



SPECIFICATION

Surface Acoustic Wave Filter

USER

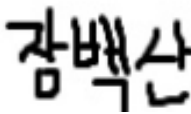
USER PART No.

WISOL PART No. **SFX836EYJ02**

DOC. No. SMS-51-L-SFT-FS-209

DATE November 9, 2018

REVISION 000

WISOL					
ISSUED BY	Jang, Baek-San 	APPROVED BY (R&D)	Ha, Sang-Ki 	APPROVED BY (QC)	Hong, Sang-Dea 
User					
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1. REVISION HISTORY

000	November 9, 2018	All Page	Make specification
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2. DEFINITION

2-1. PART No.

S F X 8 3 6 E Y J 02

① ② ③ ④ ⑤ ⑥

No.	EXPLANATION
①	SAW Filter
②	Design Type
③	Center Frequency :836.5MHz(824 ~ 849)
④	Input:50ohm,Output:50ohm
⑤	Package size: 1.8×1.4mm ²
⑥	Design Revision (02 : Molding Type)

2-2. APPLICATION : LTE B5 Unbalance Duplexer

3. PRECAUTIONS

3-1. This device should not be used in any type of fluid such as water, oil, organic solvent, etc.

3-2. This is a hermetic device.

MSL(Moisture Sensitive Level) is the '2a' level.

3-3. Ultrasonic cleaning shall be avoided.

3-4. Isopropyl Alcohol and Ethyl Alcohol can be used for cleaning. Contact us before using other cleaning solvents than above

3-5. This is an electrostatic sensitive device.

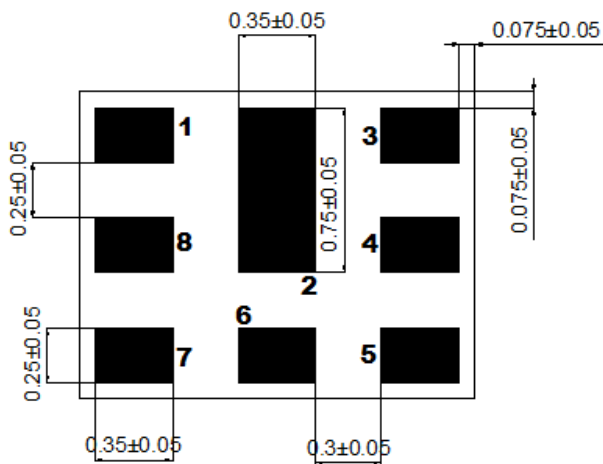
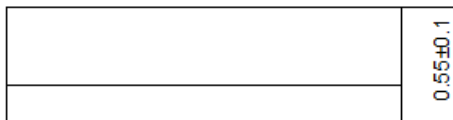
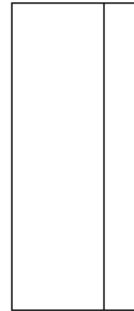
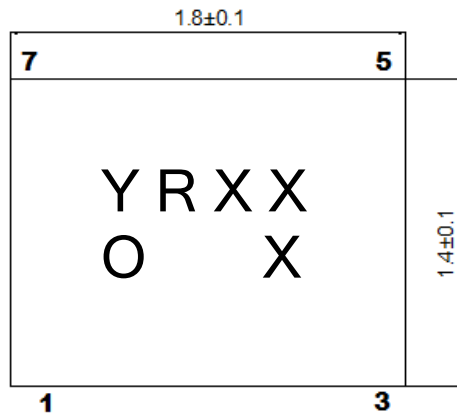
Please avoid static voltage during operation and storage.

3-6. Sudden change of temperature shall be avoided, deterioration of the characteristics can occur.

3-7. If any malfunction due to designing or manufacturing which is out of specification occurs within one year after the products have been delivered, the maker should exchange the defective products.

4. OUTLINE DRAWING & DIMENSIONS

[Unit: mm]



No.	Function
1	Rx Output
3	Tx Input
6	Antenna
2, 4, 5, 7, 8	GND

5. MARKING



5-1. Y R X X X

- The 1st 2nd character 'YR' indicates the model name of SAW Filter SFX836EYJ02.
- The 3rd character 'X' indicates the year and the month of manufacture..

Year	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
2017	1	2	3	4	5	6	7	8	9	A	B	C
2018	D	E	F	G	H	I	J	K	L	M	N	O
2019	P	Q	R	S	T	U	V	W	X	Y	Z	a
2020	1	2	3	4	5	6	7	8	9	A	B	C

※ This rotates by the 3 years.

- The 4th, 5th character 'X' indicates Lot No.

5-2. ○

- This symbol indicates input pin 1.
- This indicates the producing center
 - : China

5-3. Marking : Laser Marking

6. PERFORMANCE

6-1. MAXIMUM RATINGS

CHARACTERISTICS	RATINGS	UNITS	NOTES
DC Permissive Voltage	5	V	
Maximum Input Power	30	dBm	CW, 55°C, 5,000hr
Operating Temperature Range	− 30 ~ +85	°C	
Storage Temperature Range	− 40 ~ +85	°C	

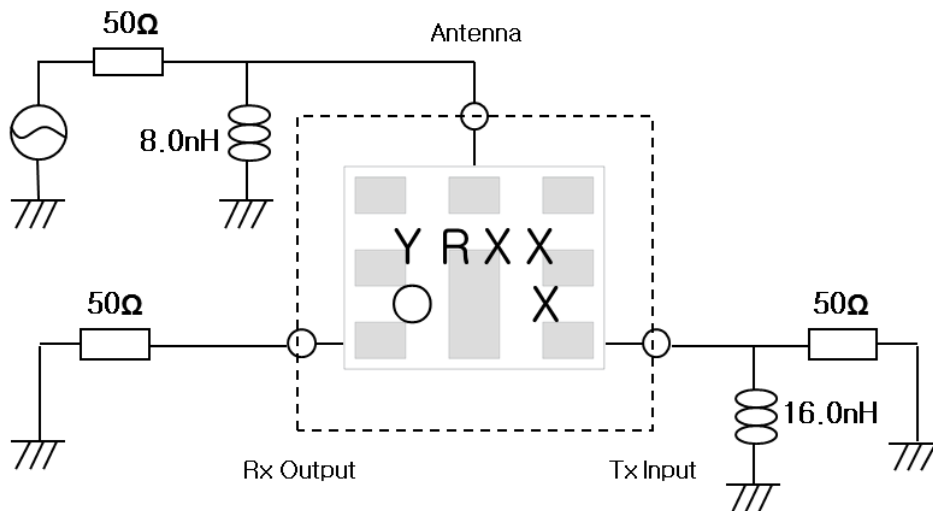
6-2. ELECTRICAL CHARACTERISTICS
6-2-1. TABLE

Ta = - 30 ~ +85℃
PCB loss is de-embedded.

