System Thermal Test Report

Model: **CTE C750 Air**

Version: **20230328A**

NO: RS202303280001

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3. Procedure

1. Objective

Our objective is to find out if the **CTE C750 Air** can efficiently extract the heat generated by the latest components, so we built a system with an Intel i9-13900K and a ASUS ROG Strix GeForce RTX® 4090 OC and put it to the test. The passing criteria we set was to keep the internal temperature under **40˚C** while the system is running at full load, with **fourteen** installed fans and a AIO 420 installed.

2. Equipment

The equipment we used in the thermal testing includes:

1. Temperature & Humidity Chamber
2. Data Acquisition Device
3. Thermocouple

The Temp. & Humidity Chamber ensures consistency in the testing environment, particularly temperature and humidity. The **temperature** was set at **25˚C** and the **humidity** at **50%** in the chamber.

The Data Acquisition Device helps us to directly collect the data through **thermocouples**, which is the most important equipment for our testing. We set up the thermocouple inside the case at various points to measure the temperature.

We used **AIDA64 Extreme** and **FurMark ROG Edition** to push 100% load on the CPU and GPU and tested for 30 minutes.

3. Procedure

Testing steps:

1. Ready the systems
2. Place the chassis into the Temp. & Humidity Chamber
3. Set the thermocouple at the specified places
4. Set up the Temp. & Humidity Chamber - temperature at 25 ˚C and the humidity at 50%
5. Turn on the Temp. & Humidity Chamber and start testing (for 30 minutes)
6. Check the data acquired from the Data Acquisition device
7. End testing

B. Test Configuration

1. Laboratory Equipment
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6. Thermal Stress Test
7. AIDA64 & FurMark Test
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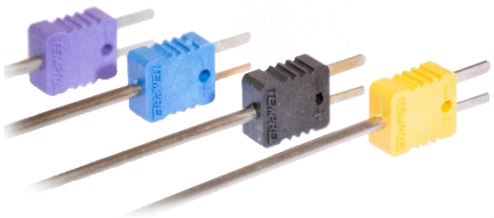
1. Laboratory Equipment



Thermocouple

Sound Level Meter

Thermal Imaging Camera

Temperature Data Acquisition

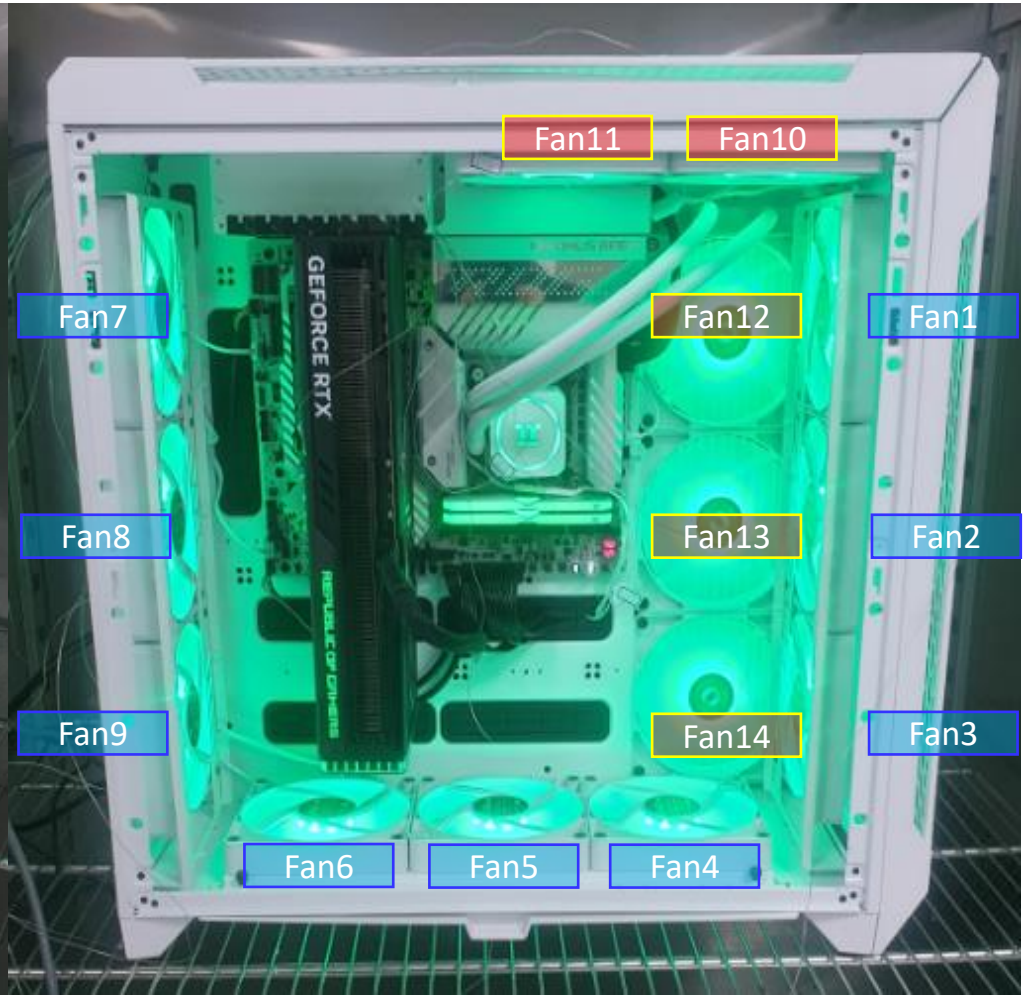
Temperature & Humidity Chamber

2. Chassis Hardware List

Component	Model
Chassis	CTE C750 Air Snow
Motherboard	ASUS ROG MAXIMUS Z790 APEX
CPU	Intel® Core™ i9-13900K Processor (TDP 253W)
GPU	ASUS ROG Strix GeForce RTX® 4090 OC 24GB GDDR6X
RAM	TOUGHRAM XG RGB DDR5 32G (16G x 2)
SSD	Seagate SSD 120G
PSU	Toughpower GF3 1200W - TT Premium Edition
CPU Cooler	TH420 ARGB Sync Snow Edition AIO Liquid Cooler
Fans	AIO: CT 140mm x 3 (1800rpm) Chassis: CT 140mm x 11 (1500 rpm) (Front x 3 , Top x 2 , Rear x 3, Bottom x 3)
Software	1. AIDA64 Extreme 2. FurMark ROG Edition V0.8.14.0 3. CPU-Z Ver.2.015 x64 4. Core Temp V1.18
Full load	30 minutes
Camera	Testo 885-2 Thermal Imaging Camera

