AEC-6977
Environment Test Report

Report NO: 13P020012

Summary	☑ **Pass** ☐ **Fail** ☐ **Pass with Deviation**

Issue date	Approval	Test Engineer
2013-10-01	**Tom Lin**	**Willy**

Test item list

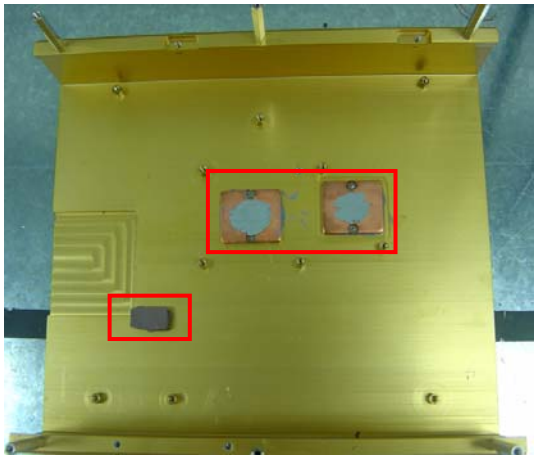
Testing Result

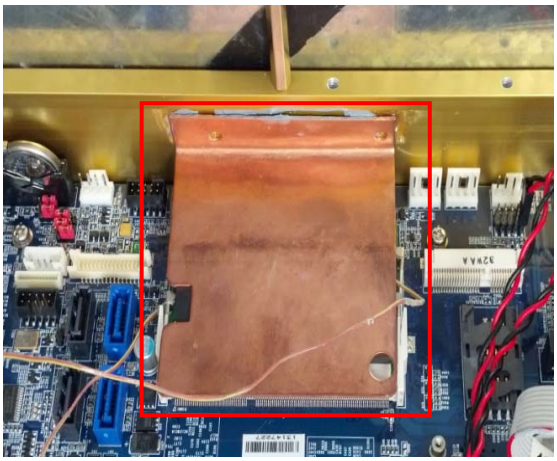
Num	Test item list	Result	Remark
1	Temp./Humidity power on/off test	Pass	
2	Temperature rise test	Pass	
3	Temperature cycle operation test	Pass	
4	High temperature storage test	Pass	
5	Low temperature storage test	Pass	
6	Humidity test	Pass	
7.	Cold start and hot start test	Pass	

Configuration of EUT

Num	Item	Spec
1	CPU Board	PBA-QM77 A1.0
2	BIOS	R0.4
3	CPU	Intel Ivy Bridge CPU i7-3517UE. 1.7GHz
4	Memory (WideTemp.)	DSL 8G DDR3 1600 Proms V73CB604808RAJJ111 *2
5	2.5” SATA HDD	Toshiba MK1060GSC / 100GB
6	Test Software	Windows 7 / Run PassMark Burn In Test 7.0 Pro
7	Adapter	

Heat Sink And Thermal Pad





Temp./humidity power on/off test

Test Date: 09-13 ~ 14-2013

Test Product: PBA-QM77 A1.0

Test Site: AAEON QE Dept.

Test Standard: Refer to IEC 68-2-30 Testing procedures
Test Db: Damp Heat Test

Test Equipment:

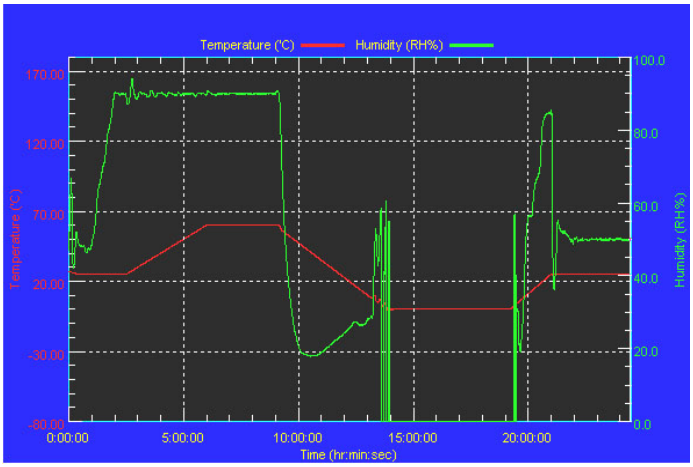
Programmable Temperature & Humidity Chamber (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 10/10/12
Serial Number: 2582

Temperature & Humidity Power On/Off Test:

Testing Specification:

Step	Temperature (℃)	Humidity (%RH)	Duration (HH:MM)
1	25	50	00:30
2	25	50	00:30
3	25	90	01:00
4	25	90	00:30
5	60	90	03:30
6	60	90	03:00
7	0	0	04:50
8	0	0	05:23
9	25	50	01:47
10	25	50	03:00

Test Curve:



Test Result:

Test Method	Actual	Successful	Failure rate
Power On/Off	1121/times	1121/times	0 %
Note: Failure rate need to under 0.2%.			

