

PRELIMINARY SPECIFICATIONS



Customer Part No.: _____ HELE. Part No: **X3S026000B71HZ-NHPZ**

Application For: _____ Products: **CRYSTAL**

Accepted Model: _____ Type & Freq.: **HSX321S / 26.000MHz**

Sample Order No: _____ Date: **2008/09/23**

Approved By :

加高電子股份有限公司

加高電子股份有限公司

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HSX321S SPECIFICATION

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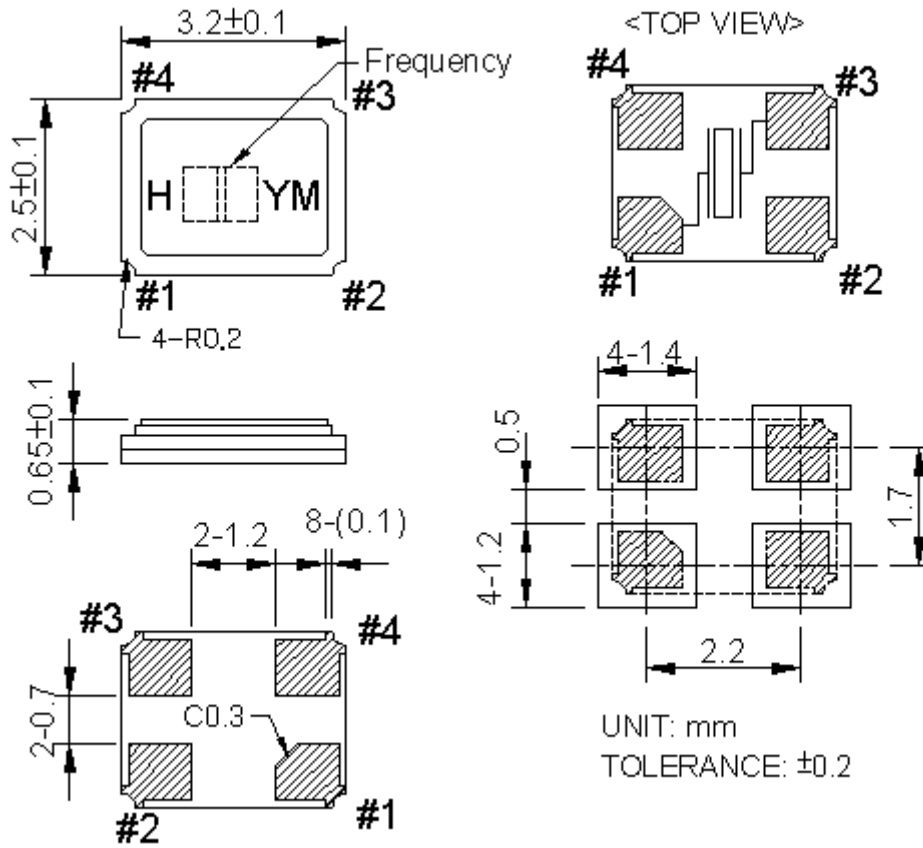
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QUARTZ CRYSTAL SPECIFICATION				TAIWAN FACTORY		
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1. QUARTZ CRYSTAL UNIT SPECIFICATION

- | | |
|--------------------------------|---|
| 1. Frequency: | 26.000000MHz |
| 2. Holder type : | HSX321S |
| 3. Frequency tolerance: | +/- 10 ppm at 25deg.C +/-3deg.C |
| 4. Equivalent resistance: | 40 ohms Max. / SERIES |
| 5. Storage temperature range: | -45 deg.C To +95 deg.C |
| 6. Operable temperature range: | -20 deg.C To +85 deg.C |
| 7. Temperature drift: | +/-10 ppm -20 deg.C To +85deg.C |
| 8. Loading capacitance (CL) : | 10.9 pF +/-0.2 pF |
| 9. Drive level: | 100 uW +/- 10 uW |
| 10. Shunt Capacitance: | 2.0 pF Max |
| 11. Insulation resistance : | More than 500M ohms at DC 100V |
| 12. Mode of oscillation: | Fundamental |
| 13. Circuit: | Measured in HP/E5100A,S&A 250B |
| 14. Shocking : | Dropping from 50 cm height 3 times on firm wood |
| Variation : | Frequency less than +/-5 ppm
Resistance less than +/- 15 % or 2ohms max. |
| 15. Aging: | Less than +/- 1 ppm/Year |
| 16. Holder | HSX321S Seam type |
| 17. Dimensions and marking | Refer to page.4 |
| 18. Emboss carrier tape & reel | Refer to page.6 and page.7 |
| 19. Note: | TS: 12.5 ppm/pF Typ (@CL=10.9pF) |

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2. HSX321S MARKING & DIMENSIONS



- *Marking should be printed as following:
Logo, Nominal Frequency, Manufactured year & month
- *Nominal frequency = integer only
(ex. 14.31818 MHz \rightarrow 14)
- *Manufacturing Lot No.
(Y: year) ex. 2000 shall be marked as '0' (The last digit of the year)
(M: month) ex. June shall be marked as 'F' (As shown on the Table-1).

Marking : Laser marking.

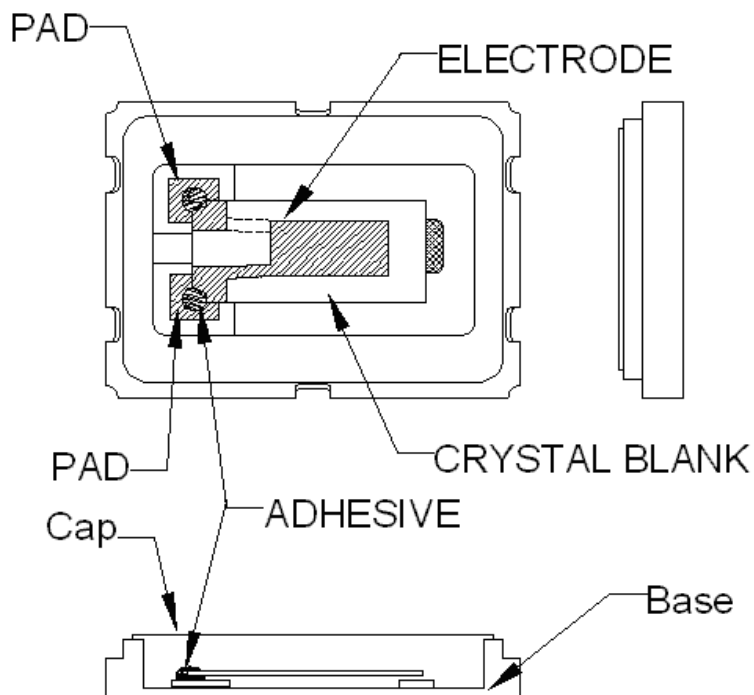
(Table-1)

Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
A	B	C	D	E	F	G	H	J	K	L	M

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3. INSIDE STRUCTURE



※Reference drawing

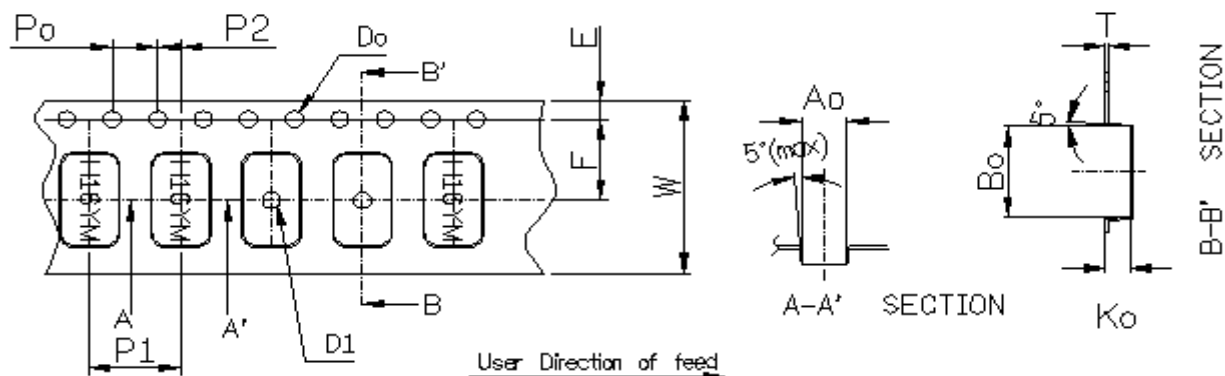
(1) Base: Alumina Ceramic (Al_2O_3) Metallized Pad: W Ni Plating Au Plating
(2) Cap: Fe-Ni
(3) Crystal Enclosure Seal: Seal Seam
(4) Crystal Blank Rectangular At-Cut Quartz Crystal Blank
(5) Adhesive Silver Conductive Silicon Resin Adhesive bonding: upper & lower bonding/lower bonding only
(6) Electrode Au
(7) PAD Alumina Ceramic (W. Ni. Au)

The use prohibition chemistry substance of Table 1 of DHE-0204-1 (QA-QM-08) is not included in this item.