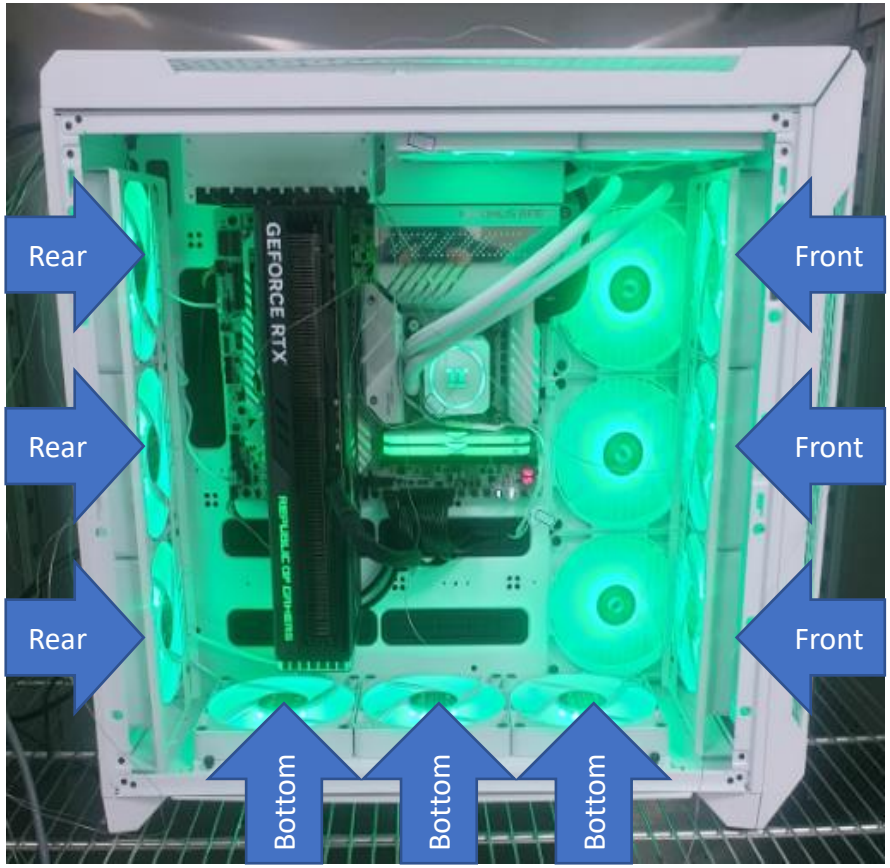
NO: RS202303280001

3. Chassis Fan Allocation

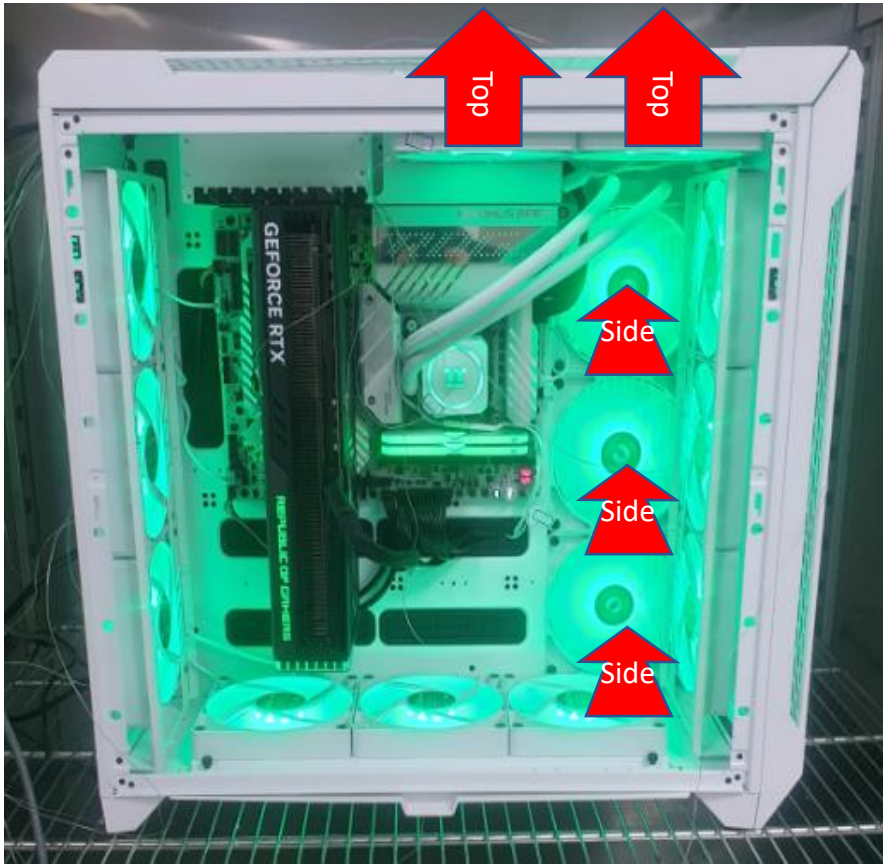


4. Chassis Thermal Airflow

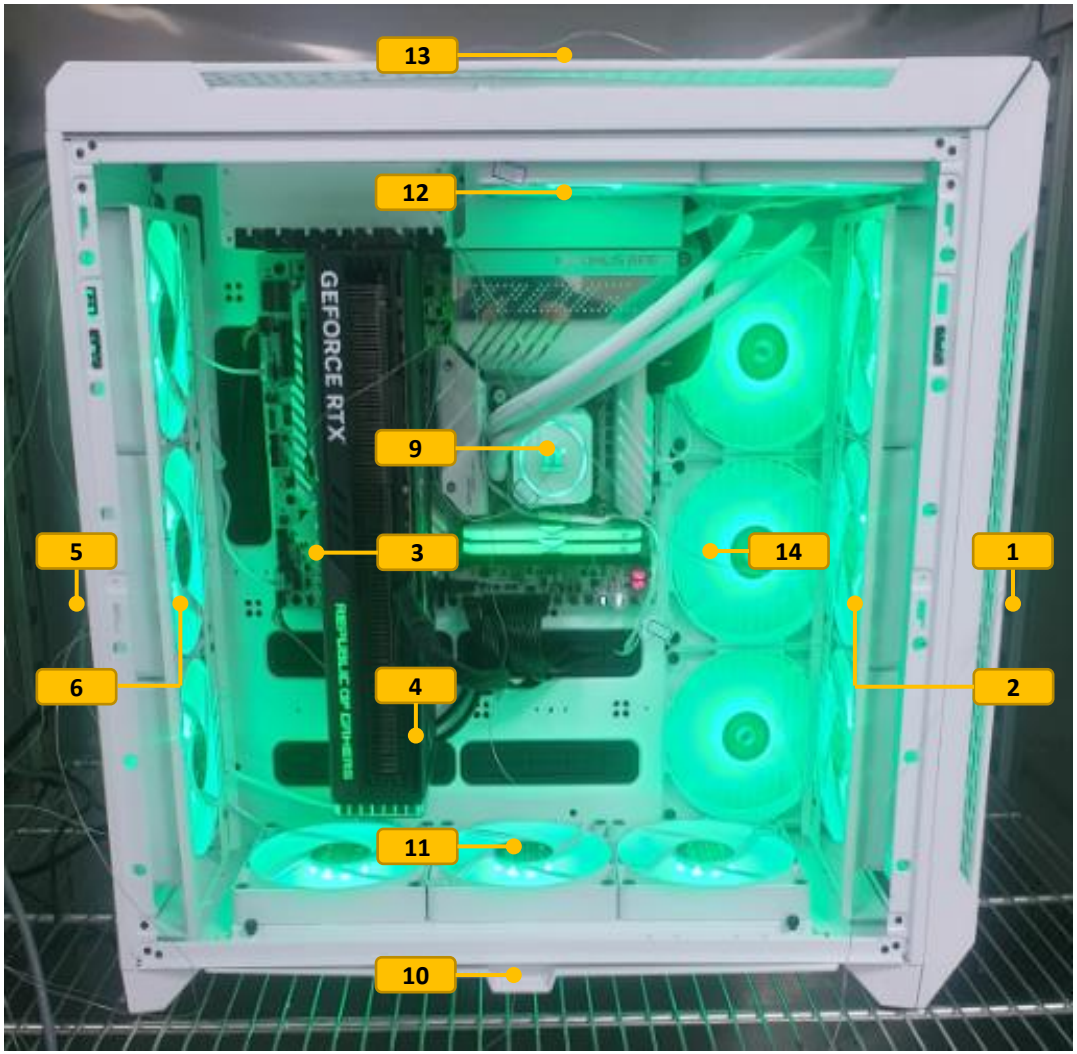
Cool Airflow Inlets



Hot Airflow Exhausts

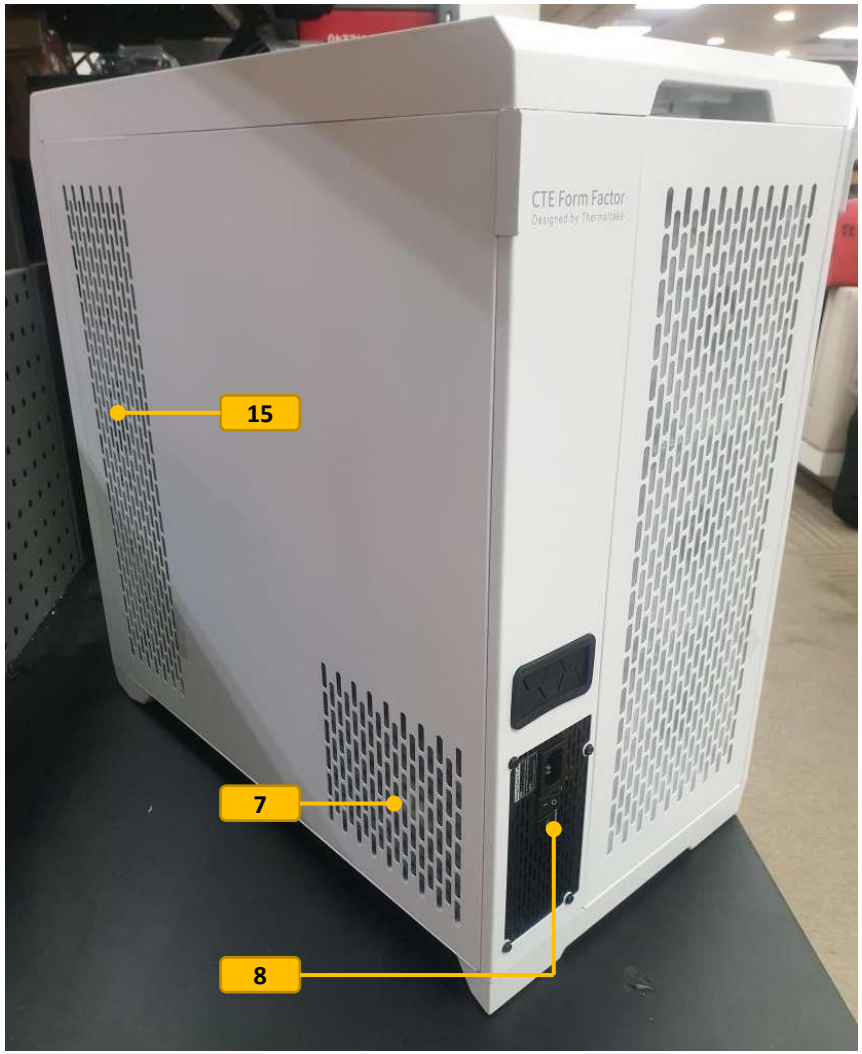


5. Chassis Measured Points



Measure Point	Description	Airflow	Thermocouple Number
1	Chassis Front External	Intake	101
2	Chassis Front Internal	Intake	102
3	GPU Left Fan	Intake	104
4	GPU Right Fan	Exhaust	105
5	Chassis Rear Internal	Intake	106
6	Chassis Rear External	Intake	108
7	PSU Bottom	Intake	110
8	PSU Rear	Exhaust	111
9	AIO Top Cover		112
10	Chassis Bottom External	Intake	113
11	Chassis Bottom Internal	Intake	114
12	Chassis Top Internal	Exhaust	115
13	Chassis Top External	Exhaust	116
14	Chassis Right Internal	Exhaust	117
15	Chassis Right External	Exhaust	118