Temperature rise test

Test Date: 09-14 ~15-2013

Test Product: AEC-6977

Test Site: AAEON QE Dept.

Test Standard: Refer to EN 61131-2(94), UL508 (94)

Temperature Measurement:

40 Channel Thermal Recorder: (YOKOGAWA Inc,)
Model: DA100-13-1D
Date of Calibration: 10/08/12
Serial Number: 12A323190

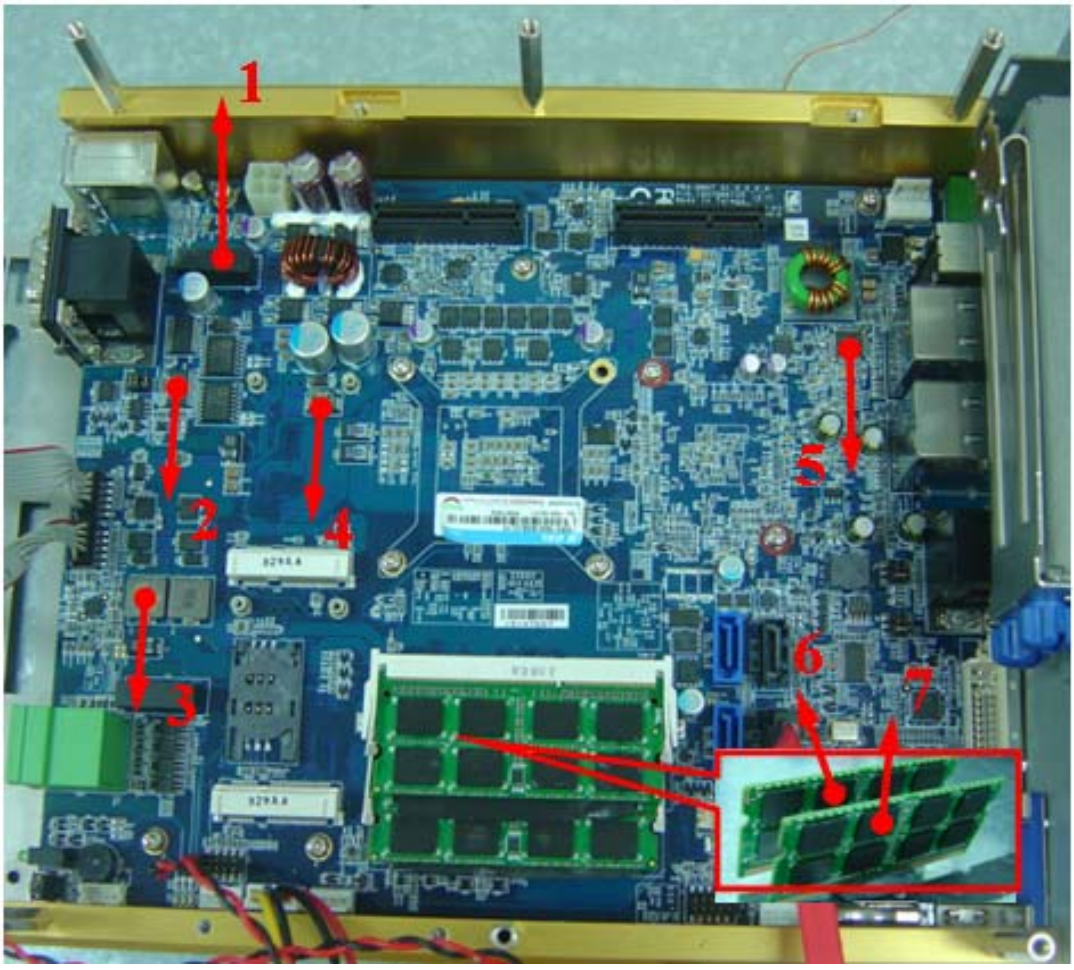
Test Condition:

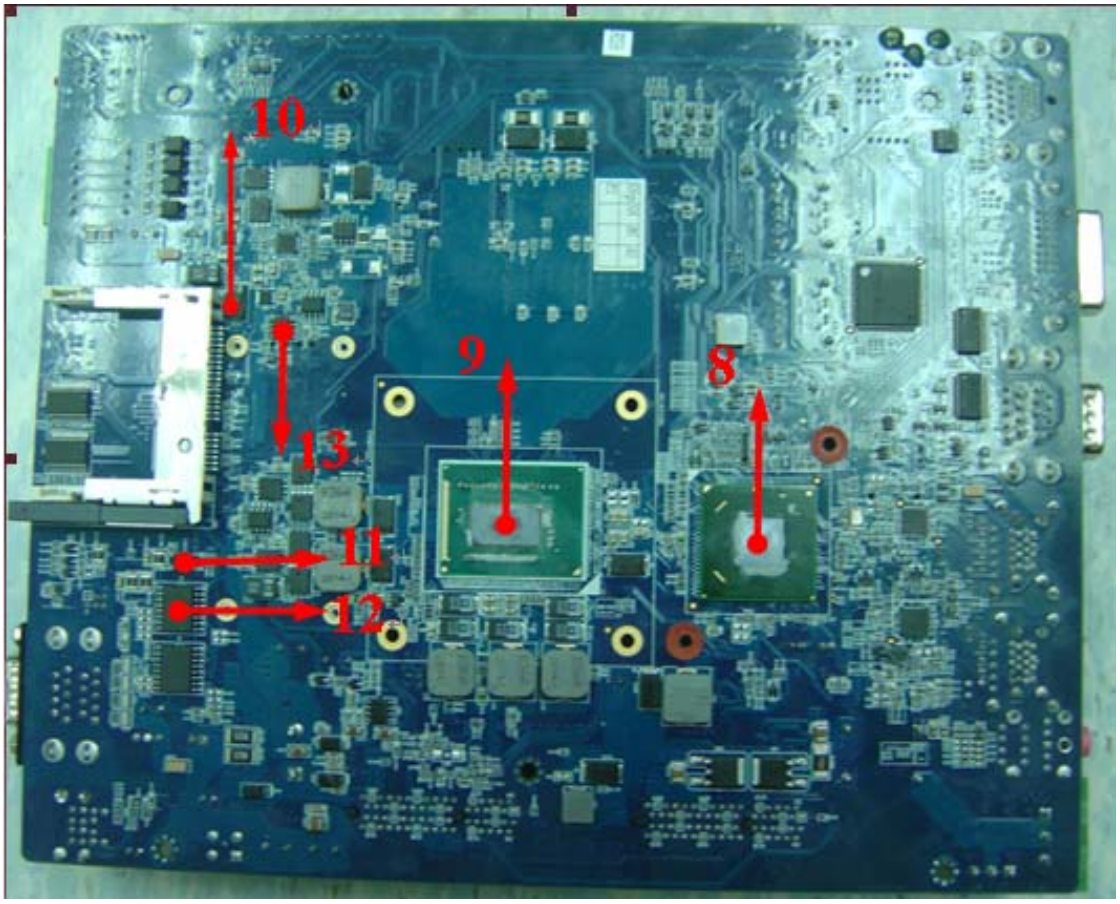
Ambient temperature: 65℃
Continuous running till thermal stability (within less than 1℃)

Test Software:

Windows 7 / Run PassMark Burn In Test 7.0 Pro

Terminal Recorder:




10
9
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Temperature rise test

Thermal profile data:

Point	Position	Describe	Tc (*1) (℃)	Tm (*2) Measured Under		Note
				25℃	65℃	
1	L19	TF)COIL. ZenithTek.ZPWM-1040MA-R36M	140	62.7	102.7	
2	U84	(TF)IC RS232 Driver ESD 15KV.AD.ADM213EARSZ	100	53.3	93.3	
3	U83	TF)CONVERTER.DC-DC.MINMAX.MA01-05S05H.3KVCD Isolated	100	54.2	94.2	
4	D81	TF)D Schottky.60V.5A.SMC.Willas.SK56C	150	54.4	94.4	
5	U8	(TF)IC.SMD.L High Definition.Audio Codec.REALTEK.ALC892-GR	85	48.9	78.9	
6	DIMM	Memory - 1	95	48.1	88.1	
7	DIMM	Memory - 2	95	49.8	89.8	
8	U4	TF)IC.SMD.Chipset PCH.INTEL.BD82QM77 SLJ8A	108	47.5	87.5	
9	U1	TF)INTEL Ivy Bridge CPU.i7-3517UE.1.7GHz. SR0T6	105	36.7	76.7	
10	EC8	(TF)POSCAP CAP.470uF.6.3V. SANYO.6TPB470M	150	48.1	88.1	
11	ISO10	TF)PhotoCoupler.5P.SMD.SHARP.PC410L0NIP0F	100	50.6	90.6	
12	U76	TF)IC.Quad-Channel Digital Isolators.Analog Devices.ADUM1411ARW	105	50.6	90.6	
13	U61	(TF)PWR.SMD.SO-8P.P-Channel MOSFET.APEC.AP6679GM-HF	150	44.6	84.6	
14		Control box external surface temp-1	N/A	42.4	82.4	
15		Control box external temp-2	N/A	43.6	83.6	
16		Chamber Air Temperature	N/A	24.5	64.5	

Note(*):
1. "Tc" indicates the component's case maximum temperature value specified in its datasheet.
2. "Tm" indicates the measured Tc value under working environmental temperature within product specification.
3. Judgment Criteria:
- **Fail** : Tm > Tc; The measured value is over specification.
- **Margin Pass** : Tc > Tm > Tc-5℃; The measured value is within specification with margin.
  It is strongly recommended to add thermal dissipation design for better reliability.
- **Pass** : Tm < Tc-5℃; The measured value is with safety margin.

Sample Configuration & Quantity Under Test:

Quantity: 1 (AEC-6977)

Test Result:

No issues were found during the temperature rise operation test.

Temperature cycle test

Test Date: 09-15 ~ 17-2013

Test Product: AEC-6977

Test Site: AAEON QE Dept.

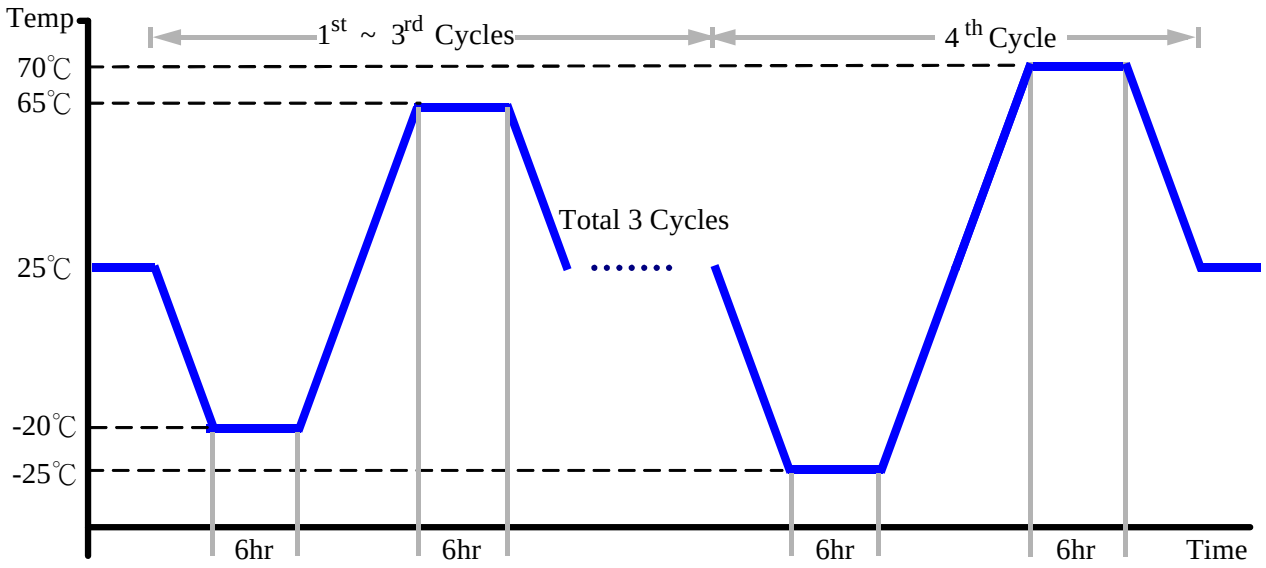
Test Standard: Refer to IEC68-2-14 Testing procedures
Test N: Change of temperature Test

Test Equipment:

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 10/10/12
Serial Number: 2582

Test Condition:

1. Test Low Temperature: -20℃ (1~3 cycles)
   -25℃ (4^{th} cycle)
2. Test High Temperature: 65℃ (1~3 cycles)
   70℃ (4^{th} cycle)
3. Test dwell time: 6Hrs
4. Temperature slope: 2℃/min
5. Test cycle: 4 cycles
6. Test Environment Curve:



Sample Configuration & Quantity Under Test:

Quantity: 1 (AEC-6977)

Test Result:

No issues were found during the temperature operation cycle test.

