FWS-7821
Environment Test Report

Report NO: 16I020008

Summary	☑ **Pass** ☐ **Fail** ☐ **Pass with Deviation** Comment:_____

Issue date	QE Manager	Test Engineer
2016-11-25	**KJ Wang**	**Ben Sun**

Test item list

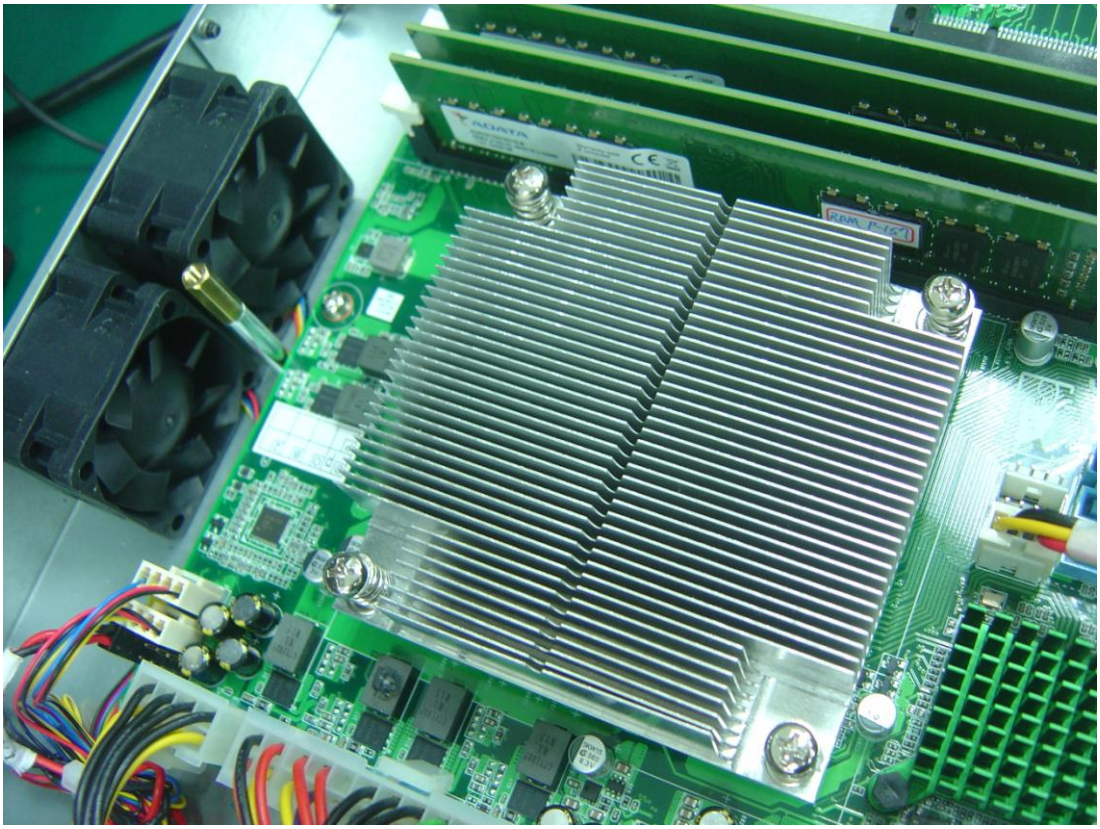
Testing Result

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

Configuration of EUT

Num	Item	Spec
1	CPU	Intel i5-7500
2	M/B	FWB-7821 A0.1
3	BIOS	FWS-7821 R0.0(K782BM00)
4	Chipset	Intel C236
5	Memory	Transcend DDR4 2133 8GB SEC K4A4G085WD x4
6	HDD	WD WD2500BPVT 250G 2.5”
7	Test Software	Ubuntu 14.10 / iperf test
8	Power Supply	ETASIS EFAP-S250 250W

CPU COOLER



Temperature rise test

Test Date: 11-22~25-2016

Test Product: FWS-7821

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: 09/11/16
Serial Number: 12A323190

IR Scanner: Infrared Camera
NEC Avio Infrared Technologies Co., Ltd.
Model: Thermo GEAR G100W2-D
Date of Calibration: 2015/12/01
Serial Number: 1051444

