



System Test Report



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Performance Test

AV600-D27



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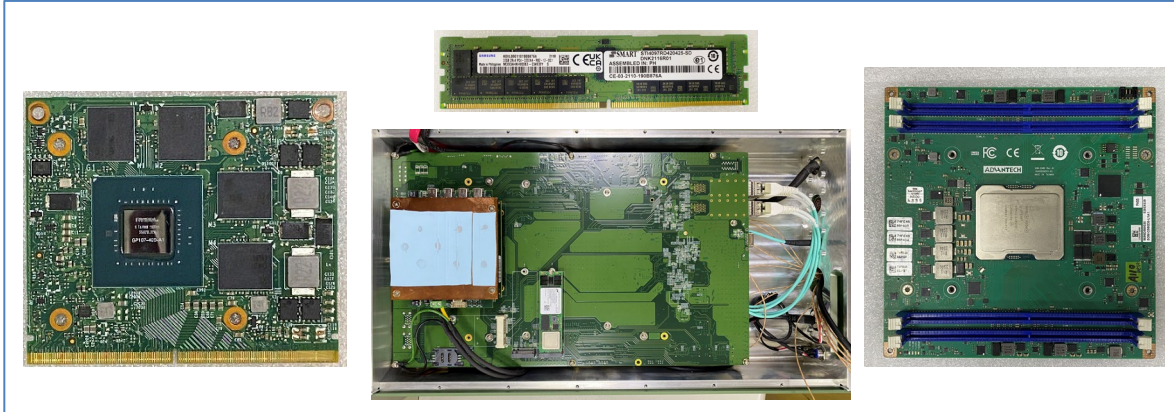
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1. SPECIFICATION

1-1. PHOTO



1-2. SYSTEM CONFIGURATION

COM-HPC Carrier Board	SK518 VA1 COM-HPC Server (D) Support Intel ICE-Lake D HCC PCIe/104 Express Expansion Slot for Rugged StackPC 12V DC Input Dimension : 350 mm x 210 mm Extreme Temperature -40°C to 85°C
Computer-On-Modules	SOM-D580D8-U1A1 CPU: Intel® Xeon® D-2733NT processors (Ice Lake-D HCC) Base Frequency: 2.1 GHz Max Turbo Frequency: 3.2 GHz Core: 8 TDP: 80W ----- BIOS: AMI UEFI 256Mbit Operating Temperature: Standard: 0 ~ 60 °C Extend: -40 ~ 85 °C
Memory	SAMSUNG M393A4K40DB3-CWEBY 32GB
Storage	Micron MTFDKBA960TDZ-1AZ15ABYY 960GB M.2 SSD Operating Temperature: 0 ~ 70 °C
GPU	NVIDIA GeForce® GTX1050Ti MXM 3.1 Graphic Module Board Power: 75W
Power Module	SK715_9V~36V 400W DC/DC Module Wide Input Range: 9V to 36V 12V DC Output up to 33 Amp Extended Temperature -40°C to 85°C

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2. TEST PLAN

2.1. THERMAL MEASUREMENT PROCESS

Test Purpose	<p>The purpose of performing thermal profile testing is to identify potential thermal issues with the EUT. Considering that semiconductor failure rates rise rapidly with increasing junction temperature, it can aid product reliability assessment.</p> <p>As the system cools down, the mode will change with stack selection, temperature/heat.</p> <p>Mapping can help develop the best tracking arrangements.</p>																																	
Test Equipment	1. KSON THS-B4T-150 Chamber.																																	
Quantity Tested	Minimum 1 Set																																	
Test Software	1. CPU Stress: PassMark Burn-In Test(Ver.9.0) 2. GPU Stress: Unigine Heaven Benchmark 4.0																																	
Test Procedure	<p>1. Thermal pre-scan measurement: Temperature: -20°C~60°C/60%RH</p> <p>2. Actual thermal measurement:</p> <p>2-1. Select the test point based on the infrared photo and connect the thermocouple to the hot spot.</p> <p>2-2. Place the EUT into the hot chamber and set the test temperature curve Specification.</p> <p>2-3. Open the hot cell and power up the EUT, enter the Windows 10 Pro (22H2) environment and perform a maximum power test + stress application.</p> <p>2-4. After the EUT executes the test software for 8 hours, record the maximum heat generation of each thermocouple point.</p> <p>2-5. Turn off the hot cell and EUT.</p> <p>2-6. Verify and check that the recorded information for each component complies with the operating temperature range listed in the specification/approval sheet for each component being tested.</p> <p>Environment defines for 45 hours.</p>																																	
Test Diagram of Curves	<table border="1"><caption>Temperature Profile Data</caption><thead><tr><th>Time (hour)</th><th>Temperature (°C)</th><th>Event</th></tr></thead><tbody><tr><td>0.5</td><td>25</td><td>Start</td></tr><tr><td>1.5</td><td>-20</td><td>temperature drop</td></tr><tr><td>9.5</td><td>-20</td><td>Pre-scan</td></tr><tr><td>11.0</td><td>40</td><td>temperature rise</td></tr><tr><td>19.0</td><td>40</td><td>Start of testing period</td></tr><tr><td>19.5</td><td>50</td><td>temperature rise</td></tr><tr><td>27.5</td><td>50</td><td>End of testing period</td></tr><tr><td>28.0</td><td>60</td><td>temperature rise</td></tr><tr><td>36.0</td><td>60</td><td>End of testing period</td></tr><tr><td>45.0</td><td>25</td><td>temperature drop</td></tr></tbody></table>	Time (hour)	Temperature (°C)	Event	0.5	25	Start	1.5	-20	temperature drop	9.5	-20	Pre-scan	11.0	40	temperature rise	19.0	40	Start of testing period	19.5	50	temperature rise	27.5	50	End of testing period	28.0	60	temperature rise	36.0	60	End of testing period	45.0	25	temperature drop
Time (hour)	Temperature (°C)	Event																																
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2.2. TEST RESULT <TEST ITEM>

