DATE	
DO NOT SCALE THIS DRAWING ALL DIMENSIONS IN MILLIMETERS			MATERIAL		SCALE	1:1		李春利		
			FINISHING		SIZE	A4		APPROVED		DATE
			DWG. NO.		SSEWU68-E32	COMPARISON			李超鹏	

Surface resistance

* 표면저항 관리 Spec

TRAY	SPEC	$1 \times 10^4 \sim 1 \times 10^9 \Omega$ 이하
	측정 대상	모든 항목(전기물 / 기구물)
	측정 Point	자재 적재면 / 바닥면 / 측면
	측정 조건	비제전체 위($1 \times 10^{12} \Omega$ 이상)
박리지	SPEC	$1 \times 10^4 \sim 1 \times 10^9 \Omega$ 이하
	측정 대상	전기물 / 전기물 ASS'Y
	측정 Point	전기물과 접촉되는 접촉면(내측면)
	측정 조건	비제전체 위($1 \times 10^{12} \Omega$ 이상)
	SIZE	가로 세로 1.5cm 이하 측정 대상 제외
토이론지	SPEC	$1 \times 10^4 \sim 1 \times 10^{11} \Omega$ 이하
	측정 대상	전기물 / 전기물 ASS'Y
	측정 Point	양면
	측정 조건	비제전체 위($1 \times 10^{12} \Omega$ 이상)
보호비닐	SPEC	1. TSP용 슬하/공정용 (터치 有) $1 \times 10^9 \sim 1 \times 10^{11} \Omega$ 이하 2. 슬하용 (터치 無) $1 \times 10^5 \sim 1 \times 10^9 \Omega$ 이하 3. 사출물 (B/G, REAR) $1 \times 10^5 \sim 1 \times 10^9 \Omega$ 이하 ※ Back Glass 슬하용비닐 : $1 \times 10^5 \sim 1 \times 10^{11} \Omega$ 이하 & $\pm 1000v$ 이하
	측정 대상	전기물
	측정 Point	전기물과 접촉되는 접촉면(내측면)
	측정 조건	비제전체 위($1 \times 10^{12} \Omega$ 이상)

6. PART LIST

No.	Part Name	Spec	Description	Qty	Unit	Remark
1	Cell	ATL 472324	270mAh,3.85V	1	pcs	ATL
2	Mylar					
3	PCM(NVT)	U1	MITSUMI,MD1421E54CPAL,PLP-4,RoHS+REACH+HF	1	pcs	MITSUMI
		R2	0201,2.7K Ω , $\pm$ 5%,1/20W	1	pcs	Ta-i/Yageo/Ralec/Uni-Ohm/Walsin
		R1	0201,330 Ω , $\pm$ 5%,1/20W	1	pcs	Ta-i/Yageo/Ralec/Uni-Ohm/Walsin
		FPC	SSEWU68,REV.02,UL94V-0,OSP,RoHS+REACH+HF	1	pcs	YDET/Assunny
		C1,C2 ,C3	0201,100nF $\pm$ 10%,25V,X5R	3	pcs	Samsung/Murata/Yageo/Walsin/Taiyo
		L-Ni	Ni,L1*L2*H*T=4*3*3*0.13mm,L shape	2	pcs	Tian Jun/Song Zhi
4	Mylar	L40.8*W14.1*T0.05mm	PET,dump black and transparent	1	pcs	Lingyu/Zhehua
5	Nomex	20.80*W10.10*T0.1	Nomex T464,Black	1	pcs	Lingyu/Zhehua
6	Label	L38.00*W13.80*T0.05mm	PET,White	1	pcs	Lingyu/Zhehua
7	Double_sided tape(双面胶)	L3.9*W1.9*T0.1mm	BVPW80,White,	1	pcs	Lingyu/Zhehua

7. Reliability TEST REPORT



○ 대외비 ● 일반

Approval Sheet of Battery Pack for Samsung Mobile

TYPE	Li-ion Battery (Inner-Pack)	
VENDOR NAME	ATL	
MODEL CODE(SKU)	EB-BR170ABU	
SEC CODE	GH43-04905A	
APPLIED MODEL		
SUBMITTED DATE	2019.02.27	
PARTS INFO	Vendor	Model CODE
Cell	ATL	472324
PCM	NVT	SSEWU68
1st Protection	MITSUMI	MD1421E54CPAL
2nd Protection		



Approval Sheet Version 4.1 [2018.12.19]

Revision History

Ver No.	Released Date	Comments
1	2008/6/28	First Released
1.1	2008/7/22	Add Sheet "Sample Productivity"
1.2	2008/10/30	Add Sheet "Check Sheet" "Safety Test", etc.
1.3	2009/7/23	Merge with Reliability test report
1.4	2009/10/30	Updata
1.5	2010/4/16	Updata
1.6	2010/11/16	Updata
1.7	2012/8/20	Updata
1.8	2012/11/14	Updata
1.9	2013/2/13	Updata
2	2014/1/13	Updata
3	2018/3/23	Updata (based on battery standard 4.0)
3	2018/12/19	Updata (based on battery standard 4.1)

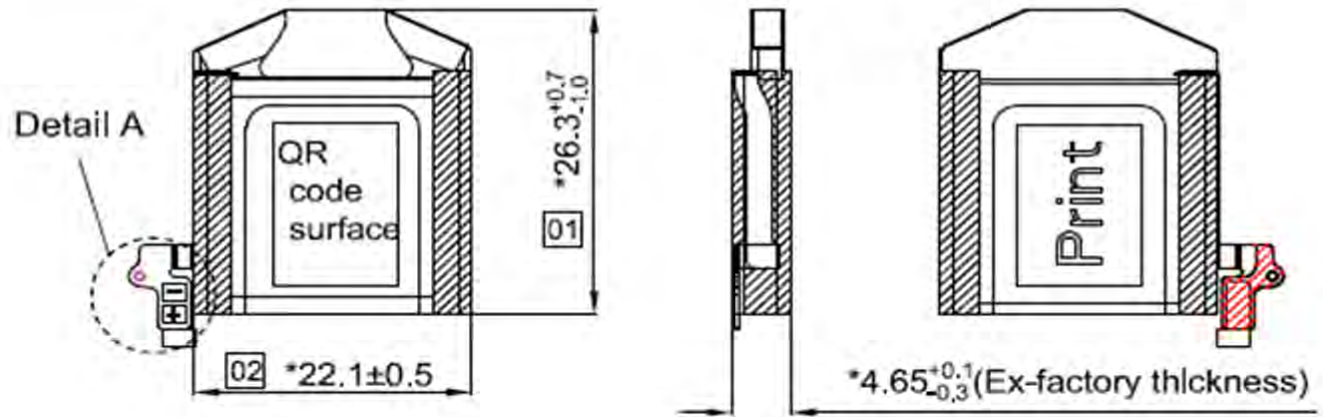
7.2 Pack Electrical Test

BATTERY PACK ELECTRICAL TEST REPORT											
Vendor Name		ATL				PARTS INFO		Vendor	Model CODE		
MODEL CODE(SKU)		EB-BR170ABU				Cell		ATL	472324		
SEC CODE		GH43-04905A				PCM		NVT	SSEWU68		
Test Date(YY/MM/DD)						1st Protection		MITSUMI	MD1421E54CPAL		
Test Lot.(Cell/Pack)						2nd Protection					
Tester Name						ANTENA					
PACK TEST											
ITEM		OCV	IR	IDR	IDR (Tablet)	Short & Recovery		Over Current Protection	Reverse Charging	NFC 안테나	
SPEC	min max	3.75	150	-	-	OK or NG	OK or NG	2	OK or NG	-	-
		3.8	210	-	-			3.75			
1		3.773	180.83			OK	OK	2.60	OK	-	-
2		3.775	181.78			OK	OK	2.60	OK	-	-
3		3.776	184.97			OK	OK	2.60	OK	-	-
4		3.775	184.03			OK	OK	2.70	OK	-	-
5		3.774	182.26			OK	OK	2.60	OK	-	-
6		3.774	186.33			OK	OK	2.60	OK	-	-
7		3.776	180.3			OK	OK	2.70	OK	-	-
8		3.775	183.33			OK	OK	2.60	OK	-	-
9		3.775	181.08			OK	OK	2.70	OK	-	-
10		3.777	181.76			OK	OK	2.60	OK	-	-
11		3.773	179.61			OK	OK	2.60	OK	-	-
12		3.774	180.01			OK	OK	2.60	OK	-	-
13		3.773	180.8			OK	OK	2.60	OK	-	-
14		3.776	181.5			OK	OK	2.60	OK	-	-
15		3.775	180.61			OK	OK	2.70	OK	-	-
16		3.774	186.02			OK	OK	2.60	OK	-	-
17		3.776	183.9			OK	OK	2.60	OK	-	-
18		3.776	179.2			OK	OK	2.70	OK	-	-
19		3.774	183.88			OK	OK	2.60	OK	-	-
20		3.775	180.78			OK	OK	2.60	OK	-	-
21		3.774	183.07			OK	OK	2.60	OK	-	-
22		3.776	179.62			OK	OK	2.60	OK	-	-
23		3.776	175.69			OK	OK	2.70	OK	-	-
24		3.777	175.55			OK	OK	2.60	OK	-	-
25		3.774	179.79			OK	OK	2.60	OK	-	-
26		3.775	177.64			OK	OK	2.60	OK	-	-
27		3.777	181.87			OK	OK	2.60	OK	-	-
28		3.774	180.75			OK	OK	2.60	OK	-	-
29		3.774	183.98			OK	OK	2.60	OK	-	-
30		3.775	185.25			OK	OK	2.60	OK	-	-
MIN		3.773	175.6	0	0	0	0	2.60	0	0	0
MAX		3.777	186.3	0	0	0	0	2.70	0	0	0
Average		3.77	181.5	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2.62	#DIV/0!	#DIV/0!	#DIV/0!
LSL		3.75	150.0					2.00			
USL		3.8	210.0					3.75			
σ		0.00	2.67	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.04	#DIV/0!	#DIV/0!	#DIV/0!
CP		7.11	3.75	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	7.17	#DIV/0!	#DIV/0!	#DIV/0!
CPK		7.09	3.56	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	5.08	#DIV/0!	#DIV/0!	#DIV/0!
2. PCM TEST											
MAKER		Protec IC				MOS FET		PCB			
ITEM	Over Charge		Over Discharge		Discharge Over Current		Charge Over Current		Current Consumption	IR	
	Limit(V)	Release(V)	Limit(V)	Release(V)	Limit(A)	Delay(t)	Limit(A)	Delay(t)	Normal		
SPEC	4.405-4.445	4.175-4.275	2.6-2.8	2.62-2.82	2-3.75	36-60	0.65-2.25	5.52-11.48	0-5.2	40-90	
1	4.425	4.197	2.711	2.750	2.65	42.95	1.19	7.95	2.52	68.56	
2	4.423	4.197	2.710	2.750	2.64	43.54	1.25	7.87	2.54	68.94	
3	4.419	4.197	2.710	2.750	2.65	43.56	1.25	7.85	2.48	68.79	
4	4.423	4.197	2.721	2.751	2.61	42.21	1.30	7.63	2.54	67.75	
5	4.423	4.197	2.710	2.735	2.59	41.91	1.34	7.67	2.54	68.84	
6	4.427	4.191	2.710	2.750	2.59	41.93	1.34	7.65	2.5	68.67	
7	4.422	4.197	2.710	2.731	2.59	41.70	1.35	7.55	2.51	68.5	
8	4.418	4.197	2.710	2.731	2.59	41.70	1.35	7.68	2.5	68.46	
9	4.419	4.196	2.710	2.731	2.59	41.66	1.34	7.71	2.51	68.44	
10	4.421	4.197	2.710	2.751	2.59	41.70	1.34	7.70	2.53	68.62	
11	4.424	4.197	2.710	2.750	2.59	41.73	1.35	7.55	2.53	68.48	
12	4.423	4.195	2.710	2.748	2.59	41.90	1.34	7.57	2.53	68.62	
13	4.421	4.195	2.710	2.735	2.59	41.86	1.33	7.62	2.49	68.55	
14	4.421	4.197	2.726	2.750	2.61	44.62	1.37	8.25	2.61	67.11	
15	4.417	4.197	2.729	2.751	2.64	42.82	1.40	7.87	2.59	68.8	
16	4.413	4.194	2.725	2.751	2.68	44.78	1.38	8.25	2.73	69.05	
17	4.418	4.197	2.729	2.749	2.66	42.70	1.40	7.88	2.57	68.73	
18	4.413	4.197	2.723	2.750	2.68	44.64	1.37	8.24	2.72	69.06	
19	4.421	4.196	2.731	2.751	2.66	42.71	1.39	7.85	2.58	68.89	
20	4.417	4.199	2.723	2.751	2.68	44.73	1.38	8.18	2.7	70.58	
21	4.421	4.197	2.707	2.731	2.63	41.79	1.35	7.68	2.53	69.63	
22	4.421	4.197	2.729	2.749	2.69	44.49	1.39	8.18	2.56	66.55	
23	4.417	4.196	2.725	2.750	2.68	42.55	1.22	7.87	2.63	70.1	
24	4.422	4.197	2.718	2.749	2.67	44.39	1.18	8.20	2.5	69.32	
25	4.419	4.195	2.721	2.751	2.63	42.03	1.30	7.72	2.62	69.48	
26	4.419	4.197	2.713	2.748	2.64	44.83	1.35	8.24	2.62	69.54	
27	4.419	4.187	2.723	2.750	2.67	42.99	1.31	7.74	2.67	69.55	
28	4.423	4.199	2.723	2.748	2.65	42.35	1.34	7.66	2.53	69.14	
29	4.419	4.197	2.723	2.750	2.66	43.11	1.32	7.85	2.59	70.35	
30	4.421	4.197	2.727	2.749	2.65	43.56	1.31	7.91	2.59	70.02	
MIN	4.413	4.187	2.707	2.731	2.586	41.661	1.183	7.546	2.480	66.6	
MAX	4.427	4.199	2.731	2.751	2.692	44.826	1.396	8.254	2.730	70.6	
Average	4.420	4.196	2.718	2.746	2.634	42.915	1.328	7.851	2.569	68.9	
LSL	4.405	4.175	2.60	2.62	2.00	36.000	0.650	5.52	0.00	40.0	
USL	4.445	4.275	2.80	2.82	3.75	60.000	2.250	11.48	5.20	90.0	
σ	0.00	0.00	0.01	0.01	0.04	1.13	0.06	0.23	0.07	0.85	
CP	2.19	7.49	4.17	4.68	8.04	3.55	4.62	4.26	12.65	9.82	
CPK	1.66	3.16	3.44	3.45	5.82	2.05	3.91	3.33	12.50	8.28	

7.3 Pack Mechanical Test

BATTERY PACK MECHANICAL TEST REPORT

Drawing



1-1. Mechanical Data - Pouch type

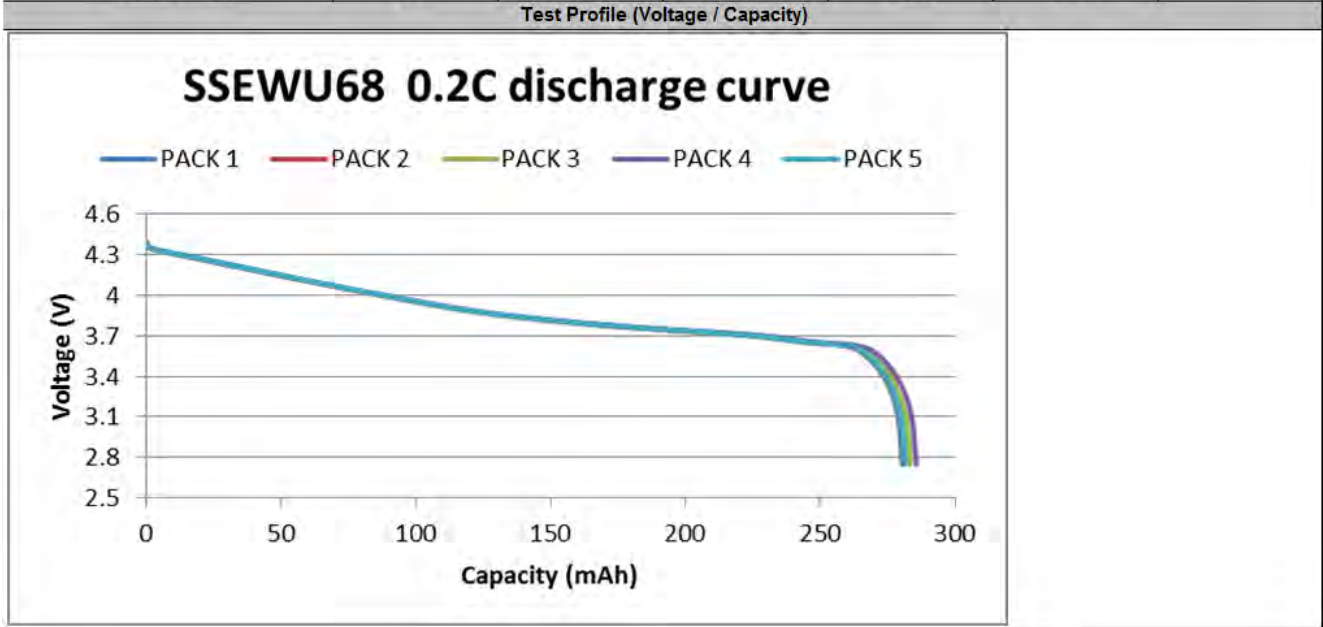
Position	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
	전장	전폭	두께(Top)	두께(중량부-출측)	두께(Bottom)	전장 (FPCB)	전폭 (FPCB)	FPCB 길이	FPCB 위치	Weight
SPEC	25.30~27.0	21.60~22.60		4.35~4.75						4.95±0.25g
1	25.88	21.90		4.50						4.92
2	26.09	22.06		4.53						4.90
3	26.28	21.77		4.57						4.92
4	26.41	22.00		4.55						4.94
5	26.01	21.94		4.56						4.94
6	26.63	22.04		4.55						4.96
7	25.80	22.16		4.56						4.94
8	25.78	22.12		4.57						4.94
9	26.40	21.99		4.52						4.90
10	26.27	22.14		4.49						4.94
11	26.29	21.98		4.49						4.91
12	25.96	21.89		4.48						4.95
13	26.20	21.96		4.59						4.93
14	25.94	21.98		4.58						4.90
15	26.18	21.84		4.45						4.94
16	26.11	22.13		4.65						4.91
17	26.28	22.03		4.47						4.91
18	25.96	21.97		4.57						4.89
19	26.21	21.92		4.48						4.91
20	26.45	22.16		4.55						4.91
21	26.25	21.92		4.64						4.93
22	26.24	21.97		4.62						4.92
23	26.06	22.21		4.53						4.92
24	26.55	22.02		4.45						4.95
25	26.38	22.08		4.50						4.90
26	26.30	21.80		4.47						4.90
27	26.67	21.88		4.55						4.93
28	26.12	22.13		4.57						4.94
29	25.88	21.84		4.47						4.96
30	26.23	21.92		4.62						4.90
MIN	25.78	21.77	0.00	4.45	0.00	0.00	0.00	0.00	0.00	4.89
MAX	26.67	22.21	0.00	4.65	0.00	0.00	0.00	0.00	0.00	4.96
Average	26.19	21.99	#DIV/0!	4.54	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	4.92
LSL	25.30	21.60		4.35						4.70
USL	27.00	22.60		4.75						5.20
σ	0.23	0.11	#DIV/0!	0.06	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.02
CP	1.22	1.45	#DIV/0!	1.19	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	4.19
CPK	1.16	1.14	#DIV/0!	1.12	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	3.74

BATTERY PACK CAPACITY TEST REPORT

Model Name	472324	Capacity	270mAh
Test Name	Standard Capacity Test		
Test Procedure			

Charge method : Maximum Charge Voltage, 0.2C, 0.02C cut off at 23℃
Discharge method : 0.2C, 3.0V cut off at 23℃

Criteria	Minimum Capacity : over 101%					
Result	Pass					
SPL No.	#1	#2	#3	#4	#5	
Capacity	280.4	281.3	283.2	285.5	281.4	
(%)	103.9%	104.2%	104.9%	105.7%	104.2%	
Result(Pass/Fail)	Pass	Pass	Pass	Pass	Pass	



7.5 Pack 1st Protection Device Test

BATTERY PACK 1st PROTECTION DEVICE TEST REPORT													
Model Name		472324					PCM Vendor			NVT			
							PCM Model Name			SSEWU68			
Test Name		과충전과 충전					Test Name		과전류과 충전				
Test Procedure							Test Procedure						
1. Bypass FET of PCM 2. Discharge battery (0.2C 2.75V cutoff) 3. 아래 조건으로 완충 후 7시간 추가 평가한다. 按如下条件满充后测试7小时 Test condition : Room Temperature , 5 samples Voltage : 4.495V Current : 1차소자 동작하지 않는 최대전류와 제조사에 의해 명시된 최대 충전 전류 중 높은 값 1次保护不工作时的最大电流和厂商给出的最大充电电流中更大的值							1. Bypass FET of PCM 2. Full charge battery (Max charge voltage, 0.5C 0.05C cutoff, 24H rest) 3. 아래 조건으로 7시간 평가한다. 按如下条件测试7小时 Test condition : Room Temperature , 5 samples Current : 1차소자 동작하기 위한 최소 전류와 제조사에 의해 명시된 최대방전 전류의 3배 값 중 낮은 값 1次保护能工作的最小电流和厂商提供的最大放电电流的3倍值中更小的值						
Criteria		누액, 연기, 발화 없을 것无漏液, 烟气, 着火					Criteria		누액, 연기, 발화 없을 것无漏液, 烟气, 着火				
Result		Pass					Result		Pass				
SPL No.		#1	#2	#3	#4	#5	SPL No.		#1	#2	#3	#4	#5
Highest Temp(°C)							Trip Time(min)		No trip	No trip	No trip	No trip	No trip
Result(Pass/Fail)		Pass	Pass	Pass	Pass	Pass	Result(Pass/Fail)		Pass	Pass	Pass	Pass	Pass
Test Picture							Test Picture						
N/A							N/A						
Before							Before						
After							After						
Test Profile (Voltage / Cell Temperature)							Test Profile (Current)						
N/A							N/A						
Test Name		불균일 충방전 (3개 이상 셀로 된 직렬/직·병렬 팩) 不均一充放电 (3个以上cell 串/串 pack)											
Test Procedure													
1. Full charge battery (Max charge voltage, 0.5C 0.05C cutoff, 24H rest) 2. 제조사에 의해 명시된 최대 충전 전압, 1A로 충전하면서 아래 조건으로 방전한다. 按厂商提供的最大充电电压, 1A充电并按如下条件放电 직렬 : 1개 Cell을 0.5C와 1A중 낮은 전류로 7시간 방전 串: 1个cell按0.5C和1A中更小的电流放7小时 직·병렬 : 직렬 회로 구성하는 Bank 1개를 0.5C와 1A 중 낮은 전류로 7시간 방전 串并: 构成串联电路的1个bank, 0.5c和1A中更小的电流放7小时													
Criteria		누액, 연기, 발화 없을 것, <80℃, 보호소자 작동할 것											
Result													
SPL No.		#1	#2	#3	#4	#5	Trip Time(min)						
Highest Temp(°C)													
Result(Pass/Fail)													
Test Picture							Test Picture						
N/A							N/A						
Before							Before						
After							After						
Test Profile (Voltage / Current / Cell Temperature)													

7.6 Pack Safety Test

BATTERY PACK SAFETY TEST REPORT

Model Name		472324						Cell Vender		ATL					
Test Name		저온·고온 낙하低温高温跌落(可拆卸电池)						Cell Model Name		472324					
Test procedure								Test Name		모서리 낙하边角跌落					
								Test procedure							
1. Full charge battery (Max charge voltage, 0.5C 0.05C cutoff, 24H rest) 2. OCV, IR 측정테스트, 23℃ (N=6) - OCV : Max 충전전압充电电压 Δ0.05V 이내以内 3. Pack 표면이 60℃ 일때 1M, 콘크리트 바닥, 12회 Random 방향으로 낙하 pack表面60度时从1米高, random跌落12回, 水泥地板 4. -10℃ 로 온도변화하여 1M, 콘크리트 바닥, 12회 Random 방향으로 낙하 -10度温度变化时从1米高, random跌落12回, 水泥地板 5. 상온에서 6시간 방치후 내부를 확인 在常温放置6小时后确认内部								1. Full charge battery (Max charge voltage, 0.5C 0.05C cutoff, 24H rest) 2. OCV, IR 측정테스트, 23℃ (N=6) - OCV : Max 충전전압充电电压 Δ0.05V 이내以内 3. 하단 모서리로 6회 반복 낙하下端边角反复跌落6回 - 높이高度 : 1.5M, 바닥地板 : Steel Plate (T: 5CM±1) 4. 평가 후 1시간 관찰 测试后观察1小时							
Criteria		안전장치 정상동작 할 것, 외관 Crack으로 내부 보이지 않을 것 누액, 연기, 발화 없을 것 安全装置正常动作, 不能从外观crack确认到内部, 无漏液, 烟气, 着火						Criteria		No Fire, smoke, <200℃					
Result		N/A						Result		N/A					
SPL No.		#1	#2	#3	#4	#5	#6	SPL No.		#1	#2	#3	#4	#5	#6
Before	OCV(V)							Before	OCV(V)						
	IR(mΩ)								IR(mΩ)						
	OCV(V)								OCV(V)						
After	IR(mΩ)							After	IR(mΩ)						
	Result (Pass/Fail)								Result (Pass/Fail)						
	Test Picture								Test Picture						
Before		After						Before		After					
Test Name		고온 환경高温环境						Test Name							
Test procedure								Test procedure							
1. Full charge battery (Max charge voltage, 0.5C 0.05C cutoff, 24H rest) - OCV : Max 충전전압充电电压 Δ0.05V 이내以内 2. 70±2℃ 챔버에서 7시간 방치 (N=5)chamber放置7小时															
Criteria		안전장치 정상동작 할 것, 외관 Crack으로 내부 보이지 않을 것 누액, 연기, 발화 없을 것 安全装置正常动作, 不能从外观crack确认到内部, 无漏液, 烟气, 着火						Criteria							
Result		Pass						Result							
SPL No.		#1	#2	#3	#4	#5		SPL No.		#1	#2	#3	#4	#5	
Before	OCV(V)	4.37	4.37	4.37	4.37	4.38		Before	OCV(V)						
	IR(mΩ)	178.8	175.1	171.8	172.2	175.6			IR(mΩ)						
After		Result (Pass/Fail)	Pass	Pass	Pass	Pass	Pass	After		Result (Pass/Fail)					
Test Picture								Test Picture							
Before		After						Before		After					

7.7 Pack Transport Test Report

Test Name	Shipping Transportation (포장운송) 包装	Test Date	2019/2/22	Result	Pass
	Before (Image)	After (Image)		Test Procedure and Criteria	
#1				0#(30) 包装运输实验 - 限量产同样IBox构成 (tray, battery) - Ibox 30个外剩下的只要装满不进行评价 * 진동 0#(30) 震动 - 时间 (震动方向): z轴15分, x轴15分, y轴15分 震动设备 (box在设备上固定好) - Frequency: 8~100Hz - FSD LEVER: 0.0547~0.0015G²/Hz - G값: 1.047Grms 0#(30) 跌落 - 跌落设备 (避免drop后box撞到发生2次冲撞, 需要固定好) - 100cm 5회 (1각 - 1면 - 3면, 표 참조) 1각: 3-4-5 위치/1면: 4-5 위치/3면: 2, 4, 6 위치 Spec · 진동: 외관 및 X-Ray 한도기준 만족할 것 · 낙하: X-Ray 한도기준 만족할 것	
#2					
#3					
#4					
#5					
Test Name	Abrasion Resistance & Chemical Resistivity (인쇄 수면) 印刷寿命	Test Date	2019/2/16	Result	Pass
	Before (Image)	After (Image)		Test Procedure and Criteria	
Front				* 라벨 내마모 (소비자 교체형, N=4) * label耐磨 (消费者替换, N=4) - Battery Label S/N shell be rubbed by a rubber eraser. - Test condition .force: 500gf .velocity: 42 times/minute .Printing part: 1500 times .S/N Printing part: 300 times Spec: No distention, split in label, Printing part of label should be recognizable * 인쇄 내마모印刷耐磨 (기술자 교체형 기술者 替换, N=4) - Test condition .force: 500gf .velocity: 42 times/minute .Pad part: 10 times .Ink part: 5 times Spec: 인쇄 번짐 허용하나, 인식 가능할 것 spec: 允许印刷溢出, 但需要识别没问题	
Rear					

7.8 Pack Environmental Test Report

BATTERY PACK ENVIRONMENTAL TEST REPORT

Vendor Name	ATL				PARTS INFO				Vendor				Model Name			
Model Name	472324				Cell				ATL				472324			
SRC Code	GR45-04905A				PCM				BVT				032V069			
Test Date (YY/MM/DD)	Tester Name				PTC				ANTENNA							

Test Name	거후환경 시험(열충격 시험)热冲击				Test Date	2019-02-16---2019-02-21				Approved Max Thickness				4.75		Result	Pass	
	Before			After(96Cycle)												Test Procedure and Criteria		
	OCV(V)	IR(mΩ)	두께(mm)	측시 측정马上测试		2hr 방치 후 측정放置后测试						24hr 추가 방치 후 측정 24hr后追加放置后测试						
				두께	변화율(10% 이상) 变化率	OCV	변화율(V) 变化量	IR	변화율(ΔΩ) 变化量	두께 厚度	변화율(8% 이상) 变化率	OCV	변화율(V) 变化量					
#1	4.24	173.4	4.62	4.70	-1.09%	4.18	-0.06	206.7	33.3	4.70	-1.09%	4.18	0.00	Charging Voltage ± 200mA 35/4 v. 4.20, 4.2 ± 4 v/c, 0.2C 0.02C cutoff Stand for half hour at -40°C, and then stand for half hour at 80°C Transfer time between each step is within 5 minutes Repeat 36 times. ΔT(목재) Not more than 10% ΔOCV(2hr) ±0.2V ΔIR(2hr) ±10mΩ ΔT(2hr) Not more than 8% ΔOCV(24hr) ±0.001				
#2	4.24	173.9	4.69	4.77	0.38%	4.18	-0.06	207.7	33.8	4.77	0.38%	4.18	0.00					
#3	4.24	176.7	4.63	4.72	-0.63%	4.18	-0.07	214.4	37.7	4.72	-0.63%	4.18	0.00					
#4	4.24	177.0	4.64	4.78	0.66%	4.19	-0.06	203.5	26.5	4.78	0.66%	4.19	0.00					
#5	4.24	175.6	4.66	4.77	0.34%	4.18	-0.07	212.9	37.2	4.77	0.34%	4.18	0.00					
#6	4.24	181.8	4.66	4.77	0.34%	4.18	-0.06	216.6	36.7	4.77	0.34%	4.18	0.00					
#7	4.24	181.4	4.64	4.70	-1.03%	4.19	-0.06	213.5	32.2	4.70	-1.03%	4.18	0.00					
#8	4.24	176.5	4.65	4.61	-2.97%	4.18	-0.06	212.2	35.7	4.61	-2.97%	4.18	0.00					
#9	4.25	182.1	4.63	4.76	0.11%	4.19	-0.06	217.1	39.0	4.76	0.11%	4.19	0.00					
#10	4.24	177.5	4.64	4.73	0.44%	4.18	-0.06	216.1	30.6	4.73	0.44%	4.18	0.00					

Test Name	연속 방하 후 열충격 시험(가열자 교체형) 连续放后热冲击试验				Test Date	Result										
	Before			Test Procedure and Criteria												
	OCV(V)	IR(mΩ)	두께(mm)	N/A												
	#1			* 연속 방하 - SOC 60~70% 충전(0.2C 0.02C Cut Off) - OCV 측정 후 25±2°C (16±4) - 용량 0.5M 방치 : Steel Plate(7.25mm) or Aluminum Plate(16mm) - 방비 : 200H(random axis) * 열충격 Stand for half hour at -40°C, and then stand for half hour at 80°C Transfer time between each step is within 5 minutes. Repeat 36 times. No leakage, No Fire												
#2																
#3																
#4																

Test Name	고온충격 시험高温动作试验				Test Date	표준 용량				Approved Max Thickness				Result		PASS	
	Before			After(60Cycle)												Test Procedure and Criteria	
	IR(mΩ)	두께(mm)	0.2C 용량 IR 용량容量		두께厚度	측시 측정马上测试		2hr 방치 후 측정放置后测试						24hr 추가 방치 후 측정 24hr后追加放置后测试			
						변화율(10% 이상) 变化率	OCV	IR	변화율(ΔΩ) 变化量	두께 厚度	변화율(8% 이상) 变化率	OCV	변화율(V) 变化量				
#1					#DIV(0)				0.0	#DIV(0)		0	1 Cycle: 40°C 50% discharge 30min → 40+40°C 30min → 60°C 50% discharge 30min → 60+40°C 30min Repeat 30 times. ④ Capacity measurement condition 25±2°C ⑤ Charging Max charge voltage: 0.2C 0.02C cutoff ⑥ Discharge 0.2C cutoff ⑦ Capacity: 0.2C discharge → 0.2C charge → 0.2C discharge → 0.2C charge → 0.2C discharge ⑧ After capacity measurement, Charging as Max Charge Voltage: 0.2C, 0.2C cutoff ⑨ 10/20 C more than 90% ⑩ Cap(10 C) more than 90% ⑪ ΔT(목재) Not more than 10% ⑫ ΔOCV(2hr) ±0.2V, ΔIR(2hr) ±10mΩ, ΔT(2hr) Not more than 8% ⑬ ΔOCV(24hr) ±0.001 ⑭ ΔT: Comparison with Approved Drawing Max Thickness ⑮ No crack, twist, separation in molding. No leakage. No fire				
#2					#DIV(0)				0.0	#DIV(0)		0					
#3					#DIV(0)				0.0	#DIV(0)		0					
#4					#DIV(0)				0.0	#DIV(0)		0					
#5					#DIV(0)				0.0	#DIV(0)		0					
#6					#DIV(0)				0.0	#DIV(0)		0					
#7					#DIV(0)				0.0	#DIV(0)		0					
#8					#DIV(0)				0.0	#DIV(0)		0					
#9					#DIV(0)				0.0	#DIV(0)		0					
#10					#DIV(0)				0.0	#DIV(0)		0					

Test Name	고온고습 가속 시험高温高湿加速				Test Date	2019-02-16---2019-03-04				Approved Max Thickness				4.75		Result	PASS	
	Before			After(14일차)14天												Test Procedure and Criteria		
	OCV(V)	IR(mΩ)	두께(mm)	측시 측정马上测试		2hr 방치 후 측정2hr放置后测试						24hr 추가 방치 후 측정 24hr后追加放置后测试						
						두께厚度	변화율(10% 이상) 变化率	OCV	변화율(V) 变化量	IR	변화율(ΔΩ) 变化量	두께 厚度	변화율(8% 이상) 变化率	OCV	변화율(V) 变化量			
#1	4.24	177.05	4.64	4.68	-1.58%	4.16	-0.08	213.3	36.3	4.66	-1.87%	4.16	0.00	SOC 90% Charging Voltage 4.20/4.35/4.4 v. 4.20, 4.3 ± 4 v/c, 0.2C 0.02C cutoff Store during 14 days at 60±2°C and 90±90% ΔT(목재) Not more than 10% ΔOCV(2hr) ±0.2V, ΔIR(2hr) ±10mΩ, ΔT(2hr) Not more than 8% ΔOCV(24hr) ±0.001 ΔT: Comparison with Approved Drawing Max Thickness No crack, twist, separation in molding. No leakage. No fire				
#2	4.24	175.94	4.62	4.67	-1.60%	4.17	-0.08	214.6	38.6	4.66	-1.96%	4.17	0.00					
#3	4.24	177.55	4.63	4.70	-1.09%	4.17	-0.08	215.7	38.2	4.68	-1.56%	4.17	0.00					
#4	4.24	177.51	4.62	4.66	-1.81%	4.17	-0.08	211.8	34.3	4.65	-2.02%	4.17	0.00					
#5	4.24	175.85	4.65	4.69	-1.22%	4.16	-0.08	214.4	35.6	4.68	-1.54%	4.16	0.00					
#6	4.24	179.28	4.69	4.73	-0.34%	4.17	-0.08	215.0	35.7	4.72	-0.67%	4.17	0.00					
#7	4.24	174.33	4.62	4.67	-1.68%	4.15	-0.09	217.1	42.8	4.66	-1.92%	4.15	0.00					
#8	4.25	177.96	4.63	4.66	-1.69%	4.17	-0.08	210.0	32.0	4.64	-2.29%	4.17	0.00					
#9	4.24	173.60	4.68	4.74	-0.15%	4.17	-0.08	209.0	35.4	4.72	-0.59%	4.17	0.00					
#10	4.24	174.22	4.66	4.73	-0.34%	4.17	-0.08	211.3	37.0	4.70	-0.97%	4.16	0.00					

Test Name	저온 방치低温放置				Test Date	2019/2/16---2019/2/20				Approved Max Thickness				4.75		Result	PASS	
	Before			After												Test Procedure and Criteria		
	OCV(V)	IR(mΩ)	두께(mm)	측시 측정马上测试		2hr 방치 후 측정2hr放置后测试						24hr 추가 방치 후 측정 24hr后追加放置后测试						
						두께厚度	변화율(10% 이상) 变化率	OCV	변화율(V) 变化量	IR	변화율(ΔΩ) 变化量	두께 厚度	변화율(8% 이상) 变化率	OCV	변화율(V) 变化量			
#1	4.38	173.7	4.68	4.78	0.63%	4.37	0.00	172.6	-1.47%	4.68	-1.47%	4.16	0.00	SOC 100% 충전 0.2C, 0.02C Cut Off) Stand for 4 days at -20°C ΔOCV±0.2V, ΔIR±30mΩ ΔT(목재) Not more than 10% ΔT(2hr) Not more than 8% ΔT: Comparison with Approved Drawing Max Thickness No crack, twist, separation in molding. No leakage. No fire				
#2	4.37	175.7	4.65	4.75	0.94%	4.37	0.00	174.6	-1.1	4.65	-2.02%	4.17	0.00					
#3	4.38	177.8	4.65	4.75	0.84%	4.38	0.00	175.1	-1.9	4.66	-2.80%	4.17	0.00					
#4	4.38	178.2	4.62	4.72	-0.74%	4.37	0.00	179.1	0.8	4.62	-2.76%	4.17	0.00					

