Thermal & Functions Test Report

TEC300P

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INDEX

1. SYSTEM SPEC 2
1-1. PRODUCT PHOTOS 2
1-2. SYSTEM COFIGURATION 2
2. TEST PLAN 3
2.1. THERMAL MEASUREMENT PROCESS 3
2.2. TEC300P TEST RESULT<TEST ITEM> 4
2.2.1 TEMPERATURE CYCLE 4
2.2.2 I/O FUNCTION 4
2.2.3 LOW-TEMP. BOOT-UP 4
3. THERMAL TEST POINT 5
4. TEST PHOTO IN LAB 6
5. TEC300P THERMAL TEST RESULT (0~+60 DEGREE C) 12
6. I/O FUNCTION TEST 13
6.1 VGA OUTPUT TEST 13
6.2 1 LAN TRANSFER DATA TEST 14
6.3 USB 3.0 TRANSFER DATA TEST 14

1. SYSTEM SPEC

1-1. PRODUCT PHOTOS

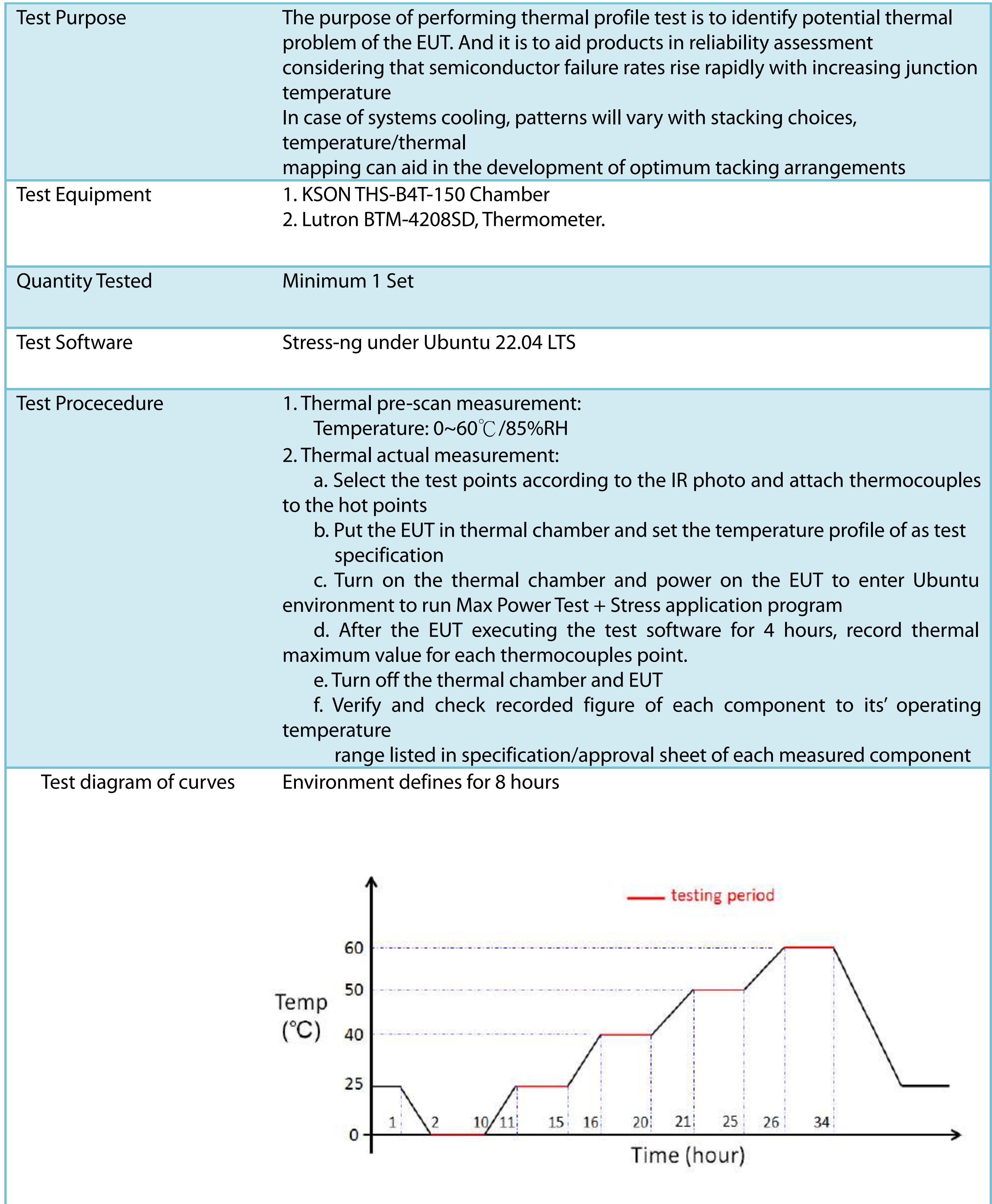
1-2. SYSTEM COFIGURATION

System Configuration	
Motherboard	GIGABYTE MP32-AR1-00 (S/N:1/B/LIANJ000467) BIOS Ver. F32d (SCP:2.10.20220531)
CPU	Ampere ARMV8(M96-28) AMPERE® ALTRA® FAMILY 64-BIT MULTI-CORE PROCESSORS CORES: 96 SUSTAINED PREDICTABLE FREQUENCY(GHz): 2.8 USAGE POWER GUIDE* (W): 190
Memory	Samsung M393A4K40DB3-CWE DDR4-3200 32G REG DIMM *1
SSD	7Starlake 7SLESO512GTLEW-I32-2 NVMe SSD 512GB Wide Temp: -40°C~85°C, RoHS x1 pcs
POWER BOARD	HDPLEX 400W HiFi DC-ATX Input Voltage: 16V-30VDC Operating Temperature: -10C - 70C