5. Chassis Measured Points



Measure Point	Description	Airflow	Thermocouple Number
1	Chassis Front External	Intake	101
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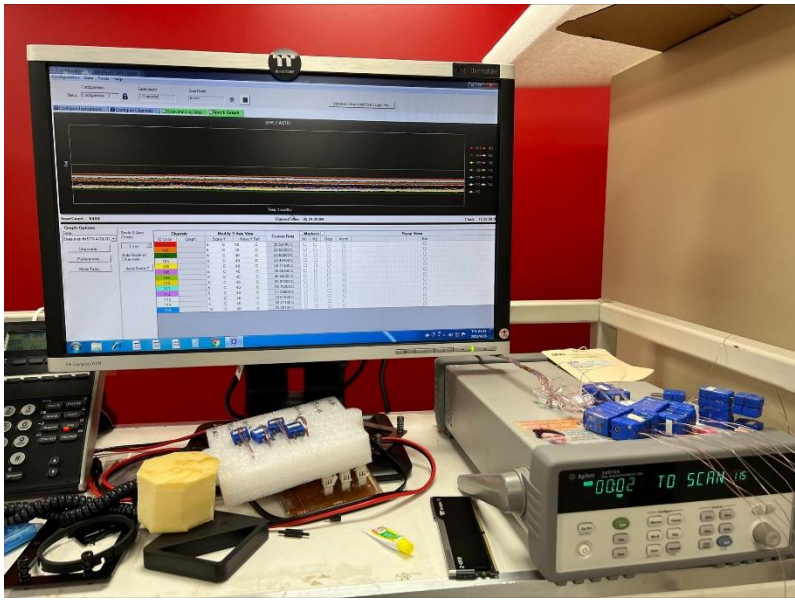
3	GPU Left Fan	Intake	104
4	GPU Right Fan	Exhaust	105
5	Chassis Rear Internal	Intake	106
6	Chassis Rear External	Intake	108
7	PSU Bottom	Intake	110
8	PSU Rear	Exhaust	111
9	AIO Top Cover		112
10	Chassis Bottom External	Intake	113
11	Chassis Bottom Internal	Intake	114
12	Chassis Top Internal	Exhaust	115
13	Chassis Top External	Exhaust	116
14	Chassis Right Internal	Exhaust	117
15	Chassis Right External	Exhaust	118

6. Thermal Stress Test

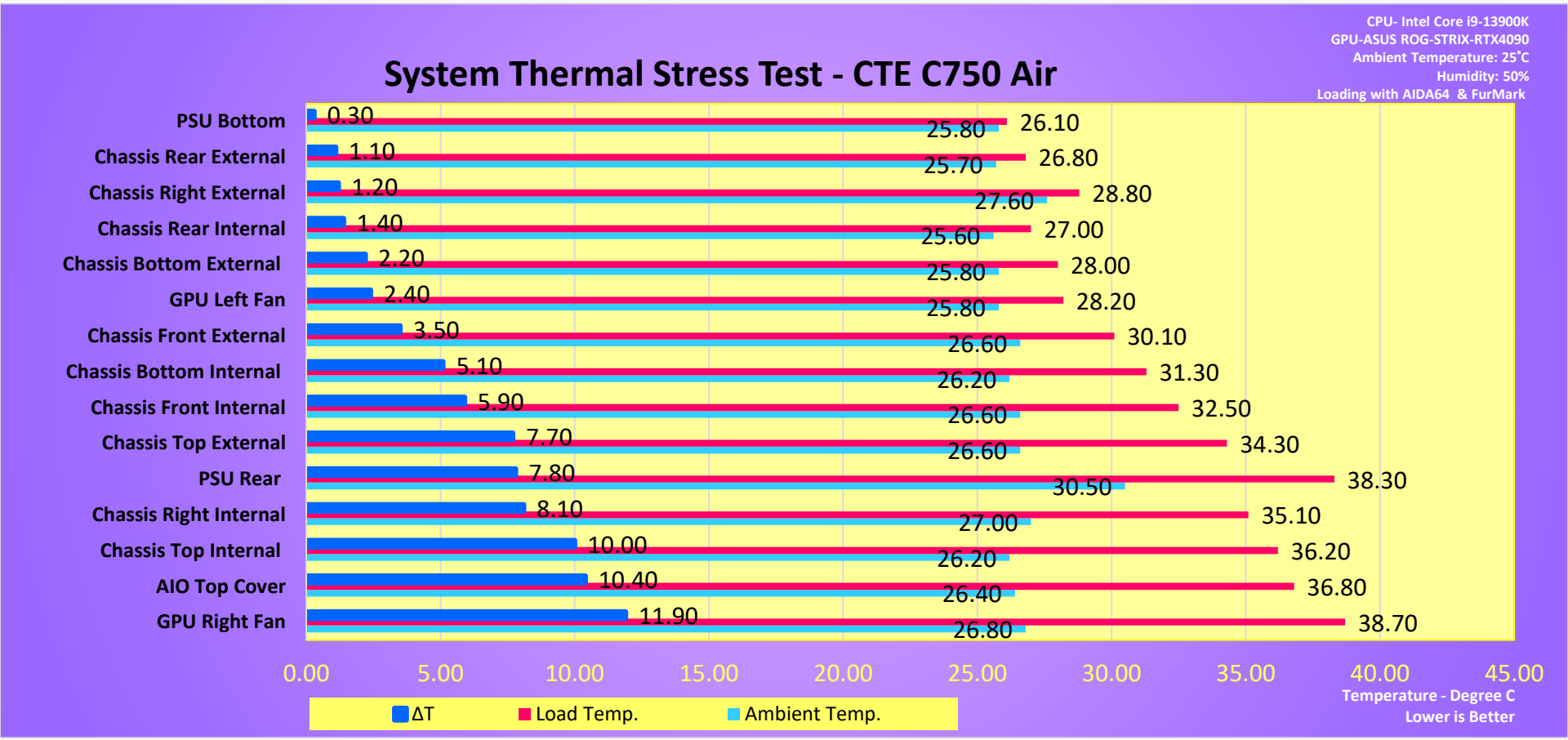


- Setting up the chamber temperature and humidity
- Temperature: 25°C
- Humidity: 50%
- Recording Data