Test Name	ESD				Test Date	2019/2/15				Result				PASS			
	Before			After												Test Procedure and Criteria	
	OCV(V)	IR(mΩ)	두께(mm)	측시 측정马上测试		2hr 방치 후 측정2hr放置后测试						24hr 추가 방치 후 측정 24hr后追加放置后测试					
						두께厚度	변화율(10% 이상) 变化率	OCV	변화율(V) 变化量	IR	변화율(ΔΩ) 变化量	두께 厚度	변화율(8% 이상) 变化率	OCV	변화율(V) 变化量		
#1	4.38	174.4			4.38	0.00	174.5	0.1						Inducted 10 times to each output wire according to below condition: Contact: ±10N Air: ±10N Insulation: 23±2°C/20%RH ΔOCV±0.2V, ΔIR±30mΩ			
#2	4.38	177.9			4.38	0.00	179.2	5.3									
#3	4.38	177.3			4.38	0.00	178.0	0.7									
#4	4.38	177.2			4.38	0.00	179.0	1.7									

Test Name	습수분포 (Can. Type, PCM) 盐水喷雾				Test Date	YY/MM/DD				Result				PASS or FAIL	
Test Procedure															
SOC 60% or 70% - PCM(40ea) : 40hrs in salt spray - Battery Pack(2ea) : 24hr in salt spray. The terminal is set in the downward direction.															
Criteria	There shall be no blueblack or discoloration in the inspection of a 10X magnifying glass														
Test Picture															
PCM (40ea)								Battery Pack (4ea)							
N/A															
Before								After							
Before								After							

7.9 Pack Sample Productivity

SAMPLE PRODUCTIVITY						Drafting	Check	Approval
						/	/	/
Maker	ATL	Mechanical Spec	RESIN	Material Spec	Maker / Model			
Model	472324		RESIN GRADE		IC	MD1421E54CPAL		
Batt Model	EB-BR170ABU		Case Vender		FET			
Code No	GH43-04905A		Coating Vender		PTC			
Country	UNION		Coating Spec		CELL	472324		
Package	MAIN			Pack Lot.				
SAMPLE MANUFACTURING INFORMATION								
Line No.	Line A				-			
Date	2019/1/30				-			
Input Q'ty	300				-			
Yield (%)	Aim (%)	99.00%			-			
	Result(%)	99.00%			-			
WORST 3	Problem	Q'ty	Defect(%)	Countermeasurement				
	Mylar wrinkle	2	0.67%	Root cause:Improper operation by manual. CA:Standard a mylar taping process in SOP , and design mylar				
	Label skew	1	0.33%	Root cause:Improper operation by manual. CA: Add pasting label operation standard into SOP				
Appearance								
	Front Picture			Rear Picture				
Improve	Problem							
	1							
	2							
	3							
	4							
5								

8. INSPECTION Standard

8.1 Inspections

Cosmetic Inspection Acceptance Standard



Embedded-Pack
외관기준_Ver1.0.ppt

☐ Embedded-Pack : Appearance 1/3

Pack	V1.0
Date	2017.03.25

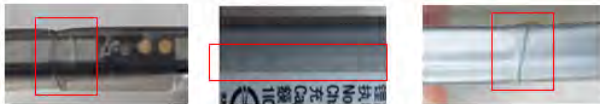
Confidential

No	Classification	Phenomenon	Phenomenon
1	Serial	 OK OK OK	> Allowed : Ink spread > Allowed : Serial & Samsung logo position (If can be recognized) > Allowed : Serial break, spread
2	Samsung	 OK OK NG	> Allowed : Logo break, & blur (If can be recognized) > Not Allowed : Logo's shape is erased (Over 2 points in one letter)
3	Info.	 OK NG	> Allowed : Line & Letter's break, blur & spread > Not Allowed : Letter can't be recognized
4	Mark	 OK NG OK OK OK	> Allowed : Mark break & blur > Not Allowed : Mark spread
5	Warning Icon ETC	 OK OK	> Allowed : Icon break, blur & spread > Allowed : PAD-Ink dot (When they are out of Mark & Letter)

☐ Embedded-Pack : Appearance 2/3

Pack	V1.0
Date	2017.03.25

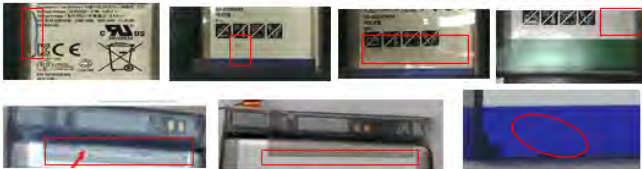
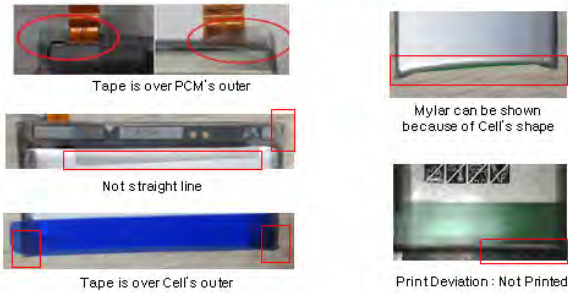
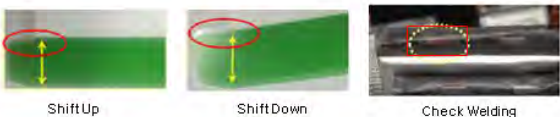
Confidential

No	Classification	Phenomenon	Phenomenon
1	Case		> Allowed : Black spot (When the spot is plastic)
2	Tape : Apply the Same Appearance on All of Tapes (When measuring Dim, use Contact-Device like Vernier-Calipers, PPG)		
1)	Winkle		> Allowed : If Not over Dim. Spec.
2)	Bubble		> Allowed : If Not over Dim. Spec.
3)	Folded		> Allowed : If Not over Dim. Spec.
4)	Peel Off		> Allowed : If Not over Dim. Spec. (Measure Dim. by Contacting Cell's surface)

☐ Embedded-Pack : Appearance 3/3

Pack	V1.0
Date	2017.03.25

Confidential

No	Classification	Phenomenon	Phenomenon
5)	Spot Stain Scratch	 Glue Lump Glue Spread Scratch	> Allowed : If Not damage to Cell
6)	Position	 Tape is over PCM's outer Mylar can be shown because of Cell's shape Not straight line PrintDeviation : Not Printed Tape is over Cell's outer	> Allowed : If Not over Dim. Spec. (Measure Dim. by Contacting Cell's surface)
7)	Print ETC	 ShiftUp ShiftDown Check Welding	> Allowed : Printing Line Shift > Allowed : Checking Mark (Welding) > Allowed : Color Deviation

※ Print allowance

1. Allowance: recognize in 3 second from 10cm distance

8.2 Key Dimension Inspection Standard

- Mark order of measurement
- . each measurement includes photos (caliper, method)

Battery Pack related control method:
SSEWU68

Item	Length	Width	Thickness
spec	26.3±0.7/-1.0mm	22.1±0.50mm	4.65±0.1/-0.3mm(Ex-factory thickness)
Check Method	* Measured one time at the position showed in below picture. * Position: PACK top to bottom. * MFG 100% check by jig. IPQA spot check by Caliper(200mm) * Record the max value.	* Measured one time at the position showed in below picture. * Position: PACK two sides. * MFG 100% check by jig. IPQA spot check by Caliper(200mm) * Record the max value.	* Measured one time at the position showed in below picture. * Position: PACK surface to bottom. * MFG 100% check by PPG(500g). IPQA spot check by Caliper(200mm) * Record the max value.
Check Method (MFG)			
Check Method (IPQA)			
Check Point			

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CHANGE HISTORY

REV	CHANGE DESCRIPTION	EFF. DATE	PREPARED BY	APPROVED BY	DEPT.
A	New Release	2/21/2019	张涛	宋刚凡	QA

CONFIDENTIALITY

☐ TOP CONFIDENTIAL ☐ CONFIDENTIAL ☐ INTERNAL ONLY

DISTRIBUTION

☐ MFG	☐ QA	☐ R&D	☐ FNC
☐ PMC	☐ AME	☐ SRC	☐ HR&A
☐ SO	☐ PE	☐ IE	☐ TE
☐ BCU	☐ PM	☐ IT	☐ OTHER

ISSUE NO.:

NO.: QF-014-01G

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REV.: A

DESCRIPTION: SSEWU68 检验操作指示
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1.PURPOSE (目的):

为指示对 SSEWU68 进行检验, 特制定本指示。

This instruction standardizes the inspection of SSEWU68 goods.

2.SCOPE(范围):

本指示适用于对 SSEWU68 产品的检验。

It is applicable to inspect of SSEWU68.

3.DEFINITION(定义):

致命缺陷 (CRITICAL): 有明显或潜在的危及使用安全之缺陷。

Critical defects: Obvious or potential defects endanger security in use.

主要缺陷 (MAJOR): 主要为性能、功能不良及可靠度不达标, 重要零部件漏装等, 且此种类型缺陷会引起客户投诉。

Major defects: Function or reliability can't reach the demand that will cause the complaint from customer.

一般缺陷 (MINOR): 主要为外观不良或机械性能不良, 但不影响性能和可靠性的缺陷。

Minor defects: Appearance or mechanical performance defects that don't influence the function and the reliability.

4.RESPONSIBILITY(职责权限):

品质部 (QA): 负责对生产部提交的 SSEWU68 产品进行检验; 负责跟进对不良的原因分析, 推动生产过程的改善, 以及对检验指示的制定与修改。

Be responsible for inspecting SSEWU68 product, following the cause analysis and pushing relative department to improve, establishing and revising the inspection standard.

生产部 (MFG): 负责向 QA 提交 SSEWU68 的送检批次; 检验不合格的返工; 工序 100%检验。

Be responsible for submitting the SSEWU68 to QA, reworking the non-conforming, 100% working procedure inspect.

制造/测试工程部 (PME/TE): 负责对 QA 检验不良的原因分析和纠正改善措施的制定。

Be responsible for analyzing the cause and taking corrective action.

5.INSTRUCTION(作业指引):

5.1 QA 抽样计划:参照 WI-206

QA sampling plan Refer WI-206.

5.2 QA 检验项目见下表所示。

5.2.1 OQA 检查条件:

5.2.1 OQA inspection conditions

5.2.1.1 检查环境: 光照度 800-1200LUX, 灯管无损坏/闪烁, 温湿度符合要求;

5.2.1.2 确认人员: 检验员视力 (矫正视力)需达 1.0 以上, 有上岗证;

5.2.1.3 确认操作: 检测时待检品离眼睛距离 0.3m, 待检品的在视角为 30~60 度内转动, 是否合格根据各部分检验标准来判定;

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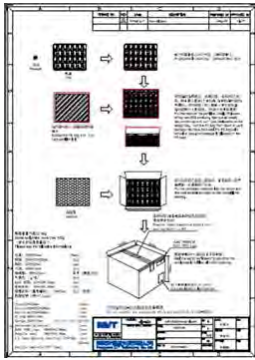
REV.: A

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5.2.2 QA 检验项目

5.2.2 QA inspection items.

序号 (NO.)	项目 Item	检查标准 Inspection standard	判定 Judgment	使用仪器 Machine	数量 Sample size
5.2.2.1 外包装检验 Packing inspection	外箱 Carton	包装轻微损伤或残缺、无明显脏污等, 但未失去物料保护作用; 允许接受。 Minor packing damage or incomplete, no obvious dirty, but still can protect the material inside; Accept	Minor	目视 Visual	包装箱 全检 Packing carton 100% inspection
		包装损坏并且失去物料保护作用, 包装未按本公司相关发文要求执行, 标识与实物不符; 不接受 Packing damage can't protect the material inside, packing is not implemented according to relative document in NVT, sign is not same as the actual; Reject	Major		
	外箱标签 Carton Sign	 外包装箱要粘贴出货、环保标签等。 Carton need stick shipment, RoHS label.	Major		
	装箱方式 Packing method	 附件 1: 装箱图纸 (SSEWU68-D02) Attachment 1: Packing drawing (SSEWU68-D02)	Major		

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5.2.2.2 单体 检验 Monomer inspection	连接器 Connector	连接器规格正确, FPC 无开裂, 排线正确。 Connector specification correct, FPC no crack, wire arrange correct.	Major	参照样 板、目视 Refer sample、 visual	参照 5.1 Refer 5.1
		连接器无变形、无氧化、无脏污、无虚焊, FPC 无褶皱、无划伤, 排线无破损、脏污。 Connector no variant, no oxidation, no dirty, no dry joint; FPC no wrinkle, no scratch; wire no breakage, no dirty.	Minor		
	喷码 Code	喷码满足规则要求, 能顺利扫描。 Bar code should be scan, barcode content and rules Refer drawing: 依最新图纸进行: 附件 2: SSEWU68-E01/02/11/12 Refer update drawing: Attachment 2: SSEWU68-E01/02/11/12	Major		
		喷码轻微模糊可识别, 歪斜在允收范围, 字体轻微变形等; 可接受。 Code slight blurry Can be recognition, Slant in permission limits, Word slight variant etc; Accept	Minor		
5.2.2.2 单体 检验 Monomer inspection	移印 (silk-screen)/Label	移印/印刷内容符合图纸要求。 Silk-screen/label content meet drawing drawing. 附件 2: SSEWU68- E01/02/11/12 Refer update drawing: Attachment 2: SEWU68- E01/02/11/12	Major	参照样 板、目视 Refer sample、 visual	参照 5.1 Refer 5.1
		字迹/图标清晰、不能断字, “CE” 不能有白点, 参考 QSI-197。 Word/icon clear, word no break, “CE” no white dot, refer QSI-197。	Minor		
	成品外观 Battery appearanc	电池无漏液、胀气、破损、变形、跌角。 Battery no leakage, no swelling, no breakage, no variant, no fall.	Major		

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	e	电池表面无划痕、凸点、异物、凹点、脏污, Mylar 无破损、褶皱、掉色、发亮, 参考 QSI-197《SSE 外观检查标准》。 Battery appearance no scratch, no bulge, no impurity, no pit, no dirty, mylar no breakage, no wrinkle, no fade, no bright. Refer to QSI-197 "SSE cosmetic inspect criteria".	Minor		
	尺寸 (CTF) dimension	附件 3: 尺寸图纸: SSEWU68-G01, CPK>1.0 Attachment 3: dimension drawing: SSEWU68-G01, CPK>1.0	Major	卡尺及 夹具 Calipers &jig	参照 5.1 Refer 5.1
5.2.2.3 功能 检验 Function inspection 参照附件 4 Refer attachment 4	出货电压 (CTF) Shipment voltage	参照: WI-SSEWU68 测试指引 Refer: WI- SSEWU68 Testing instruction Voltage: 3.92~3.99V, CPK>1.33 30%SOC OCV: 3.75~3.80V, CPK>1.33	Major	成品测 试仪 Final Tester	参照 5.1 Refer 5.1
	内阻 (CTF) Impedance	参照: WI-SSEWU68 测试指引 Refer: WI- SSEWU68 Testing instruction IR: ≤195 mohm, CPK>1.33	Major		
	充电/放电 Charge/ Discharge	参照: WI-SSEWU68 测试指引 Refer: WI- SSEWU68 Testing instruction 充电/放电功能正常 Charge/ Discharge function normal	Major		
	放电过流 保护 OCP	参照: WI-SSEWU68 测试指引 Refer: WI- SSEWU68 Testing instruction ODCP: 2.0~3.75A	Major		
	短路保护 测试 Short Protect Test	参照: WI-SSEWU68 测试指引 Refer: WI- SSEWU68 Testing instruction 短路保护功能正常 Short Protect function normal	Major		
5.2.2.4 电池重量 Battery weight	重量 Weight	4.95±0.25 g	Major	电子秤	5pcs/per manufactur e day
5.2.2.5 容量测试 Capacity Test	容量 Capacity	1C/0.2C(截止 2.75V)容量测试, 容量大于 Label 标称容量 101% 。 1C/0.2C(cut off 2.75V)capacity test, capacity more than Label nominal capacity 101% .	Major	Learning machine	5pcs/Per manufactur e day

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5.2.2.6 有害物质检查 RoHS/HF inspection	参照 9.3 Refer: 9.3	参照附件 5 Refer: attachment 5	Critical	XRF 测试仪 XRF tester	1pcs/Per manufactur e day
5.2.2.7 TVOC 测试 Volatile Organic Compounds Test	参照 9.3 Refer: 9.4	参照附件 6 Refer attachment 6	Critical	TVOC 测试仪 TVOC tester	1pcs/Per manufactur e day
5.2.2.8 性耐性测试	焊接拉力 Welding pull	激光焊接拉力测试: Laser welding pull test Al: ≥ 5 N Ni: ≥ 15 N	Major	拉力计	3pcs/Per manufactur e day
	橡皮擦拭 Rubber erase	橡皮擦拭测试: Rubber erase test 将橡皮放在丝印面上, 压力 500g, 丝印面摩擦 10 次, 喷码摩擦 5 次 (速度: 42 次/min) Put the rubber eraser on the label silk-screen part with applied force of 500g, rub silk-screen part 10times and inkjet printing part 5times(velocity:42 times/min) 标准: 能够识别 Standard: Can be recognition	Minor	耐磨机	1pcs/Per manufactur e day
5.2.2.9 ORT 测试 ORT test	高温高湿 存储 HTHH storage	Test Procedure: 1. Put full charged batteries on chamber, for 14 days. (Chamber condition : 60°C / 90%RH) 2. measure it after 2hr storage at 7 days and 14 days Criteria: $\Delta V \pm 0.2V$, $\Delta IR \pm 115mohm$, $\Delta T \leq 10\%$ @ at once, $\Delta T \leq 8\%$ @ 2 hours, No leakage, short, crack, normal performance	Critical	Chamber	5pcs/time 2time/mont h
	冷热冲击 Thermal Shock test	Test Procedure:: 1. Put full charged batteries on chamber, for 2 hours. (chamber condition : -40°C) 2.Change condition, 85°C and then, put them on chamber, for 2 hours.	Critical	Shock chamber	5pcs/time 2time/mont h

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		3. Repeat above 1, 2 test, 20 times. 4. Put the batteries on room temperature, for 2 hours and at once Criteria: $\Delta V \pm 0.2V$, $\Delta IR \pm 115mohm$, $\Delta T \leq 10\%$ @ at once, $\Delta T \leq 8\%$ @ 2 hours, No leakage, short, crack, normal performance			
--	--	--	--	--	--

5.3 成品检验后若判定 PASS，须于标签左下角上盖 QA PASS；若判定 reject，则交还生产部返工，且每批抽检后均须于《成品抽样检验记录表》上记录。

After inspection, if affirm PASS, shall seal QA PASS on label; if affirm reject, QA give this lot back to MFG to rework, and record on «Finished product sample inspection record».

5.4 出货前需对产品按照 WI-206 标准进行外观和成品功能抽检，抽检记录于《出货检验报告》上。

Before shipment, QA want to inspect appearance and function according to WI-206 standard, and record on «OBA report».

6. ATTENTION (注意事项):

6.1 检验时，必须戴手套。

In the inspection, shall wearing glove.

6.2 检验台面要保持整洁与干净。

The inspection table keeps nattiness and cleaning.

6.3 检验时不准使用 FPC 提起电池，检验过程中避免 FPC 受到损伤

Forbidden use the FPC to take up pack, avoid to hurt FPC during inspection.

7. REFERENCE DOCUMENT(参考文件):

QEP-023 《不合格品控制程序》

Non-conforming control procedure

QEP-028 《纠正与预防措施控制程序》

The control procedure for corrective action and preventive action

WI-102 《OBA 操作指示》

OBA Instruction

8. RECORD(相关记录):

8.1 成品抽样检验记录表 QEP-056-FM001A 保存单位: QA 保存年限: 5 年

Finished product sample inspection record QEP-056-FM001A keeper: QA storage life: 5years

8.2 出货检验报告 QEP-056-FM001 A 保存单位: QA 保存年限: 5 年

OBA report QEP-056-FM001 A keeper: QA storage life: 5years

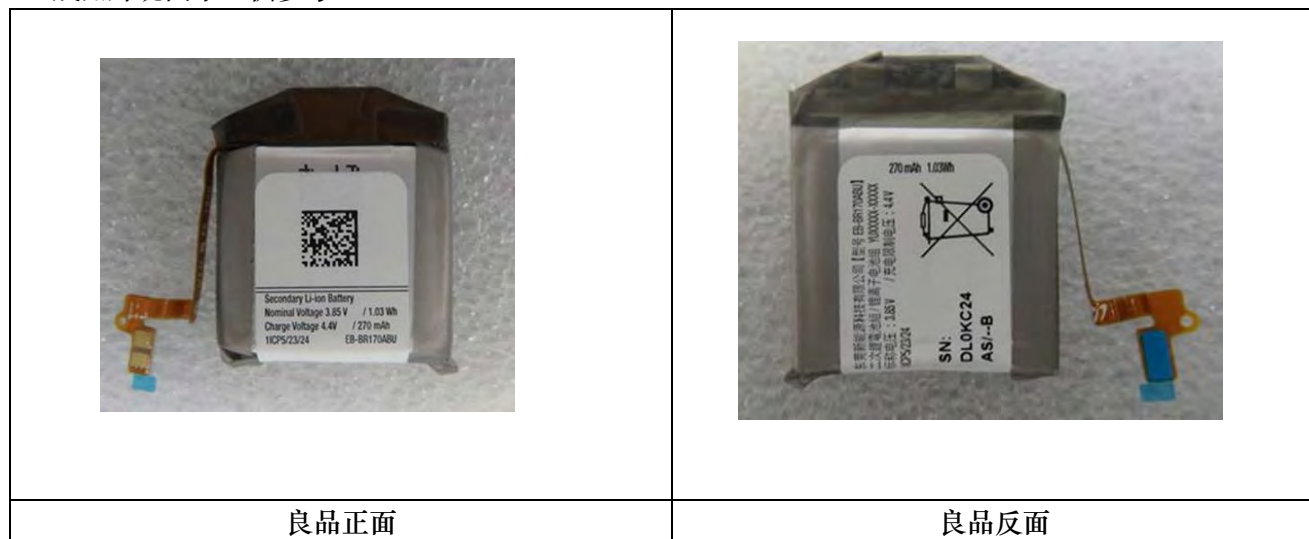
9. ATTACHMENT(附件):

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9.1 成品外观图示：供参考



9.2 成品外观标准

参考 QSI-197 标准进行外观检查，有客户标准，按客户外观检查标准执行。

Refer to QSI-197 Cosmetic criteria for SSE

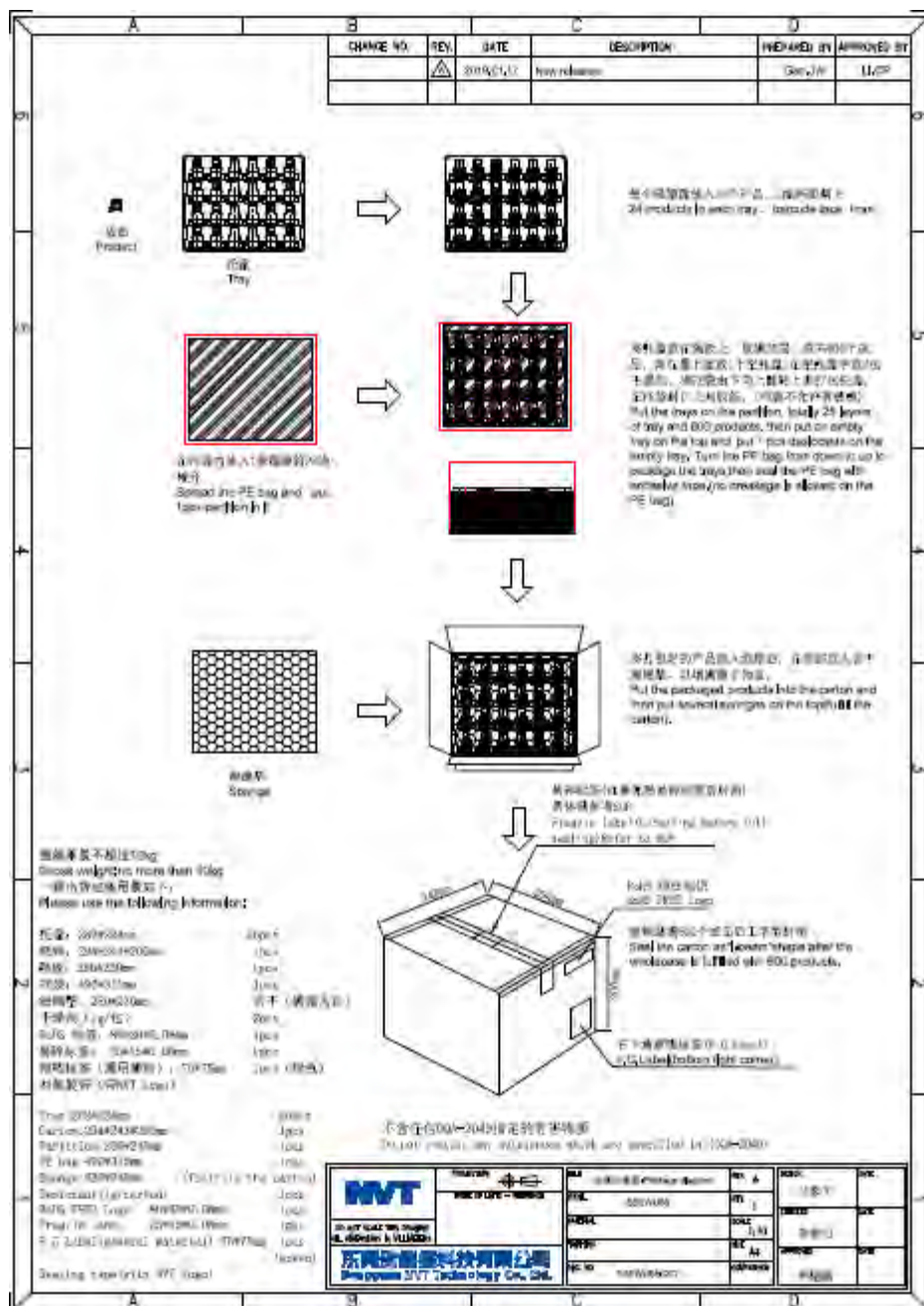
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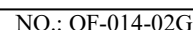
DESCRIPTION: SSEWU68 检验操作指示
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附件 1： 装箱方式



附件 2-2：喷码、印刷图纸参照



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附件 3：尺寸检查图纸

Detail A
Scale: 3:1

Detail A
QR code surface

Detail A
4.65 $\pm$ 0.1 (Factory thickness)

Item	Dimension	Size name	Control
01	26.30 $\pm$ 0.1	Pack Length	OTF
02	22.10 $\pm$ 0.5	Pack Width	OTF
03	4.65 $\pm$ 0.1	Thickness (Factory thickness)	OTF

PARTS LIST

Item	Part name	Amount	Unit	Item	Part name	Amount	Unit
1	Cell	1	PCS	5	Adhesive tape	1	PCS
2	Label	1	PCS				
3	PCSA	1	PCS				
4	Mylar	1	PCS				
5	Names	1	PCS				

Technical Requirements:
1. RoHS requirements: RoHS+HF+REACH
Environment requirements: RoHS+HF+REACH
2. Dimensions marked with () are reference dimensions.
3. Dimensions marked with () are reference dimensions.

Do not contain any substances which are specified in (OQA-2049)

Technical Requirements:
1. RoHS requirements: RoHS+HF+REACH
Environment requirements: RoHS+HF+REACH
2. Dimensions marked with () are reference dimensions.
3. Dimensions marked with () are reference dimensions.

Do not contain any substances which are specified in (OQA-2049)

Technical Requirements:
1. RoHS requirements: RoHS+HF+REACH
Environment requirements: RoHS+HF+REACH
2. Dimensions marked with () are reference dimensions.
3. Dimensions marked with () are reference dimensions.

Do not contain any substances which are specified in (OQA-2049)

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附件 4: WI-SSEWU68 测试指引

项目/Item	测试名称/Testing name	参数/Parameter	规格/specifications
1	开路电压测试 Open circuit voltage test	开路电压 Open Circuit Voltage	3790mV~3810mV
2	内阻测试 Impedance test	正端阻抗 PCMRESIS_P	$\leq 25m\Omega$
		负端阻抗 PCMRESIS_N	$\leq 65m\Omega$
		保护板导通内阻 PCM Impedance	$\leq 90m\Omega$
3	消耗电流测试 Consume Current test	工作消耗电流 Normal Current Consumption	0.1uA~5.2uA
		休眠消耗电流 Power down Current Consumption	0.01uA~0.5uA
4	过充电压保护测试 Over charge protection voltage test	保护电压 Protect Voltage	4405mV~4445mV
		保护时间 Protect Time	750ms~1250ms
		恢复电压 Release Voltage	4175mV~4275mV
5	过放电压保护测试 Over discharge protection voltage test	保护电压 Protect Voltage	2600mV~2800mV
		保护时间 Protect Time	75mS~125mS
		恢复电压 Release Voltage	2620mV~2820mV
6	放电过流保护测试 Over discharge current protection test	保护电流 Protect Current	2A~3.75A
		保护时间 Protect Time	36mS~60mS
7	充电过流保护测试 Over charge current protection test	保护电流 Protect Current	0.65A~2.25A
		保护时间 Protect Time	5.52mS~11.48mS
8	短路保护测试 Short circuit protection test	保护时间 Protect Time	360uS~840uS

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附件 5: XRF 测试表格

No.	品名 / 零件名 (物料名称)	规格 / 尺寸 (规格/尺寸)	元素含量 (ppm)										照片	备注
			Co	Fe	Mn	Cr	Ni	Cu	Zn	Al	Sr	Mo		
1	Isotype_160x160 Isotype	100-1000	100	100	100	11.1	100	100	100	100	100	100		P-001
2	Isotype_160x160 Isotype	100-1000	100	100	100	11.1	100	100	100	100	100	100		P-002
3	Product Label Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-003
4	Product Label Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-004
5	Product Label Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-005
6	Product Label Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-006
7	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-007
8	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-008
9	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-009
10	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-010
11	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-011
12	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-012
13	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-013
14	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-014
15	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-015
16	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-016
17	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-017
18	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-018
19	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-019
20	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-020
21	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-021
22	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-022
23	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-023
24	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-024
25	Isotype_160x160 Isotype	100-1000	100	100	100	100	100	100	100	100	100	100		P-025

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附件 6: TVOC 测试标准

测试项目	标准	备注
TVOC(Volatile Organic Compounds Test)	$\leq 16\text{PPM}$	
Toluene	$\leq 16\text{PPM}$	If TVOC result above 16ppm, test these item
Benzene	$\leq 0.8\text{PPM}$	
Formaldehyde	$\leq 0.08\text{PPM}$	
Phosphine	$\leq 0.08\text{PPM}$	

附件 7: OQA 检验项目

序号	项目	参数	标准	备注
1	外包装	外箱	包装无损坏、损伤、残缺、脏污。	
		外箱标签	符合图纸要求。	
		装箱方式	符合图纸要求。	
2	外观检查	连接器	符合图纸要求, 连接器无变形、无氧化、无脏污、无虚焊, FPC 无褶皱、无划伤。	
		喷码	符合图纸要求, 字迹清晰、无变形。	
		丝印	符合图纸要求, 字迹/图标清晰、不能断字, “CE” 不能有白点, 参考《移印外观检查标准》。	
		成品外观	电池表面无划痕、凸点、异物、凹点、脏污, Mylar 无破损、褶皱、掉色、发亮, 参考 QSI-197。	
3	尺寸检查	L (mm)	25.3~27.00	
		W(mm)	21.60~22.60	
		T(mm)	4.35~4.75	
4	性能检查	OCV	60% SOC : 3.92~3.99V 30%SOC : 3.75~3.80V	
		IMP	$\leq 195 \text{ mohm}$	
		充电/放电	充电/放电功能正常。	
		放电过流保护电流 (ODCP)	2.0~3.75A	
		短路保护	短路保护功能正常。	
5	重量	重量	$4.95 \pm 0.25 \text{ g}$	
6	性耐性	焊接拉力	Al: $\geq 8\text{N}$ Ni: $\geq 20 \text{ N}$	
		橡皮擦拭	将橡皮放在丝印面上, 压力 500g, 丝印面摩擦 10 次, 喷码摩擦 5 次 (速度: 42 次/min), 能够识别。	
		HTHH	满充状态 60°C, 90%湿度	

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			测试时间：14 天。 T≤8%mm（静置 2H 后）																																			
	容量		常规电芯：环境温度 22℃±1℃，1C 充电，0.02C 截止，放电 0.2C 截止电压 2.75V. 最小容量：23℃±2℃，0.2C 充电，0.02C 截止，放电 0.2C 截止电压 2.75V. 容量≥101%（最小值）																																			
	冷热冲击		4.25V 状态下，-40℃（30 分钟）~85℃（30 分钟）96 Cycle T≤8%mm（静置 2H 后）																																			
	拆解检查		参考 QSI-SSE 拆解标准																																			
	XRF		<table><tr><td rowspan="2">No.</td><td rowspan="2">检测项目 《检测标准》</td><td rowspan="2">检测标准 (ppm,重量百分比,mg/kg)</td><td colspan="8">检测范围</td><td rowspan="2">备注</td></tr><tr><td>Cd</td><td>Pb</td><td>As</td><td>Cr</td><td>Br</td><td>Cl</td><td>Sb</td><td>Sn</td><td>Sept limit</td></tr><tr><td></td><td></td><td></td><td>500/700</td><td>700/700</td><td>700</td><td>700</td><td>50/5000</td><td>50/5000</td><td>700</td><td>50/5000</td><td>无/无</td><td></td></tr></table>	No.	检测项目 《检测标准》	检测标准 (ppm,重量百分比,mg/kg)	检测范围								备注	Cd	Pb	As	Cr	Br	Cl	Sb	Sn	Sept limit				500/700	700/700	700	700	50/5000	50/5000	700	50/5000	无/无		
No.	检测项目 《检测标准》	检测标准 (ppm,重量百分比,mg/kg)	检测范围								备注																											
			Cd	Pb	As	Cr	Br	Cl	Sb	Sn		Sept limit																										
			500/700	700/700	700	700	50/5000	50/5000	700	50/5000	无/无																											
	TVOC		TVOC(Volatile Organic Compounds Test) ≤16PPM																																			

9.0 Pack QCP and MPCP

QUALITY CONTROL FLOW CHART (Manual Line)						DOC.NO.:	QCFC-SSEWU68		
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MATERIAL	PROCESS SN	PROCESS NAME	PRODUCTPROCESS CONTROL PARAMETER	CONTROL SPECIFICATION	SAMPLING QTY FREQUENCY	CONTROL METHOD	RECORD	RESP. DEPT.	FEED BACK
Remark: *品质控制关键工序 /CTQ ! 功能控制关键工序 /CTF									
表示一般流程工序, Normal process									
表示检测监控工序 /Inspection process									
表示起始工序, /Start of process									
表示终止工序 /End of process									
成品组装 Product Assembly									
	1	Label打印加工 Label printing	1.外观Appearance 2.位置position 3.尺寸Dimension	1.内容及尺寸参考移印图纸/Content and dimension refer to dwg: SSEWU68-E11/12 2.操作参考(Refer to):SOP-SSEWU68	1.100% (MFG) 2.10pcs/2Hours (QA) 3.3pcs/Shift (QA)	Label 打印设备 Label printing machine	1.直通率(yield report) 2.QA巡检表 (QA Daily Report)	MFG/QA	QA/AME
CELL	2*	电芯外观检查(CTQ-PL) Cell incoming inspection(CTQ-PL)	1.外观Appearance 2.外观环境 (Visual condition)	1. 外观参考 (Refer to)QSI-197 2.外观环境亮度要求(light control.) 800~1200 Lux	1.100% (MFG) 2.10pcs/2Hours (QA)	1.目测(Visual check) 2.照度计 (light measure)	1.直通率 Yield report 2.QA巡检表 QA Daily Report	MFG/QA	SQE
	3!	电压内阻测试(CTF-PL) Cell Voltage Impedance measuring(CTF-PL)	1. 电压/OCV 2.内阻/ Impedance	1. 参考(Refer to): WI-SSEWU68 2. 需要有不良tray 放不良品 (NG sample put into NG tray)	1.100% (MFG) 2.1time/Shift for master check.(IPQA)	内阻测试仪/测试夹具 Impedance tester/ fixture	1.直通率(yield report) 2.首件记录表 (FAI Record) 3. BIS Master Record	MFG/QA	QA/PE
	4	极耳冲切 Tab cutting	1.外观(Appearance) 2.设备气压(Air pressure of Equipment)	1.外观要求(appearance): 毛刺长度(burr Length)≤0.20mm 2.操作指引 (Refer to WI-194/SOP-SSEWU68) : 3.气压(Air pressure):0.4±0.1MPa	1.100% (MFG) 2.5pcs/2Hours (QA)	1.冲切机冲切夹具 Cutting machine and fixture 2.目视Visual check	1.直通率 Yield report 2.夹具点检表 fixture check record	MFG/QA	MFG/AME
	5	极耳整形 Tab shaping	1. 外观&尺寸(Appearance&Dimension) 2.气压 (air pressure)	1.电芯极耳长度规格(cell Tab length): 28.65±0.3 mm, 后端定位 2.整形后需平整 (flatness required) , 毛刺长度(burr Length)≤0.20mm 3.气压(Air pressure):0.2±0.1MPa	1.100% (MFG) 2.5pcs/2Hours (QA)	1.2.5次元抽检(second element Sample) (Flatness machine) 2.目视Visual check 3.极耳整形机	1. 直通率 (Yield rate) 2. 夹具点检表/fixture check record 2. QA巡检表 (QA Daily Report)	MFG/QA	MFG/AME
PCBA	6*	激光焊接 (CTQ-PL) Laser welding (CTQ-PL)	1.设备参数equipment parameter 2.拉力测试&焊接位置Pull Strength Test&Welding position	1.拉力Pull :Ni ≥20N,Al ≥8N; 2.设备参数: AL:峰值,0.5~0.8KW,脉宽: 3.5~4.5ms 能量: 1. 0~4.0J Ni : 峰值,0.6~0.9KW,脉宽,3.5~4.5ms. 能量1~5.0J Parameters :Al: Peak value,0.5~0.8kw,Time,3.5~4.5ms, Power:1. 0~4.0J Ni: Peak value,0.6~0.9KW,Time,3.5~4.5ms ,Power:1. 0~5.0J	1.3pcs/Shift (QA) 2.1pcs/2Hours(QA)	1.拉力测试仪/Pull Strength Tester 2.目测/Visual Check 3.激光焊接机 /Laser welding machine 4.SSEWU68激光焊夹具 /fixture	1.首件记录表/FAI record; 2.QA巡检表/QA Daily Report 3.直通率/Yield report 4.LMR SPC控制图 5.设备点检表/Mechine check record	MFG/QA	MFG/QA
	7	焊点外观检查 Laser welding spot inspection	1. 外观(Appearance) 2. 外观环境(Visual condition)	1. 外观环境亮度要求(light control.) 800~1200 Lux. 2. 焊点外观参考 (Refer to)QSI-197	1.100% (MFG) 2.10pcs/2Hours(QA) 3.5pcs/shift X-ray inspection(QA)	1.10X放大镜(10XMagnifier) 2.照度计 (light measure) 3.X-ray 设备/X-ray machine	1.直通率 Yield report 2.QA巡检表 QA Daily Report 3.X-Ray记录清单 X-Ray record list	MFG/QA	MFG/QA
	8	弯折L型镍片 Bending L-Type nickel plate	1.外观 Appearance	1.折弯后镍片需平整; Nickel plate after bending required flat. 2.操作参考SOP-SSEWU68/ Operatin refer to :SOP-SSEWU68	1.100% (MFG) 2.10pcs/2Hours(QA)	1.目测/Visual check 2.弯折L型镍片夹具 Bending L-type nickel plate fixture	1.QA巡检表 QA Daily Report 2.夹具点检表 fixture check record	MFG/QA	MFG/QA
Nomex	9*	贴杜邦纸 (CTQ-PL) Sticking Nomex	1. 外观(Appearance) 2. 位置/ position	1.杜邦纸与PCBA平行, 完全覆盖PCBA silicone with PCBA parallel, fully covered with PCBA 2.操作参考SOP-SSEWU68/ Operatin refer to :SOP-SSEWU68	100%(MFG)	1.目测/Visual check 2. SSEWU68贴杜邦纸夹具/fixture	1.直通率Yield report 2.夹具点检表 fixture check record	MFG	MFG/AME
	10	弯折极耳 Cell tab bending	1.外观 Appearance 2.尺寸 Dimension	1. 弯折后PCBA嵌入在电芯顶封区, 电池厚度、长度不超标: 26.05±0.3mm After folding PCBA laid in cell top sealant,pack thickness and length within Spec. 2. Regularly check fixture dimension, and make record./定期检查夹具尺寸并作记录 3. Don't damage FPCB/不能损伤FPCB	1.100% (MFG) 2.5pcs/2Hours(QA)	弯折极耳夹具 Cell tab folding fixture	1.QA巡检表/QA Daily Report 2.夹具点检表 fixture check record	MFG/QA	MFG/QA
Mylar	11	贴头部Mylar Stick top mylar	1.外观/Appearance 2.位置/position	1.外观标准参考:QSI-197/Refer To: QSI-197. 2.操作参考SOP-SSEWU68/ Operatin refer to :SOP-SSEWU68	100% (MFG)	1.目测/Visual check 2. 贴Mylar夹具/stick Mylarfixture	1.直通率/Yield report 2.夹具点检表/Fixture check record	MFG	MFG
	12	包头部Mylar Taping with mylar	1.外观/Appearance 2.位置/position	1.外观标准参考:QSI-197/Refer To: QSI-197. 2.操作参考SOP-SSEWU68/ Operatin refer to :SOP-SSEWU68	100% (MFG)	目测 Visual check	NA	MFG	QA
Label	13	贴Label (Labe pasting)	1.外观/Appearance 2.位置/position	1、平整,无气泡,褶皱(smooth,no bubbles and wrinkle) 2、作业参考(Operate refer to):SOP-SSEWU68	100%(MFG)	目测/贴label夹具 (Visual check, Paste label fixture)	NA	MFG	PE
	14	关联条码 Barcode linking	Barcode Content 条码内容	Barcode 有效、可识别, 参考: SOP-SSEWU68 Barcode Readable, Refer to SOP-SSEWU68	100% (MFG)	扫描仪、BIS系统 / Scanner, BIS system	1.直通率/Yield Rate 2. BIS测试记录/BIS record	MFG	QA/AME

