



# THOR100-X4

## **Thermal & Function TEST REPORT**

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**Test Report**  
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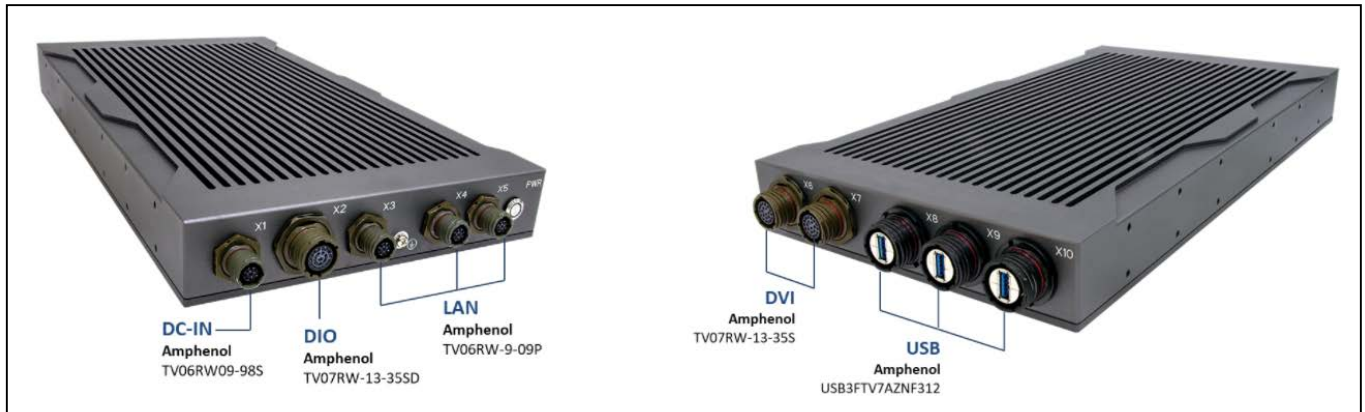
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# 1. SYSTEM SPEC

## 1-1. PRODUCT PHOTOS

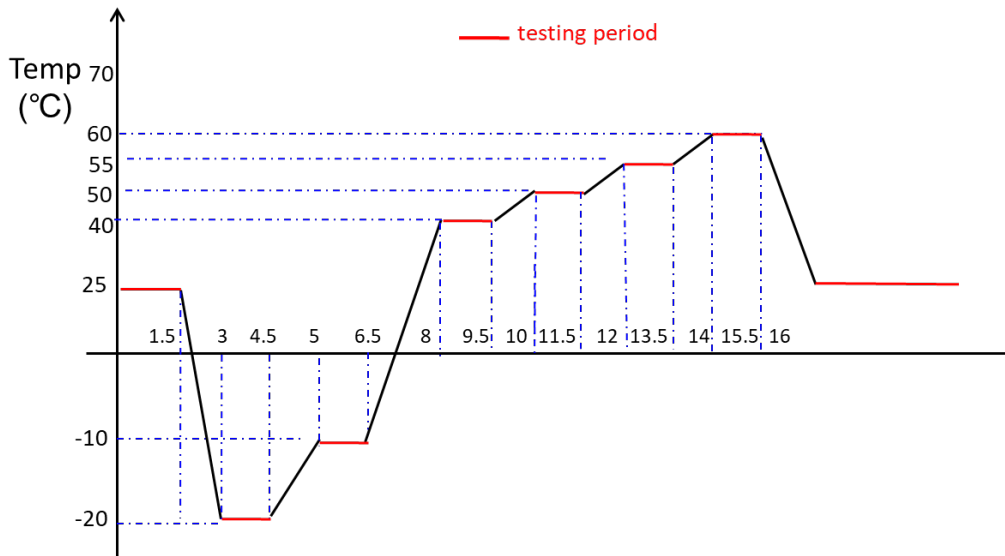


## 1-2. SYSTEM COFIGURATION

System Configuration	
Motherboard	Perfectron OXY5741A
CPU	Intel® XEON-E-2276ML
Memory	Innodisk DDR4-2400 16G SODIMM
M.2 NVME PCIe SSD	7Starlake M.2 NVME 480GB
X1~X2	Intel I210 with 10/100/1000Mbps
X3	Intel I219LM with 10/100/1000Mbps
X4	8Bit DIO / Line-out / MIC-in
X5	DC-IN 18~36V
X6~X8	USB3.0 TYPE A
X9~X10	DVI-D