6. Thermal Stress Test

Temperature Data Recoding

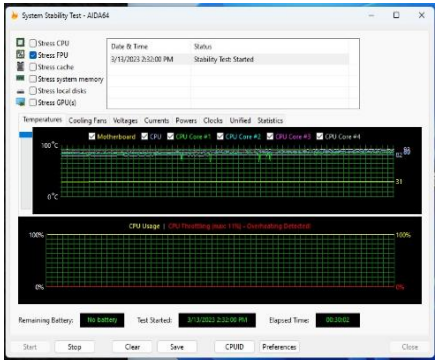
6. Thermal Stress Test

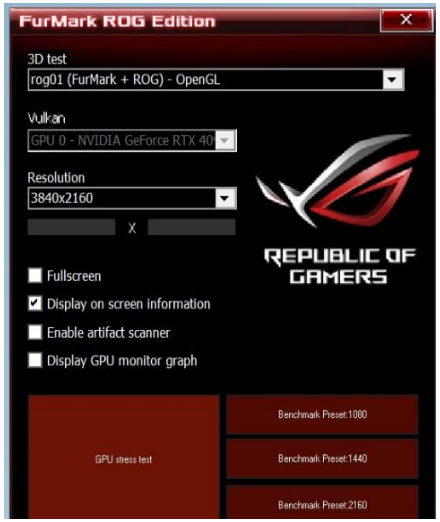


We expected to see higher temperature at the exhaust points and relatively lower temperature at the intake positions. The highest temperature was found at the AIO exhaust, which is reasonable given the CPU was running at full load. Most of the intake positions recorded a temperature lower than **40˚C** since they were drawing air from environment. Two critical positions we were looking at are **NO. 105 GPU Fan** and **NO. 112 AIO Cover**, which were drawing internal air to cool two of the most important components.

7. AIDA64 & FurMark Test

We used **AIDA64 Extreme** (stress FPU) and **FurMark ROG Edition (resolution: 3840 x 2160) to push 100% load** on the CPU and GPU for 30 minutes.





Date	3/13/2023
Time (HH:MM)	2:03 PM
CPU Clock	5500 MHz
Motherboard	Asus ROG Maximus Z790 Apex
BIOS Version	0812
Free Memory	26517 MB
GPU Clock	210 MHz
Motherboard	27°C
CPU	33°C
CPU Package	40°C
GPU Diode	32°C
GPU Hotspot	40°C
CPU	1804 RPM
AIO Pump	3026 RPM
Chassis #3	1632 RPM
GPU	0 RPM
GPU	0%
CPU Core	1.314 V
GPU Core	0.875 V
CPU Package	41.96 W
GPU	16.38 W
GPU TDP%	3%

Date	3/13/2023
Time (HH:MM)	3:02 PM
CPU Clock	5200 MHz
Motherboard	Asus ROG Maximus Z790 Apex
BIOS Version	0812
Free Memory	26333 MB
GPU Clock	2760 MHz
Motherboard	31°C
CPU	82°C
CPU Package	93°C
GPU Diode	80°C
GPU Hotspot	90°C
CPU	1788 RPM
AIO Pump	2967 RPM
Chassis #3	1634 RPM
GPU	2503 RPM
GPU	80%
CPU Core	1.199 V
GPU Core	1.000 V
CPU Package	253.51 W
GPU	489.18 W
GPU TDP%	98%

FurMark

Idle

Full load

7. AIDA64 & FurMark Test

We used **AIDA64 Extreme** (stress FPU) and **FurMark ROG Edition (resolution: 3840 x 2160) to push 100% load** on the CPU and GPU for 30 minutes.

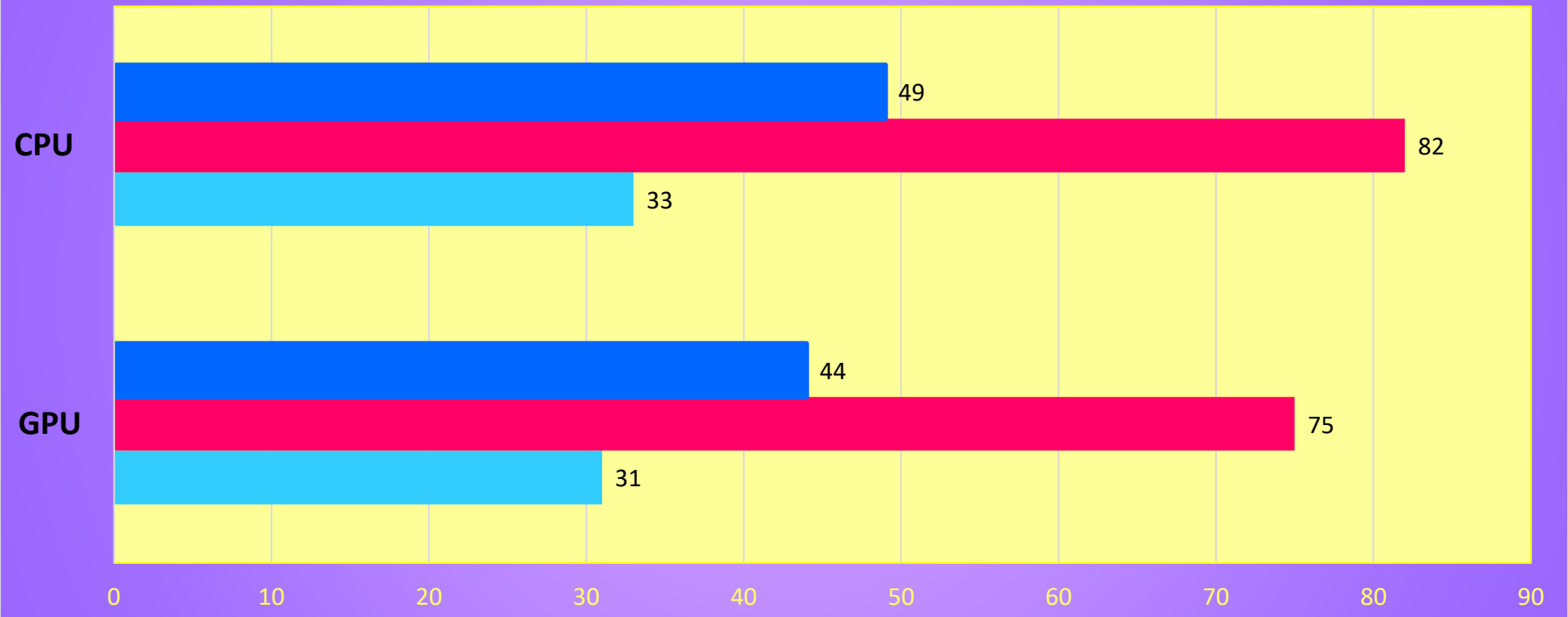
Idle

Full load

7. AIDA64 & FurMark Test

CPU & GPU Thermal Stress Test

CTE C750 Air



CPU- Intel Core i9-13900K
GPU-ASUS ROG-STRIX-RTX4090
Ambient Temperature: 25˚C
Humidity: 50%
Loading with AIDA64 & FurMark