GPU	Integrated in Aspeed® AST2500 2D Video Graphic Adapter with PCIe bus interface 1920x1200@60Hz 32bpp

2. TEST PLAN

2.1. Thermal Measurement Process

Test Purpose	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
Test Equipment	1. KSON THS-B4T-150 Chamber 2. Lutron BTM-4208SD, Thermometer.
Quantity Tested	Minimum 1 Set
Test Software	Stress-ng under Ubuntu 22.04 LTS
Test Procecedure	1. Thermal pre-scan measurement: Temperature: 0~60℃/85%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 Ubuntu environment to run Max Power Test + Stress 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 component to its' operating temperature range listed in specification/approval sheet of each measured component
Test diagram of curves	Environment defines for 8 hours



2.2. TEC300P 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
0℃	PASS
25℃	PASS
40℃	PASS
50℃	PASS
60℃	PASS

2.2.2 I/O FUNCTION

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

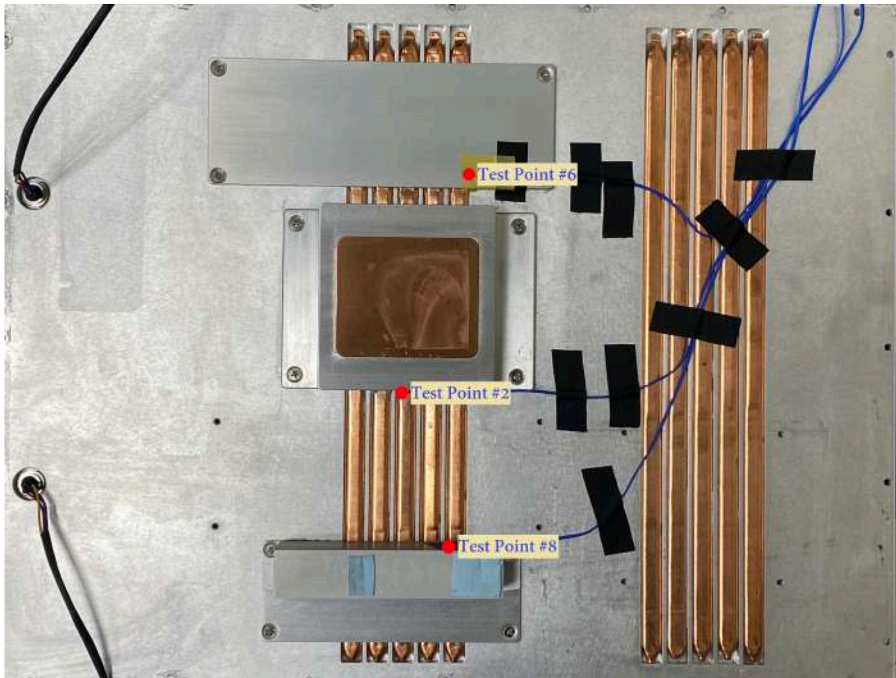
Item	Criteria	Result
USB3.0 *3	Connection 2.5" USB3.0 SSD device and transfer data test	PASS
LAN *2	Connection 1G/10G/100G SWITCH HUB transfer data test	PASS
VGA *1	Check work well	PASS

