




# System Test Report



**AV600-THT**

A large, detailed image of the AV600-THT engine, shown from a front-three-quarter perspective. The engine is a complex, multi-cylinder unit with various components like intake manifolds and exhaust pipes visible. The text "AV600-THT" is overlaid in a large, bold, dark blue font across the center of the engine image.

A vertical collage of three images on the left side of the page. The top image shows a soldier in camouflage gear climbing a steep, rocky hillside. The middle image shows a large naval ship, possibly a destroyer or cruiser, at sea. The bottom image shows a military helicopter in flight.

Product Manager	R&D Leader	Mechanical Engineer	System Engineer	Test Engineer
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# Performance Test

AV600-THT

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# Performance Test

AV600-THT

## 1. SPECIFICATION

### 1-1. SYSTEM CONFIGURATION

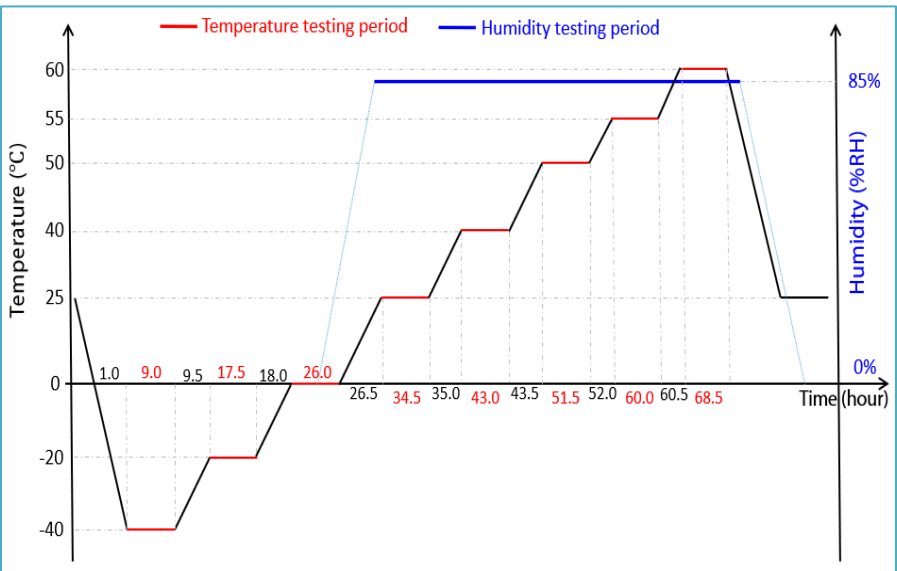
<b>Motherboard</b>	SK515M+COM Express CPU module MXM Type 3.1 Support NVIDIA® GTX® / RTX® GPU PCI/104 Express Expansion Slot for Modular Open Structure Multi-Expansion Slots include Dual Mini PCIe Express Slots, 1x M.2 Slot Wide Range DC 9V~36V Input Extreme Temperature Support -40°C to 85°C
<b>CPU</b>	Intel® Xeon® W-11865MLE Processor Total Cores: 8 Total Threads: 16 Max Turbo Frequency: 4.50 GHz Processor Base Frequency: 1.50 GHz Cache 24 MB Intel® Smart Cache TDP: 25 W TJUNCTION: 100°C Max Operating Temperature: 100 °C
<b>Memory</b>	32GB DDR4 SO-DIMM wide temp.
<b>Storage</b>	256GB SATA SSD wide temperature
<b>GPU</b>	Nvidia RTX A4500 Embedded GPU BIOS Version: 94.04.81.00.30 CUDA parallel-processing cores: 5888 CUDA® cores GPU base/boost clock: 930 MHz / 1500 MHz Max Power Consumption: 80 W
<b>Power Module</b>	SK712_18V~36V MIL-STD-461/1275 EMI/Power DC 400W Module

# Performance Test

AV600-THT

## 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	<p>1. Stress CPU: PassMark Burn-in Test Software Ver 9.0</p> <p>2. Stress GPU: AIDA64 extreme690</p>																																																									
Test Procedure	<p>1. Thermal pre-scan measurement:          Temperature: <b>-40°C~60°C</b>          Humidity: <b>85%RH (Temperature above 25°C)</b></p> <p>2. Actual thermal measurement:          2-1. Select the test point based on the infrared photo and connect the thermocouple to the hot spot.          2-2. Place the EUT into the hot chamber and set the test temperature curve Specification.          2-3. Open the hot cell and power up the EUT, enter the Windows 10 Pro environment and perform a maximum power test + stress application.          2-4. After the EUT executes the test software for 8 hours, record the maximum heat generation of each thermocouple point.          2-5. Turn off the hot cell and EUT.          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>																																																									
Test Diagram of Curves	<p>Environment defines for 60 hours.</p>  <table border="1"> <caption>Test Diagram of Curves Data</caption> <thead> <tr> <th>Time (hour)</th> <th>Temperature (°C)</th> <th>Humidity (%RH)</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>25</td><td>0</td></tr> <tr><td>1.0</td><td>0</td><td>0</td></tr> <tr><td>9.0</td><td>-40</td><td>0</td></tr> <tr><td>9.5</td><td>-40</td><td>0</td></tr> <tr><td>17.5</td><td>-20</td><td>0</td></tr> <tr><td>18.0</td><td>-20</td><td>0</td></tr> <tr><td>26.0</td><td>25</td><td>85</td></tr> <tr><td>34.5</td><td>25</td><td>85</td></tr> <tr><td>35.0</td><td>40</td><td>85</td></tr> <tr><td>43.0</td><td>40</td><td>85</td></tr> <tr><td>43.5</td><td>50</td><td>85</td></tr> <tr><td>51.5</td><td>50</td><td>85</td></tr> <tr><td>52.0</td><td>55</td><td>85</td></tr> <tr><td>60.0</td><td>55</td><td>85</td></tr> <tr><td>60.5</td><td>60</td><td>85</td></tr> <tr><td>68.5</td><td>60</td><td>85</td></tr> <tr><td>69.0</td><td>25</td><td>85</td></tr> <tr><td>70.0</td><td>25</td><td>0</td></tr> </tbody> </table>	Time (hour)	Temperature (°C)	Humidity (%RH)	0.0	25	0	1.0	0	0	9.0	-40	0	9.5	-40	0	17.5	-20	0	18.0	-20	0	26.0	25	85	34.5	25	85	35.0	40	85	43.0	40	85	43.5	50	85	51.5	50	85	52.0	55	85	60.0	55	85	60.5	60	85	68.5	60	85	69.0	25	85	70.0	25	0
Time (hour)	Temperature (°C)	Humidity (%RH)																																																								
0.0	25	0																																																								
1.0	0	0																																																								
9.0	-40	0																																																								
9.5	-40	0																																																								
17.5	-20	0																																																								
18.0	-20	0																																																								
26.0	25	85																																																								
34.5	25	85																																																								
35.0	40	85																																																								
43.0	40	85																																																								
43.5	50	85																																																								
51.5	50	85																																																								
52.0	55	85																																																								
60.0	55	85																																																								
60.5	60	85																																																								
68.5	60	85																																																								
69.0	25	85																																																								
70.0	25	0																																																								

