



System Thermal Test Report

Model: CTE T500 TG ARGB Snow

Version: 20230526A

NO: RS202305260002

A. Introduction

B. Test Configuration

C. Conclusion

A. Introduction

- 1. Objective**
- 2. Equipment**
- 3. Procedure**



Our objective is to find out if the CTE T500 TG ARGB 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 **eight** installed fans and a AIO 420 installed.

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.

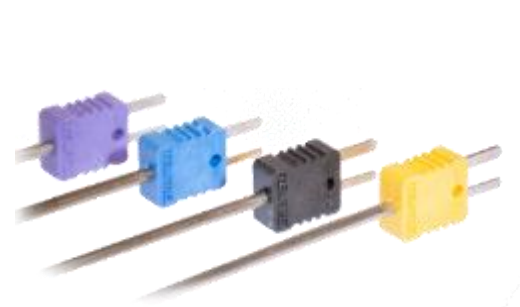
Testing steps:

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**
- 2. Chassis Hardware List**
- 3. Chassis Fan Allocation**
- 4. Chassis Thermal Airflow**
- 5. Chassis Measured Points**
- 6. Thermal Stress Test**
- 7. AIDA64 & FurMark Test**
- 8. Graphics Performance Testing**
- 9. Acoustic Test**

1. Laboratory Equipment



Thermocouple



Sound Level Meter



Thermal Imaging Camera



Temperature Data Acquisition

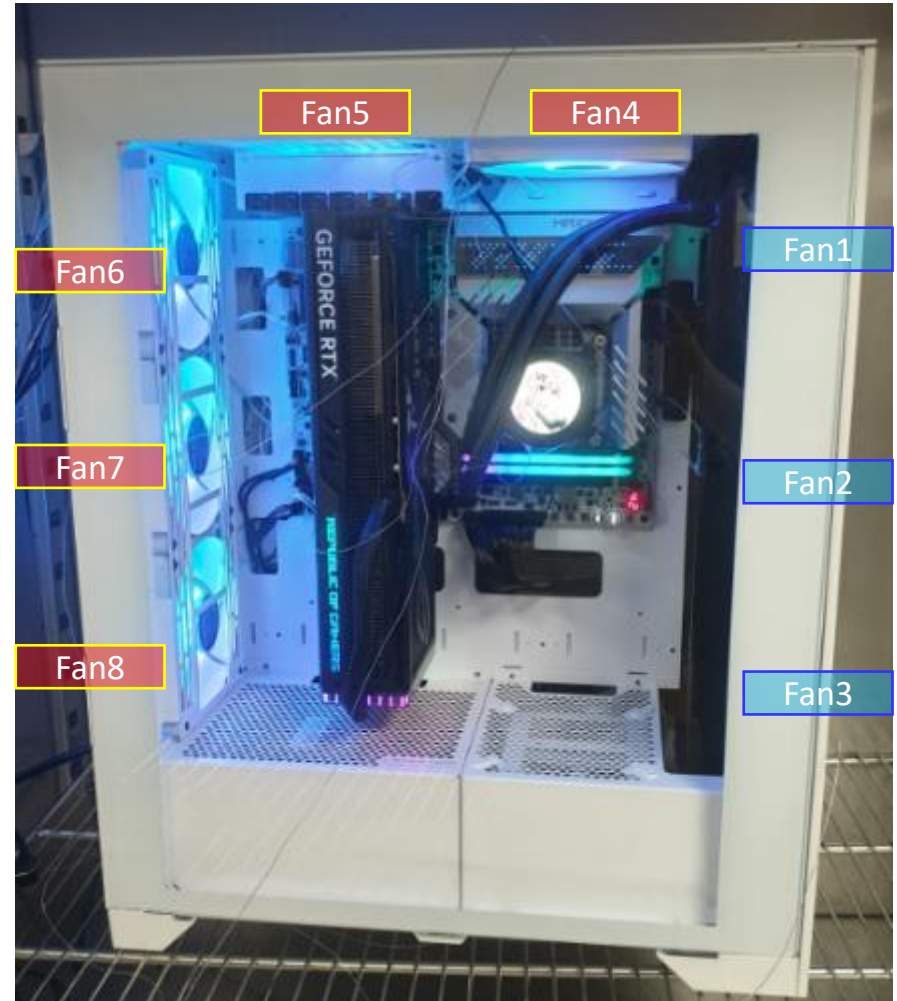


Temperature & Humidity Chamber

2. Chassis Hardware List

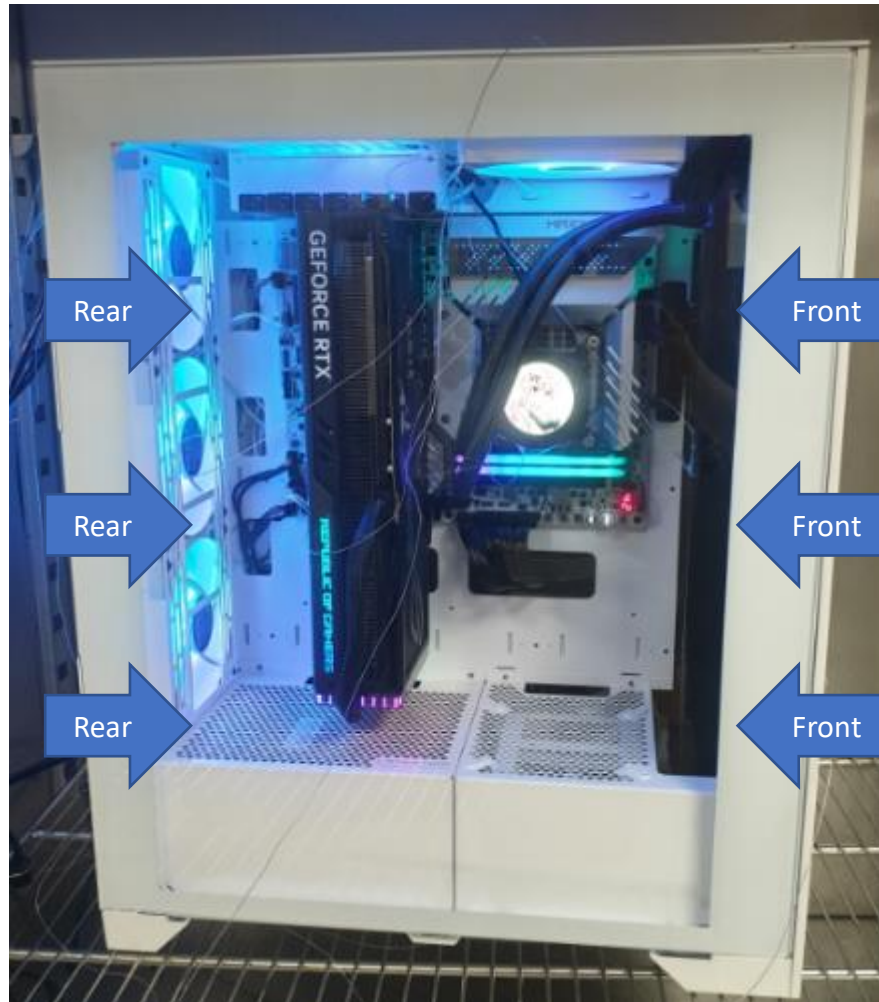
Component	Model
Chassis	CTE T500 TG ARGB Snow
Motherboard	ASUS ROG MAXIMUS Z790 APEX
CPU	Intel® Core™ i9-13900K Processor (TDP 253W)
GPU	ASUS ROG Strix GeForce RTX® 4090 OC 24GB GDDR6X
RAM	TOUGHRAM Z-ONE RGB D5 (16G x 2)
SSD	Seagate SSD 120G
PSU	Toughpower GF3 1200W - TT Premium Edition
CPU Cooler	TOUGHLIQUID Ultra 420 AIO Liquid Cooler
Fans	AIO:TOUGHFAN 140mm x 3 (2000rpm) Chassis: CT 140mm x 5 (1500 rpm) (Top x 2 , Rear 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