2.2.1 Temperature Cycle

Aging test of various parts at different temperatures under maximum load and full load conditions.

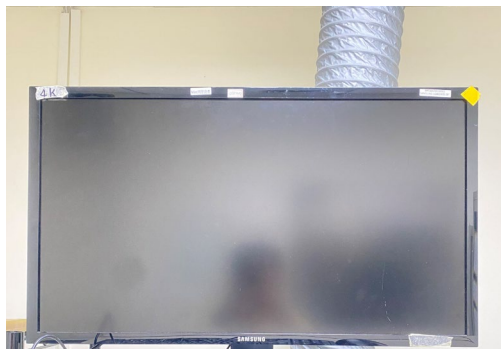
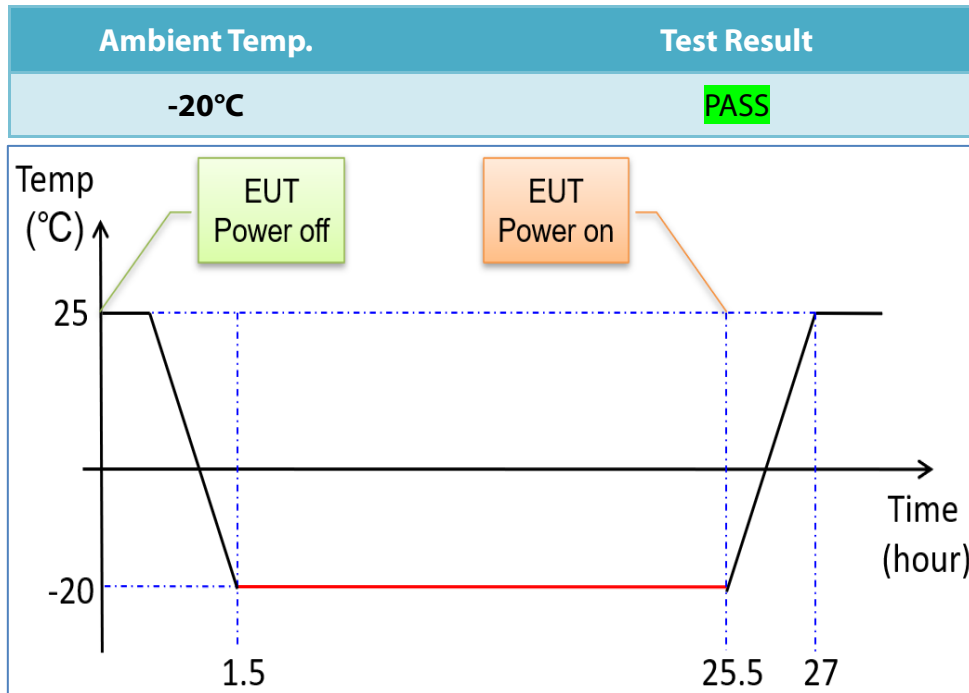
Test Temperature	Test Result
-20°C	PASS
0°C	PASS
25°C	PASS
40°C	PASS
50°C	PASS
60°C	PASS

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2.2.2 Low-temperature & Boot-up

