FWS-7520
Environment Test Report

Report NO: 15I020016

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

Issue date	Approval	Test Engineer
2015-10-06	**KJ Wang**	**Ben Sun**

Test item list

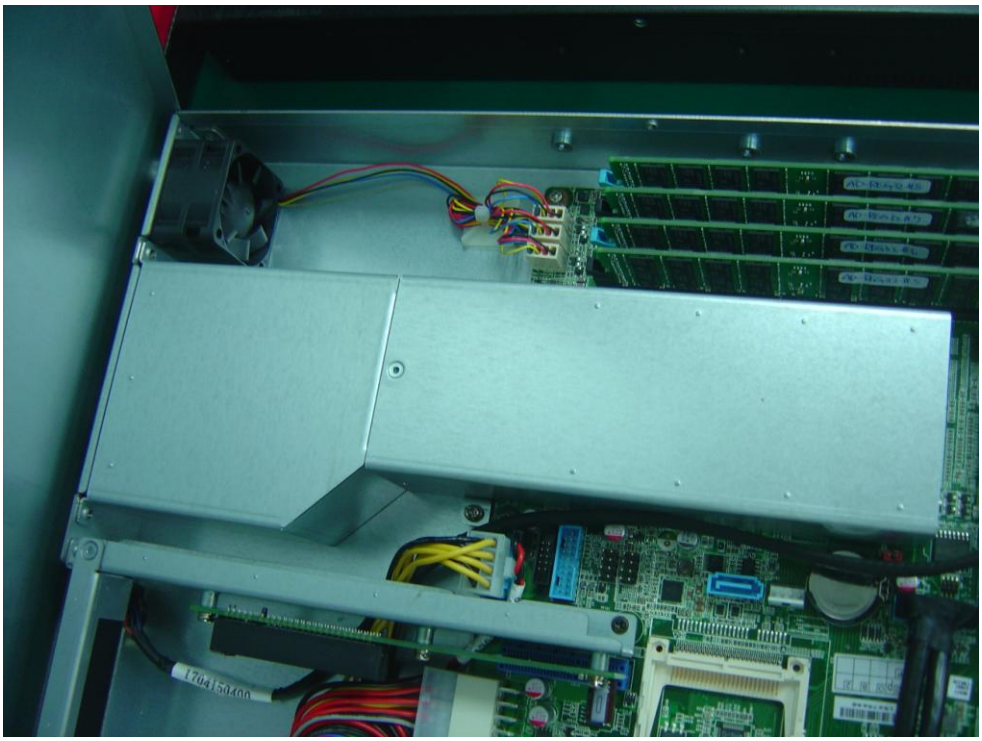
Testing Result

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	

Configuration of EUT

Num	Item	Spec
1	CPU	Intel Boardwell-DE V-1 12MB 8c 1.4GHz
2	M/B	FWB-7520
3	BIOS	K752AM05
4	Chipset	Intel Boardwell-DE
5	Memory	Adata DDR4-2133 32Gx36 (AD4R2133432G15-BSSB)*4
6	HDD	Toshiba 320G
7	Test Software	Ubuntu 14.10
8	Module	NIM-S13A*3 (i350*1 , 82580*2)

CPU COOLER



Temperature rise test

Test Date: 09-30~10-01-2015

Test Product: FWS-7520

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: 09/15/15
Serial Number: 12A323190