2.2.3 LOW-TEMP. BOOT-UP

#Power supply under 0℃ and ensure that the system boot up properly

Ambient Temp.	Test Result
0℃	PASS

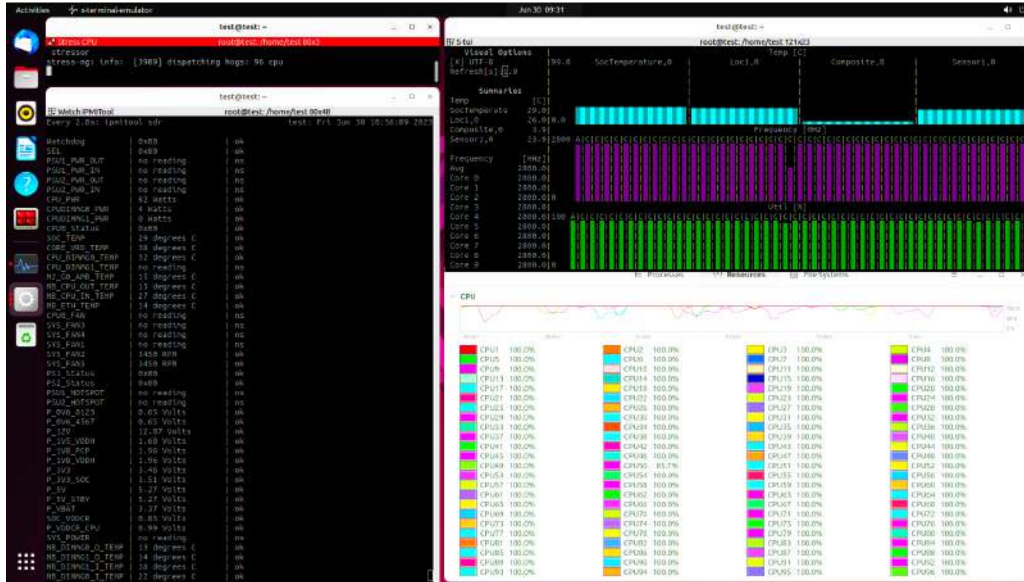
3. THERMAL TEST POINT



TEST POINT NO.	Test Point
1	CPU
2	CPU Heatsink
3	Power Supply
4	Power Supply Heatsink
5	DRAM
6	DRAM Heatsink
7	M.2 SSD
8	M.2 SSD Heatsink
9	Inside the Case