# Performance Test

## AV600-THT

### 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.

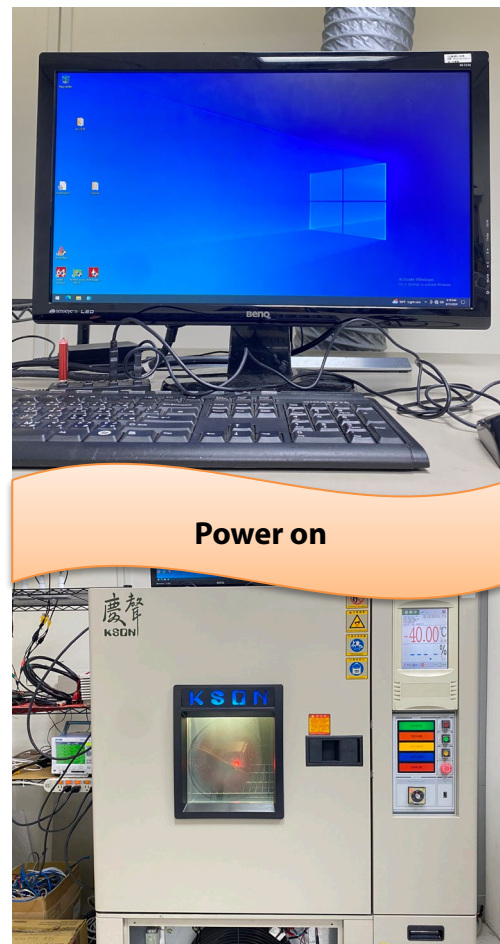
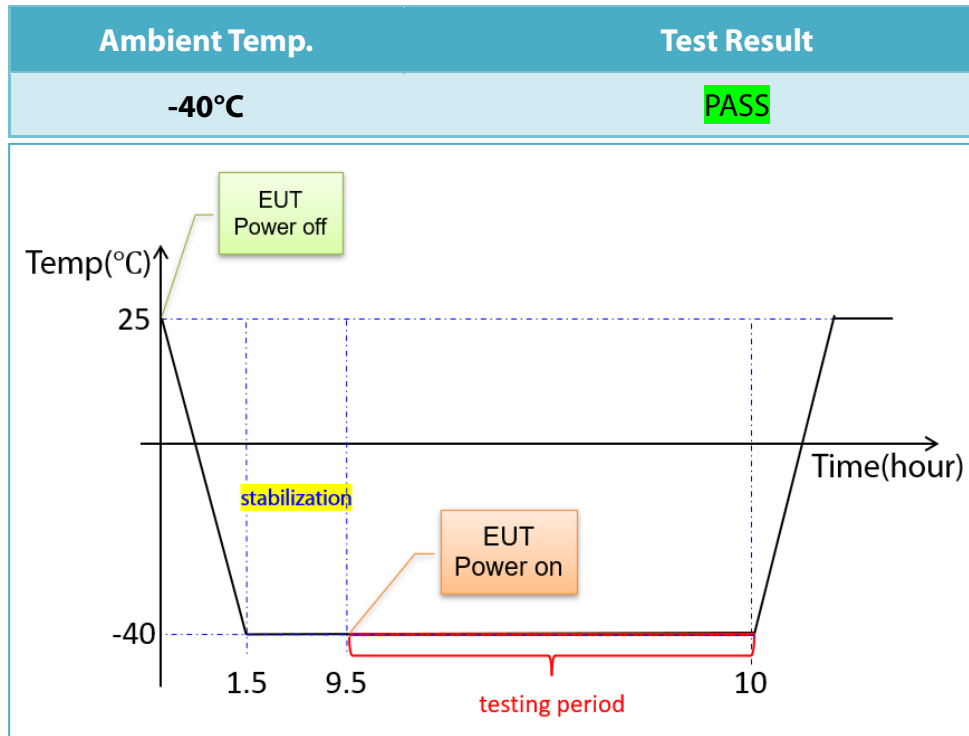
Test Temperature	Test Result
-40°C	PASS
-20°C	PASS
0°C	PASS
25°C / 85%RH	PASS
40°C / 85%RH	PASS
50°C / 85%RH	PASS
60°C / 85%RH	PASS