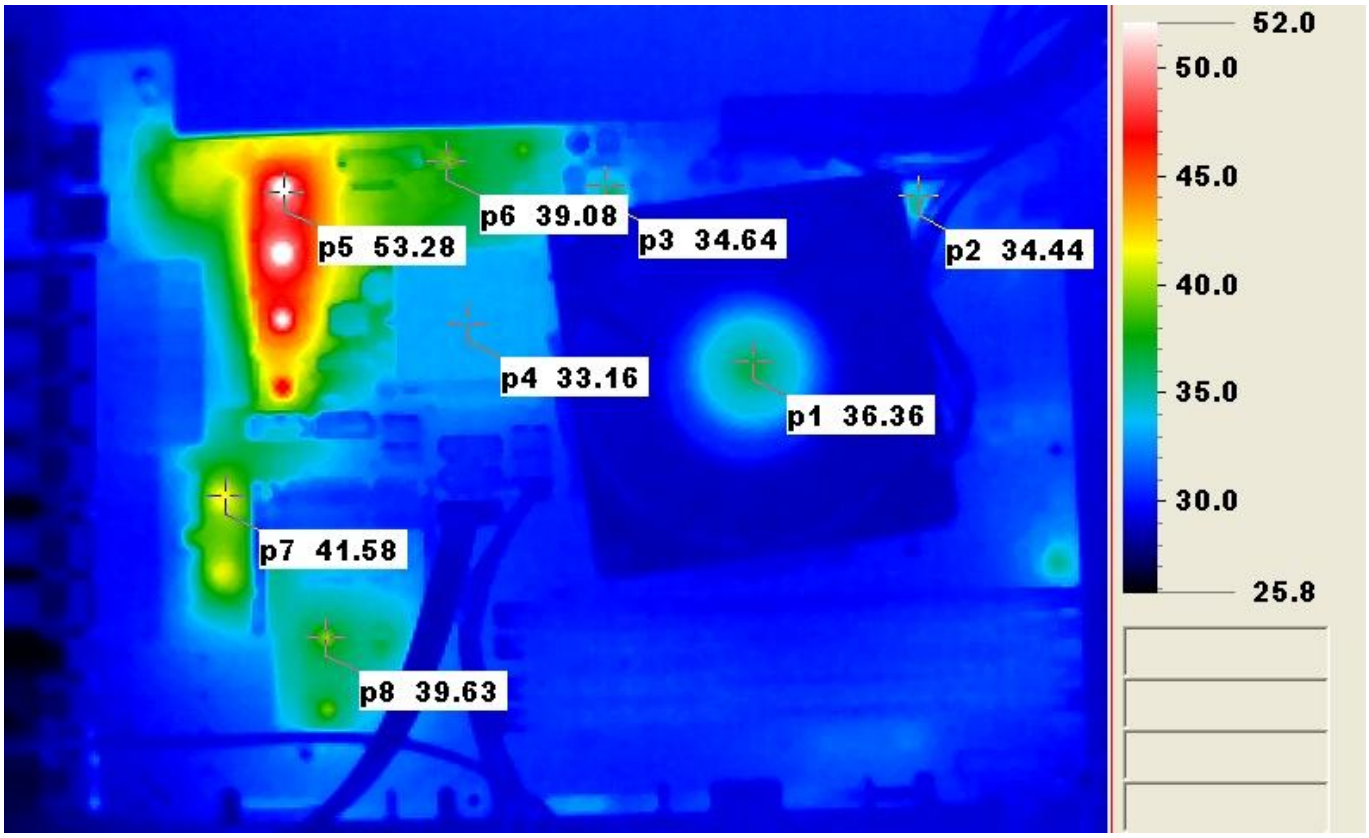
Test Condition:

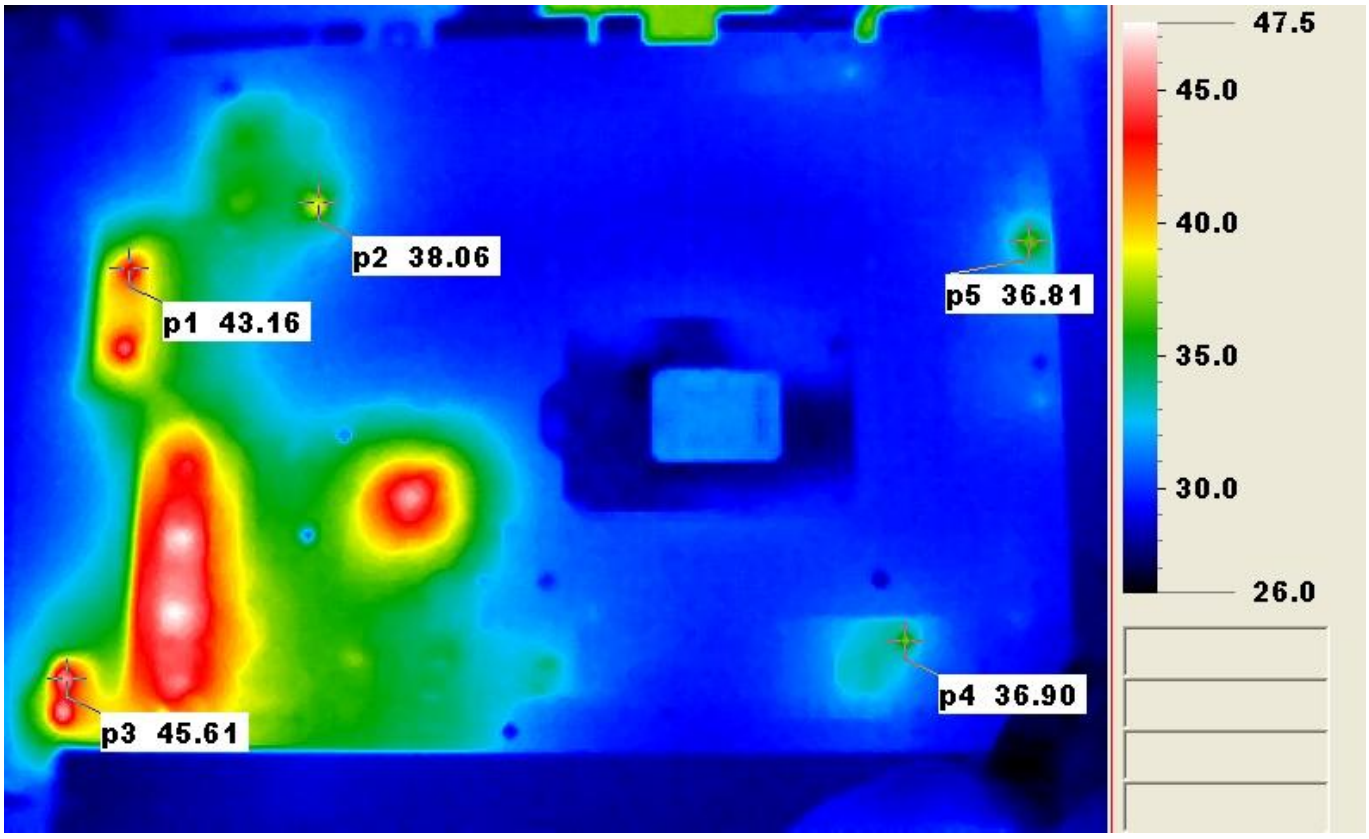
Ambient temperature: 40℃
Continuous running till thermal stability (within less than 1℃)