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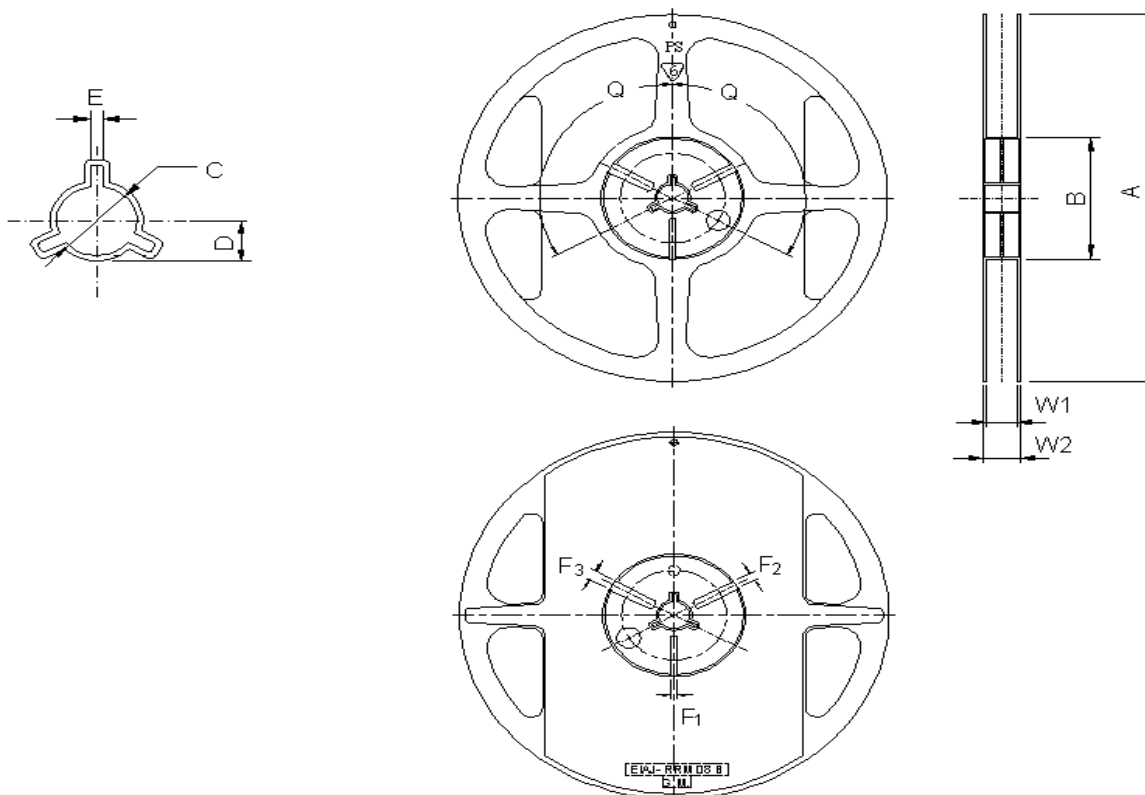
4. HSX321S EMBOSS CARRIER TAPE & REEL

a.) Dimensions of Carrier Tape



Symbol	Ao	Bo	Ko	Po	P1	P2
Spec	2.70±0.1	3.4±0.1	1.40±0.1	4.0±0.1	4.0±0.1	2.0±0.05
Symbol	E	F	Do	D1	W	T
Spec	1.75±0.1	3.5±0.05	∅1.55±0.05	∅1.0(min)	8.0±0.2	0.25±0.05

b.) Dimensions of Reel



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(Table-2)

(UNIT: mm)

ITEM		MARK	DIMENSIONS · ANGLE	
FLANCE	Diameter	A	ϕ 178+1/-1	
	Inner Width	W1	8.0+/-1.5	
	Outer Width	W2	11.5+/-0.2	
HUB	Out Line diameter		B	ϕ 60+1.0/-0.0
	Center Core slit	Width	F1	3.0+0.5/-0
			F2	4.0+0.5/-0
			F3	5.0+0.5/-0
		Position	q	120deg
	Spindle diameter		C	ϕ 13+/-0.5
Key Ditch	Width	E	2.5+/-0.5/-0	

c.) Storage condition

Temperature: +40deg.C Max.

Relative Humidity: 80% Max.

d.) Standard packing quantity

3,000PCS / REEL

e.) Material of the tape

Tape	Material
Carrier tape	A – PET
Top tape	Polyester

f.) Label contents

- .The type of product
- .Our specification No.
- .Your Part No.
- .Lot No.
- .Nominal Frequency
- .Quantity
- .Our Company Name

Sticks label for every reel.

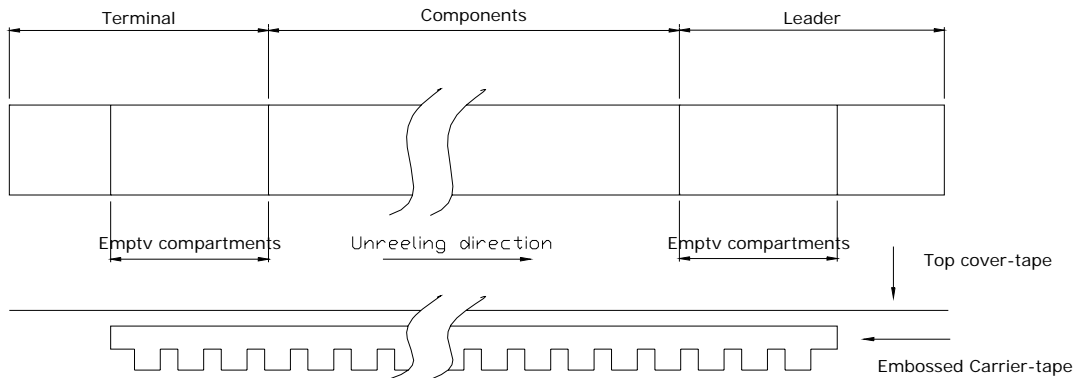
TYPE	
SPEC NO.	
Parts NO.	
Lot No.	
FREQ.	
Q'TY	(RoHS Compliance)
H.E.ELE. HARMONY ELECTRONICS CORP.	

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g.) Taping dimension

Leader	Cover-tape	The length of cover-tape in the leader is more than 400 mm including empty embossed area.
	Carrier-tape	After all products were packaged, must remain more than twenty pieces or 400 mm empty area, which should be sealed by cover-tape.
Terminal	Cover-tape	The tip of cover-tape shall be fixed temporary by paper tape and roll around the core of reel one round.
	Carrier-tape	The empty embossed area which are sealed by top cover-tape must remain more the 40 mm.



h.) Joint of tape

The carrier-tape and top cover-tape should not be jointed.

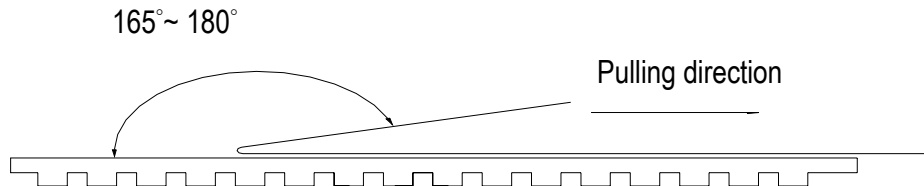
i.) Release strength of cover tape

It has to between 0.1N to 0.7N under following condition.

Pulling direction 165° to 180°

Speed 300mm/min.

Otherwise unless specified.



Other standards shall be based on JIS C 0806-1990.

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5. Mechanical Performance

5.1. Natural Drop

Drop 3 times from the height of 50cm onto min. 30mm thickness hard wooden board
The component shall satisfy requirement of the electrical characteristics.

5.2. Vibration

Frequency 10-55Hz, Sine Wave full amplitude of 1.5mm to X,Y and Z 3 axes, Duration of 2 hours to each axis.
The component shall satisfy requirement of the electrical characteristics.

5.3. Sealing Tightness

Leak Rate 1.0×10^{-8} Pa-m³/sec. Max. measured by Helium leak detector.

5.4. Solderability

After applying ROSIN Flux, dipping in solder bath at 230°C +/-5°C for 5 sec.
Over 90% of terminal shall be covered by solder.