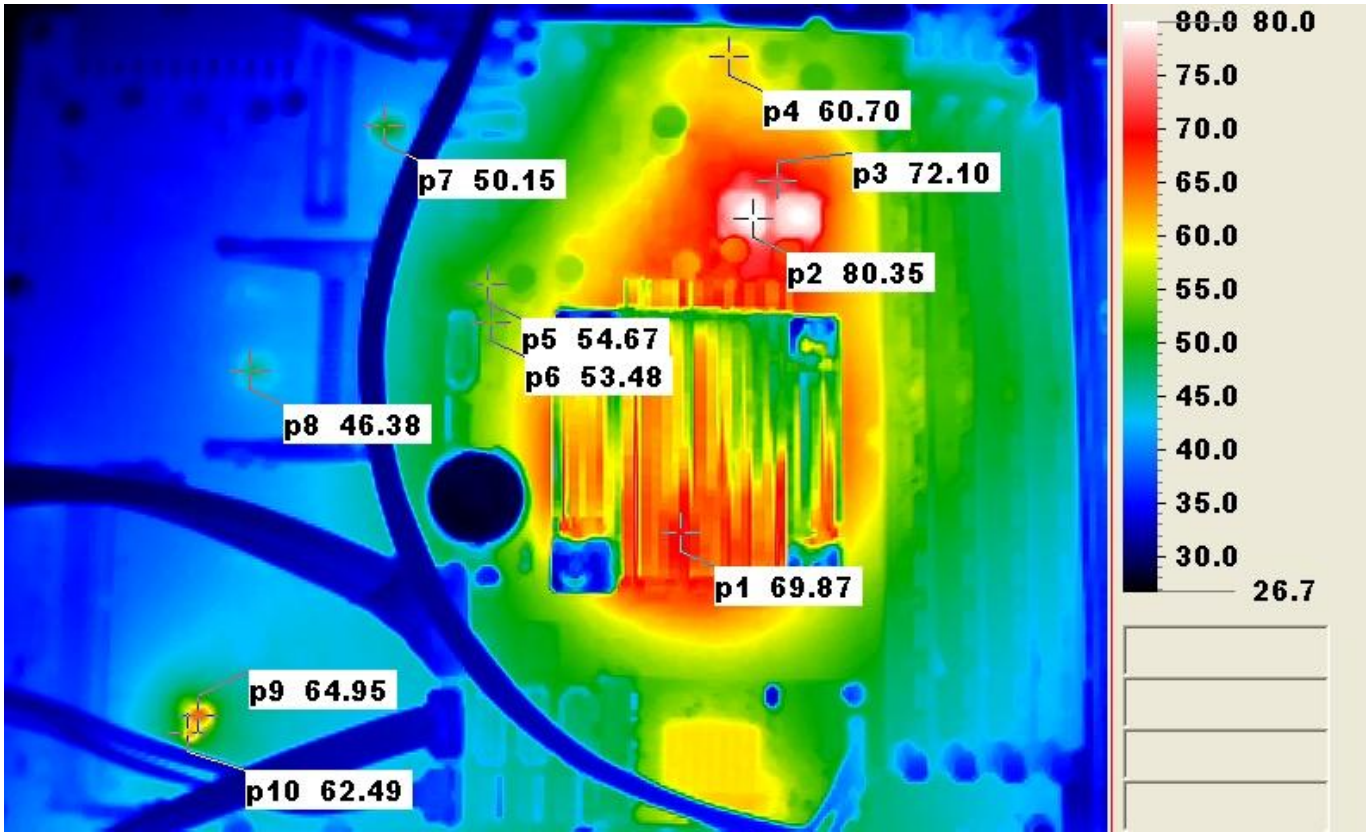
Test Condition:

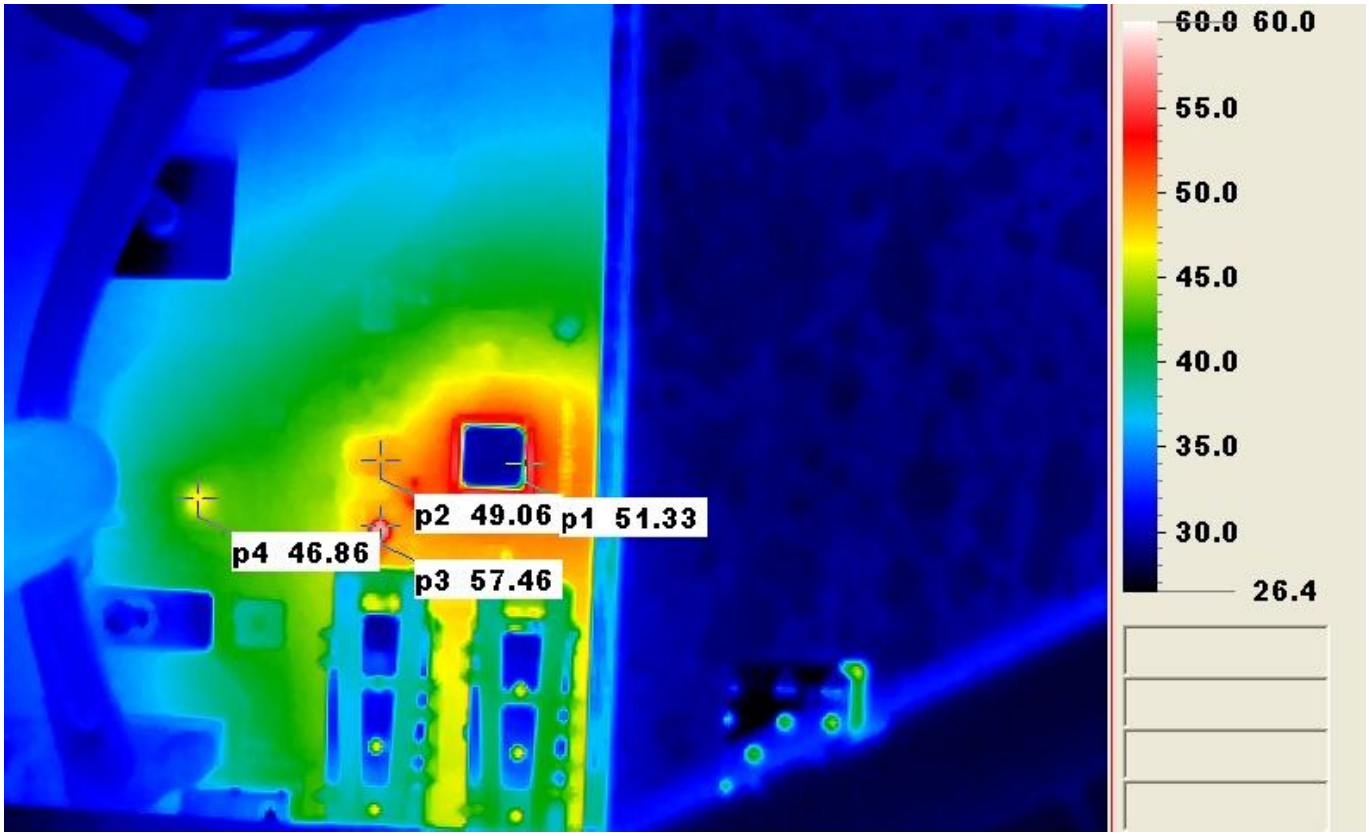
Ambient temperature: 40℃
Continuous running till thermal stability (within less than 1℃)