#Power supply under -20°C and ensure that the system boot up properly



Power off



Power on

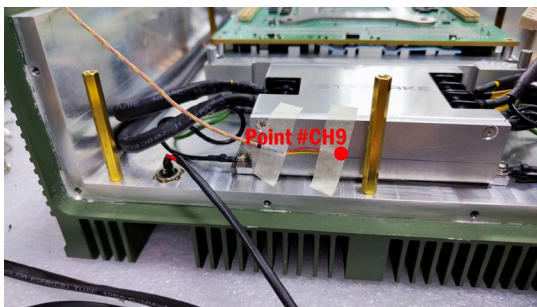
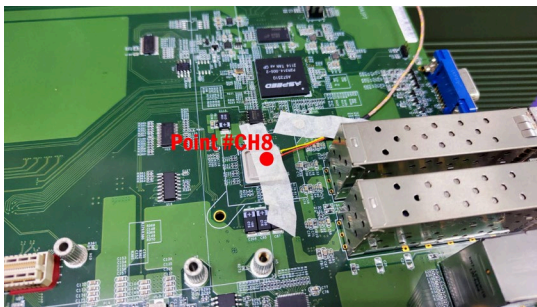
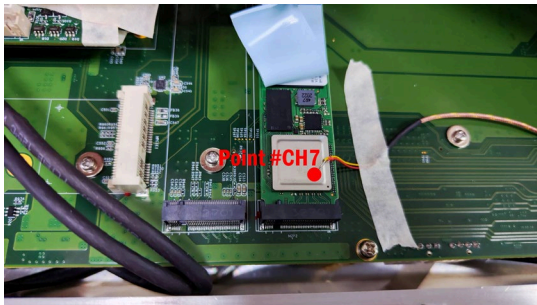
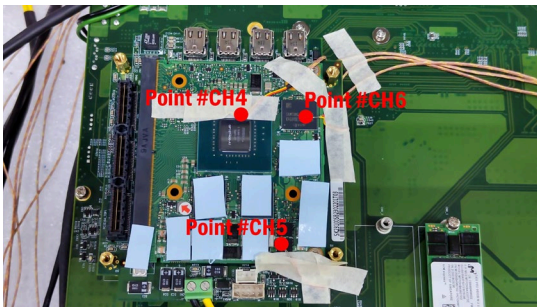
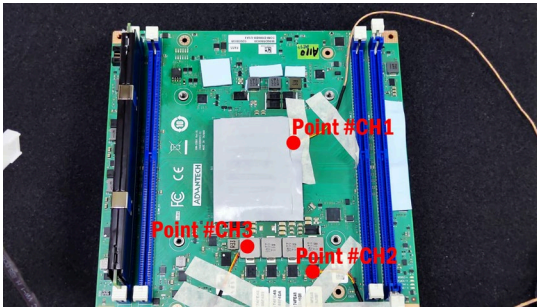


Item	Temp	Temp	Temp	Temp			
1	-20.0	7	-20.0	13	-Over	19	-Over
2	-20.0	8	-20.0	14	-Over	20	-Over
3	-20.0	9	-20.0	15	-Over	21	-Over
4	-20.0	10	-20.0	16	-Over	22	-Over
5	-20.0	11	-20.0	17	-Over	23	-Over
6	-20.0	12	-Over	18	-Over	24	-Over

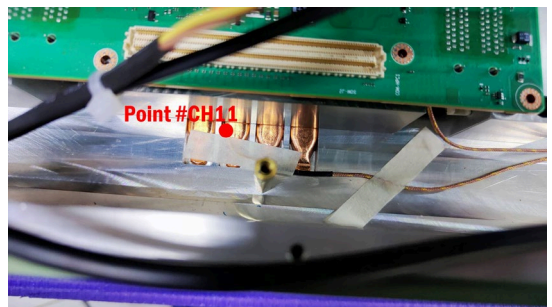
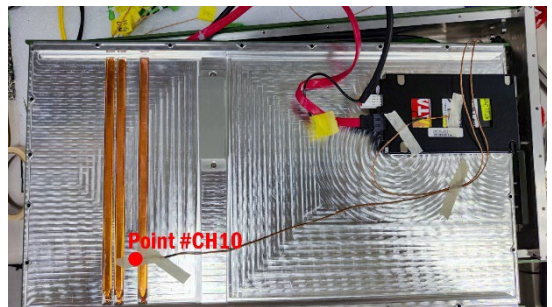
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3. THERMAL TEST POINT



1	CPU	7	M.2 NVMe
2	CPU MOSFET	8	10G LAN
3	CPU Choke	9	SK715 Power Module
4	GPU	10	Bottom HeatSink
5	GPU MOSFET	11	TOP Heatsink
6	GPU DRAM	12	N/A