High temperature storage test

Test Date: 09-17 ~19-2013

Test Product: AEC-6977

Test Site: AAEON QE Dept.

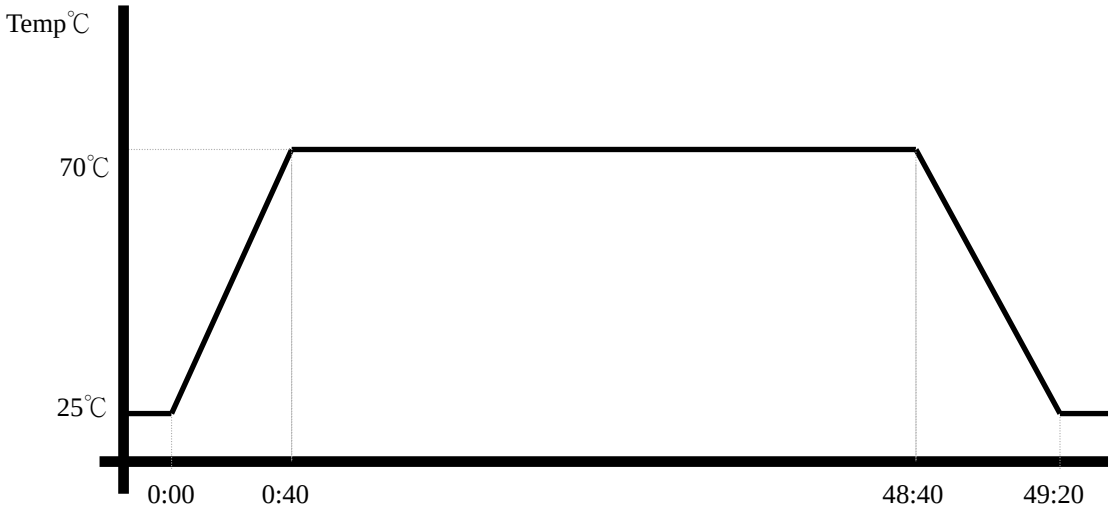
Test Standard: Refer to IEC 68-2-2 Testing procedures
Test Bb: Dry Heat Test (Non-operation)

Test Equipment:

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 10/10/12
Serial Number: 2582

Testing Item:

1. Test Temperature: 70℃
2. Test Times: 48Hrs
3. Test Software: Windows 7 / Run PassMark Burn In Test 7.0 Pro
4. Test Environment Curve:



Sample Configuration & Quantity Under Test:

Quantity: 1 (AEC-6977)

Test Result:

No issues were found after the high temperature storage test.

Low temperature storage test

Test Date: 09-19 ~ 09-21-2013

Test Product: AEC-6977

Test Site: AAEON QE Dept.

Test Standard: Refer to IEC 68-2-1 Testing procedures
Test Ab: Cold Test (Non-operation)

Test Equipment:

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 10/10/12
Serial Number: 2582

Testing Item:

1. Test Temperature: -30℃
2. Test Times: 48Hrs
3. Test Software: Windows 7 / Run PassMark Burn In Test 7.0 Pro
4. Test Environment Curve:

Sample Configuration & Quantity Under Test:

Quantity: 1 (AEC-6977)

Test Result:

No issues were found after the low temperature storage test.

Humidity test

Test Date: 09-21~23-2013

Test Product: AEC-6977

Test Site: AAEON QE Dept.

