# FWS-7820

## Environment Test Report

**Report No: 16I020006**

| | |
|---|---|
| Summary | ☐ **Pass**<br>☐ **Fail**<br>☑ **Pass with Deviation**<br>**Comment: Temperature at one component was estimated to be in marginal temperature point in comparison with component datasheet.** |

| Test Result Summary | | | | |
|---|---|---|---|---|
| | Critical | Major | Minor | Enhancement |
| Defect Found | 0 | 0 | 0 | 1 |
| Defect Unsolved | 0 | 0 | 0 | 1 |

| Issue date | QE Manager | Issued by |
|---|---|---|
| **2016-04-18** | **KJ Wang** | **Jerry Chen** |

# Test item list



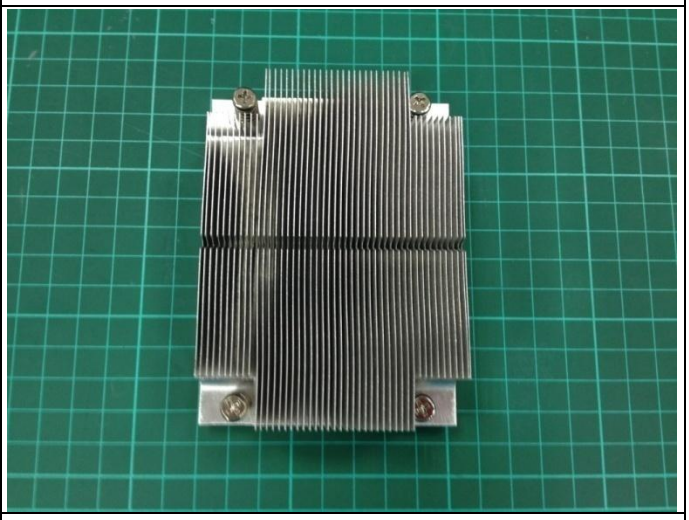
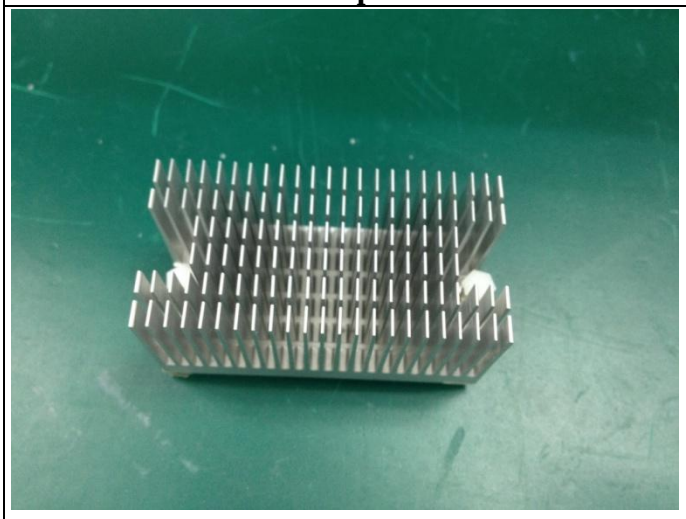
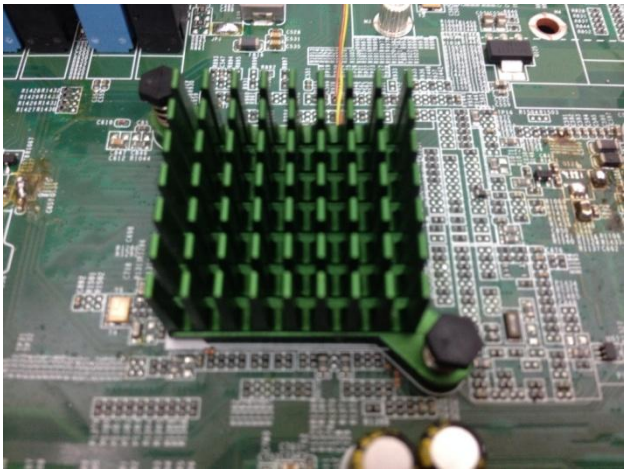
## Testing Result

| Num | Test item list | Result | Remark |
|---|---|---|---|
| 1 | High Temperature Operation test | Pass | |
| 2 | Temp./humidity power on/off 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

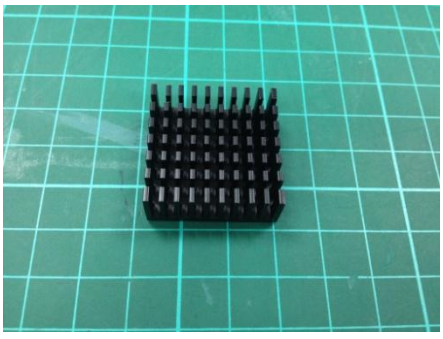
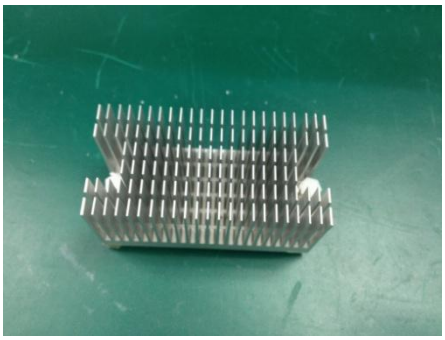
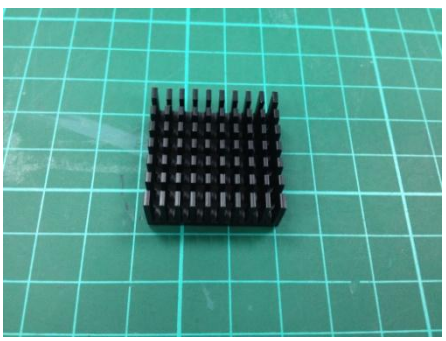
| Num | Item | Spec |
|---|---|---|
| **1.** | **Test Product: FWS-7820 / Ver. A0.2** | |
| **2.** | **Client (Main test of system)** | |
| | 1. Model Name | FWS-7820 / Ver. A0.2 |
| | 2. Main board | FWB-7820 / Ver. A0.2 |
| | 3. BIOS Ver. | FWS-7820 R0.6 (K782AM06) (12/18/2015) |
| | 4. CPU Type | Intel Xeon® E3-1225 v5 @ 3.30GHz x 4 |
| | 5. Chipset | Intel C236 |
| | 6. LAN Module | PER-T393 / Ver. A0.2 |
| | 7. LAN Module | NIM-C13B / Ver. A0.1 x 4 (LAN Chipset - i350) |
| | 8. Module | PER-R38X / Ver. A0.2 |
| | 9. Memory | ADATA - DDR4 2133 (15) 16Gx16 U-DIMM ( SEC / 525 K4ABG08 5WB BCPB) * 4 pcs |
| | 10. 2.5” SATA SSD | Transcend / 2.5" SATA Solid State Driver SSD370 / TS32GSSD370 32G |
| | 11. Test Software | ubuntu 14.10 / Run iPerf test |
| | 12. Power supply | FSP / FSP250-50LC |
| **3.** | **Server (Secondary aid test of system)** | |
| | 1. Model Name | FWS-7820 / Ver. A0.2 |
| | 2. Main board | FWB-7820 / Ver. A0.2 |
| | 3. BIOS Ver. | FWS-7820 R0.6 (K782AM06) (12/18/2015) |
| | 4. CPU Type | Intel Core i7-6700 3.40GHz x 8 |
| | 5. Chipset | Intel C236 |
| | 6. LAN Module | PER-T393 / Ver. A0.2 |
| | 7. LAN Module | NIM-C13B / Ver. A0.1 x 4 (LAN Chipset - i350*1 & 82580*3) |
| | 8. Module | PER-R38X / Ver. A0.1 |
| | 9. Memory | ADATA - DDR4 2133 (15) 16Gx18 ECC-DIMM ( SEC / 525 K4ABG08 5WB BCPB) * 4 pcs |
| | 10. 2.5” SATA HDD | TOSHIBA / MK5076GSX 500GB |
| | 11. Test Software | ubuntu 15.04 / Run iPerf test |
| | 12. Power supply | ETASIS / EFAP-S250 |