4. TEST PHOTO IN LAB

- Chamber in 0°C

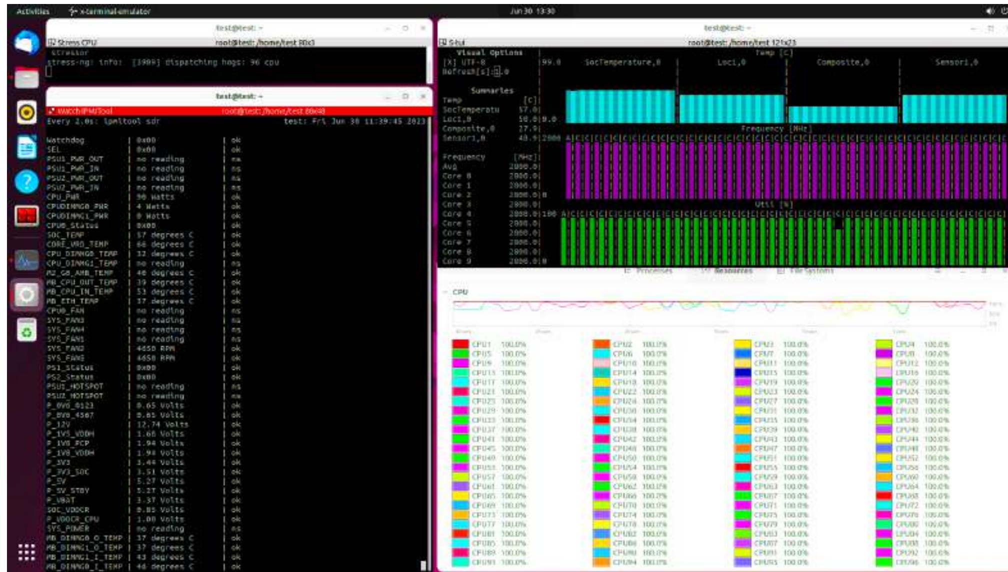


Test Point	Ambient Temp.	0°C
	CPU FRQ.	2.8GHz
	CPU Tj. (<95°C)	29.0°C
CH1	CPU	16.1°C
CH5	CPU Heatsink	12.0°C
CH2	Power Supply	9.0°C
CH6	Power Supply Heatsink	9.4°C
CH3	DRAM	22.2°C
CH7	DRAM Heatsink	10.1°C
CH4	M.2 SSD	11.7°C
CH8	M.2 SSD Heatsink	10.1°C
CH9	Inside the Case	7.0°C

Thermal & Functions Test Report

TEC300P (Ampere M96-28 CPU)

- Chamber in 25°C

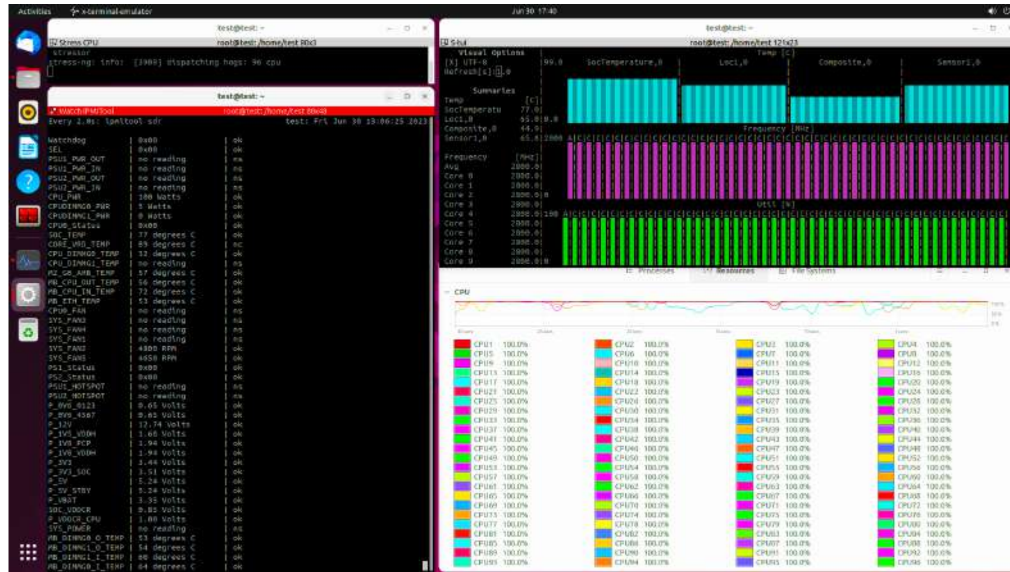


Test Point	Ambient Temp.	25°C
	CPU FRQ.	2.8GHz
	CPU Tj. (<95°C)	57°C
CH1	CPU	41.5°C
CH5	CPU Heatsink	36.6°C
CH2	Power Supply	33.7°C
CH6	Power Supply Heatsink	33.9°C
CH3	DRAM	46.1°C
CH7	DRAM Heatsink	34.7°C
CH4	M.2 SSD	36.9°C
CH8	M.2 SSD Heatsink	35.0°C
CH9	Inside the Case	31.9°C