Item	CONDITION	UNIT	RATING			Note
	[MHz]		Min.	Typ.(25℃)	Max.	
TX → ANTENNA						
Insertion Loss(*1)	824 ~ 849	dB		1.5	2.0	Over Temp
	824 ~ 849	dB		1.5	2.0	+23 to +27℃
Inband Ripple	824 ~ 849	dB		0.5	1.2	
VSWR	824 ~ 849	-		1.5	2.0	
	824 ~ 849	-		1.5	2.0	
Absolute Attenuation	0 ~ 764	dB	21	26		
	764 ~ 804	dB	23	28		
	869 ~ 894	dB	48	57		Over. Temp. Rx
	869 ~ 894	dB	48	57		+23 to +27℃, Rx
	925 ~ 960	dB	24	29		
	1574 ~ 1577	dB	30	35		
	1638 ~ 1708	dB	32	37		
	1805 ~ 1880	dB	36	41		
	1920 ~ 1980	dB	38	43		
	2110 ~ 2170	dB	36	42		
	2400 ~ 3000	dB	29	34		
	3000 ~ 6000	dB	5	10		
Termination Impedance : Tx / ANT			50Ω(// 16.0[nH]) / 50Ω(// 8.0[nH])			

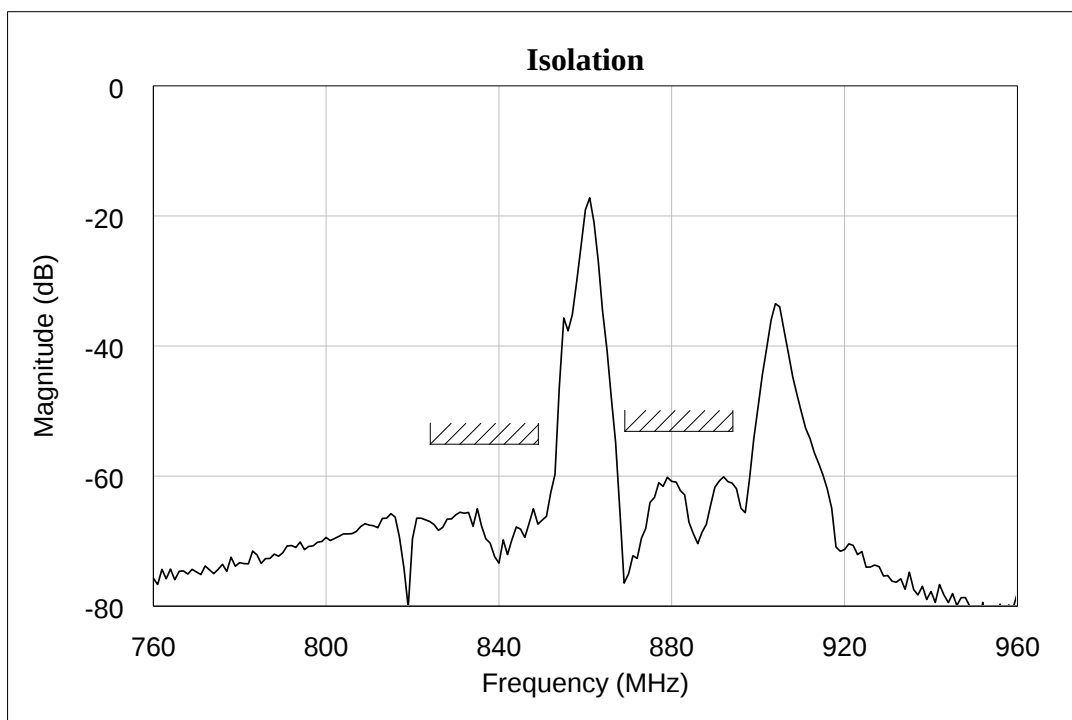
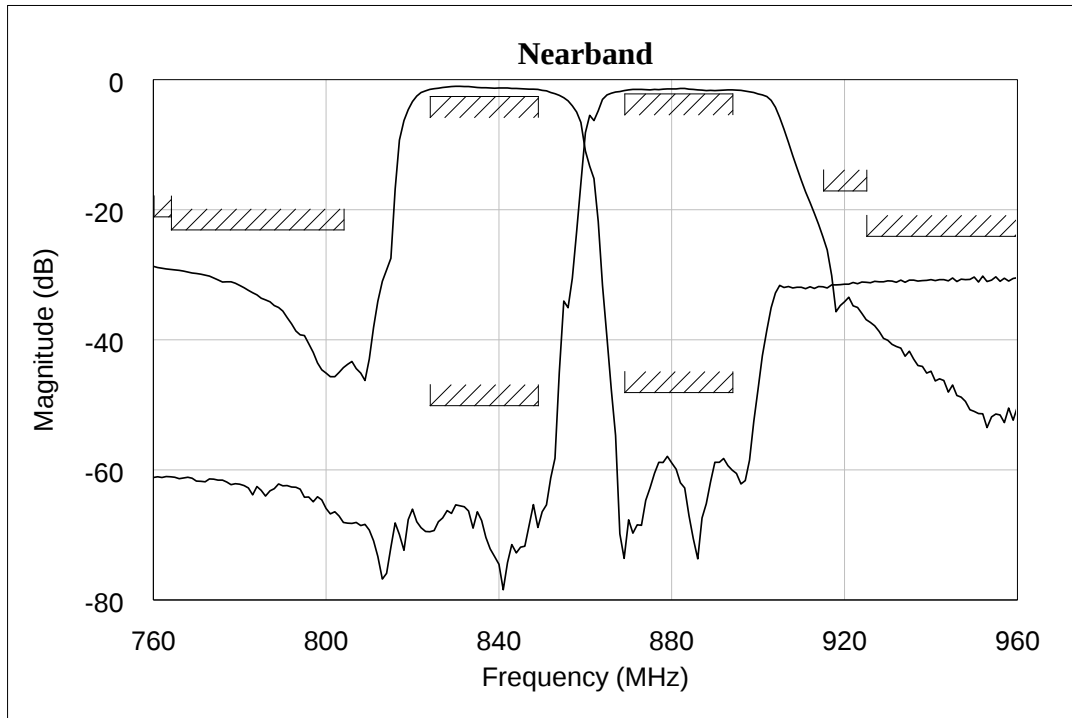
Item	CONDITION [MHz]	UNIT	RATING			Note
			Min.	Typ.(25℃)	Max.	
ANTENNA → RX						
Insertion Loss(*1)	869 ~ 894	dB		1.7	2.1	Over Temp
	869 ~ 894	dB		1.7	2.1	+23 to +27℃
Inband Ripple	869 ~ 894	dB		0.6	1.2	
VSWR	869 ~ 894	-		1.5	2.0	
	869 ~ 894	-		1.7	2.1	
Absolute Attenuation	0 ~ 779	dB	52	57		
	779 ~ 804	dB	52	57		
	824 ~ 849	dB	50	63		Over Temp. Tx
	824 ~ 849	dB	50	63		+23 to +27℃, Tx
	915 ~ 925	dB	17	24		
	925 ~ 960	dB	30	36		
	1920 ~ 1980	dB	55	63		
	2400 ~ 2500	dB	51	58		
	2500 ~ 3000	dB	50	55		
	3000 ~ 6000	dB	32	38		
Termination Impedance : ANT / Rx			50Ω(// 8.0[nH]) / 50Ω)			
TX → RX						
Isolation between Rx and Tx	824 ~ 849	dB	55	62		Tx
	869 ~ 894	dB	53	59		Rx