## 2. Test Plan

### 2-1. Thermal Measurement Process

<b>Test Purpose</b>	The purpose of performing thermal profile test is to identify potential thermal problem of the EUT. And it is to aid products in reliability assessment considering that semiconductor failure rates rise rapidly with increasing junction temperature In case of systems cooling, patterns will vary with stacking choices, temperature/thermal mapping can aid in the development of optimum tacking arrangements
<b>Test Equipment</b>	1. KSON THS-B4T-150 Chamber 2. YOKOGAWA MV1000, Thermometer (FLUKE50D K/J)
<b>Quantity Tested</b>	Minimum 1 Set
<b>Test Software</b>	Passmark Burn-In Test under Windows 10
<b>Test Procedure</b>	1. Thermal pre-scan measurement: Temperature: -40~70°C /60%RH 2. Thermal actual measurement: a. Select the test points according to the IR photo and attach thermocouples to the hot points b. Put the EUT in thermal chamber and set the temperature profile of as test specification c. Turn on the thermal chamber and power on the EUT to enter windows environment to run Max Power Test + 3DMARK 2003 application program d. After the EUT executing the test software for 4 hours, record thermal maximum value for each thermocouples point. e. Turn off the thermal chamber and EUT f. Verify and check recorded figure of each components to its' operating temperature range listed in specification/approval sheet of each measured component
<b>Test diagram of curves</b>	Environment defines for 8 hours  <p>The graph illustrates a thermal profile with the following key points:</p> <ul style="list-style-type: none"> <li>Start: 25°C (at 1.5h)</li> <li>Drop: -20°C (at 3.5h)</li> <li>Rise: 40°C (at 8h)</li> <li>Step up: 50°C (at 10h)</li> <li>Step up: 55°C (at 12h)</li> <li>Step up: 60°C (at 14h)</li> <li>End: 25°C (at 16h)</li> </ul> <p>The testing period is indicated by a red line from 8h to 15.5h, during which the temperature is at or above 40°C.</p>

## 2-2. THOR100-X4 TEST RESULT

### TEST ITEM:

#### 2.2.1 TEMPERATURE CYCLE

# Burn-in test under each temperature with maximum quantity of external devices on all I/O connected and full loading status on each device

Test Temperature	Test Result
-40°C	PASS
0°C	PASS
25°C	PASS
40°C	PASS
50°C	PASS
60°C	PASS
70°C	PASS

#### 2.2.2 I/O FUNCTION

#Confirm the system specifications and I/O connection to ensure that they are functioning properly

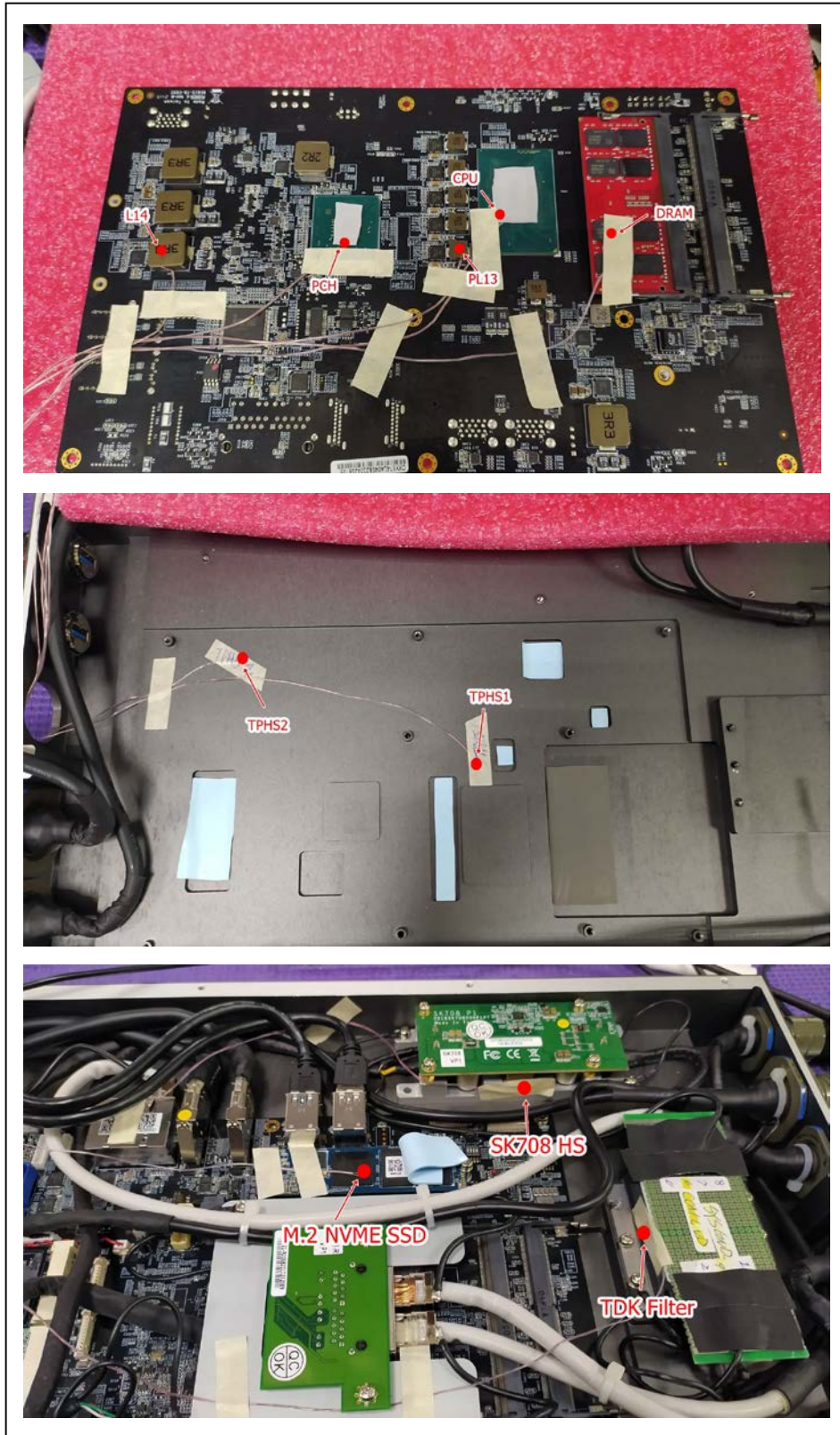
Item	Criteria	Result
USB3.0 *3	Connection 2.5" USB3.0 SSD device and transfer data test	PASS
	PassMark USB3.0 Loopback Plugs for Troubleshooting and Testing USB 3.0 ports.	
LAN * 3	Connection 2.5" USB3.0 SSD device and transfer data test	PASS
DVI-D *2	Check work well	PASS
Line Out/Mic In	Check work well	PASS