4. Chassis Thermal Airflow

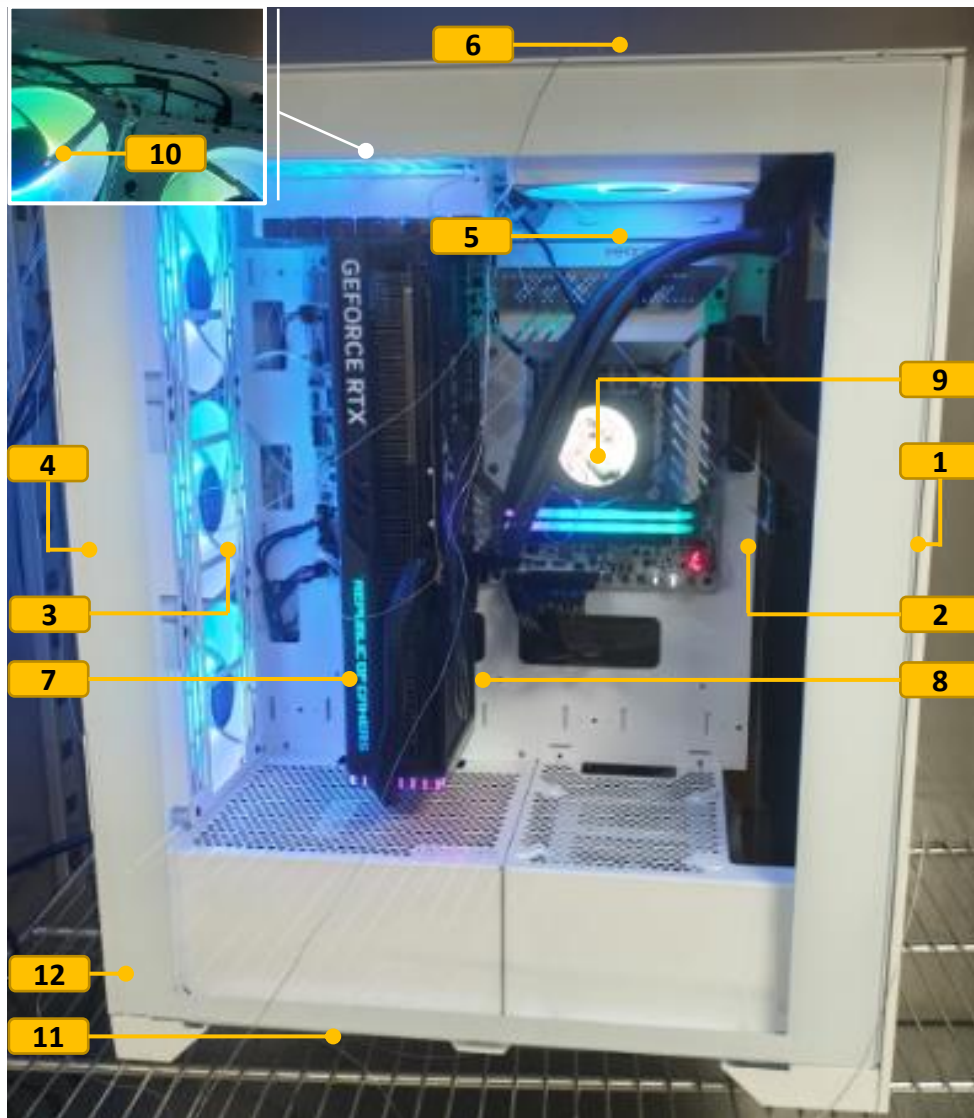
Cool Airflow Inlets (Active)