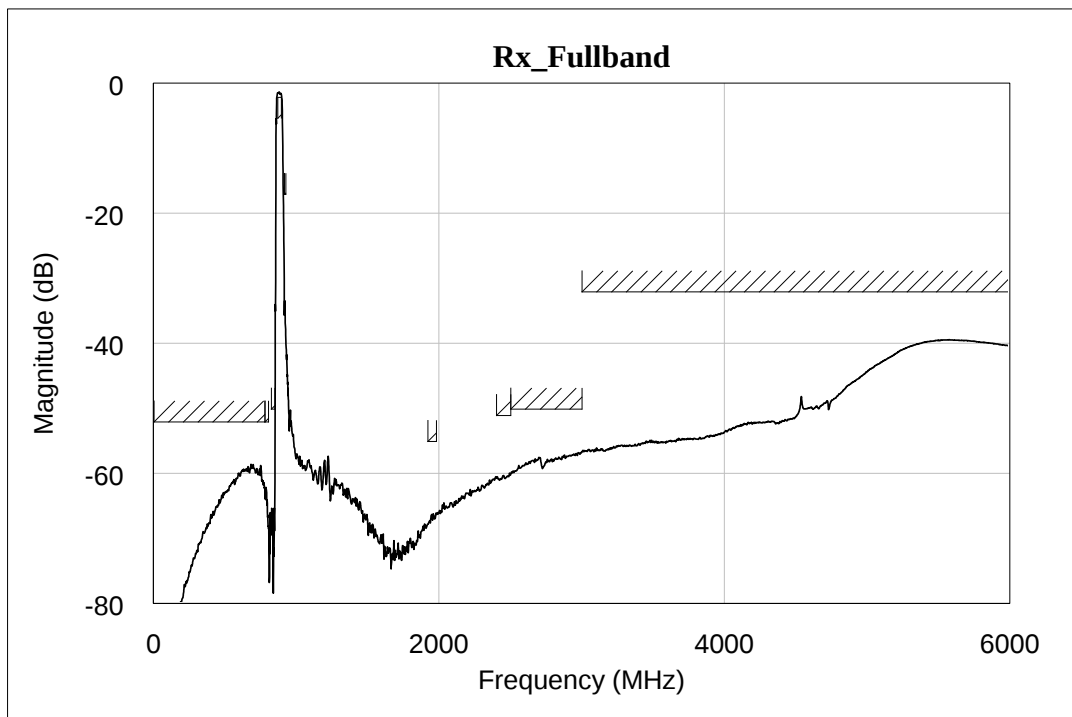
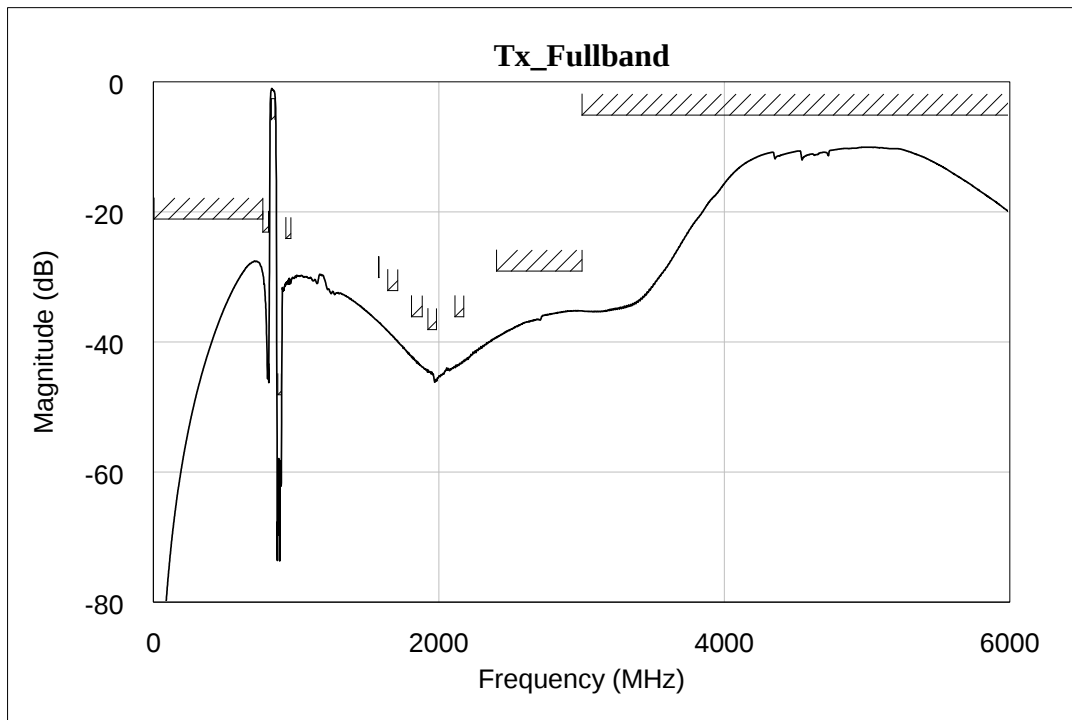
6-2-2. TEST FIXTURE

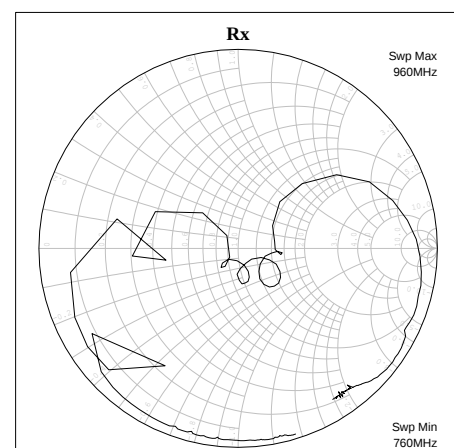
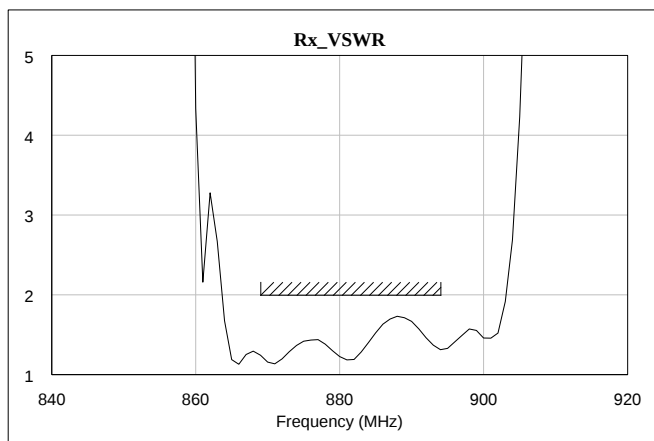
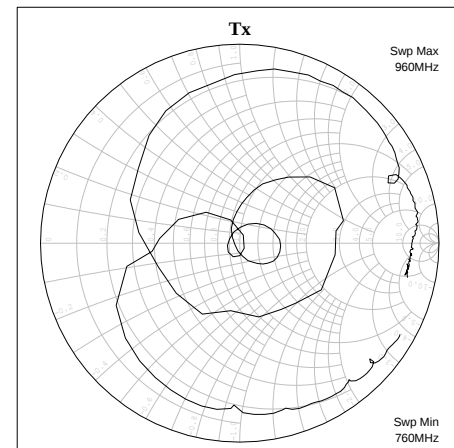
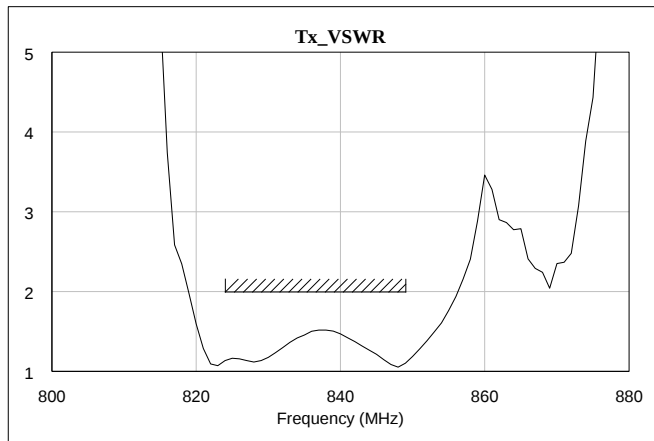
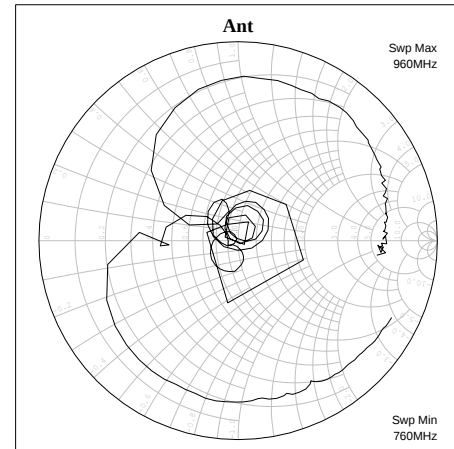
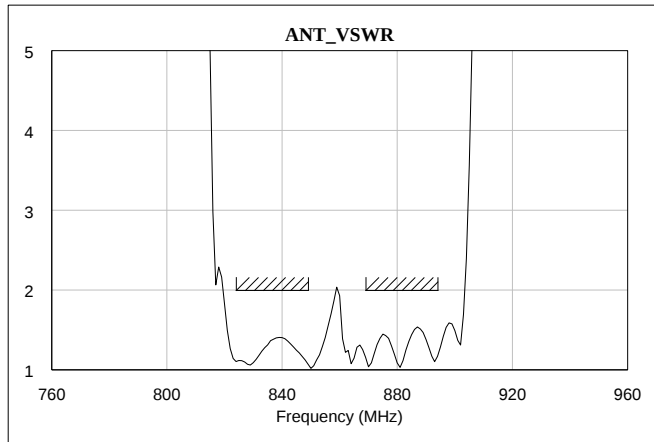