#### 2.2.3 LOW-TEMP. BOOT-UP

#Power supply under -40°C and ensure that the system boot up properly

Ambient Temp.	Test Result
-40°C	PASS

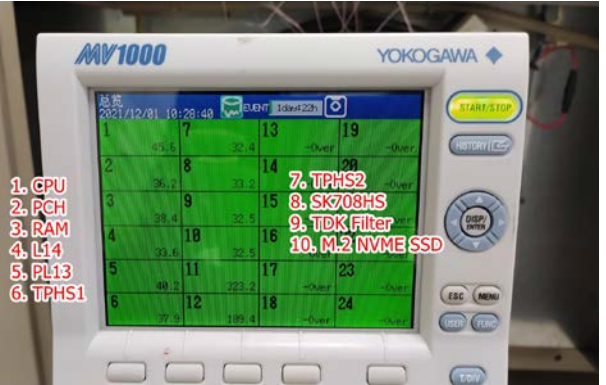
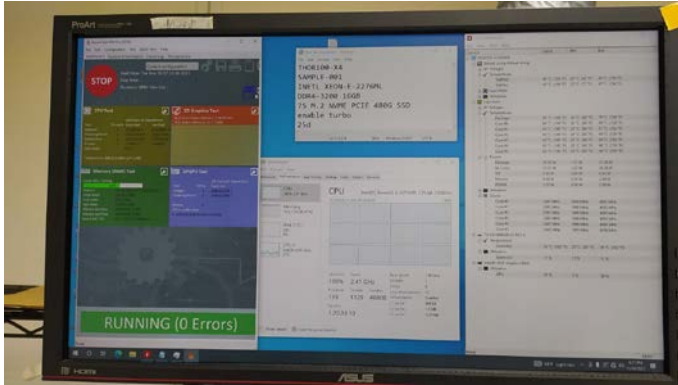
### 3. Thermal Test Point