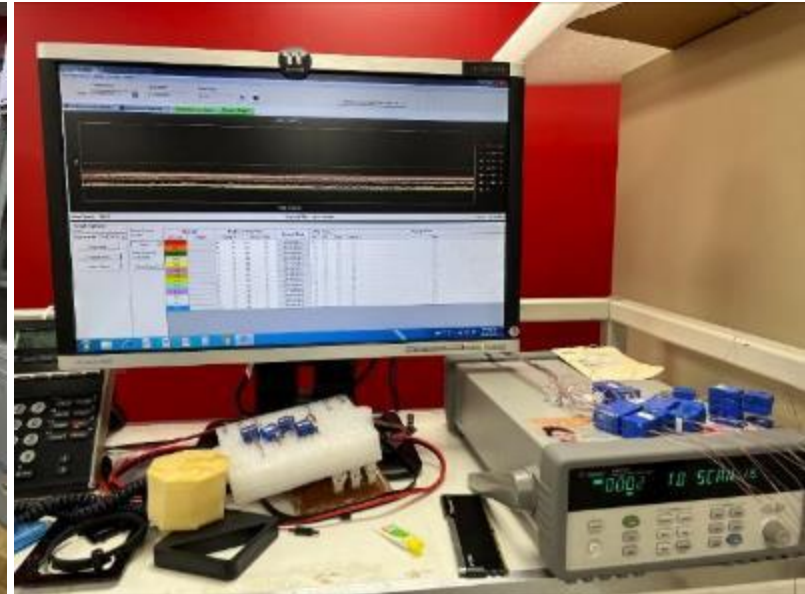
Hot Airflow Exhausts



5. Chassis Measured Points



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



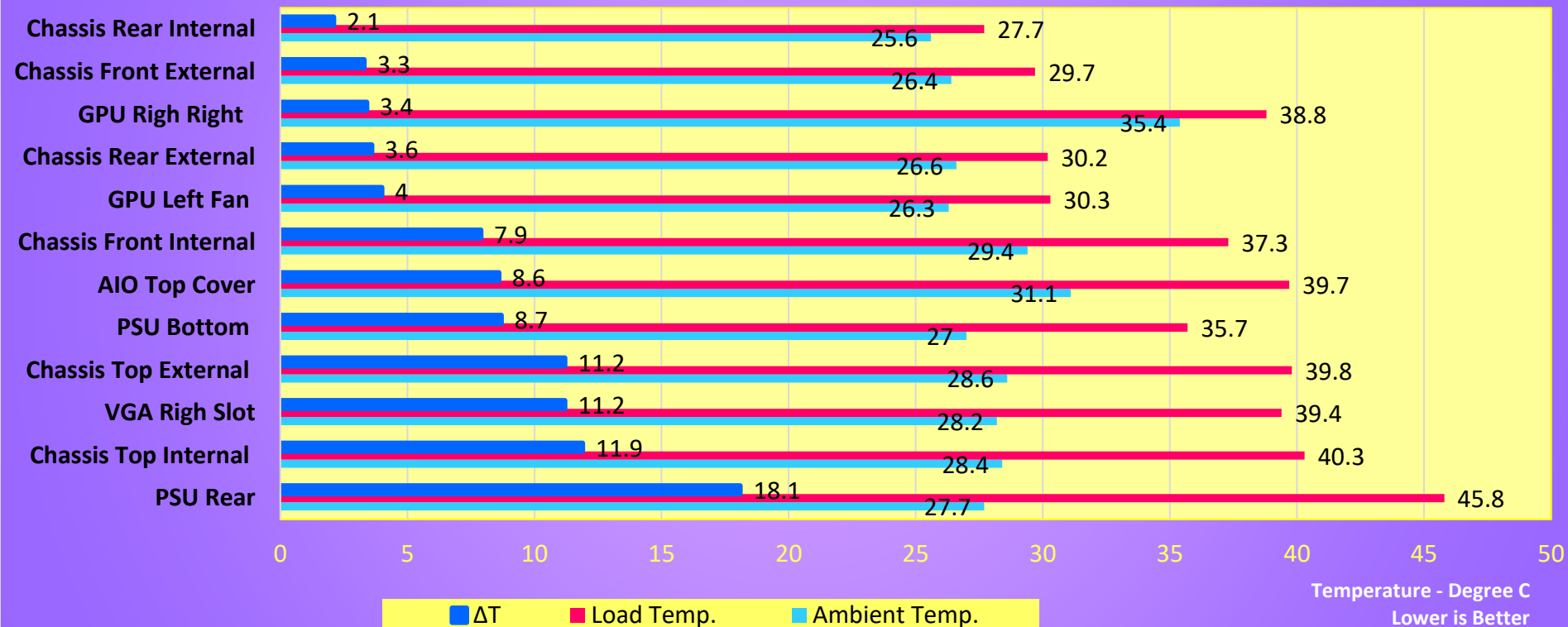
- NO: RS202305260002**



Temperature Data Recoding

System Thermal Stress Test CTE T500 TG ARGB

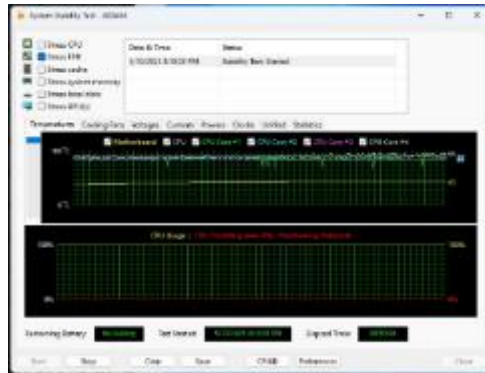
CPU- Intel Core i9-13900K
GPU-ASUS ROG-STRIX-RTX4090
Ambient Temperature: 25°C
Humidity: 50%



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. 113 GPU Right Fan** and **NO. 114 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.



AIDA64 Extreme



FurMark

Date	5/18/2023
Time (HH:MM)	1:59 PM
CPU Clock	1400 MHz
Motherboard	Asus ROG Maximus Z790 Apex
BIOS Version	0812
Free Memory	27141 MB
GPU Clock	210 MHz
Motherboard	32°C
CPU	38°C
CPU Package	41°C
GPU Diode	38°C
GPU Hotspot	46°C
AIO Pump	3183 RPM
CPU	548 RPM
Chassis #3	715 RPM
GPU	0 RPM
GPU	0%
CPU Core	0.728 V
GPU Core	0.875 V
CPU Package	21.81 W
GPU	16.06 W
GPU TDP%	3%

Idle

Date	5/18/2023
Time (HH:MM)	2:30 PM
CPU Clock	5201 MHz
Motherboard	Asus ROG Maximus Z790 Apex
BIOS Version	0812
Free Memory	26865 MB
GPU Clock	2745 MHz
Motherboard	36°C
CPU	86°C
CPU Package	97°C
GPU Diode	82°C
GPU Hotspot	91°C
AIO Pump	3183 RPM
CPU	2005 RPM
Chassis #3	1578 RPM
GPU	2696 RPM
GPU	87%
CPU Core	1.190 V
GPU Core	0.995 V
CPU Package	252.58 W
GPU	495.86 W
GPU TDP%	99%

Full load

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.