# Photos

| FWS-7820 - System | FWS-7820 - CPU Heat Sink |
|---|---|
|  |  |
| **FWS-7820 - Chipset Heat Sink** | **FWS-7820 - Chipset Heat Sink** |
|  |  |

**FWS-7820 – Module: PER-T393 / PER-R38X / NIM-C13B & Chipset Heat Sink**



# High Temperature Operation test

**Test Date:** 04-14 ~ 15-2016

**Test Product**: FWS-7820 with PER-T393、PER-R38X 、NIM-C13B

**Test Site:** AAEON QE Dept.

**Test Standard:** Refer to IEC 68-2-2 Testing procedures
Test Bd: Dry Heat Test (Operation)

**Test Equipment:**

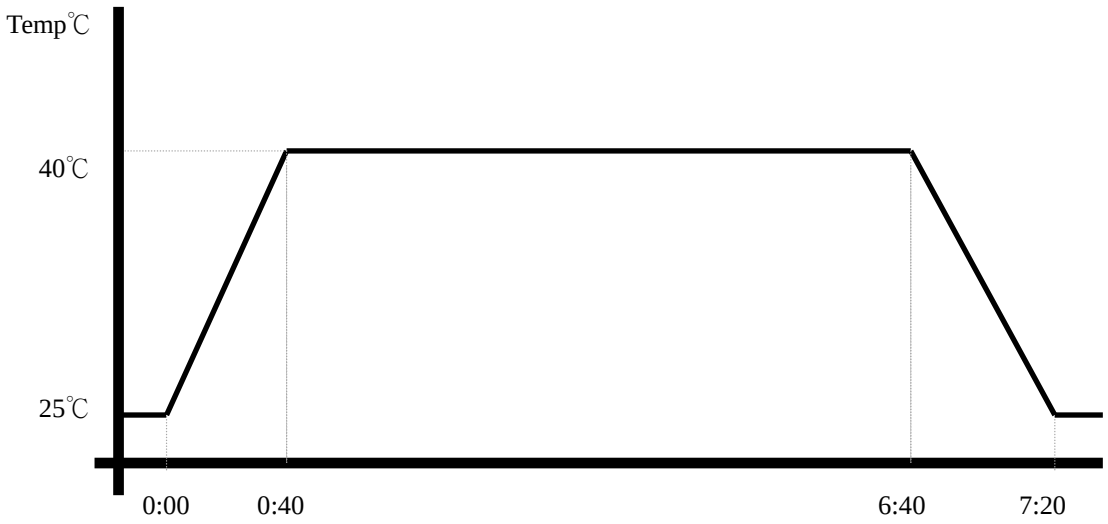
Natural Convection Oven Chamber: (K.SON. INS. TECH. CORP.)
Model: NCO-BT-80
Date of Calibration: 02/26/2016
Serial Number: A0446

**Temperature Measurement:**

**40 Channel Thermal Recorder: (YOKOGAWA Inc,)**
Model: DA100-13-1D
Date of Calibration: 09/10/2015
Serial Number: 12A323190

**Testing Item:**

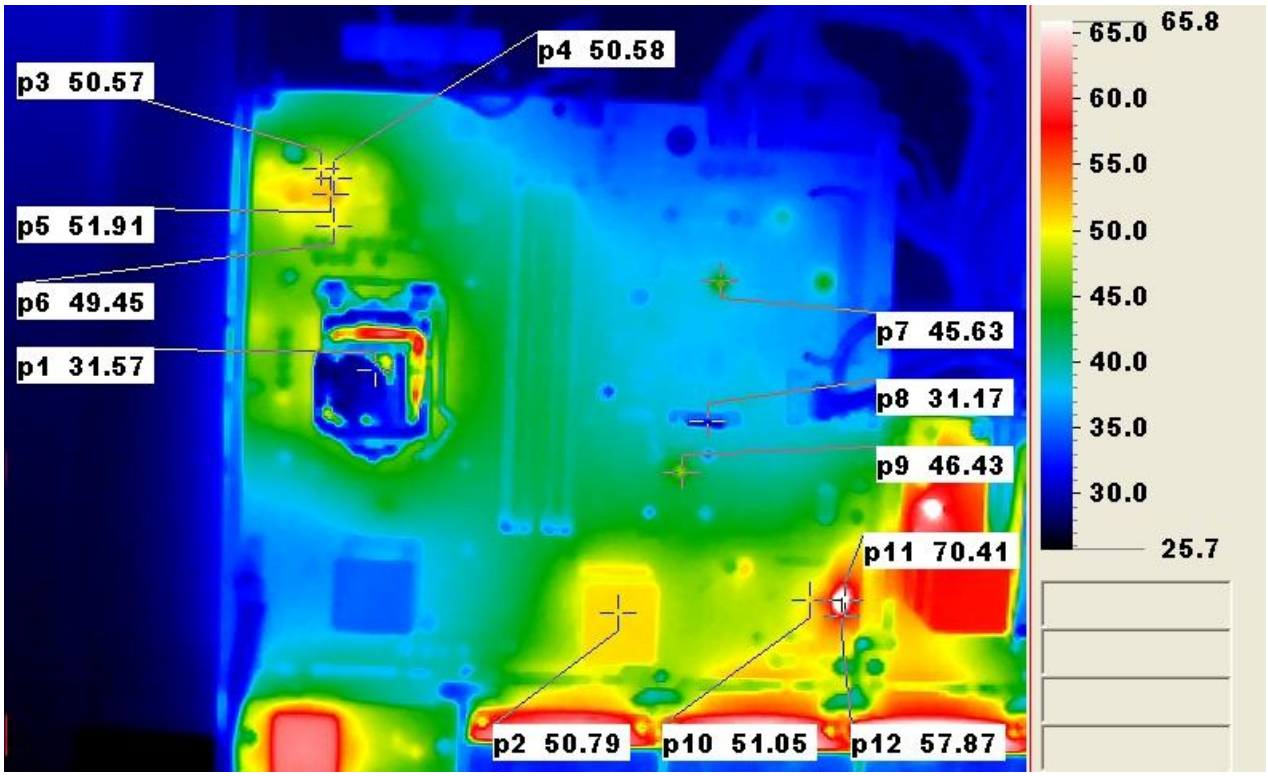
1. Test Temperature: 40℃
2. Test Times: 6Hrs
3. Test Software: ubuntu 14.10 / Run iPerf test
4. Test Environment Curve:



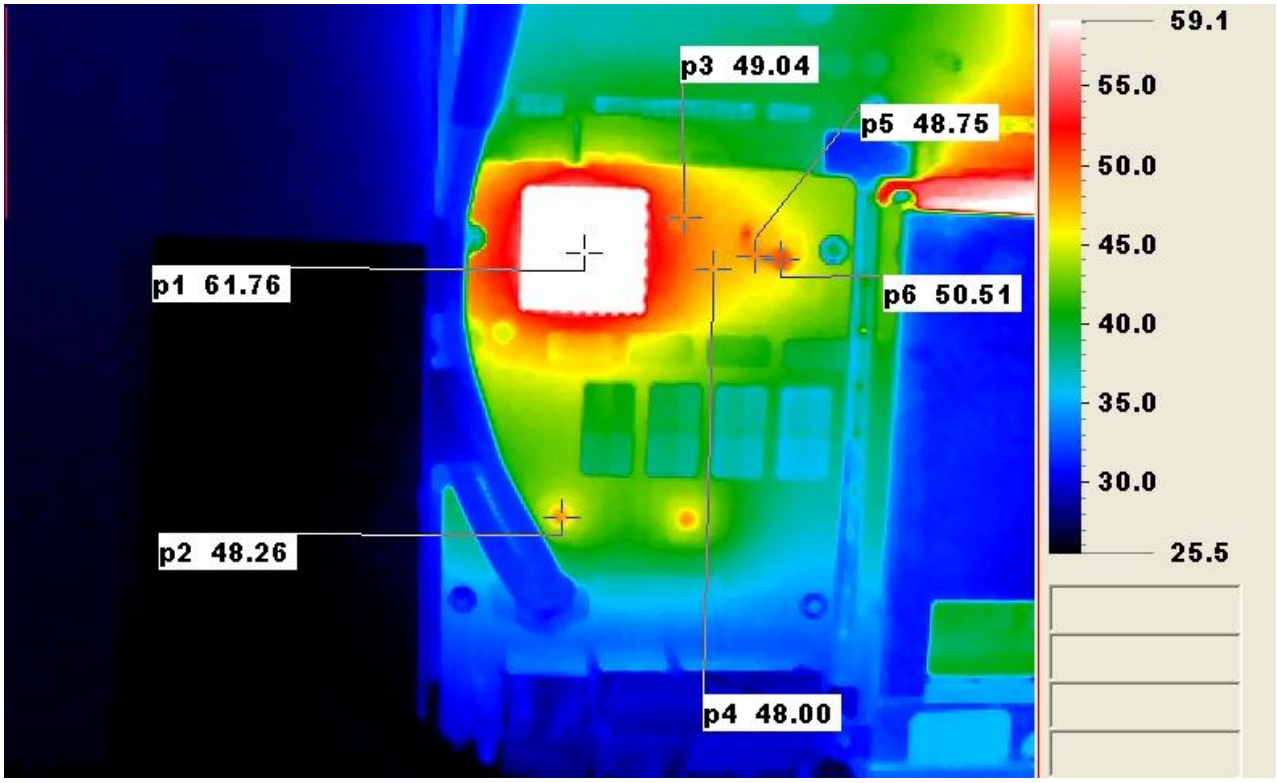
# High Temperature Operation test

**IR Thermal Photos**

**Main Board Front Side**

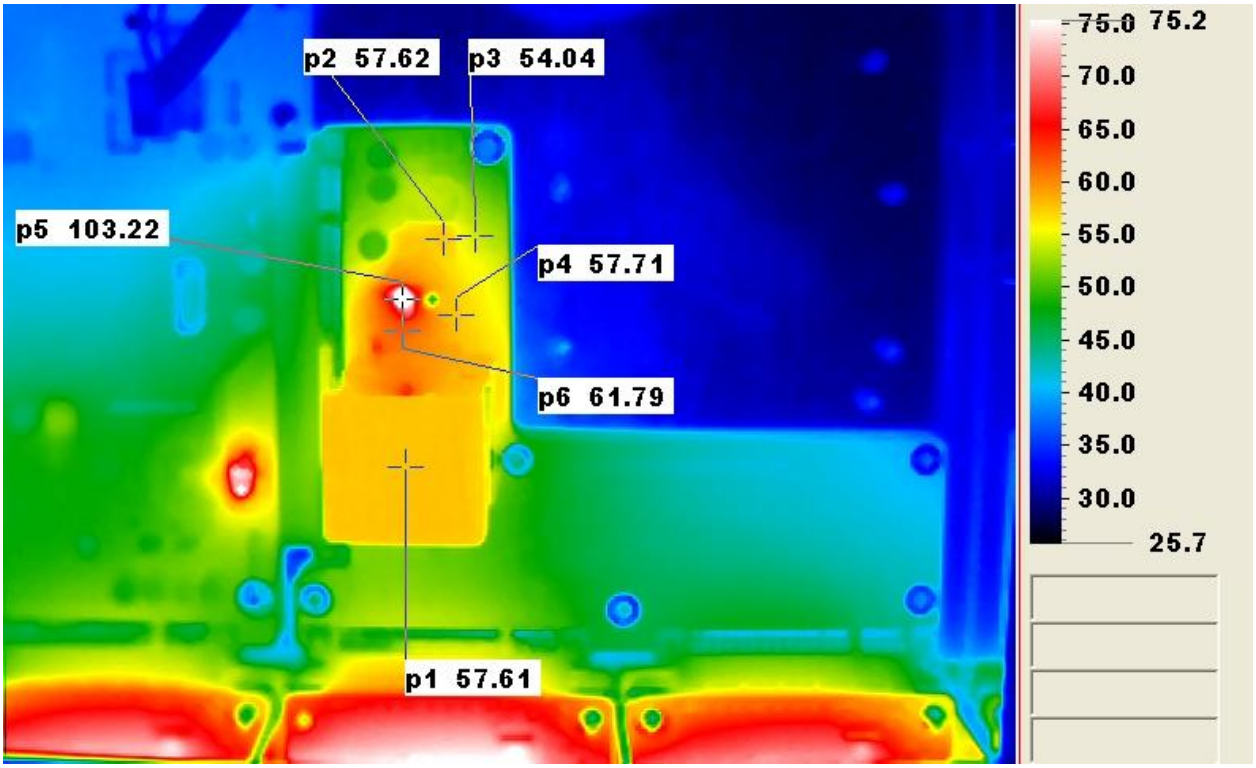



**LAN Module – PER-T393**

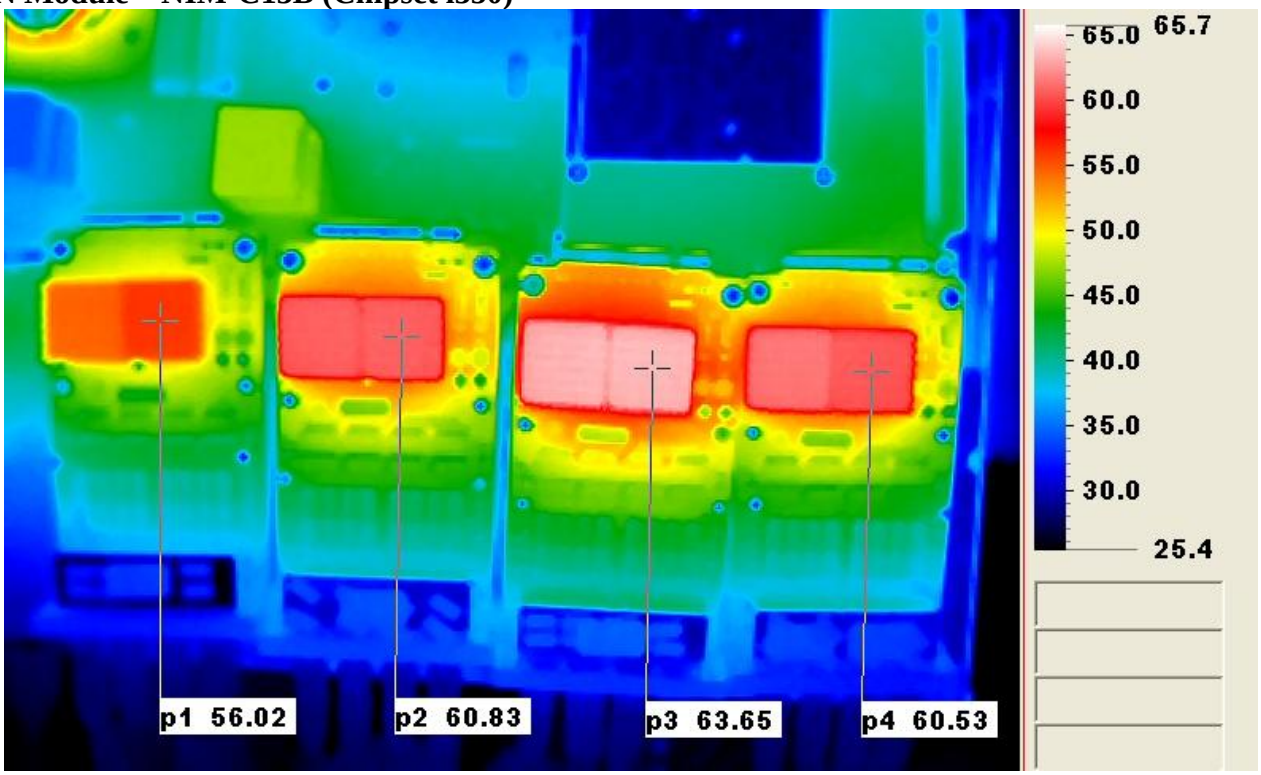


# High Temperature Operation test

**Module – PER-R38X**

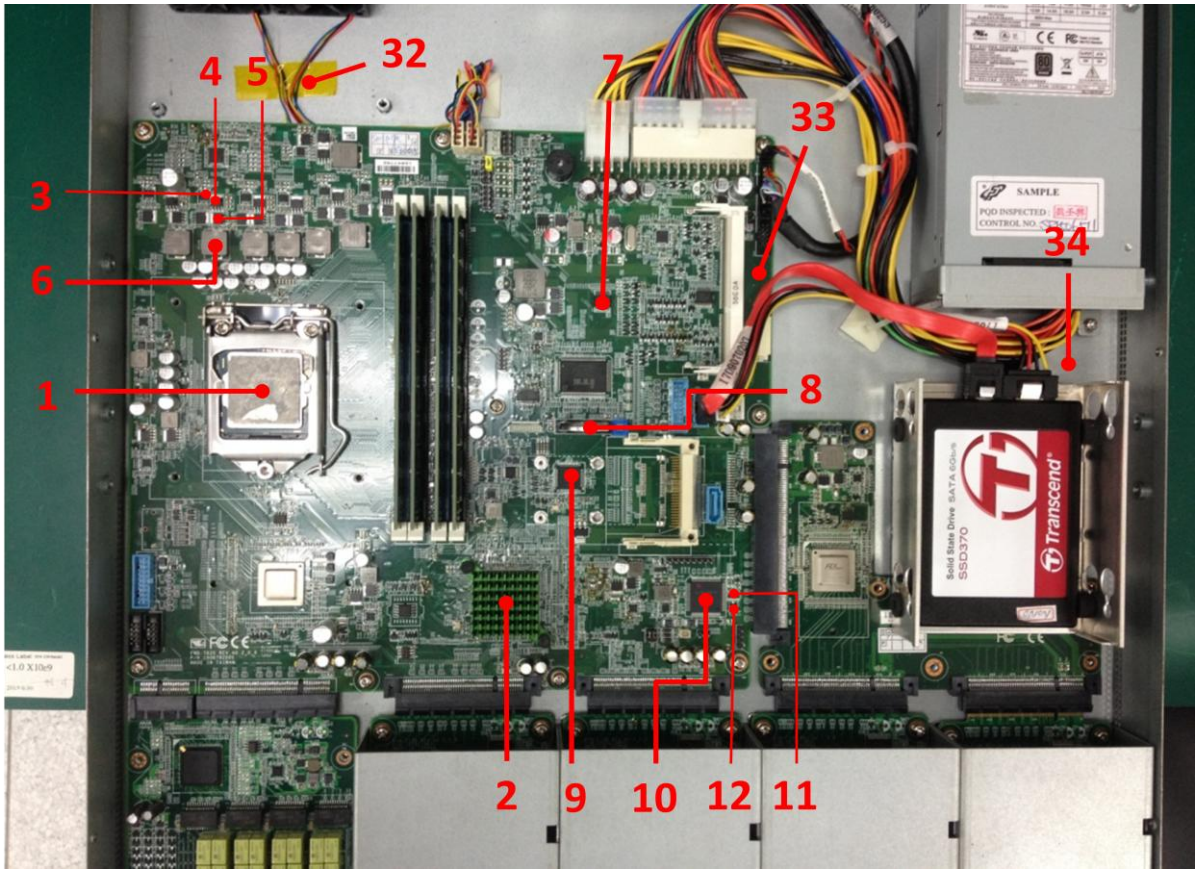


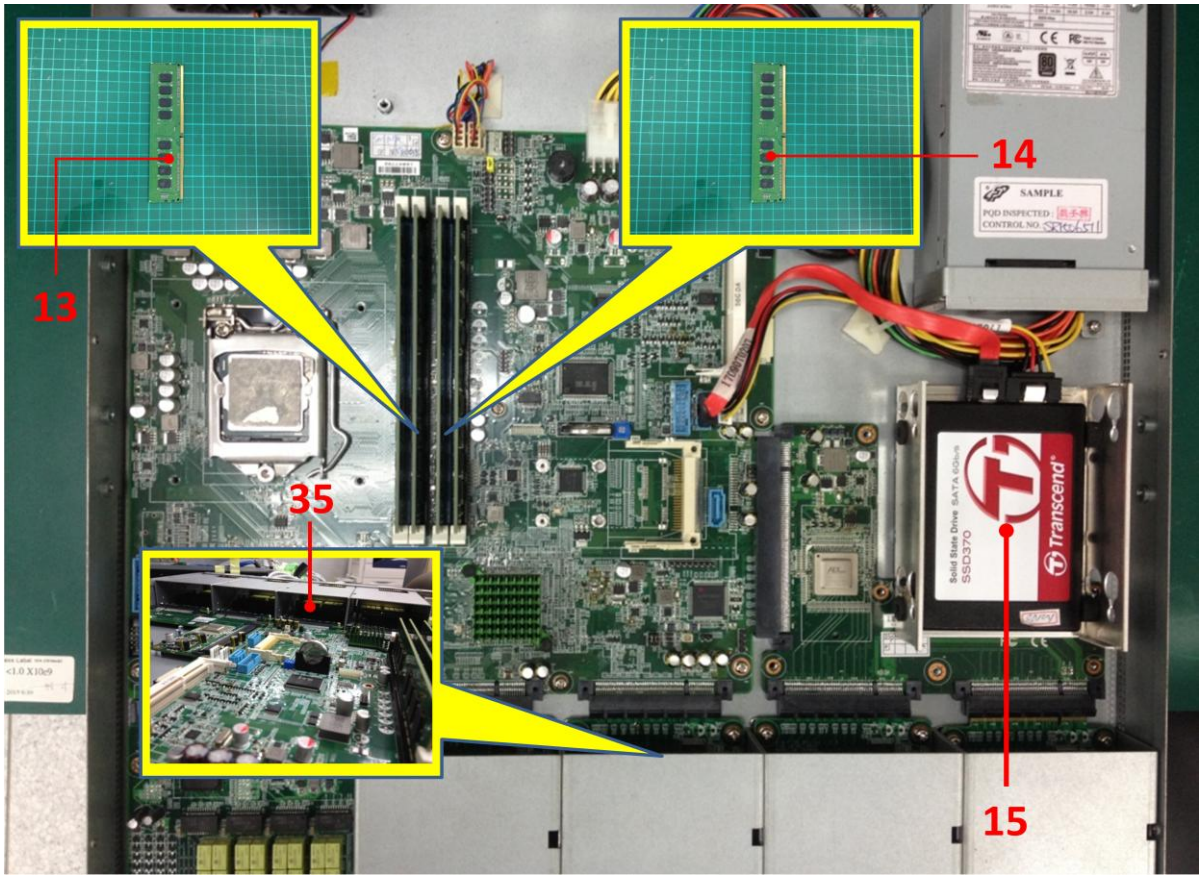

**LAN Module – NIM-C13B (Chipset i350)**



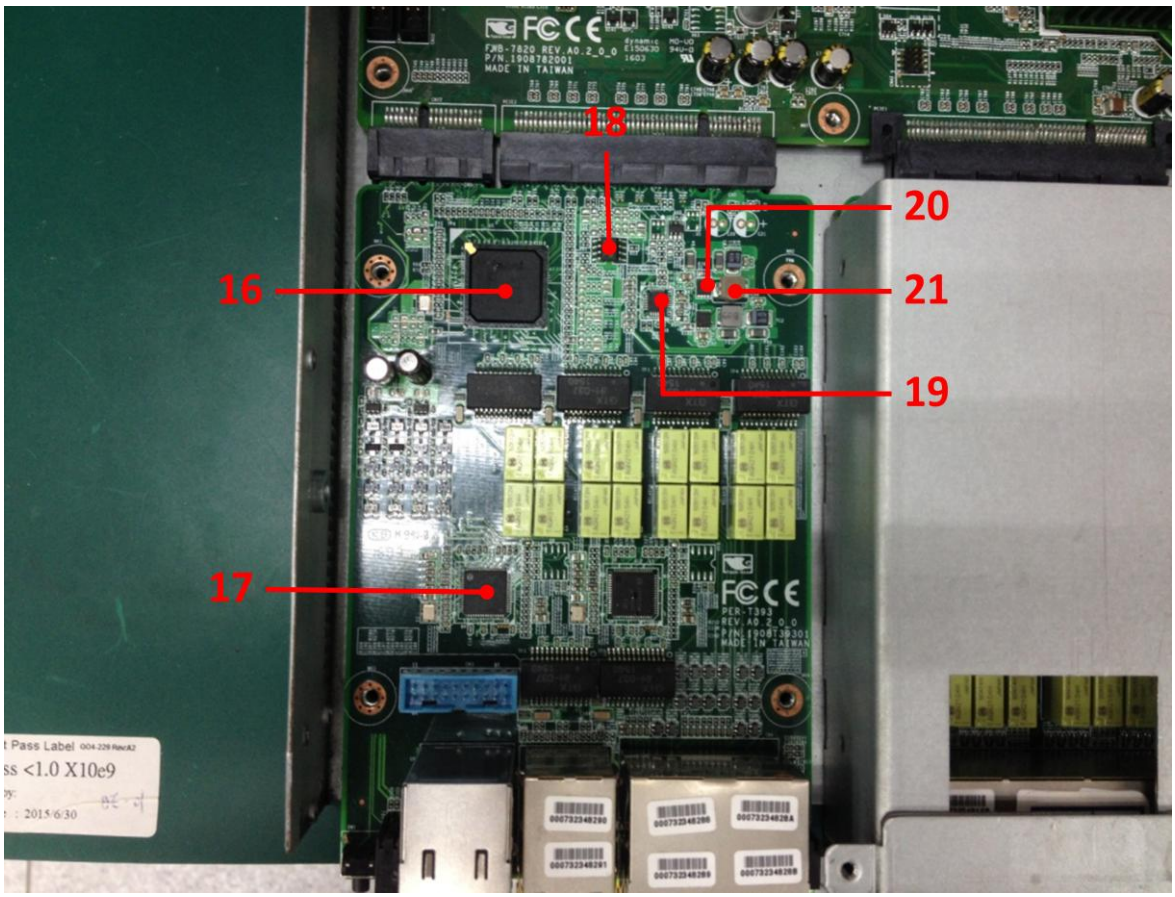
# High Temperature Operation test

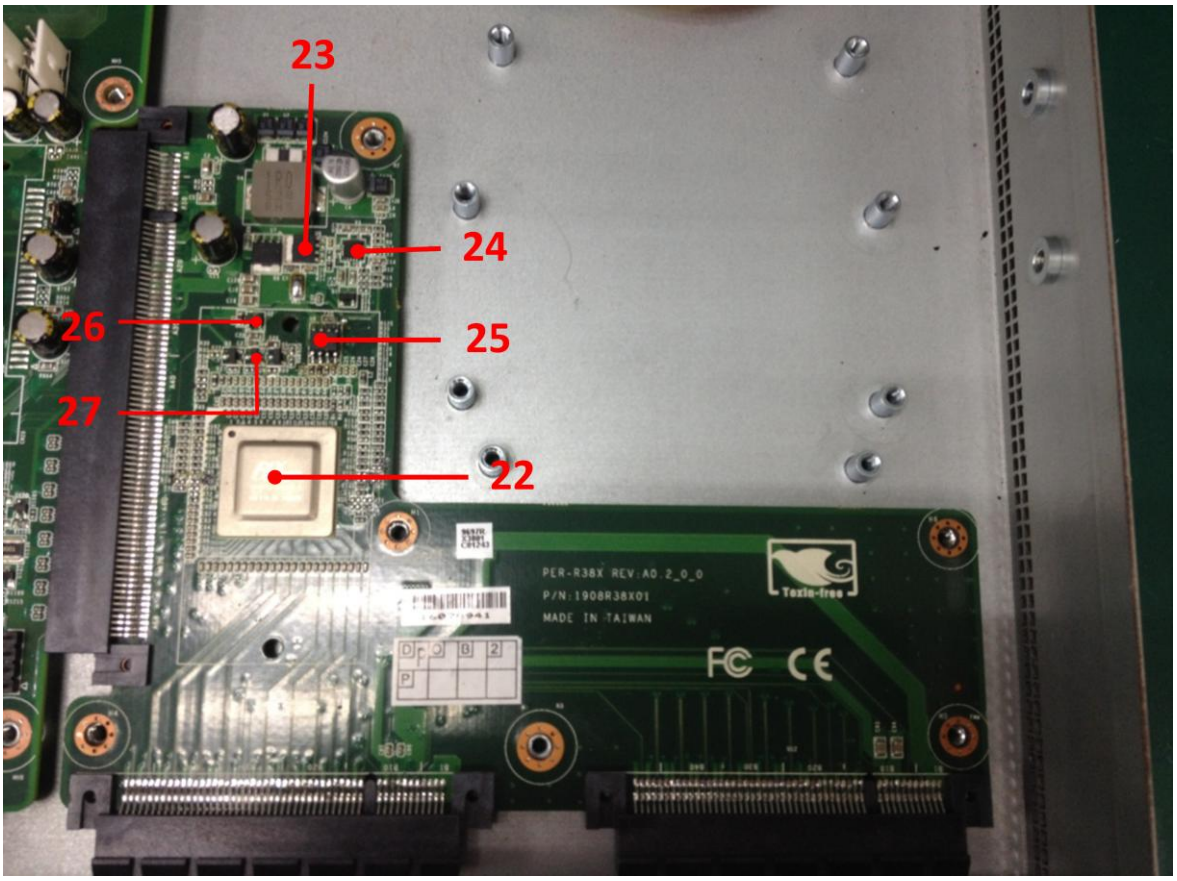
**Measuring Thermal Couple Position：**



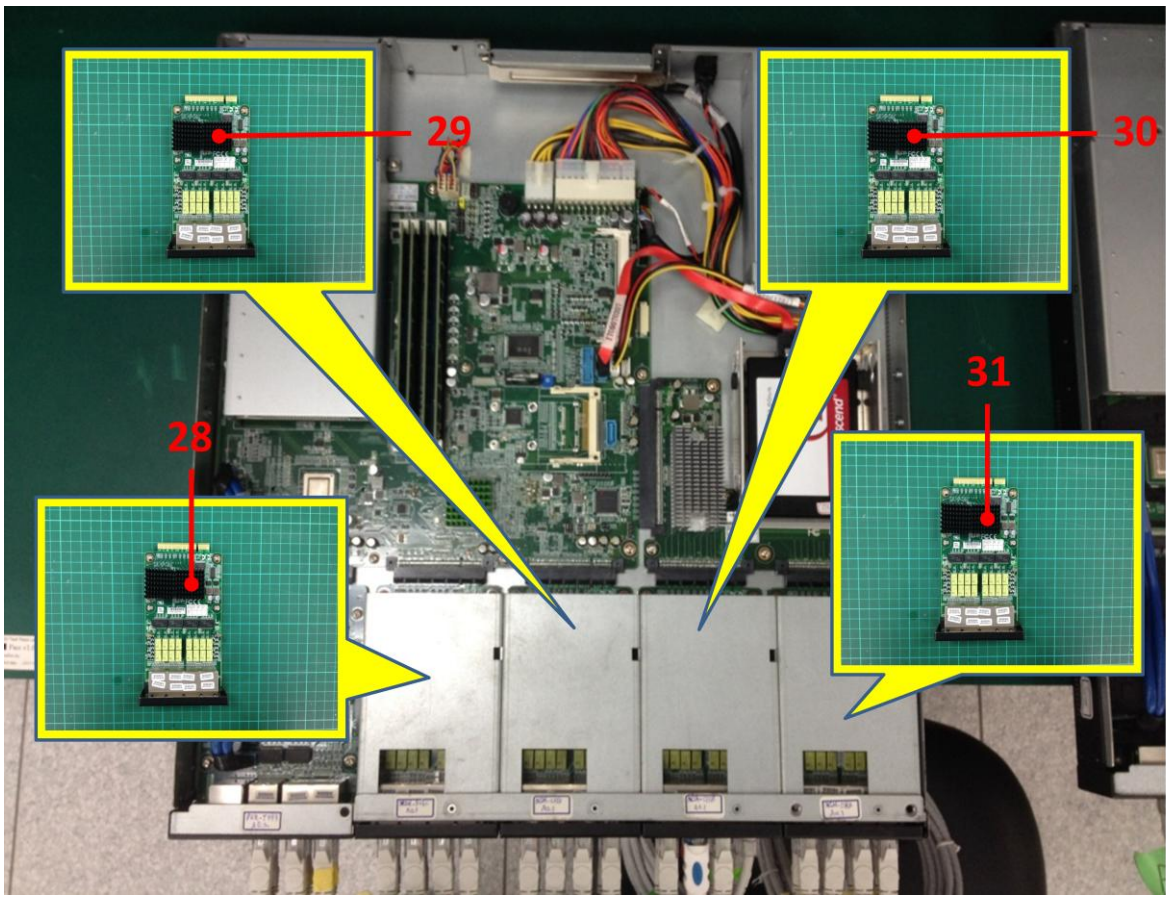



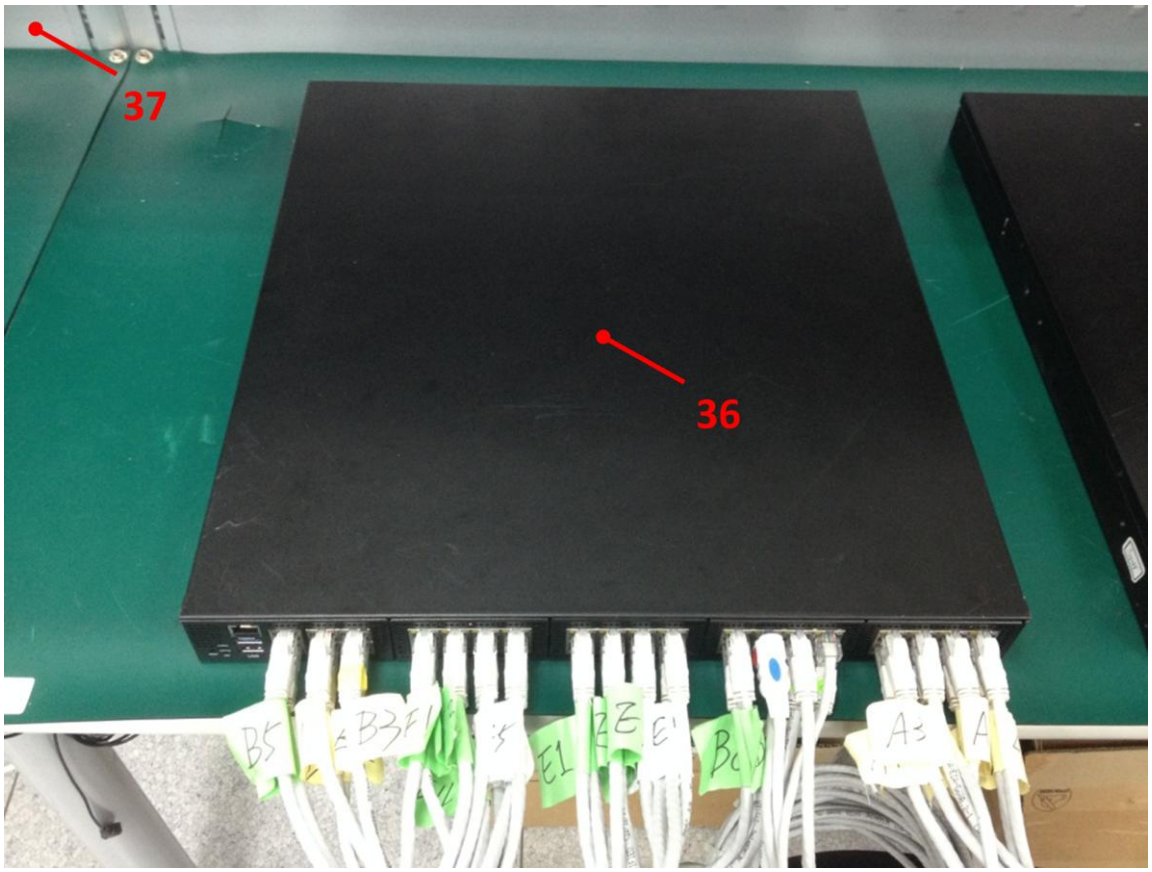
# High Temperature Operation test



# High Temperature Operation test



# High Temperature Operation test

**Thermal profile data:**

**FWS-7820 (With 0.2m/sec airflow)**

| Point / Temp. Stage(℃) | Spec Tc(*1) | TAT(*2) 40 | TPT(*3) 25 | Note |
|---|---|---|---|---|
| **FWB-7820 Rev. A0.2** | | | | |
| 01. U1 - Intel Xeon® E3-1225 v5 @ 3.30GHz x 4 | 61.3 | 51 | 36 | |
| 02. U2 - IC.CHIPSET.SKYLAKE PCH.200 SERIES.BGA837P.INTEL.GLC236 SR2CC | 108 | 64.1 | 49.1 | |
| 03. U9 - IC.Single Phase Buck.MOSFET Driver.WDFN-8L 3x3.Richtek.RT9624FGQW | 100 | 54.4 | 39.4 | |