6. Environment Performance

6.1. Humidity

Temperature 60°C +/-2°C, RH 90~95%, Duration of 240 hours
Back to room temperature first, then in 1~2 hours, the component shall be checked.
The component shall satisfy requirement of the electrical characteristics.
No physical damage

6.2. Storage in Low Temperature

-30°C +/-2°C, Duration of 240 hours.
Back to the room temperature first, then in 1~2 hours, the component shall be checked.
The component shall satisfy requirement of the electrical characteristics.
No physical damage

6.3. Storage in High Temperature

+85°C +/-2°C, Duration of 240 hours.
Back to the room temperature first, then in 1~2 hours, the component shall be checked.
The component shall satisfy requirement of the electrical characteristics.
No physical damage

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6.4. Temperature cycles

-30°C +/- 2°C (30min) ↔ +85°C +/- 2°C (30min) 20 cycles

Back to the room temperature first, then in 1~2 hours, the component shall be checked.

The component shall satisfy requirement of the electrical characteristics.

No physical damage

6.5. VPS

FC-70 (the boiling point: +215°C) Vapor for 30 sec

Back to the room temperature first, then in 1~2 hours, the component shall be checked.

The component shall satisfy requirement of the electrical characteristics.

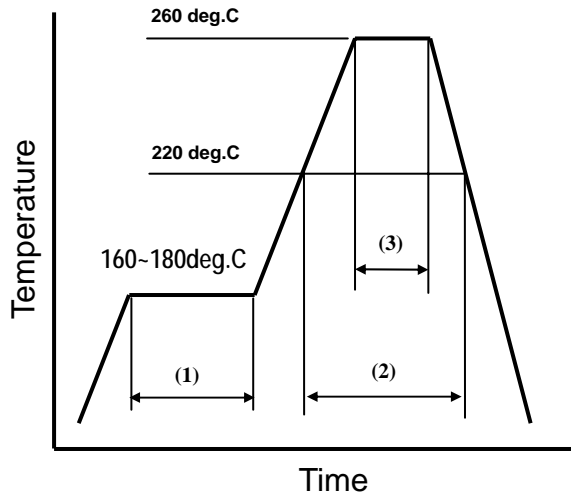
No physical damage

7. Supplement

7.1. Soldering

7.2. Please stay with our proposed reflow condition and do then soldering 2 times max.

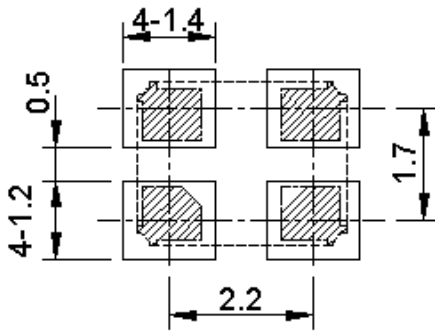
Available for Lead Free Soldering



(1)	Preheat	160~180 deg.C	120sec.
(2)	Primary heat	220 deg.C	60sec.
(3)	Peak	260 deg.C	10sec. Max.

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7.3.Land pattern layout(Example)



7.4.Solder iron (Example)

Bit temp.:350°C max.,Time:3sec max. ,Each terminal solder a 1 time max.

7.5.Mounting

This component is designed for automatic insertion.

However, you are requested to do the trial with your insertion machine in order to be sure of proper operation and no damage of component.

Please pay attention to board warp which may damage the component and cause Soldering Process.

7.6.Cleaning

Cleaning liquid which corrodes Nickel shall not be used

It may cause the problem on the surface, color, marking etc.

Ultra-sonic cleaning is possible, however, you are requested to check on your board.

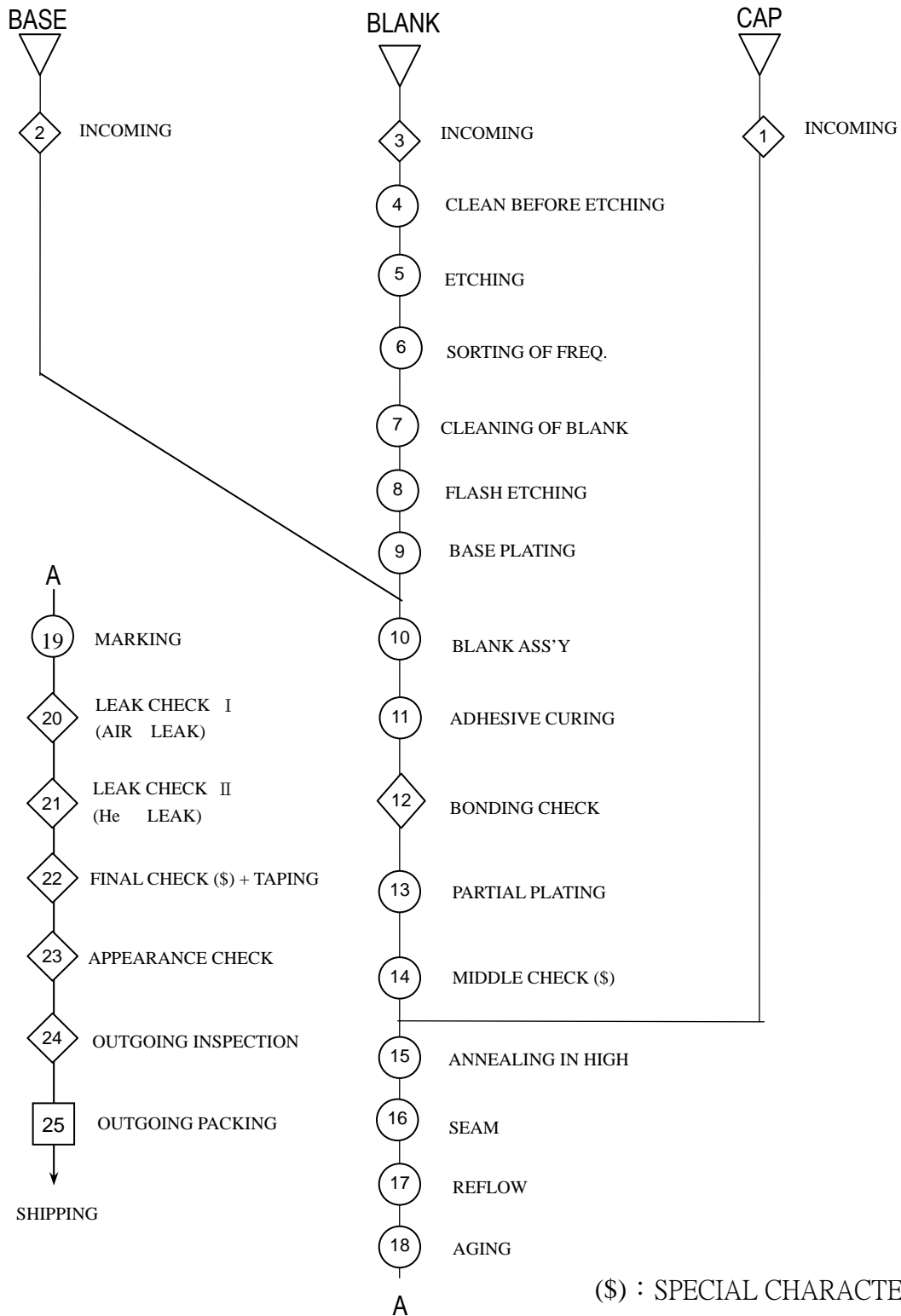
Because we only checked as single unit.

7.7.Storage

Please keep away from high temperature and high humidity ,which may cause put solderbility. No direct Sunlight, No dew as well.

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8. Flow Chard



Tittle HSX321S QUARTZ CRYSTAL SPECIFICATION				Remark THAILAND FACTORY TAIWAN FACTORY		
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9. Environmental Workload Chemical Substance Components List

Environmental Workload Chemical Substance Components List		
TYPE	H(D)SX321S	
PERCENTAGE	19(mg)	ppm
Chemical Substance Components		
Si	0.0437	2,300
Au	0.1463	7,700
Co & Co Compound	1.1286	59,400
Mo & Mo Compound	0.0380	2,000
Ag	0.3952	20,800
Cu	0.1102	5,800
Cr & Cr Compound	0.0380	2,000
Al	4.7234	248,600
Mn & Mn Compound	0.0228	1,200
W & W Compound	0.1843	9,700
Ni & Ni Compound	2.8424	149,600
Fe	3.8437	202,300

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EXCEL EXPORT PRINTOUT FORMAT