Test Software:

Ubuntu 14.10 / Run iperf test

Terminal Recorder:

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45.0
40.0
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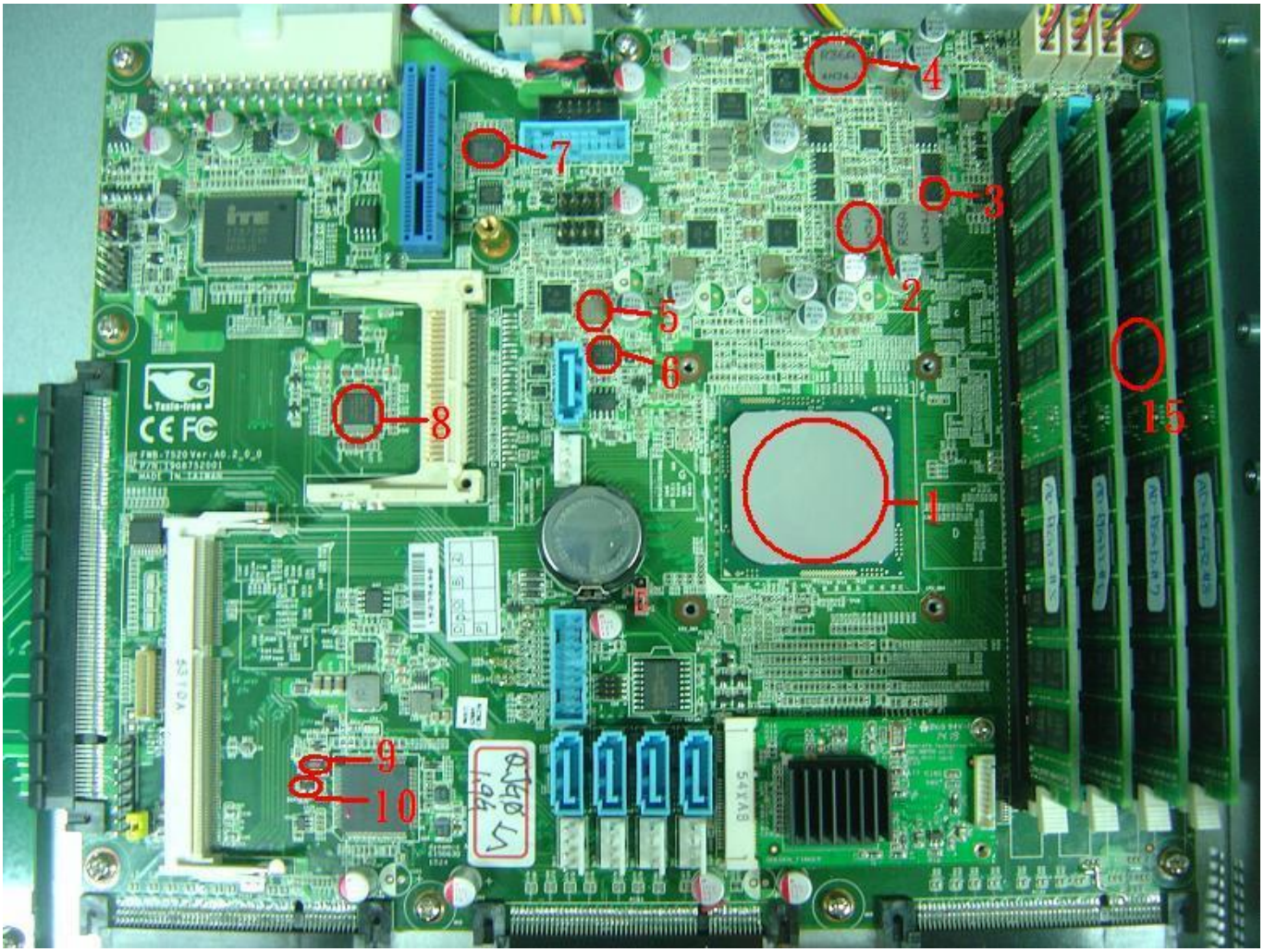
26.4
p2 49.06
p1 51.33
p4 46.86