# Performance Test

## AV600-THT

### 2.2.2. Low-temperature & Boot-up

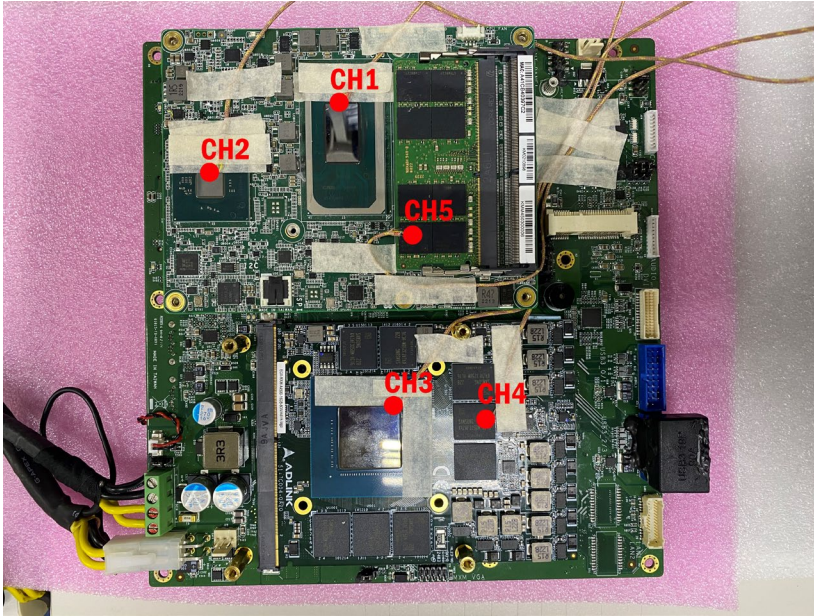
#Power supply under -40°C and ensure that the system boot up properly



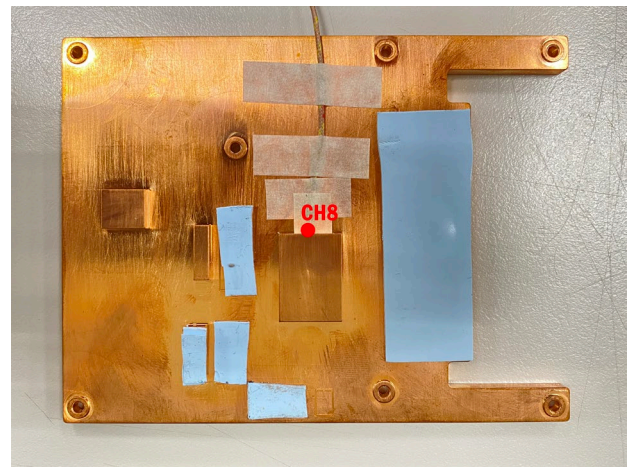
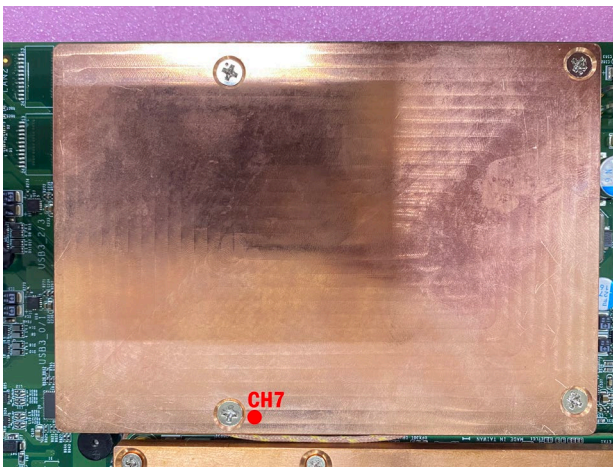
# Performance Test

AV600-THT

## 3. THERMAL TEST POINT



Test Point	Test Point
CH1	CPU DIE
CH2	PCH
CH3	GPU DIE
CH4	GPU DRAM
CH5	DIMM
CH6	2.5 inch SSD
CH7	CPU Heat Sink
CH8	GPU Heat Sink