Run Date : 12-09-2008 9:08 am

S&A 250B: 9.40 Report: 4.60

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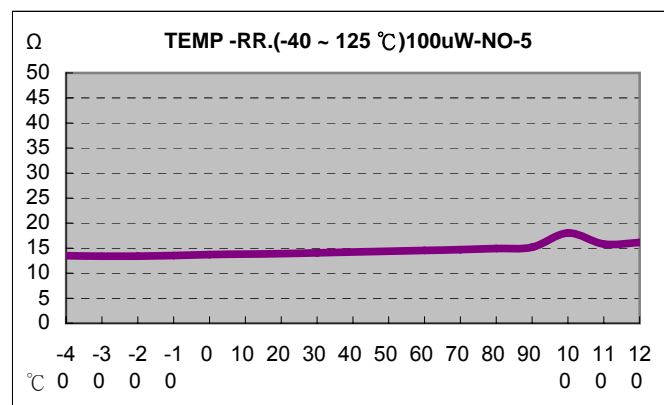
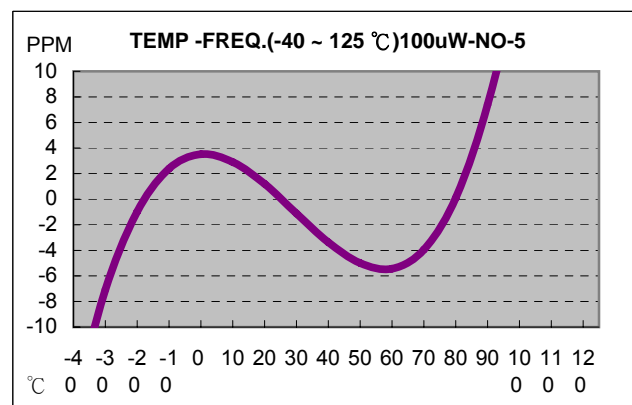
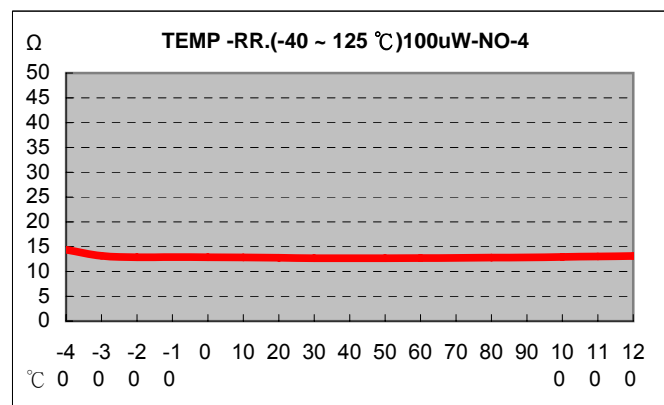
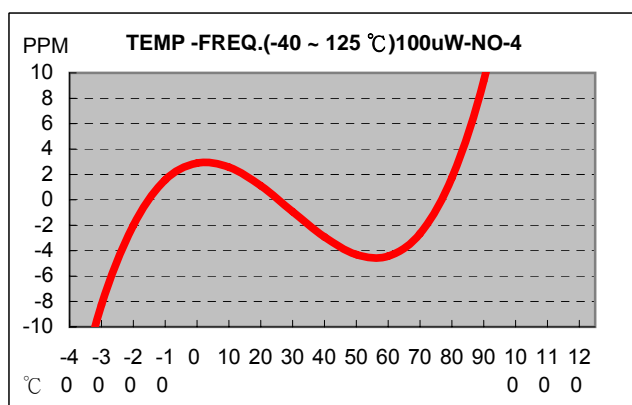
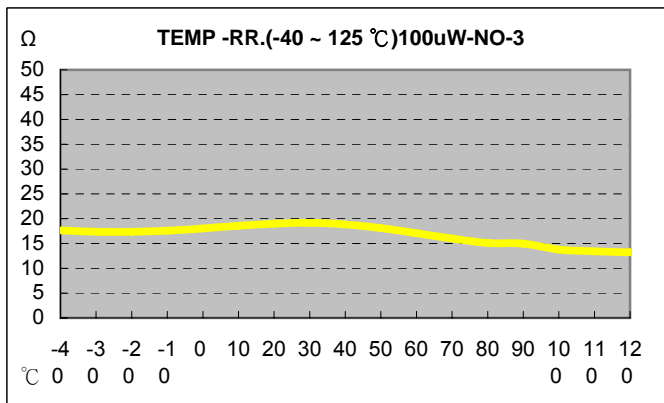
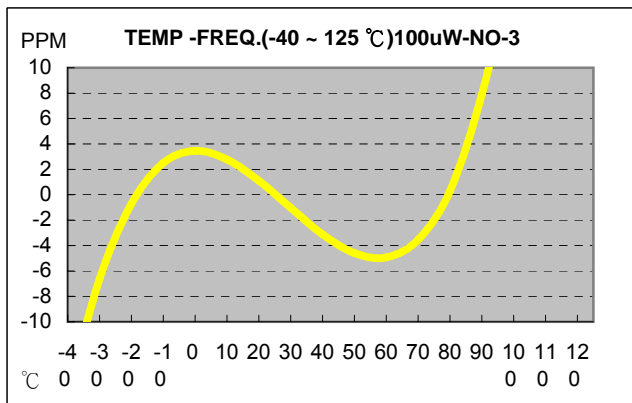
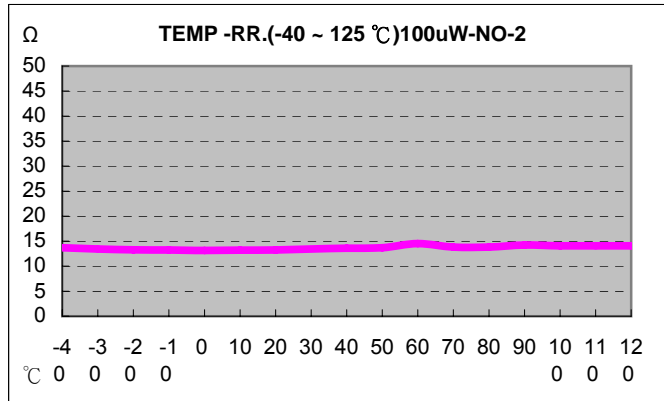
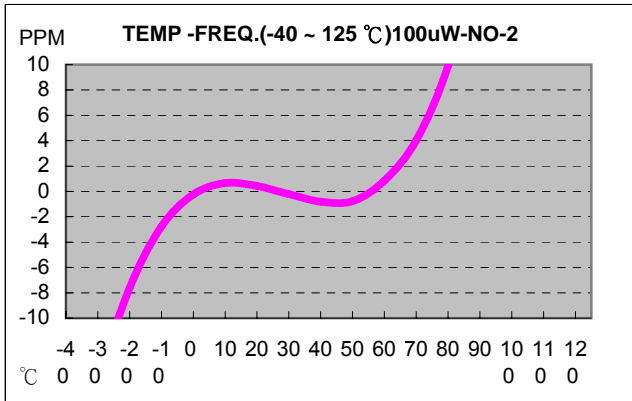
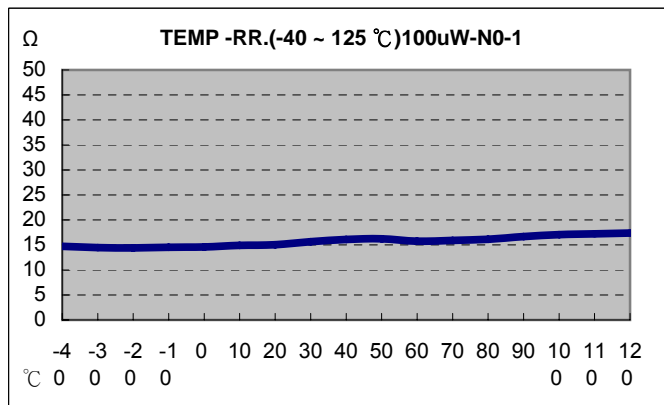
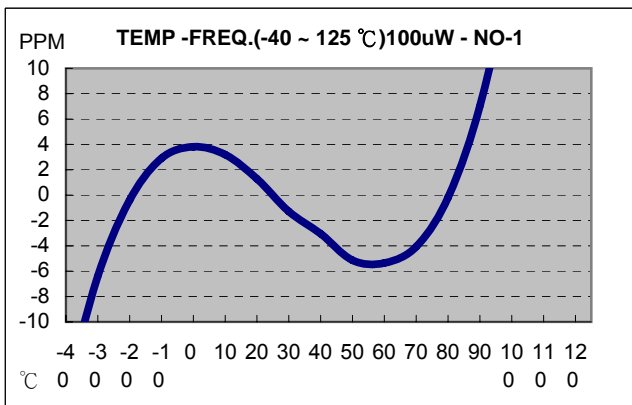
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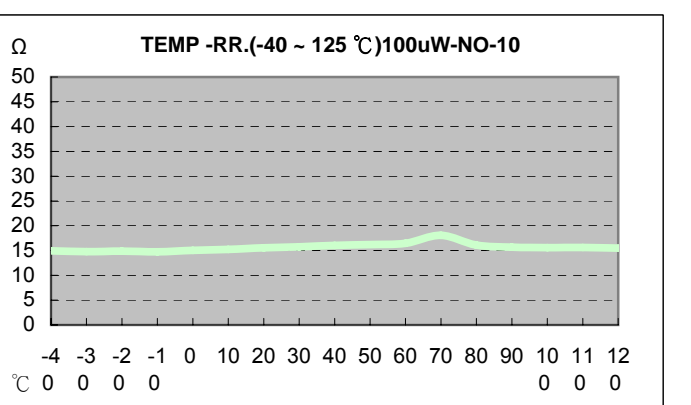
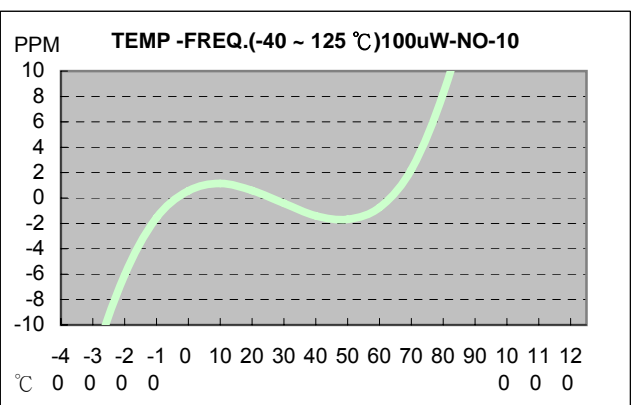
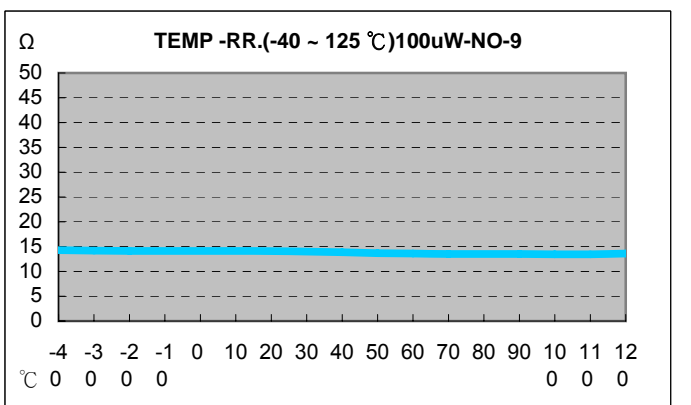
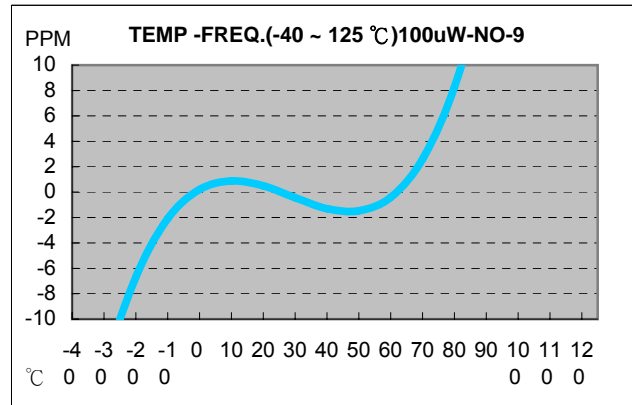