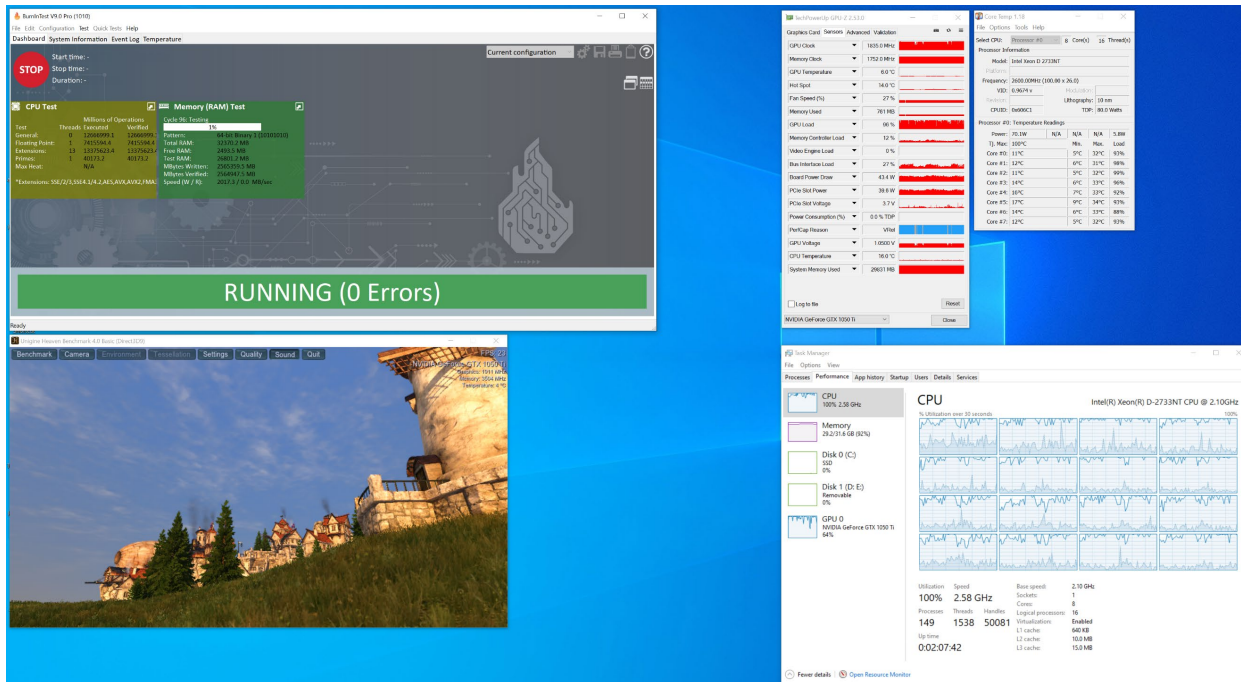


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4. TEST PHOTO IN LAB

- Chamber in -20°C



总览	2024/05/24	1hour	1hour	1hour	1hour
1	2.6	7	13	19	-Over
2	-6.8	8	14	20	-Over
3	-6.5	9	15	21	-Over
4	2.0	10	16	22	-Over
5	-1.1	11	17	23	-Over
6	-1.5	12	18	24	-Over