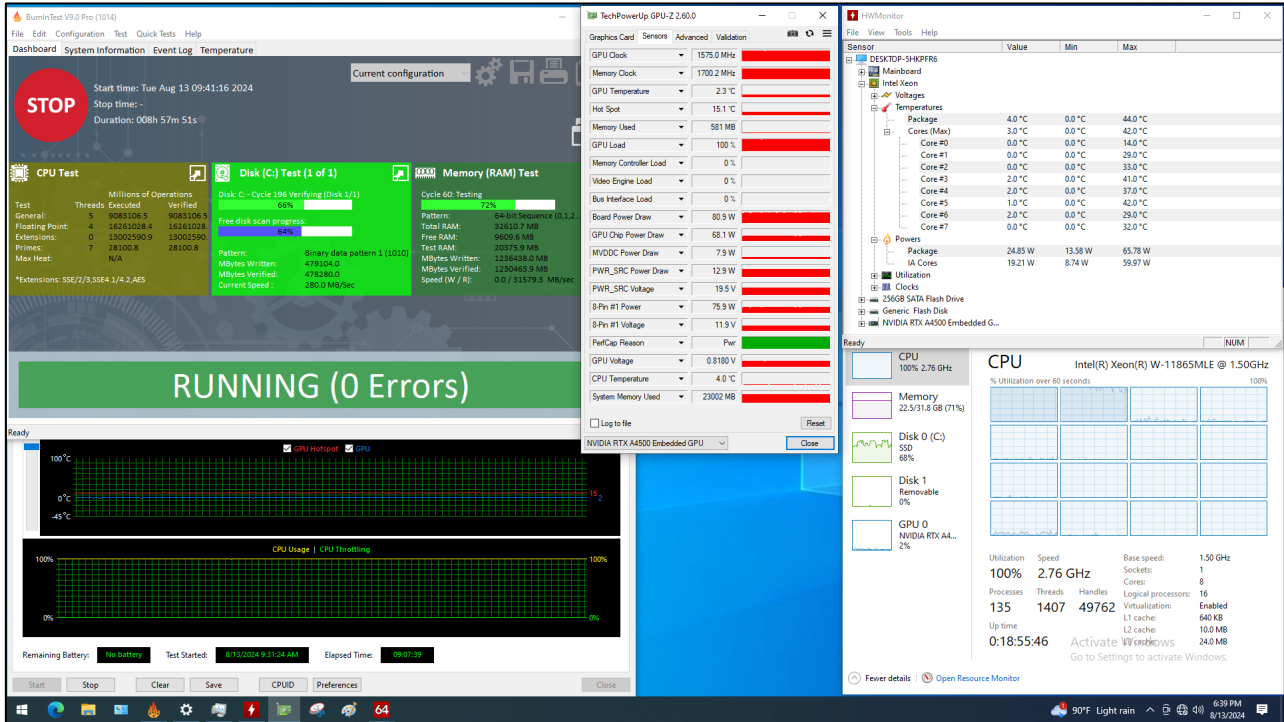


# Performance Test

## AV600-THT

### 4. TEST PHOTO IN LAB

#### - Chamber in -40°C



OVERVIEW					
2024/08/13 18:36:31					
1	-9.1	7	-14.8	13	19
2	-14.9	8	-11.1	14	20
3	-1.2	9	-over	15	21
4	-14.6	10	-over	16	22
5	-16.6	11	-over	17	23
6	-15.8	12	-over	18	24

Measuring Point	Ambient Temp.	-40°C
	CPU Cores Max Temperature	3.0 °C
	CPU Cores Frequency (Unit: GHz)	2.76 GHz
	GPU Temperature	2.3 °C
	GPU Hot Spot Temperature	15.1 °C
	GPU Frequency (Unit: MHz)	1575.0 MHz
CH1	CPU DIE	-9.1 °C
CH2	PCH	-14.9 °C
CH3	GPU DIE	-1.2 °C
CH4	GPU DRAM	-14.6 °C
CH5	DIMM	-16.6 °C
CH6	2.5 inch SSD	-15.0 °C
CH7	CPU Heat Sink	-14.8 °C
CH8	GPU Heat Sink	-11.1 °C



# Performance Test

## AV600-THT

### - Chamber in -20°C

The screenshot shows a Windows desktop with several performance monitoring applications running. BurnInTest V3.0 Pro is in the foreground, displaying a 'STOP' button and test results for CPU, Disk, and Memory. TechPowerUp GPU-Z 2.22.0.0 shows GPU specifications like 1560.0 MHz clock and 22.8 °C temperature. HWMonitor displays a detailed temperature table for various sensors.

Sensor	Value	Min	Max
Package	21.0 °C	0.0 °C	44.0 °C
Cores (Max)	21.0 °C	0.0 °C	42.0 °C
Core #0	16.0 °C	0.0 °C	17.0 °C
Core #1	19.0 °C	0.0 °C	29.0 °C
Core #2	21.0 °C	0.0 °C	33.0 °C
Core #3	24.0 °C	0.0 °C	41.0 °C
Core #4	20.0 °C	0.0 °C	37.0 °C
Core #5	21.0 °C	0.0 °C	42.0 °C
Core #6	20.0 °C	0.0 °C	33.0 °C
Core #7	19.0 °C	0.0 °C	32.0 °C

OVERVIEW  
2024/08/14 09:19:10

1	7	13	19
	10.2	4.8	-Over
2	8	14	20
	4.6	8.8	-Over
3	9	15	21
	18.7	-Over	-Over
4	10	16	22
	5.4	-Over	-Over
5	11	17	23
	2.9	-Over	-Over
6	12	18	24
	4.9	-Over	-Over

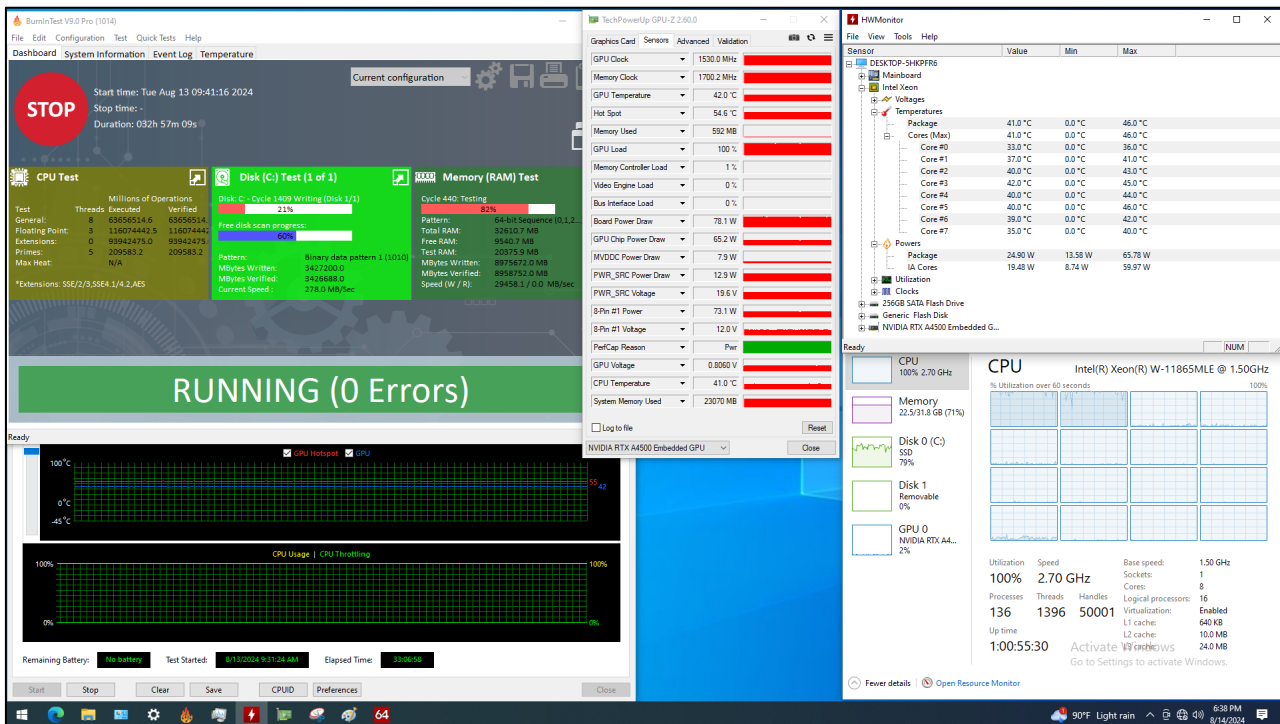
Measuring Point	Ambient Temp.	-20°C
CPU P-Cores Max Temperature		21.0 °C
CPU E-Cores Frequency (Unit: GHz)		2.76 GHz
GPU Temperature		22.8 °C
GPU Hot Spot Temperature		35.7 °C
GPU Frequency (Unit: MHz)		1560.0 MHz
CH1	CPU DIE	10.2 °C
CH2	PCH	4.6 °C
CH3	GPU DIE	18.7 °C
CH4	GPU DRAM	5.4 °C
CH5	DIMM	2.9 °C
CH6	2.5 inch SSD	4.9 °C
CH7	CPU Heat Sink	4.8 °C
CH8	GPU Heat Sink	8.8 °C