| 04. Q20 - N-Channel.Vds=30V.Vgs=(+/-)20V.Ids=62A.SOT-669.NXP.PH6030DLB | 150 | 53.4 | 38.4 | |
| 05. Q36 - N-Channel.Vds=30V.Vgs=(+/-)20V.Ids=62A.SOT-669.NXP.PH6030DLB | 150 | 53.8 | 38.8 | |
| 06. L13 - Coil.0.36uH.Idc=30A.DCR=1.2mohm.CYNTEC.PCMB104T-R36MT | 125 | 53 | 38 | |
| 07. U17 - IC.SMD SSOP.20Pin RS-232 Driver&Receivers.TI.GD75232DBR | 85 | 57.8 | 42.8 | |
| 08. BT1 – Lithium Battery.3V.220mAH.-20~+85℃.MAXELL.CR2032H | 85 | 47.9 | 32.9 | |
| 09. U38 -IC.TQFP 64P.SATA to IDE/ATA.Jmicron.JMD330.APCI-TGCD | 100 | 56.5 | 41.5 | |
| 10. U53 - IC.CPLD.TQFP100.CS:81A8.LATTICE.LCMXO2-640HC-4TG100C | 75 | 55.1 | 40.1 | |
| 11. R1130 - CR.100.1W.1%.1218 | 155 | 76 | 61 | |
| 12. Q137 - PWR.N-Channel.SOT-23.PHILIPS.2N7002 | 125 | 80 | 65 | |
| 13. RAM-1 - ADATA DDR4 2133 (15) 16Gx16 U-DIMM ( SEC K4ABG08 5WB BCPB) | 85 | 48.8 | 33.8 | |
| 14. RAM-2 - ADATA DDR4 2133 (15) 16Gx16 U-DIMM ( SEC K4ABG08 5WB BCPB) | 85 | 49.8 | 34.8 | |
| 15. SSD - Transcend / 2.5" SATA Solid State Driver SSD370 / TS32GSSD370 32G | 70 | 43.7 | 28.7 | |
| **PER-T393 A0.2** | | | | |
| 16. U5 - IC.PCI-E.GbE Controller Quad Port.PBGA 256P.Intel.82580EB | 100 | 60.1 | 45.1 | |