[X-Ray Top View]

6-2-3. GRAPH

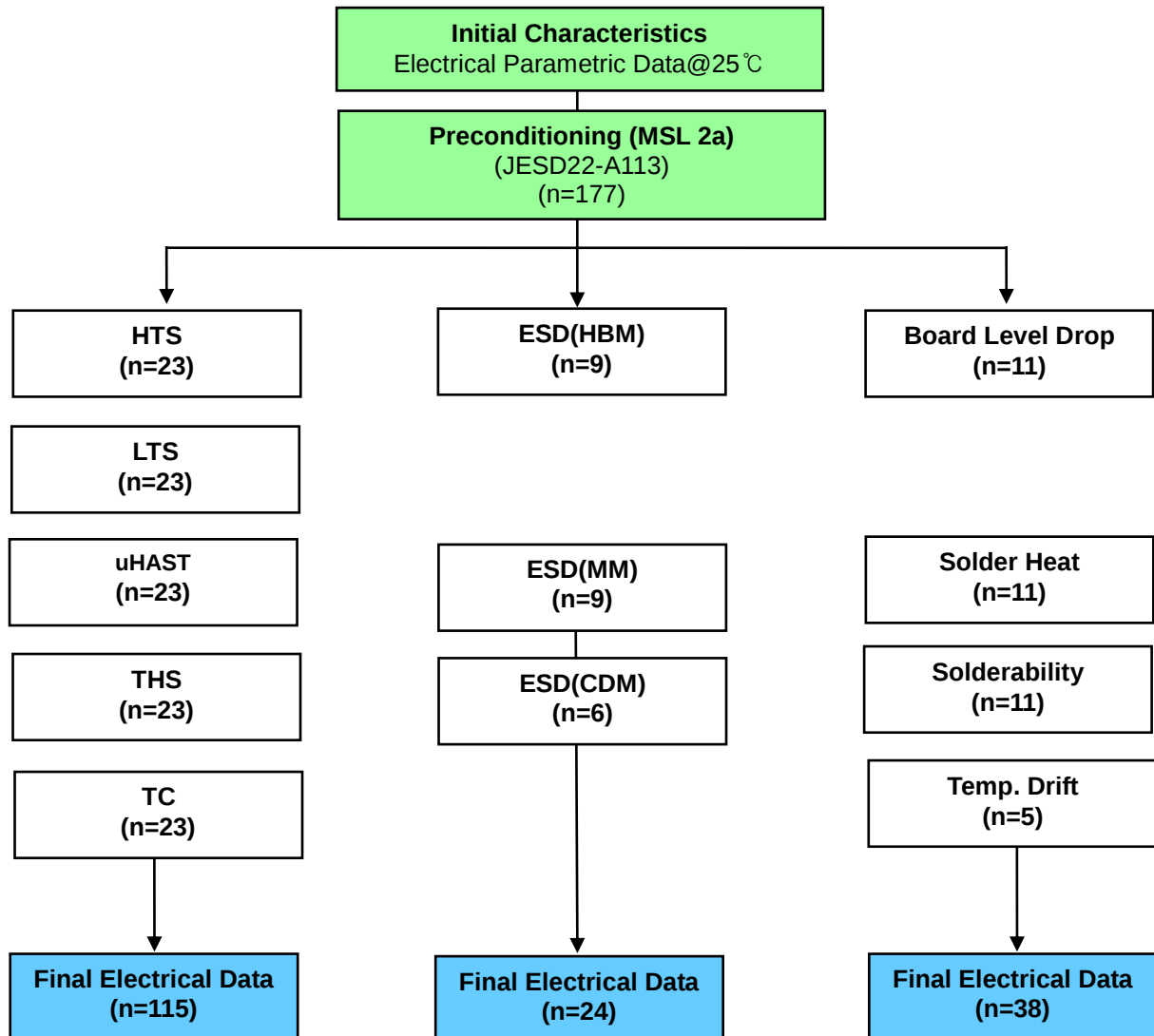






7. RELIABILITY

7-1. ENGINEERING SAMPLE FLOW CHART



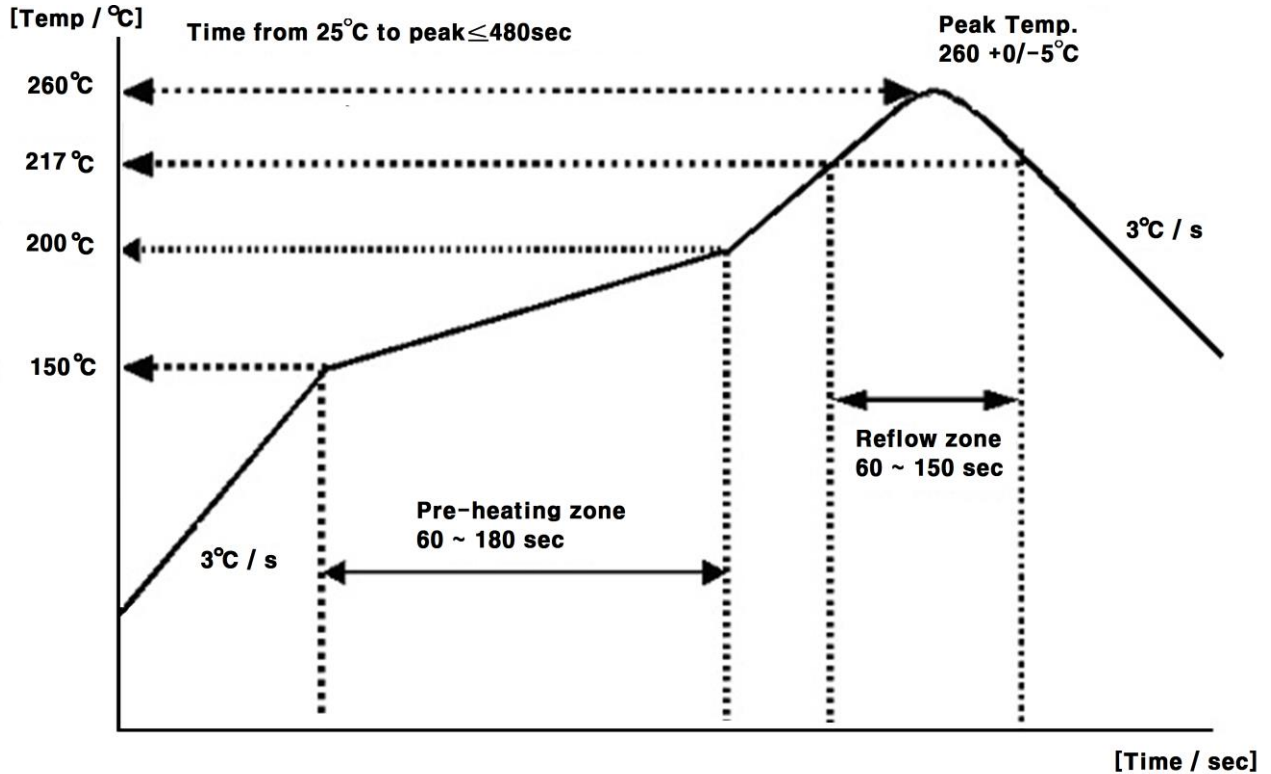
7-2. TEST ITEM & CONDITION

CATEGORY	TEST ITEM	TEST CONDITION	REMARK
	Preconditioning	Bake + Soak(MSL or above) + 3X Reflow duration (Soak 60℃ 60% 120HR)	JESD22-A113



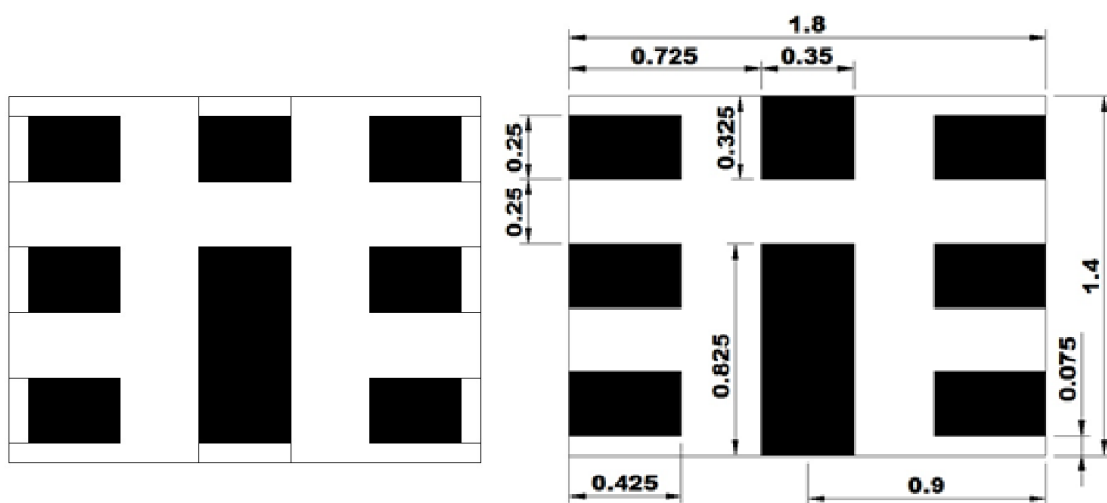
TEST ITEM	REMARK	TEST CONDITION	Duration
HTS (High Temperature Storage)	JESD22-A103	condition A +125(-10/+0)℃	1000hr
LTS (Low Temperature Storage)	JESD22-A119	condition A -40(-10/+0)℃	1000hr
uHAST (Unbiased HAST)	JESD22-A118	condition A 130±2℃, 85±5%, 33.3psi	96hr
THS (Temperature Humidity Storage)	JESD22-A101	85±2℃, 85±5% RH	1000hr
TC (Temperature Cycle)	JESD22-A104	condition B (-55℃⇔ +125℃) Soak mode 4 (30min)	500cycle
ESD(HBM)	JESD22-A114	200V, 250V, 300V	All pin 1sec 1time
ESD(MM)	JESD22-A115	100V 150V 200V	All pin 1sec 1time
ESD(CDM)	JESD22-C101	1.0KV, 1.2KV	All pin 1sec 1time
Board Level Drop Test	-	120 cm, 152 cm	12times 19times
Solder Heat Resistance	JESD22-B106C	260℃ Solder Pore Dipping	10sec