TEST POINT NO.	Test Point
1	CPU
2	PCH
3	DRAM
4	L14
5	PL13
6	TPHS1
7	TPHS2
8	SK708 HS
9	TDK FILTER
10	M.2 NVME SSD

# 4. Test Photo in LAB

- Chamber in 25°C

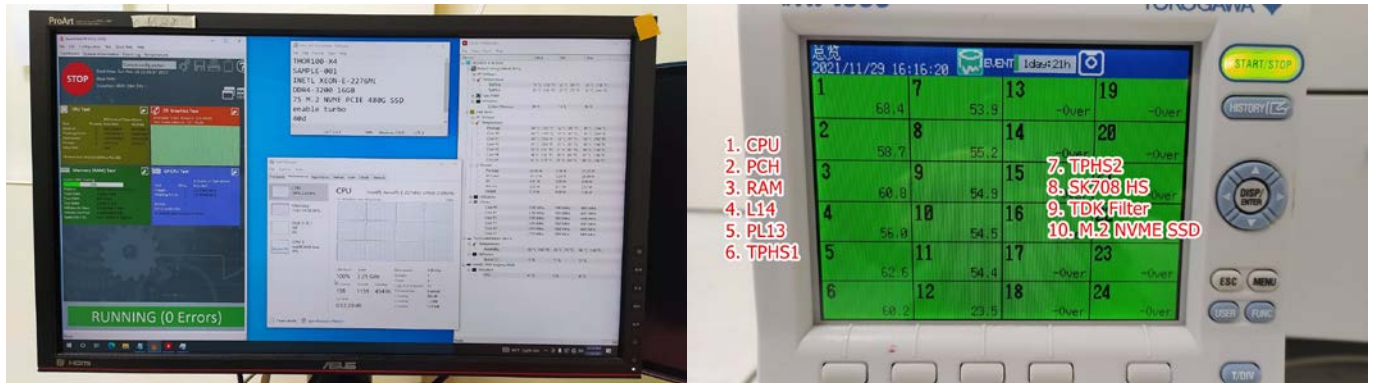


- 1. CPU
- 2. PCH
- 3. RAM
- 4. L14
- 5. PL13
- 6. TPHS1
- 7. TPHS2
- 8. SK708HS
- 9. TDK Filter
- 10. M.2 NVME SSD



TEST POINT NO.	Test Point	Ambient Tem.	25°C
	CPU FRQ.		2.4G
	CPU Tj. (<105°C)		65
1	CPU		45.6
2	PCH		36.2
3	DRAM		38.4
4	L14		33.6
5	PL13		40.2
6	TPHS1		37.9
7	TPHS2		32.4
8	SK708		33.2
9	TDK FILTER		32.5
10	M.2 NVME SSD		32.5

## - Chamber in 40°C

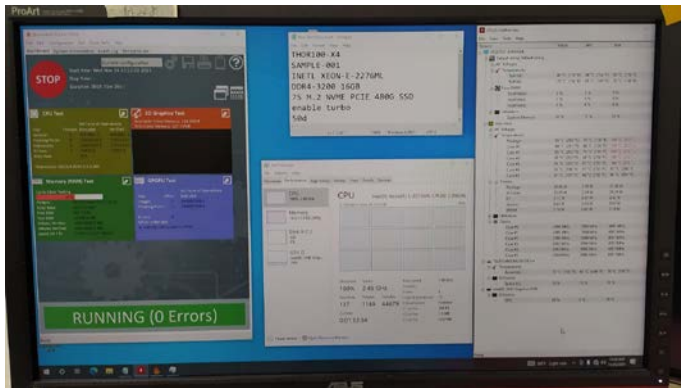


TEST POINT NO.	Test Point	Ambient Tem	40°C
	CPU FRQ.		2.25G
	CPU Tj. (<105°C)		84
1	CPU		68.4
2	PCH		58.7
3	DRAM		60.8
4	L14		56
5	PL13		62.6
6	TPHS1		60.2
7	TPHS2		53.9
8	SK708		55.2
9	TDK FILTER		54.9
10	M.2 NVME SSD		54.5



# THOR100-X4

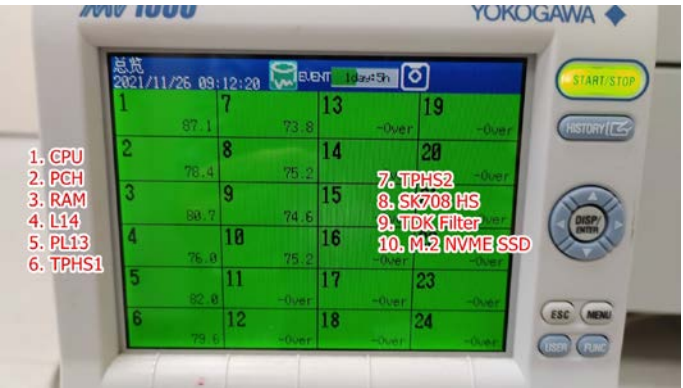
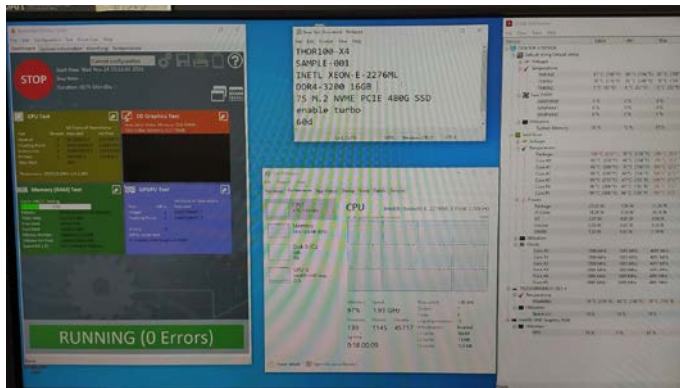
- Chamber in 50°C