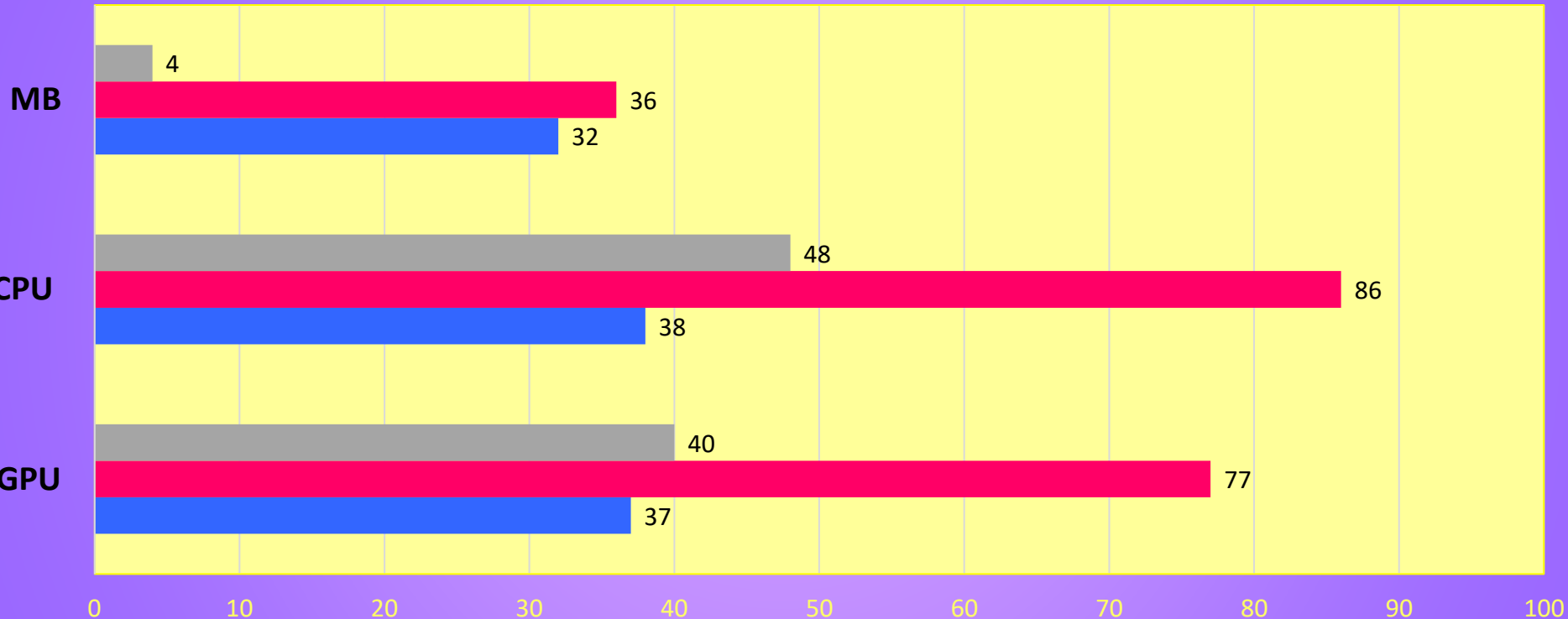


Idle



Full load

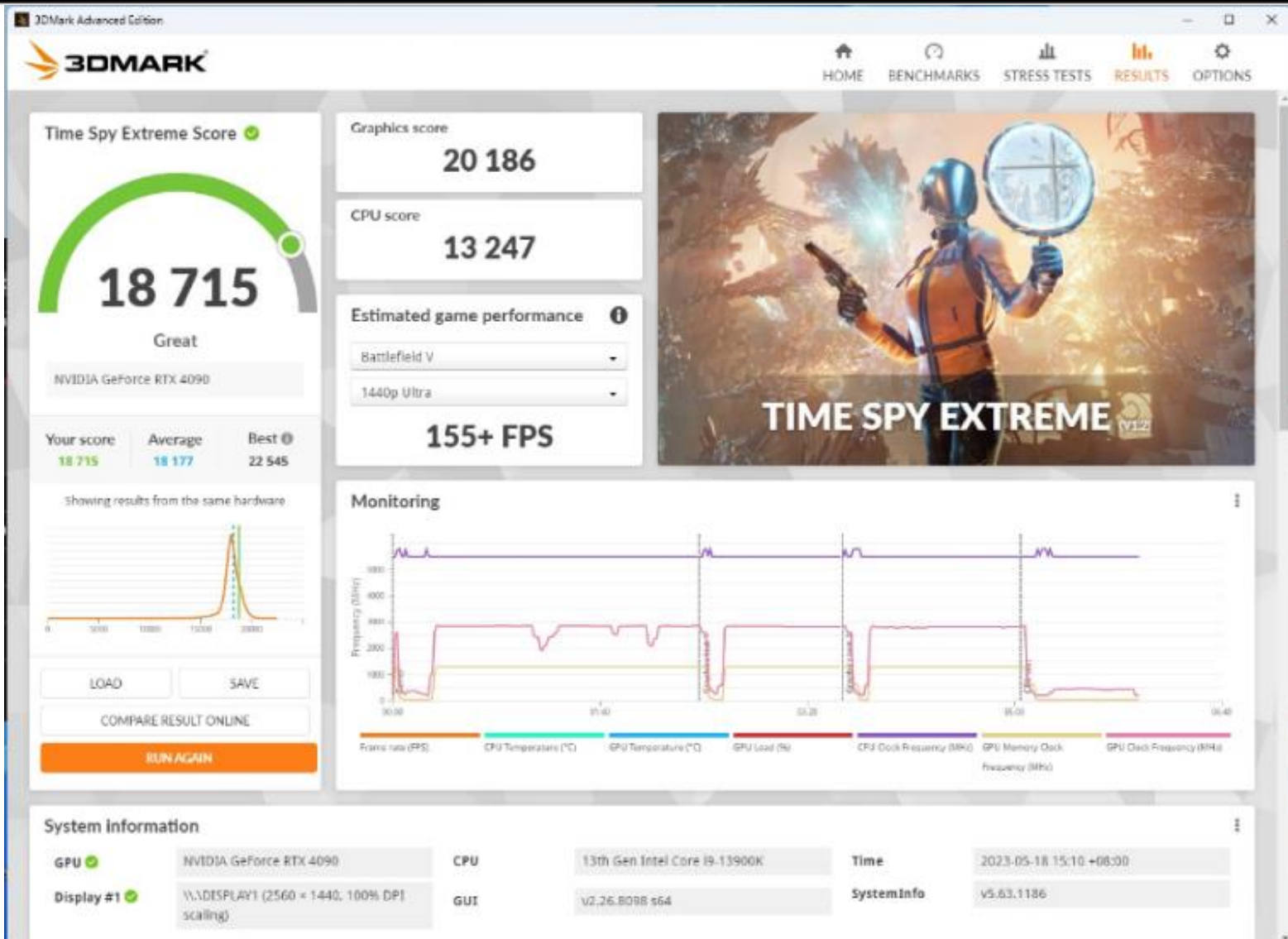
CPU & GPU Thermal Stress Test CTE T500 TG ARGB