| 17. U11 - IC.PCI-E GigaBit Ethernet Chipset.QFN 64P.Intel.I210AT | 85 | 51.7 | 36.7 | |
| 18. U4 - IC.Serier SPI BUS EEPROM.SO8.256Kbit.ST.M95256-WMN6P | 100 | 47.9 | 32.9 | |
| 19. U6 - IC.VQFN 24P.DUAL SYNCHRONOUS STEP-DOWN CON.TI.TPS51124RGE | 100 | 48.2 | 33.2 | |
| 20. Q1 - PWR.PMPAK3X3 DUAL N-MOSFET.FAIRCHILD.FDMC7200S. | 125 | 50 | 35 | |
| 21. L1 - COIL.2.2uH.DCR=36.4mohm.Irms=4.5Amp.NEC/TOKIN.MPLCG0530L2R2 | 120 | 52.9 | 37.9 | |
| **PER-R38X A0.2** | | | | |
| 22. U10 - IC.PCIe-PCIe Bridge.24-Lane.FCBGA 324Pin.PLX.PEX8724-CA80BC G | 85 | 55.7 | 40.7 | |
| 23. U6 - N-Channel.Vds=30V.Vgs=(+/-)20V.Ids=62A.SOT-669.NXP.PH6030DLB | 150 | 57.6 | 42.6 | |
| 24. U5 - IC.Single Synchronous.Buck Controller.WQFN-16L.Richtek.RT8202MZQW | 100 | 53.5 | 38.5 | |
| 25. U8 - IC.8P.8K SPI Bus Serial EEPROM.ATMEL.AT25080B-SSHL-T | 85 | 54.5 | 39.5 | |
| 26. Q2 - REG.SMD.SOT-23 3P.CMOS LDO Regulator.AME.AME8800MEETZ | 100 | 97.8 | 82.8 | **Note 5** |
| 27. Q4 - PWR.N-Channel.SOT-23.PHILIPS.2N7002 | 125 | 58.7 | 43.7 | |
| **LAN Module - NIM-C13B Rev. A0.1 (LAN Chipset - i350)** | | | | |
| 28. LAN Chipset-1 - IC.PCI-E.GbE Controller.Qual Port.PBGA 256P.Intel.I350-AM4 | 100 | 69.3 | 54.3 | |