# Performance Test

## AV600-THT

### - Chamber in 0°C



Measuring Point	Ambient Temp.	0°C
CPU P-Cores Max Temperature		41.0 °C
CPU E-Cores Frequency (Unit: GHz)		2.70 GHz
GPU Temperature		42.0 °C
GPU Hot Spot Temperature		54.6 °C
GPU Frequency (Unit: MHz)		1530.0 MHz
CH1	CPU DIE	28.9 °C
CH2	PCH	24.0 °C
CH3	GPU DIE	38.4 °C
CH4	GPU DRAM	25.2 °C
CH5	DIMM	22.4 °C
CH6	2.5 inch SSD	23.9 °C
CH7	CPU Heat Sink	24.3 °C
CH8	GPU Heat Sink	28.7 °C



# Performance Test

## AV600-THT

### - Chamber in 25°C / 85%RH

The screenshot displays three main test windows: CPU Test, Disk (C:) Test, and Memory (RAM) Test. The CPU Test window shows a 'STOP' button and a 'RUNNING (0 Errors)' status. The Disk and Memory tests are also running. The HWMonitor window shows system metrics: CPU at 100% (2.59 GHz), GPU at 100% (1440 MHz), and various temperatures (CPU P-Cores at 69.0°C, GPU at 67.6°C, Hot Spot at 80.2°C). The HWMonitor window also shows power draw and utilization for various components.

OVERVIEW  
2024/08/15 10:13:55

1	7	13	19
54.3	58.1	-Over	-Over
2	8	14	20
49.5	54.7	-Over	-Over
3	9	15	21
63.9	-Over	-Over	-Over
4	10	16	22
51.0	-Over	-Over	-Over
5	11	17	23
48.0	-Over	-Over	-Over
6	12	18	24
46.3	-Over	-Over	-Over

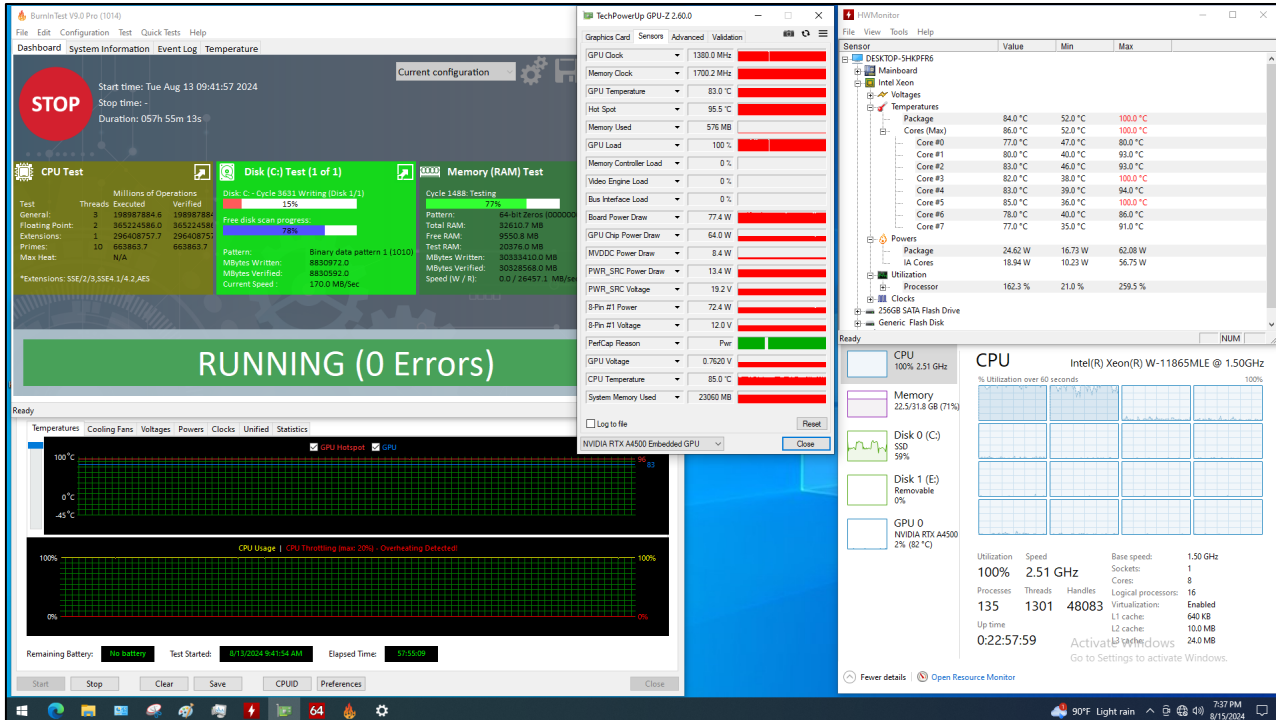
Measuring Point	Ambient Temp.	25°C
	CPU P-Cores Max Temperature	69.0 °C
	CPU E-Cores Frequency (Unit: GHz)	2.59 GHz
	GPU Temperature	67.6 °C
	GPU Hot Spot Temperature	80.2 °C
	GPU Frequency (Unit: MHz)	1440.0 MHz
CH1	CPU DIE	54.3 °C
CH2	PCH	49.5 °C
CH3	GPU DIE	63.9 °C
CH4	GPU DRAM	51.0 °C
CH5	DIMM	48.0 °C
CH6	2.5 inch SSD	46.3 °C
CH7	CPU Heat Sink	50.1 °C
CH8	GPU Heat Sink	54.7 °C