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

■ ΔT ■ Load Temp. ■ Idle Temp.

Temperature - Degree C
Lower is Better



9. Acoustic Sound Pressure Level Test

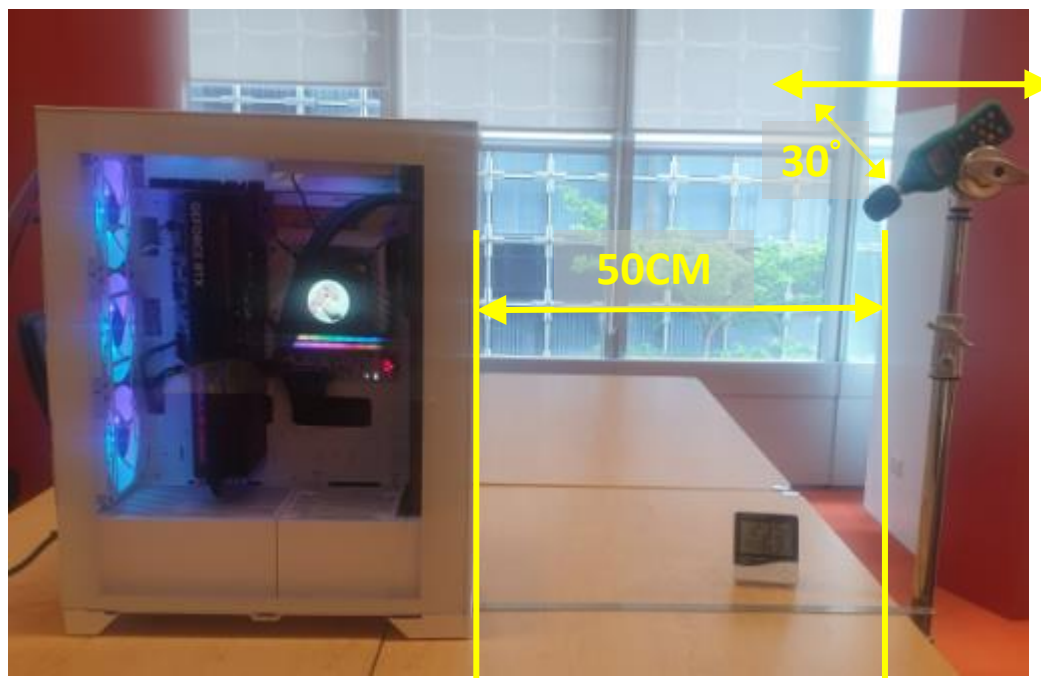
Test Environment : **Thermaltake Taipei Office**