TEST POINT NO.	Test Point	Ambient Tem	50°C
	CPU FRQ.		2.5G
	CPU Tj. (<105°C)		95
1	CPU		78.9
2	PCH		69.2
3	DRAM		71.7
4	L14		66.4
5	PL13		73.2
6	TPHS1		70.6
7	TPHS2		64.3
8	SK708		65.4
9	TDK FILTER		65.4
10	M.2 NVME SSD		65

# THOR100-X4

- Chamber in 60°C



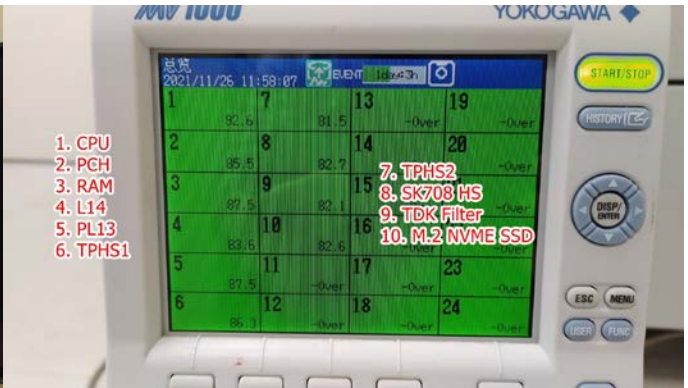
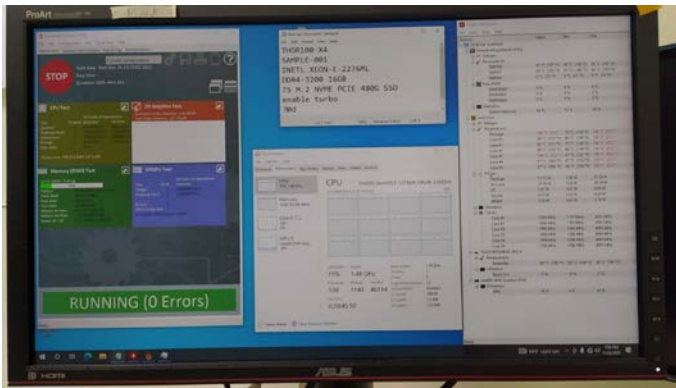
- 1. CPU
- 2. PCH
- 3. RAM
- 4. L14
- 5. PL13
- 6. TPHS1
- 7. TPHS2
- 8. SK708 HS
- 9. TDK Filter
- 10. M.2 NVME SSD



TEST POINT NO.	Ambient Tem Test Point	60°C
	CPU FRQ.	1.93G
	CPU Tj. (<105°C)	100
1	CPU	87.1
2	PCH	78.4
3	DRAM	80.7
4	L14	76
5	PL13	82
6	TPHS1	79.6
7	TPHS2	73.8
8	SK708	75.2
9	TDK FILTER	74.6
10	M.2 NVME SSD	75.2

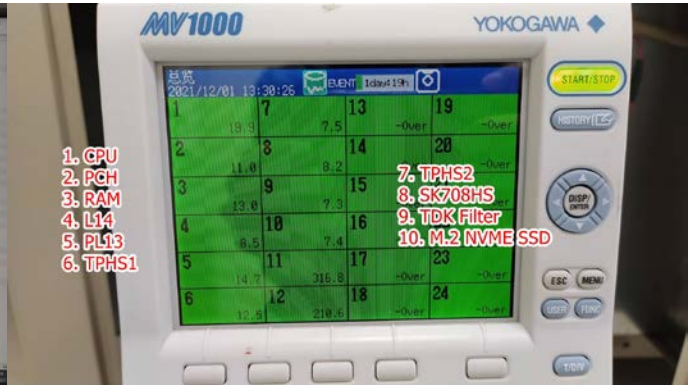
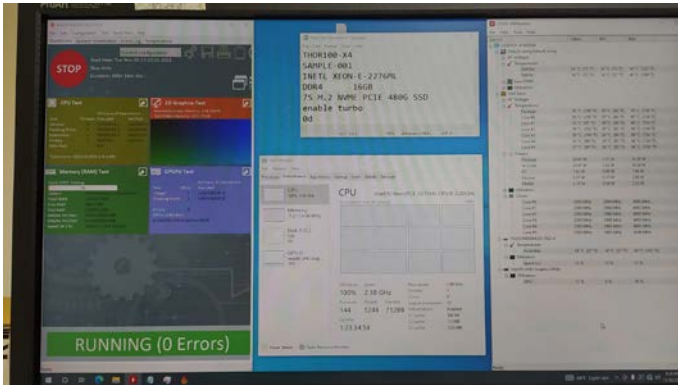
# THOR100-X4