Temperature - Degree C
Lower is Better

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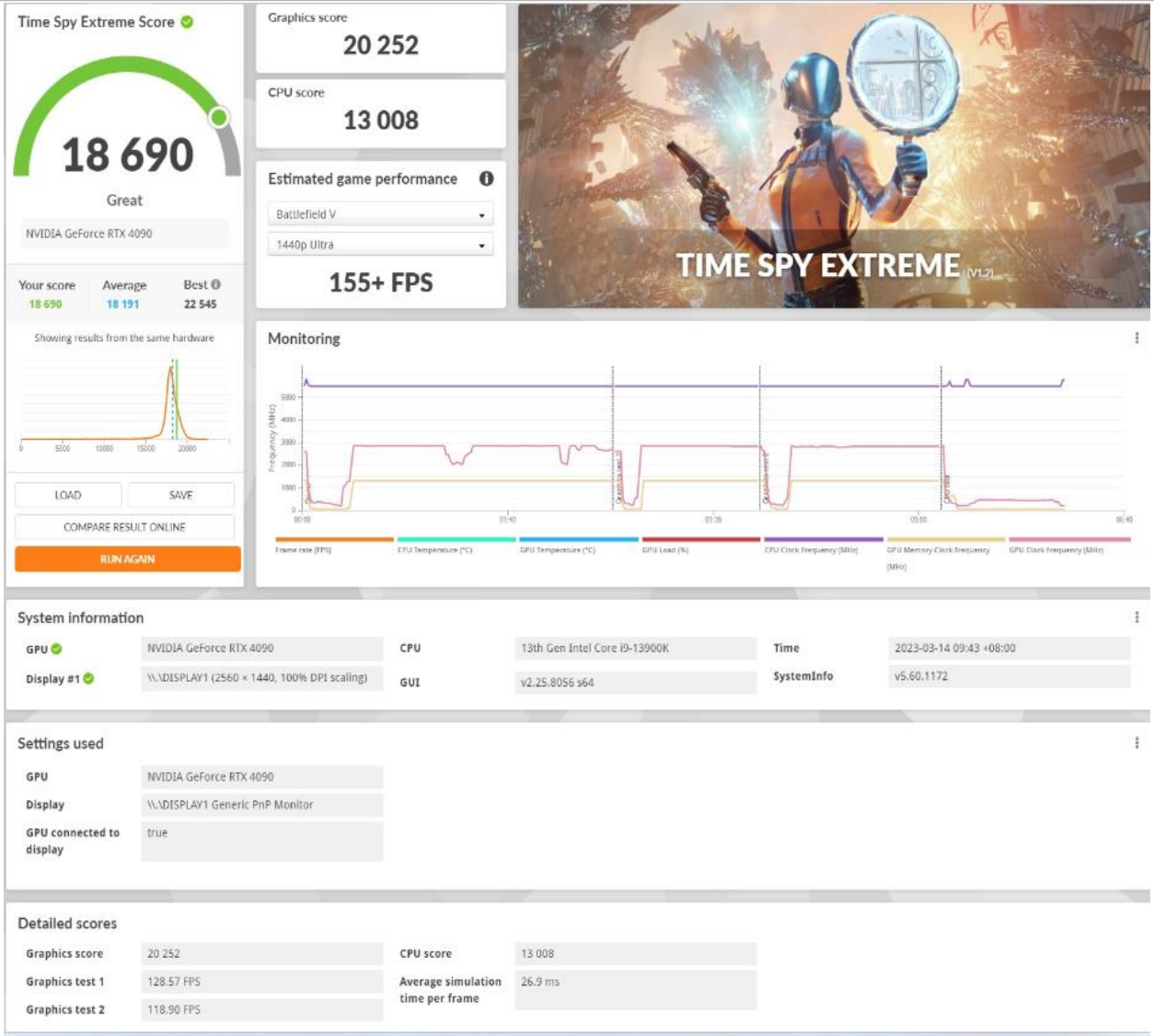
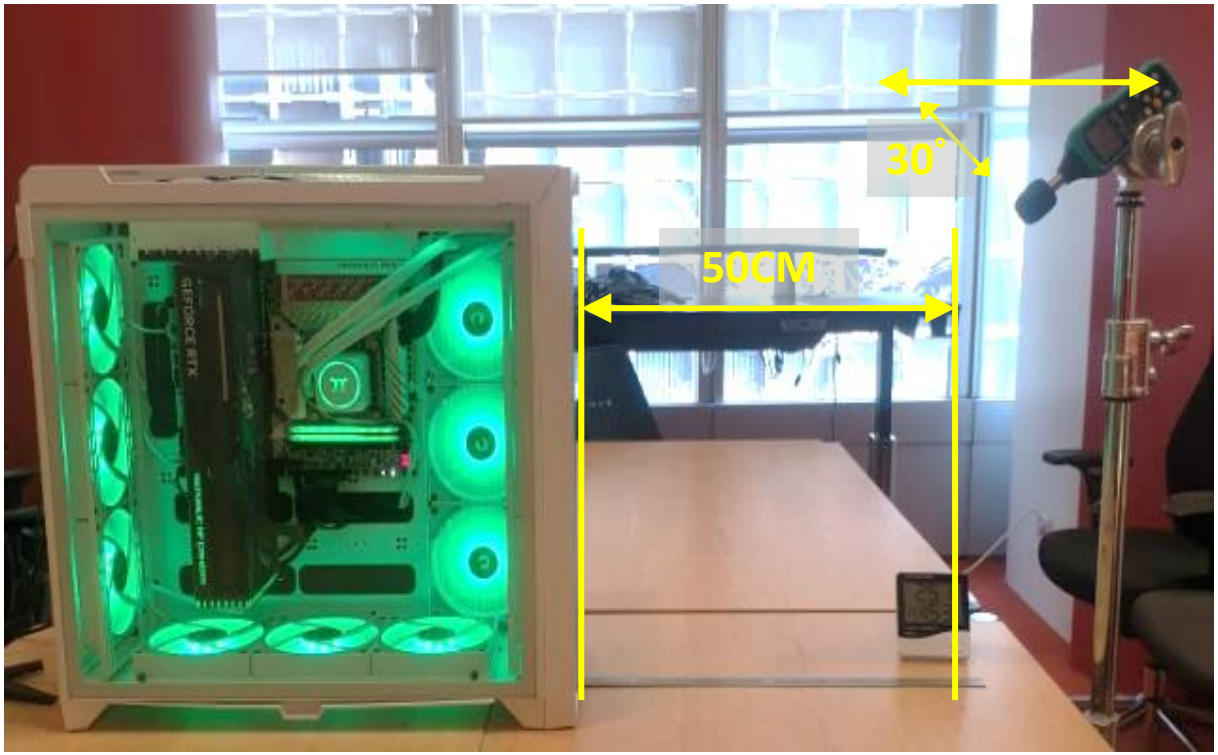
8. Graphics Performance Testing