Thermal & Functions Test Report

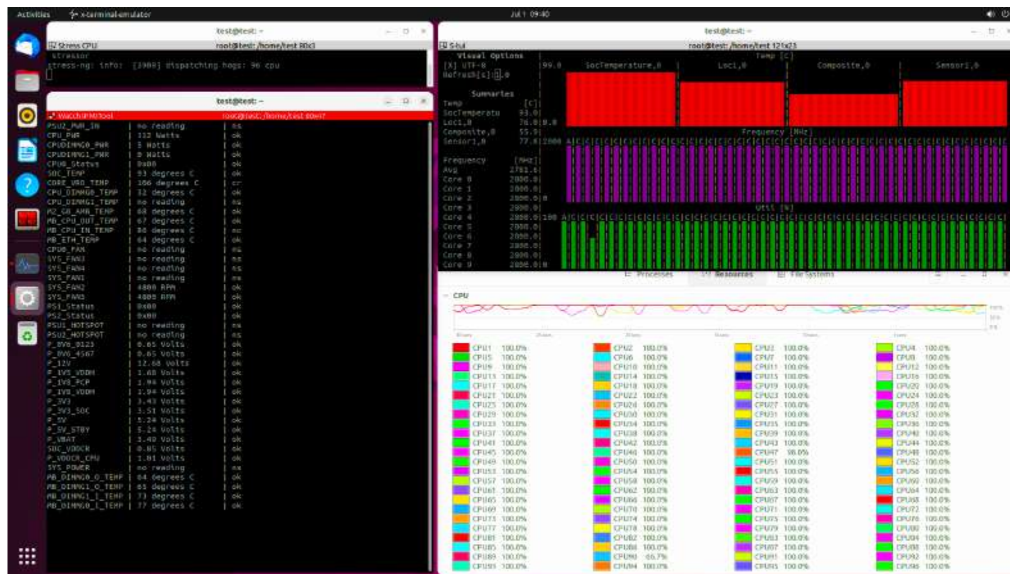
TEC300P (Ampere M96-28 CPU)

- Chamber in 40°C



Test Point	Ambient Temp.	40°C
	CPU FRQ.	2.8GHz
	CPU Tj. (<95°C)	77.0°C
CH1	CPU	58.6°C
CH5	CPU Heatsink	53.2°C
CH2	Power Supply	50.4°C
CH6	Power Supply Heatsink	50.5°C
CH3	DRAM	63.3°C
CH7	DRAM Heatsink	51.1°C
CH4	M.2 SSD	53.5°C
CH8	M.2 SSD Heatsink	51.4°C
CH9	Inside the Case	48.2°C