- Chamber in 70°C



TEST POINT NO.	Ambient Tem Test Point	70°C
	CPU FRQ.	1.48G
	CPU Tj. (<105°C)	100
1	CPU	92.6
2	PCH	85.5
3	DRAM	87.5
4	L14	83.6
5	PL13	87.5
6	TPHS1	86.3
7	TPHS2	81.5
8	SK708	82.7
9	TDK FILTER	82.1
10	M.2 NVME SSD	82.6

## - Chamber in 0°C

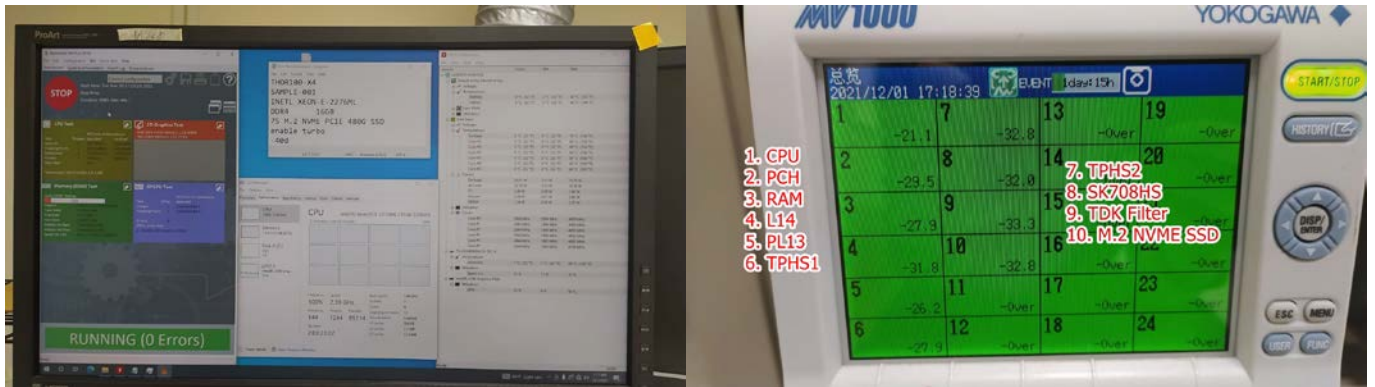


- 1. CPU
- 2. PCH
- 3. RAM
- 4. L14
- 5. PL13
- 6. TPHS1
- 7. TPHS2
- 8. SK708HS
- 9. TDK Filter
- 10. M.2 NVME SSD



TEST POINT NO.	Ambient Temp. Test Point	0°C
	CPU FRQ.	2.4G
	CPU Tj. (<105°C)	38
1	CPU	19.9
2	PCH	11
3	DRAM	13
4	L14	8.5
5	PL13	14.7
6	TPHS1	12.5
7	TPHS2	7.5
8	SK708	8.2
9	TDK FILTER	7.3
10	M.2 NVME SSD	7.4