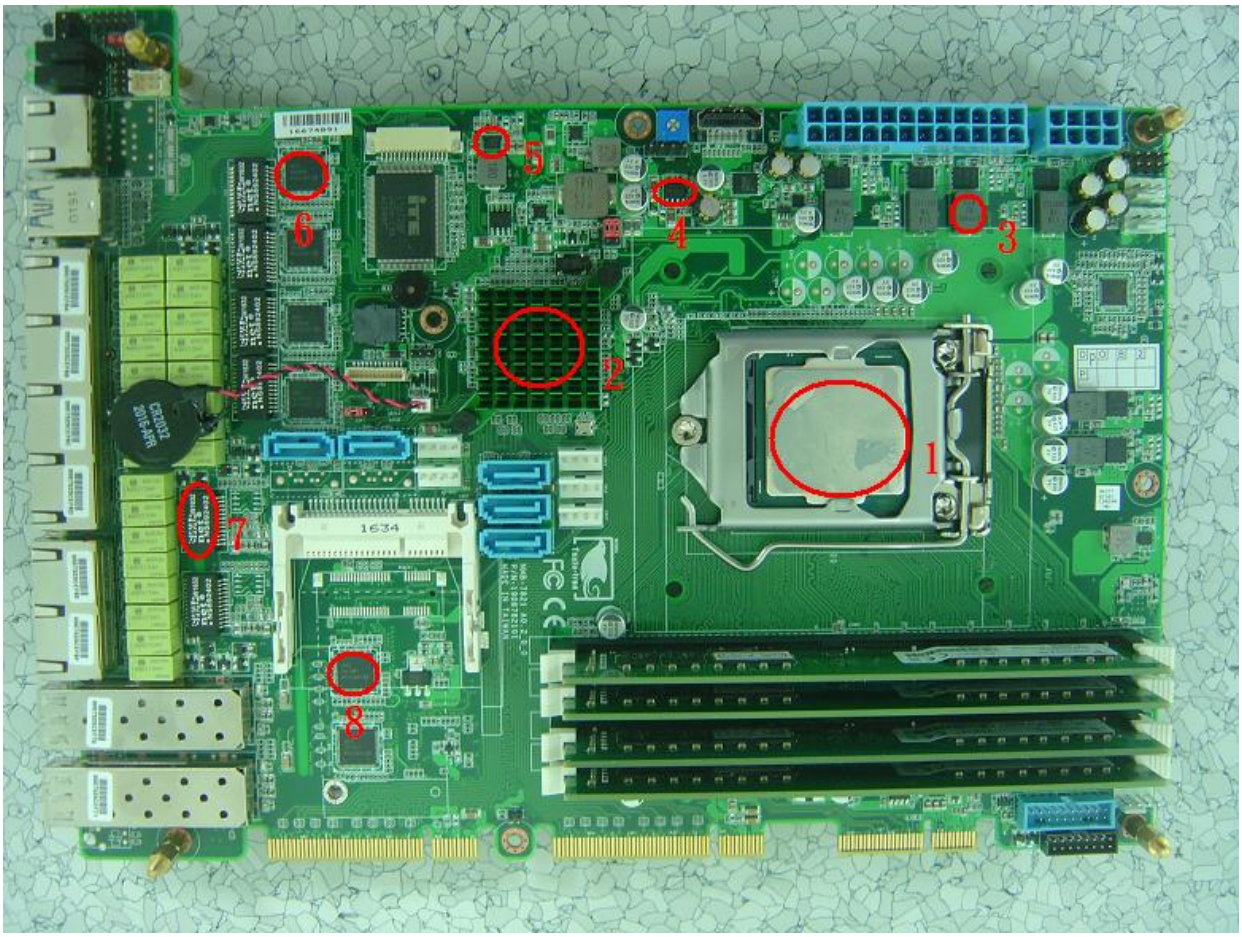
Test Software:

Ubuntu 14.10 / Run iperf test

Terminal Recorder:



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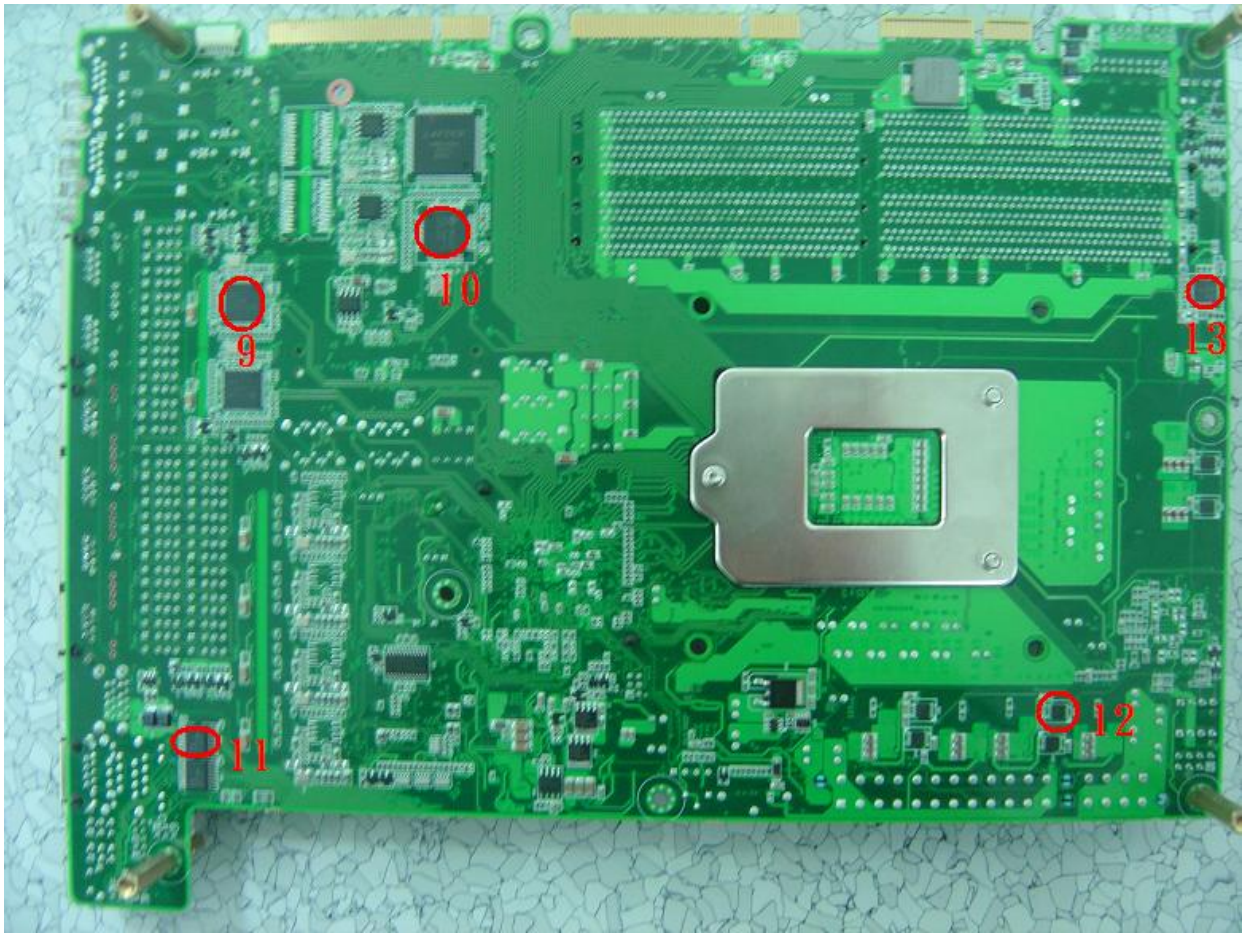
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Temperature rise test

Thermal profile data:

Point	Position	Describe	Tc (*1) (℃)	TAT (*2) Measured Under 40℃	Note
1	U1	Intel i5-7500	75	46.5	
2	U25	(TF)IC.CHIPSET.SKYLAKE PCH.200 SERIES.BGA837P.SMD.INTEL.GLC236 SR2CC	90	51.8	
3	L7	(TF)INDUCTOR.0.15uH.10%.DCR=0.39±5%mohm.IDC=53A. 10.2x7x4.95mm.SMD.GOTREND.GTV1005PR1-R15K	100	57.4	
4	U21	(TF)IC.LDO Linear Regulator.0.23V.2A.SOP-8(Exposed Pad).SMD.RICHTEK.RT9025-25PSP	125	51.3	
5	U27	(TF)IC.10A.Synchronous Step down.QFN16.3X4mm.SMD.MPS.MP8762GLE-Z	100	49.3	
6	U34	(TF)IC.PCI-E GigaBit Ethernet Chipset.QFN 64P.SMD.Intel.WGI211AT	105	58.7	
7	TF5	(TF)Transformer.100/1000 Base.SMD.NETSWAP.NS892402	85	47.5	
8	U32	(TF)IC.PCI-E GigaBit Ethernet Chipset.QFN 64P.SMD.Intel.WGI211AT	105	51.3	
9	U83	(TF)IC.PCI-E GigaBit Ethernet Chipset.QFN 64P.SMD.Intel.WGI211AT	105	47.3	
10	U69	(TF)IC.SATA to IDE/ATA.TQFP 64P.SMD.Jmicron.JMD330-TGAA1D	100	51.1	
11	U85	(TF)IC.SMD SSOP.20Pin RS-232 Driver&Receivers.TI.GD75232DBR	100	53.0	
12	U58	(TF)IC.Single Phase Buck.MOSFET Driver.WDFN-8L 3x3.SMD.Richtek.RT9624FGQW	125	59.8	
13	U56	(TF)IC.DisplayPort to VGA Converter.QFN 40P.SMD.Chrontel.CH7517A-BF	125	47.8	
14		RAM	85	46.8	
15		HDD Surface	70	44.5	

Note(*):

1. "Tc" indicates the component's case maximum temperature value specified in its datasheet.

2. "TAT" indicates the actual measured temperature under product specification.