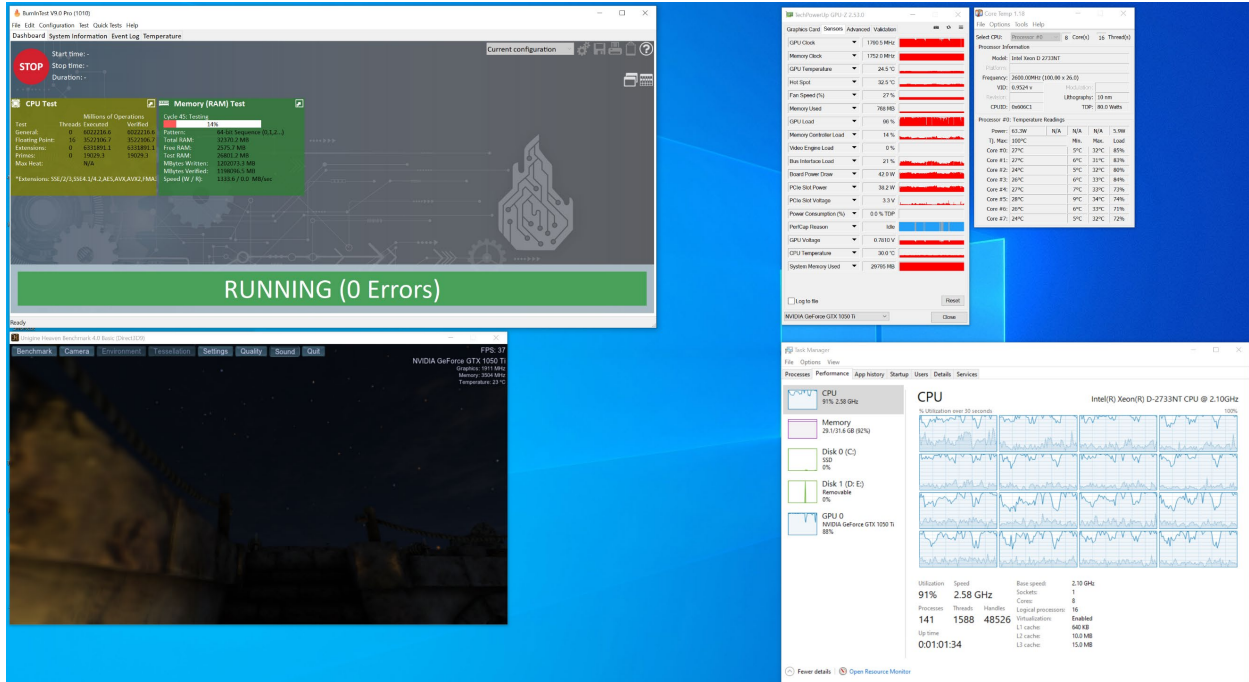
Test Point	Ambient Temp.	-20°C
	CPU Avg. Frequency	2580 MHz
	CPU Tj. Temperature	13.0 °C
	GPU Avg. Frequency	1835 MHz
	GPU Tj. Temperature	6.0 °C
CH1	CPU	2.6 °C
CH2	CPU MOSFET	-6.8 °C
CH3	CPU Choke	-6.5 °C
CH4	GPU	2.0 °C
CH5	GPU MOSFET	-1.1 °C
CH6	GPU DRAM	-1.5 °C
CH7	M.2 NVMe	-5.6 °C
CH8	10G LAN	-1.9 °C
CH9	SK715Power Module	-8.8 °C
CH10	Bottom HeatSink	-8.7 °C
CH11	TOP Heatsink	-9.4 °C



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- Chamber in 0°C



2024/05/24					
1	19.4	7	14.7	13	19
2	13.1	8	17.7	-Over	20
3	13.0	9	11.4	-Over	21
4	22.8	10	13.5	-Over	22
5	19.3	11	10.9	-Over	23
6	18.8	12	-Over	18	24

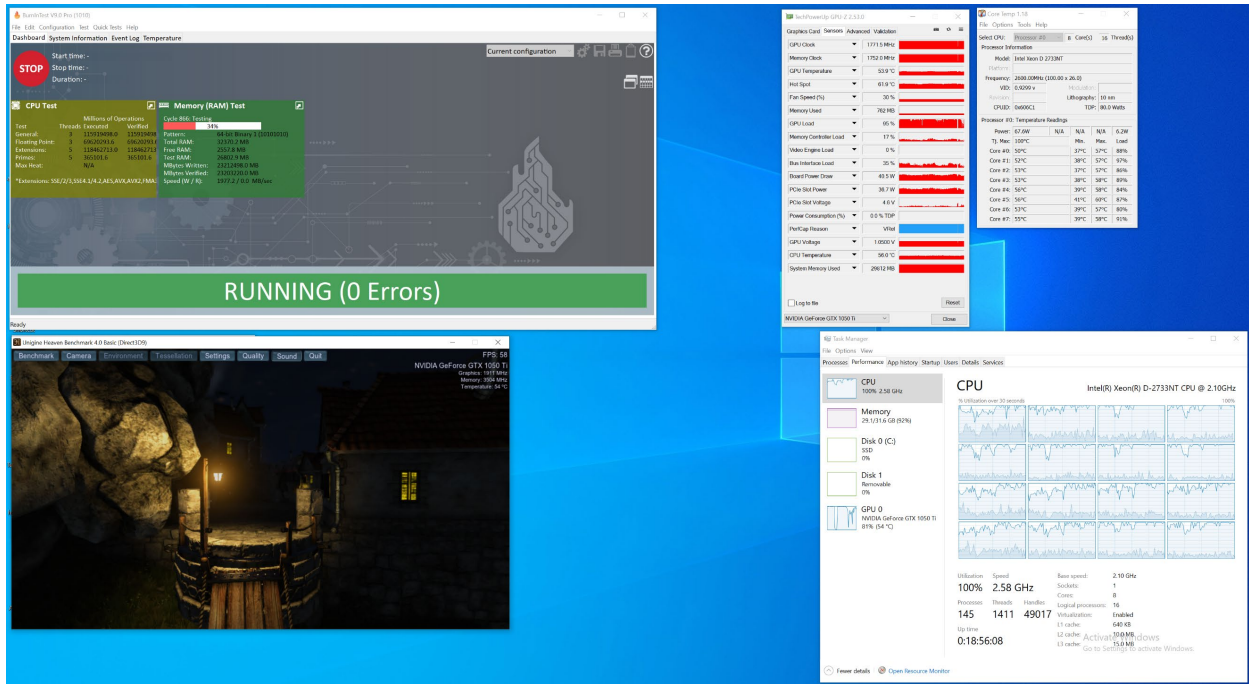
Test Point	Ambient Temp.	0°C
	CPU Avg. Frequency	2580 MHz
	CPU Tj. Temperature	26.0 °C
	GPU Avg. Frequency	1791 MHz
	GPU Tj. Temperature	24.5 °C
CH1	CPU	19.4 °C
CH2	CPU MOSFET	13.1 °C
CH3	CPU Choke	13.0 °C
CH4	GPU	22.8 °C
CH5	GPU MOSFET	19.3 °C
CH6	GPU DRAM	18.8 °C
CH7	M.2 NVMe	14.7 °C
CH8	10G LAN	17.7 °C
CH9	SK715Power Module	11.4 °C
CH10	Bottom HeatSink	13.6 °C
CH11	TOP Heatsink	10.9 °C