Solderability	JESD22-B102E	235℃Solder Pore Dipping	3sec
Temp Drift		-40℃ => 25℃ => 125℃	조건당 2HR

8. REFLOW CONDITION



9. RECOMMENDED PCB DIMENSIONS

[unit : mm]



[SAW, X-ray Top view]

[PCB, X-ray Top view]

10. CAUTION

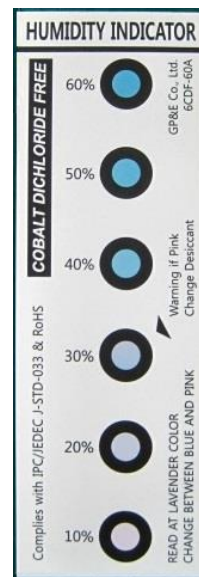
Moisture Sensitivity Device Caution (MSL LEVEL=2a)

1. Calculated shelf life in sealed bag : 12 month at <40℃ and <90% relative Humidity(RH)
 2. Peak package body temperature : **260℃**
 3. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must be
 - (a) Mounted within : 672 hours of factory conditions ≤30℃/60% RH, or
 - (b) Stored per J-STD-033
 4. Device require bake, before mounting, if :
 - (a) Humidity Indicator Card reads > 60% when read at 23±5℃
 - (b) 3(a) or 3(b) are not met
 5. If baking is required, refer to IPC/JEDEC J-STD-033 for bake procedure
- Note : Level and body temperature defined by IPC/JEDEC J-STD-020

Aluminum Pack (310mmX370mm)



HIC(Humidity Indication Card)

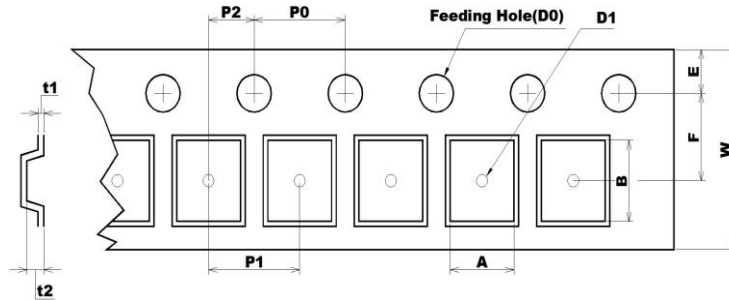


10 to 60% RH

11. PACKING

11-1. DIMENSIONS

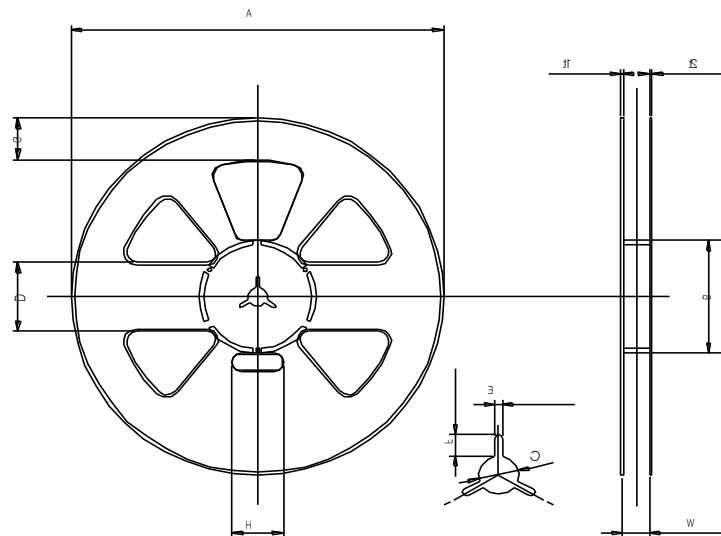
- Carrier Tape



[Unit: mm]