| 29. LAN Chipset-2 - IC.PCI-E.GbE Controller.Qual Port.PBGA 256P.Intel.I350-AM4 | 100 | 74 | 59 | |
| 30. LAN Chipset-2 - IC.PCI-E.GbE Controller.Qual Port.PBGA 256P.Intel.I350-AM4 | 100 | 71.8 | 56.8 | |

| | | | | |
|---|---|---|---|---|
| 31. LAN Chipset-2 - IC.PCI-E.GbE Controller.Qual Port.PBGA 256P.Intel.I350-AM4 | 100 | 64.1 | 49.1 | |
| **Control Box Inside Air Temperature** | | | | |
| 32. Control Box Inside Air Temperature-1 | N/A | 45.9 | 30.9 | |
| 33. Control Box Inside Air Temperature-2 | N/A | 43.8 | 28.8 | |
| 34. Control Box Inside Air Temperature-3 | N/A | 42.3 | 27.3 | |
| 35. Control Box Inside Air Temperature-4 | N/A | 45 | 30 | |
| **Control Box External Surface Temperature** | | | | |
| 36. Control Box External Surface Temperature | N/A | 42.6 | 27.6 | |
| **Chamber Air Temperature** | | | | |
| 37. Chamber Air Temperature | N/A | 40 | 25 | |

**Note(*):**
**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. "TPT"** indicates the predicted temperature under 25℃ working environmental.
**4. Judgment Criteria:**
- **Fail** **:** Tm > Tc; The measured value is over specification.
- **Margin Pas :** 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.