p3 57.46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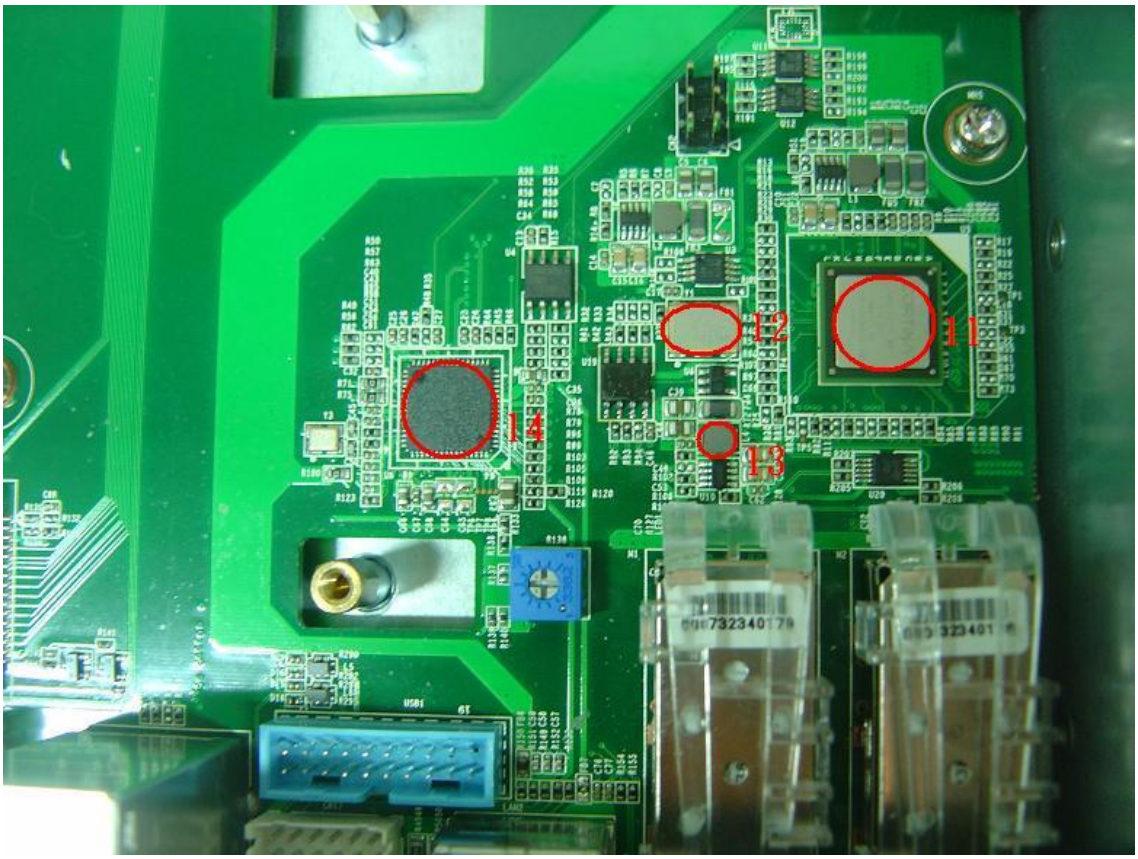
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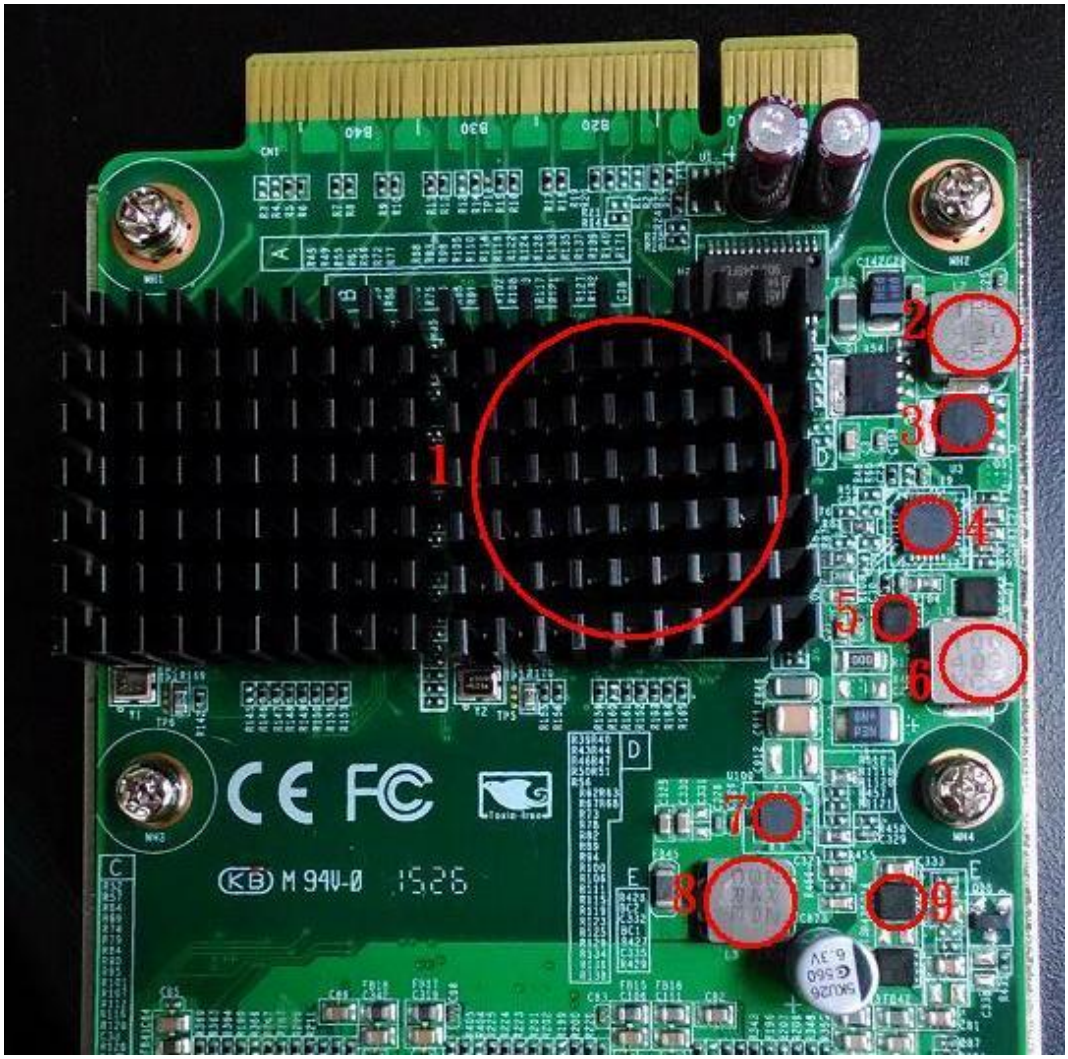
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CE FC
KB M 94V-0