# Performance Test

## AV600-THT

### - Chamber in 40°C / 85%RH



OVERVIEW				
2024/08/15 19:35:26				
1	7	13	19	
68.9	64.6	-Over	-Over	
2	8	14	20	
64.3	69.3	-Over	-Over	
3	9	15	21	
78.4	-Over	-Over	-Over	
4	10	16	22	
65.5	-Over	-Over	-Over	
5	11	17	23	
62.6	-Over	-Over	-Over	
6	12	18	24	
68.5	-Over	-Over	-Over	

Measuring Point	Ambient Temp.	40°C
	CPU P-Cores Max Temperature	86.0 °C
	CPU E-Cores Frequency (Unit: GHz)	2.51 GHz
	GPU Temperature	83.0 °C
	GPU Hot Spot Temperature	95.5 °C
	GPU Frequency (Unit: MHz)	1380.0 MHz
CH1	CPU DIE	68.9 °C
CH2	PCH	64.3 °C
CH3	GPU DIE	78.4 °C
CH4	GPU DRAM	65.5 °C
CH5	DIMM	62.6 °C
CH6	2.5 inch SSD	60.5 °C
CH7	CPU Heat Sink	64.6 °C
CH8	GPU Heat Sink	69.3 °C



# Performance Test

## AV600-THT

### - Chamber in 50°C / 85%RH

The screenshot displays a comprehensive performance testing environment. On the left, the 'BumitTest V9.0 Pro' dashboard shows a 'STOP' button and test progress for CPU, Disk, and Memory. The CPU test is currently running with 0 errors. In the center, 'TechPowerUp GPU-Z 2.60.0' shows GPU metrics: 1230.0 MHz clock, 86.5°C temperature, and 98.5°C hot spot. On the right, 'HWMonitor' displays detailed sensor data for the Intel Xeon processor, including core temperatures ranging from 35.0°C to 100.0°C. At the bottom, a 'RUNNING (0 Errors)' banner indicates the test status.

OVERVIEW 2024/08/16 12:02:41

1	7	13	19
77.7	72.9	-Over	-Over
2	8	14	20
73.0	74.8	-Over	-Over
3	9	15	21
83.1	-Over	-Over	-Over
4	10	16	22
72.4	-Over	-Over	-Over
5	11	17	23
78.9	-Over	-Over	-Over
6	12	18	24
69.1	-Over	-Over	-Over

Measuring Point	Ambient Temp.	50°C
	CPU P-Cores Max Temperature	94.0 °C
	CPU E-Cores Frequency (Unit: GHz)	2.38 GHz
	GPU Temperature	86.5 °C
	GPU Hot Spot Temperature	98.5 °C
	GPU Frequency (Unit: MHz)	1230.0 MHz
CH1	CPU DIE	77.7 °C
CH2	PCH	73.0 °C
CH3	GPU DIE	83.1 °C
CH4	GPU DRAM	72.4 °C
CH5	DIMM	70.9 °C
CH6	2.5 inch SSD	69.1 °C
CH7	CPU Heat Sink	72.9 °C
CH8	GPU Heat Sink	74.8 °C



# Performance Test

## AV600-THT

### - Chamber in 55°C / 85%RH

The screenshot shows a Windows desktop with three performance monitoring applications running:

- BurnInTest V9.0 Pro (1014):** Displays a 'STOP' button and 'RUNNING (0 Errors)' status. It shows CPU test results with 100% utilization and a cycle of 2846. Other tests for Disk (C:) and Memory (RAM) are also visible.
- TechPowerUp GPU-Z 2.60.0:** Shows GPU specifications for an NVIDIA RTX A4500, including a clock speed of 1095.0 MHz and a memory clock of 1700.2 MHz.
- HWMonitor:** Displays real-time sensor data for the Intel Xeon W-11865MLE processor, showing core temperatures up to 95.0°C and a package temperature of 97.0°C.