QUALITY CONTROL FLOW CHART						DOC.NO.:	QCFC-SSEWU68		
						REV.:	B		
						PAGE:	3	OF	3
MATERIAL	PROCESS S/N	PROCESS NAME	PRODUCTPROCESS CONTROL PARAMETER	CONTROL SPECIFICATION	SAMPLING QTY /FREQUENCY	CONTROL METHOD	RECORD	RESP. DEPT.	FEEDBACK
Remark: *品质控制关键工序 /CTQ ! 功能控制关键工序 /CTF  表示一般流程工序  表示检测监控工序  表示起始工序  表示终止工序									
成品组装 / Product Assembly									
	15	包label (Label wrapping)	外观.位置(Appearance,Position)	1、作业参考(Operate refer to):SOP-SSEWU68 2、平整.无气泡.褶皱(smooth,no bubbles and wrinkle)	1.100%(MFG)	NA	NA	MFG	PE
	16!	成品厚度测试 (CTF-PL) thickness check (CTF-PL)	1.pack area thickness(pack整体厚度) 2.压力Pressure 3.气压Air pressure	1. pack area thickness(pack整体厚度): 4.65±0.1/-0.3 mm 2.Pressure: 500±/-50g 3.气压(Air pressure):0.3±0.1MPa	1. 100% (MFG) 2. 5pcs/2 Hours(QA)	PPG (MFG) ; 卡尺 (QA) /check fixture ,PPG ,Callipers	1. 直通率 /Yield rate 2. QA巡检表 /QA Daily Report 3.设备、夹具点检表 /Fixture check record	MFG/QA	MFG/QA
	17!	成品功能测试 (CTF-PL) Final product test (CTF-PL)	测试项目、参数 Test items, Key Parameters	1. 不得漏测, 不得扫A测B, 测试参数参照 WI-SSEWU68 作业参考: SOP-SSEWU68 参考(Refer to): WI-SSEWU68 2. 需要有不良tray 放不良品 (NG sample put into NG tray)	1.100% (MFG) 2.1time/Shift for master check.(IPQA)	锂电池综合测试仪 /成品测试仪 /Li-ion integrated tester	1. BIS测试记录、直通率、QA巡检表 /BIS test record, yield report, QA report 2.Master Record	MFG/QA	QA/TE
	18	成品漏液测试 Pack leakage test	1.气压/Pressure 2.保压时间/Holding time 3.检测时间/test time	参考SOP-SSEWU68 /Refer to SOP-SSEWU68	1. 100% leakage test (MFG) 2.1 time/Shift for master check.(AME)	Leakage tester	1.直通率 /Yield rate	MFG	MFG/PE/AME
	19!	成品长宽及CCD外观检查 (CTF-PL) Battery length & width dimension and golden finger check (CTF-PL)	1.成品长、宽检查 Battery length&width inspection 2.金手指外观 Golden finger inspection	1.成品尺寸参考图纸: SSEWU68-G01/Battery dimension refer to drawing:SSEWU68-G01 2.参考 QSI-197 Refer to QSI-197	1.100% (MFG) 2. 5pcs/2 Hours(QA)	1.成品长宽尺寸检查夹具、卡尺/Battery length and width, Connector position check fixture, callipers 2.CCD 测试仪 /CCD tester	1.直通率/Yield rate 2. QA巡检表/QA Daily Report	MFG/QA	MFG/QA/PE
	20	FPC弯折 FPC bending shaping	1. 外观 /Appearance 2.连接器位置 /Connector position	1.FPC需弯折到位, 不能损伤FPC, 整形后FPC弯折区域无油墨脱落 /don't damage FPC and FPC without ink peeling in the bending area after plasting. 2.操作参考SOP-SSEWU68/ Operatin refer to :SOP-SSEWU68	1.100%(MFG) 2.5pcs/2 Hours(QA)	1.目测/Visual check 2. 成型FPC夹具 FPC folding fixture	1. 直通率 /Yield rate 2. QA巡检表 /QA Daily Report 3.设备、夹具点检表 /Fixture check record	MFG/QA	MFG/QA/PE/AME
FPC adhesive	21	贴FPC背胶 Connector stick adhesive	1.外观/Appearance	操作参考SOP-SSEWU68/ Operatin refer to :SOP-SSEWU68	100% (MFG)	目测 Visual check	NA	MFG	MFG/QA
	22	成品外观检查 /Final product appearance inpection	1. 外观/Appearance 2. 尺寸/Dimension 3.外观环境/Visual condition	1.外观检查参考: ;QSI-197 用无尘布清洁外观, 无划痕、破损等 /Appearance checking standard refer to: ;QSI-197 Clean with the cloth, should be no scratch and crack. 2.外观环境亮度要求(light control.) 800-1200 Lux	1.100% (MFG) 2.10pcs/2Hours(QA) 3.5pcs/2 Hours(QA) X-ray inspection	1.目测/Visual check 2.照度计/light measure 3.X-ray 设备/X-ray machine	1.直通率/Yield rate 2.QA巡检表/QA Daily Report 3.X-Ray记录清单 X-Ray record list	MFG/QA	MFG/QA
	23	扫描条码 /Scanning barcode	Barcode记录 /Barcode record	纸箱Code与箱内Pack Barcode对应, 且留有记录; /Box and Pack barcode corresponding,preserving record.	100% (MFG)	扫描仪, 电脑 /Scanner/PC	Barcode记录表 Barcode record	MFG	MFG/TE
	24	包装 /Packing	包装方法, 装箱数量 /Packing method, Qty.	参考SOP-SSEWU68 /Refer to SOP-SSEWU68	1.100% (MFG) 2.1time/4 hour	目测 /Visual check	1.N/A 2.QA巡检表 /QA Daily Report	MFG/QA	MFG/AME
	25	OQA 检查 OQA inspection	外观, 功能, 尺寸 Appearance,function,Dim.	Electrical spec(电气规格): WI-SSEWU68 Visual (外观):QSI-197 Dim.(尺寸): SSEWU68-G01	WI-SSEWU68 使用 Critical /Major /Min = 0 /0 /0.25	目检/成品测试仪/卡尺 Visual/battery tester/callipers	QA 出货报告 OQA report	QA	PE/MFG
	26	成品出货检查 / Outgoing inspections	包装、外观、电压、内阻测试 /Packing, Appearance, Voltage, Impedance test	参考: WI-SSEWU68 /Refer to and WI-SSEWU68	AQL II :0.25	目测、卡尺、成品测试仪等 /Visual check, callipers and integrated tester, etc.	成品出货检验报告 OQC report	QA	QA/MFG/AME
	27	入库 /Storing	数量/Part number /Qty, Part number	参考PO /Refer to PO	N/A	目测 /Visual check	N/A	N/A	N/A

QUALITY CONTROL FLOW CHART (Auto Line)						DOC.NO.:	QCFC-Modularization SSEWU68		
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MATERIAL	PROCESS SN	PROCESS NAME	PRODUCTPROCESS CONTROL PARAMETER	CONTROL SPECIFICATION	SAMPLING QTY FREQUENCY	CONTROL METHOD	RECORD	RESP. DEPT.	FEED BACK
Remark: *品质控制关键工序 /CTQ !功能控制关键工序 /CTF									
表示一般流程工序, Normal process									
表示检测监控工序 /Inspection process									
表示起始工序, /Start of process									
表示终止工序 /End of process									
成品组装 Product Assembly									
	1	Label打印加工 Label printing	1.外观Appearance 2.位置position 3.尺寸Dimension	1.内容及尺寸参考移印图纸/Content and dimension refer to dwg: SSEWU68-E11/12 2.操作参考(Refer to):SOP-Modularization SSEWU68	1.100% (MFG) 2.10pcs/2Hours (QA) 3.3pcs/Shift (QA)	Label 打印设备 Label printing machine	1.直通率(yield report) 2.QA巡检表 (QA Daily Report)	MFG/QA	QA/AME
CELL	2*	电芯外观检查(CTQ-PL) Cell incoming inspection(CTQ-PL)	1.外观Appearance 2.外观环境 (Visual condition)	1. 外观参考 (Refer to)QSI-197 2.外观环境亮度要求(light control.) 800~1200 Lux	1.100% (MFG) 2.10pcs/2Hours (QA)	1. 目测(Visual check) 2.照度计 (light measure)	1.直通率 Yield report 2.QA巡检表 QA Daily Report	MFG	SQE
	3!	自动测试&裁切&整形(CTF-PL) Cell Voltage Impedance measuring&Tab cutting&Shaping(CTF-PL)	测试/measuring: 1. 电压/OCV 2.内阻/ Impedance	1. 参考(Refer to): SOP-Modularization SSEWU68 2. 需要有无不良tray 放不良品 (NG sample put into NG tray)	1.100% (MFG) 2.1time/Shift for master check.(IPQA)	mini cell 极耳剪切&整形&电压测试联合机 Voltage Impedance measuring、Tap cutting 、 Tap shaping equipment	1.直通率(yield report) 2. 首件记录表 (FAI Record) 3. BIS Master Record	MFG/QA	QA/PE
			冲切/Tab cutting: 1.外观&尺寸(Appearance&Dimension)	1.外观要求(appearance): 毛刺长度(burr Length)≤0.20mm	1.100% (MFG) 2.5pcs/2Hours (QA)	1.mini cell 极耳剪切&整形&电压测试联合机 Voltage Impedance measuring、Tap cutting 、 Tap shaping equipment 2.目视Visual check	1.直通率/Yield report 2.设备点检表 Mechine&fixture check record	MFG	MFG/AME
			整形/Tab shaping: 1. 外观(Appearance)	1.整形后需平整 (flatness required) , 毛刺长度(burr Length)≤0.20mm 2.电芯极耳长度规格(cell Tab length): 28.65±0.3 mm	1.100% (MFG) 2.5pcs/2Hours (QA)	1.mini cell 极耳剪切&整形&电压测试联合机 Voltage Impedance measuring、Tap cutting 、 Tap shaping equipment	1.直通率/Yield report 2.QA巡检表 QA Daily Report	MFG/QA	MFG/AME
PCBA	4*	自动激光焊接&焊点外观检查 (CTQ-PL) Laser welding&inspection (CTQ-PL)	激光焊接/Laser welding: 1.设备参数/equipment parameter 2.拉力测试&焊接位置/Pull Strength Test&Welding position	1.拉力Pull :Ni ≥20N,Al ≥8N; 2.设备参数: AL:峰值,0.5~0.8KW,脉宽: 3.5-4.5ms 能量: 1. 0~4.0J Ni: 峰值,0.6~0.9KW,脉宽,3.5-4.5ms 能量1~5.0J Parameters :Al: Peak value,0.5~0.8kw,Time,3.5~4.5ms, Power:1. 0~4.0J Ni: Peak value,0.6~0.9KW,Time,3.5~4.5ms ,Power:1. 0~5.0J	1.3pcs/Shift (QA) 2.1pcs/2Hours(QA)	1.拉力测试仪/Pull Strength Tester 2.目测/Visual Check	1.首件记录表/FAI record; 2.QA巡检表/QA Daily Report 3.直通率/Yield report 4.I-MR SPC控制图 5.设备点检表/Mechine check record	MFG/QA	MFG/QA
			焊点检查/ Laser welding spot inspectio: 1. 外观(Appearance)	1. 焊点外观参考 (Refer to)QSI-197	1.100% (MFG) 2.10pcs/2Hours(QA) 3.5pcs/shift X-ray inspection(QA)	1.mini cell 激光焊接机/Laser welding machine 2.X-ray 设备/X-ray machine	1.直通率 Yield report 2.QA巡检表 QA Daily Report 3.X-Ray记录清单 X-Ray record list	MFG/QA	MFG/QA
	5	弯折L型镍片 Bending L-Type nickel plate	1.外观 Appearance 2.尺寸 Dimension	1.折弯后镍片需平整: Nickel plate after bending required flat. 2. 检查夹具尺寸并记录Regularly check fixture dimension, and make record.	1.100% (MFG) 2.10pcs/2Hours(QA)	1. 目测/Visual check 2. 弯折L型镍片夹具 Bending L-type nickel plate fixture	1.QA巡检表 QA Daily Report 2. 夹具点检表 fixture check record	MFG/QA	MFG/QA
Nomex	6*	贴杜邦纸 (CTQ-PL) Sticking Nomex	1. 外观(Appearance) 2. 位置/ position	1.杜邦纸与PCBA平行, 完全覆盖PCBA silicone with PCBA parallel, fully covered with PCBA 2.操作参考SOP-Modularization SSEWU68/ Operattin refer to :SOP-Modularization SSEWU68	100%(MFG)	目测/Visual check	1.直通率Yield report 2.夹具点检表 fixture check record	MFG	MFG
	7	弯折极耳 Cell tab bending	1.外观 Appearance 2.尺寸 Dimension	1. 弯折后PCBA放入在电芯顶封区, 电池长度不超标: 26.05±0.3mm After folding PCBA laid in cell top sealant,pack length within Spec. 2. 定期检查夹具尺寸并作记录/Regularly check fixture dimension, and make record. 3. 不能损伤PCBA/ Don't damage PCBA.	1.100% (MFG) 2.5pcs/2Hours(QA)	弯折极耳夹具 Cell tab folding fixture	1.QA巡检表/QA Daily Report 2. 夹具点检表 fixture check record	MFG/QA	MFG/QA
Mylar	8	贴头部Mylar Stick top mylar	1.外观/Appearance 2.位置/position	1.外观标准参考:QSI-197/Refer To: QSI-197. 2.操作参考SOP-Modularization SSEWU68/ Operattin refer to :SOP-Modularization SSEWU68	100% (MFG)	1. 目测/Visual check 2. 贴Mylar夹具/stick Mylarfixture	1.直通率/Yield report 2. 夹具点检表/Fixture check record	MFG	MFG
	9	包头部Mylar Taping with mylar	1.外观/Appearance 2.位置/position	1.外观标准参考:QSI-197/Refer To: QSI-197. 2.操作参考SOP-Modularization SSEWU68/ Operattin refer to :SOP-Modularization SSEWU68	100% (MFG)	目测 Visual check	NA	MFG	QA
Label	10	自动条码链接&贴、包Label Barcode linking&Label pasting&Label wrapping	条码链接/Barcode linking: 1.Barcode Content 条码内容 2.卡站机制点检 Station check	1.Barcode 有效、可识别, 参考: SOP-Modularization SSEWU68 Barcode Readable, Refer to SOP-Modularization SSEWU68 2.可以正常卡站: CELL,Weld-check Check station accomplished: CELL,Weld-check	100% (MFG) 1 time/Shift (AME)	mini cell 标准贴label机、BIS系统 /Label paste machine、BIS system	1.直通率/Yield Rate 2. BIS测试记录/BIS record 3.卡站测试点检表/Station check record	MFG/AME	QA/AME
		贴Label/Labe pasting: 1.外观,位置(Appearance,Position)	1、 作业参考(Operate refer to):SOP-Modularization SSEWU68 2、 平整,无气泡,褶皱(smooth,no bubbles and wrinkle)	100%(MFG)	目测/mini cell 标准贴label机 (Visual check, Label paste machine)	NA	MFG	AME	
		包label/Label wrapping 外观,位置(Appearance,Position)	1、 作业参考(Operate refer to):SOP-Modularization SSEWU68 2、 平整,无气泡,褶皱(smooth,no bubbles and wrinkle)	100%(MFG)	NA	NA	MFG	MFG/PE	

QUALITY CONTROL FLOW CHART						DOC.NO.:	QCFC-Modularization SSEWU68		
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MATERIAL	PROCESS S/N	PROCESS NAME	PRODUCTPROCESS CONTROL PARAMETER	CONTROL SPECIFICATION	SAMPLING QTY /FREQUENCY	CONTROL METHOD	RECORD	RESP. DEPT.	FEEDBACK
Remark: *品质控制关键工序 /CTQ ! 功能控制关键工序 /CTF									
○ 表示一般流程工序, Normal process ◇ 表示检测监控工序 /Inspection process ▽ 表示起始工序, /Start of process △ 表示终止工序 /End of process									
成品组装/ Product Assembly									
	11!	自动成品尺寸检查 (CTF-PL) Product size check (CTF-PL)	厚度: 1.pack area thickness(pack整体厚度) 2.压力Pressure	1.成品尺寸参考图纸: SSEWU68-G01/Battery dimension refer to drawing:SSEWU68-G01 2.Pressure: 500+/-50g	1. 100% (MFG) 2. 5pcs/2 Hours(QA)	1.mini cell 长宽厚检测机 (MFG) /Product size measure machine 2.卡尺 (QA) /Callipers	1.直通率 /Yield rate 2. QA巡检表 /QA Daily Report 3.设备点检表 /Machine check record	MFG/QA	MFG/QA
			长宽: 1.成品长、宽检查 Battery length&width inspection	1.成品尺寸参考图纸: SSEWU68-G01/Battery dimension refer to drawing:SSEWU68-G01	1.100% (MFG) 2. 5pcs/2 Hours(QA)	1.mini cell 长宽厚检测机 (MFG) /Product size measure machine 2.卡尺 (QA) /Callipers	1.直通率/Yield rate 2. QA巡检表/QA Daily Report 3.设备点检表 /Machine check record	MFG/QA	MFG/QA
			卡站机制点检 Station check	可以正常卡站: mapping Check station accomplished: mapping	1 time/Shift (AME)	目测 Visual check	1.卡站测试点检表 /Station check record	AME	AME
	12!	成品功能测试 (CTF-PL) Final product test (CTF-PL)	1.测试项目、参数 Test items, Key Parameters 2.卡站机制点检 Station check	1. 不得漏测, 不得扫A测B, 测试参数参照 WI-SSEWU68 作业参考: SOP-Modularization SSEWU68 参考(Refer to): WI-SSEWU68 2. 需要不良tray 放不良品 (NG sample put into NG tray) 3.可以正常卡站: mapping,pack-size Check station accomplished: mapping,pack-size	1.100% (MFG) 2.1time/Shift for master check (IPQA) 3.1 time/Shift (AME)	锂电池综合测试仪/成品测试仪 /Li-ion integrated tester	1.直通率记录、直通率、QA巡检表 /BIS test record, yield report, QA report 2.Master Record 3. 卡站测试点检表 /Station check record	MFG/QA/AME	QA/TE/AME
	13	成品漏液测试 Pack leakage test	1.气压/Pressure 2.保压时间/Holding time 3.检测时间/test time 4.卡站机制点检 Station check	1.参考SOP-Modularization SSEWU68 /Refer to SOP-Modularization SSEWU68 2.可以正常卡站: FT Check station accomplished: FT	1. 100% leakage test (MFG) 2.1 time/Shift (AME)	Leakage tester	1.直通率 /Yield rate 2.卡站测试点检表 /Station check record	MFG/AME	MFG/PE/AME
	14!	FPC弯折&CCD外观检查 (CTF-PL) FPC bending shaping &Golden finger check (CTF-PL)	1.FPC外观 FPC Appearance 2.连接器位置 Connector position 3.金手指外观 Golden finger inspection	1.FPC需弯折到位, 不能损伤FPC, 整形后FPC弯折区域无油墨脱落 /don't damage FPC and FPC without ink peeling in the bending area after plasting. 2.操作参考SOP-Modularization SSEWU68/ Operattin refer to :SOP-Modularization SSEWU68 3.参考 QSI-197 Refer to QSI-197	1.100% (MFG) 2.100%(MFG) 3.5pcs/2 Hours(QA)	1.目测/Visual check 2.成型FPC夹具 FPC folding fixture 3.CCD 测试仪 /CCD tester	1. 直通率 /Yield rate 2. QA巡检表 /QA Daily Report 3. CCD 测试记录 /Fixture check record	MFG/QA	MFG/QA/PE/AME
FPC adhesive	15	贴FPC背胶 Connector stick adhesive	1.外观/Appearance	操作参考SOP-Modularization SSEWU68/ Operattin refer to :SOP-Modularization SSEWU68	100% (MFG)	目测 Visual check	NA	MFG	MFG/QA
	16	成品外观检查 /Final product appearance inspection	1. 外观/Appearance 2.外观环境/Visual condition	1.外观检查参考: :QSI-197 用清洁布清洁外观, 无划痕、破损等 /Appearance checking standard refer to: :QSI-197 Clean with the cloth, should be no scratch and crack. 2.外观环境亮度要求(light control.) 800~1200 Lux	1.100% (MFG) 2.10pcs/2Hours(QA) 3.5pcs/2 Hours(QA) X-ray inspection	1.目测/Visual check 2.照度计/light measure 3.X-Ray 设备/X-ray machine	1.直通率/Yield rate 2.QA巡检表/QA Daily Report 3.X-Ray记录清单 X-Ray record list	MFG/QA	MFG/QA
	17	扫描条码 /Scanning barcode	1.Barcode记录 /Barcode record 2.卡站机制点检 Station check	1.纸箱Code与箱内Pack Barcode对应, 且留有记录; /Box and Pack barcode corresponding,preserving record. 2.可以正常卡站: mapping,pack-size,FT,League-test Check station accomplished: mapping,pack-size,FT,League-test	1.100% (MFG) 2.1 time/Shift (AME)	扫描仪, 电脑 /Scanner/PC	1.Barcode记录表 Barcode record 2.卡站测试点检表 /Station check record	MFG/AME	MFG/TE/AME
	18	包装 /Packing	包装方法, 装箱数量 /Packing method, Qty.	参考SOP-Modularization SSEWU68 /Refer to SOP-Modularization SSEWU68	1.100% (MFG) 2.1time/4 hour	目测 /Visual check	1.N/A 2.QA巡检表 /QA Daily Report	MFG/QA	MFG/AME
	19	OQA 检查 OQA inspection	外观, 功能, 尺寸 Appearance,function,Dim.	Electrical spec(电气规格): WI-SSEWU68 Visual (外观):QSI-197 Dim.(尺寸): SSEWU68-G01	WI-SSEWU68 使用 Critical /Major /Min = 0 /0 /0.25	目检/成品测试仪/卡尺 Visual/battery tester/callipers	QA 出货报告 OQA report	QA	PE/MFG
	20	成品出货检查 / Outgoing inspections	包装、外观、电压、内阻测试 /Packing, Appearance, Voltage, Impedance test	参考 : WI-SSEWU68 /Refer to and WI-SSEWU68	AQL II :0.25	目测、卡尺、成品测试仪等 /Visual check, callipers and integrated tester, etc.	成品出货检验报告 OQC report	QA	QA/MFG/AME
	21	入库 /Storing	数量/Part number /Qty, Part number	参考PO /Refer to PO	N/A	目测 /Visual check	N/A	N/A	N/A

Battery Pack 단위공정 점검 현황 (Manual Line)

NO	공정명 工序名称	산포유발인자	실물 균일품질 관리기준 (Spec) 实物均一品质管理基准 (Spec)	측정방법 测试方法	관리주기 管理周期	기록 记录
IQC	IQC-Cell	Thickness	4.65±0.1/-0.3mm	Refer to WI document	Each Lot	IQC inspection Report
		Width	22.1+/-0.5mm			
		Length	22.8+/-0.7mm			
		OCV	3.94~3.99v			
		IR	3.77~3.80v			
	IQC-PCM	PCB Length	20.6+/-0.15mm			
		PCB Width	5.50+/-0.1mm			
		PCB Thickness	0.8+/-0.1mm			
		FPC thickness	0.15+/-0.03mm			
	IQC-Label	Length	38+/-0.15mm			
		Width	13.8+/-0.1mm			
		Thickness	0.05+/-0.01mm			
	IQC-Nomex	Length	20.8+/-0.2mm			
		Width	10.1+/-0.15mm			
		Thickness	0.1+/-0.02mm			
	IQC-Mylar	Length	40.81+/-0.2mm			
		Width	14.12+/-0.15mm			
		Thickness	0.05+0/-0.01mm			
1	Label printing	Label printing	1.Appearance 2.position 3.Dimension	Visual check Film check	1.100% (MFG) 2.10pcs/2Hours (QA) 3.3pcs/Shift (QA)	1.yield report 2.QA Daily Report
2	Cell of incoming Cosmetic Inpsection	1.Appearance 2.Visual condition	1. Appearance visual refer to:QSI-197 2.light control: 800~1200 Lux	Visual check light measure	100% (MFG) 10pcs/2Hours (QA)	1.yield report 2.QA Daily Report
3	Cell OCV and IR test	1. OCV 2.Impedance	Refer to:WI-SSEWU68	Impedance tester	1.100% (MFG) 2.1time/Shift for master check.(IPQA)	1.yield report 2. FAI Record 3. BIS Master Record
4	Tab cutting	1. Appearance& Dimension	1.Appearance:no burr.	Visual check	1.100% (MFG) 2.5pcs/2Hours (QA)	1.Yield report 2.Fixture check record
			2.Cell Tab length:28.65±0.3mm	Cutting machine and fixture		
			3.Operation instruction	Refer to WI-194		
		2. Air pressure	4. Air pressure:0.4±0.1MPa	Cutting machine and fixture		
5	Tab flatness	1. Appearance 2.Air pressure	1. flatness required: burr Length)≤ 0.20mm 2.Air pressure:0.2±0.1MPa	1.Flatness machine 2.Callipers Sample 3. 2.5 dimention	1.100% (MFG) 2.5pcs/2Hours (QA)	1.yield report 2.QA Daily Report
6	Laser welding	1.equipment parameter	Parameters :Al: Peak value,0.5~0.8kw,Time,3.5~4.5ms, Power:1. 0~4.0J Ni: Peak value,0.6~0.9KW,Time,3.5~4.5ms ,Power:1. 0~5.0J	1. Equipment check	1.3pcs/Shift (QA) 2.1pcs/2Hours(QA)	1.FAI record; 2.QA Daily Report 3.Yield report 4.I-MR SPC
		2.Pull Strength Test&Welding position	2.Pull strength (Ni:Min15N, AL:Min5N)	2. Pull Strength Tester 3.Visual Check		
7	Laser welding spot inspection	Appearance Visual condition	Light control 800~1200 Lux. Refer to QSI-197	1.10XMagnifier 2.Light measure 3.X-ray machine	1.100% (MFG) 2.10pcs/2Hours(QA) 3.5pcs/shift X-ray inspection(OA)	1.Yield report 2.QA Daily Report 3.X-Ray record list
8	Nickel plate Bending	Appearance Dimension	Nickel plate after bending required flat. Regularly check fixture dimension, and make record.	1. Visual check 2. Bending L-type nickel plate fixture	1.100% (MFG) 2.10pcs/2Hours(QA)	1.QA Daily Report 2.Fixture check record
9	Sticking Nomex	1.Appearance 2.position	Silicone with PCBA parallel, fully covered with PCBA Operratin refer to :SOP-SSEWV66	Visual check Stick Label fixture	100% (MFG)	1.Yield report 2.Fixture check record
10	Cell Tab Bending	1. Appearance 2.Dimension	1.Length:26.05±0.3mm 2. Regularly check fixture dimension, and make record.	Visual check Bending Cell tab fixture	1.100% (MFG) 2.5pcs/2Hours(QA)	1.QA Daily Report 2.Fixture check record
11	Stick top mylar	Appearance Position	1.QSI-197/Refer To: QSI-197. 2.Operratin refer to :SOP-SSEWU68	1. Visual check 2. Stick Mylar fixture	100% (MFG)	1.Yield report 2.Fixture check record
12	Taping with mylar	1.Appearance 2.Position	1.QSI-197/Refer To: QSI-197. 2.Operratin refer to :SOP-SSEWU68	Visual check	100% (MFG)	NA
13	Labe pasting	Fixture	1、Operratin refer to :SOP- SSEWU68 2、 Smooth,no bubbles and wrinkle	Visual check, Paste label fixture	100%(MFG)	NA
14	Barcode Linking	Barcode Content	Barcode Readable, Refer to SOP- SSEWU68	Scanner, BIS system	100% (MFG)	1.BIS system 2.Yield Rate

15	Label wrapping	1.Appearance 2.position	1、Operate refer to:SOP-SSEWU68 2、Smooth,no bubbles and wrinkle)	Visual check	100% (MFG)	Yield report
16	Thickness check	pack area thickness Pressure	Dimension Refer to : SSEWU68-G01 Pressure: 500+/-50g	Check fixture ,PPG ,Callipers	1. 100% (MFG) 2. 5pcs/2Hours(QA)	1. Yield rate 2. QA Daily Report 3.Equipment check record
17	Final product test	Test items, key Parameters	Refer to:WI-SSEWU68 NG sample put into NG tray	Li-ion integrated tester	1.100% (MFG) 2. 1time/Shift for master check.(IPQA)	1.BIS test record, yield report 2.Master Record
18	Pack leakage test	1.Pressure 2.Holding time 3.Test time	Refer to SOP-SSE系列漏液检测.	1.100% (MFG) 2.1time/Shift for master check.(AME)	100% (MFG)	Yield rate
19	Battery length & width dimension and golden finger check	Battery length、width、thickness and Connector position,	Battery dimension refer to drawing:SSEWU68-G01	Battery length and width, Connector position check fixture, CCD of Manual	1. 100% (MFG) 2. 5pcs/2 Hours(QA)	1. Yield rate 2. QA Daily Report 3.Equipment check record
20	FPC bending shaping	1. Appearance	1.Don't damage FPC and FPC without ink peeling in the bending area after plasticing. 2.Operratin refer to :SOP-SSEWU68	1.Visual check 2. FPC folding fixture	1.100%(MFG) 2.5pcs/2 Hours(QA)	1. Yield rate 2. QA Daily Report 3. Fixture check record
21	Connector stick adhesive	Appearance	Operratin refer to :SOP-SSEWU68	Visual check	100% (MFG)	NA
22	Final product appearance inspection	1. Appearance 2. Dimension 3. Visual condition	1.Appearance checking standard refer to: ;QSI-197 Clean with the cloth, should be no scratch and crack. 2.light control800~1200 Lux	1.Visual check 2.light measure 3.X-ray machine	1.100% (MFG) 2.10pcs/2Hours(QA) 3.5pcs/2 Hours(QA) X-ray inspection	1.Yield rate 2.QA Daily Report 3.X-Ray record list
23	FQA inspections	Appearance Dimension Visual condition	1.Appearance checking standard refer to: limit sample 2.(light control.) 800~1200 Lux	Visual check Light measure	Critical /Major /Min = 0 /0 /0.25	FQA report
24	Scanning barcode	Barcode record	Box and Pack barcode corresponding.preserving record.	Scanner/PC	100% (MFG)	Barcode record
25	Packing	Packing method, Qty.	Refer to SOP-SSEWU68	Visual check	1> 100% (MFG) 2>1time/4 hour	N/A
26	OQA	Appearance,function,Dim.	Electrical spec: WI-SSEWU68 Visual :QSI-197 Dim.: SSEWU68-G01	Visual/battery tester/callipers	WI-SSEWU68 Critical /Major /Min = 0 /0 /0.25	OQA report
27	Outgoing inspections	/Packing, Appearance, Voltage, Impedance test	Refer to:WI-SSEWU68/SSEWU68-G01	Visual check, callipers and integrated tester, etc.	AQL II :0.25	OQC report
28	Storing	/Qty, Part number	Refer to PO	Visual check	N/A	N/A

Battery Pack 단위공정 점검 현황 (Auto Line)

NO	공정명 工序名称	산포유발인자	실물 균일품질 관리기준 (Spec) 实物均一品质管理基准 (Spec)	측정방법 测试方法	관리주기 管理周期	기록 记录
1	IQC	Cell Thickness	4.81±0.1/-0.2mm	Refer to WI document	Each Lot	IQC inspection Report
		Cell Width	39±0.5mm			
		Cell Length	87.4±0.5mm			
		Cell OCV	3.94~3.99v			
		Cell IR	28±5mΩ			
		PCM PCB Length	37.35±0.15mm			
		PCM PCB Width	2.5±0.10mm			
		PCM PCB Thickness	0.75±0.075mm			
		PCM FPC Length	2.08±0.20mm			
		PCM FPC Width	20.03±0.20mm			
		PCM FPC+Mylar thickness	0.22±0.03mm			
		PCM PCM Length	44.43±0.2mm			
		PCM IR	55mΩ max			
		Holder Length	38.36±0.1mm			
		Holder Width	2.79±0.08mm			
		Holder Thickness	2.82±0.08mm			
		Mylar Length	58.5±0.2mm			
		Mylar Width	14.8±0.15mm			
		Mylar Thickness	0.05 Max			
		Tape Length	79±0.3mm			
		Tape Width	35.5±0.3mm			
		Tape Thickness	0.35±0.05mm			
		Tape Width (White PET)	20.83±0.2mm			
		Rubber Length	37±0.2mm			
		Rubber Width	8.96±0.15mm			
		Rubber Thickness	0.3±0.1mm			
IQC	IQC-Cell	Thickness	4.65±0.1/-0.3mm	Refer to WI document	Each Lot	IQC inspection Report
		Width	22.1+/-0.5mm			
		Length	22.8+/-0.7mm			
		OCV	3.94~3.99v			
		IR	3.77~3.80v			
	IQC-PCM	PCB Length	101±15mΩ			
		PCB Width	20.6+/-0.15mm			
		PCB Thickness	5.50+/-0.1mm			
		FPC thickness	0.8+/-0.1mm			
	IQC-Label	Length	0.15+/-0.03mm			
		Width	38+/-0.15mm			
		Thickness	13.8+/-0.1mm			
	IQC-Nomex	Length	0.05+/-0.01mm			
		Width	20.8+/-0.2mm			
		Thickness	10.1+/-0.15mm			
	IQC-Mylar	Length	0.1+/-0.02mm			
		Width	40.81+/-0.2mm			
		Thickness	14.12+/-0.15mm			
		Thickness	0.05+/-0.01mm			
1	Label printing	1.Appearance 2.position 3.Dimension	1.Content and dimension refer to dwg: SSEWU68-E11/12 2.Refer to):SOP-Modularrization SSEWU68	Label printing machine	1.100% (MFG) 2.10pcs/2Hours (QA) 3.3pcs/Shift (QA)	1.yield report) 2.QA Daily Report
2	Cell incoming inspection(CTQ-PL)	1.Appearance 2.Visual condition	1. Refer to)QSI-197 2.light control. 800~1200 Lux	1. Visual check 2. light measure)	1.100% (MFG) 2.10pcs/2Hours (QA)	1.Yield report 2.QA Daily Report
3	Cell Voltage Impedance measuring&Tab cutting&Shaping(CTF-PL)	measuring: 1. OCV 2. Impedance	1. Refer to: SOP-Modularrization SSEWU68 2. NG sample put into NG tray	Voltage Impedance measuring、Tap cutting、Tap shaping equipment	1.100% (MFG) 2.1time/Shift for master check.(IPQA)	1.yield report 2. FAI Record 3. BIS Master Record
4		Tab cutting: 1.Appearance&Dimension	1.appearance : burr Length≤0.20mm	1.Voltage Impedance measuring、Tap cutting、Tap shaping equipment 2.Visual check	1.100% (MFG) 2.5pcs/2Hours (QA)	1.Yield report 2.Mechine&fixture check record
5		Tab shaping: 1. Appearance	1. flatness required , burr Length≤0.20mm 2.cell Tab length: 28.65±0.3 mm	1.Voltage Impedance measuring、Tap cutting、Tap shaping equipment 2.second element Sample	1.100% (MFG) 2.5pcs/2Hours (QA)	1.Yield report 2.QA Daily Report
6	welding&inspection (CTQ-PL)	Laser welding: 1.equipment parameter 2.Pull Strength Test&Welding position	1.Pull :Ni≥20N,Al≥8N; 2. Parameters :Al: Peak value,0.5~0.8kw,Time,3.5~4.5ms, Power:1. 0~4.0J Ni: Peak value,0.6~0.9KW,Time,3.5~4.5ms ,Power:1. 0~5.0J	1.Pull Strength Tester 2.Visual Check	1.3pcs/Shift (QA) 2.1pcs/2Hours(QA)	1.FAI record; 2.QA Daily Report 3.ield report 4.I-MR SPC 5.Mechine check record
7		Laser welding spot inspectio: 1. Appearance	1. Refer to QSI-197	1.Laser welding machine 2.X-ray machine	1.100% (MFG) 2.10pcs/2Hours(QA) 3.5pcs/shift X-ray inspection(QA)	1.Yield report 2.QA Daily Report 3.X-Ray record list
8	Bending L-Type nickel plate	1.Appearance 2.Dimension	1.Nickel plate after bending required flat. 2. Regularly check fixture dimension, and make record.	1. Visual check 2. Bending L-type nickel plate fixture	1.100% (MFG) 2.10pcs/2Hours(QA)	1.QA Daily Report 2.fixture check record
9	Sticking Nomex	1. Appearance 2. position	1.silicone with PCBA parallel, fully covered with PCBA 2.SOP-Modularrization SSEWU68/ Operratin refer to :SOP-Modularrization SSEWU68	Visual check	100%(MFG)	1.Yield report 2.fixture check record