3. Judgment Criteria:

- **Fail** : Tm > Tc+5℃; The measured value is over specification plus margin.
- **Margin** : Tc+5℃ > Tm > Tc-10℃; The measured value is within specification with margin.
  For FANLESS system application, it is strongly recommended to add thermal dissipation design for better reliability.
- **Pass** : Tm < Tc-10℃; The measured value is with safety margin.

5. **RTC battery avoid to put on heat position.** Please do not exceed battery temperature specification.

4. Defect NO.

Sample Configuration & Quantity Under Test:

Quantity: 1 (FWS-7821)

Test Result:

No issues were found during the temperature rise operation test.

Temperature cycle test

Test Date: 11-18 ~ 20-2016

Test Product: FWS-7821

Test Site: AAEON QE Dept.

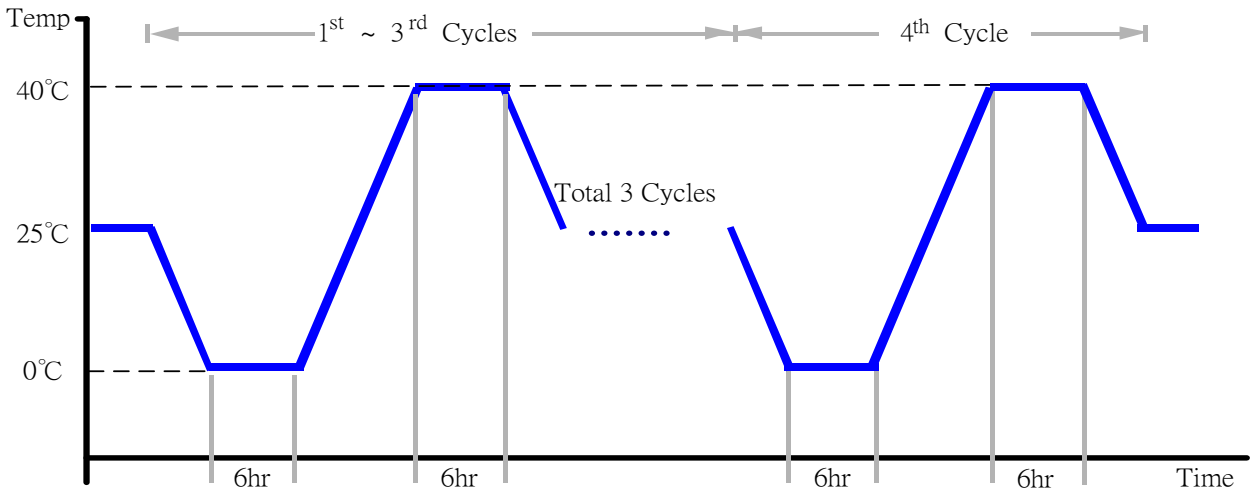
Test Standard: Refer to IEC68-2-14 Testing procedures
Test N: Change of temperature Test

Test Equipment:

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-B6T-150+LN2
Date of Calibration: 04/25/16
Serial Number: 6488KT

Test Condition:

1. Test Low Temperature: 0℃ (1~4 cycles)
2. Test High Temperature: 40℃ (1~4 cycles)
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 (FWS-7821)

Test Result:

No issues were found during the temperature operation cycle test.

High temperature storage test

Test Date: 11-09 ~ 10-2016

Test Product: FWS-7821

Test Site: AAEON QE Dept.

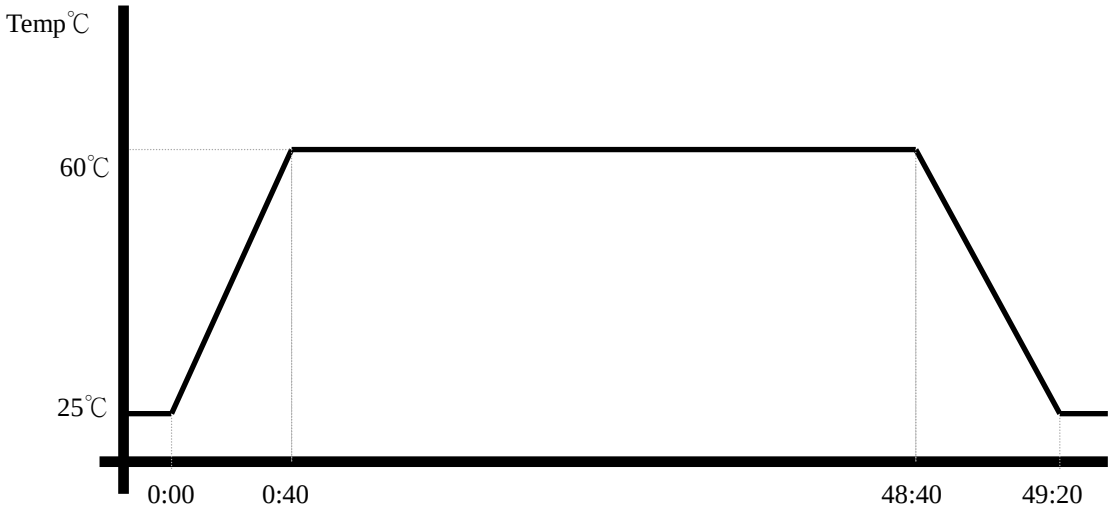
Test Standard: Refer to IEC 68-2-2 Testing procedures
Test Bb: Dry Heat Test (Non-operation)