9. Acoustic Sound Pressure Level Test

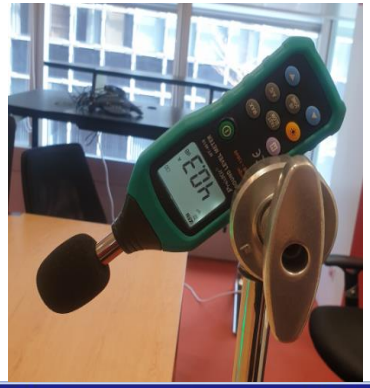
Test Environment：**Thermaltake Taipei Office**
Test Model: **CTE C750**
Test Ambience: **25.1 ℃(Temperature) / 53% R.H.(Relative Humidity)**
Microphone position: **50 cm / in front of PC system**
Background Noise：**36.3 dBA.**



Microphone position

Test Ambience

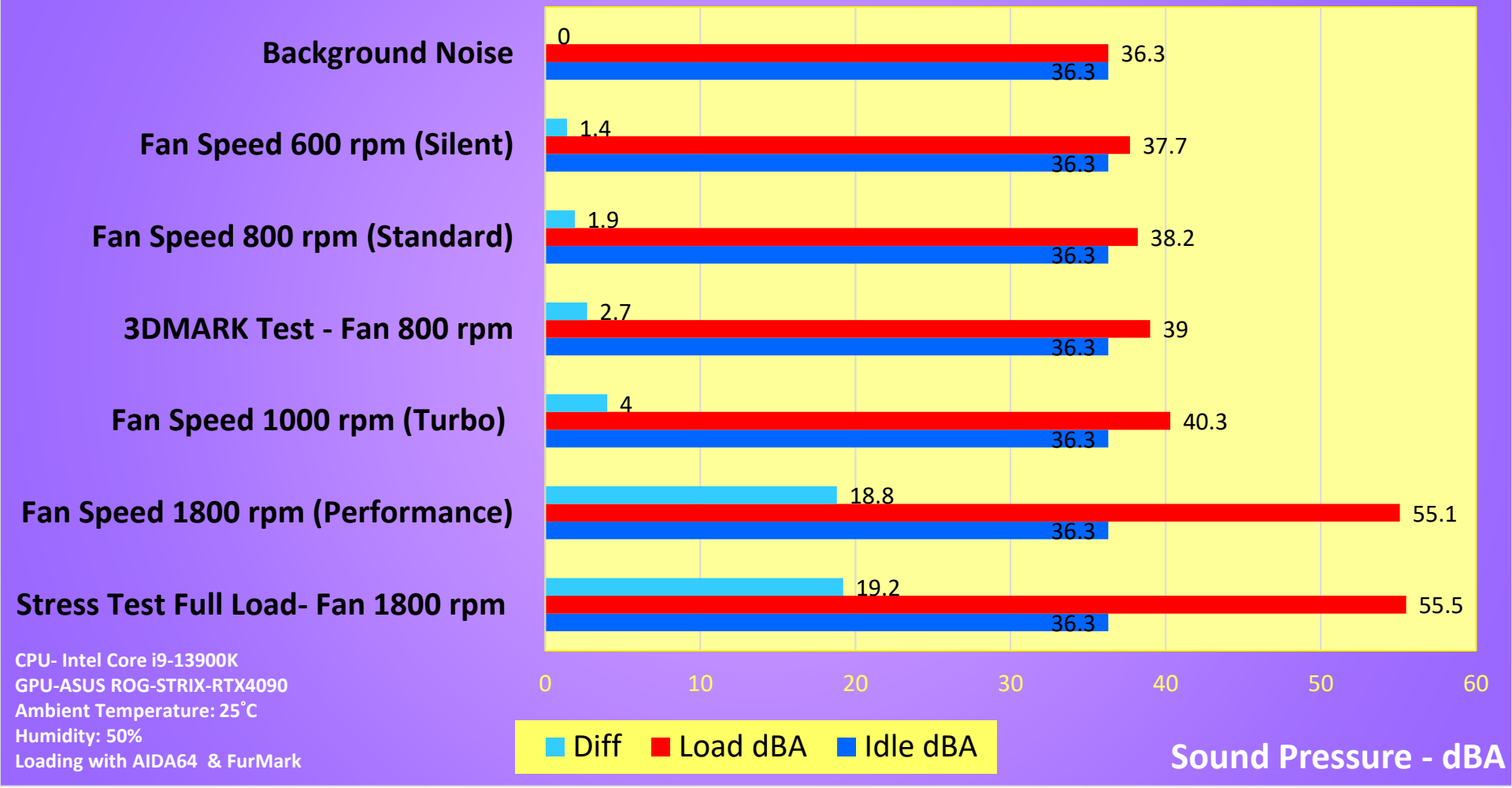
9. Acoustic Sound Pressure Level Test

Fan Speed 600rpm – **37.7dBA**	Fan Speed 800rpm – **38.2dBA**	Fan Speed 1000rpm – **40.3dBA**	Fan Speed 1800rpm – **55.1dBA**
			