**5. Defect NO. I150404QED15**

**Sample Configuration & Quantity Under Test:**

Quantity: 1 (FWS-7820)

**Test Result:**

No issues were found during the temperature rise operation test.

# Temp./humidity power on/off test

**Test Date:** 03-31 ~ 04-01-2016

**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-D4H+-100
Date of Calibration: 11/13/2015
Due date of Calibration: 11/12/2016
Serial Number: 2582

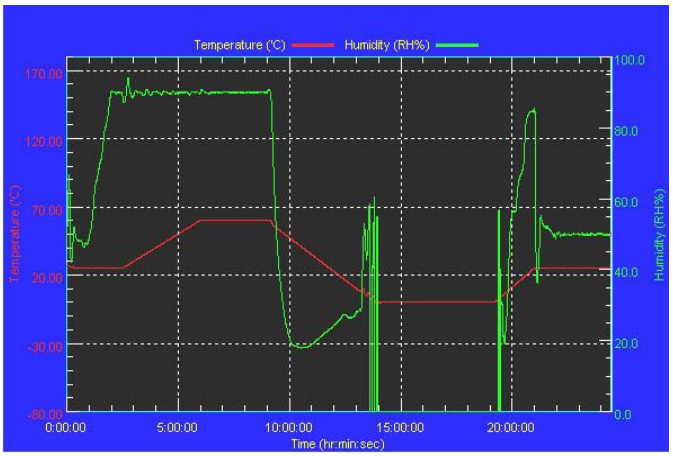
**Temperature & Humidity Power On/Off Test:**

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 | 1066/times | 1066/times | 0 % | Pass |

**Note:** 1. Failure rate need to under 0%.

2. Power on/off fixture setting: Button – 0.5 sec / on/off - 40 sec

# Temperature cycle test

**Test Date:** 04-11 ~ 13-2016

**Test Product:** FWS-7820 with PER-T393、PER-R38X 、NIM-C13B

**Test Site:** AAEON QE Dept.

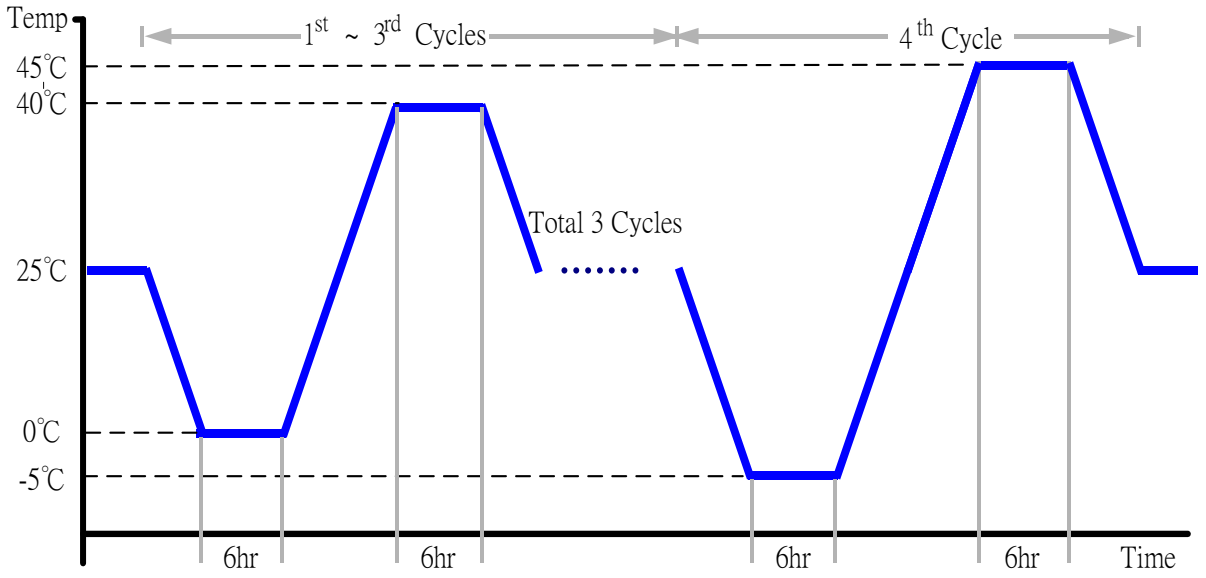
**Test Standard:** Refer to IEC68-2-14 Testing procedures
Test N: Change of temperature Test

**Test Equipment:**

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 11/13/2015
Due date of Calibration: 11/12/2016
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-7820)

**Test Result:**

No issues were found during the temperature operation cycle test.