10	Cell tab bending	1.Appearance 2.Dimension	1. After folding PCBA laid in cell top sealant,pack length within Spec 26.05 ±0.3mm. 2. Regularly check fixture dimension, and make record. 3. Don't damage PCBA.	Cell tab folding fixture	1.100% (MFG) 2.5pcs/2Hours(QA)	1.QA Daily Report 2.fixture check record
11	Stick top mylar	1.Appearance 2.position	1.Refer To: QSI-197. 2.Operratin refer to :SOP-Modularrization SSEWU68	1. Visual check 2. stick Mylarfixture	100% (MFG)	1.Yield report 2.Fixture check record
12	Taping with mylar	1.Appearance 2.position	1.Refer To: QSI-197. 2.Operratin refer to :SOP-Modularrization SSEWU68	Visual check	100% (MFG)	NA
13	Barcode linking&Label pasting&Label wrapping	Barcode linking: 1.Barcode Content 2.Station check	1.Barcode Readable, Refer to SOP-Modularrization SSEWU68 2.CELL,Weld-check Check station accomplished; CELL,Weld-check	Label paste machine, BIS system	100% (MFG) 1 time/Shift (AME)	1.Yield Rate 2. BIS record 3.Station check record
14		Labe pasting: 1.Appearance,Position	1、 Operate refer to:SOP-Modularrization SSEWU68 2、 smooth,no bubbles and wrinkle	Visual check, Label paste machine	100%(MFG)	NA
15		Label wrapping: Appearance,Position	1、 Operate refer to:SOP-Modularrization SSEWU68 2、 smooth,no bubbles and wrinkle	NA	100%(MFG)	NA
16	Product size check (CTF-PL)	1.pack area thickness(2.Pressure	1.Battery dimension refer to drawing:SSEWU68-G01 2.Pressure: 500+/-50g	1.Product size measure machine 2.Callipers	1. 100% (MFG) 2. 5pcs/2 Hours(QA)	1. Yield rate 2. QA Daily Report 3.Machine check record
17		1.Battery length&width inspection	1./Battery dimension refer to drawing:SSEWU68-G01	1.Product size measure machine 2.Callipers	1.100% (MFG) 2. 5pcs/2 Hours(QA)	1.Yield rate 2. QA Daily Report 3.Machine check record
18		Station check	Mapping check station accomplished: mapping	Visual check	1 time/Shift (AME)	1.Station check record
19	Final product test (CTF-PL)	1.Test items, Key Parameters 2.Station check	1. Refer to WI-SSEWU68 Refer to: SOP-Modularrization SSEWU68 Refer to: WI-SSEWU68 2. NG sample put into NG tray 3.mapping,pack-size Check station accomplished; mapping,pack-size	Li-ion integrated tester	1.100% (MFG) 2.1time/Shift for master check.(IPQA) 3.1 time/Shift (AME)	1.BIS test record, yield report, QA report 2. QA Daily Report 3. Station check record
20	Pack leakage test	1.Pressure 2.Holding time 3.test time 4.Station check	1.Refer to SOP-Modularrization SSEWU68 2.FT Check station accomplished; FT	Leakage tester	1. 100% leakage test (MFG) 2.1 time/Shift (AME)	1.Yield rate 2. Station check record
21	Golden finger check (CTF-PL)	1.Golden finger inspection	1.Refer to QSI-197	1.CCD tester	1.100% (MFG)	1.Yield rate 2. QA Daily Report
22	FPC bending shaping	1. Appearance 2.Connector position	1.don't damage FPC and FPC without ink peeling in the bending area after plasticing. 2.Operratin refer to :SOP-Modularrization SSEWU68	1. Visual check 2. FPC folding fixture	1.100%(MFG) 2.5pcs/2 Hours(QA)	1. Yield rate 2. QA Daily Report 3.Fixture check record
23	Connector stick adhesive	1.Appearance	SOP-Modularrization SSEWU68/ Operratin refer to :SOP-Modularrization SSEWU68	Visual check	100% (MFG)	NA
24	Final product appearance inspection	1. Appearance 2.Visual condition	1.Appearance checking standard refer to: ;QSI-197 Clean with the cloth, should be no scratch and crack. 2.light control. 800~1200 Lux	1. Visual check 2.ight measure 3.X-ray machine	1.100% (MFG) 2.10pcs/2Hours(QA) 3.5pcs/2 Hours(QA) X-ray inspection	1.Yield rate 2.QA Daily Report 3.X-Ray record list
25	FQA check	Appearance Position check	Refer to: QSI-197	1. Visual check	Critical /Major /Min = 0 /0 /0.25	QA Daily Report
26	Scanning barcode	1.Barcode record 2.Station check	1.Box and Pack barcode corresponding,preserving record. 2.mapping,pack-size,FT,League-test Check station accomplished: mapping,pack-size,FT,League-test	Scanner/PC	1.100% (MFG) 2.1 time/Shift (AME)	1.Barcode record 2.Station check record
27	Packing	Packing method, Qty.	SOP-Modularrization SSEWU68 /Refer to SOP-Modularrization SSEWU68	Visual check	1.100% (MFG) 2.1time/4 hour	1.N/A 2.QA Daily Report
28	OQA inspection	Appearance,function,Dim.	Electrical spec: WI-SSEWU68 Visual :QSI-197 Dim.: SSEWU68-G01	Visual/battery tester/callipers	WI-SSEWU68 Critical /Major /Min = 0 /0 /0.25	OQA report
29	Outgoing inspections	Packing, Appearance, Voltage, Impedance test	Refer to and WI-SSEWU68	Visual check, callipers and integrated tester, etc.	AQL II :0.25	OQC report
30	Storing	Qty, Part number	Refer to PO	Visual check	N/A	N/A

10. EHM DATA

☐ 作業環境 有害物質 基準 and 試験 結果

Raw materials (adhesive (bond, tape..), rubber, leather, paint, plastic..) or chemical substance which used in the processes may cause VOC(Volatile Organic Compounds) matters such as benzene, toluene, formaldehyde, phosphine-(like)..... So, should follow below management criteria.

Standard 1: Do not use benzene, toluene, formaldehyde, phosphine-like (Yes, No)

Standard 2: Above 4 matters are used in the raw-materials or in the processes; however we manage these 4 matters according to table 1-1 below.

[Table 1-1]

item	list of measurement	Spec (ppm)	Results(ppm)
作業環境 有害物質	TVOC	16.0	0.183
	toluene	16.0	0
	benzene	0.8	0
	formaldehyde	0.08	0
	phosphine(limited to cables)	0.08	0
Measuring equipment	ex)Mini RAE, Gastek detecting tube, GC/MS		
Measuring condition	Q'ty : F-PCB XXpcs		
	Gas Sampling 条件記述 : 25cm×30cm Zipperbag collection after discharging 40℃×30min		
MSDS	Attach MSDS of material which use above 4 有害物質 ex) 1. adhesive, ex) 2. protection vinyl		

☐ Guide line of measuring condition for each part

① The minimum quantity of test part in accordance with following criteria.

(A) HPP 群 : Part included in Unit Box (circuit/mechanical/acessories) : 1ea/3 ℓ

(B) NPC 群 : Part included in Unit Box (circuit/mechanical/acessories) : 1ea/20 ℓ

(C) Packing materials, Bag : 1ea/20 ℓ

※ 3 ℓ Tedlar Bag (or Zipperbag 250 mm×300 mm)

20 ℓ Tedlar Bag (or Zipperbag 500 mm×500 mm)

※ Master Box ≒ 350 mm×300 mm×250 mm ≒ 26 ℓ)

② When test the part, it should be tested within the average MP input time

③ Collect the Gas under "higher than 40℃, after 30 minutes of gas discharging time".

In case testing under room-temperature, gas discharging time should be more than 60 minutes

④ Measuring equipment : Also accept "commercialized detecting tube" and "simplified measuring equipment.

⑤ Control the hazardous material for MP products: between 16ppm as Total VOC.

1. We ATL do not use Benzene and n-Hexane (one or mixed element) in our whole workplace.

2. Application time : from April 1st, 2015

T-voc test result: OK



Battery Size(Cm, Minus area)				Standards Size		Labelling Size(Cm)				Verdict1		불합격		
width		Length		0.0000		Width		Length						
No	SEC CODE	ACTUAL WEIGHT	Product Information (Unit: 100g, Minus area, 100g, 100g)				Material name		Certificate Information		Class 1			
			Supplier Item	Assay Item / Item	Sub Item	Material Name	Organic / Inorganic	Date of Analysis	Analyst	Cd		Pb		
										Detection	Containing	Detection	Containing	
9			0.01024	MTF	Adhesive	Adhesive	Organic	2018.1.12	SGS		0	0	0	
10		0.010	0.00410	MTF	PET Film	PET Film	Organic	2017.12.11	SGS		0	0	0	
11			0.00004	SUNBLO WY	MILK BLACK WY	MILK BLACK WY	Organic	2018.1.18	SGS		0	0	0	
12			0.012	DUPONT	TAB4	TAB4	Organic	2018.1.5	SGS		0	0	0	
13		0.020	0.005	IM	IM467	IM467	Organic	2018.1.16	SGS		0	0	0	
			0.008	MTO	MTON	MTON	Organic	2017.11.15	CTI		0	0	0	
14		0.01	0.01	ONUPENG	Onupeng base	Onupeng base	Organic	2018.8.29	SGS		0	0	0	
4		0.16	0.075	CHEERMO	WHITE PET	WHITE PET	Organic	2018/1/17	SGS		0	0	0	
5			0.08	CHEERMO	Adhesive	Adhesive	Organic	2018/1/17	SGS		0	0	0	
6			0.025	TOYO	VALNDSH	VALNDSH	Organic	2018/5/9	CTI		0	0	0	
7			0.02	TOKA	UV NH BLACK	UV NH BLACK	Organic	2018.1.11	CTI		0	0	0	
15			0.005	DONGVI	Bonding Shield	Bonding Shield	Organic	2018.8.27 2018.8.2	CTI		0	0	0	
16			0.185	HARVEST	WH130	WH130	Inorganic	2018.8.29	CTI		0	0	0	
17			0.003	TAIYO	Marking Ink	Marking Ink	Organic	2018.2.23	SGS		0	0	0	
18			0.0015	UYEMURA	Nemulen NPG-2-A	Nemulen NPG-2-A	Inorganic	2018/1/9	SGS		0	0	0	
19		0.201	0.000	SAMMENKA KELLY	Potassium Autocyclable	Potassium Autocyclable	Inorganic	2018.4.19	SGS		0	0	0	
20			0.012	THINFLEX	Nitrogen Free Covertly	Nitrogen Free Covertly	Inorganic	2018.8.3	SGS		0	0	0	
21			0.01	THINFLEX	THINFLEX-W22	THINFLEX-W22	Inorganic	2018/7/14	SGS		0	0	0	
22			0.003	TAIYO	Solder Braid	Solder Braid	Organic	2018/1/12	CTI		0	0	0	
			0.001	LIANGHENG	F22	F22	Organic	2018/6/29	SGS		0	0	0	
23		0.01	0.01	MIURA	Solder Paste	CM340	Organic	2018.1.11 2018.5.24	POW CTI	14.1	0.00000001	0	0	
24		0.008	0.006	TOYOON	Metall soft Nickel paste	Nickel	Inorganic	2018.5.2	SGS		0	0	0	
25		0.001	0.001	TA-H	RES	Chip Resistor	Inorganic	2017.11.15	SGS	740	0.00000001	0	0	
26		0.0002	0.0002	SAMSUNG	Concave Lactator	75N	Inorganic	2017.11.17	SGS		0	0	0	
27			0.00001			Ag Plating Layer	Inorganic	2018.2.12	SGS		0	0	0	
28			0.00002			Au Plating Layer	Inorganic	2018.2.19	SGS		0	0	0	
29			0.00148			Ni Plating Layer	Inorganic	2018.2.12	SGS		0	0	0	
30			0.00002			Pd Plating Layer	Inorganic	2018.2.13	SGS		0	0	0	
31			0.00004	TATSUTA	W Coated Copper Bonding Wire	W Coated Copper Bonding Wire	Inorganic	2018.10.05	SGS		0	0	0	
32		0.00003	0.00003	TAKAKA	40 Bonding Wire	40 Bonding Wire	Inorganic	2017.12.15	SGS		0	0	0	
33			0.00138	MITSUBA	CHP-A	IC CHP-W	Organic	2017.11.28	SGS		0	0	0	
34			0.00029	MAGMACHIP	CHP-B	Wires	Organic	2018.1.25	SGS		0	0	0	
35			0.000103	FURUKAWA	DAF-TEPE	White Ink Attach Film	Organic	2018.1.13	SGS		0	0	0	
36			0.00007	KYOCERA	Die bonding	Paste	Organic	2017.11.08	SGS		0	0	0	
37			0.00003	AOI	Mold resin	Mold resin	Organic	2018.7.17	SGS		0	0	0	
BATT Total Weight(g)		0.41572	Battery ■ The actual size is the size of the battery pack, then fill (more than 3% of the large area &) Upon detection of hazardous materials ■ fill in part weight, the total weight of the battery required field ■ automatically calculated inside the red box (Formula Modification)						TTL Containing(Total)		0.00000000	0	0	
Hazardous Substances		합격		Content of hazardous substances		Cd	2.129458		Pb	0		Hg	0	

XRF test point

											관			
장비명 XRF		장비 maker UX-310 / E	측정일		2019년 2월 1일							이름	趙王顯	黃龍
			2019-2-1											
No.	측정구명 (원재료명)	분석조건명 (ex. 플라스틱, 금속)	측정결과									Spot-test 보라색	판정	
			Cd 50/70	Pb 200/700	Hg 700	Cr 700	Br 1000	Cl 1000	Sb 700	Sn 1000				
1	Mylar_Molded Surface	ED-XRF	ND	ND	ND	15.7	ND	289.2	ND	ND		PASS		
2	Mylar_Molded Gun	ED-XRF	ND	ND	ND	11.2	ND	ND	391.7	ND		PASS		
3	Product Label Surface	ED-XRF	ND	ND	ND	ND	ND	ND	ND	ND		PASS		
4	Product Label Gun	ED-XRF	ND	ND	ND	ND	ND	ND	ND	ND		PASS		
5	Product Label Mask ink	ED-XRF	ND	ND	ND	ND	ND	ND	ND	ND		PASS		
6	Product Label barcode ink	ED-XRF	ND	ND	ND	28.9	ND	347	ND	ND		PASS		
7	Nomex Surface	ED-XRF	21.3	ND	ND	ND	14.3	306.5	ND	ND		PASS		
8	Nomex Gun	ED-XRF	ND	232.2	ND	ND	ND	176.2	176.2	ND		PASS		
9	Double_sided tape	ED-XRF	ND	ND	ND	ND	ND	ND	ND	ND		PASS		
10	FPC	ED-XRF	53.3	ND	ND	149.4	20.8	ND	ND	56.9		PASS		
11	FPC Mask ink	ED-XRF	ND	114.1	ND	ND	ND	ND	ND	ND		PASS		
12	FPC Goldfinger	ED-XRF	ND	ND	ND	ND	129.1	ND	ND	ND		PASS		
13	FPC Stiffening Plate	ED-XRF	ND	ND	ND	ND	ND	ND	ND	52.1		PASS		
14	FPC Insulating layer (black)	ED-XRF	ND	ND	ND	ND	ND	ND	ND	541.3		PASS		
15	Solder Paste	ED-XRF	ND	ND	ND	ND	ND	ND	ND	348.9		PASS		
16	Metal part_Nickel plate_L	ED-XRF	ND	ND	ND	ND	ND	ND	ND	88.1		PASS		
17	RES	ED-XRF	ND	194.2	ND	ND	ND	305.1	ND	226		PASS		
18	Ceramic capacitor	ED-XRF	ND	ND	ND	ND	ND	ND	ND	159		PASS		
19	IC_Protec	ED-XRF	ND	206.3	ND	222.4	ND	ND	ND	159.1		PASS		
20	Cell	ED-XRF	ND	ND	ND	56.7	ND	442.8	ND	ND		PASS		
21	Cell Ink	ED-XRF	ND	ND	ND	194.9	ND	7	ND	ND		PASS		
22	Cell Tab Ni	ED-XRF	35.4	ND	ND	138.6	ND	ND	ND	ND		PASS		
23	Cell Tab Al	ED-XRF	ND	ND	ND	24.8	ND	ND	ND	ND		PASS		
24	Cell Tab Sealant	ED-XRF	ND	ND	ND	24.8	ND	ND	ND	ND		PASS		
25	Cell barcode ink	ED-XRF	ND	ND	ND	124.5	ND	ND	ND	ND		PASS		

11. Pack Certification

11.1 Certification Summary

Certification	Country	Issued Office	Standard	Issued Date
UL	North America	Refer the report	Refer below detail standard	/
UN 38.3	Globe			Done
GB	China			3/20
KC	Korea			Done
PSE	Japan			Done
CTIA	North America			3/20
CB	CB Group country			Done
BSMI	Taiwan			3/20
CQC	China			3/20
BIS	India			Done
VNTA	Vietnam			3/20

11.2 Certification



中国认可
国际互认
检测
TESTING
CNAS L3767

检测报告

Test Report

报告编号 (Report No.): RTN-UN-1901-4003

样 品 名 称: 锂离子电池

Sample Name: Li-ion battery

样 品 型 号: EB-BR170ABU

Sample Model: EB-BR170ABU

委 托 单 位: 东莞新能源科技有限公司

Consignor: Dongguan Amperex Technology Limited

东莞新能源科技有限公司中心实验室

Dongguan Amperex Technology Limited Central Lab



样品名称 Sample name	锂离子电池 Li-ion battery	测试类别 Test category	委托检测 After testing		
样品型号 Sample model	EB-BR170ABU	样品接收日期 Accepted date	2019-01-28		
样品规格 Sample specification	3.85V 1.03Wh	测试开始日期 Test start date	2019-01-30		
样品数量(个) Sample quantity (pcs.)	48	测试结束日期 Test end date	2019-02-23		
委托单位信息 Consignor Information	委托单位 Consignor	东莞新能源科技有限公司 Dongguan AmpereX Technology Limited			
	委托单位地址 Consignor address	中国广东省东莞市松山湖科技园工业西路1号 West Industrial Road 1#, Songshan Lake Industry Park, Dongguan City, Guangdong Province, P. R. China			
制造商信息 Manufacturer Information	制造商名称 Manufacturer Name	同委托单位 To entrust unit			
	制造商地址 Manufacturer address	同委托单位地址 To entrust unit address			
	电话号码 Telephone Number	/	电子邮箱 E-mail /		
	网址 Website	/			
测试环境条件 Test environment condition	环境温度: 15℃ - 25℃; 环境湿度: 45%~75% Ambient temperature: 15℃ - 25℃; Ambient humidity: 45%~75%				
样品外观 Appearance	银色尼龙/铝/聚丙烯复合膜 Silver nylon/Al/PP compound film				
测试方法和判定标准 Test method and criterion	联合国《关于危险货物运输的建议书 试验和标准手册》 ST/SG/AC.10/11 Rev.6/Amend 1, 38.3 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria ST/SG/AC.10/11 Rev.6/Amend 1, 38.3				
测试项目 Test items	高度模拟、温度试验、振动、冲击、外部短路、挤压、过度充电、强制放电 Altitude simulation, Thermal test, Vibration, Shock, External short circuit, Crush, Overcharge, Forced discharge				
测试结论 Conclusion	经测试, 该样品符合联合国《关于危险货物运输的建议书 试验和标准手册》ST/SG/AC.10/11 Rev.6/Amend 1, 38.3 标准的要求 The sample has passed the test items of UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria ST/SG/AC.10/11 Rev.6/Amend 1, 38.3				
测试人员 Testers	赵志强 陈超				
编制人员 Compiler	陈雅		东莞新能源科技有限公司 中心实验室 Dongguan AmpereX Technology Limited Central Lab (签章) (signature) 签发日期: 2019年2月25日		
审核 Checker	郭佳丽				
批准 Approval	郭佳丽				
	蔡京晶: 技术负责人 Cai JingJing: Technical Director 郭佳丽: 中心主任 Guo Jiali: Center Director				



안전확인신고 증명서

Confirmation Letter of Declaration

신고번호 : YU10211-19005
(Application No.)

신고회사명 : DongGuan Amperex Technology Limited
(Applicant)

주소 : 1 West Industrial Road, North Zone of SSL Sci. Tech. Industry Park,
Dongguan, Guangdong, P.R. China 523808
(Address)

제품명 : 전지
(Product) Battery

기본모델명 : EB-BR170ABU
(Basic Model)

파생모델명 : 없음(None)
(Series Model)

정격/안전기준상의모델구분 : 3.85 Vd.c., 270 mAh
(Rating)

안전기준 : KC 62133(2015-07)
(Standard)

본 확인신고는 제조국명 : 중국

제조업자명 : DongGuan Amperex Technology Limited의 제품에만 해당함

제조공장의 주소 : 1 West Industrial Road, North Zone of SSL Sci. Tech. Industry Park,
Dongguan, Guangdong, P.R. China 523808

「전기용품 및 생활용품 안전관리법 시행규칙」 제28조제1항, 같은 조 제3항, 제29조제2항 또는 제34조제2항에 따라 안전확인신고 증명서를 발급합니다.

We issue this Confirmation Letter of Declaration of the Safety Confirmation for the above appliances in accordance with Article 28(1), 28(3), 29(2) or 34(2) of the Electrical Appliances and Consumer Products Safety Control Act.

2019년 02월 28일
year month day



한국화학융합시험연구원
KOREA TESTING & RESEARCH INSTITUTE



※ 이 신고증명서는 「전기용품 및 생활용품 안전관리법」에 따른 제품의 안전성 확인에 한정된 것이며, 그 밖의 다른 법률이 적용되는 제품의 경우에는 해당 법률에 따라 추가로 인증·허가 등을 받아야 합니다.

첨부서류	1. 전기용품의 안전관리부품 및 재질목록(List of Critical Components)(전기용품에 한정한다) 2. 기본모델·파생모델의 내용(Description of the basic and series model)
------	--



※ 안전인증 시의 조건 : 동 제품의 생산 시 자체검사를 실시하고 안전인증 시 등록된
변경사항의 변경하지 말 것.



신고번호(Application No.) : YU10211-19005

[붙임 1 : 전기용품의 안전관리부품 및 재질목록]

[Attachment 1 : List of Critical Components]

부품명(회로기호) Component(Part no.)	제조사(상표명) Manufacturer(Brand)	모델명(형식) Model(Type)	정격 또는 특성 (Technical data)	인증마크 (Mark(s))
단전지[Cell]	DongGuan AmpereX Technology Limited	472324	3.85 Vd.c., 270 mAh	CBTR Evaluati on
IC (U1)	Mitsumi Electric Co., Ltd.	MD1421E54CPAL	Overcharge Detection Voltage : (4.425 $\pm$ 0.020) V, Overdischarge Detection Voltage : (2.700 $\pm$ 0.100) V, Charging Overcurrent Detection Voltage : (-0.050 $\pm$ 0.015) V, VDS : 24 V, ID : 6.0 A	-

※ 주의사항(Attention)

1. 안전관리부품은 전기적인 안전에 직접적인 영향을 주는 부품으로서 안전인증기관이 정기공장 검사시 확인 및 관리하는 사항입니다. 따라서 상기목록에 기재된 사항을 변경하거나 또는 복수등재를 원하시는 경우는 안전인증 기관에 인증변경 신청을 하여야 합니다.
(As the critical components and parts are directly related with safety, these components shall be checked during a factory inspection by the certification body. In case of applying for multiple listings or changes for the items above, the certification revision shall be applied.)
2. 인증변경신청 없이 임의로 변경하는 경우는 전기용품 및 생활용품 안전관리법 제11조 및 제20조 제1항의 규정에 의한 안전인증 취소사유가 됨을 유의하시기 바랍니다.
(The safety certification will be cancelled under the Electrical Appliances and Consumer Products Safety Control Act, Clause 1 of Article 11 and 20 if the contents of the certification are altered without prior authorization.)

適合証明書

CERTIFICATE OF CONFORMITY

証明書番号 Certificate No.: 4352163.01COC
 貴社照会番号 Client Reference: QUA7379188 弊社照会番号 Our Reference: 4352163.51

証明書保有者 Certificate Holder

Company name: Amperex Technology Limited
 Company Address: 3503 Wharf Cable TV Tower, 9 Hoi Shing Road, Tsuen Wan, N.T., Hong Kong

製造工場 Manufacturing Plant

Factory: DongGuan Amperex Technology Limited
 Address: 1 West Industrial Road, North Zone of SSL Sci. & Tech. Industry Park, Dongguan, Guangdong 523808, China

本適合証明書は、下記の一の製品試料の評価結果に基づいており、その評価試料が下記基準に適合していたことを証明するものであり、評価品と同じ設計の他生産品の評価を包含していません。また、これは、DEKRAの何れの適合性マークの使用も許可しません。
 This certificate of conformity is based on the results of a sample of the below-mentioned product and is to verify that the evaluated sample had complied with the below-mentioned requirements, but this does not imply assessment of other products with same design to the evaluated item. In addition, this does not permit the use of any conformity marks of DEKRA.

製品 Product: Lithium-ion Batteries
 (電気用品安全法 - 特定電気用品以外の電気用品 - リチウムイオン蓄電池)
 (Electrical Appliance and Material Safety Law - Non-Specified Electrical Appliances and Materials - Lithium-ion Batteries)

商号 Trade name: ATL

評価製品識別

Identification of the product evaluated

型式 Type: EB-BR810ABU, EB-BR170ABU

製造番号 Serial Number: N. A.

定格電圧 Rated voltage: 3,85 Vdc

定格周波数 Rated Frequency: N.A.

定格容量 Rated Capacity: 270 mAh

T保護クラス Degree of protection: N.A.

適用基準 Applied Standards: METI Electrical Appliance and Material Safety Law Appendix 9

備考 Remark :

・評価は、電気用品安全法（以下、「法」）第8条第1項に基づいており、同条第2項及び第9条に基づくものではありません。

The evaluation is based on Article 8, Clause 1 of the Electrical Appliance and Material Safety Law (hereinafter, "the Law") but not based on Clause 2 of the said article and Article 9.

・法では、指定製品は「特定電気用品」又は「特定電気用品以外の電気用品」に分類されます。本証明書は、「特定電気用品以外の電気用品」に該当する製品のためのものです。法第3条規定による届出事業者は、法の関連条項（第3条、第8条、第10条、その他該当条項）の規定を遵守する必要がある、また、下図記号を適切に表示する必要があります。

Under the Law, the designated products are classified to either "Specified Electrical Appliances and Materials" or "Non-Specified Electrical Appliances and Materials". This certificate is for products classified to "Non-Specified Electrical Appliances and Materials". The "Reporting Supplier", who has been specified in Article 3 of the law, shall observe the requirements of the relevant articles of the law, i.e., Article 3, Article 8, Article 10 and other articles if any, and shall indicate the below-shown symbol suitably.



：特定電気用品以外の電気用品の場合、この記号及び届出事業者名を近接して表示

If Non-Specified Electrical Appliances and Materials, closely indicate this symbol and the name of "Reporting Supplier".

この証明書は、弊社の試験・認証規則に基づいており、法第9条に規定の証明書（又は、証明書と同等なもの）ではありません。

This certificate is based on our Testing and Certification Regulations but not a certificate (or equivalent one) specified in Article 9 of the Law.

DEKRA Testing and Certification (Shanghai) Ltd. Guangzhou Branch

2019-02-19

Miranda Zhou

Miranda Zhou

Certification Manager

DEKRA Testing and Certification (Shanghai) Ltd., Guangzhou Branch

Building A3, No.3 Qiyun Road, Science City, Guangzhou Hi-Tech Industrial Development Zone, Guangzhou, P.R. China

Tel +86 20 6661 2000 Fax +86 20 6661 2001 www.dekra-certification.com

添付書類 Annex

型式の区分 Type Classification

証明書番号 Certificate No. : 4352163.01COC
電気用品名 Equipment Name : リチウムイオン蓄電池 Lithium-ion Batteries

要素 Factor	区分 Classification
単電池の形状 Shape of secondary cell	☐ 円筒のもの Cylindrical ☒ 角形のもの Angular ☐ その他のもの Others
単電池の電解質の種類 Type of electrolyte in secondary cell	☐ 液体状のもの Liquid state ☒ その他のもの Others
単電池の上限充電電圧 Upper-limit charge voltage of secondary cell	☐ 4.25 V 以下のもの 4.25 V or less ☒ 4.25 V を超えるもの More than 4.25 V
組電池の質量 Weight of secondary battery	☒ 7 kg 以下のもの 7 kg or less ☐ 7 kg を超えるもの More than 7 kg
電池ブロックの個数 Number of battery blocks	☒ 1個のもの Single ☐ 2個以上のもの Multiple
過充電の保護機能 Overcharge protection	☒ 組電池で制御するもの Controlled by secondary battery ☐ 組電池搭載機器又は充電器で制御するもの Controlled by equipment incorporating a secondary battery or a charger
用途 Usage	☒ 携帯機器用のもの For mobile equipment ☐ 卓上機器用のもの For desktop equipment ☐ その他のもの Others
組電池の種類 Type of battery pack	☐ はんだ付けその他の接合方法により、容易に取り外すことができない状態で機械器具に固定して用いられるものその他の特殊な構造のもの It's fixed to appliances by soldering or other joining methods so that it cannot be easily removed, or having other special construction. ☒ その他のもの Others

End

TEST REPORT
Electrical Appliance and Material Safety Law Appendix 9:
(Lithium Ion Secondary Batteries)

Report Reference No.	4352163.51
Date of issue	2019-02-18
Total number of pages	26 pages
Testing Laboratory	DEKRA Testing and Certification (Shanghai) Ltd., Guangzhou Branch
Address	No.3 Qiyun Road, Science City, Guangzhou Hi-Tech Industrial Development Zone, Guangzhou, China
Applicant's name	Amperex Technology Limited
Address	3503 Wharf Cable TV Tower, 9 Hoi Shing Road, Tsuen Wan, N.T., HongKong
Test specification:	
Standard	METI Electrical Appliance and Material Safety Law Appendix 9
Test procedure	Type test
Non-standard test method	N/A
Test item description	Secondary Li-ion Battery
Trade Mark	ATL
Manufacturer	Dongguan Amperex Technology Limited 1 West Industrial Road, North Zone of SSL Sci. & Tech. Industry Park, Dongguan, Guangdong523808, P.R. China
Factory location	Dongguan Amperex Technology Limited 1 West Industrial Road, North Zone of SSL Sci. & Tech. Industry Park, Dongguan, Guangdong523808, P.R. China
Model/Type reference	EB-BR810ABU, EB-BR170ABU
Ratings	3,85 Vdc, 270 mAh

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT
(IECEE) CB SCHEME

CB TEST CERTIFICATE

Product	Secondary Li-ion Battery
Name and address of the applicant	Amperex Technology Limited 3503 Wharf Cable TV Tower, 9 Hoi Shing Road, Tsuen Wan, N. T. Hong Kong
Name and address of the manufacturer	Dongguan Amperex Technology Limited 1 West Industrial Road, North Zone of SSL Sci. & Tech. Industry Park, Dongguan, Guangdong 523808 China
Name and address of the factory	☐ Additional information on page 2 Dongguan Amperex Technology Limited 1 West Industrial Road, North Zone of SSL Sci. & Tech. Industry Park, Dongguan, Guangdong 523808 China
Note: When more than one factory, please report on page 2	
Ratings and principal characteristics	3,85 Vdc, 270 mAh
Trademark (if any)	ATL
Customer's Testing Facility (CTF) Stage used	
Model / Type Ref.	EB-BR810ABU, EB-BR170ABU
Additional information (if necessary may also be reported on page 2)	☐ Additional information on page 2 This CB Test Certificate is an addition to CB NL-54307 with Test Report Number 4347824.50 dated 2018-09-07 due to addition of model name.
A sample of the product was tested and found to be in conformity with	IEC 62133:2012
As shown in the Test Report Ref. No. which forms part of this Certificate	4352163.50

This CB Test Certificate is issued by the National Certification Body

DEKRA Certification B.V.
Meander 1051, NL-6825 MJ Arnhem, Netherlands



Test Report issued under the responsibility of:



TEST REPORT

IEC 62133

Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications

Report Number.: 4352163.50

Date of issue: 2019-02-18

Total number of pages: 29 pages

Applicant's name: Amperex Technology Limited

Address: 3503 Wharf Cable TV Tower, 9 Hoi Shing Road, Tsuen Wan, N.T., HongKong

Test specification:

Standard: IEC 62133: 2012 (Second Edition)

Test procedure: CB Scheme

Non-standard test method: N/A

Test Report Form No.: IEC62133B

Test Report Form(s) Originator: UL(Demko)

Master TRF: Dated 2013-03

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If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

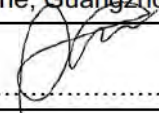
Test item description: Secondary Li-ion Battery

Trade Mark: ATL

Manufacturer: Dongguan Amperex Technology Limited
1 West Industrial Road, North Zone of SSL Sci. & Tech. Industry Park, Dongguan, Guangdong523808, P.R. China

Model/Type reference: EB-BR810ABU, EB-BR170ABU

Ratings: 3,85 Vdc, 270 mAh

Testing procedure and testing location:		
☒	CB Testing Laboratory:	DEKRA Testing and Certification (Shanghai) Ltd., Guangzhou Branch
Testing location/ address		No.3 Qiyun Road, Science City, Guangzhou Hi-Tech Industrial Development Zone, Guangzhou, China
Tested by (name + signature)		Alger Yang 
Approved by (name + signature)		Ron Liang 

List of Attachments (including a total number of pages in each attachment):	
Attachment 1 : Photos and illustrations (6 pages)	
Summary of testing:	
Tests performed (name of test and test clause): Model EB-BR810ABU was subjected to full tests as far as applicable. (in report 4347824.50) The cell type 472324 was tested according to IEC 62133 2 nd in report 4347538.50 issued by DEKRA Testing and Certification (Shanghai) Ltd., Guangzhou Branch, issued on 2018-08-13 and CB certificate NL-53924 issued on 2018-08-13, issued by DEKRA Certification B.V. No additional test was required in report 4352163.50	Testing location: DEKRA Testing and Certification (Shanghai) Ltd., Guangzhou Branch No.3 Qiyun Road, Science City, Guangzhou Hi-Tech Industrial Development Zone, Guangzhou, China
Summary of compliance with National Differences	
List of countries addressed: N/A	



भारतीय मानक ब्यूरो

(उपभोक्ता मामले, खाद्य एवं सार्वजनिक वितरण मंत्रालय, भारत सरकार)

BUREAU OF INDIAN STANDARDS

(Ministry of Consumer Affairs, Food & Public Distribution,
Govt. of India)

मानक भवन, 9 बहादुर शाह जफर मार्ग, नई दिल्ली - 110002
Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi - 110002
दूरभाष/Phone: +91-11-23230856/2323010131/23233375/23239402
ई-मेल/E-mail: registration@bis.gov.in
वेबसाइट/Website: <https://bis.gov.in/>, <https://www.crsbis.in/BIS/>

Our Ref: REGISTRATION/CRS 2019-4418/R-41146250

Date:14-02-2020

Inclusion Id: 34137

Subject :Inclusion of Additional Model(s)

MANUFACTURING UNIT :	Dongguan Amperex Technology Limited 1-WEST INDUSTRIAL ROAD NORTH ZONE OF SONGSHAN LAKE, NATIONAL HIGH-TECH INDUSTRIAL, DEVELOPMENT ZONE, DONGGUAN CITY, GUANGDONG PROVINCE,PRC GUANGDONG,China-523000 zhoujie@atlbattery.com 86-769-88989338	
-------------------------	--	--

Dear Sir,

1. This has reference to your request for inclusion of models of **"Sealed Secondary Portable Lithium System Battery" as per IS 16046 (Part 2) : 2018/IEC 62133-2 : 2017 in Licence No. R-41146250** already granted to you which is valid upto 09-12-2021.

2. It is intimated that the additional Models as per details given below have been agreed to be included in your scope of Licence. **R-41146250 w.e.f. 14-02-2020:**

Product	Sealed Secondary Portable Lithium System Battery
IS No.	IS 16046 (Part 2) : 2018/IEC 62133-2 : 2017
Brand (As Declared by Manufacturer):	SAMSUNG (stylized)
Inclusion of Additional Models (w.e.f. 14-02-2020)	EB-BR840ABY
Factory Address	1-WEST INDUSTRIAL ROAD NORTH ZONE OF SONGSHAN LAKE, NATIONAL HIGH-TECH INDUSTRIAL, DEVELOPMENT ZONE, DONGGUAN CITY, GUANGDONG PROVINCE,PRC GUANGDONG,China-523000

3. Other terms and conditions of the licence shall remain same.

4. This letter is being issued with the approval of competent authority.

Kindly acknowledge receipt of this letter.

Thanking you,

Yours faithfully,
(Vibha Rani)
Sc. D
Telfax : +91-11-23230856
E-mail: registration@bis.gov.in

Note: This is a system generated letter. Hence signature is not required.
To verify authentication of letter, kindly scan the QR code on this letter.