Test Model: CTE T500 TG

Test Ambience: **24.5 °C(Temperature) / 60% R.H.(Relative Humidity)**

Microphone position: **50 cm / in front of PC system**

Background Noise : **36.1 dBA.**



Microphone position



Test Ambience

9. Acoustic Sound Pressure Level Test

Fan Speed 600rpm – 37.5dBA

Fan Speed 700rpm – 37.8dBA

Fan Speed 900rpm – 38.6dBA

Fan Speed 1500rpm – 56dBA



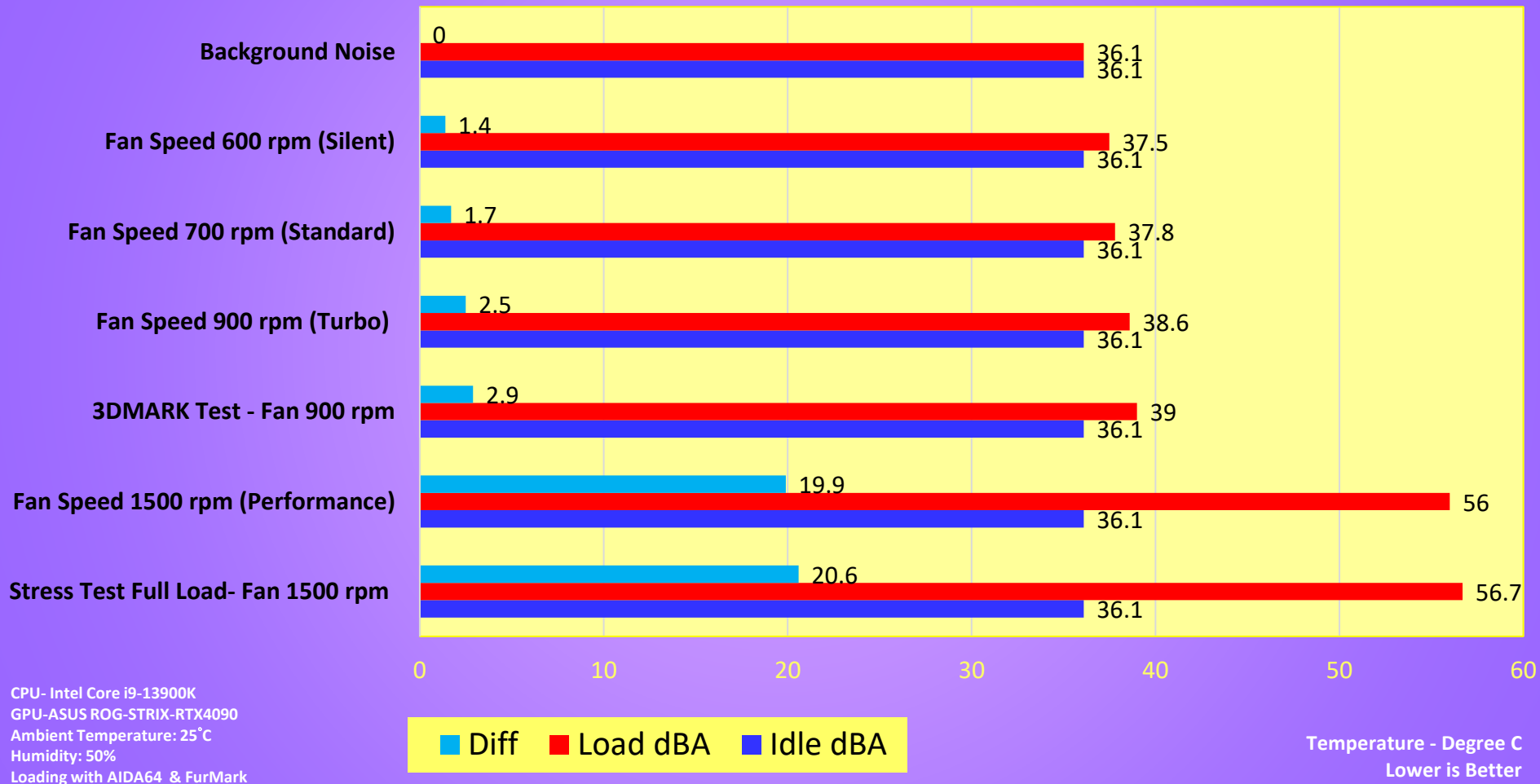
Date	5/22/2023
Time (HH:MM)	11:44 AM
CPU Clock	1100 MHz
Motherboard	Asus ROG Maximus Z790 Apex
BIOS Version	0812
Free Memory	27529 MB
GPU Clock	210 MHz
Motherboard	31°C
CPU	35°C
CPU Package	40°C
GPU Diode	39°C
GPU Hotspot	47°C
AIO Pump	3176 RPM
CPU	473 RPM
Chassis #3	549 RPM
GPU	0 RPM
GPU	0%
CPU Core	0.879 V
GPU Core	0.875 V
CPU Package	17.21 W
GPU	14.56 W
GPU TDP%	3%