A	B	D0	D1	E	F	P0	P1	P2	t1	t2	W
1.60 +0.05 -0.05	2.00 +0.05 -0.05	Ø1.55 +0.05 -0.05	Ø1.00 MIN	1.75 +0.10 -0.10	3.50 +0.05 -0.05	4.00 +0.10 -0.10	4.00 +0.10 -0.10	2.00 +0.05 -0.05	0.25 +0.05 -0.05	0.80 +0.05 -0.05	8 +0.10 -0.10

- Reel



[Unit: mm]

A	B	C	D	E	F	G	H	t1	t2	W
Ø258.0 +1.0 -0.5	Ø81.0 +1.0 -1.0	Ø13.0 +0.5 -0.5	50.0 +0.8 -0.8	2.2 +0.3 -0.3	7.0 +0.5 -0.5	30.0 +0.8 -0.8	35.0 +1.0 -1.0	1.8 +0.5 -0.5	1.5 +0.5 -0.5	9.0 +1.0 -0.5

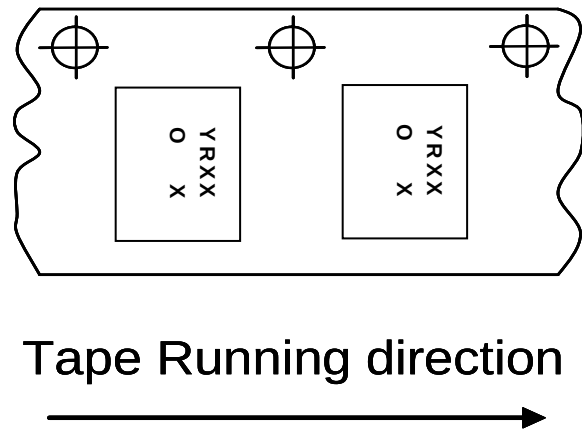
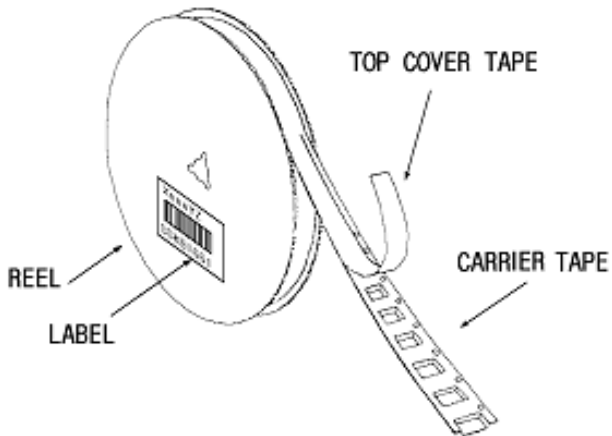
- The product shall be packed properly not to damaged during transportation and storage.

11-2. REELING QUANTITY

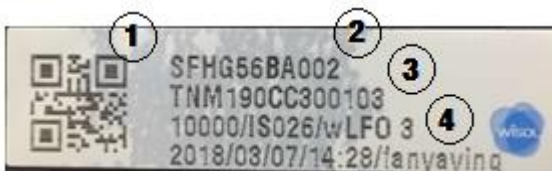
10 inch reel : 8,000 pcs/reel

11-3. TAPING STRUCTURE

11-3-1. The tape shall be wound around the reel in direction shown below.

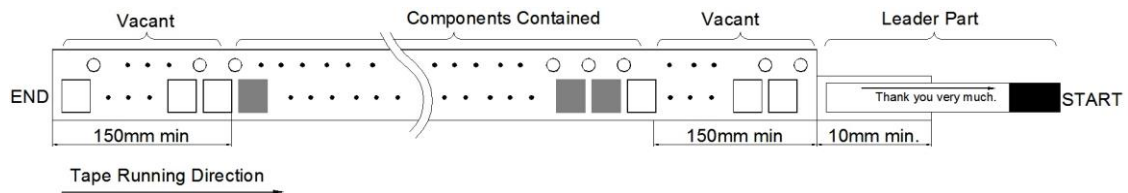


11-3-2. BARCODE LABEL



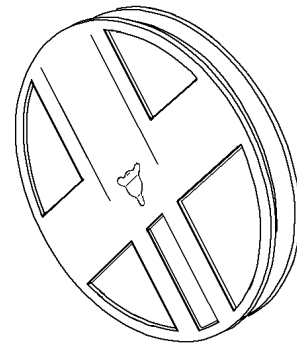
①	MODEL NAME BARCODE
②	Model Name
③	Reel number
④	Quantity / Marking

1-3-3. Leader part and vacant position specifications.