12. PCM APPROVAL SHEET

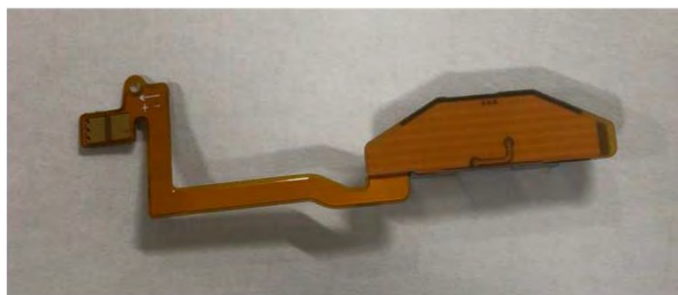
PCM Part Description	1. Company approval sheet cover
	2. Insert development, approval and revise (change) histories - Mark date and details when approval sheet is revised (changed) - Write all revised details using 5W1S order (mark the page and revised detail with the original - - Must have approval sheet history although it does not have any revised edition
	3. Development history must be marked from proposal step- mark problems before approval
	4. Product details - insert at the front of JET
	5. PART LIST
	6. Schematic diagram
	7. PCB Layout diagram
	8. Insulated thickness of PCB
	9. PCM drawing
	10. PCB Hole Section Data
	11. Test sheet

SSEWU68实物图片

TOP



BOTTOM



APPROVED SHEET

型号 Model Name	SSEWU68-01
文件编号 Document No.	
文件版别 Revision No.	S2
产品编码 Production code	
文件页数 Total Page	10
客户 Customer	SEC
PCM制造商 PCM Maker	NVT/Blue Way
实施日期 Released Date	2019.01.11

R&D Registered	R&D Checked	QA Re-checked	R&D Approved
宋鹏飞	韩财旺	何天	陈光辉

Catalog

1、 Modified record List	Page1
2、 Specification	Page2
3、 Pad Description	Page3
4、 Part List	Page3
5、 Drawing	Page4
6、 Main Material Drawing.....	Page7
7、 Reliable Test	Page10
8、 Precaution	Page10

Model Name	SSEWU68-01	Revision	S2	Page	2/10
Document NO.	0	Controlled		Date	2019.01.11

2、 SPECIFICATION

2.1、 Using scope: The document only applies to Li-ion battery protection module, SSEWU68-01

2.2、 Battery capacity 270 mAh

2.3、 Environment request

补充要求: Do not contain any substances which are specified in (004□049)-SSE

2.4、 Function description

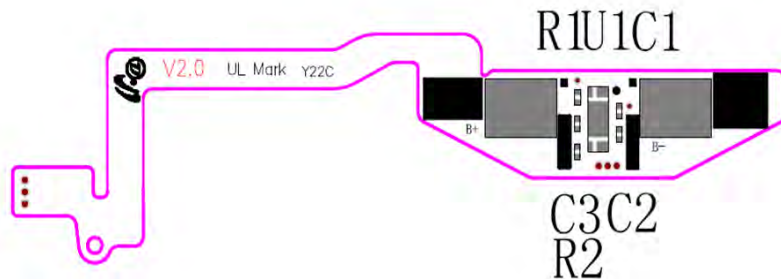
Overcharge protection	Overdischarge protection
Overcurrent protection	Short circuit protection

2.5、 Electrical characteristics: (标识*的电气参数需100%测试pass)

Protection IC:	Mitsumi, MD1421E54CPAL	Specification @ 25℃			
Item		Min	Type	Max	Unit
过充 Overcharge	Detection voltage (保护电压) (1st protection)*	4.405	4.425	4.445	V
	Release voltage (恢复电压) (1st protection)*	4.175	4.225	4.275	V
	Detection delay time (保护延时) *	0.750	1.000	1.250	S
过放 Overdischarge	Detection voltage (保护电压) (1st protection)*	2.600	2.700	2.800	V
	Release voltage (恢复电压) (1st protection)*	2.620	2.720	2.820	V
	Detection delay time (保护延时) *	75	100	125	ms
充电过流 charge overcurrent	Detection overcurrent (保护电流) (1st protection)*	0.65	1.35	2.25	A
	Detection delay time (保护延时) (1st protection)*	5.52	8.5	11.48	ms
放电电流 discharge overcurrent	Detection overcurrent (保护电流) (1st protection)*	2.00	2.85	3.75	A
	Detection delay time (保护延时) (1st protection)*	36	48	60	ms
短路保护 Short protection	Detection delay time (保护延时)	360	500	840	us
Current Consumption (Normal Mode, VDD = 3.6V) *		/	/	5.2	uA
Current Consumption (Stand-By, VDD = 2.0V)		/	/	0.5	uA
PCM Impedance (内阻) *		40	/	90	mΩ
0V battery charge function (0V充电功能)		Available			
IC pushing force(IC推力)		1.0	/	/	KgF
Ni-tap drawing force (镍片拉拔力)		1.2	/	/	KgF

Model Name	SSEWU68-01	Revision	S2	Page	3/10
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3、Pad Description



P+	Battery output/charging positive pole	B+	Cell positive pole
P-	Battery output/charging negative pole	B-	Cell negative pole

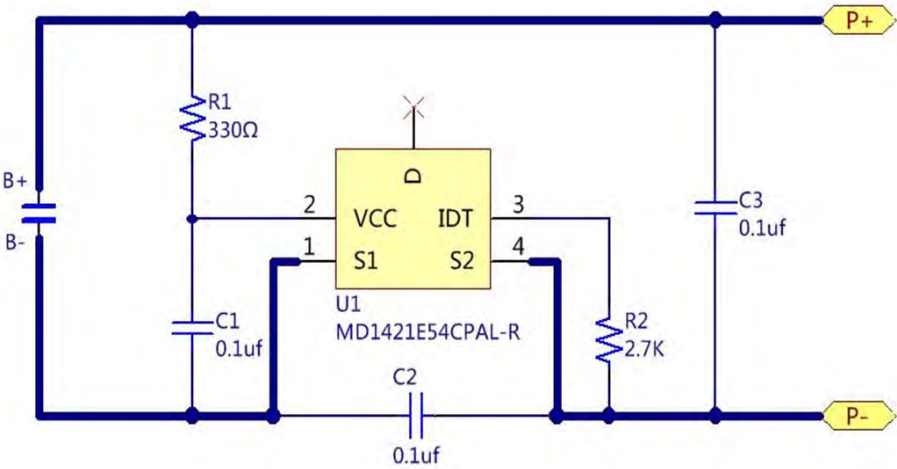
4、Part List

NO.	Code				unit	Q'ty
1	C0710-700047-0AL	IC_Protect(锂电池保护)	U1	MITSUMI,MD1421E54CPAL,PLP-4,RoHS+REACH+HF	PCS	1
2	C0120-800053-0AL	RES_5%(电阻_5%)	R1	0201,330Ω±5%,1/20W,RoHS+REACH+HF+邻苯6类	PCS	1
3	C0120-700034-0AL	RES_5%(电阻_5%)	R2	0201,2.7KΩ±5%,1/20W,RoHS+HF+REACH	PCS	1
4	C0210-900339-0AL	Ceramic capacitor(陶瓷电容)	C1,C2,C3	0201,100nF±10%,25V,X5R	PCS	3
5	E2030-700088-0AL	metal part_Nickel plate_L(金属件_镍片_L)	B+,B-	Ni,L1*L2*H*T=4*3*3*0.13mm,L shape,RoHS+HF+REACH+GP,DWG:SNY311-B01-B,(镀锡)	PCS	2
6	C2120-710002-0AL	FPC(FPC空板)		SSEWU68,REV.02,L43.24*W11.71*T0.15mm,PI,2-layers,UL94V-0,OSP+镀金,RoHS+REACH+HF,DWG:SSEWU68-F01-B	PCS	1
7	X0400-900004-0AL	Solder Paste(锡膏)		爱法,OM340-Type 4,GP+HF or Indium 8.9HF	g	0.019

Model Name	SSEWU68-01	Revision	S2	Page	4/10
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5、Drawing

5.1、Schematic



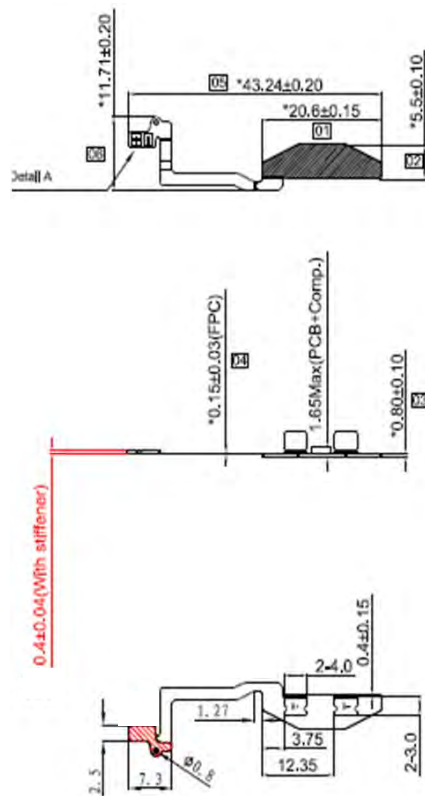
Model Name	SSEWU68-01	Revision	S2	Page	5/10
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5.2、FPC Layout

	 B+/P+	 P-	 B-	 Other		
TOP LAYER					Bottom LAYER	
TOPSOLDER					Bottom SOLDER	
TOP OVERLAY					Bottom OVERLAY	
NC DRILL						

Model Name	SSEWU68-01	Revision	S2	Page	6/10
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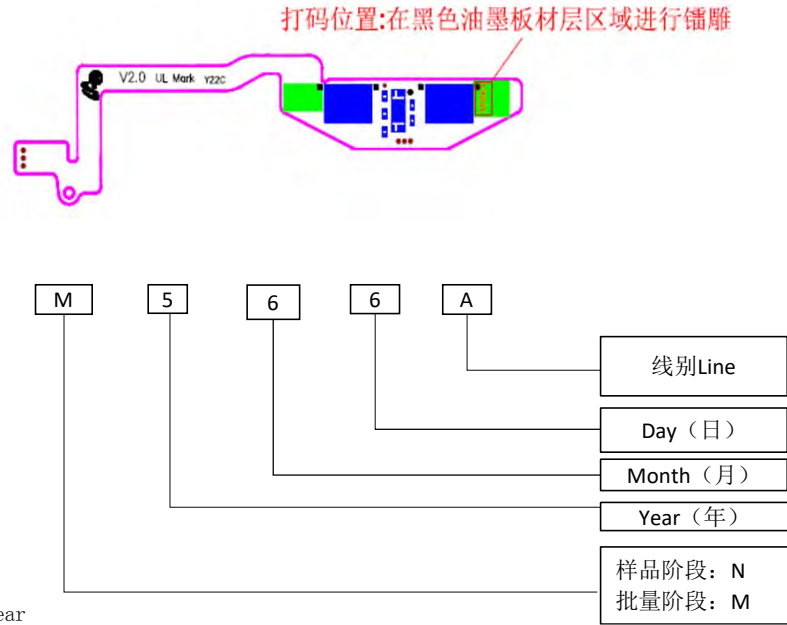
5.3、PCM Assembly Drawing（组装图）



Note:
 1、Tolerance:±0.15mm
 2、Unit: mm

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5.4、Indicating of Spray (打码指示图)



5.4.1: Year

Use the end of the year, e.g. 2016 → 6

5.4.2: MONTH

Month	1	2	3	4	5	6	7	8	9	10	11	12
Sign	1	2	3	4	5	6	7	8	9	A	B	C

5.4.3: Day

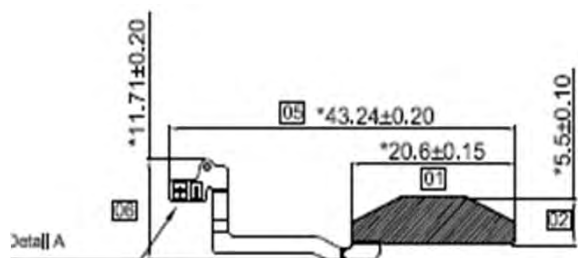
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Sign	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	J	K
Day	20	21	22	#	24	25	26	27	28	29	30	31							
Sign	L	M	N	R	S	T	U	V	W	X	Y	Z							

5.4.4: Line

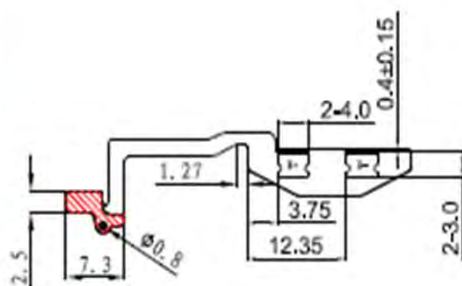
Line	3301线	3302线	3303线	3304线	3305线	3306线	3307线	3401线	3402线	3403线	3404线
Sign	A	B	D	E	F	G	H	I	J	K	L
Sign	3405线	3406线	3407线	5301线	5302线	5303线	5304线	5305线	5306线	5307线	
Line	M	N	R	S	T	U	V	W	X	Y	

Model Name	SSEWU68-01	Revision	S2	Page	7/10
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6.1、FPC Mechanical Drawing



0.4 ± 0.04 (With stiffener)



备注:

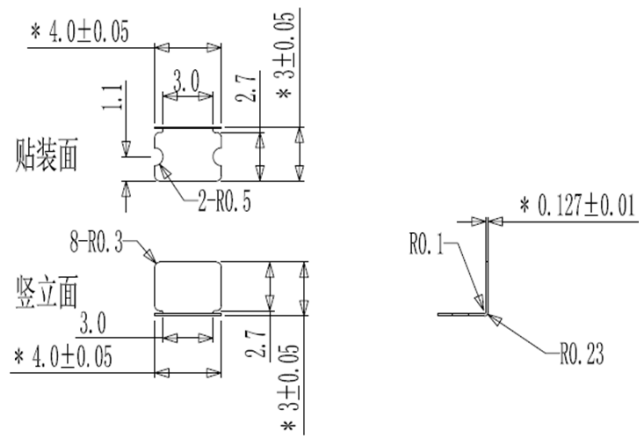
1: 未注公差: $\pm 0.1 \text{ mm}$

2: FPC弯折要求: 弯折半径 0.5 mm , 180° 度, 10次后内阻变化量 $\leq 10\%$ 。

Model Name	SSEWU68-01	Revision	S2	Page	9/10
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6.3、Ni-plate Drawing

- Note:
- 1、Tolerance: $\pm 0.1\text{mm}$
 - 2、Unit:mm



6.4、Other

Model Name	SSEWU68-01	Revision	S2	Page	10/10
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7、Reliable Test

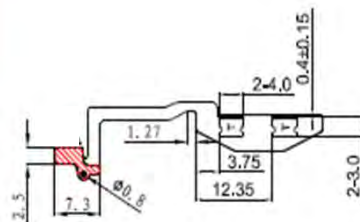
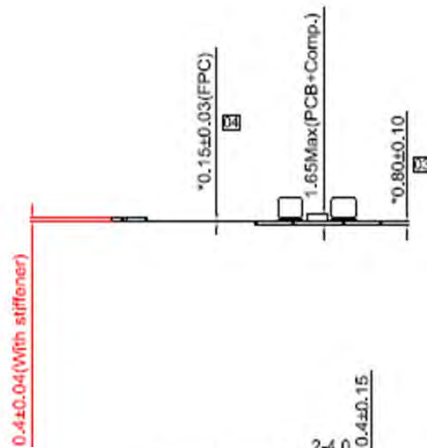
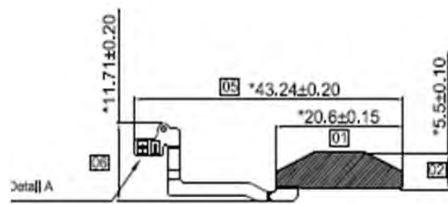
Items	Test Condition	Test Item	Result
Normal-temperature Parameter Test	In room tem(Tem:24.8℃, Humidity:54%RH), test the function parameter of the products.	Function Test	Pass
ESD Test	After the PCM connecting the cell, using the Discharge gun of ESD Generator to take ESD test of every terminal in PCM ± 10KV with 15times.	Function Test	Pass
Over-charge Protection Test	Connected cell with PCM.The Voltage of batteries: 2.7V~2.9V, Charging voltage: 12V, Charging Current: 2C5A, Charging Time: 24h.	Function Test	Pass
Short-circuit protection test	Connect the PCM with cell. short the PCM P+/P- output with 100mΩ resistance for 1 hour.	Function Test	Pass
Reverse Charge Test	Connect the PCM with rating capacity core (Core voltage:3.6~3.8V) , and then reverse charge with 5 times, and the last time is 10s, 6V/2A reverse charge condition.	Function Test	Pass
Vibration Test	Place the PCM on the electric vibration table with a fixture.The machine is running with the sine frequency sweep vibration, The frequency is slowly change from 10 Hz to 50 Hz, and then slow down to 10Hz.Amplitude: 1.6mm, Vibration direction: Vertical. Vibration time: 90min.	Function Test	Pass
Low Temperature Storage Test	PCM store in Low Tem Chamber with -25℃ ±2℃ for 96 hours.	Function Test	Pass
High temperature and humidity Storage test	PCM store in Humidity Chamber with 60℃ ±2℃ and RH为 90%-95% for 14 days.	Function Test	Pass
Temperature shock test	Putting the tem in chamber with -40℃ for 2H, and then turn to 85℃ chamber for 2H, the tem change lasts 5 minutes, this is one cycle, and totally 20cycles.	Function Test	Pass
PCM performance	Store the PCM in-20℃/ 25℃ /60℃test box for 2 hours and test overcharge, overdischarge, overcurrent and	Function Test	Pass

8、Precautions

- 9.1、 The PCM can withstand electrostatic discharge,but don't apply one to it that exceeds claim in the spec.
- 9.2、 The PCM can withstand distortion,but don't bend it badly during assembly.
- 9.3、 Don't apply exterior strength to all the component during assembly.
- 9.4、 When the cell is connected to the PCM first,the export of the battery may be "0"V,it's eligible, connect the charger to restore the normal.
- 9.5、 The PCM only applies to single Li-ion battery protection,don't apply voltage、 current and temperature that exceeds the max performance.

Dongguan NVT Technology Limited APPROVED SHEET

PCB Dimension Test Report				
No.	Spec			CPK
	Min	Typ	Max	
SPC1	20.45	20.60	20.75	1.80
SPC2	5.40	5.50	5.60	1.60
SPC3	0.70	0.80	0.90	1.77
SPC4	0.12	0.15	0.18	1.56
SPC5	43.04	43.24	43.44	1.89
SPC6	11.51	11.71	11.91	1.35

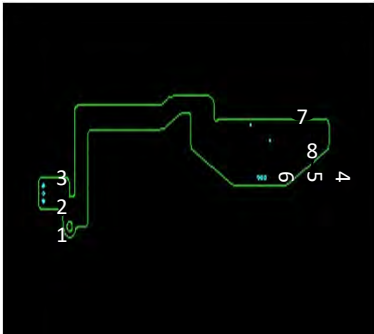


附：FPC过孔及铜面切片报告

FPC Section



Vi

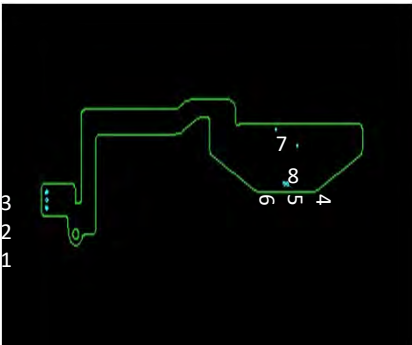


NO.	Point 1	Point 2	Point 3	Point 4	Point 5
1#					
测试值 (um)	7.01/17.44/29.33/29.33	6.18/16.58/28.48/29.77	7.03/16.59/29.34/30.11	11.14/18.73/30.19/30.19	3.71/17.88/30.61/32.33
2#					
测试值 (um)	5.16/16.60/29.76/29.33	7.01/17.88/28.91/29.77	7.45/17.01/30.61/29.33	9.98/19.13/29.77/31.13	3.28/18.73/32.32/31.88
3#					
测试值 (um)	7.43/17.86/30.20/29.77	9.98/19.56/30.61/30.11	9.15/19.56/28.91/30.61	8.86/17.01/31.46/31.13	7.88/17.03/31.89/31.05

附：FPC过孔及铜面切片报告

FPC Section

■ Via hole section

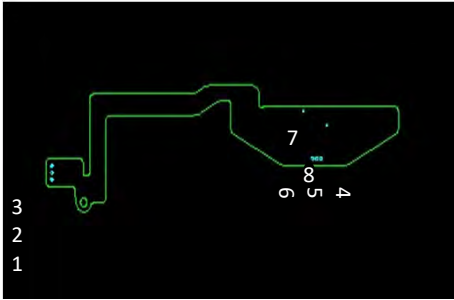


NO.	Point 6	Point 7	Point 8	Point 9	Point 10
1#					
测试值 (um)	7.86/17.88/29.76/31.4	8.71/18.30/31.46/32.3	8.30/19.14/32.74/31.9		
2#					
测试值 (um)	9.15/19.98/31.89/32.3	9.13/18.28/32.31/31.9	9.56/19.13/31.04/31.4		
3#					
测试值 (um)	8.28/18.71/29.76/31.4	7.86/17.01/30.61/32.3	9.56/19.98/32.31/32.7		

附：FPC过孔及铜面切片报告

FPC Section

■ Via hole section



NO.	1#	2#	3#
EPOXY (覆盖膜区域叠层)			
测试值 (um)	12.33/24.66/32.74/24.23/32.75/24.67/12.33	12.78/24.24/32.74/23.81/32.74/24.66/12.33	12.75/24.66/32.31/24.23/32.74/24.23/12.34
NO.	1#	2#	3#
EPOXY (FR4区域叠层)			
测试值 (um)	12.75/24.66/32.74/24.66/32.31/24.67/12.75/34.01/262.74	12.75/24.66/32.31/24.66/32.31/24.23/12.36/34.01/261.04	12.75/24.66/32.31/24.66/32.74/24.23/12.33/34.01/261.04

13. CELL APPROVAL SHEET

RoHS FREE
HFR PVC PHL Sb Be CoCl2

APPROVAL SHEET (ver2.0)

PRODUCT NAME	BATTERY CELL	
SEC CODE	GH96-12519A	
MAKER PART CODE	GC-SDC-472324	
APPLIED PACK	EB-BR810ABU	
PACKAGE TYPE	Main	
Reliability Test Version	Rev. 4.0	
REMARK		
WEIGHT (g)	NET	4.5 ± 0.23g
	GROSS	
	INNER BOX	
	MASTER BOX	
SIZE (mm) (T*W*L, (Max)) T : Shipping SOC (Max).	NET	4.75*22.60*23.50
	GROSS	
	INNER BOX	
	MASTER BOX	



VENDOR APPROVAL			
	DRAFT	AGREEMENT	APPROVAL
SIGN			
NAME	Tank Wang	PT Zhao	Magic Ma
DATE	2019.11.6	2019.11.6	2019.11.6

All items in this approval sheet have to be periodically controlled and maintained for assurance and quality of mass product as cell was approved

We are not supposed to ask the partners to provide a technical document without valid reasons.

The acquired technical document should not be used elsewhere.

Comply with the threshold of substances which are specified in OQA-2049

MAKER	ATL	Tel.	+852-2498-0908
ADDRESS	3503 Wharf Cable TV Tower, Tsuen Wan, N.T., Hong Kong		

Manufacture Site

1. Cell Maker

FACTORY	ATL(DG)	VENDOR CODE	
ADDRESS	North Zone of SSL S&T Industry Park, Dongguan, GuangDong, PRC 523808	TEL	+86-769-8898-9338
FACTORY		VENDOR CODE	
ADDRESS		TEL	

Mass Production Quality Management Guide

The company, as a sub-contractor of SEC, submits this approval sheet that was written with guideline show below to guarantee steady quality and supply of the product.

1. Specification, inspection, management standard and other terms that are required for the quality management should be included in this approval sheet.
2. After beginning mass production, quality management and steady supply of the product must be guaranteed by sub-contractor and product quality must be provided at acceptable levels
3. If any changes, that may affect the quality (reliability, expected life, etc.), are made, sub-contractor must notify about the change and receive approval from SEC.
4. The sub-contractor should have mass production management standard so all the products meet the required standard, and test results certificate of each lot must be provided to SEC.
5. Sub-contractor must guarantee the quality of the product and not allow any defect, even if the information, including trade secret, related to the corresponding defect is not included in the approval sheet.
6. If there are any requests or issues that are required to obtain the quality level of the product, sub-contractor should contact SEC reliability to revise and make modification.

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 - 1.2 Revision History
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1. DEVELOPMENT HISTORY

1.1 Development History

1.2 Revision History

1.3 CTF (CRITICAL TO FACTOR/FUNCTION)

1.1 Development History

1.1.1 APPLIED PACK : EB-BR810ABU(SEC Code : GH43-04856B (68%), GH43-04857B (30%))

1.1.2 CELL P/N : GC-SDC-472324(Vendor, SEC Code : GH96-12519A)

1.1.3 Development Start date: 2018.06.01

1.1.4 Approval History

Approval Date	Responsible Person : Jang Kiyoun	
	Issue / Countermeasure	
By	Issue	Countermeasure
	QPA audit NG(9/14-9/20), anode coating finish point on R corner	Apply teflon on mandrel
	HTHH Δ IR NG	Change Δ IR NG spec from 90mohm to 115mohm

1.2 Revision History

[illegible]

1.3 CTF (CRITICAL TO FACTOR/FUNCTION)

1.3.1 Electrical Performance * $n \geq 32$, $Cpk > 1.33$ (n : the number of sample)

ITEM	SPEC			Cpk	Remark
	MIN	TYP	MAX		
OCV(V)	3.75	3.78	3.80	1.94	30% SOC
	3.94	3.97	3.99	1.83	68% SOC
IR (mΩ)	86	101	116	1.46	

1.3.2 Cell Dimension (unit: mm) * $n \geq 32$, $Cpk > 1.00$

ITEM	SPEC			Cpk	Remark
	MIN	TYP	MAX		
Length	22.1	22.8	23.5	1.58	Refer to Drawing
Width	21.6	22.1	22.6	1.21	
Thickness (Shipping SOC%)	4.35	4.65	4.75	2.03	
Cathode	Total length	362	366	370	1.2
	Coating length B	279.7	283.5	287.3	1.3
	Coating length A	326.4	330.2	334	1.2
	Width	15.9	16.2	16.5	1.1
Anode	Total length	350.5	354.5	358.5	1.2
	Coating length B	297	300	303	1.3
	Coating length A	331	334	337	1.3
	Width	17.4	17.7	18.0	1.1
Separator Width		19.8	20.1	20.4	1.6
Overhang	Cathode - Anode	0.1	0.75	1.4	1.4
	Separator-Anode	0.5	1.2	1.9	1.8
Anode Coating end position		3.15	-	-	1.35

1.3.3 Welding strength : (unit: kgf)

ITEM	SPEC			Cpk	Remark
	MIN	TYP	MAX		
Ni Tab (pull strength)	1.5	-	-	2.22	
Al Tab (pull strength)	1.5	-	-	1.32	

1.3.4 Others

No.	Item	Check
1	PARTS LIST: supplier spec. (New supplier /new part)	OK
2	Construction review	OK

2. PRODUCT SPECIFICATION

2.1 Scope

This specification shall be applied to EB-BR810ABU, which is manufactured by ATL.

Statement (1): Unless otherwise specified, all tests stated in this Product Specification are conducted at below conditions:

Temperature: 23 °C ("Temperature Condition");

Humidity: 65 ± 20% RH ("Humidity Condition")

Statement (2): Throughout this specification, numeric criteria annotated by "*" means such criteria are only applicable to fresh unused Product within 30 days from manufacture by ATL. Products either have been used or stored for a period longer than 30 days by Customer and/or its customer may exhibit an inferior numeric parameter than such criteria. Customer agrees that such occurrence does not constitute nonconformance of specification.

Statement (3): ΔT , means thickness change.

2.2 Warranty period

*The Battery manufactures guarantees for 15 months since battery pack is completely assembled"

2.3 General Specification

No.	Item	Definition	Specifications
2.3.1	Min. capacity	Std. discharge capacity and criterion of C-rate	270mAh
2.3.2	Energy Density (E/D)	(Min capacity X Nominal Voltage) / max Volume X1000 (Without side tape) ※ Standard E/D : 1st Vendor ※ Max Volume at SOC for ex-factory condition.	431Wh/L
2.3.3	Nominal voltage	Mean operation voltage during standard discharge after standard charge	3.85V
2.3.5	Charging Method	CC-CV(constant voltage with limited current)	CC-CV
2.3.6	Standard charge	Charge voltage Charge current Cutoff condition	4.4V 54mA 5.4mA
2.3.7	Standard discharge	Discharge current Cutoff voltage	54mA 2.75V
2.3.8	Max charge current	Maximum charge current at 23(±2)°C	216mA
2.3.9	Max discharge current	Maximum discharge current at 23(±2)°C	270mA

2.3.10	Cycle Life Condition	- Charge : 4.4V, 0.8C & 0.1C Cut-off - Discharge : 1.0C, 3.0V Cut-off - Cycle counts : 400cycle (23°C)	Higher than 88% of min. capacity T≤5.13mm (after 2Hr)
2.3.11	Accelerated Cycle Life Condition	- Charge : 4.4V, 0.8C & 0.1C Cut-off - Discharge : 1.0C, 3.0V Cut-off - Cycle counts : 300cycle (45°C)	Higher than 88% of min. capacity T≤5.13mm (after 2Hr)
2.3.12	Dimension	Measure with 0.01mm resolution calipers after standard charge. ※ Thickness : 500g, PPG ※ Width : 300g, PPG	Refer to cell drawing
2.3.13	Weight	Measure with 1mg resolution scale.	4.5 ± 0.23g
2.3.14	Appearance	Cell shall not have any defect that could give negative effects of commercial cell value such as scratches, flaws, dirty spots, rust, deformation, discoloration, leakage, etc.	Refer to Appearance defect limit
2.3.15	Shipping OCV%	Measure with 0.01V resolution voltmeter	SOC 68% : 3.94~3.99 V SOC 30% : 3.75~3.80V
2.3.16	Shipping IR	Measure with 0.1 mΩ resolution ohmmeter	SOC 68% : 86~106mΩ SOC 30% : 86~106 mΩ
2.3.17	ΔOCV	When discharge at normal condition OCV drop rate per day under shipping SOC Cell OCV drop < 4mV/day	4mV/day
2.3.18	Weight of electrolyte	After degassing (remaining)	1.55≥g/Ah
2.3.19	Active Material	Cathode (ex LCO A type, LCO B type) Anode (ex AG A type, AG B type)	CPC-102 APG-077
2.3.20	Material thickness	Cathode foil (Aluminum) Anode foil (Copper) Separator(base film/coating) Pouch (Al layer)	10um 8um (7/3)um 86um (Al 35um)
2.3.21	Tab Sizes	Cathode(T x W x L) Anode(T x W X L)	0.08 x 3.0 x 30mm 0.08 x 3.0 x 30mm
2.3.22	Tab Materials	Cathode Anode	Al Ni
2.3.23	Operating Protocol in different Temperatures	Cell charge protocol by different temperature range	-5~5 °C, 0.3C to 4.2V 5~12 °C, 0.3C to 4.4V 12 ~ 45 °C, 0.8C to 4.4V 45 ~ 60 °C, 0.8C to 4.2V
		Cell operation temperature in standard cycle condition	-20~60°C
2.3.24	Storage temperature	Storage temperature range (<1 month)	-20 ~ 60°C
		Storage temperature range (<3 months)	-20 ~ 45°C

		Storage temperature range (< 15 months)	-20 ~ 25°C
2.3.25	Standard test environment	Standard temperature 5class and standard humidity 20class specified KS A 0006 (standard condition for test and measurement)	Temp : 23±2°C Humidity:65±20%

※ Standard/Safety/Regulation should be managed by CTF.

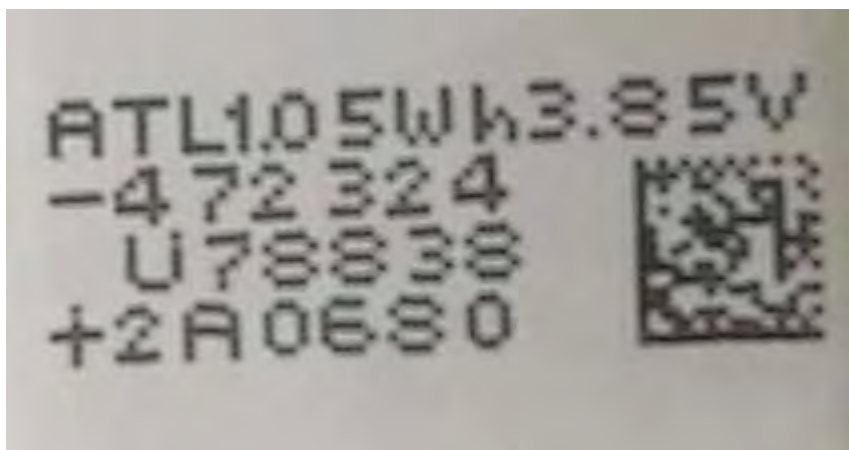
2.4 Cell Barcode System

Barcode size

2d barcode size: 15mm*4.5mm

Location (battery side)

* insert cell barcode image (example)



2.4,1 Barcode description (code #: U788382A0680)

Digit	U79	8	38	2	A0680
12	ATL MI code	Year=2018	Week=38	Date=Tuesday	Serial No.=A0680

2.5 Reliability Test

This battery is tested according to 'Battery Reliability Test' version that is marked at the approval sheet cover.