Date	5/22/2023
Time (HH:MM)	11:48 AM
CPU Clock	5501 MHz
Motherboard	Asus ROG Maximus Z790 Apex
BIOS Version	0812
Free Memory	27326 MB
GPU Clock	210 MHz
Motherboard	31°C
CPU	36°C
CPU Package	41°C
GPU Diode	41°C
GPU Hotspot	49°C
AIO Pump	3183 RPM
CPU	516 RPM
Chassis #3	727 RPM
GPU	0 RPM
GPU	0%
CPU Core	1.350 V
GPU Core	0.875 V
CPU Package	29.26 W
GPU	14.21 W
GPU TDP%	3%

Date	5/22/2023
Time (HH:MM)	11:54 AM
CPU Clock	1100 MHz
Motherboard	Asus ROG Maximus Z790 Apex
BIOS Version	0812
Free Memory	27458 MB
GPU Clock	210 MHz
Motherboard	31°C
CPU	35°C
CPU Package	39°C
GPU Diode	40°C
GPU Hotspot	48°C
AIO Pump	3199 RPM
CPU	787 RPM
Chassis #3	901 RPM
GPU	0 RPM
GPU	0%
CPU Core	0.675 V
GPU Core	0.875 V
CPU Package	11.37 W
GPU	8.86 W
GPU TDP%	2%

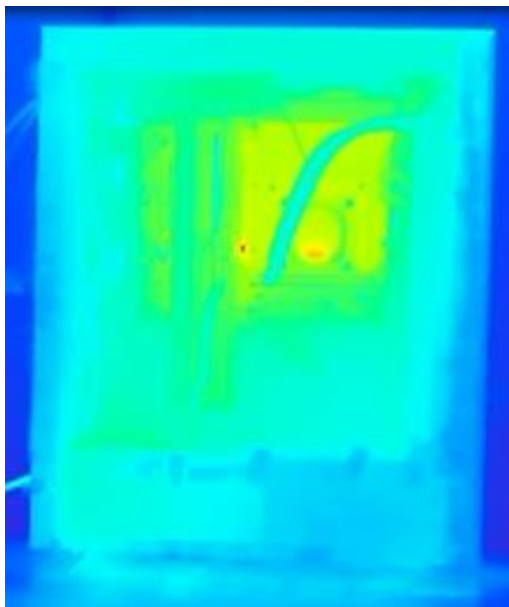
Date	5/22/2023
Time (HH:MM)	1:11 PM
CPU Clock	5501 MHz
Motherboard	Asus ROG Maximus Z790 Apex
BIOS Version	0812
Free Memory	27378 MB
GPU Clock	210 MHz
Motherboard	29°C
CPU	33°C
CPU Package	38°C
GPU Diode	34°C
GPU Hotspot	43°C
AIO Pump	3176 RPM
CPU	1897 RPM
Chassis #3	1624 RPM
GPU	0 RPM
GPU	0%
CPU Core	1.305 V
GPU Core	0.880 V
CPU Package	28.54 W
GPU	10.94 W
GPU TDP%	2%

Acoustic Sound Pressure Level Test - CTE T500 TG ARGB



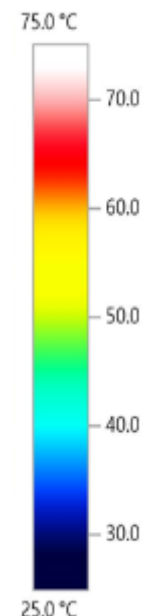
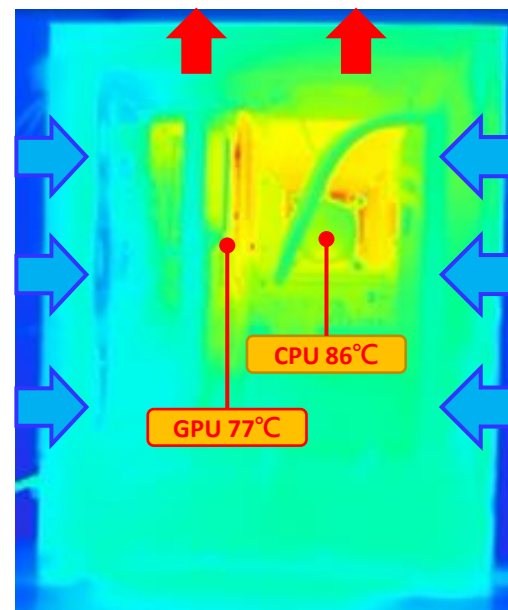
C. Conclusion

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) : **86°C (TDP 253W)**

-ASUS ROG Strix GeForce RTX® 4090 OC / GPU Temp. (Max) : **77°C**

Through the thermal image, we found that the internal heat was effectively directed to designated exhaust vents, keeping the system operating at a cooler temperature. This finding validates how efficient The CTE T500 TG ARGB is regarding cooling performance.



thermaltake

Thank you!