OVERVIEW  
2024/08/17 09:19:00

Point	Temp (°C)	Frequency (MHz)	Frequency (GHz)	Status	Status
1	81.1	7	13	19	-Over
2	76.6	8	14	20	-Over
3	83.9	9	15	21	-Over
4	75.8	10	16	22	-Over
5	74.4	11	17	23	-Over
6	73.8	12	18	24	-Over

Measuring Point	Ambient Temp.	55°C
CPU P-Cores Max Temperature		95.0 °C
CPU E-Cores Frequency (Unit: GHz)		2.23 GHz
GPU Temperature		86.6 °C
GPU Hot Spot Temperature		98.8 °C
GPU Frequency (Unit: MHz)		1095.0 MHz
CH1	CPU DIE	81.1 °C
CH2	PCH	76.6 °C
CH3	GPU DIE	83.9 °C
CH4	GPU DRAM	75.0 °C
CH5	DIMM	74.4 °C
CH6	2.5 inch SSD	73.0 °C
CH7	CPU Heat Sink	76.4 °C
CH8	GPU Heat Sink	77.0 °C



# Performance Test

## AV600-THT

### - Chamber in 60°C / 85%RH

The screenshot displays three main windows from performance testing software:

- BurnInTest V9.0 Pro (1014):** Shows a 'STOP' button and test results for CPU, Disk (C:) Test (1 of 1), and Memory (RAM) Test. The CPU test is stopped, and the GPU test is running. The overall status is 'RUNNING (0 Errors)'. The test started on Tue Aug 13 09:41:57 2024 and has a duration of 1:44h 26m 28s.
- TechPowerUp GPU-Z 2.60.0:** Shows GPU specifications and real-time performance metrics. Key values include GPU Clock at 675.0 MHz, Memory Clock at 1700.2 MHz, GPU Temperature at 90.8 °C, and GPU Hot Spot at 99.8 °C. Power draw is 45.0 W.
- HWMonitor:** Shows system temperatures and power consumption. Key values include CPU Package Temperature at 99.0 °C, CPU P-Core Temperature at 84.0 °C, and CPU E-Core Temperature at 79.0 °C. Power consumption is 146.8 W.

OVERVIEW					
2024/08/19 10:01:35					
1hour					
1	84.4	7	79.8	13	-Over
2	79.9	8	89.2	14	-Over
3	94.9	9	-Over	15	-Over
4	87.4	10	-Over	16	-Over
5	77.7	11	-Over	17	-Over
6	76.2	12	-Over	18	-Over
				19	-Over
				20	-Over
				21	-Over
				22	-Over
				23	-Over
				24	-Over

Measuring Point	Ambient Temp.	60°C
	CPU P-Cores Max Temperature	99.0 °C
	CPU E-Cores Frequency (Unit: GHz)	2.20 GHz
	GPU Temperature	90.8 °C
	GPU Hot Spot Temperature	99.8 °C
	GPU Frequency (Unit: MHz)	675.0 MHz
CH1	CPU DIE	84.4 °C
CH2	PCH	79.9 °C
CH3	GPU DIE	94.9 °C
CH4	GPU DRAM	87.4 °C
CH5	DIMM	77.7 °C
CH6	2.5 inch SSD	76.2 °C
CH7	CPU Heat Sink	79.8 °C
CH8	GPU Heat Sink	89.2 °C