Test Standard: Refer to IEC 68-2-3 Testing procedures
Test Ca: Damp heat, steady state (Non-operation)

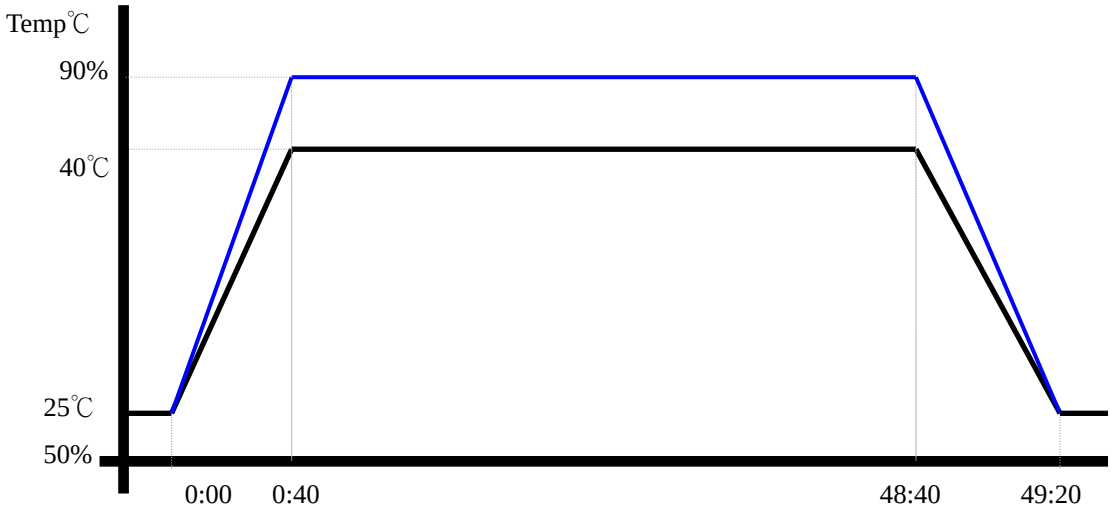
Test Equipment:

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 10/10/12
Serial Number: 2582

Testing Item:

1. Test Temperature: 40℃
2. Test Humidity: 90%RH
3. Test Times: 48Hrs
4. Test Software: Windows 7 / Run PassMark Burn In Test 7.0 Pro
5. Test Environment Curve:

Humidity %



Sample Configuration & Quantity Under Test:

Quantity: 1 (AEC-6977)

Test Result:

No issues were found after the humidity storage test.

Cold start and hot start test

Test Date: 09-23~ 25-2013

Test Product: AEC-6977

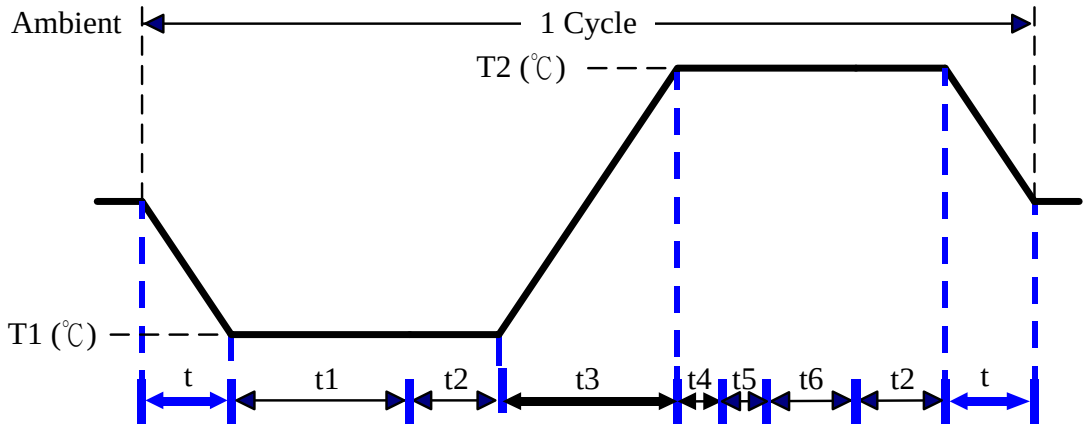
Test Site: AAEON QE Dept.

Test Standard: Refer to IEC 68-2-14 Testing procedures
Test N: Change of temperature Test

Test Equipment:

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 10/10/12
Serial Number: 2582

Test Condition:



Parameters	Description
T1	-25℃
T2	70℃
t1	4 hrs
t2, t6	2 hrs
t4, t5	1hrs
t, t3	2℃/min
n (Cycle)	1

t = temprature slope
t , t1, t6: Power Off
t2: Power on/off test 10 times (on 2 min / off 5min)
t3, t4: Run burn in test 7.0
t5: Win 7 Software restart test 3 times
Test Software: Windows 7

Test Result:

a. No issues were found during the cold start test.

b. No issues were found during the hot start test.