Temperature rise test

Thermal profile data:

Point	Position	Describe	Tc (*1) (℃)	Tm (*2) Measured Under 40℃	Note
FWB-7520 & PER-T362					
1	U35	(TF)IC.CPU.Broadwell-DE SOC FCBGA 1667PIN SMD INTEL D-1500	80	59.6	
2	L10	(TF)COIL.0.36uH.Irms=34A.20%.MD(11.5x10x4.0).2pin.RDC=0.76m Ohm.Panasonic.ETQP4LR36AFC	130	75.2	
3	Q33	(TF)N-Channel.Vds=30V.Vgs=(+/-)20V.Ids=62A.Rds=8.35mohm.SOT-669.SMD.NXP.PH6030DLB	150	64.6	
4	L2	(TF)COIL.0.36uH.Irms=34A.20%.MD(11.5x10x4.0).2pin.RDC=0.76m Ohm.Panasonic.ETQP4LR36AFC	130	63.9	
5	L14	(TF)COIL.0.47uH.DCR=8.4mohm.IDC=9.5A.20%.5.5x5x3mm.SMD.NEC/TOKIN.MPLCG0530LR47	105	55.5	
6	U28	(TF)IC.4bit Bidirectional.Voltage Level Translator.TSSOP 14P.SMD.TI.LSF0204PWR	125	52.1	
7	U9	(TF)IC.SMD SSOP.20Pin RS-232 Driver&Receivers.TI.GD75232DBR	85	55.8	
8	U34	(TF)IC.PCI Express to.PATA Host Controller.LQFP 48P.SMD.InnoDisk.IDB368(6DB368L048C1)	110	55.2	
9	R838	(TF)CR.100.1W.1%.SMD.1218	155	73.3	
10	Q46	(TF)PWR.N-Channel.SMD.SOT-23.PHILIPS.2N7002	135	65.1	
11	U5	(TF)IC.10Giga Bit Ethernet PHY.BGA 121P.SMD CORTINA WPCS4227C A2-900370	110	74.4	
12	Y1	(TF)OSC.Differential.156.25MHz.3.3V.50ppm.7.0*5.0*1.4mm.6P.SMD.EPSON.XG-2102CA	100	62.3	
13	L4	(TF)COIL.3.3uH.DCR=183mohm.IDC=1.5A.20%.3.2x3x1.2mm.SMD.TDK.SPM3012T-3R3M	140	66.5	
14	U8	U8 (TF)IC.PCI-E GigaBit Ethernet Chipset.QFN 64P.SMD.Intel.I210AT	85	60.4	
15	DIMM	ADATA DDR4-2133 32G(M393A4K40BB0-CP8)	85	55.5	
Module1 (i350)					
1	U4	Intel I350	110	75.8	
2	L2	NEC/TOKIN.MPLCG0530L1R5.1.5uH.DCR=21.7mohm.Irms=5.9Amp	140	68.1	
3	Q1	PH6030DLB	150	64.5	
4	U3	TPS51124RGE	100	61.3	

5	**Q3**	EMB20N03V	**150**	**66.0**	
6	**L1**	INDUCTOR.10uH.20%.SMD.7.3*6.8* 3mm.CYNTEC.PCMB063T-100MS	**125**	**65.2**	
7	**U100**	NB671GQ-Z	**150**	**64.9**	
8	**L3**	2.2uH.Idc=8A.DCR=13.5mohm	**125**	**65.2**	
9	**Q13**	EMB20N03V	**150**	**65.8**	
Module2 (82580)					
1	**U5**	Intel 82580	**110**	**71.8**	
2	**L2**	NEC/TOKIN.MPLCG0530L1R5.1.5uH.DCR=21.7mohm.Irms=5.9Amp	**140**	**64.6**	
3	**Q2**	PH6030DLB	**150**	**61.7**	
4	**U3**	TPS51124RGE	**100**	**58.3**	
5	**Q4**	EMB20N03V	**150**	**62.4**	
6	**L1**	INDUCTOR.10uH.20%.SMD.7.3*6.8* 3mm.CYNTEC.PCMB063T-100MS	**125**	**61.0**	
7	**U100**	NB671GQ-Z	**150**	**60.8**	
8	**L3**	2.2uH.Idc=8A.DCR=13.5mohm	**125**	**61.9**	
9	**Q13**	EMB20N03V	**150**	**62.6**	

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+5℃; The measured value is over specification plus margin.
- **Margin** : Tc > 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.

4. Defect NO.

Sample Configuration & Quantity Under Test:

Quantity: 1 (FWS-7520)

Test Result:

No issues were found during the temperature rise operation test.

Temperature cycle test

Test Date: 09-16 ~ 17-2015

Test Product: FWS-7520

Test Site: AAEON QE Dept.