(ver. 4.0)

Task	Test Item	Test Condition	Spec.
Initial	Δ OCV	1st Δ OCV Measurement after 12hr Storage → 2nd Δ OCV Measurement after 24hr Storage	Δ OCV < 50mV
	X-Ray	Electrode, Alignment, Tab and Jell Roll Shape	Deflection Angle <30° , Electrode overhang> 0.1mm
Structure	Decap	All item of Decap Standard	Refer to Dcap Standard
Cycle life	Room temp. (23°C)	Charge 0.8C, 0.1C Cut-off Discharge 1.0C 3.0V Cut-off, 400 Cycle	Higher than 88% of min. capacity $T \leq 5.13\text{mm}$
	High temp. (45°C)	Charge 0.8C, 0.1C Cut-off Discharge 1.0C 3.0V Cut-off, 300 Cycle	Higher than 88% of min. capacity $T \leq 5.13\text{mm}$
	Trickle charge	45°C, 4.37V $\leftrightarrow$ 4.32V	$T \leq 5.13\text{mm}$
Capacity	Temp.	Capacity at each temperature (-20, -10, 55°C)	Refer to Reliability Standard
	C-rate	Capacity at each c rate (0.2C , 0.5, 1C)	Refer to Reliability Standard
Storage	Retention & Recovery	Retention : SOC 100%, after 28 days Recovery : Within 24hr after Retention	Retention : $\geq 95\%$ Recovery : $\geq 100\%$ (of min. capacity)
	High temp.	Shipping charge voltage, 40°C, 90days	Retention : $\geq 80\%$ (of minimum capacity)
	Room temp.	Shipping charge voltage 23°C, 12 months	Retention : $\geq 95\%$ (of min. capacity)
Environ ment	High temperature operation	Charge at 45°C, Discharge at 60°C, 60 Cycle → Δ OCV, Capacity at 23 °C	Capacity : 0.2C $\geq 90\%$ and 1.0C $\geq 80\%$ of min. capacity) $T \leq 5.13\text{mm}$ after 2hrs aging at RT
	High temperature High humidity	60°C/90%, SOC100%, 14 days → Δ OCV	$T \leq 5.23\text{mm}$ as finished, $\leq 5.13\text{m}$ after 2hrs aging at RT Δ OCV : < 0.3V, Δ IR : <115m Ω
	Thermal cycle	-40°C 30min $\leftrightarrow$ 85°C 30min, 96 Cycle, 4.25V → Δ OCV	$T \leq 5.23\text{mm}$ as finished, $\leq 5.13\text{m}$ after 2hrs aging at RT Δ OCV : < 0.2V, Δ IR : <115m Ω
Safety	External short	55°C 6Hr short by wire using $\leq 80 \pm 20\text{m}\Omega$	$\leq \text{C1}$
	Forced Discharge	Max. discharge current, 1.5Hr	$\leq \text{C1}$
	Overcharge	4.6V, 3 times of max charge current, 7Hr	$\leq \text{C1}$
	Crush	Applied 13kN with 300N $\pm$ 10N speed	$\leq \text{C2}$
	Triangular T Rod Crush	Applied 1.5kN with 3kN $\pm$ 10N speed	$\leq \text{C2}$
	Dent	Applied 1,300N using $\varnothing 6\text{ mm}$ Tip	$\leq \text{C2}$
	Heating	130°C 1Hr	$\leq \text{C2}$
	High temperature strength	90°C 8Hr using specially designed jig	<C0

2.6 Cell ORT Plan (Reliability Test ver.4.0)

Test	Test Condition	Quantity	
Life Cycle	23°C 400Cycle Charge 0.8C, 0.1C Cut-off Discharge 1.0C 3.0V Cut-off	3EA (All model/month)	Higher than 88% of min. capacity T ≤5.13m
Acceleration Life Cycle	45°C, 300Cycle Charge 0.8C, 0.1C Cut-off Discharge 1.0C 3.0V Cut-off	3EA (All model/2week)	Higher than 88% of min Capacity T ≤5.13m
Product Liability (PL) Safety Test	Triangular Rod Crush, Crush, Heating, Overcharge, External Shortage,	5EA (Each Lot)	According to Safety Test
Capacity	☐ GB/T : 22±1°C - Charge 1C 0.02C cutoff Discharge 0.2C 2.75V cutoff ☐ Min. Capacity : 23±2°C, - Charge 0.2C 0.02C cutoff Discharge 0.2C 2.75V cutoff	3EA (Each Lot)	Inner Pack ≥ 104% Embedded Pack ≥ 101% (Minimum capacity)
High Temperature and High Humidity	Full Charge 60°C, RH 90%, 14 day must use specially designed jig	5EA (Each Lot)	T ≤5.13m after 2hrs aging at RT
Thermal cycle	80% Charge -40°C(30min) ~ 85°C(30min) 96Cycle must use specially designed jig box	5EA (Each Lot)	T ≤5.13m after 2hrs aging at RT

- ※ Mass production lot is sampled on a line-by-line basis ,and on multiple lines, sampling is performed alternately
- ※ Each mass production lot must be tested by SEC approval specification and satisfy all qualifications
- ※ All tested data have to be provided and continuously updated to SEC IQC

3. CELL Photos

Site	Front	Back
1		

4. DRAWING

4.1 Cell Assembly

4.2 Jelly Roll Assembly

4.3 Pouch Forming

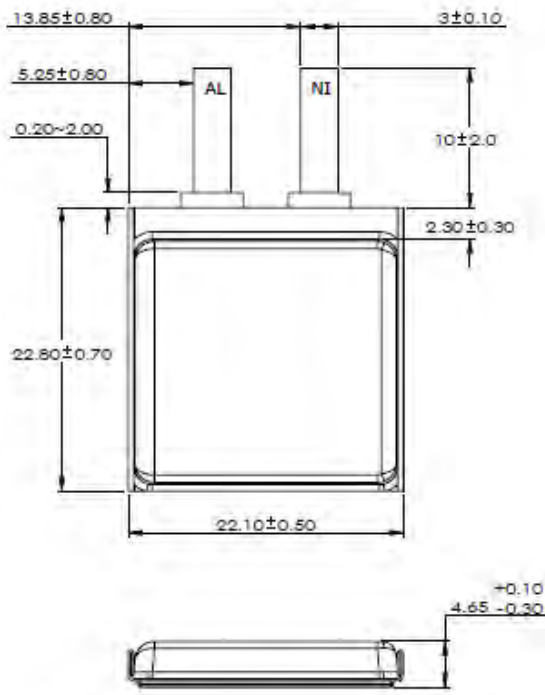
4.4 Cathode

4.5 Anode

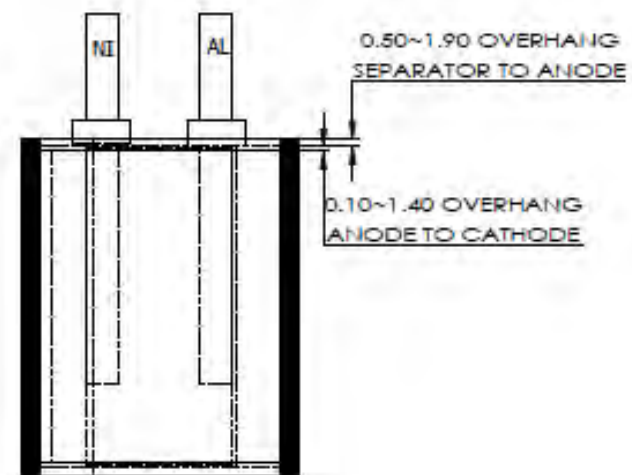
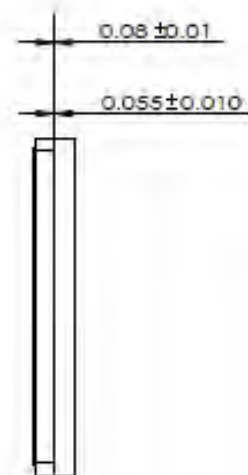
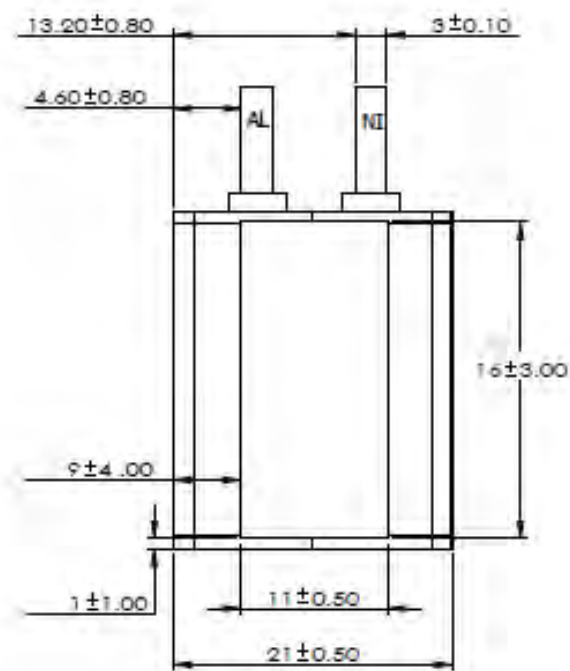
4.6 Separator

4.7 Package

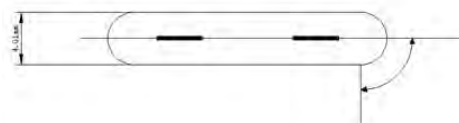
4.1 Cell

5	Control the length difference between left and right side of finished cell	o Completed Cell Tolerance: -Length difference between left and right side <0.8 mm -(a) mm – (b) mm : length difference 	※ Can and pouch have to satisfy the length tolerance spec. The length difference must be added in this section
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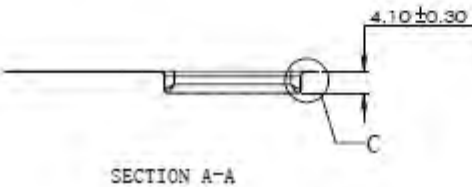
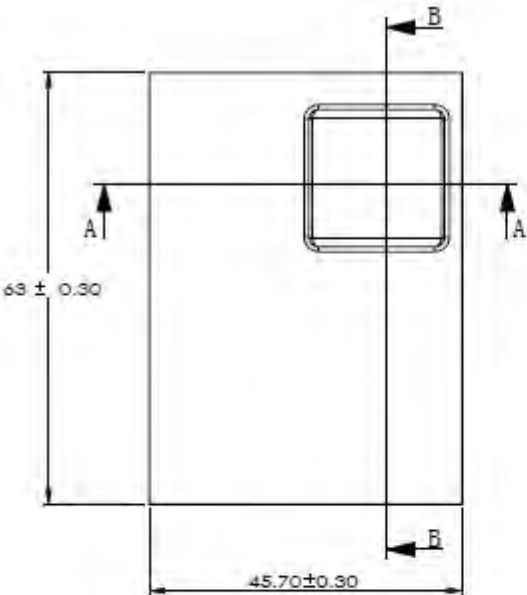
4.2 Jelly Roll



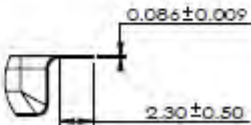
Anode Coating end Position : Min 3.10mm



4.3 Pouch Forming

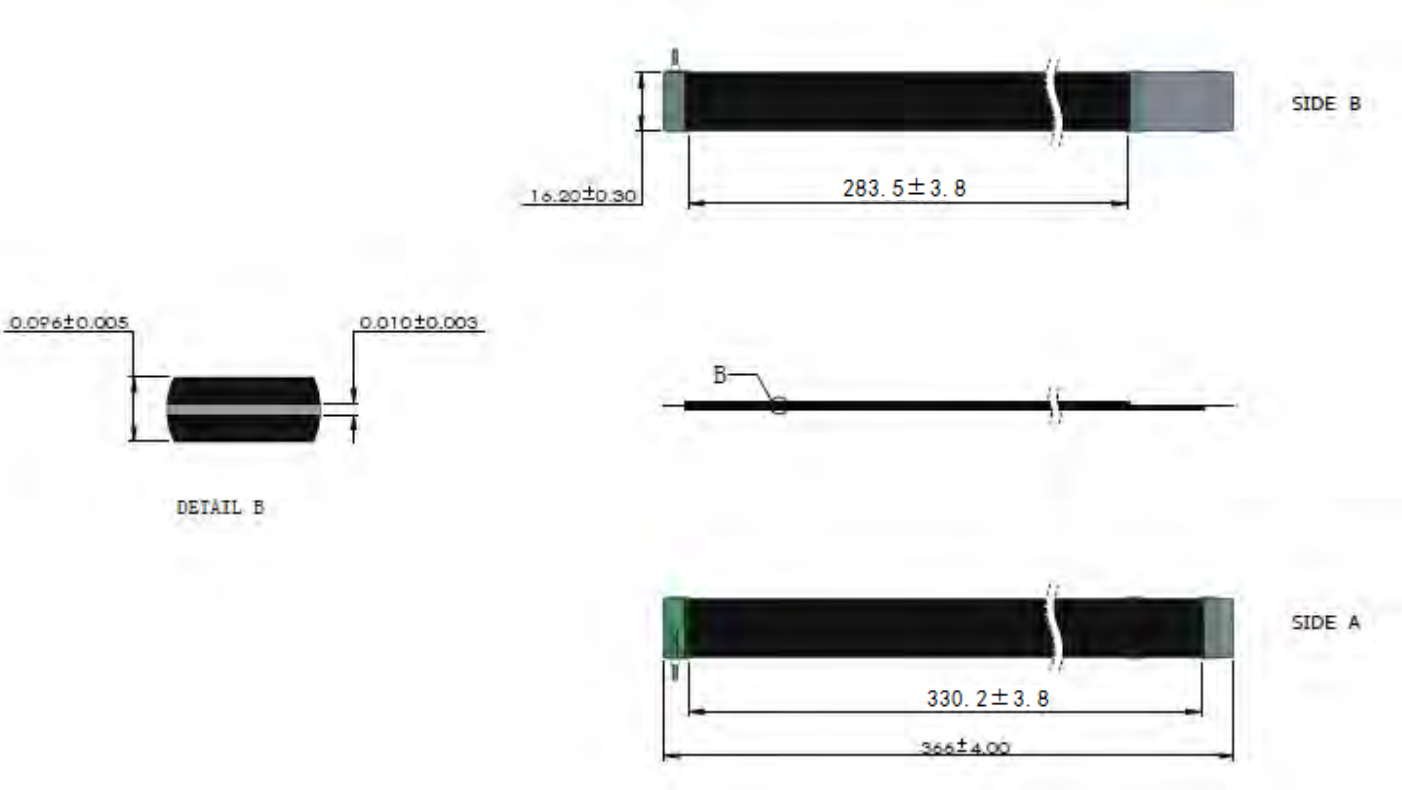


SECTION B-B

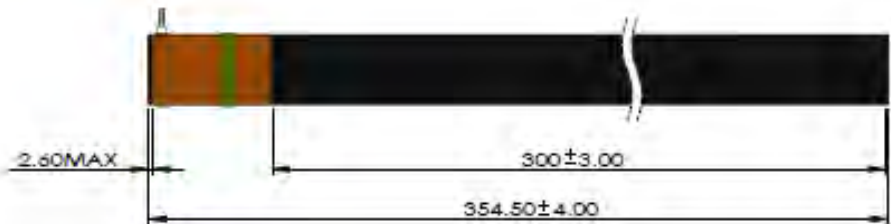
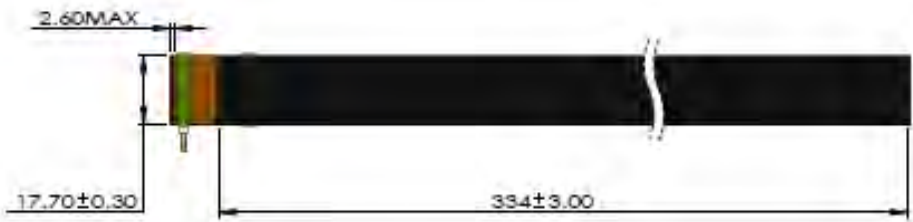
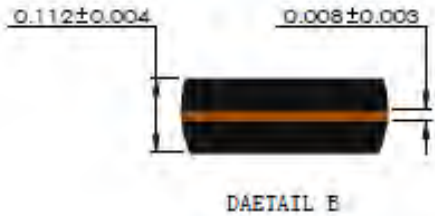


DETAIL C

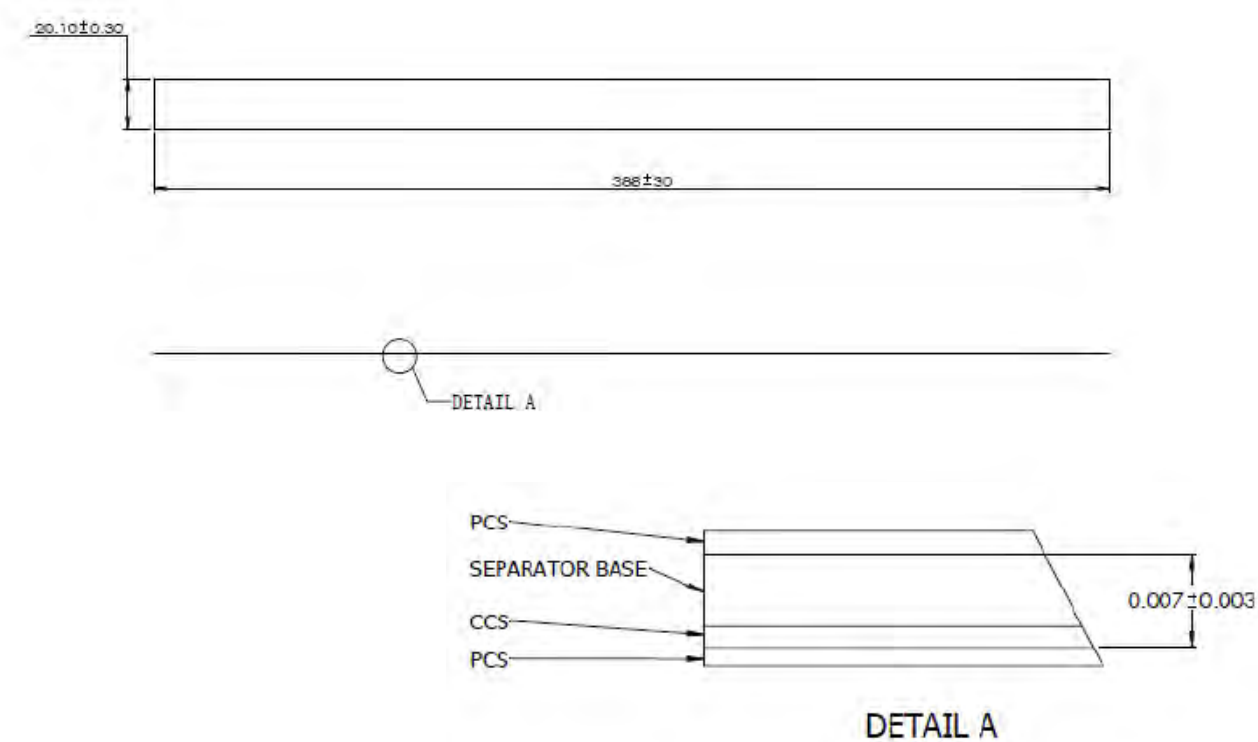
4.4 Cathode



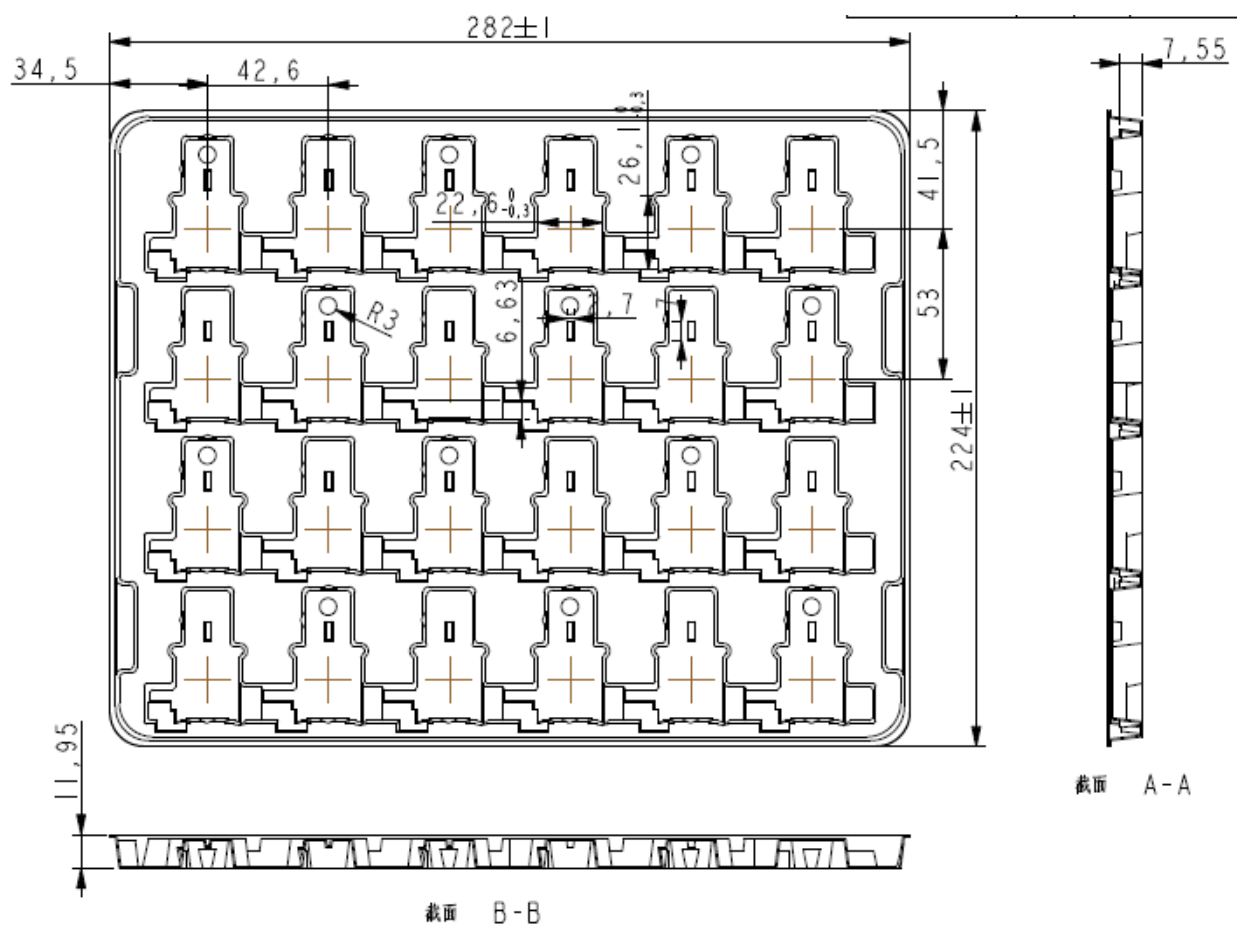
4.5 Anode



4.6 Separator



4.7 Package



5. PART LIST

5.1 Part List

Category	Condition	Spec.
Pouch Type	Pouch Thickness	86um
Active Material	Cathode	CPC-102
	Anode	APG-077
Substrate Material	Cathode	10um Al
	Anode	8um Cu
Electrolyte	Electrolyte	ESN-222
Separator	Thickness(um) (Coat/Base/Coat)	10um(7+3)

5.2 Part List Specification

5.2.1 Cathode Substrate Specification

Thickness (um)	Tensile Strength (MPa)		Material
	MD	TD	
10	≥200	≥200	Al

5.2.2 Anode Substrate Specification

Thickness (um)	Tensile Strength (kgf/cm²)		Material
	MD	TD	
8	≥4500	≥4500	Cu

5.2.3 Separator Specification

Thicknes s (um)	Ceramic Coating Thickness (um)	Tensile Strength (kgf/cm²)		Puncture Strength (kgf)	Dimensional Stability (105°C 1h) %	
		MD	TD		MD	TD
7	3	≥1000	≥1000	≥300	≤6	≤4

5.2.4 Pouch Specification

Thickness (um)	Tensile Strength	Material
86	NA	Nylon+Al+PP

6. TEST REPORT

6.1 Test Summary

1. Cell Electrical Test: Pass
2. Cell Mechanical Test : Pass
3. Cell Life cycle Test (23°C, 45°C) : Pass
4. Cell Capacity Test : Pass
5. Cell Environment Test : Pass
6. Cell Safety Test : Pass
7. Battery Tear Down Check: Pass



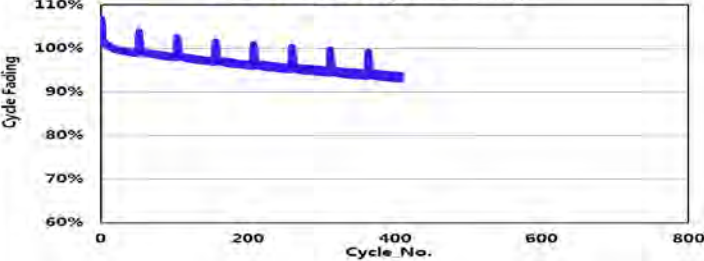
6.2 Cell Electrical Test

No.	Voltage (V)	IR (mohm)	Capacity (mAh)
1	3.79	106.53	289
2	3.78	105.76	286
3	3.79	108.20	285
4	3.79	106.04	286
5	3.78	108.37	285
6	3.79	101.61	285
7	3.78	106.16	286
8	3.79	106.05	286
9	3.79	106.14	289
10	3.79	105.64	288
11	3.79	109.84	284
12	3.79	104.35	288
13	3.79	106.94	284
14	3.79	108.41	288
15	3.79	106.41	287
16	3.78	105.01	283
17	3.78	108.34	289
18	3.78	105.02	284
19	3.78	107.28	285
20	3.79	104.27	288
21	3.79	109.13	292
22	3.79	106.56	291
23	3.79	109.19	285
24	3.79	107.01	287
25	3.79	108.87	286
26	3.79	104.75	287
27	3.78	107.06	285
28	3.79	105.87	287
29	3.79	105.08	286
30	3.79	106.81	290
31	3.78	105.87	285
32	3.79	105.23	286
Min.	3.78	100.31	282
Max.	3.80	113.18	294
Avg.	3.79	107.04	287
LSL	3.75	86.00	270
USL	3.80	116.00	-
σ	0.00	2.05	-
CP	3.50	2.44	-
CPK	1.94	1.46	-

6.3 Cell Mechanical Test

Cell No.	Length (mm)	Width (mm)	Thickness (mm)
1	23.21	22.03	4.49
2	23.00	22.16	4.50
3	23.21	22.00	4.49
4	23.06	22.03	4.50
5	23.17	21.95	4.54
6	23.01	22.16	4.52
7	23.12	22.03	4.51
8	23.14	21.88	4.50
9	23.15	21.80	4.50
10	23.05	21.98	4.52
11	23.14	21.90	4.54
12	23.06	21.99	4.51
13	23.22	21.93	4.52
14	23.10	21.94	4.50
15	23.02	21.93	4.53
16	23.06	22.08	4.54
17	23.17	21.96	4.57
18	23.00	21.95	4.55
19	23.15	21.95	4.49
20	23.15	21.99	4.52
21	22.95	22.00	4.49
22	23.12	21.96	4.49
23	23.24	21.85	4.51
24	22.98	21.98	4.53
25	23.22	22.05	4.53
26	23.05	21.99	4.47
27	23.18	22.01	4.53
28	23.04	21.98	4.50
29	22.89	21.98	4.49
30	22.98	22.28	4.52
31	23.08	21.97	4.58
32	23.06	21.98	4.56
Min.	22.89	21.73	4.45
Max.	23.32	22.30	4.59
Avg.	23.13	21.99	4.52
LSL	22.10	21.60	4.35
USL	23.50	22.60	4.75
σ	0.08	0.11	0.03
CP	2.95	1.56	2.42
CPK	1.58	1.21	2.03

6.4 Cell Life cycle Test Report (23°C, 45°C)

Cell Name	472324														
Test 5	Life Cycle Test (23±2℃)														
Procedure	0.2C Capacity - Charge : 0.2C, 0.02C-cutoff - Discharge : 0.2C, 2.75V-cutoff 0.5C Capacity - Charge : 0.8C, 0.02C-cutoff - Discharge : 0.5C, 2.75V-cutoff 1.0C Capacity - Charge : 0.8C, 0.1C-cutoff - Discharge : 1.0C, 3.00V-cutoff							IEC, GBT : 60% Cell @400cycle, Pack @300cycle							
Result	Spec. (Capacity)	1	2	3 ~50	51	52	53 ~100	101	102	103 ~150	151	152	153 ~200	201	
		0. 2C	0. 5C	1. 0C	0. 2C	0. 5C	1. 0C	0. 2C	0. 5C	1. 0C	0. 2C	0. 5C	1. 0C	0. 2C	
		100%	98%	90%	97%	95%	87%	95%	93%	85%	93%	91%	83%	92%	
	#1	107%	106%	99%	103%	103%	98%	102%	102%	97%	101%	101%	96%	101%	
	#2	106%	106%	99%	103%	103%	98%	102%	101%	97%	100%	100%	96%	100%	
	#3	106%	106%	99%	103%	103%	98%	102%	101%	97%	101%	100%	96%	100%	
	#4	106%	106%	99%	104%	103%	98%	102%	102%	97%	101%	101%	97%	101%	
	#5	107%	106%	99%	104%	103%	98%	103%	102%	98%	102%	101%	97%	101%	
	#6	106%	106%	99%	103%	103%	98%	102%	101%	97%	101%	100%	96%	100%	
	#7	106%	106%	99%	103%	103%	98%	102%	101%	97%	101%	100%	96%	100%	
	#8	106%	106%	99%	103%	103%	98%	102%	102%	97%	101%	101%	96%	101%	
	#9	107%	106%	99%	104%	103%	98%	103%	102%	97%	102%	101%	97%	101%	
	#10	107%	106%	99%	104%	103%	98%	102%	102%	97%	101%	101%	96%	101%	
	#11	106%	106%	99%	103%	103%	98%	102%	101%	97%	101%	100%	96%	100%	
	#12	106%	106%	99%	103%	103%	98%	102%	102%	97%	101%	101%	96%	100%	
	#13	106%	106%	99%	104%	103%	98%	102%	102%	97%	102%	101%	97%	101%	
	#14	107%	106%	99%	104%	103%	98%	102%	102%	97%	101%	101%	96%	101%	
	#15	106%	106%	99%	103%	103%	98%	102%	102%	97%	101%	101%	96%	100%	
	#16	106%	106%	99%	103%	103%	98%	102%	101%	97%	101%	101%	96%	100%	
	Spec. (Capacity)	202	203 ~250	251	252	253 ~300	301	302	303 ~350	351	352	353 ~400	401	402	
		0. 5C	1. 0C	0. 2C	0. 5C	1. 0C	0. 2C	0. 5C	1. 0C	0. 2C	0. 5C	1. 0C	0. 2C	0. 5C	
		90%	82%	91%	89%	81%	90%	88%	80%	89%	87%	78%	88%	86%	
	#1	100%	96%	100%	99%	95%	99%	99%							
	#2	99%	95%	99%	99%	94%	98%	98%							
	#3	100%	95%	99%	99%	94%	99%	98%							
	#4	100%	96%	100%	100%	95%	100%	99%							
	#5	101%	96%	101%	100%	95%	100%	99%							
	#6	100%	95%	99%	99%	94%	99%	98%							
	#7	100%	95%	99%	99%	94%	99%	98%							
	#8	100%	95%	100%	99%	95%	99%	99%							
	#9	101%	96%	100%	100%	95%	100%	99%							
	#10	100%	95%	100%	99%	95%	99%	99%							
	#11	100%	95%	99%	99%	94%	99%	98%							
	#12	100%	95%	100%	99%	95%	99%	99%							
	#13	100%	96%	100%	100%	95%	100%	99%							
	#14	100%	96%	100%	100%	95%	100%	99%							
	#15	100%	95%	100%	99%	94%	99%	99%							
	#16	100%	95%	99%	99%	94%	99%	98%							
	Thickness Δ %	201	401	Thickness Δ %	201	401	Thickness Δ %	201	401	Thickness Δ %	201	401			
		6%	8%		6%	8%		6%	8%						
		#1	2. 8%	3. 4%	#5	2. 6%	3. 3%	#9	2. 7%	3. 4%	#13	2. 8%	3. 4%		
		#2	2. 8%	3. 4%	#6	2. 8%	3. 4%	#10	2. 8%	3. 4%	#14	2. 7%	3. 3%		
		#3	2. 7%	3. 3%	#7	2. 8%	3. 4%	#11	2. 8%	3. 5%	#15	2. 8%	3. 4%		
	#4	2. 9%	3. 5%	#8	2. 8%	3. 4%	#12	2. 7%	3. 4%	#16	2. 7%	3. 4%			
	Life Cycle Test (23℃) Graph	25℃ 08C/1C Cycle Fading 													

Test 6	Accelerated Life Cycle Test (45±2℃)																														
Procedure	0.2C Capacity - Charge : 0.2C, 0.02C-cuttoff - Discharge : 0.2C, 2.75V-cuttoff 0.5C Capacity - Charge : 0.8C, 0.02C-cuttoff - Discharge : 0.5C, 2.75V-cuttoff 1.0C Capacity - Charge : 0.8C, 0.1C-cuttoff - Discharge : 1.0C, 3.00V-cuttoff																														
Result	Spec. (Capacity)	1	2	3 ~50	51	52	53 ~100	101	102	103 ~150	151	152	153 ~200	201																	
		0.2C	0.5C	1.0C	0.2C	0.5C	1.0C	0.2C	0.5C	1.0C	0.2C	0.5C	1.0C	0.2C																	
		100%	98%	90%	95%	93%	85%	92%	90%	82%	91%	89%	81%	90%																	
	#1	106%	107%	103%	105%	105%	101%	103%	103%	100%	103%	102%	99%	100%																	
	#2	107%	107%	103%	105%	105%	101%	103%	103%	100%	103%	102%	99%	101%																	
	#3	106%	106%	101%	103%	103%	99%	102%	102%	98%	101%	101%	97%	99%																	
	#4	107%	107%	102%	104%	104%	100%	102%	102%	99%	102%	101%	97%	100%																	
	#5	106%	106%	102%	104%	104%	100%	102%	102%	98%	101%	101%	98%	100%																	
	#6	106%	107%	103%	105%	105%	101%	103%	103%	100%	103%	102%	99%	101%																	
	#7	106%	107%	102%	104%	104%	100%	102%	102%	99%	102%	101%	98%	100%																	
	#8	106%	107%	102%	104%	104%	100%	102%	102%	98%	101%	101%	97%	100%																	
	#9	106%	107%	102%	104%	104%	100%	102%	102%	98%	101%	101%	97%	100%																	
	#10	106%	107%	102%	104%	104%	101%	103%	103%	99%	102%	102%	98%	100%																	
	#11	106%	107%	102%	104%	104%	101%	103%	103%	99%	102%	102%	98%	100%																	
	#12	106%	107%	102%	104%	104%	100%	102%	102%	99%	102%	101%	98%	100%																	
	#13	106%	107%	102%	104%	104%	100%	102%	102%	98%	101%	101%	97%	100%																	
	#14	106%	107%	102%	104%	104%	100%	102%	102%	99%	102%	101%	98%	100%																	
	#15	106%	107%	102%	104%	104%	101%	103%	103%	99%	102%	102%	98%	100%																	
	#16	106%	107%	102%	104%	104%	100%	102%	102%	99%	102%	101%	98%	100%																	
	Thickness Δ %	201	301	Thickness Δ %	201	301	Thickness Δ %	201	301	Thickness Δ %	201	301																			
		6%	8%		6%	8%		6%	8%		6%	8%																			
	#1	4.7%	5.3%	#5	4.7%	5.3%	#9	4.7%	5.3%	#13	4.7%	5.3%																			
	#2	4.6%	5.3%	#6	4.7%	5.3%	#10	4.7%	5.3%	#14	4.7%	5.3%																			
	#3	4.5%	5.1%	#7	4.6%	5.2%	#11	4.7%	5.3%	#15	4.7%	5.3%																			
	#4	4.5%	5.1%	#8	4.5%	5.1%	#12	4.6%	5.2%	#16	4.7%	5.3%																			
	Accelerated Life Cycle Test (45℃) Graph	45℃ 08C/1C Cycle Fading <table><caption>Cycle Fading Data Points (Estimated)</caption><tr><th>Cycle No.</th><th>Cycle Fading (%)</th></tr><tr><td>0</td><td>105</td></tr><tr><td>50</td><td>102</td></tr><tr><td>100</td><td>100</td></tr><tr><td>150</td><td>98</td></tr><tr><td>200</td><td>96</td></tr><tr><td>250</td><td>94</td></tr><tr><td>300</td><td>95</td></tr></table>														Cycle No.	Cycle Fading (%)	0	105	50	102	100	100	150	98	200	96	250	94	300	95
	Cycle No.	Cycle Fading (%)																													
	0	105																													
	50	102																													
100	100																														
150	98																														
200	96																														
250	94																														
300	95																														
Test 6	High Temp. Continuous Charge (45±2℃)																														
Procedure	Charge : (Max Charge Voltage - 0.03V) 0.2C, .0.02C-cuttoff Discharge : 0.01C, (Max Charge Voltage - 0.08V)-cuttoff Check : 28 Day																														
Result	Thickness Δ %	28Day	Thickness Δ %	28Day	Thickness Δ %	28Day	Thickness Δ %	28Day	Thickness Δ %	28Day																					
		8%		8%		8%		8%		8%																					
	#1	0.5%	#3	0.4%	#5	0.5%	#7	0.5%																							
	#2	0.3%	#4	0.7%	#6	0.4%	#8	0.6%																							

6.5 Cell Capacity Test

Cell Name	472324								
Test 1	Rated Discharge Capacity					관련 규격			
Procedure	Charge : 0.2C, 0.02-cutoff, Discharge : 0.2C / 0.5C / 1.0C, 2.75V-cutoff Test Cycle : 0.2C (2cycle) → 0.5C → 1.0C, 23±2℃					IEC : 0.2C 100%, 1.0C Cell 70%, Pack 60% GBT : 0.2C 100%, 1.0C 85%(<1000mAh)			
Result	Spec.	0.2C		Spec.	0.5C		Spec.	1.0C	
		270mAh	100%		265mAh	98%		243mAh	90%
	#1	290	107%	#1	289	107%	#1	283	105%
	#2	288	107%	#2	286	106%	#2	281	104%
	#3	287	106%	#3	285	106%	#3	280	104%
Result	#4	289	107%	#4	286	106%	#4	282	104%
Procedure	Charge : 0.2C, 0.02-cutoff, Discharge : 0.2C / 0.5C / 1.0C, 3.4V-cutoff Test Cycle : 0.2C (2cycle) → 0.5C → 1.0C, 23±2℃					IEC : 0.2C 100%, 1.0C Cell 70%, Pack 60% GBT : 0.2C 100%, 1.0C 85%(<1000mAh)			
Result	Spec.	0.2C		Spec.	0.5C		Spec.	1.0C	
		463mAh	98%		434mAh	92%		378mAh	80%
	#1	283	105%	#1	280	104%	#1	269	100%
	#2	281	104%	#2	278	103%	#2	267	99%
	#3	280	104%	#3	277	102%	#3	266	99%
Result	#4	282	105%	#4	277	103%	#4	266	98%
Test 2	Discharge Capacity as Temperature Condition								
Procedure	Charge : 0.2C, 0.02-cutoff, 23±2℃ Discharge : -20℃ / -10℃ (Stay 4hr), 55℃ (Stay 2hr) 0.2C, 2.75V-cutoff					IEC : -20℃ : Cell 30%, Pack 30% GBT : -10℃ : 60%, 55℃ : 100%			
Result	Spec.	-20±2℃		Spec.	-10±2℃		Spec.	55±2℃	
		81mAh	30%		189mAh	70%		270mAh	100%
	#21	256	95%	#31	269	100%	#41	285	105%
	#22	252	93%	#32	267	99%	#42	284	105%
	#23	256	95%	#33	270	100%	#43	287	106%
Result	#24	255	94%	#34	269	100%	#44	286	106%
Procedure	Charge : 0.2C, 0.02-cutoff, 23℃ Discharge : -20℃ / -10℃ (Stay 4hr), 55℃ (Stay 2hr) 0.1C, 3.4V-cutoff					IEC : -20℃ : Cell 30%, Pack 30% GBT : -10℃ : 60%, 55℃ : 100%			
Result	Spec.	-20±2℃		Spec.	-10±2℃		Spec.	55±2℃	
		14mAh	5%		135mAh	50%		265mAh	98%
	#21	174	65%	#31	241	89%	#41	279	103%
	#22	180	67%	#32	246	91%	#42	279	103%
	#23	166	61%	#33	236	87%	#43	279	103%
Result	#24	162	60%	#34	233	86%	#44	278	103%
Test 3	Retention & Recovery Capacity								
Procedure	Full Charge & Store : 28 day, 23±2℃ Retention Discharge : 0.2C, 2.75V-cutoff Charge : within 24 hr Recovery Discharge : 0.2C, 2.75V-cutoff					Retention IEC : Cell 70%, Pack 60% GBT : 85% Recovery IEC : 85% GBT : 90%			
Result	Spec.	Retention		Spec.	Retention (12 month)				
		230mAh	85%		243mAh	90%			
	#51	266	99%	#51	284	105%			
	#52	266	99%	#52	282	105%			
	#53	266	98%	#53	283	105%			
Result	#54	268	99%	#54	285	105%			
	#55	267	99%	#55	284	105%			
Test 4	Room Temperature Storage & High Temperature Storage								
Procedure	Half Charged, 12 month, 23±2℃ Retention Discharge : 0.2C-rate, 2.75V-cutoff, 23℃ Half Charged, 90 day, 40±2℃ Retention Discharge : 0.2C-rate, 2.75V-cutoff, 23℃					Room Temp. : GBT 80% High Temp. : IEC 50%			
Result	Spec.	12 month, 23±2℃		Spec.	High Temperature				
		216mAh	95%		135mAh	80%			
	#56	275	102%	#61	273	101%			
	#57	276	102%	#62	276	102%			
	#58	275	102%	#63	274	102%			
Result	#59	275	102%	#64	275	102%			
	#60	279	103%	#65	275	102%			

6.6 Cell Environment Test

Cell Name	472324							
Test 1	고온동작							
Procedure	Charge : Max voltage, 0.8C, 0.02C-cutoff, 45℃ Discharge : 1.0C, 2.75V-cutoff, 60℃ Test Cycle : Charge(90min) → Temp Change(45℃→60℃, 30min) → Discharge(50min) → Temp Change(60℃→45℃, 30min) After 60Cycle, check capacity and thickness Capacity : Charge 0.2C, 0.02C-cutoff / Discharge 2.75V-cutoff							
Result	Spec.	Immediately	Wait 2Hr			Wait 24Hr	Capacity	
		△T	△IR	△T	OCV	△OCV	0.2C	1.0C
		10%	90m	8%	-	0.05V	90%	80%
	#1	5%	69	2%		0.014	96%	91%
	#2	5%	69	2%		0.013	97%	93%
	#3	5%	68	2%		0.010	97%	92%
	#4	5%	72	2%		0.012	97%	92%
	#5	4%	65	2%		0.012	97%	92%
	#6	5%	69	2%		0.012	93%	85%
	#7	5%	71	2%		0.012	96%	92%
	#8	4%	67	2%		0.011	97%	93%
	#9	5%	70	2%		0.012	95%	89%
	#10	4%	68	2%		0.012	97%	92%
	#11	4%	68	2%		0.011	97%	92%
	#12	5%	70	2%		0.012	94%	87%
	#13	4%	67	2%		0.012	96%	92%
	#14	5%	69	2%		0.012	97%	92%
	#15	5%	69	2%		0.012	95%	88%
	#16	4%	67	2%		0.012	97%	92%
	#17	5%	70	2%		0.012	97%	92%
	#18	5%	68	2%		0.012	94%	87%
	#19	4%	68	2%		0.012	97%	92%
	#20	5%	69	2%		0.012	97%	92%