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- Chamber in 25°C



2024/05/22

1	44.6	7	41.2	13	-Over	19	-Over
2	39.2	8	43.1	14	-Over	20	-Over
3	38.9	9	37.4	15	-Over	21	-Over
4	47.9	10	39.3	16	-Over	22	-Over
5	45.1	11	37.2	17	-Over	23	-Over
6	44.5	12	-Over	18	-Over	24	-Over

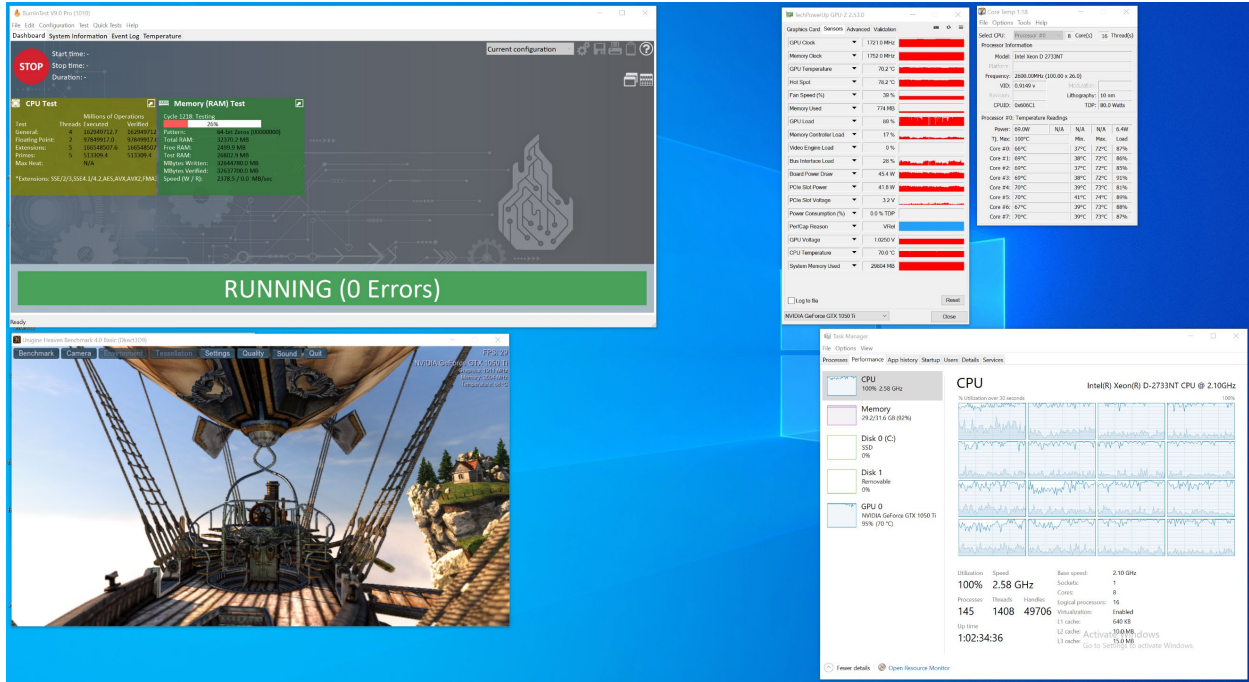
Test Point	Ambient Temp.	25°C
		CPU Avg. Frequency
	CPU Tj. Temperature	54.0 °C
	GPU Avg. Frequency	1772 MHz
	GPU Tj. Temperature	53.9 °C
CH1	CPU	44.6 °C
CH2	CPU MOSFET	39.2 °C
CH3	CPU Choke	38.9 °C
CH4	GPU	47.9 °C
CH5	GPU MOSFET	45.1 °C
CH6	GPU DRAM	44.5 °C
CH7	M.2 NVMe	41.2 °C
CH8	10G LAN	43.1 °C
CH9	SK715Power Module	37.4 °C
CH10	Bottom HeatSink	39.3 °C
CH11	TOP Heatsink	37.2 °C