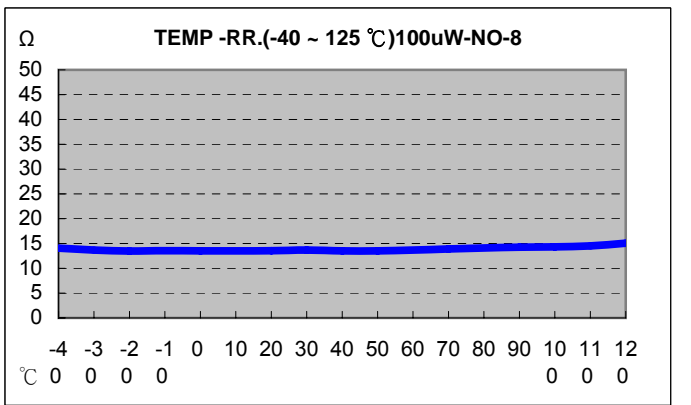
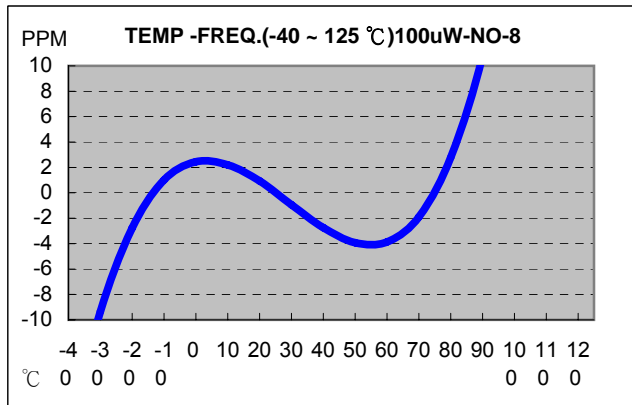
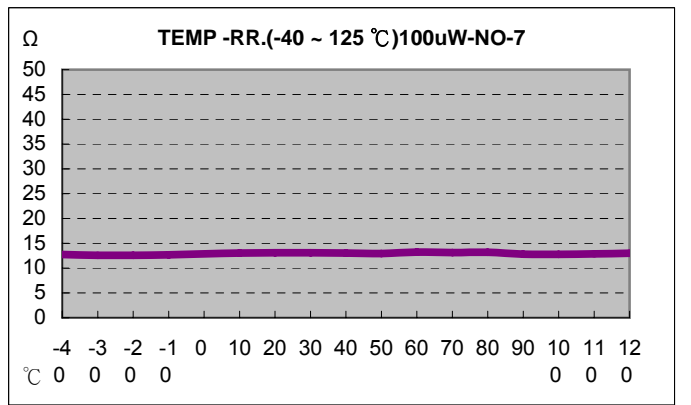
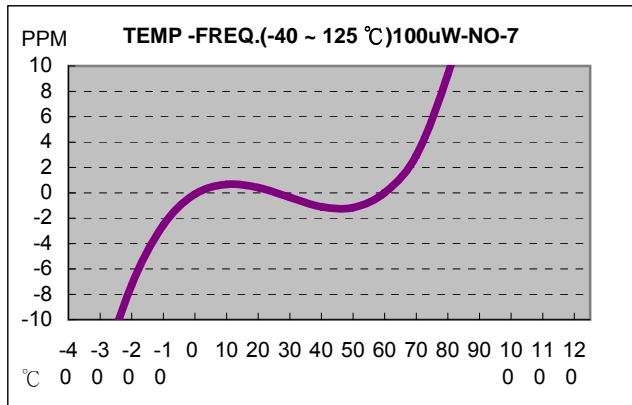
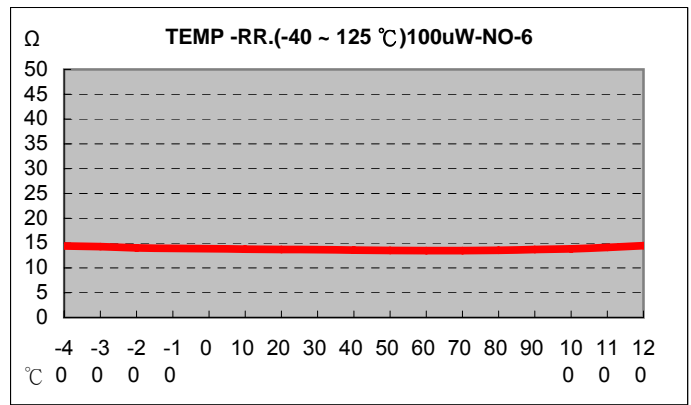
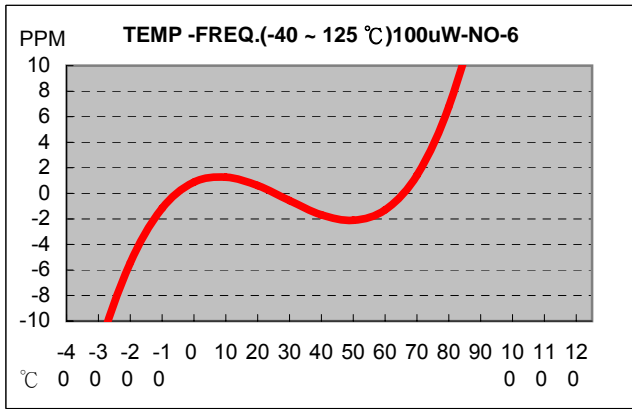
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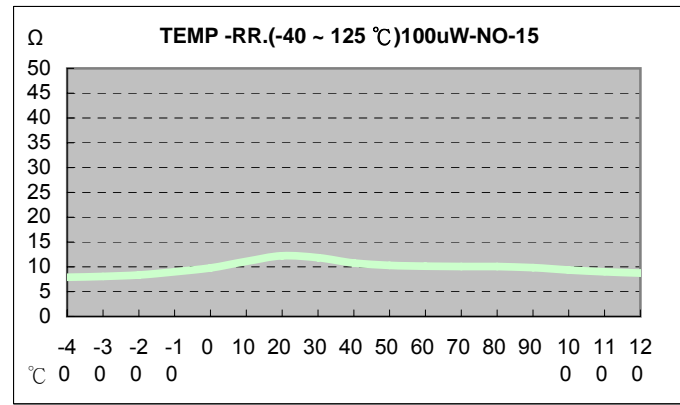
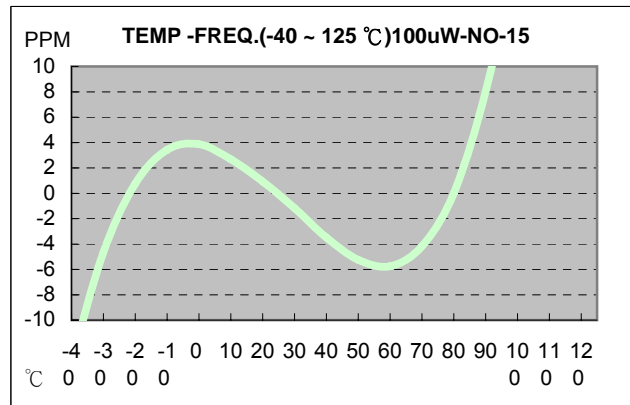
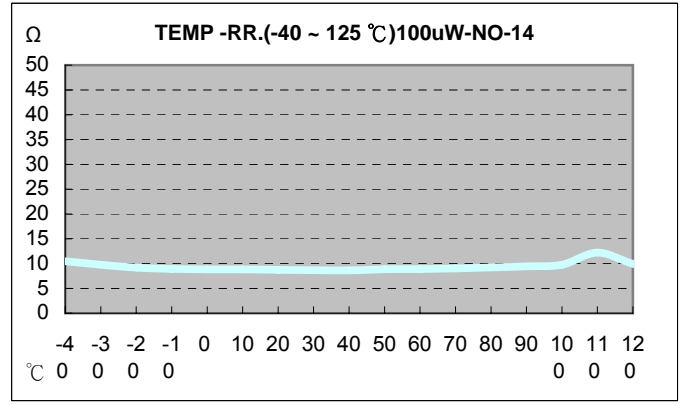
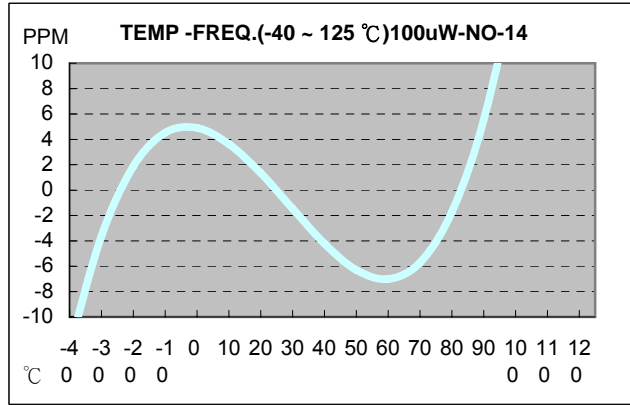
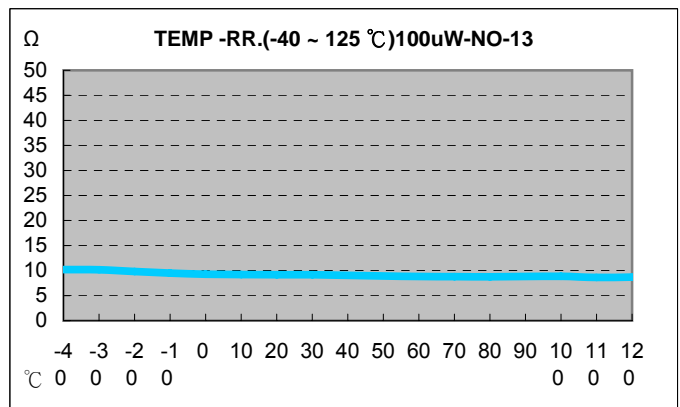
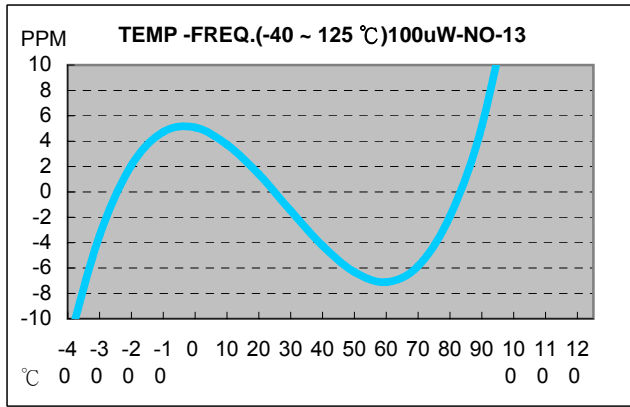
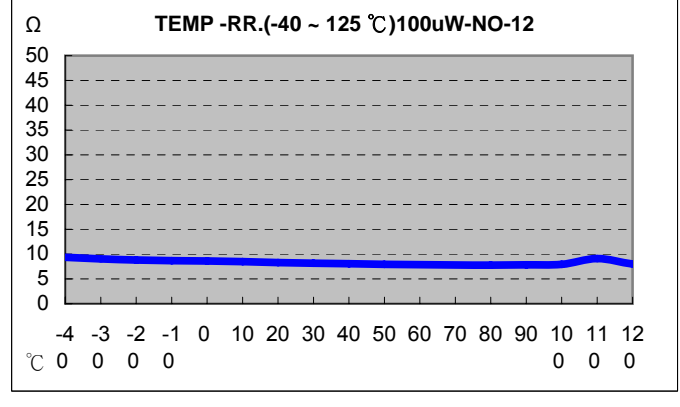
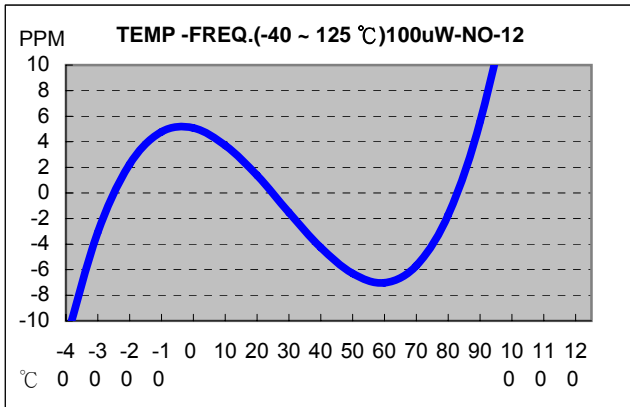
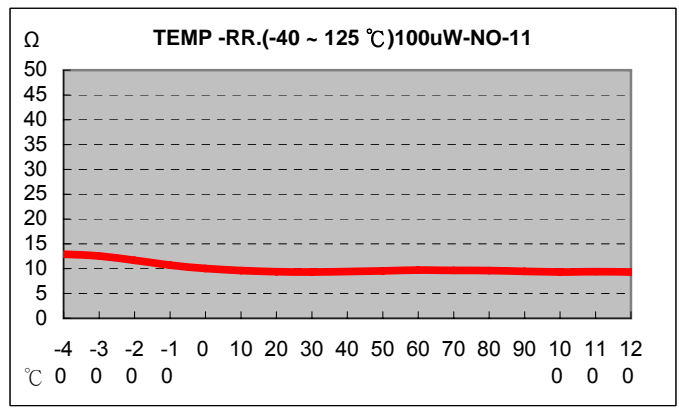
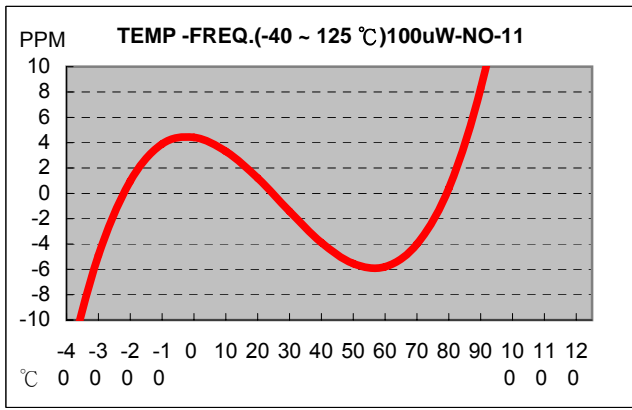
PL: No Load CL: 10.90 pF