Test 2	고온고습 가속							
Procedure	Charge : Max voltage, 0.2C, 0.02-cutoff, 23±2℃ 60±2℃ / 90±5%RH, Stay 14 day After 14 day, check capacity and thickness Capacity : Charge 0.2C, 0.02C-cutoff / Discharge 2.75V-cutoff							
Result	Spec.	Immediately	Wait 2Hr			Wait 24Hr	Capacity	
		△T	△IR	△T	△OCV	△OCV	0.2C	1.0C
		10%	65m	8%	0.3V	0.05V	80%	70%
	#1	0.8%	58	0.7%	0.12	0.006	97%	92%
	#2	0.8%	63	0.7%	0.12	0.006	97%	89%
	#3	0.8%	58	0.7%	0.12	0.006	96%	90%
	#4	0.8%	59	0.7%	0.13	0.006	96%	86%
	#5	0.8%	59	0.7%	0.12	0.006	95%	93%
	#6	0.5%	58	0.3%	0.11	0.006	97%	91%
	#7	0.5%	61	0.3%	0.11	0.006	97%	88%
	#8	0.5%	59	0.3%	0.11	0.006	96%	91%
	#9	1.0%	58	0.7%	0.12	0.005	96%	88%
	#10	0.7%	60	0.6%	0.11	0.006	96%	92%
	#11	0.7%	58	0.6%	0.11	0.006		
	#12	0.6%	59	0.5%	0.11	0.007		
	#13	0.6%	60	0.4%	0.11	0.006		
	#14	1.0%	58	0.9%	0.11	0.006		
	#15	1.1%	59	0.9%	0.11	0.006		
	#16	0.6%	59	0.5%	0.11	0.005		
	#17	0.7%	58	0.6%	0.11	0.006		
	#18	0.5%	59	0.4%	0.11	0.006		
	#19	0.6%	59	0.5%	0.11	0.006		
	#20	0.7%	59	0.6%	0.11	0.006		
	#21	0.8%	58	0.7%	0.12	0.005		
	#22	0.6%	61	0.6%	0.11	0.006		
	#23	0.6%	58	0.6%	0.11	0.006		
	#24	0.5%	59	0.6%	0.11	0.006		
	#25	1.0%	60	0.5%	0.11	0.006		
	#26	1.0%	58	0.7%	0.11	0.006		
	#27	0.7%	60	0.7%	0.11	0.006		
	#28	0.7%	59	0.4%	0.11	0.006		
	#29	0.5%	58	0.6%	0.11	0.006		
	#30	0.7%	59	0.4%	0.11	0.006		
	#31	0.8%	59	0.6%	0.11	0.006		
	#32	0.7%	59	0.6%	0.11	0.006		
	#33	0.7%	59	0.6%	0.11	0.006		
	#34	0.6%	60	0.7%	0.11	0.007		
	#35	0.5%	58	0.7%	0.12	0.006		
	#36	0.9%	59	0.6%	0.11	0.006		
	#37	0.9%	59	0.5%	0.11	0.006		
	#38	0.7%	58	0.6%	0.11	0.006		
	#39	0.6%	59	0.7%	0.11	0.005		
	#40	0.5%	59	0.5%	0.11	0.006		

Test 3	열충격							
Procedure	Charge : 4.25@4.35/4.4V, 4.3@4.43/4.45V, 0.2C, 0.02-cutoff, 23±2℃, Rest time 24H Test Cycle : -40℃ (30min) → 85℃ (30min) After 96 Cycle, check capacity and thickness							
Result	Spec.	Immediately	Wait 2Hr			Wait 24Hr	Capacity	
		△T	△IR	△T	△OCV	△OCV	0.2C	1.0C
		10%	30m	8%	0.2V	0.05V	80%	70%
	#1	1.2%	42	1.1%	0.074	0.002	102%	100%
	#2	1.4%	43	1.2%	0.075	0.002	103%	101%
	#3	1.6%	45	1.3%	0.075	0.002	103%	102%
	#4	1.7%	46	1.4%	0.077	0.002	102%	100%
	#5	1.2%	46	1.1%	0.077	0.002	102%	101%
	#6	1.1%	44	0.9%	0.074	0.001	102%	101%
	#7	1.0%	46	0.7%	0.076	0.002	102%	101%
	#8	1.0%	45	0.8%	0.076	0.002	103%	101%
	#9	1.1%	45	0.8%	0.075	0.003	102%	101%
	#10	0.9%	46	0.7%	0.076	0.002	102%	101%
	#11	0.9%	45	0.8%	0.075	0.002		
	#12	0.8%	45	0.7%	0.076	0.002		
	#13	1.2%	46	0.9%	0.076	0.002		
	#14	1.4%	45	1.1%	0.075	0.004		
	#15	1.3%	45	1.0%	0.076	0.002		
	#16	1.4%	45	1.1%	0.076	0.002		
	#17	1.1%	45	0.9%	0.075	0.001		
	#18	1.2%	45	1.0%	0.076	0.002		
	#19	1.3%	45	1.0%	0.076	0.002		
	#20	1.1%	45	0.9%	0.076	0.002		

6.7 Cell Safety Test

PL SAFETY TEST RESULT

No.	Test Name	Safety Test		Test Result	
		Procedure	Criteria	T max (°C)	Result
1	External Short	Short-Circuited by connecting the positive and negative terminals with a total resistance of less than $80 \pm 20 \text{m}\Omega$ for 6 hours.	C1 ↓		PASS
2	Forced Discharge	Discharge continuously the cell with constant current 1C for 1.5 hours.	C1 ↓	56	PASS
3	Overcharge	Charge the test samples with (max charge current) ×3 and voltage 4.6V for 7 hours.	C1 ↓	39	PASS
4	Penetration	Penetrate completely center of cell with 3mm diameter nail at the velocity of 150mm/sec.	C2 ↓		
5	Impact	9.1kg weight is to be dropped from a height of 610 ±25mm onto the bar and cells.	C2 ↓		
6	Crush	Cell(rated charged) is placed between two flat surfaces and a force of $13 \pm 1 \text{ kN}$ shall be applied by a crushing apparatus. The force shall be released when the following occurs: there is 10% deformation of the battery height.	C2 ↓	23	PASS
7	Heating	Temperature of the chamber is to be raised at a rate of $5 \pm 2^\circ\text{C}$ ($9 \pm 3.6^\circ\text{F}$) per minute to a temperature of $130 \pm 2^\circ\text{C}$ ($302 \pm 3.6^\circ\text{F}$) for 1 hours.	C2 ↓ (After cell temperature reaching at $130 \pm 2^\circ\text{C}$)	134	PASS
8	Triangular Rod Crush	Applied force of $3 \text{ kN} \pm 10 \text{ N}$ (Pouch $1.5 \text{ kN} \pm 10 \text{ N}$) to the test samples by triangular rod.	C2 ↓		PASS
9	Extreme Temperature Exposure	Put the test samples on the center of heating block when its temperature is reaching at 250°C .	C4 ↓		PASS
10	External Dent	Press edge of cell with 6mm diameter jig when its pressure is reaching at 0.4kN (Pouch 1.3kN)	C2 ↓		PASS
11	Nail Half-Penetration	Penetrate center of cell with 3mm diameter nail at the velocity of 150mm/sec.	C2 ↓		

Criteria Level	Criterion
C0	No Leakage
C1	Leakage, Heated < 150°C
C2	Heated < 200°C
C3	Smoked, Heated > 200°C
C4	Flame
C5	Explosion

Safety Test shall be performed with the following criteria

- UL1642

- Fully charged cell is a cell that is rated-charged. (CC-CV 0.5C 4.4V 0.05C cut-off)

- Testing shall be performed after 24hours after charging.

- Fully discharge cell is a cell that is rated discharged. (CC 0.2C 2.75V cut-off)

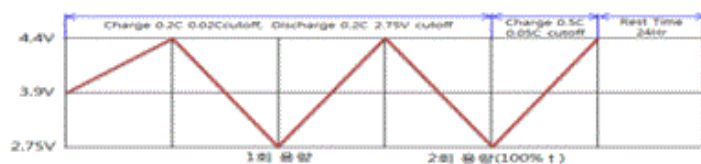
- Testing shall be performed after 2hours after discharging.

Testing shall be performed at 23°C .

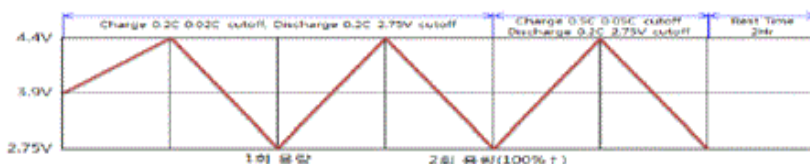
All Safety Test shall be performed after rated 2-cycle.

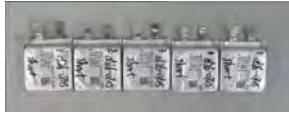
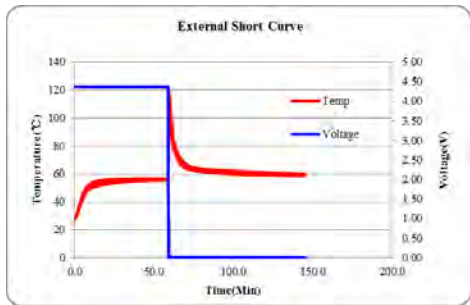
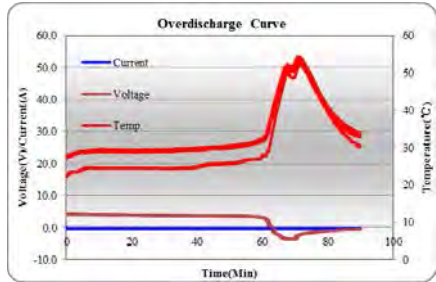
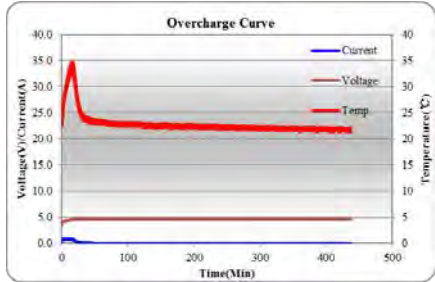
※ Rated 2-cycle (charge : CC-CV 0.2C 4.4V 0.02C cut-off / discharge : CC 0.2C 2.75V cut off)

- Test after fully charged



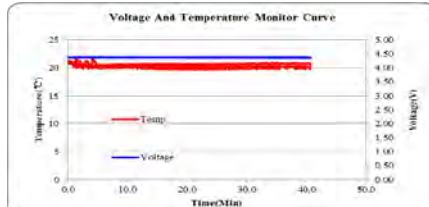
- Test after fully discharged



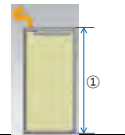
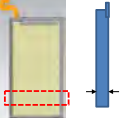
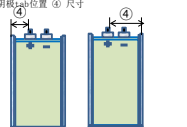
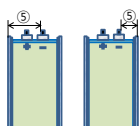
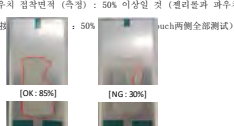
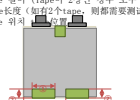
Test Name		External Short					Test Name		Forced Discharge																																																																						
Test Procedure							Test Procedure																																																																								
Short-Circuited by connecting the positive and negative terminals with a total resistance of less than 80±20mΩ for 6 hours.							Discharge continuously the cell with constant current 1C for 1.5 hours.																																																																								
Test Result							Test Result																																																																								
<table><tr><td colspan="2">SPL No.</td><td>#1</td><td>#2</td><td>#3</td><td>#4</td><td>#5</td></tr><tr><td rowspan="2">Before</td><td>OCV(V)</td><td>4.38</td><td>4.38</td><td>4.38</td><td>4.38</td><td>4.38</td></tr><tr><td>IR(mΩ)</td><td>96</td><td>96</td><td>96</td><td>96</td><td>98</td></tr><tr><td rowspan="2">After</td><td>T max (℃)</td><td>119</td><td>118</td><td>111</td><td>114</td><td>116</td></tr><tr><td>Level</td><td>C0</td><td>C0</td><td>C0</td><td>C0</td><td>C0</td></tr></table>							SPL No.		#1	#2	#3	#4	#5	Before	OCV(V)	4.38	4.38	4.38	4.38	4.38	IR(mΩ)	96	96	96	96	98	After	T max (℃)	119	118	111	114	116	Level	C0	C0	C0	C0	C0	<table><tr><td colspan="2">SPL No.</td><td>#1</td><td>#2</td><td>#3</td><td>#4</td><td>#5</td></tr><tr><td rowspan="2">Before</td><td>OCV(V)</td><td>4.377</td><td>4.377</td><td>4.379</td><td>4.380</td><td>4.380</td></tr><tr><td>IR(mΩ)</td><td>94.5</td><td>96.0</td><td>95.4</td><td>96.1</td><td>95.7</td></tr><tr><td rowspan="2">After</td><td>T max (℃)</td><td>51</td><td>52</td><td>51</td><td>53</td><td>53</td></tr><tr><td>Level</td><td>C0</td><td>C0</td><td>C0</td><td>C0</td><td>C0</td></tr></table>							SPL No.		#1	#2	#3	#4	#5	Before	OCV(V)	4.377	4.377	4.379	4.380	4.380	IR(mΩ)	94.5	96.0	95.4	96.1	95.7	After	T max (℃)	51	52	51	53	53	Level	C0	C0	C0	C0	C0
SPL No.		#1	#2	#3	#4	#5																																																																									
Before	OCV(V)	4.38	4.38	4.38	4.38	4.38																																																																									
	IR(mΩ)	96	96	96	96	98																																																																									
After	T max (℃)	119	118	111	114	116																																																																									
	Level	C0	C0	C0	C0	C0																																																																									
SPL No.		#1	#2	#3	#4	#5																																																																									
Before	OCV(V)	4.377	4.377	4.379	4.380	4.380																																																																									
	IR(mΩ)	94.5	96.0	95.4	96.1	95.7																																																																									
After	T max (℃)	51	52	51	53	53																																																																									
	Level	C0	C0	C0	C0	C0																																																																									
Test Picture							Test Picture																																																																								
 							 																																																																								
Before							After																																																																								
Test Profile (Voltage / Cell Temperature)							Test Profile (Voltage / Current / Cell Temperature)																																																																								
																																																																															
Test Name		Overcharge					Test Name		Penetration																																																																						
Test Procedure							Test Procedure																																																																								
Charge the test samples with (max charge current)×3 and voltage 4.6V for 7 hours.							Penetrate completely center of cell with 3mm diameter nail at the velocity of 150mm/sec.																																																																								
Test Result							Test Result																																																																								
<table><tr><td colspan="2">SPL No.</td><td>#1</td><td>#2</td><td>#3</td><td>#4</td><td>#5</td></tr><tr><td rowspan="2">Before</td><td>OCV(V)</td><td>3.800</td><td>3.793</td><td>3.792</td><td>3.793</td><td>3.792</td></tr><tr><td>IR(mΩ)</td><td>97.9</td><td>96.1</td><td>97.8</td><td>98.4</td><td>96.3</td></tr><tr><td rowspan="2">After</td><td>T max (℃)</td><td>33</td><td>34</td><td>34</td><td>33</td><td>35</td></tr><tr><td>Level</td><td>C0</td><td>C0</td><td>C0</td><td>C0</td><td>C0</td></tr></table>							SPL No.		#1	#2	#3	#4	#5	Before	OCV(V)	3.800	3.793	3.792	3.793	3.792	IR(mΩ)	97.9	96.1	97.8	98.4	96.3	After	T max (℃)	33	34	34	33	35	Level	C0	C0	C0	C0	C0	<table><tr><td colspan="2">SPL No.</td><td>#1</td><td>#2</td><td>#3</td><td>#4</td><td>#5</td></tr><tr><td rowspan="2">Before</td><td>OCV(V)</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>IR(mΩ)</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="2">After</td><td>T max (℃)</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Level</td><td></td><td></td><td></td><td></td><td></td></tr></table>							SPL No.		#1	#2	#3	#4	#5	Before	OCV(V)						IR(mΩ)						After	T max (℃)						Level					
SPL No.		#1	#2	#3	#4	#5																																																																									
Before	OCV(V)	3.800	3.793	3.792	3.793	3.792																																																																									
	IR(mΩ)	97.9	96.1	97.8	98.4	96.3																																																																									
After	T max (℃)	33	34	34	33	35																																																																									
	Level	C0	C0	C0	C0	C0																																																																									
SPL No.		#1	#2	#3	#4	#5																																																																									
Before	OCV(V)																																																																														
	IR(mΩ)																																																																														
After	T max (℃)																																																																														
	Level																																																																														
Test Picture							Test Picture																																																																								
 							 																																																																								
Before							After																																																																								
Test Profile (Voltage / Current / Cell Temperature)							Test Profile (Cell Temperature)																																																																								
																																																																															

Test Name		Impact					Test Name		Crush				
Test Procedure							Test Procedure						
9.1kg weight is to be dropped from a height of 610±25mm onto the bar and cells.							Cell(rated charged) is placed between two flat surfaces and a force of 13 ± 1 kN shall be applied by a crushing apparatus. The force shall be released when the following occurs: there is 10% deformation of the battery height.						
Test Result							Test Result						
SPL No.		#1	#2	#3	#4	#5	SPL No.		#1	#2	#3	#4	#5
Before	OCV(V)						Before	OCV(V)	4.378	4.379	4.378	4.379	4.383
	IR(mΩ)							IR(mΩ)	97.0	96.9	96.1	95.0	94.9
After	T max (°C)						After	T max (°C)	25	25	24	24	24
	Level							Level	C0	C0	C0	C0	C0
Test Picture							Test Picture						
Before							After						
Test Name		Heating					Test Name		Triangular Rod Crush				
Test Procedure							Test Procedure						
Temperature of the chamber is to be raised at a rate of 5±2°C (9±3.6°F) per minute to a temperature of 130±2°C(302±3.6°F) for 1 hours.							Applied force of 3kN±10N(Pouch 1.5kN±10N) to the test samples by triangular rod.						
Test Result							Test Result						
SPL No.		#1	#2	#3	#4	#5	SPL No.		#1	#2	#3	#4	#5
Before	OCV(V)	4.389	4.383	4.388	4.389	4.381	Before	OCV(V)	4.389	4.388	4.383	4.383	4.389
	IR(mΩ)	98.9	95.4	95.7	97.1	96.7		IR(mΩ)	96.8	97.2	95.4	96.2	97.1
After	T max (°C)	133	134	133	136	132	After	Level	C0	C0	C0	C0	C0
	Event Time												
Test Picture							Test Picture						
Before							After						
Test Profile (Cell / Ambient Temperature)							Test Profile (Cell / Ambient Temperature)						

Test Name		High Temperature Internal Force Test				
Test Procedure						
Stand for 8 hours at 90℃ in Jig						
- Jig Height:110% of Battery Thickness						
- Jig Side gap:0.1mm						
Test Result						
SPL No.		#1	#2	#3	#4	#5
Before	OCV(V)	4.374	4.373	4.377	4.376	4.378
	IR(mΩ)	97.1	97.5	96.7	97.5	98.3
After	Level					
Test Picture						
Before		After				
						
Before		After				

Test Name		Triangular Rod Crush(2)				
Test Procedure						
Applied force of 3kN±10N(Pouch 1.5kN±10N) to the test samples by triangular rod.						
Test Result						
SPL No.		#1	#2	#3	#4	#5
Before	OCV(V)	4.38	4.38	4.38	4.38	4.38
	IR(mΩ)	102	105	104	104	106
After	Level	C0	C0	C0	C0	C0
Test Picture						
Before		After				
						
Before		After				
						

6.8 Battery Tear down Check List(Decap 1.7)

No.	검사 방법 検査方法	검사 항목 検査項目	판단 기준 判断基準	검사 시기 検査時期	영향도 影響度			측정 項目 測定項目	Data										판정 (OK/NG)	비고 (승인원 初手) Spec							
					Critical	Major	Minor		1	2	3	4	5	6	7	8	9	10									
1	분해전 X-Ray 拆解前 X-ray	● 오시리부 각면 형상 角位板片狀況	○ 4면(상, 하, 좌, 우)의 오시리에서 최외각부 각면각도가 30도 이내일 것 4面(上、下、左、右)的角位到最外角位置, 板片角度30度以内	개발 양산 개발 양산		●			Qualify	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	≤30°					
									QPA	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	≤30°					
2	분해전 CT 拆解前 CT	● 셀리온 형상 J/R 狀況 角位要求 확인토록 한다. 需要时测试 - 수경시험이 종료된 시료의 경우 寿命测试完成の样品 - 환경시험이 종료된 시료의 경우 环境测试完成の样品	○ 리플 및 각은 변형될 것을 deform及變形開 - 측정 방법: 상(극관 소용과 결합부), 중, 하(끝단에서 5mm) 测试方法: 上(极片超声波結合部), 中, 下(尾部开始5mm) ※ 리플: 셀리온의 형태가 변형이 생긴상태 deform, J/R的状态为发生变形的状态	개발 개발		●			셀리온 형상 J/R 狀況	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA						
																											
3	분해전 Dimension 拆解前 Dimension	● Pack (or Cell) 전장 ① 지수 : pack (or cell) 长度 ① 尺寸	○ 승인원래 명기된 Pack (or Cell) 전장 지수 Spec. 을 만족할 것 需要满足承认书中规定的pack (or cell) 长度尺寸Spec - 측정 방법: PPG 또는 마이크로캘리퍼스도 측정 测试方法: 使用PPG或者卡尺测试 ※ 고온고압, 열충격 시험을 시험 완료 후 차온 20hr 범위 후 측정할 것 高温高压、热冲击样品要在测试完成后需温置2小时后再进行测试	개발 양산 개발 양산		●			Qualify	25.71	25.81	25.80	25.63	25.88	25.81	25.91	25.85	25.59	25.75	OK	25.3°'27"						
									QPA	25.64	25.83	25.74	25.88	26.03	25.84	25.77	25.74	25.65	25.7	OK	25.3°'27"						
4	분해전 Dimension 拆解前 Dimension	● Pack (or Cell) 폭 ② 지수 : pack (or cell) 宽度 ② 尺寸	○ 승인원래 명기된 Pack (or Cell) 폭 지수 Spec. 을 만족할 것 需要满足承认书中规定的pack (or cell) 宽度尺寸Spec - 측정 방법: PPG 또는 마이크로캘리퍼스도 측정 测试方法: 使用PPG或者卡尺测试 ※ 고온고압, 열충격 시험을 시험 완료 후 차온 20hr 범위 후 측정할 것 高温高压、热冲击样品要在测试完成后需温置2小时后再进行测试	개발 양산 개발 양산		●			Qualify	21.98	21.70	22.04	21.89	22.07	22.01	22.01	21.89	21.96	22.28	OK	21.6°'22.6"						
									QPA	22.22	21.95	22.11	22.1	22.01	22.04	22.00	21.96	21.83	21.93	OK	21.6°'22.6"						
5	분해전 Dimension 拆解前 Dimension	● Pack (or Cell) 두께 ③ 지수 : pack (or cell) 厚度 ③ 尺寸	○ 승인원래 명기된 Pack (or Cell) 두께 지수 Spec. 을 만족할 것 需要满足承认书中规定的pack (or cell) 厚度尺寸Spec - 측정 방법: PPG 또는 마이크로캘리퍼스도 측정 测试方法: 使用PPG或者卡尺测试 ※ 고온고압, 열충격 시험을 시험 완료 후 차온 20hr 범위 후 측정할 것 高温高压、热冲击样品要在测试完成后需温置2小时后再进行测试	개발 양산 개발 양산		●			Qualify	4.92	4.49	4.50	4.52	4.45	4.47	4.47	4.46	4.45	4.46	OK	4.35°'4.75"						
									QPA	4.51	4.50	4.49	4.47	4.47	4.53	4.51	4.52	4.51	4.49	OK	4.35°'4.75"						
6	분해전 Dimension 拆解前 Dimension	● 양극 Tab 위치 ④ 지수 : 阳极Tab位置 ④ 尺寸	○ 승인원래 명기된 도면 기준으로 양극 Tab 위치 지수 Spec. 을 만족할 것 以承认书中的drawing为基础, 需要符合阳极Tab位置尺寸Spec - 측정 방법: 마이크로캘리퍼스 또는 상용하는 지그를 사용하여 측정 测试方法: 使用卡尺或者相应的Jig测试	개발 양산 개발 양산		●			Qualify	5.16	5.15	5.24	5.27	5.25	5.24	5.26	5.25	5.25	5.34	OK	4.45°'6.05"						
									QPA	5.24	5.26	5.25	5.27	5.25	5.27	5.26	5.25	5.27	5.25	OK	4.45°'6.05"						
7	분해전 Dimension 拆解前 Dimension	● 음극 Tab 위치 ⑤ 지수 : 阴极Tab位置 ⑤ 尺寸	○ 승인원래 명기된 도면 기준으로 음극 Tab 위치 지수 Spec. 을 만족할 것 以承认书中的drawing为基础, 需要符合阴极Tab位置尺寸Spec - 측정 방법: 마이크로캘리퍼스 또는 상용하는 지그를 사용하여 측정 测试方法: 使用卡尺或者相应的Jig测试	개발 양산 개발 양산		●			Qualify	13.77	13.86	13.75	13.86	13.94	13.84	13.85	13.86	13.87	13.92	OK	13.05°'14.6"						
									QPA	13.84	13.84	13.85	13.86	13.85	13.86	13.87	13.84	13.84	13.85	OK	13.05°'14.6"						
8	분해전 Dimension 拆解前 Dimension	● Tab 폭 ⑥ 지수 : Tab 宽度 ⑥ 尺寸	○ 승인원래 명기된 양극 Tab 폭 지수 Spec. 을 만족할 것 需要满足承认书中的规定的阳极Tab宽度尺寸Spec ○ 승인원래 명기된 음극 Tab 폭 지수 Spec. 을 만족할 것 需要符合承认书中的规定的阴极Tab宽度尺寸Spec - 측정 방법: 마이크로캘리퍼스 또는 상용하는 지그를 사용하여 측정 测试方法: 使用卡尺或者相应的Jig测试	개발 양산 개발 양산		●	●		Qualify	3.01	3.00	2.99	3.00	3.01	2.99	3.01	3.00	2.98	3.02	OK	2.9°'3"						
									QPA	3.01	3.00	2.98	3.00	3.01	2.99	3.01	3.00	3.00	3.01	OK	2.9°'3.1"						
9	분해 후 Dimension 拆解后 Dimension	● J/R부착 Tape 사이즈 및 부착위치 J/R附貼Tape尺寸及貼附位置 ①: Tape 폭 Tape 宽度 ②: Tape 폭 Tape 宽度 ③: Tape 길이(Tape) 2장인 경우 모두 측정 tape长度 (如2个tape, 则都需要测试) ④: Tape 가로방향 Tape 横向位置 ⑤: Tape 세로방향 Tape 纵向位置 ⑥: OPS Tape	○ Tape 누락 (측정) Tape 遗漏 (内脱) ○ Tape 위치 (측정) : Min, Max 측정 시 이상일 것 Tape 位置 (测试) : Min, Max测试时无异常 ○ Tape 사이즈 (측정) Tape 尺寸 (测试) ○ 셀리온과 좌우측 접착면치 (측정) : 50% 이상일 것 (셀리온과 좌우측 접착면 모두 측정) J/R Pouch Test : 50% (J/R pouch Test 两侧全部测试)	개발 양산	●		●	●	Tape 누락 (측정)	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK						
									Qualify	① 11.00 11.00 11.00 11.00 11.00 11.00 11.00 11.00 11.00 11.00 ② 16.20 16.3 16.2 16.2 16.0 16.3 16.2 16.1 16.0 16.00 ③ 5.5 5.0 5.5 5.5 5.0 5.5 5.5 5.5 5.5 5.0 ④ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	10.5°'11.5° 5°'13° 0°'2°	
									QPA	① 11.00 11.00 11.00 11.00 11.00 11.00 11.00 11.00 11.00 11.00 ② 16.2 16.3 16.2 16.2 16.0 16.3 16.2 16.1 16.0 16.0 ③ 5.5 5.0 5.5 5.5 5.0 5.5 5.5 5.5 5.5 5.0 ④ 0 0 0 0 0 0 0 0 0 0	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	10.5°'11.5° 13°'19° 5°'13° 0°'2°	
									QPA	① 11.00 11.00 11.00 11.00 11.00 11.00 11.00 11.00 11.00 11.00 ② 16.2 16.3 16.2 16.2 16.0 16.3 16.2 16.1 16.0 16.0 ③ 5.5 5.0 5.5 5.5 5.0 5.5 5.5 5.5 5.5 5.0 ④ 0 0 0 0 0 0 0 0 0 0	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	10.5°'11.5° 13°'19° 5°'13° 0°'2°
10	분해 후 Dimension 拆解后 Dimension	● BOTTOM Tape 사이즈 및 부착위치, 누락 후 셀리온 형상 Bottom tape size及貼附位置, 粘貼后J/R狀況 ①: Tape 폭 Tape 宽度 ②: Tape 길이 (Tape) 2장인 경우 모두 측정 tape长度 (如2个tape, 则都需要测试) ③: Tape 위치	○ Tape 누락 (측정) Tape 遗漏与否 (内脱) ○ Tape 위치 (측정) Tape 位置 (测试) ○ Tape 사이즈 (Tape 탈착 후 측정) Tape size (tape撕掉后测试) ○ Tape 누락 후 셀리온과 접착면치 (측정) Tape size (tape撕掉后测试) ①: Tape 폭 Tape 宽度 ②: Tape 길이 (Tape) 2장인 경우 모두 측정 tape长度 (如2个tape, 则都需要测试) ③: Tape 위치	개발 양산 개발 양산		●	●	●	Qualify	① NA NA NA NA NA NA NA NA NA NA NA ② NA NA NA NA NA NA NA NA NA NA NA ③ NA NA NA NA NA NA NA NA NA NA NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	OK					
									QPA	① NA NA NA NA NA NA NA NA NA NA NA ② NA NA NA NA NA NA NA NA NA NA NA ③ NA NA NA NA NA NA NA NA NA NA NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	OK				

[illegible]

[illegible]

7. INSPECTION STANDARD

7.1 Cosmetic Inspection Allowance

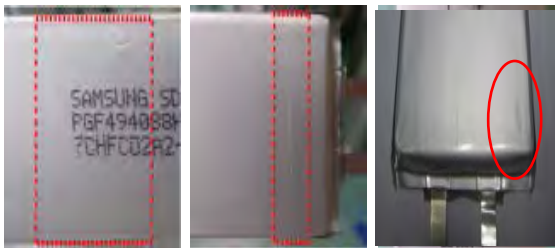
□ Reference 3: Appearance condition allowance (embedded pouch without label print)

1) Appearance

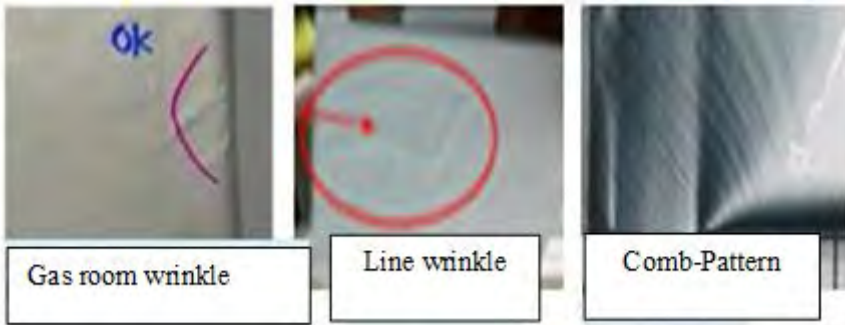
- Pouch Dent: Measurement by magnifying glass (10x magnification). No exposure of Al foil

Photos	Criteria
	Allowance: 1) $2.0\text{mm} < D$: Not allowed 2) $1.0\text{mm} < D \leq 2.0\text{mm}$: Need to check by magnifying glass 3) $D \leq 1.0\text{ mm}$: Allowed

- Scratch: No rework

Photos	Criteria
	Allowance : With $\leq 0.2\text{mm}$ (No Al foil exposure)

- Wrinkle 1 : Pouch Wrinkle, (Need to improve process to minimize)

Photos	Criteria
 Gas room wrinkle Line wrinkle Comb-Pattern	Allowed

- Wrinkle 2 : Wrinkle by Jelly Roll

Photos	Criteria
 Folded tape OPS mark Tape Wrinkle Seps. wrinkle Tape wrinkle Tape overlap	1) Separator's Upper & Lower Overlapping Winkles: Allowed without reducing SET-Tape's adhesive by winks) 2) J/R upper & lower Tape Winkle: Not allowed 3) Tape Protrusion, OPS Mark, Tape Overlap: Allowed 4) J/R tape Overlapping wrinkle: Allowed (must be able to read 2d code)

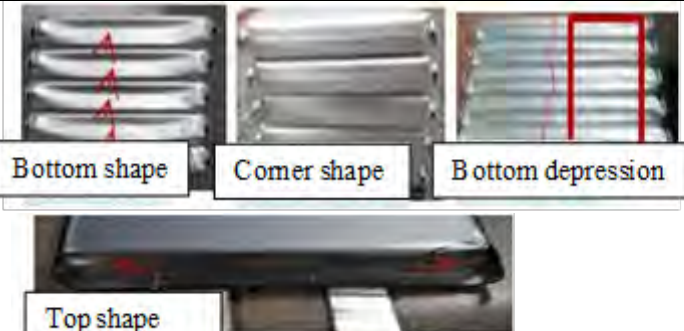
- Wrinkle 3 : OPS bubble, Vacuum Pad mark, (Need to improve process for minimization)

Photos	Criteria
 Vacuum pad bulge OPS bubble bulge	Allowed

- Dot bulge: Not allowed any bulge by abnormal material or particle

Photos	Criteria
	Allowance: Diameter $\leq 1.0\text{mm}$ Numbers $\leq 2\text{ea}$

- Shape 1 : X-Ray inspection for all sample for top/bottom

Photos	Criteria
 Bottom shape Comer shape Bottom depression Top shape <Bottom> <Top>	Allowed

- Shape 2: Pouch abnormal alignment/Corner dent, X-Ray inspection for all sample

Photos	Criteria
	Corner dent : Allowed

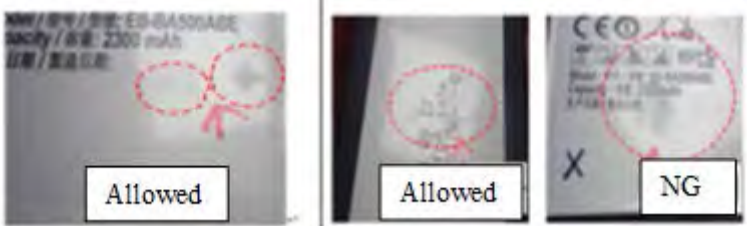
- Shape 3: Pouch distortion, Gripper Mark & Terrace distortion

Photo	Criteria
	1) Gripper mark: Allowed 2) Terrace distortion: Allowed (OK/NG by limitation sample)

- Depression 2: Top/side pouch distortion

Photo	Criteria
	1) Top: $D \leq 3.0\text{mm}$ (No electrode Damage) 2) Side: Allowed (No electrode Damage) ※ No account limit

- Electrolyte Contamination

Photo	Judgment criteria
 The 'Photo' column contains three images of battery labels. The first image shows a label with 'Allowed' written below it, with a red dashed circle around the top edge. The second image shows a label with 'Allowed' written below it, with a red dashed circle around the top edge. The third image shows a label with 'NG' written below it, with a red dashed circle around the top edge and an 'X' mark.	No contamination around 2mm on the Left/right/top Edge OK/NG by limitation sample although allowed area

Remark: this standard is only applied for the cosmetic defect caused by external force. The intrinsic phenomenon of polymer battery such as natural dent, tiny dent, light scratch, etc. is acceptable.

7.2 Key Dimension Inspection Standard

- Inspected Dimensions:
- . Each inspection method and tools must be dictated. The method must be added with photos

Length	width	Thickness
Vernier calipers	PPG(300g)	PPG(500g)

Item(项目)	Length(长度)	Width(宽度)	Thickness(厚度)
Spec. (规格)	22.80+/-0.70 mm	22.10 +/-0.50 mm	4.65 +0.10/-0.20mm
Inspect Method (检查方法)	* 按照如下图片测试方法测量 * Measured as below pictures. * 位置: 顶封到底部 * Position: Top Sealing to bottom * 工具: 卡尺或长宽尺寸测量仪 * Tooling: Caliper (200mm) * 记录最大值 * Record the max value.	* 按照如下图片测试方法测量 * Measured as below pictures. * 位置: 电芯左边到右边 * Position: Cell left and right. * 工具: 卡长宽尺寸测量仪 * Tooling: PPG(300g) * 记录最大值 * Record the max value.	* 按照如下图片测试方法测量 * Measured as below pictures. * 位置: 电芯中间 * Position: Center of battery position * 工具: PPG * Tooling: PPG(500g) * 记录最大值 * Record the max value.
Picture (照片)			
Remark (说明)	* 卡尺须贴绝缘胶, 须防止正负极Tab发生短路. *Should stick insulating tape on the caliper to prevent short.		