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- Chamber in 40°C



总览 2024/05/22					
1	59.8	7	56.6	13	19
2	54.5	8	58.5	14	20
3	54.2	9	52.5	15	21
4	63.4	10	54.5	16	22
5	60.8	11	52.3	17	23
6	60.2	12	-Over	18	24
			-Over	-Over	-Over

Test Point	Ambient Temp.	40°C
	CPU Avg. Frequency	2580 MHz
	CPU Tj. Temperature	69.0 °C
	GPU Avg. Frequency	1721 MHz
	GPU Tj. Temperature	70.2 °C
CH1	CPU	59.8 °C
CH2	CPU MOSFET	54.5 °C
CH3	CPU Choke	54.2 °C
CH4	GPU	63.4 °C
CH5	GPU MOSFET	60.8 °C
CH6	GPU DRAM	60.2 °C
CH7	M.2 NVMe	56.6 °C
CH8	10G LAN	58.5 °C
CH9	SK715Power Module	52.5 °C
CH10	Bottom HeatSink	54.5 °C
CH11	TOP Heatsink	52.3 °C



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- Chamber in 50°C

The screenshot shows a Windows desktop with several performance monitoring windows. The 'Performance' window displays 'CPU Test' with a status of 'RUNNING (0 Errors)'. The 'HWiNFO64' window shows detailed system information, including CPU temperature (83.4°C), voltage (1.150V), and power consumption (65.0W). The 'Task Manager' window shows the CPU usage at 100% and the system is running on Intel(R) Xeon(R) D-2733NT CPU @ 2.10GHz.

总览 2024/05/23					
1hour					
1	78.4	7	67.6	13	19
2	65.1	8	69.3	14	20
3	64.7	9	63.2	15	21
4	74.8	10	64.9	16	22
5	71.6	11	63.8	17	23
6	71.1	12	-Over	18	24
			-Over	-Over	-Over

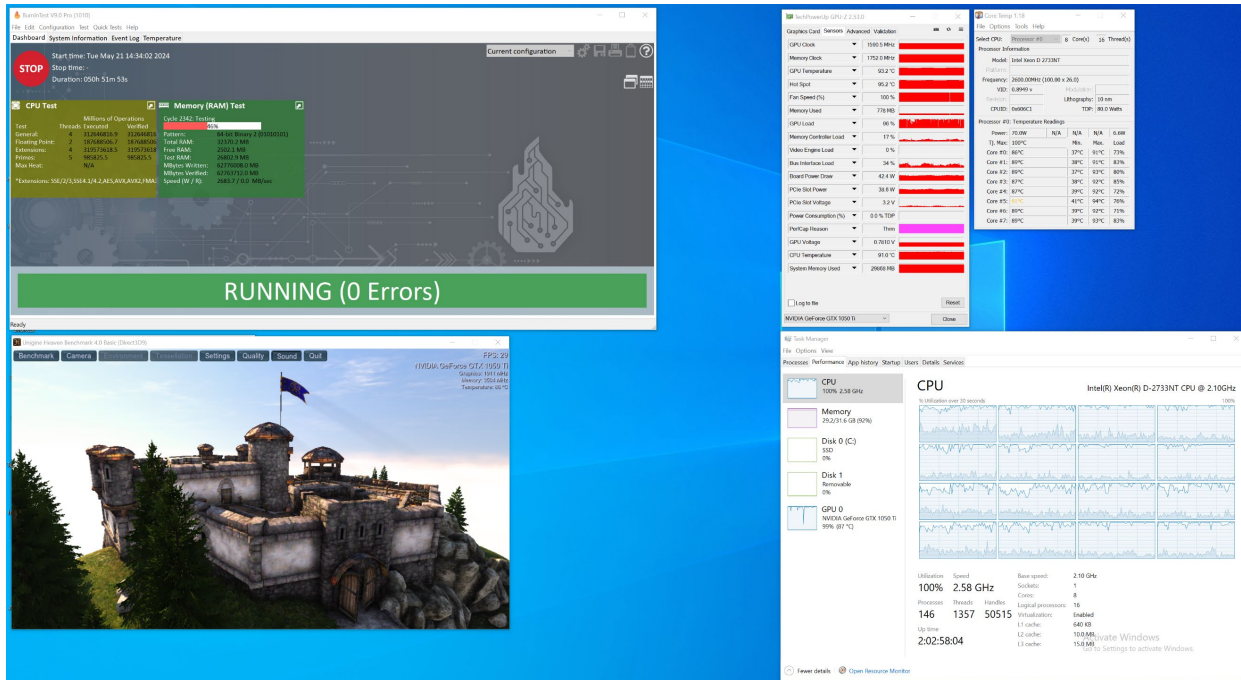
Test Point	Ambient Temp.	50°C
	CPU AVG. FRQ.	2300 MHz
	CPU Tj. Temperature	75.0 °C
	CPU P-Cores Temperature	75.0 °C
	CPU E-Cores Temperature	75.0 °C
CH1	CPU	67.7 °C
CH2	PCH	61.4 °C
CH3	DRAM #1	81.3 °C
CH4	DRAM #2	76.8 °C
CH5	2.5 inch SSD	69.4 °C
CH6	CPU Heatsink	61.9 °C
CH7	Power Supply #1	66.1 °C
CH8	Power Supply #2	69.4 °C
CH9	AC Sockets #1	55.9 °C
CH10	AC Sockets #2	54.9 °C