Crystal	First Failure	FR	FL	FL	RR	C0	C1	C0/C1	L	Q	TS	RLD2	DLD2	FDLD	DLDH2	FDLDH
		Hz	Hz	ppm	Ohms	pF	fF		mH	k	ppm/pF	Ohms	Ohms	ppm	Ohms	ppm
High Limit					40.0	2.00						40.0	3.0	2.0	3.0	2.0
Low Limit																
1	PASS	25996184.5	26000000.8	0.0	15.2	1.05	3.47	303.6	10.8	116.3	12.1	15.1	0.3	0.6	0.2	0.0
2	PASS	25995973.5	25999995.4	-0.2	13.5	1.12	3.68	304.7	10.2	123.8	12.7	13.4	0.3	1.0	0.2	0.0
3	PASS	25996193.8	26000021.4	0.8	19.2	1.05	3.48	302.1	10.8	91.8	12.2	20.4	1.8	0.9	1.4	0.2
4	PASS	25995941.1	26000022.4	0.9	13.1	1.09	3.72	292.8	10.1	125.5	12.9	12.9	0.4	0.7	0.2	0.2
5	PASS	25996031.5	26000015.9	0.6	14.1	1.11	3.64	305.0	10.3	119.4	12.6	14.0	0.3	1.1	0.2	0.0
6	PASS	25995883.8	25999750.2	-9.6	13.8	1.11	3.53	315.1	10.6	126.0	12.2	13.7	0.3	1.4	0.2	0.0
7	PASS	25995913.6	25999773.9	-8.7	13.2	1.08	3.52	307.0	10.7	131.5	12.3	13.2	0.3	1.0	0.2	0.0
8	PASS	25995920.0	25999798.2	-7.8	13.9	1.12	3.55	315.5	10.6	124.6	12.3	14.0	0.7	1.6	0.4	0.1
9	PASS	25995934.3	25999782.6	-8.4	14.2	1.12	3.52	318.0	10.7	122.5	12.2	14.5	0.7	1.7	0.3	0.1
10	PASS	25995916.5	25999792.9	-8.0	16.0	1.06	3.52	301.9	10.6	108.9	12.3	17.6	2.0	0.6	1.3	0.1
11	PASS	25996196.0	26000267.6	10.3	9.4	1.16	3.74	311.3	10.0	174.7	12.8	9.3	0.3	1.4	0.2	0.0
12	PASS	25996310.1	26000258.6	9.9	8.3	1.11	3.61	307.4	10.4	203.8	12.5	8.3	0.4	1.5	0.4	0.1
13	PASS	25996189.3	26000276.2	10.6	9.2	1.13	3.74	301.1	10.0	177.8	12.9	9.2	0.3	1.2	0.3	0.0
14	PASS	25996276.0	26000275.3	10.6	8.7	1.11	3.66	304.3	10.3	191.8	12.7	8.6	0.3	1.5	0.3	0.0
15	PASS	25996283.1	26000271.2	10.4	12.2	1.11	3.64	303.7	10.3	137.8	12.6	12.1	0.2	1.1	0.2	0.0