2.6 X-ray Test

- Standard of Inspection item

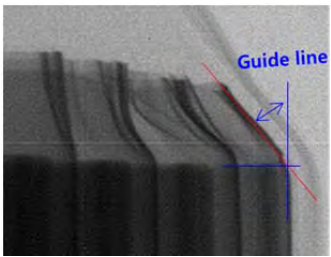
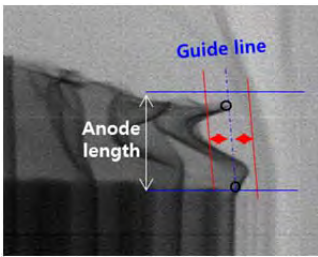
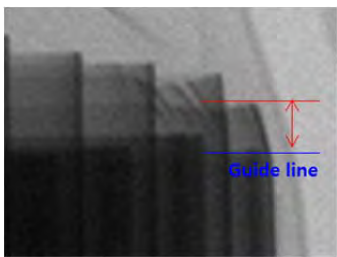
Measurement position: 4 corner/Cell, Outlier 1 turn (except comb shape)

NG Judgment

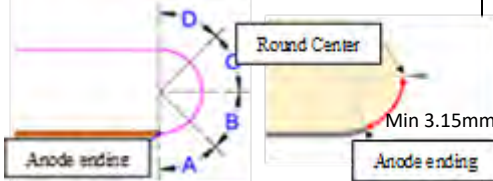
1) Angle: Bending of outlier anode

2) Depression NG: Anode flection with S shape

3) Cathode/Anode Align: Distance between cathode and anode

Criteria	Angle	Depression	Cathode/Anode alignment
		*The machine will judge it's NG or OK according to the big historic test data base. Inspection area (Anode length)	
NG	$\geq 30^\circ$	NA.	$\leq 0.1\text{mm}$
Photo			
Occurrence Reason	Overlap design (Interference of pouch)	Interference of Machine	Winding condition

8. Cell Important Process Check List

No	Item	Definition	Specification & reference Photo	Control Method
8.1	Anode Coating end position	The end of anode coating should not be placed in the J/R round		IPQC control
8.2	Anode over hang banding	No damage($\phi \leq 30^\circ$), No Anode over hang banding after 3 J/R turn from out side		X-ray inspection
8.3	Active material ink viscosity	Positive Negative	CentiPoise CentiPoise	FAI control
8.4	Tab welding	Cathode Condition & Image	- Pressure : 0.01~0.25MPa - Time : 0.02~0.2s - Amplitude : 20~50%	Machine setting
		Cathode Tab welding strength	$\geq 13\text{N}$	Pull strength tester
		Cathode Tab weld burr	$\leq 40\mu\text{m}$	Micro caliper
		Cathode Tab Horn, Anvil Change period	800000times	Auto count
		Anode Condition & Image	- Pressure : 0.01~0.25MPa - Time : 0.02~0.2sc - Amplitude : 50~90%	Machine setting
		Anode Tab welding strength	$\geq 13\text{N}$	Pull strength tester
		Anode Tab weld burr $\leq 60\mu\text{m}$	$\leq 60\mu\text{m}$	Micro caliper
		Anode Tab Horn, Anvil exchange cycle	100000times	Auto count
8.5	Winding order	Cathode – Separator– Anode – Separator		Visual
8.6	Coating condition	Cathode Loading Cathode density	0.582g/1540.25 mm2 4.15g/cc	Beta-ray
		Anode Loading Anode density	0.300g/1540.25 mm2 1.73g/cc	Beta-ray
8.7	Burr	Cathode electrode Anode electrode Cathode tab Anode tab	$\leq 5\mu\text{m}$ $\leq 5\mu\text{m}$ $\leq 25\mu\text{m}$ $\leq 25\mu\text{m}$	CCD
8.8	X-ray alignment inspection		A/C=0.1~1.4mm	X-ray

8.9	Hi-Pot Inspection		$\geq 20\text{M}\Omega$	Hi-pot test
8.10	Sealing	pulling intensity thickness width	$\geq 15\text{N}$ (Non-tab area) $0.175 \pm 0.015\text{mm}$ $2.3 \pm 0.3\text{mm}$	Pull strength test Micro-caliper CCD
8.11	length of electrode sealant	Cathode Anode	$4.5 \sim 5.0\text{mm}$ $4.0 \sim 4.5\text{mm}$	IQC checking
8.12	Vent broken pressure	Cylindrical Cell Prismatic Cell	$< 10\text{ kgf/cm}^2$ Side $< 6\text{kgf/cm}^2$, Top $< 10 \sim 20\text{kgf/cm}^2$	NA
8.13	Separator cut knife	Exchange Cycle	After 1,000,000 times (high speed steels)	Auto count
8.14	Management Standard inside CAN	Prismatic Cell		NA

9. Cell QCP

Machine list

승인 호기 (Galileo S/Friday라인) 472324				
		Qualified	2nd line	3th New line
Mixing	음극	공용		
	양극			
Coating	음극	P36951		
	양극	P36407		
Press	음극	P36631, P36922, P36924		
	양극	P38716, P38589, P38503		
Slitting	음극	P36538, P38017		
	양극	P36282, P38018		
Welding	음극	P38084	P38051	P37920
	양극	P38085	P38054	P37916
Winding	P38087, P38088, P38086		P38063, P38062, P38070	P37921,P38061,P37929
Top sealing	P37344, P37293, P37710, P37707		P38049, P38007	P37882,P37862,P37933
Injection	P37756, P38436		P38123	P38247,P38171
HPC	P38016 , P38655 , P37652		P37779 P38065	P37936,P37937
Degassing	P38605 (AUTO), P38604 (AUTO)P36044, P35945		P38614 (AUTO) P35076, P35046	P35076,P35046 P38591,P38764 P38836,P38850
Folding	P37767, P37838 P37751, P37753		P38474	P38442,P38444 P38441,P37693 P38440
IR/OCV	P37813, P37269, P36334		P36373, P37788	P37289,P37287,P37270 P36334,P36682 P36617,P36397
X-RAY	P38339		P38358	P38360,P38416,P38361 P38343,P38417

ATL		QUALITY CONTROL FLOW CHART						
Material	Process	Control		Specification	Frequency Sample size	Control method	Record	Resp. Dept.
		Product Parameter	Process Parameter					
Powder 	① IQC			Refer to SOP	Each Lot	Pull strength tester Gurley Tester	SAP system	IQC
	② Mixing	Viscosity	Inside Temp. Rotation speed	Refer to MI-AEC-02/MI-CEC-02 Refer to WI-S-C011 Refer to WI-S-C011	Once per tank Real time Real time	Viscosity tester Build in function Build in function	ODS system	
	③ Coating	Weight	Temp. Speed	Refer to MI-AEC-02/MI-CEC-02 Refer to WI-S-C021 Refer to WI-S-C021 Refer to WI-S-396	Real time Real time Real time 100%	Beta-Ray Build in function Build in function By naked eye	ODS system	PRD/QA
	④ Calendaring	Visual Electrode thickness		Refer to MI Refer to WI-S-C031 Refer to WI-S-C031	18 units/block/ roll Real time Real time	Micro-meter Build in function Build in function		PRD/QA
	⑤ Slitting	Electrode width Burr	Pressure Speed Blade-life Tension	Refer to MI Refer to WI-S-C041	Once /shift/cutter Once/shift/cutter Real time Real time	Caliper Microscope Build in function	FAE EMMS system.	PRD
	⑥ Tab welding+ Winding	Pull strength (Tab welding for cathode)	Delay time Welding time Pressure Tip life time Amplitude	Refer to WI-S-A011 Refer to WI-S-A011 Refer to WI-S-A011 Refer to WI-S-A011 Refer to WI-S-A011	3 pcs/shift/machine Real time Real time Real time Real time Real time	Pull strength tester Build in function Build in function Build in function Build in function(800KT) Build in function	FAE	PRD
		Pull strength (Tab welding for anode)	Delay time Welding time Pressure Tip life time Amplitude	Refer to WI-S-A012 Refer to WI-S-A012 Refer to WI-S-A012 Refer to WI-S-A012 Refer to WI-S-A012	3 pcs/shift/machine Real time Real time Real time Real time Real time	Pull strength tester Build in function Build in function Build in function Build in function(100KT) Build in function	FAE	PRD
		Visual (Winding) Resistance (Hi-Pot test)	Voltage	Refer to MI & WI-S-396 Refer to WI-S-A041	100% 100% Real time	By naked eye Hi-Pot tester Build in function		PRD PRD
	⑦ X-Ray inspection	Alignment		Refer to MI	5%	X-Ray Machine		PRD
Remark: 1. "▲" – means CTQ; 2. "△" – means CTF.								

ATL		QUALITY CONTROL FLOW CHART						
Material	Process	Control		Specification	Frequency Sample size	Control Method	Record	Resp. Dept.
		Product Parameter	Process Parameter					
Electrolyte 	⑧ Ops Tape	Visual		Refer to MI	100%	Go-no-Go Jig		PRD
	▲⑨ Top / Side sealing	Sealing Thickness Sealing strength	Temp. Time Pressure	Refer to WI-S-Q034 Refer to WI-S-A091 Refer to WI-S-A091 Refer to WI-S-A091 Refer to MI Refer to WI-S-A091	3 pcs/shift/machine 2 pcs/shift/machine Real time Real time Real time Real time	Microcalliper Pull strength tester Build in function Build in function Build in function Hi-Pot tester	FAE	
	Resistance test	Resistance	Voltage	Refer to MI	100%	Hi-Pot tester		PRD
	⑩ Barcode printing	Visual		Refer to WI-S-A131&MI Refer to WI-267	100%	By naked eye	FAE	PRD
	⑪ Mylar tape onto cell pouch	Visual		SOP	100%			
	⑫ Vacuum baking		Temp. Time Vacuum	Refer to MI & WI-S-A151 Refer to MI & WI-S-A151 Refer to MI & WI-S-A151 Refer to MI	Real time Real time Real time 3pcs/shift/room	Build in function Build in function Build in function K-F Instrument		PRD
	▲⑬ Electrolyte injection Side Sealing	Volume Sealing Strength Sealing Thickness	Temp. Time Pressure vacuum vacuum delay	Refer to MI Refer to WI-S-G011 Refer to WI-S-Q034 Refer to WI-S-G011 Refer to WI-S-G011 Refer to WI-S-G011 Refer to WI-S-G011	Real time 5 pcs/shift/machine 5 pcs/shift/machine Real time Real time Real time Real time	Balance Pull strength tester Microcalliper Build in function Build in function Build in function Build in function	FAE	PRD
	⑭ Standby		Time Temp.	Refer to MI Refer to MI	Real time Real time	Build in function Build in function		PRD
	⑮ Formation		Time Temp. Pressure Procedure	Refer to MI Refer to MI Refer to MI & WI-S-G053 Refer to MI	100% Real time Real time Real time Real time	Formation tester Build in function Build in function Build in function Build in function	FAE BIS system	PRD
	▲⑯ Degassing	Sealing Thickness Sealing strength	Time Pressure Vacuum Temp. Seal Temp.	Refer to WI-S-Q034 Refer to WI-S-G071 Refer to WI-S-G071 Refer to WI-S-G071 Refer to WI-S-G071 Refer to WI-267	4 pcs/shift/machine 4 pcs/shift/machine Real time Real time Real time 100%	Microcalliper Pull strength tester Build in function Build in function Build in function By naked eye	FAE	PRD
	⑰ SSF	Visual		Refer to MI & WI-S-G085-B Refer to WI-267	100%	By naked eye	FAE	PRD
	▲⑱ Capacity test	Capacity	Procedure Temp.	Refer to MI Refer to MI	100% Real time Real time	Capacity tester Build in function Build in function	BIS system BIS system BIS system	PRD
Remark: 1. "▲" – means CTQ; 2. "△" – means CTF.								

ATL		QUALITY CONTROL FLOW CHART						
Material	Process	Control		Specification	Frequency Sample size	Control method	Record	Resp. Dept.
		Product parameter	Process parameter					
	▲⑲ OCV	OCV ΔV Impedance		Refer to MI Refer to MI Refer to MI	100% 100% 100%	OCV/Imp tester OCV/Imp tester OCV/Imp tester	BIS system BIS system BIS system	PRD PRD PRD
	⑳ Taping	Visual		Refer to WI-722 Refer to WI-267	100%	By naked eye	FAE	PRD
	▲㉑ X-Ray 2 inspection	Alignment		Refer to MI	100%	X-Ray Machine		PRD
	㉒ Vacuum leakage test	Vacuum degree Test time		Refer to MI Refer to MI	100% 100%	Vacuum oven Vacuum oven		PRD PRD
	▲㉓ Inspection	Visual Dimension		Refer to WI-267 Refer to MI	100% 100%			PRD
	㉔ OQC	Visual		Refer to WI-267 Refer to WI-235	Critical item: AQL = 0.25	GNG fixture/Jig		QA
Remark: 1. "▲" – means CTQ; 2. "△" – means CTF.								

10. EHM DATA

☐ 作業環境 有害物質 基準 and 試験 結果

Raw materials (adhesive (bond, tape..), rubber, leather, paint, plastic..) or chemical substance which used in the processes may cause VOC(Volatile Organic Compounds) matters such as benzene, toluene, formaldehyde, phosphine-(like)..... So, should follow below management criteria.

Standard 1: Do not use benzene, toluene, formaldehyde, phosphine-like (Yes, No)

Standard 2: Above 4 matters are used in the raw-materials or in the processes; however we manage these 4 matters according to table 1-1 below.

[Table 1-1]

item	list of measurement	Spec (ppm)	Results(ppm)
作業環境 有害物質	TVOC	16.0	0.6
	toluene	16.0	0
	benzene	0.8	0
	formaldehyde	0.08	0
	phosphine(limited to cables)	0.08	0
Measuring equipment	ex)Mini RAE, Gastek detecting tube, GC/MS		
Measuring condition	Q'ty : F-PCB XXpcs		
	Gas Sampling 条件記述 : 25cm×30cm Zipperbag collection after discharging 40℃×30min		
MSDS	Attach MSDS of material which use above 4 有害物質 ex) 1. adhesive, ex) 2. protection vinyl		

☐ Guide line of measuring condition for each part

① The minimum quantity of test part in accordance with following criteria.

(A) HPP 群 : Part included in Unit Box (circuit/mechanical/acessories) : 1ea/3 ℓ

(B) NPC 群 : Part included in Unit Box (circuit/mechanical/acessories) : 1ea/20 ℓ

(C) Packing materials, Bag : 1ea/20 ℓ

※ 3 ℓ Tedlar Bag (or Zipperbag 250 mm×300 mm)

20 ℓ Tedlar Bag (or Zipperbag 500 mm×500 mm)

※ Master Box ≒ 350 mm×300 mm×250 mm ≒ 26 ℓ)

② When test the part, it should be tested within the average MP input time

③ Collect the Gas under "higher than 40℃, after 30 minutes of gas discharging time".

In case testing under room-temperature, gas discharging time should be more than 60 minutes

④ Measuring equipment : Also accept "commercialized detecting tube" and "simplified measuring equipment.

⑤ Control the hazardous material for MP products: between 16ppm as Total VOC.

1. We ATL do not use Benzene and n-Hexane (one or mixed element) in our whole workplace.

2. Application time : from April 1st, 2015

Standard Operation Procedure

DESCRIPTION: TVOC testing SOP

DOC. NO.: SOP-TVOC-00

REV.: A0

PAGE: 1 of 1

Model	Gernal	Process	TVOC testing	Process No.	/
Version	01				
Standard Operation Steps				Preparation	
1		2		3	
Step1: load the testing sample into a clear bag, then fill fresh air, after that seal the clear bag;		Step2: Put the bag with sample to oven , setting temperature 40degree , last 30 minutes;		Step3: Take out the after oven bag out, place it on desk stand by 10 minutes;	
4					
Step4: Put the testing pin of RAE3000 into clear bag ,start the testing and record a maximum data. (TVOC < 16ppm mean within spec.)					
Material Name		Part No.	Equipment	Equipment setting	Prepare by
			1. RAE3000	1. RAE3000	Check by
				2. Oven (Temp: 40℃; Time: 0.5H)	Approve by
				Attention Remark	
				1.Prepare SSE sample per production day, 1pcs /day/model	
				1.Specification: TVOC<16ppm, 2. Need arrange 3th Party to double confirm testing if the testing value over 16ppm. 3. detail requirement. methylbenzene(甲苯): <16ppm; benzene (苯):<0.8ppm; methanal (甲醛):<0.08ppm; phosphine(磷化氢)<0.08ppm;	
				Additional requirements	
				WangLi	
				Tiffany	
				Tenny.luo	

11. Certification

11.1 Certification Summary

Certification	Country	Issued Office	Standard	Issued Date
UL	North America	Refer the report	Refer below detail standard	Done
UN 38.3	Globe			Done
GB	China			Done
KC	Korea			Done
PSE	Japan			Done
CTIA	North America			Done
CB	CB Group country			Done
BSMI	Taiwan			Done
CQC	China			Done
BIS	India			Done
VNTA	Vietnam			Done

11.2 Certification

NOTICE OF COMPLETION
AND
AUTHORIZATION TO APPLY THE UL MARK



2018-08-31

MS. Jie Zhou
AMPEREX TECHNOLOGY LTD
35TH FL, ROOM 3503
WHARF CABLE TV TOWER
9 HOI SHING RD
TSUEN WAN N T, HK

Our Reference: File MH27725 , Vol 1 and 3

Order: 12447553

Project: 4788617934

Your Reference: Qi, Sunny (3-Aug-2018)

Project Scope: UL1642 for 15 alternate battery cell models in MH27725 / BBCV2.

Models: 266250, 393459, 417883, 416387, 308695, 426278, 446675A, 416279A,
406575H, 483277, 472324, 562529, 396172H, 496063, 623058

Dear MS. Jie Zhou:

Congratulations! UL's investigation of your product(s) has been completed under the above Reference Number and the product was determined to comply with the applicable requirements. This letter temporarily supplements the UL Follow-Up Services Procedure and serves as authorization to apply the UL Mark at authorized factories under UL's Follow-Up Service Program. To provide your manufacturer(s) with the intended authorization to use the UL Mark, you must send a copy of this notice to each manufacturing location currently authorized under File MH27725 , Vol 1 and 3.

Records in the Follow-Up Services Procedure covering the product are now being prepared and will be sent in the near future. Until then, this letter authorizes application of the UL Mark for 90 days from the date indicated above.

Additional requirements related to your responsibilities as the Applicant can be found in the document "Applicant responsibilities related to Early Authorizations" that can be found at the following web-site:
<http://www.ul.com/EAResponsibilities>

Any information and documentation provided to you involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

We are excited you are now able to apply the UL Mark to your products and appreciate your business. Feel free to contact me or any of our Customer Service representatives if you have any questions.

Very truly yours,

Reviewed by:

Abby Pan
Engineer Project Associate
Abby.Pan@ul.com

Bruce A. Mahrenholz
CPO Director
Bruce.A.Mahrenholz@ul.com

cb3b43b0-7c24-45a7-bfbb-f58d8c8f1eb2



中国认可
国际互认
检测
TESTING
CNAS L3767

检测报告

Test Report

报告编号 (Report No.): RTN-UN-1807-020

样品名称: 锂离子电芯

Sample Name: Li-ion cell

样品型号: 472324

Sample Model: 472324

委托单位: 东莞新能源科技有限公司

Consignor: Dongguan Amperex Technology Limited

东莞新能源科技有限公司中心实验室

Dongguan Amperex Technology Limited Central Lab





150009013121



中国认可
国际互认
检测
TESTING
CNAS L0357

CESI标志认证 安全型式试验报告

☒新申请 ☐变更 ☐监督 ☐复审 ☐其他:

申请编号: 2018-031001-0568-474

产品名称: 电芯

申请型号: 472324

检测机构: 中国电子技术标准化研究院赛西实验室





안전확인신고 증명서

Confirmation Letter of Declaration

신고번호 : YU10211-18010
(Application No.)

신고회사명 : DongGuan Amperex Technology Limited
(Applicant)

주소 : 1 West Industrial Road, North Zone of SSL Sci. Tech. Industry Park,
Dongguan, Guangdong, P.R. China 523808
(Address)

제품명 : 전지
(Product) Battery

기본모델명 : EB-BR810ABU
(Basic Model)

파생모델명 : 없음(None)
(Series Model)

정격/안전기준상의모델구분 : 3.85 Vd.c, 270 mAh
(Rating)

안전기준 : KC 62133(2015-07)
(Standard)

본 확인신고는 제조국명 : 중국

제조업자명 : DongGuan Amperex Technology Limited의 제품에만 해당함

제조공장의 주소 : 1 West Industrial Road, North Zone of SSL Sci. Tech. Industry Park,
Dongguan, Guangdong, P.R. China 523808

「전기용품 및 생활용품 안전관리법 시행규칙」 제28조제1항, 같은 조 제3항, 제29조제2항 또는 제34조제2항에 따라 안전확인신고 증명서를 발급합니다.

We issue this Confirmation Letter of Declaration of the Safety Confirmation for the above appliances in accordance with Article 28(1), 28(3), 29(2) or 34(2) of the Electrical Appliances and Consumer Products Safety Control Act.

2018년 10월 04일
year month day



한국화학융합시험연구원
KOREA TESTING & RESEARCH INSTITUTE



※ 이 신고증명서는 「전기용품 및 생활용품 안전관리법」에 따른 제품의 안전성 확인에 한정된 것이며, 그 밖의 다른 법률이 적용되는 제품의 경우에는 해당 법률에 따라 추가로 인증·허가 등을 받아야 합니다.

첨부서류

1. 전기용품의 안전관리부품 및 재질목록(List of Critical Components)(전기용품에 한정한다)
2. 기본모델 · 파생모델의 내용(Description of the basic and series model)



신고번호(Application No.) : YU10211-18010

[붙임 1 : 전기용품의 안전관리부품 및 재질목록]

[Attachment 1 : List of Critical Components]

부품명(회로기호) Component(Part no.)	제조사(상표명) Manufacturer(Brand)	모델명(형식) Model(Type)	정격 또는 특성 (Technical data)	인증마크 (Mark(s))
단전지[Cell]	DongGuan AmpereX Technology Limited	472324	3.85 Vd.c., 270 mAh	CBTR Evaluati on
IC (U1)	Mitsumi Electric Co., Ltd.	MD1421E54CPAL	Overcharge Detection Voltage : (4.425 $\pm$ 0.020) V, Overdischarge Detection Voltage : (2.700 $\pm$ 0.100) V, Charging Overcurrent Detection Voltage : (-0.050 $\pm$ 0.015) V	-

※ 주의사항(Attention)

- 안전관리부품은 전기적인 안전에 직접적인 영향을 주는 부품으로서 안전인증기관이 정기공장 검사시 확인 및 관리하는 사항입니다. 따라서 상기목록에 기재된 사항을 변경하거나 또는 복수등재를 원하시는 경우는 안전인증 기관에 인증변경 신청을 하여야 합니다.
(As the critical components and parts are directly related with safety, these components shall be checked during a factory inspection by the certification body. In case of applying for multiple listings or changes for the items above, the certification revision shall be applied.)
- 인증변경신청 없이 임의로 변경하는 경우는 전기용품 및 생활용품 안전관리법 제11조 및 제20조 제1항의 규정에 의한 안전인증 취소사유가 됨을 유의하시기 바랍니다.
(The safety certification will be cancelled under the Electrical Appliances and Consumer Products Safety Control Act, Clause 1 of Article 11 and 20 if the contents of the certification are altered without prior authorization.)

適合証明書

CERTIFICATE OF CONFORMITY

証明書番号 Certificate No.: 4347538.01COC
貴社照会番号 Client Reference: QUA7365441 弊社照会番号 Our Reference: 4347538.51

証明書保有者 Certificate Holder

Company name: Amperex Technology Limited
Company Address: 3503 Wharf Cable TV Tower, 9 Hoi Shing Road, Tsuen Wan, N. T., Hong Kong

製造工場 Manufacturing Plant

Factory: Dongguan Amperex Technology Limited
Address: 1 West Industrial Road, North Zone of SSL Sci. & Tech. Industry Park, Dongguan, Guangdong 523808, China

本適合証明書は、下記の一の製品試料の評価結果に基づいており、その評価試料が下記基準に適合していたことを証明するものであり、評価品と同じ設計の他生産品の評価を包含していません。また、これは、DEKRA の何れの適合性マークの使用も許可しません。

This certificate of conformity is based on the results of a sample of the below-mentioned product and is to verify that the evaluated sample had complied with the below-mentioned requirements, but this does not imply assessment of other products with same design to the evaluated item. In addition, this does not permit the use of any conformity marks of DEKRA.

製品 Product: Lithium-ion Batteries
(電気用品安全法 - 特定電気用品以外の電気用品 - リチウムイオン蓄電池)
(Electrical Appliance and Material Safety Law - Non-Specified Electrical Appliances and Materials - Lithium-ion Batteries)

商号 Trade name: ATL

評価製品識別

Identification of the product evaluated

型式 Type: 472324
製造番号 Serial Number: N. A.
定格電圧 Rated voltage: 3.85 Vdc
定格周波数 Rated Frequency: N.A.
定格容量 Rated Capacity: 270 mAh
T 保護クラス Degree of protection: N.A.

適用基準 Applied Standards: METI Electrical Appliance and Material Safety Law Appendix 9

備考 Remark:

・評価は、電気用品安全法（以下、「法」）第8条第1項に基づいており、同条第2項及び第9条に基づくものではありません。

The evaluation is based on Article 8, Clause 1 of the Electrical Appliance and Material Safety Law (hereinafter, "the Law") but not based on Clause 2 of the said article and Article 9.

・法では、指定製品は「特定電気用品」又は「特定電気用品以外の電気用品」に分類されます。本証明書は、「特定電気用品以外の電気用品」に該当する製品のためのものです。法第3条規定による届出事業者は、法の関連条項（第3条、第8条、第10条、その他該当条項）の規定を遵守する必要があり、また、下図記号を適切に表示する必要があります。

Under the Law, the designated products are classified to either "Specified Electrical Appliances and Materials" or "Non-Specified Electrical Appliances and Materials". This certificate is for products classified to "Non-Specified Electrical Appliances and Materials". The "Reporting Supplier", who has been specified in Article 3 of the law, shall observe the requirements of the relevant articles of the law, i.e., Article 3, Article 8, Article 10 and other articles if any, and shall indicate the below-shown symbol suitably.



・特定電気用品以外の電気用品の場合、この記号及び届出事業者名を近接して表示

If Non-Specified Electrical Appliances and Materials, closely indicate this symbol and the name of "Reporting Supplier".

この証明書は、弊社の試験・認証規則に基づいており、法第9条に規定の証明書（又は、証明書と同等なもの）ではありません。

This certificate is based on our Testing and Certification Regulations but not a certificate (or equivalent one) specified in Article 9 of the Law.

DEKRA Testing and Certification (Shanghai) Ltd. Guangzhou branch

2018-08-22

Miranda Zhou

Certification Manager

DEKRA Testing and Certification (Shanghai) Ltd., Guangzhou branch

Building A3, No.3 Qiyun Road, Science City, Guangzhou Hi-Tech Industrial Development Zone, Guangzhou, P.R. China

Tel +86 20 6661 2000 Fax +86 20 6661 2001 www.dekra-certification.com

Test Report No:	DGXNY20180823CTIA03		Page 1 of 20
Client:	Amperex Technology Limited 3503 Wharf Cable TV Tower, 9 Hoi Shing Road, Tsuen Wan, N. T., Hong Kong		
Test Item:	Rechargeable Li-ion Polymer Cell		
Identification:	472324	Serial No.: 73062	
Receipt No:	DGXNY20180823CTIA03	Date of receipt: 2018-08-23	
Capacity:	Nom: 274mAh, Min: 270mAh	Revision#: A	
Test specification:	Certification Requirements for Battery System Compliance to IEEE 1725 Revision 2.11 Section 4 CRSL version: 170601		
Test Result:	The test item passed the test specification(s).		
Test Laboratory:	Guangzhou MCM Certification and Testing Co., Ltd. 1F No.13,Zhong San Section, ShiGuang Road, Panyu District, Guangzhou City, Guangdong Province, P.R. China.		
Tested by:	Reviewed by:		
			
2018-09-27 Yu Xutong/ Project Engineer		2018-09-27 Xu Hongbin/ Reviewer	
Date	Name/Position	Signature	Date Name/Position Signature
Other Aspects: MCM CTIA recognized approval procedure. The cell validated passed according to the specifications listed above. The complete test report includes the following documents: - Test report (20pages); - Attachment 1:CRSL (5 pages); - Attachment 2:Photo documents (1pages).			
Abbreviations: P(ass)= passed F(ail) = failed N/A = not applicable N/T=not tested			
This test report relate to the a.m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.			

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT
(IECEE) CB SCHEME

CB TEST CERTIFICATE

Product	Rechargeable Lithium-ion Polymer Cell
Name and address of the applicant	Amperex Technology Limited 3503 Wharf Cable TV Tower, 9 Hoi Shing Road, Tsuen Wan, N. T. Hong Kong
Name and address of the manufacturer	Dongguan Amperex Technology Limited 1 West Industrial Road, North Zone of SSL Sci. & Tech. Industry Park, Dongguan, Guangdong 523808 China
Name and address of the factory	☐ Additional information on page 2 Dongguan Amperex Technology Limited 1 West Industrial Road, North Zone of SSL Sci. & Tech. Industry Park, Dongguan, Guangdong 523808 China
Note: When more than one factory, please report on page 2	
Ratings and principal characteristics	3,85 Vdc, 270 mAh
Trademark (if any)	ATL
Customer's Testing Facility (CTF) Stage used	
Model / Type Ref.	472324
Additional information (if necessary may also be reported on page 2)	☐ Additional information on page 2
A sample of the product was tested and found to be in conformity with	IEC 62133:2012
As shown in the Test Report Ref. No. which forms part of this Certificate	4347538.50

This CB Test Certificate is issued by the National Certification Body

DEKRA Certification B.V.
Meander 1051, NL-6825 MJ Arnhem, Netherlands



財團法人台灣電子檢驗中心

ELECTRONICS TESTING CENTER, TAIWAN



Product Certification
PC002

商品驗證登錄證書

CERTIFICATE OF THE REGISTRATION OF PRODUCT CERTIFICATION

證書號碼：CI326164181037 號 14

Certificate No.

系列型式：	481. 375981H	521. 474585	561. 442125
Series of the type	482. 376180H	522. 654581	562. 376478
	483. 483165	523. 415564	563. 483174
	484. 464493	524. 464678	564. 406578H
	485. 3085A7	525. 2667C7	565. 384795
	486. 415675	526. 425679	566. 424791
	487. 396281	527. 2954B5	567. 406179
	488. 426887	528. 3146C1	568. 356088
	489. 416278	529. 336678	569. 266250
	490. 426273	530. 403863	570. 393459
	491. 475867	531. 403864	571. 472324
	492. 314363	532. 404168	572. 562529
	493. 406470	533. 404169	573. 983231
	494. 396276	534. 4045A2	574. 386481
	495. 385982	535. 4045A3	575. 396686
	496. 476274	536. 406981	576. 496063
	497. 533345	537. 416584	577. 483277
	498. 406578	538. 436169	578. 623058
	499. 446275	539. 444788	579. 476174
	500. 386581H	540. 454998	580. 595490N
	501. 416066	541. 465272	(以下空白)
	502. 336581	542. 475477	
	503. 605490H	543. 475778	
	504. 4244C8	544. 525057	
	505. 356385H	545. 586160	
	506. 446273	546. 386272	
	507. 386381	547. 416587	
	508. 326584	548. 356683	
	509. 3974A6	549. 2959F2	
	510. 416368	550. 385982H	
	511. 396074	551. 405084	
	512. 446381	552. 2855H2	
	513. 466790	553. 2574H8	
	514. 355763A	554. 645464	
	515. 464291	555. 504478	
	516. 765165	556. 476477	
	517. 634282	557. 236388	
	518. 527076	558. 204846	
	519. 3863B8	559. 442021	
	520. 483177	560. 442023	



产 品 认 证 证 书

No: CESI01118P10199R0M

OID No: 1.2.156.1.2.CESI01118P10199R0M

申请人名称及地址、邮编

东莞新能源科技有限公司

东莞松山湖高新技术产业开发区工业西路1号、523808

制造商名称

东莞新能源科技有限公司

生产厂名称及地址、邮编

东莞新能源科技有限公司

东莞松山湖高新技术产业开发区工业西路1号、523808

产品名称、型号规格

电芯

472324 3.85V 270mAh

产品认证模式

型式试验 + 获证后监督

认证标准和技术要求

GB 31241-2014

上述产品符合 CESI 产品认证实施规则

CESI-PC-OD71 的要求，特发此证。

颁证日期: **2018 年 08 月 08 日**

(自获证之日起 12 个月后，本证书与年度《监督确认书》共用方为有效。)

总经理:

北京赛西认证有限责任公司





भारतीय मानक ब्यूरो

(प्रशिक्षण, मानक, उद्योग एवं सार्वजनिक वितरण विभाग, भारत सरकार)

BUREAU OF INDIAN STANDARDS

(Ministry of Consumer Affairs, Food & Public Distribution, Govt. of India)

मानक भवन, 9 बहादुर शाह जफर मार्ग, नई दिल्ली - 110002
Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi - 110002
टेलीफोन/Phone: +91-11-23230856/23230101/23233375/23239402
ई-मेल/E-mail: registration@bis.org.in
वेबसाइट/Website: <http://www.bis.gov.in>, <http://cebis.in/BIS>

Our Ref: Registration/CRS 2015-2882/R-41033200

Date:08-08-2018

Inclusion Id: 19439

Subject :Inclusion of Additional Model(s)

MANUFACTURING UNIT :	DONGGUAN AMPEREX TECHNOLOGY LIMITED SONGSHAN LAKE INDUSTRY PARK, DONGGUAN CITY, GUANGDONG PROVINCE, P.R. CHINA
INDIAN REPRESENTATIVE :	OMEGA QMS 909, HEMKUNT HOUSE, RAJENDRA PLACE, NEW DELHI-110008, INDIA Mr. ABDHESH KUMAR, ASSISTANT MANAGER OPERATIONS info@globalomega.com 01141413939

Dear Sir,

1. This has reference to your request for inclusion of models of 'Sealed Secondary Portable Li-ion Polymer Cell' as per IS 16046:2015/ IEC 62133: 2012 in Registration No. R-41033200 already granted to you which is valid upto 04-02-2020.

2. It is intimated that the additional Models as per details given below have been agreed to be included in your Registration No. R-41033200 w.e.f. 03-08-2018:

Product	Sealed Secondary Portable Li-ion Polymer Cell
IS No.	IS 16046:2015 / IEC 62133 : 2012
Brand	ATL
Inclusion of Additional Models (w.e.f. 03-08-2018)	396172H,472324,562529
Factory Address	SONGSHAN LAKE INDUSTRY PARK, DONGGUAN CITY, GUANGDONG PROVINCE, P.R. CHINA

3. In view of the above, you are permitted to mark your product 'Sealed Secondary Portable Li-ion Polymer Cell' having above mentioned Brand/Additional Models as per the guidelines for the use of Standard Mark and labelling requirements under BIS Compulsory Registration Scheme for Electronic and IT Products given in circular No. Ref: CMD 3/8:1/6975 dated 03/12/2015 available on BIS website and Ministry of Electronics and Information Technology (MeitY) notification S. O. 638(E) dated 10/02/2016, w.e.f. 03-08-2018. Other terms and conditions of the Registration Scheme shall remain same.

4. Please note that the models as per 2012 version in your scope of Registration, (R-41033200) shall stand deleted in case you fail to switch them over the revised version within the stipulated timeline.

This letter is being issued with the approval of competent authority. Kindly acknowledge receipt of this letter.

Thanking you,

Yours faithfully,

(Sundeeep Kumar)
Scientist-C (Reg. Deptt.)

Telefax : +91-11-23230856

E-mail: registration@bis.org.in

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

BẢN TỰ ĐÁNH GIÁ SỰ PHÙ HỢP

Số: SEV-R810ABU002

Tên tổ chức : CÔNG TY TNHH SAMSUNG ELECTRONICS VIỆT NAM

Địa chỉ : KCN Yên Phong I, xã Yên Trung, huyện Yên Phong, tỉnh Bắc Ninh

Điện thoại : +84-222-369-6049

CÔNG BỐ:

Sản phẩm : Pin lithium-ion Polymer cho điện thoại di động

Ký hiệu : **EB-BR810ABU (Cell: 472324)**

Hãng, nơi sản xuất : Dongguan Amperex Technology Limited

Phù hợp với quy chuẩn kỹ thuật, tiêu chuẩn: Mục 2.6 - Yêu cầu về đặc tính an toàn - QCVN 101:2016/BTTTT: “Quy chuẩn kỹ thuật Quốc gia về pin lithium cho thiết bị cầm tay”.

Căn cứ Kết quả đo kiểm sản phẩm số:

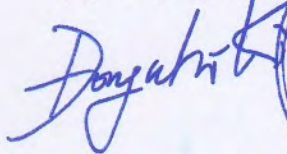
- | | |
|------------------------|-----------------|
| ✓ VH/2018/P0044 (Cell) | Ngày 31/07/2018 |
| ✓ VH/2018/P0078 (Pack) | Ngày 15/08/2018 |

Được cấp bởi Phòng Thử nghiệm Điện-Hóa-Lý thuộc Trung tâm Đổi mới Công nghệ Việt-Hàn (INCENTECH), trực thuộc Trung tâm Chứng nhận Phù hợp (QUACERT).

Hà Nội, ngày 17 tháng 09 năm 2018

CÔNG TY TNHH SAMSUNG ELECTRONICS VIỆT NAM

(Ký tên, chức vụ, đóng dấu)

GIÁM ĐỐC MUA HÀNG
DONGWHI KIM

**BÁO CÁO KẾT QUẢ THỬ NGHIỆM**
TEST REPORT**QCVN 101:2016/BTTTT****Quy chuẩn kỹ thuật Quốc gia về pin Lithium cho thiết bị cầm tay**
National technical regulation on lithium batteries for portable applications

Báo cáo số / Report number: **VH/2018/P0044**

Ngày, tháng, năm / Date: 2018-07-31

Tổng số trang / Total number of page: 10 pages

Khách hàng / Customer.....: **Amperex Technology Limited**

Địa chỉ / Address: 3503 Wharf Cable TV Tower, 9 Hoi Shing Road,
Tsuen Wan, N.T., Hong Kong

Loại sản phẩm thử nghiệm / Test item description: **Rechargeable Li-ion Polymer Cell**

Nhãn thương mại / Trade mark: ATL

Model: **472324**

Thông số kỹ thuật / Ratings.....: DC 3.85V, 274mAh(Typ)/270mAh(min)

Hãng sản xuất / Manufacturer.....: Dongguan Amperex Technology Limited

Tên và địa chỉ của nhà máy sản xuất /
Name and address of factory.....: Dongguan Amperex Technology Limited
1 West Industrial Road, Song Shan Lake Hi-Tech
Park, Dongguan, Guangdong, P.R. China

Ngày nhận mẫu / Date of receiving: 2018-07-17

Thời gian thử nghiệm / Testing time: 2018-07-18 ~ 2018-07-31

Quy chuẩn thử nghiệm / Technical Regulation: QCVN 101:2016/BTTTT

Nơi thử nghiệm / Testing Lab.....: Phòng thử nghiệm Điện-Hóa-Lý
Electrical-Chemical-Physical Testing Lab

Địa chỉ / Address: Số 8 Hoàng Quốc Việt, Cầu Giấy, Hà Nội
8 Hoang Quoc Viet Street, Cau Giay District, Hanoi

THỬ NGHIỆM VIÊN
Analyst

Nguyễn Quốc Anh

PHÒNG THỬ NGHIỆM ĐIỆN-HÓA-LÝ
Electrical-Chemical-Physical Testing Lab

Le Ngoc Thuc

GIÁM ĐỐC
Director