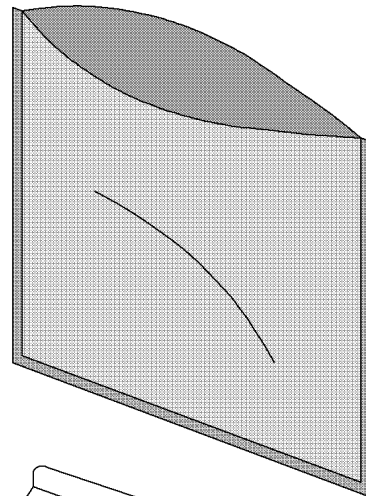


11-4. INNER BOX(Reel Packing) STRUCTURE

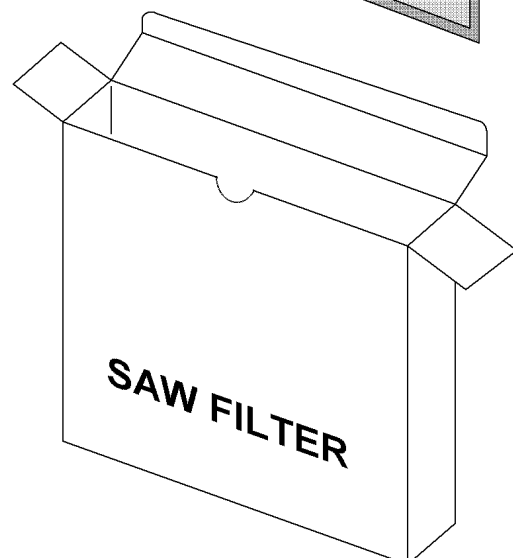
Material: Polycarbonate



Material : Polyethylene + Aluminium
Size : $310 \times 370\text{mm}^2$



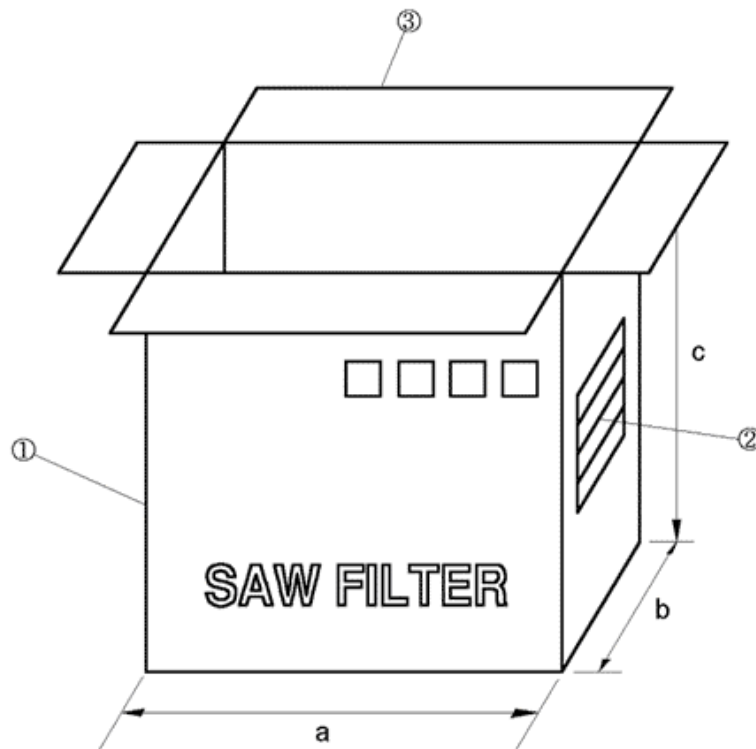
Material : Paper
Size: (D)260×(W)37×(H)265mm³



11-5. OUTER BOX STRUCTURE

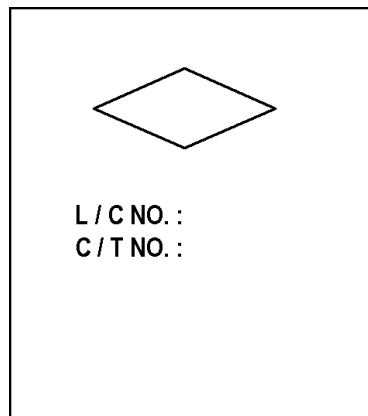
Material : Paper

TYPE	SIZE(mm)			Inner Box #
	a	b	c	
A	270	240	275	6 boxes



SIDE ①

SIDE ②



MODEL	
Q'TY	EA
USER	
DATE	. .

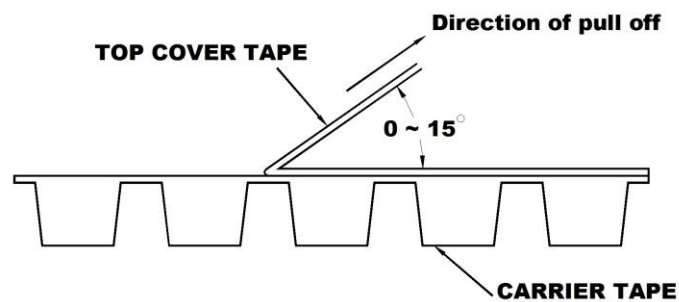
- SIDE is the same as front side.

12. TAPE SPECIFICATIONS

12-1. Tensile Strength of Carrier Tape: 4.4N/mm width

12-2. Top Cover Tape Adhesion (See the below figure)

- pull of angle: $0 \sim 15$ degree
- speed: 300mm/min.
- force: 20~70g



13. RoHS DATA



Test Report No. F690101/LF-CTSAYAA18-56872

Issued Date : 2018. 10. 30

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WISOL CO., LTD.

28-40, Gajangsaneopdong-ro

Osan-si, Gyeonggi-do

Korea



The following sample(s) was/were submitted and identified by/on behalf of the client as:-

SGS File No. : AYAA18-56872

Product Name : SAW FILTER(A2029)

Item No./Part No. : N/A

Buyer(s) : SAMSUNG

Received Date : 2018. 10. 25

Test Period : 2018. 10. 25 to 2018. 10. 30

Test Comments : By the applicant's specific request, the sampling and testing was performed only for the part indicated in the photo without disassembly.

Test Results : For further details, please refer to following page(s)

SGS Korea Co., Ltd.

Jeff Jang

Jeff Jang / Chemical Lab Mgr

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401 000004



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Test Report No. F690101/LF-CTSAYAA18-56872

Issued Date : 2018. 10. 30

Page 2 of 7

Sample No. : AYAA18-56872.001
Sample Description : SAW FILTER(A2029)
Item No./Part No. : N/A
Materials : HTCC, GOLD, EPOXY(A2029), LT

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cadmium by ICP-OES)	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Lead by ICP-OES)	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013 (Determination of Mercury by ICP-OES)	2	N.D.
Hexavalent Chromium (Cr VI)*	mg/kg	With reference to IEC 62321-7-2:2017, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis and/or with reference to IEC 62321-5:2013, determination of Chromium by ICP-OES.	8	N.D.
Antimony (Sb)	mg/kg	With reference to EPA 3052(1996), US EPA 6010B(1996), ICP	10	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tribromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.

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Sample No. : AYAA18-56872.001
Sample Description : SAW FILTER(A2029)
Item No./Part No. : N/A
Materials : HTCC. GOLD, EPOXY(A2029), LT

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.

Halogen Content

Test Items	Unit	Test Method	MDL	Results
Bromine(Br)	mg/kg	With reference to EN 14582:2016, IC	30	N.D.
Chlorine(Cl)	mg/kg	With reference to EN 14582:2016, IC	30	N.D.

- NOTE:
- (1) N.D. = Not detected.(<MDL)
 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) Negative = Undetectable / Positive = Detectable
 - (6) ** = Qualitative analysis (No Unit)
 - (7) * = a. The result of Hexavalent Chromium (Cr(VI)) is "ND" as the result of Chromium (Cr) is "ND",
and confirmation test of Hexavalent Chromium (Cr(VI)) is not required.
b. If the Chromium (Cr) content is greater than the MDL of Hexavalent Chromium (Cr(VI)),
confirmation test of Hexavalent Chromium (Cr(VI)) is required.