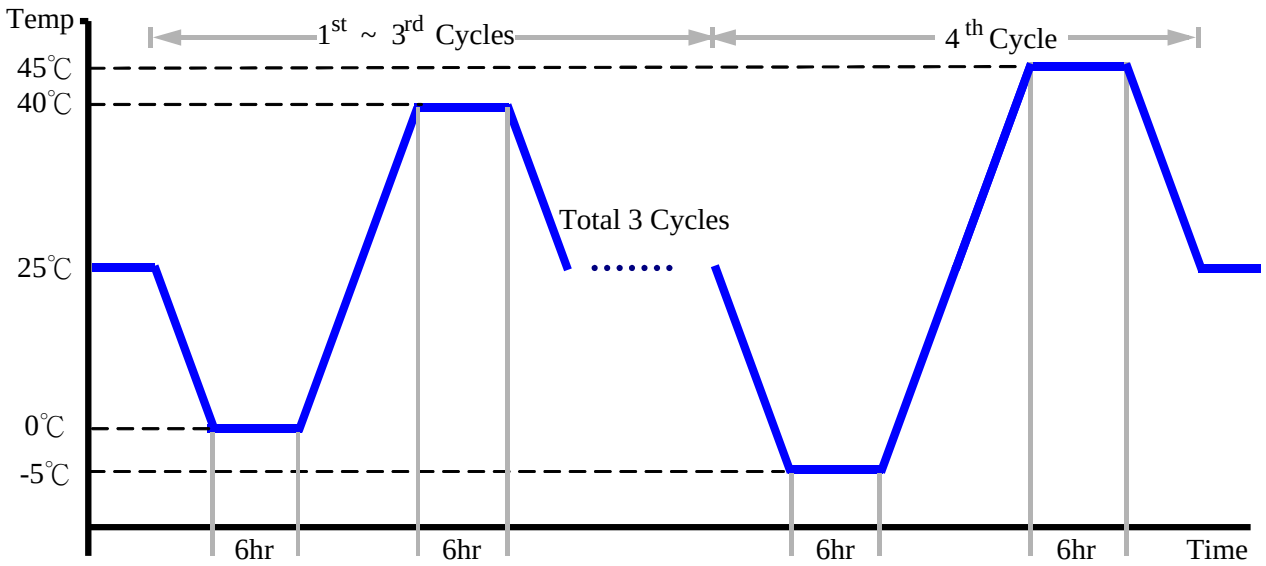
Test Standard: Refer to IEC68-2-14 Testing procedures
Test N: Change of temperature Test

Test Equipment:

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 10/09/14
Serial Number: 2582

Test Condition:

1. Test Low Temperature: 0℃ (1~3 cycles)
   -5℃ (4^{th} cycle)
2. Test High Temperature: 40℃ (1~3 cycles)
   45℃ (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 (FWS-7520)

Test Result:

No issues were found during the temperature operation cycle test.

High temperature storage test

Test Date: 09-18 ~ 19-2015

Test Product: FWS-7520

Test Site: AAEON QE Dept.

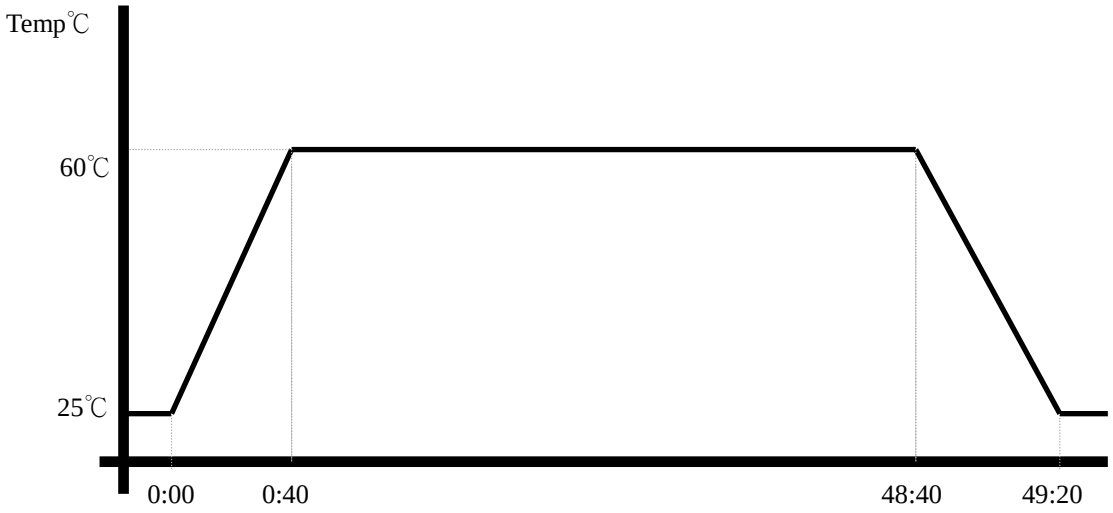
Test Standard: Refer to IEC 68-2-2 Testing procedures
Test Bb: Dry Heat Test (Non-operation)

Test Equipment:

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 10/09/14
Serial Number: 2582

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-7520)

Test Result:

No issues were found after the high temperature storage test.