- Chamber in 50°C

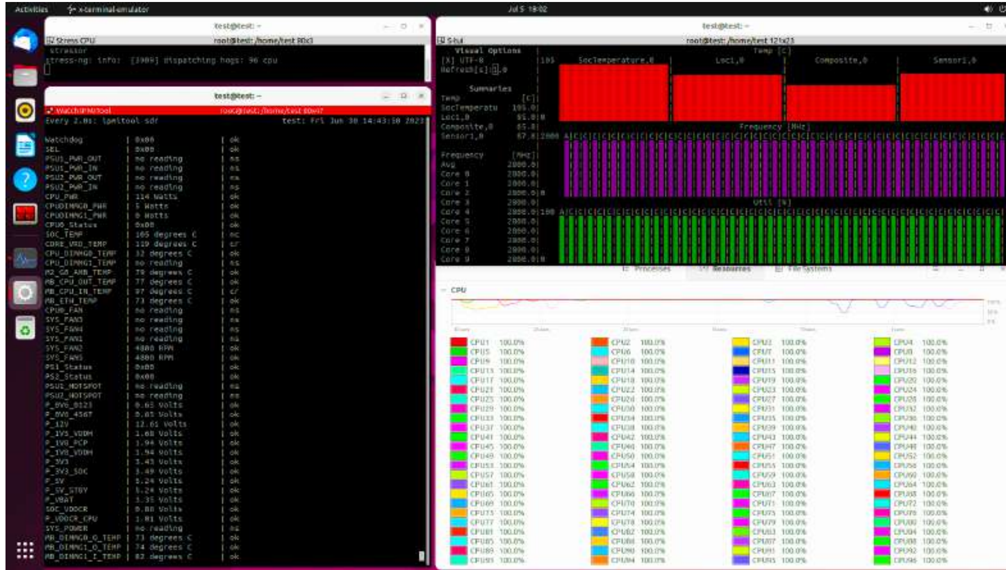


Test Point	Ambient Temp.	50°C
	CPU AVG. FRQ.	2.8GHz
	CPU Tj. (<95°C)	93.0°C
CH1	CPU	70.9°C
CH5	CPU Heatsink	64.8°C
CH2	Power Supply	61.6°C
CH6	Power Supply Heatsink	61.8°C
CH3	DRAM	75.0°C
CH7	DRAM Heatsink	63.1°C
CH4	M.2 SSD	64.9°C
CH8	M.2 SSD Heatsink	62.8°C
CH9	Inside the Case	59.3°C

Thermal & Functions Test Report

TEC300P (Ampere M96-28 CPU)

- Chamber in 60°C



Test Point	Ambient Temp.	60°C
	CPU FRQ.	2.8GHz
	CPU Tj. (<95°C)	105.0°C
CH1	CPU	81.1°C
CH5	CPU Heatsink	74.7°C
CH2	Power Supply	71.4°C
CH6	Power Supply Heatsink	71.5°C
CH3	DRAM	84.2°C
CH7	DRAM Heatsink	73.1°C
CH4	M.2 SSD	74.9°C
CH8	M.2 SSD Heatsink	72.7°C
CH9	Inside the Case	68.9°C

Low Temperature SYSTEM Boot up Test
- Ambient Temp. 0°C

5. TEC300P THERMAL TEST RESULT (0~+60 DEGREE C)

CPU Temperature and Frequency						
TEST POINT NO.	Core Temp / CPU Frequency \ Ambient Temp	0℃	25℃ 85%H	40℃ 85%H	50℃ 85%H	60℃ 85%H
	CPU Avg. Frequency	2800MHz	2800MHz	2800MHz	2800MHz	2800MHz
	CPU Tj. Temp (< 95℃)	29.0℃	57.0℃	77.0℃	93.0℃	105.0℃
CH1	CPU	16.1℃	41.5℃	58.6℃	70.9℃	81.9℃
CH5	CPU Heatsink	12.0℃	36.6℃	53.2℃	64.8℃	74.7℃
CH2	Power Supply	9.0℃	33.7℃	50.4℃	61.6℃	71.4℃
CH6	Power Supply Heatsink	9.4℃	33.9℃	50.5℃	61.8℃	71.5℃
CH3	DRAM	22.2℃	46.1℃	63.3℃	75.0℃	84.2℃
CH7	DRAM Heatsink	10.1℃	34.7℃	51.1℃	63.1℃	73.1℃
CH4	M.2 SSD	11.7℃	36.9℃	53.5℃	64.9℃	74.9℃
CH8	M.2 SSD Heatsink	10.1℃	35.0℃	51.4℃	62.8℃	72.7℃
CH9	Inside the Case	7.0℃	31.9℃	48.2℃	59.3℃	68.9℃

6. I/O FUNCTION TEST

6.1 VGA OUTPUT TEST

6.2 1 LAN Transfer Data Test

(1)1G/10G LAN Test

6.3 USB 3.0 Transfer Data Test