# High temperature storage test

**Test Date:** 04-08 ~ 11-2016

**Test Product:** FWS-7820 with PER-T393、PER-R38X 、NIM-C13B

**Test Site:** AAEON QE Dept.

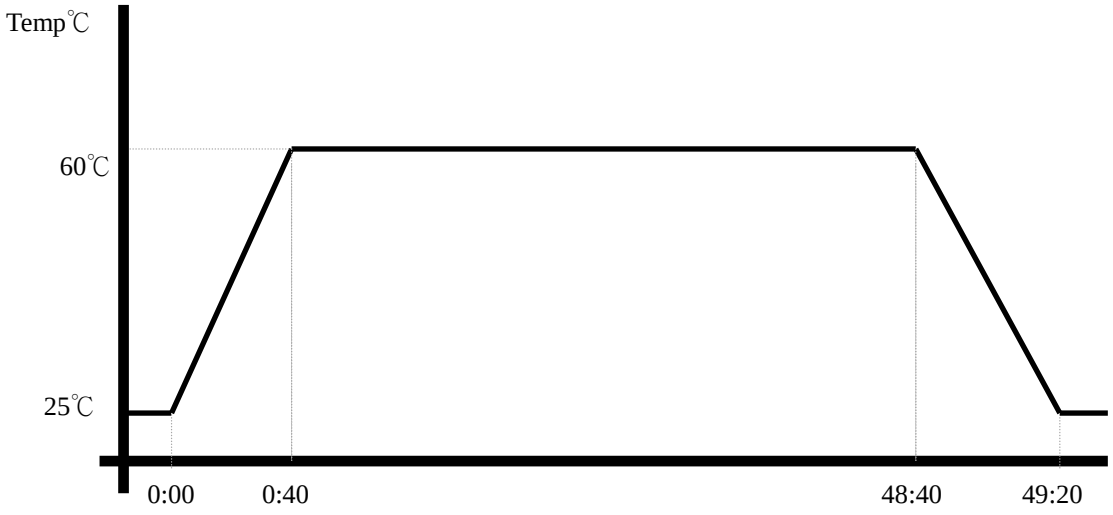
**Test Standard:** Refer to IEC 68-2-2 Testing procedures
Test Bb: Dry Heat Test (Non-operation)

**Test Equipment:**

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 11/13/2015
Due date of Calibration: 11/12/2016
Serial Number: 2582

**Testing Item:**

5. Test Temperature: 60℃
6. Test Times: 48Hrs
7. Test Software: ubuntu 14.10 / Run iPerf test
8. Test Environment Curve:




**Sample Configuration & Quantity Under Test:**
Quantity: 1 (FWS-7820)

**Test Result:**

No issues were found after the high temperature storage test.

# Low temperature storage test

**Test Date:** 04-06 ~ 08-2016

**Test Product:** FWS-7820 with PER-T393、PER-R38X 、NIM-C13B

**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: 11/13/2015
Due date of Calibration: 11/12/2016
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-7820)

**Test Result:**

No issues were found after the low temperature storage test.

# Humidity test

**Test Date:** 04-01 ~ 06-2016

**Test Product:** FWS-7820 with PER-T393、PER-R38X 、NIM-C13B

**Test Site:** AAEON QE Dept.

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

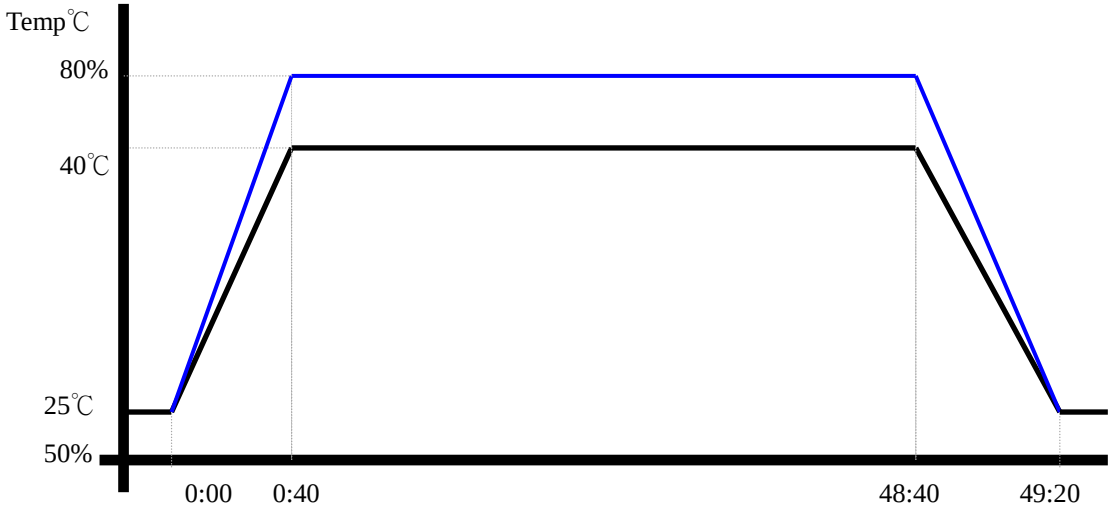
**Test Equipment:**

Programmable Temperature & Humidity Chamber: (K.SON. INS. TECH. CORP.)
Model: THS-D4H+-100
Date of Calibration: 11/13/2015
Due date of Calibration: 11/12/2016
Serial Number: 2582

**Testing Item:**

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

**Humidity %**




**Sample Configuration & Quantity Under Test:**
Quantity: 1 (FWS-7820)

**Test Result:**

No issues were found after the humidity storage test.

# Cold start and hot start test

**Test Date:** 04-13 ~ 14-2016

**Test Product:** FWS-7820 with PER-T393、PER-R38X 、NIM-C13B

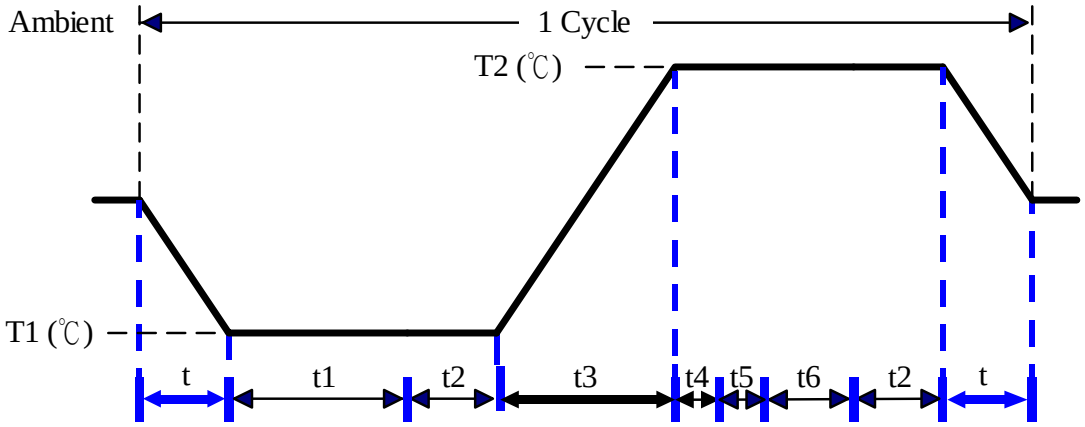
**Test Site:** AAEON QE Dept.

**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: 11/13/2015
Due date of Calibration: 11/12/2016
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 14.10 LTS Software restart test 3 times
Test Software: ubuntu 14.10 LTS

**Test Result:**

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