# Performance Test

AV600-THT

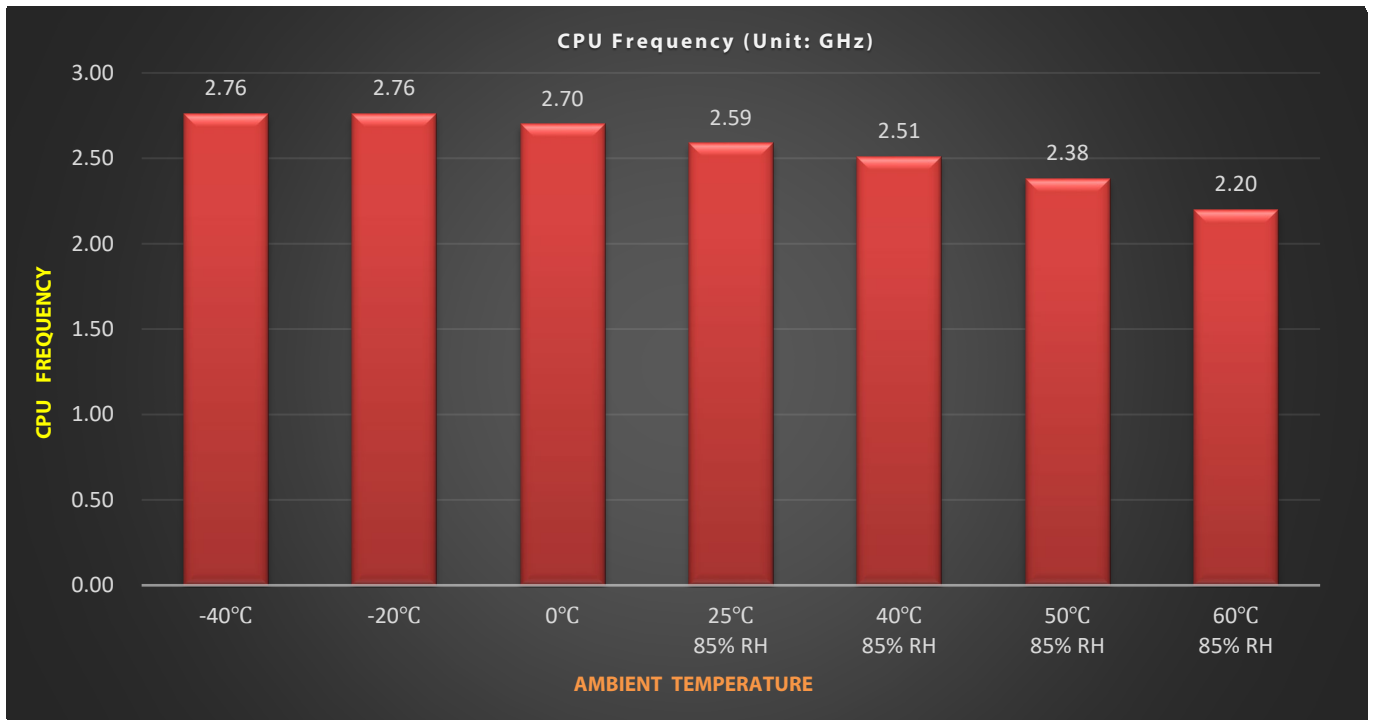
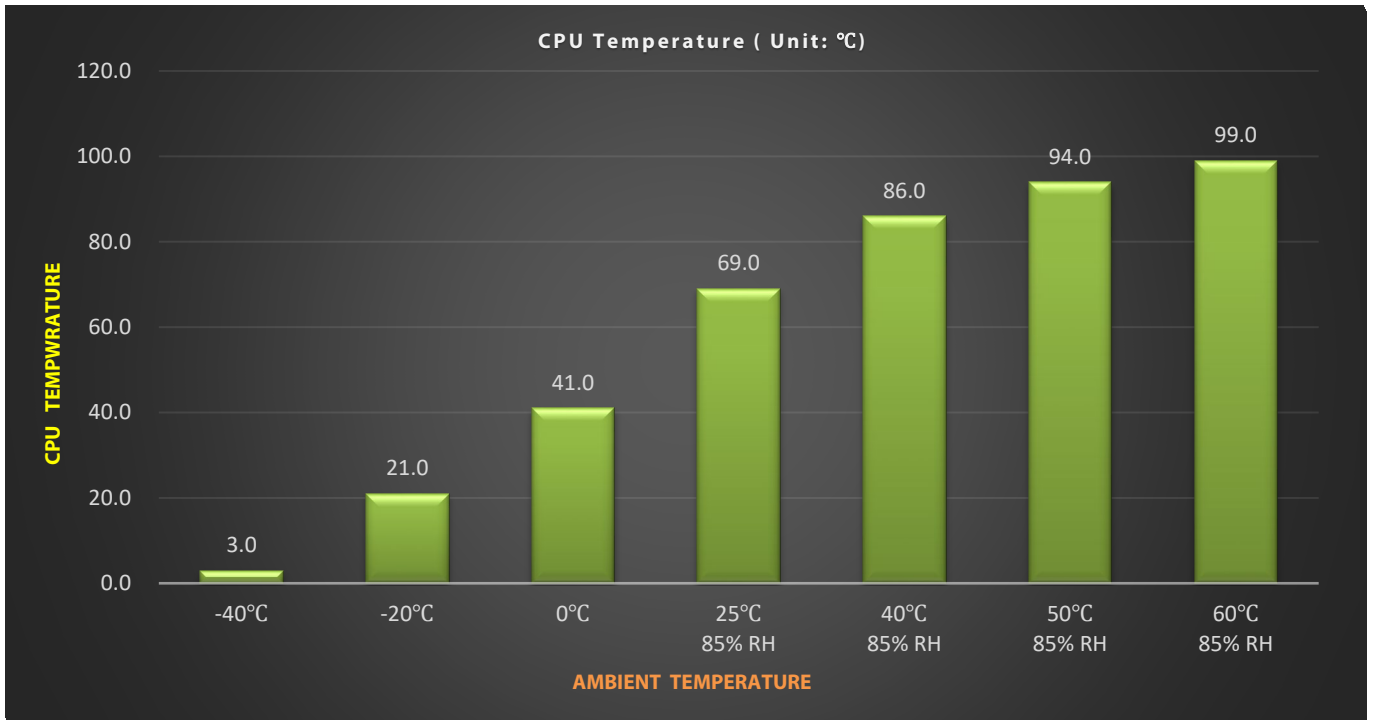
## 5. THERMAL TEST RESULT(-40°C ~ +60°C)

Temperature & Frequency / Thermocouple Measurements

Temperature		Ambient							
Temp.		-40°C	-20°C	0°C	25°C 85% RH	40°C 85% RH	50°C 85% RH	55°C 85% RH	60°C 85% RH
CPU Cores Max Temperature ( Unit: °C)		3.0	21.0	41.0	69.0	86.0	94.0	95.0	99.0
CPU Cores Frequency (Unit: GHz)		2.76	2.76	2.70	2.59	2.51	2.38	2.23	2.20
Temperature		Ambient							
Temp.		-40°C	-20°C	0°C	25°C 85% RH	40°C 85% RH	50°C 85% RH	55°C 85% RH	60°C 85% RH
GPU Temperature ( Unit: °C)		2.3	22.8	42.0	67.6	83.0	86.5	86.6	90.8
GPU Hot Spot Temperature ( Unit: °C)		15.1	35.7	54.6	80.2	95.5	98.5	98.8	99.8
GPU Frequency (Unit: MHz)		1575	1560	1530	1440	1380	1230	1095	675
Thermocouple		Ambient							
Temp.		-40°C	-20°C	0°C	25°C 85% RH	40°C 85% RH	50°C 85% RH	55°C 85% RH	60°C 85% RH
CH1	<b>CPU DIE</b>	-9.1	10.2	28.9	54.3	68.9	77.7	81.1	84.4
CH2	<b>PCH</b>	-14.9	4.6	24.0	49.5	64.3	73.0	76.6	79.9
CH3	<b>GPU DIE</b>	-1.2	18.7	38.4	63.9	78.4	83.1	83.9	94.9
CH4	<b>GPU DRAM</b>	-14.6	5.4	25.2	51.0	65.5	72.4	75.0	87.4
CH5	<b>DIMM</b>	-16.6	2.9	22.4	48.0	62.6	70.9	74.4	77.7
CH6	<b>2.5 inch SSD</b>	-15.0	4.9	23.9	46.3	60.5	69.1	73.0	76.2
CH7	<b>CPU Heat Sink</b>	-14.8	4.8	24.3	50.1	64.6	72.9	76.4	79.8
CH8	<b>GPU Heat Sink</b>	-11.1	8.8	28.7	54.7	69.3	74.8	77.0	89.2

# Performance Test

## AV600-THT



# Performance Test

## AV600-THT