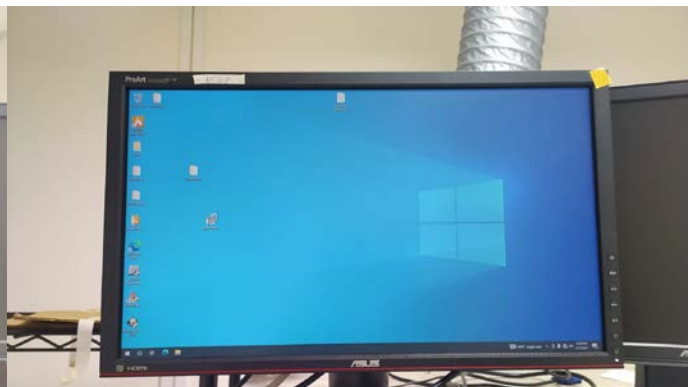
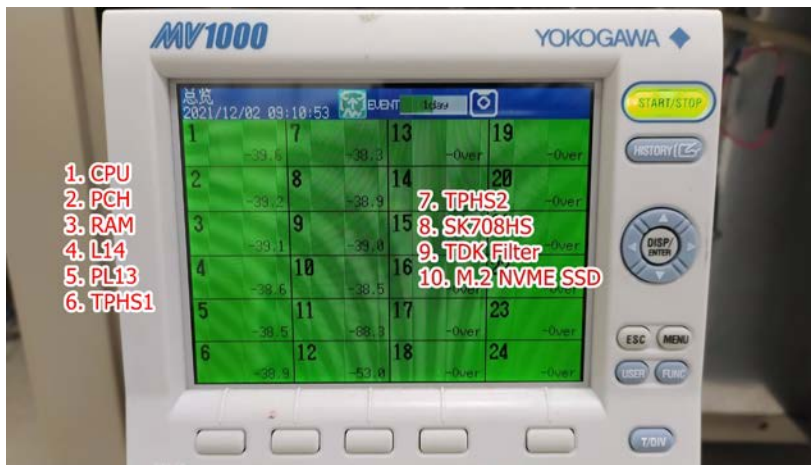
- Chamber in -40°C



TEST POINT NO.	Ambient Temp	-40°C
	CPU FRQ.	2.4G
	CPU Tj. (<105°C)	0
1	CPU	-21.1
2	PCH	-29.5
3	DRAM	-27.9
4	L14	-31.8
5	PL13	-26.2
6	TPHS1	-27.9
7	TPHS2	-32.8
8	SK708	-32
9	TDK FILTER	-33.3
10	M.2 NVME SSD	-32.8