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- Chamber in 60°C



总览
2024/05/23

Item	Value 1	Value 2	Value 3	Value 4
1	88.3	77.2	-Over	-Over
2	75.0	79.7	-Over	-Over
3	74.7	72.9	-Over	-Over
4	81.3	73.4	-Over	-Over
5	79.2	72.5	-Over	-Over
6	78.8	-Over	-Over	-Over

Test Point	Ambient Temp.	60°C
	CPU Avg. Frequency	2580 MHz
	CPU Tj. Temperature	81.0 °C
	GPU Avg. Frequency	1591 MHz
	GPU Tj. Temperature	93.2 °C
CH1	CPU	80.3 °C
CH2	CPU MOSFET	75.0 °C
CH3	CPU Choke	74.7 °C
CH4	GPU	81.3 °C
CH5	GPU MOSFET	79.2 °C
CH6	GPU DRAM	78.8 °C
CH7	M.2 NVMe	77.2 °C
CH8	10G LAN	79.7 °C
CH9	SK715Power Module	72.9 °C
CH10	Bottom HeatSink	73.4 °C
CH11	TOP Heatsink	72.6 °C



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5. THERMAL TEST RESULT(-20°C ~ +60°C)

CPU Temperature and Frequency

Core Temp CPU Frequency	Ambient Temp	-20°C	0°C	25°C 60% RH	40°C 60% RH	50°C 60% RH	60°C 60% RH
	CPU Avg. Frequency		2580 MHz	2580 MHz	2580 MHz	2580 MHz	2580 MHz
CPU Tj. Temperature		13.0 °C	26.0 °C	54.0 °C	69.0 °C	79.0 °C	81.0 °C
GPU Avg. Frequency		1835 MHz	1791 MHz	1772 MHz	1721 MHz	1620 MHz	1591 MHz
GPU Tj. Temperature		6.0 °C	24.5 °C	53.9 °C	70.2 °C	83.4 °C	93.2 °C

Measurement Point	Ambient Temp	-20°C	0°C	25°C 60% RH	40°C 60% RH	50°C 60% RH	60°C 60% RH
	CH1 CPU		2.6 °C	19.4 °C	44.6 °C	59.8 °C	70.4 °C
CH2 CPU MOSFET		-6.8 °C	13.1 °C	39.2 °C	54.5 °C	65.1 °C	75.0 °C
CH3 CPU Choke		-6.5 °C	13.0 °C	38.9 °C	54.2 °C	64.7 °C	74.7 °C
CH4 GPU		2.0 °C	22.8 °C	47.9 °C	63.4 °C	74.8 °C	81.3 °C
CH5 GPU MOSFET		-1.1 °C	19.3 °C	45.1 °C	60.8 °C	71.6 °C	79.2 °C
CH6 GPU DRAM		-1.5 °C	18.8 °C	44.5 °C	60.2 °C	71.1 °C	78.8 °C
CH7 M.2 NVMe		-5.6 °C	14.7 °C	41.2 °C	56.6 °C	67.6 °C	77.2 °C
CH8 10G LAN		-1.9 °C	17.7 °C	43.1 °C	58.5 °C	69.3 °C	79.7 °C
CH9 SK715Power Module		-8.8 °C	11.4 °C	37.4 °C	52.5 °C	63.2 °C	72.9 °C
CH10 Bottom HeatSink		-8.7 °C	13.6 °C	39.3 °C	54.5 °C	64.9 °C	73.4 °C
CH11 TOP Heatsink		-9.4 °C	10.9 °C	37.2 °C	52.3 °C	63.0 °C	72.6 °C