Test Equipment:

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-B6T-150+LN2
Date of Calibration: 04/25/16
Serial Number: 6488KT

Testing Item:

1. Test Temperature: 60℃
2. Test Times: 48Hrs
3. Test Software: Ubuntu 14.10 / iperf test
4. Test Environment Curve:



Sample Configuration & Quantity Under Test:

Quantity: 1 (FWS-7821)

Test Result:

No issues were found after the high temperature storage test.

Low temperature storage test

Test Date: 11-11 ~ 12-2016

Test Product: FWS-7821

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-B6T-150+LN2
Date of Calibration: 04/25/16
Serial Number: 6488KT

Testing Item:

1. Test Temperature: -20℃
2. Test Times: 48Hrs
3. Test Software: Ubuntu 14.10 / Run iperf test
4. Test Environment Curve:

Sample Configuration & Quantity Under Test:
Quantity: 1 (FWS-7821)

Test Result:
No issues were found after the low temperature storage test.

Humidity test

Test Date: 11-16~18-2016

Test Product: FWS-7821

Test Site: AAEON QE Dept.

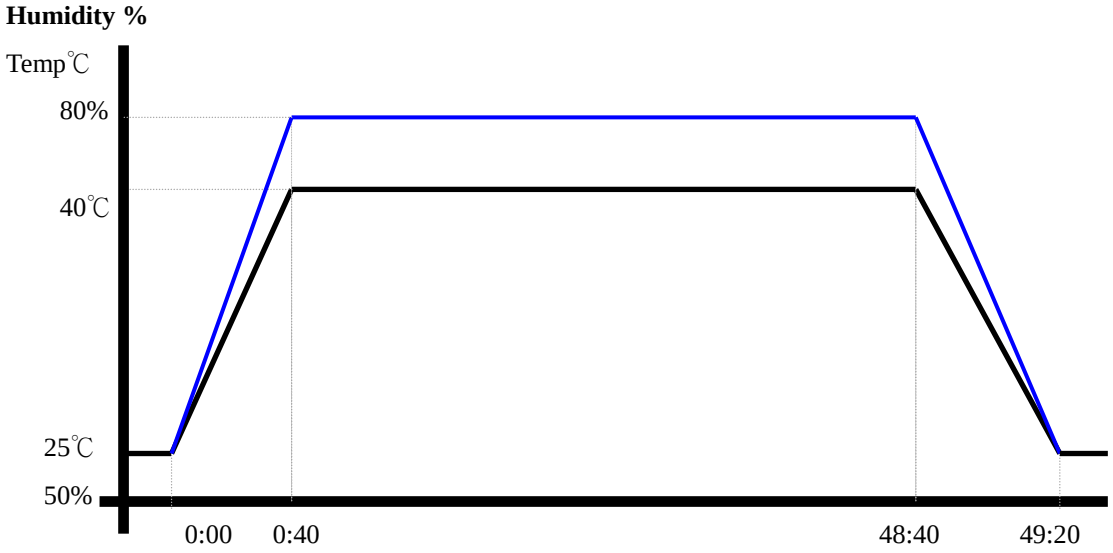
Test Standard: Refer to IEC 68-2-3 Testing procedures
Test Ca: Damp heat, steady state (Non-operation)

Test Equipment:

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-B6T-150+LN2
Date of Calibration: 04/25/16
Serial Number: 6488KT

Testing Item:

1. Test Temperature: 40℃
2. Test Humidity: 80%RH
3. Test Times: 48Hrs
4. Test Software: Ubuntu 14.10 / Run iperf test
5. Test Environment Curve:



Sample Configuration & Quantity Under Test:

Quantity: 1 (FWS-7821)

Test Result:

No issues were found after the humidity storage test.