# THOR100-X4

## Low Temperature SYSTEM Boot up Test - Ambient Temp. -40°C

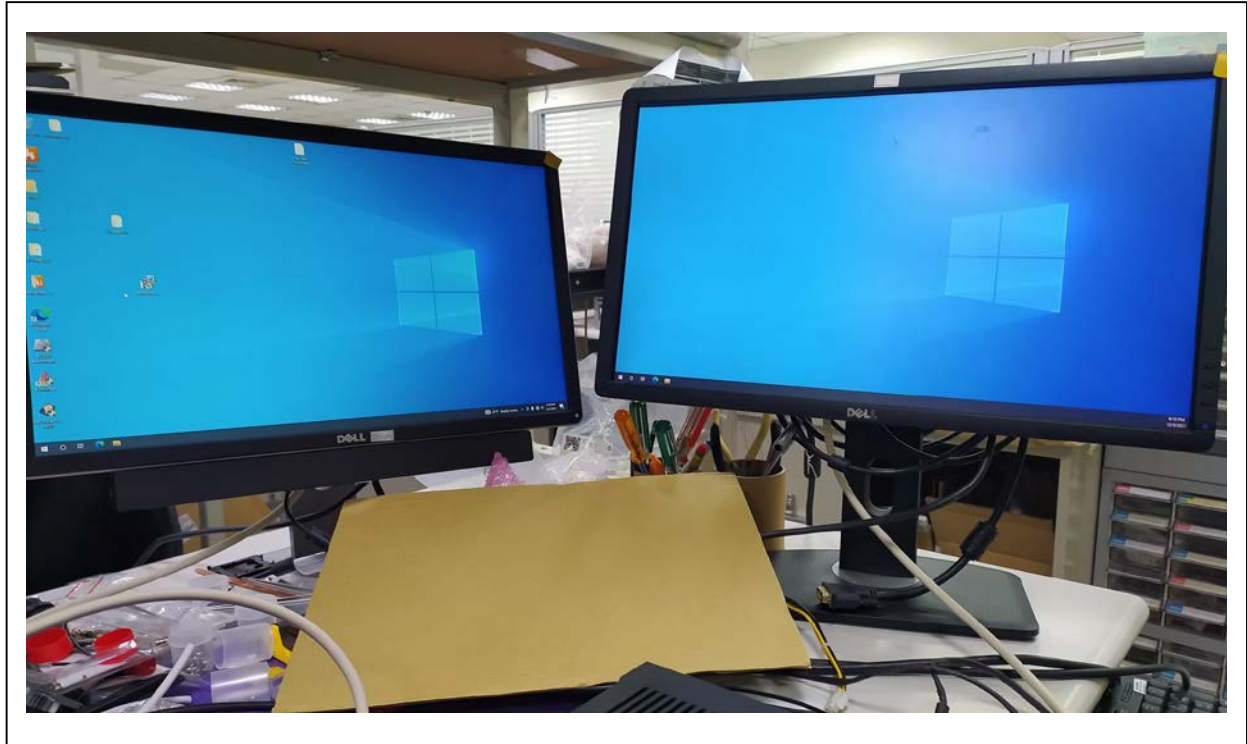


## 5. THOR100-X4 THERMAL TEST RESULT (-40~+70 DEGREE)

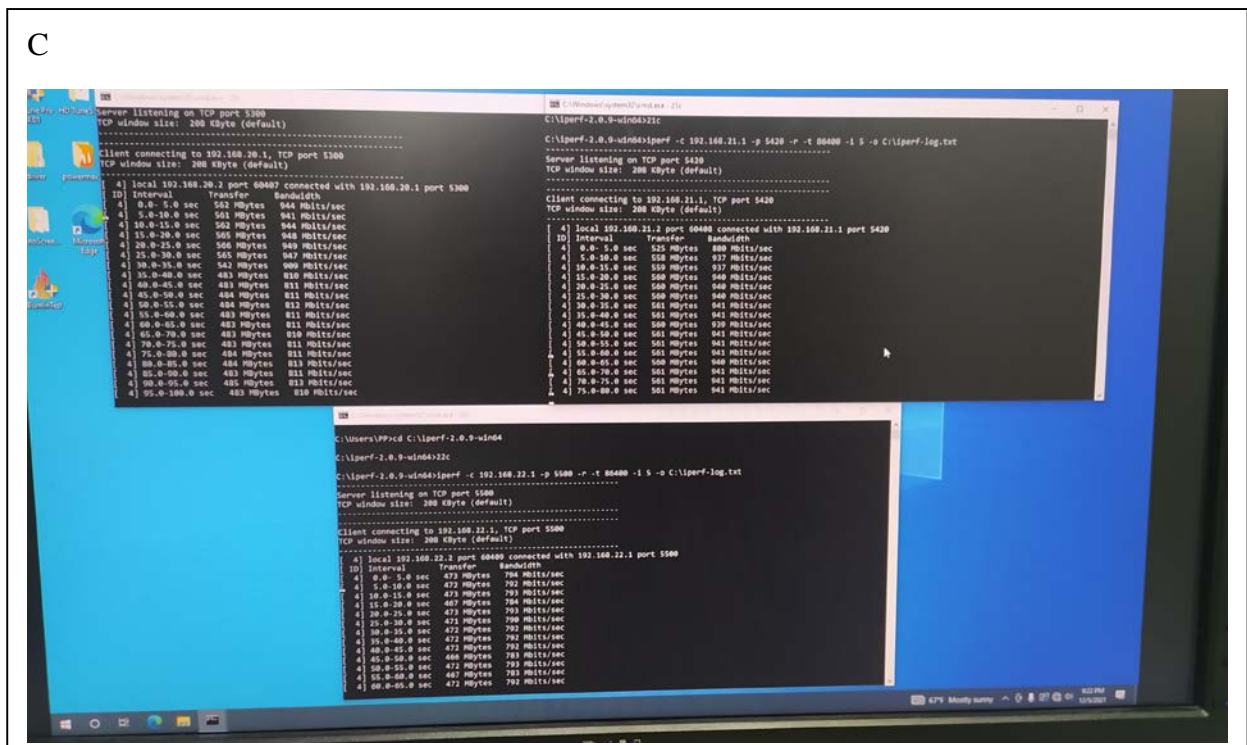
TEST POINT NO.	Test Point	Ambient Tem						
		-40℃	0℃	25℃	40℃	50℃	60℃	70℃
	CPU FRQ.	2.4G	2.4G	2.4G	2.25G	2.5G	1.93G	1.48G
	CPU Tj. (<105℃)	0	38	65	84	95	100	100
1	CPU	-21.1	19.9	45.6	68.4	78.9	87.1	92.6
2	PCH	-29.5	11	36.2	58.7	69.2	78.4	85.5
3	DRAM	-27.9	13	38.4	60.8	71.7	80.7	87.5
4	L14	-31.8	8.5	33.6	56	66.4	76	83.6
5	PL13	-26.2	14.7	40.2	62.6	73.2	82	87.5
6	TPHS1	-27.9	12.5	37.9	60.2	70.6	79.6	86.3
7	TPHS2	-32.8	7.5	32.4	53.9	64.3	73.8	81.5
8	SK708	-32	8.2	33.2	55.2	65.4	75.2	82.7
9	TDK FILTER	-33.3	7.3	32.5	54.9	65.4	74.6	82.1
10	M.2 NVME SSD	-32.8	7.4	32.5	54.5	65	75.2	82.6

# 6. I/O FUNCTION TEST

## (1) DVI OUTPUT TEST



## (2) LAN transfer data test





(3) USB 3.0 transfer data test