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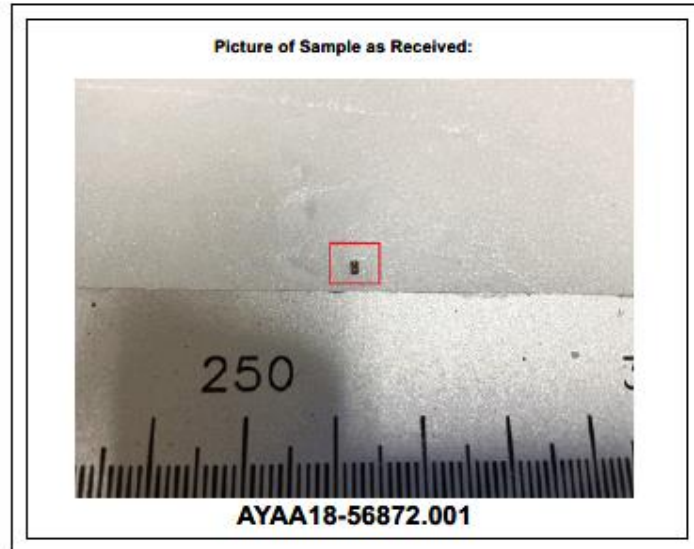
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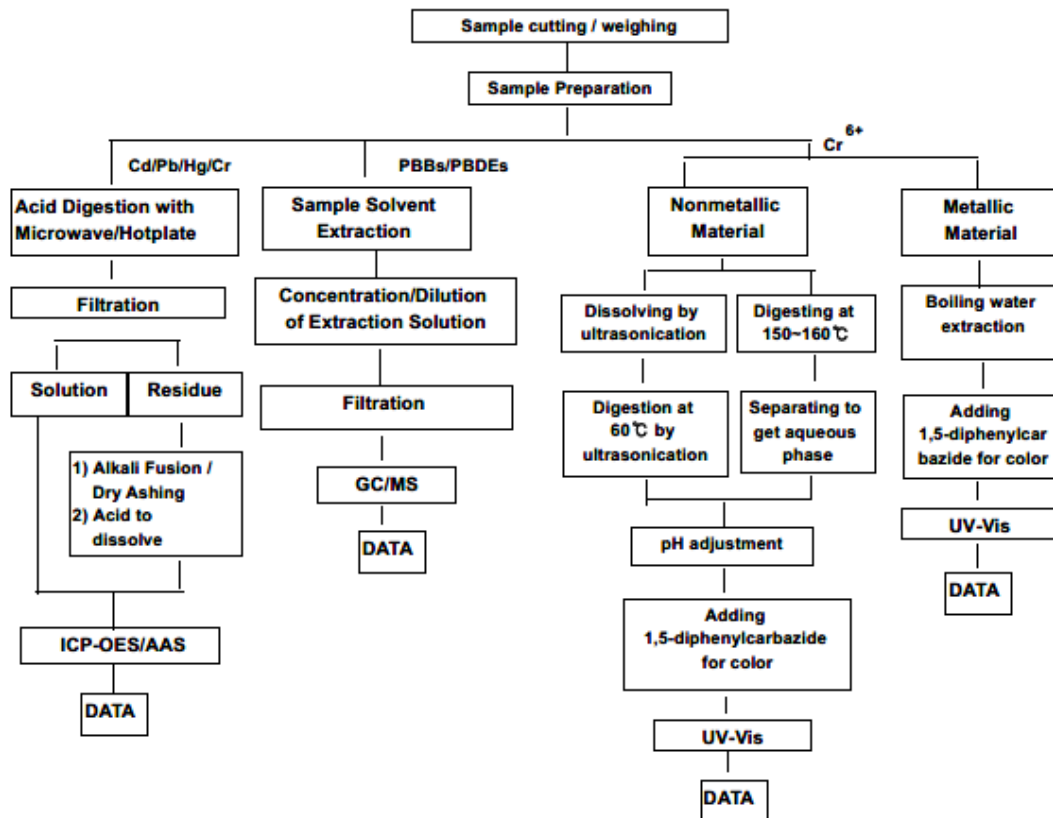


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Testing Flow Chart for RoHS: Cd/Pb/Hg/Cr⁶⁺ /PBBs&PBDEs Testing



The samples were dissolved totally at the acid digestion step of the above flow chart for Cd,Pb,Hg
Section Chief : Minkyu Park

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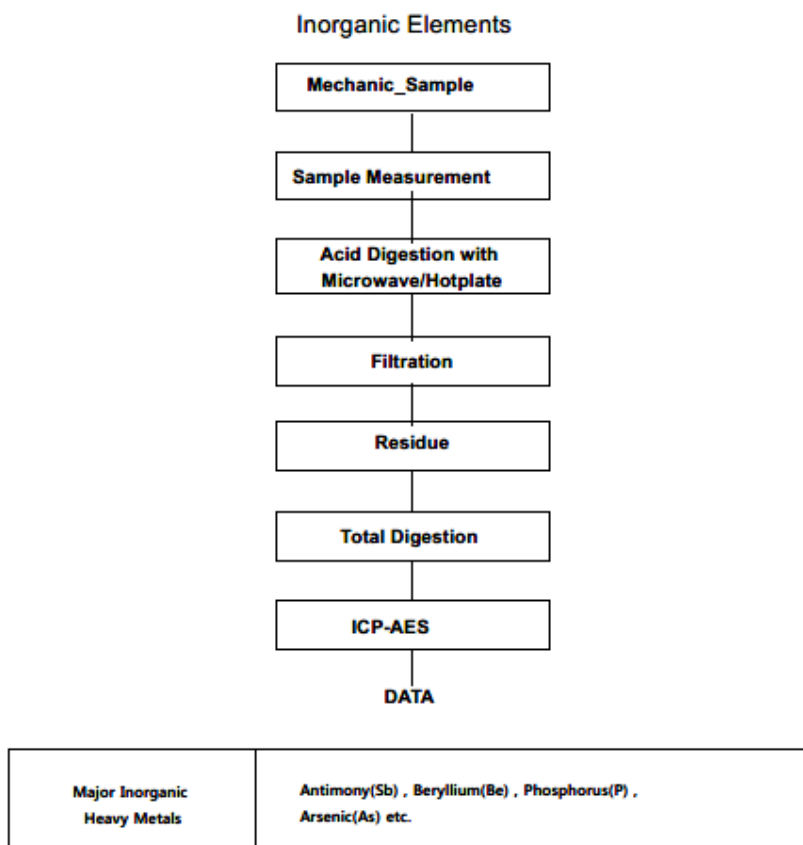
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Flow Chart for Inorganic Elements Testing


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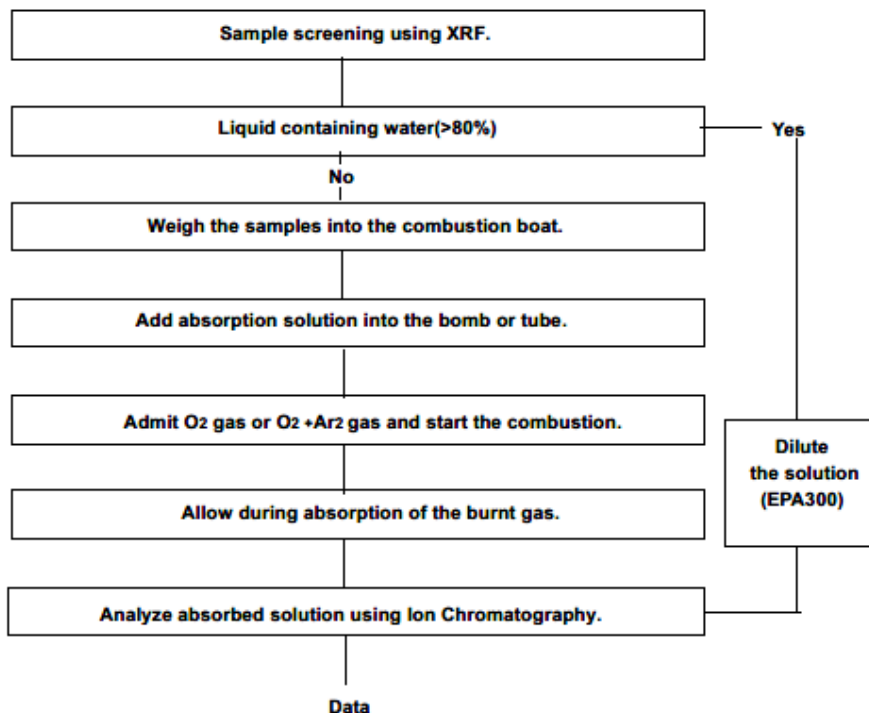


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Flow Chart for Halogen Test



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