Date 3/15/2023	Date 3/15/2023	Date 3/15/2023	Date 3/15/2023
Time (HH:MM) 1:25 PM	Time (HH:MM) 1:27 PM	Time (HH:MM) 1:29 PM	Time (HH:MM) 1:38 PM
CPU Clock 5500 MHz	CPU Clock 5501 MHz	CPU Clock 5500 MHz	CPU Clock 5500 MHz
Motherboard Asus ROG Maximus Z790 Apex	Motherboard Asus ROG Maximus Z790 Apex	Motherboard Asus ROG Maximus Z790 Apex	Motherboard Asus ROG Maximus Z790 Apex
BIOS Version 0812	BIOS Version 0812	BIOS Version 0812	BIOS Version 0812
Free Memory 26498 MB	Free Memory 26517 MB	Free Memory 26535 MB	Free Memory 26655 MB
GPU Clock 210 MHz	GPU Clock 210 MHz	GPU Clock 210 MHz	GPU Clock 210 MHz
Motherboard 28°C	Motherboard 27°C	Motherboard 26°C	Motherboard 25°C
CPU 31°C	CPU 30°C	CPU 30°C	CPU 32°C
CPU Package 34°C	CPU Package 35°C	CPU Package 33°C	CPU Package 39°C
GPU Diode 39°C	GPU Diode 39°C	GPU Diode 39°C	GPU Diode 33°C
GPU Hotspot 47°C	GPU Hotspot 47°C	GPU Hotspot 47°C	GPU Hotspot 41°C
CPU 576 RPM	CPU 767 RPM	CPU 958 RPM	CPU 1814 RPM
AIO Pump 2673 RPM	AIO Pump 2683 RPM	AIO Pump 2824 RPM	AIO Pump 3026 RPM
Chassis #3 516 RPM	Chassis #3 619 RPM	Chassis #3 805 RPM	Chassis #3 1630 RPM
GPU 0 RPM	GPU 0 RPM	GPU 0 RPM	GPU 0 RPM
GPU 0%	GPU 0%	GPU 0%	GPU 0%
CPU Core 1.181 V	CPU Core 1.314 V	CPU Core 1.314 V	CPU Core 1.305 V
GPU Core 0.875 V	GPU Core 0.875 V	GPU Core 0.875 V	GPU Core 0.875 V
CPU Package 24.95 W	CPU Package 30.98 W	CPU Package 32.07 W	CPU Package 36.09 W
GPU 15.06 W	GPU 13.54 W	GPU 13.78 W	GPU 12.89 W
GPU TDP% 3%	GPU TDP% 3%	GPU TDP% 3%	GPU TDP% 3%

NO: RS202303280001

9. Acoustic Sound Pressure Level Test

Acoustic Sound Pressure Level Test - CTE C750 Air

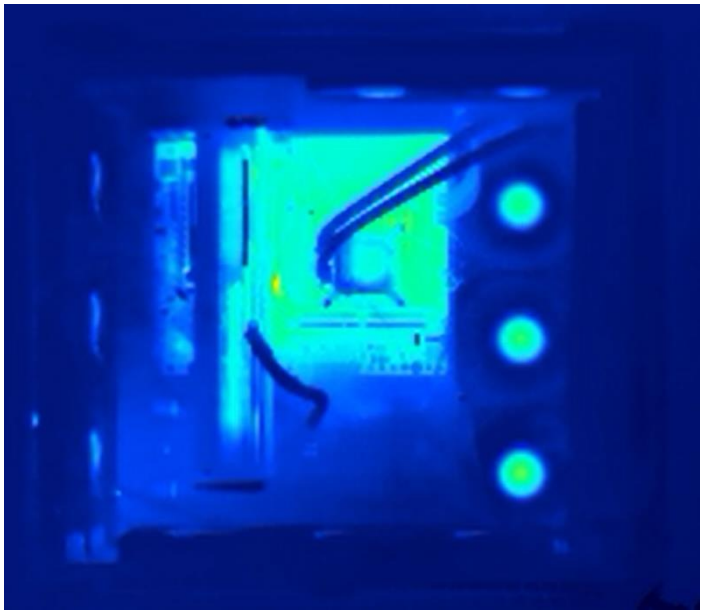


CPU- Intel Core i9-13900K
GPU-ASUS ROG-STRIX-RTX4090
Ambient Temperature: 25˚C
Humidity: 50%
Loading with AIDA64 & FurMark

NO: RS202303280001

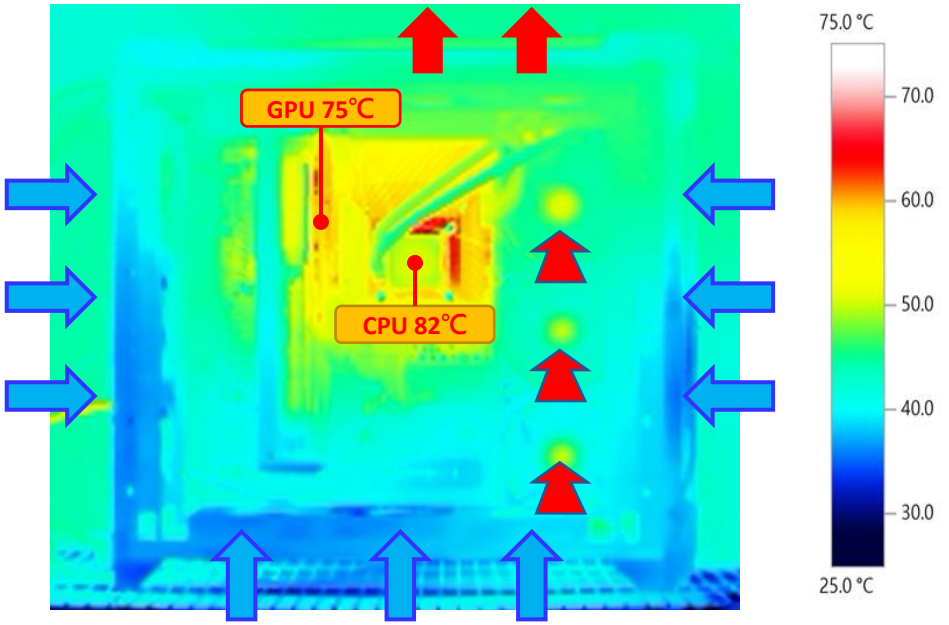
C. Conclusion

Idle



Left View

Full Load



AIDA64 Extreme (stress FPU) and **FurMark ROG Edition** (**resolution: 3840 x 2160) to push 100% load** on the CPU and GPU for 30 minutes**.**

-INTEL i9 13900K / CPU Temp. (Max)：82℃ (TDP 253W)

-ASUS ROG Strix GeForce RTX® 4090 OC / GPU Temp. (Max)：75℃

Through the thermal image, we found that the internal heat was effectively directed to designated exhaustion vents, keeping the system operating at a cooler temperature. This finding validates how efficient CTE C750 Air is regarding cooling performance.

thermaltake

Thank you!