MAX	25996310	26000276	10.6	19.2	1.16	3.74	318.0	10.8	203.8	12.9	20.4	2.0	1.7	1.4	0.2
MIN	25995884	25999750	-9.6	8.3	1.05	3.47	292.8	10.0	91.8	12.1	8.3	0.2	0.6	0.2	0.0
X-bar	25996076	26000020	0.8	12.9	1.10	3.60	306.2	10.4	138.4	12.5	13.1	0.6	1.2	0.4	0.1
3S	477.4	622.9	24.0	8.9	0.1	0.3	19.6	0.8	97.9	0.9	10.0	1.7	1.1	1.2	0.2







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

Sample Description : CRYSTAL OSCILLATOKS
Style/Item No. : HSX321S,DSX321S(Au)
Sample Receiving Date : 2008/07/10
Testing Period : 2008/07/10 TO 2008/7/16

=====
Test Result(s) : - Please see the next page(s) -


Katherine Ho / Supervisor
Signed for and on behalf of
SGS Taiwan Limited

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Test Result(s)

PART NAME NO.1 : MIX TEST:BROWN+GOLD+SILVER CRYSTAL OSCILLATOKS

Test Item (s)	Unit	Method	MDL	Result
				No. 1
Cadmium (Cd)	mg/kg	With reference to IEC 62321/2nd CDV (111/95/CDV). Determination of Cadmium by ICP-AES.	2	n.d.
Hexavalent Chromium Cr(VI) by alkaline extraction	mg/kg	With reference to IEC 62321/2nd CDV (111/95/CDV). Determination of Hexavalent Chromium for non-metallic samples by UV/Vis Spectrometry.	2	n.d.
Mercury (Hg)	mg/kg	With reference to IEC 62321/2nd CDV (111/95/CDV). Determination of Mercury by ICP-AES.	2	n.d.
Lead (Pb)	mg/kg	With reference to IEC 62321/2nd CDV (111/95/CDV). Determination of Lead by ICP-AES.	2	n.d.
PERFLUOROOCCTANE SULFONATES (PFOS)	mg/kg	With reference to US EPA 3540C : 1996 method for PFOS Content. Analysis was performed by LC/MS.	10	n.d.
Sum of PBBs	mg/kg	With reference to IEC 62321/2nd CDV (111/95/CDV). Determination of PBBs and PBDEs by GC/MS.	-	n.d.
Monobromobiphenyl			5	n.d.
Dibromobiphenyl			5	n.d.
Tribromobiphenyl			5	n.d.
Tetrabromobiphenyl			5	n.d.
Pentabromobiphenyl			5	n.d.
Hexabromobiphenyl			5	n.d.
Heptabromobiphenyl			5	n.d.
Octabromobiphenyl			5	n.d.
Nonabromobiphenyl			5	n.d.
Decabromobiphenyl			5	n.d.

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Test Item (s)	Unit	Method	MDL	Result
				No. 1
Sum of PBDEs			-	n.d.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321/2nd CDV (111/95/CDV). Determination of PBBs and PBDEs by GC/MS.	5	n.d.
Dibromodiphenyl ether			5	n.d.
Tribromodiphenyl ether			5	n.d.
Tetrabromodiphenyl ether			5	n.d.
Pentabromodiphenyl ether			5	n.d.
Hexabromodiphenyl ether			5	n.d.
Heptabromodiphenyl ether			5	n.d.
Octabromodiphenyl ether			5	n.d.
Nonabromodiphenyl ether			5	n.d.
Decabromodiphenyl ether			5	n.d.
Halogen			---	---
Halogen-Chlorine (Cl) (CAS No.: 022537-15-1)	mg/kg	With reference to BS EN 14582 . Analysis was performed by IC method for Chlorine content.	50	n.d.
Halogen-Fluorine (F) (CAS No.: 014762-94-8)	mg/kg	With reference to BS EN 14582 . Analysis was performed by IC method for Fluorine content.	50	n.d.
Halogen-Bromine (Br) (CAS No.: 010097-32-2)	mg/kg	With reference to BS EN 14582 . Analysis was performed by IC method for Bromine content.	50	n.d.
Halogen-Iodine (I) (CAS No.: 014362-44-8)	mg/kg	With reference to BS EN 14582 . Analysis was performed by IC method for Iodine content.	50	n.d.