Cold start and hot start test

Test Date: 11-15~16 - 2016

Test Product: FWS-7821

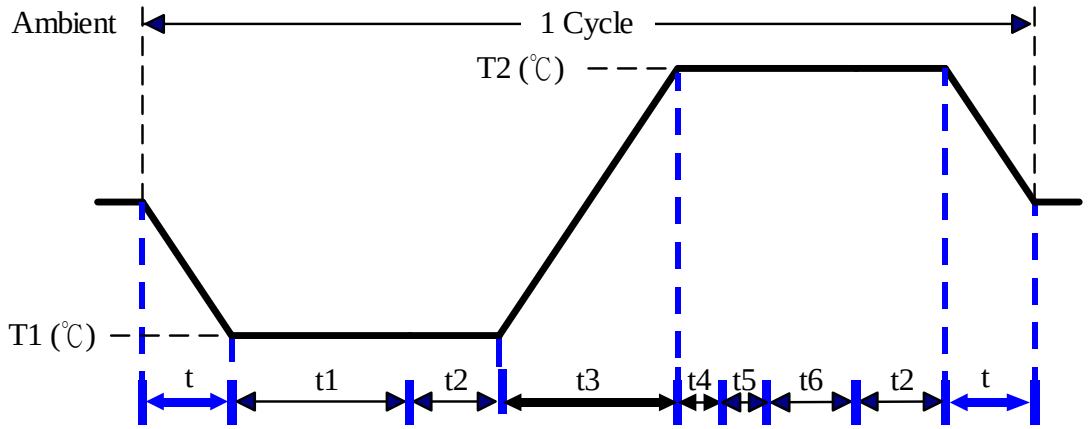
Test Site: AAEON QE Dept.

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-B6T-150+LN2
Date of Calibration: 04/25/16
Serial Number: 6488KT

Test Condition:



Parameters	Description
T1	0℃
T2	40℃
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 iperf test
t5: Ubuntu Software restart test 3 times
Test Software: Ubuntu 14.10

Test Result:

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

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

Temp./humidity power on/off test

Test Date: 11-14 ~ 15-2016

Test Site: AAEON QE Dept.

Test Standard: Refer to IEC 68-2-30 Testing procedures
Test Db: Damp Heat Test
Refer to IEC 68-2-1 Testing procedures
Test Ad: Cold Test

Test Equipment:

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-B6T-150+LN2
Date of Calibration: 04/25/16
Serial Number: 6488KT

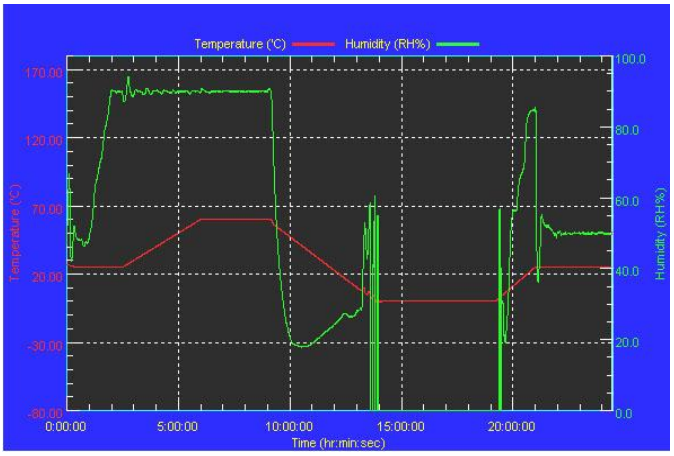
Temperature & Humidity Power On/Off Test:

1. Test High Temp./Humidity: 60℃@90%RH
2. Test Low Temperature: 0℃
3. Test Time: 24Hours / Cycle
4. Test Cycle: 1 Cycles
5. Test Software: DOS Mode / Run Boot Up Record Program ver 1.41

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:

	Actual	Successful	Failure rate	Test Result
Power On/Off	1737/times	1737/times	0 %	Pass

Note: 1. Failure rate need to under 0%.
2. Power on/off fixture setting: on - 35 sec / off - 5 sec