Low temperature storage test

Test Date: 09-21 ~ 22-2015

Test Product: FWS-7520

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: 10/09/14
Serial Number: 2582

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-7520)

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

Humidity test

Test Date: 09-23~24-2015

Test Product: FWS-7520

Test Site: AAEON QE Dept.

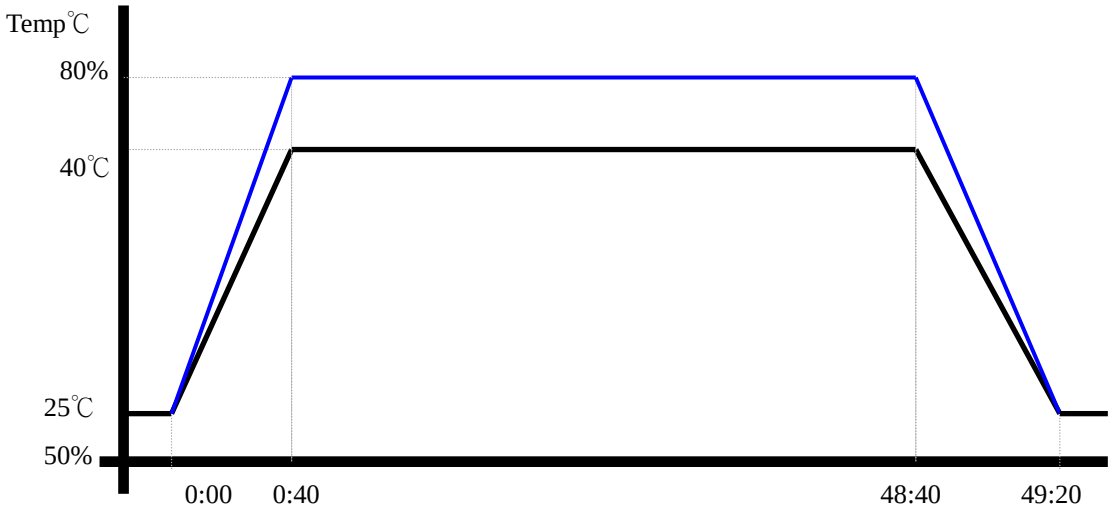
Test Standard: Refer to IEC 68-2-3 Testing procedures
Test Ca: Damp heat, steady state (Non-operation)

Test Equipment:
Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 10/09/14
Serial Number: 2582

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:

Humidity %



Sample Configuration & Quantity Under Test:
Quantity: 1 (FWS-7520)

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

Cold start and hot start test

Test Date: 09-25 - 2015

Test Product: FWS-7520

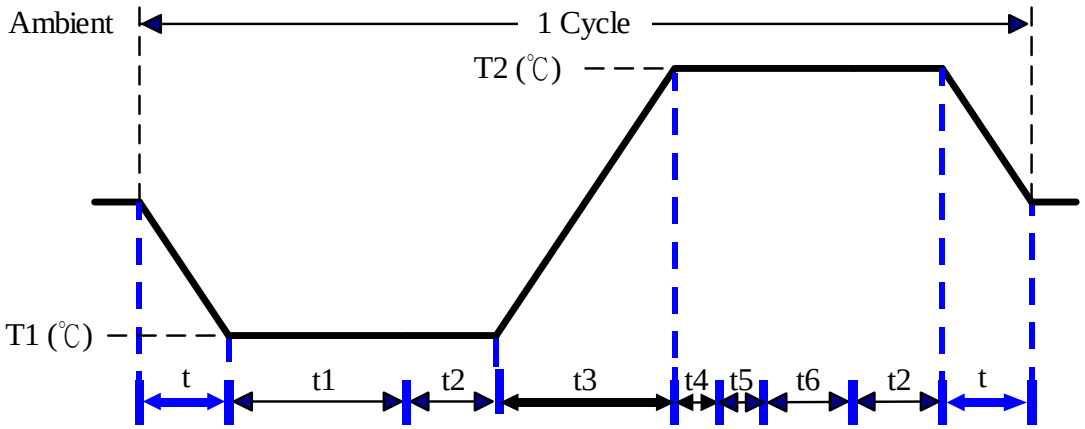
Test Site: AAEON QE Dept.

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: 10/09/14
Serial Number: 2582

Test Condition:



Parameters	Description
T1	-5℃
T2	45℃
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.