- Note :
1. mg/kg = ppm
 2. n.d. = Not Detected
 3. MDL = Method Detection Limit
 4. The exemption of DecaBDE in polymeric application according 2005/717/EC was overruled by the European Court of Justice by its decision of 01.04.2008. Subsequently DecaBDE will be included in the sum of PBDE after 01.07.2008
 5. " - " = Not Regulated
 6. " --- " = Not Conducted

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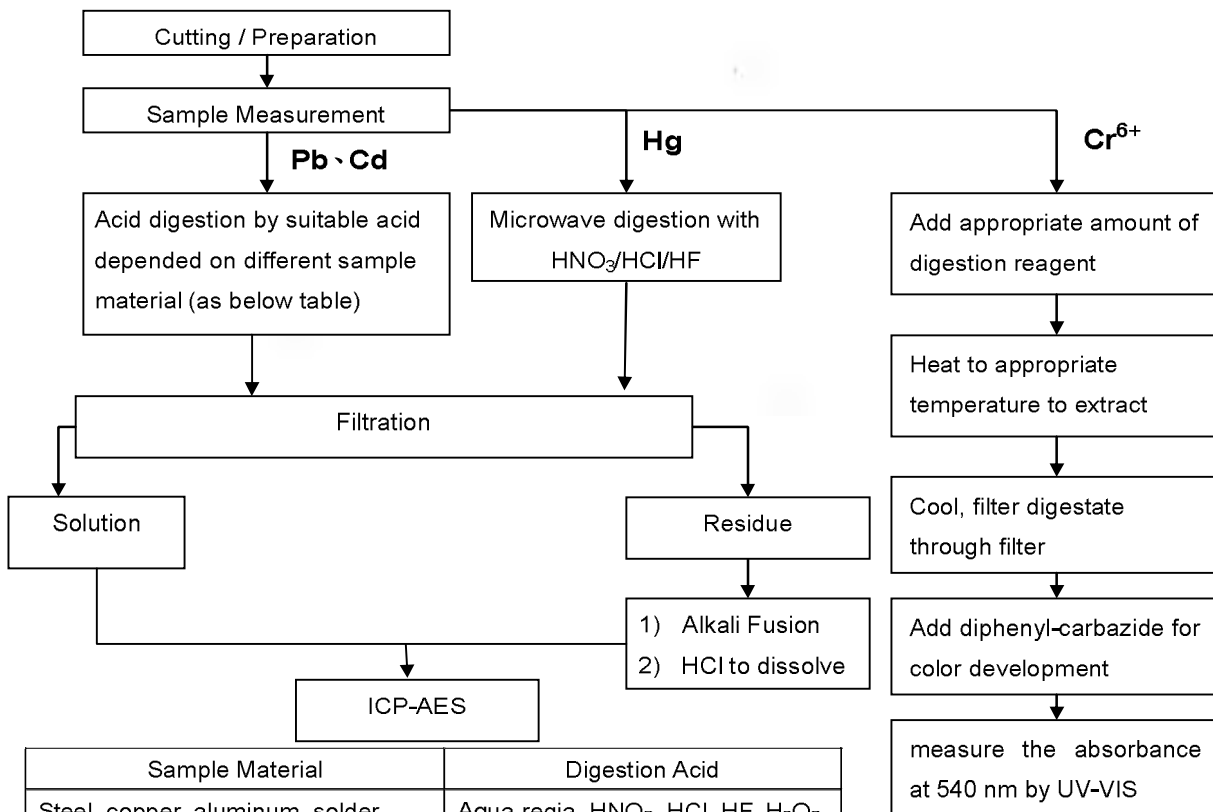
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- 1) These samples were dissolved totally by pre-conditioning method according to below flow chart.
(Cr6+ test method excluded)
- 2) Name of the person who made measurement: Hungming Li
- 3) Name of the person in charge of measurement: Ray Chang



Sample Material	Digestion Acid
Steel, copper, aluminum, solder	Aqua regia, HNO ₃ , HCl, HF, H ₂ O ₂
Glass	HNO ₃ /HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO ₃
Plastic	H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , HCl
Others	Any acid to total digestion

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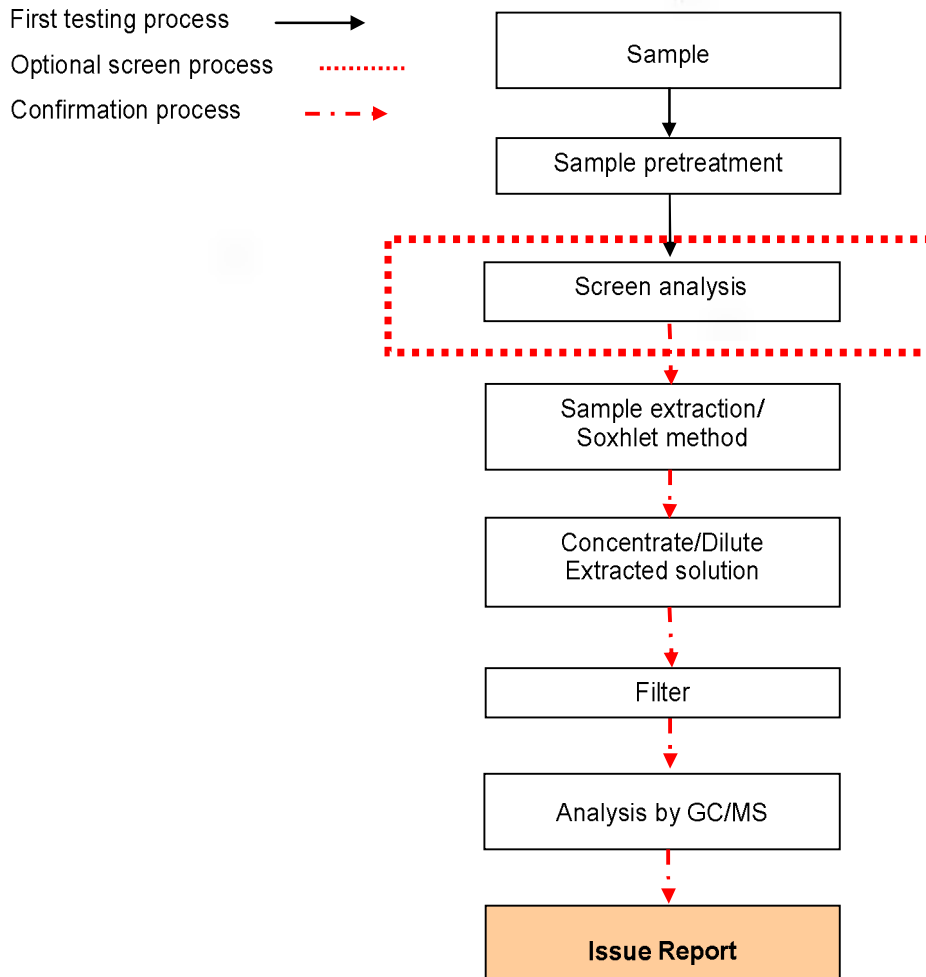
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PBB/PBDE analytical FLOW CHART

1) Name of the person who made measurement: Anson Tsao

2) Name of the person in charge of measurement: Ray Chang



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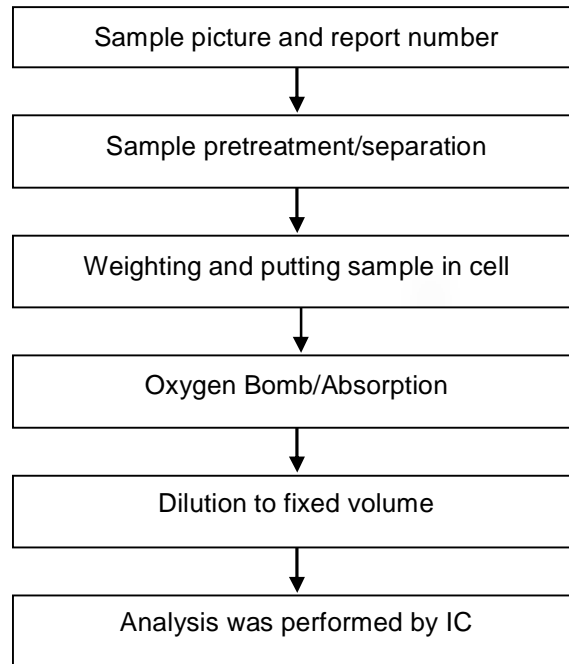
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Analytical flow chart of halogen content

- 1) Name of the person who made measurement: Hungming Li
- 2) Name of the person in charge of measurement: Ray Chang



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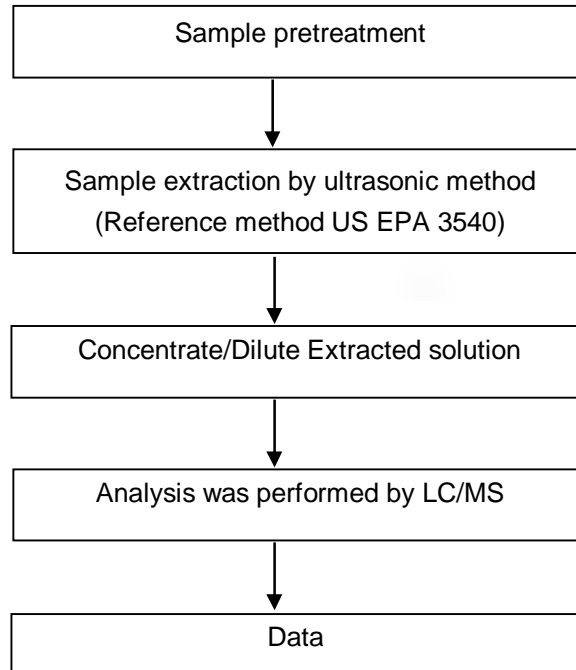
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Analytical flow chart of PFOS content

- 1) Name of the person who made measurement: Anson Tsao
- 2) Name of the person in charge of measurement: Ray Chang



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** End of Report **

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