System Thermal Test Report

Model: **CTE C700 Air**

Version: **20230621B**

NO: RS202306210002

Table of Contents

A. Introduction

1. Objective
2. Equipment
3. Procedure

1. Objective

Our objective is to find out if the **CTE C700 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 **41˚C** while the system is running at full load, with **ten** 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

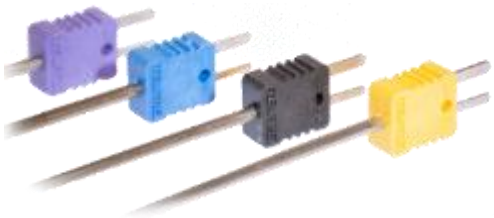
Testing steps:

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
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

Temperature & Humidity Chamber

Thermal Imaging Camera

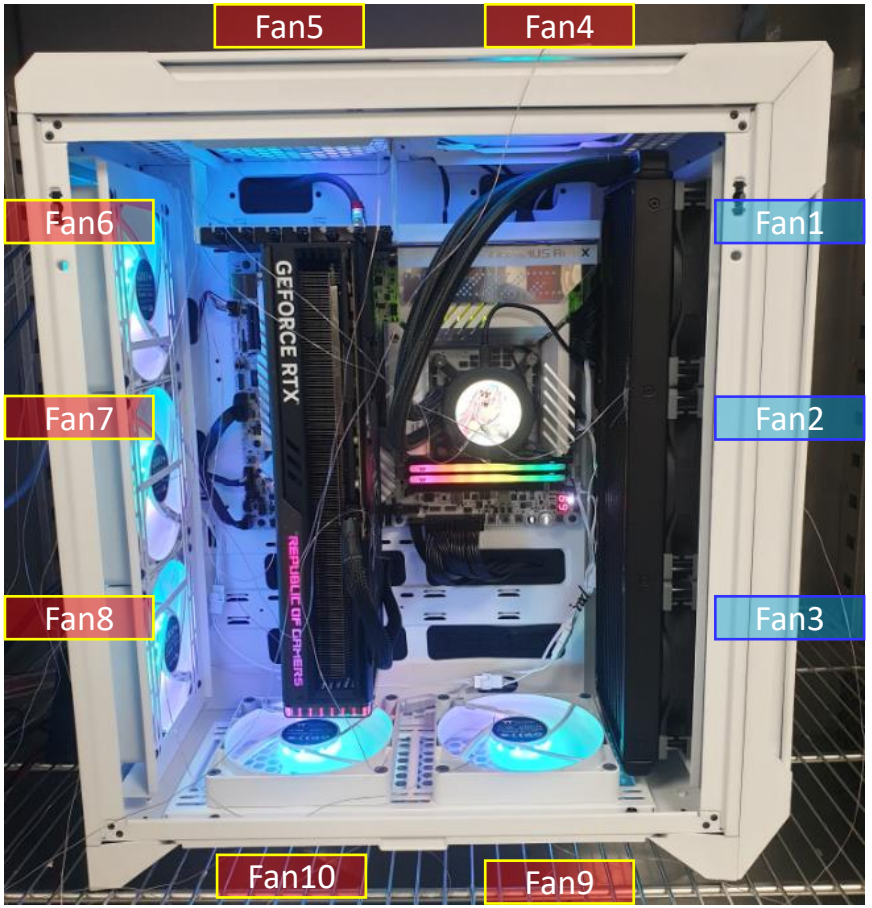
Temperature Data Acquisition

2. Chassis Hardware List

Component	Model
Chassis	CTE C700 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 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 7 (1500 rpm) (Top x 2 , Rear x 3, Bottom x 2)
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: RS202306210002

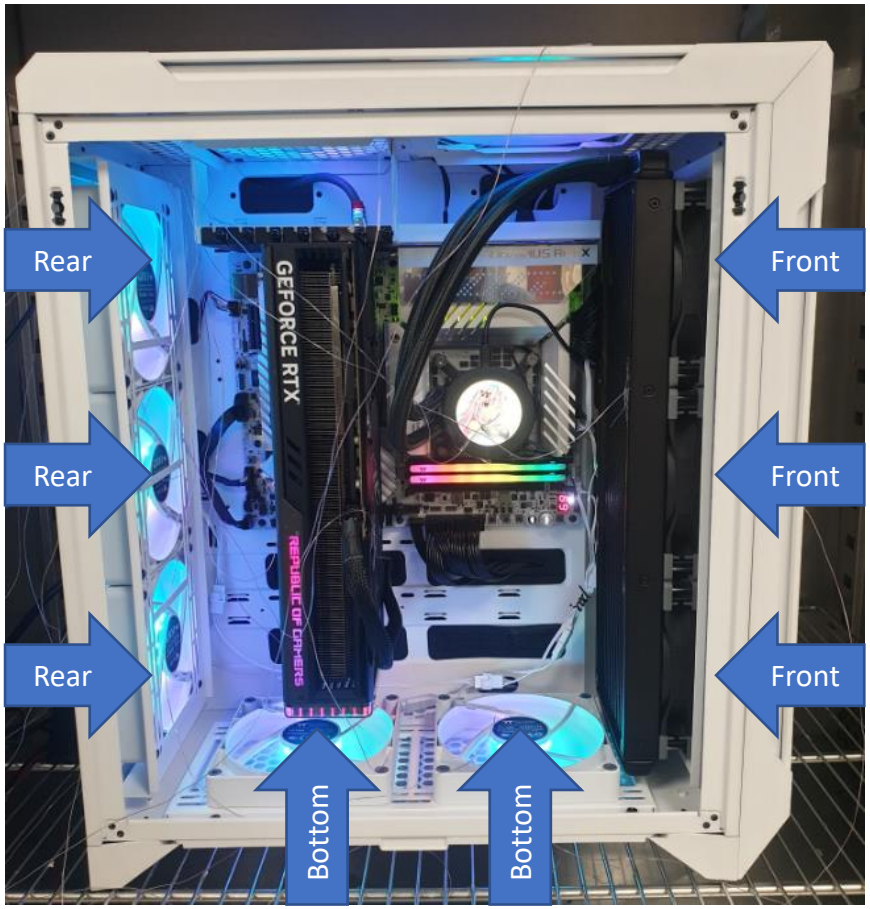
3. Chassis Fan Allocation



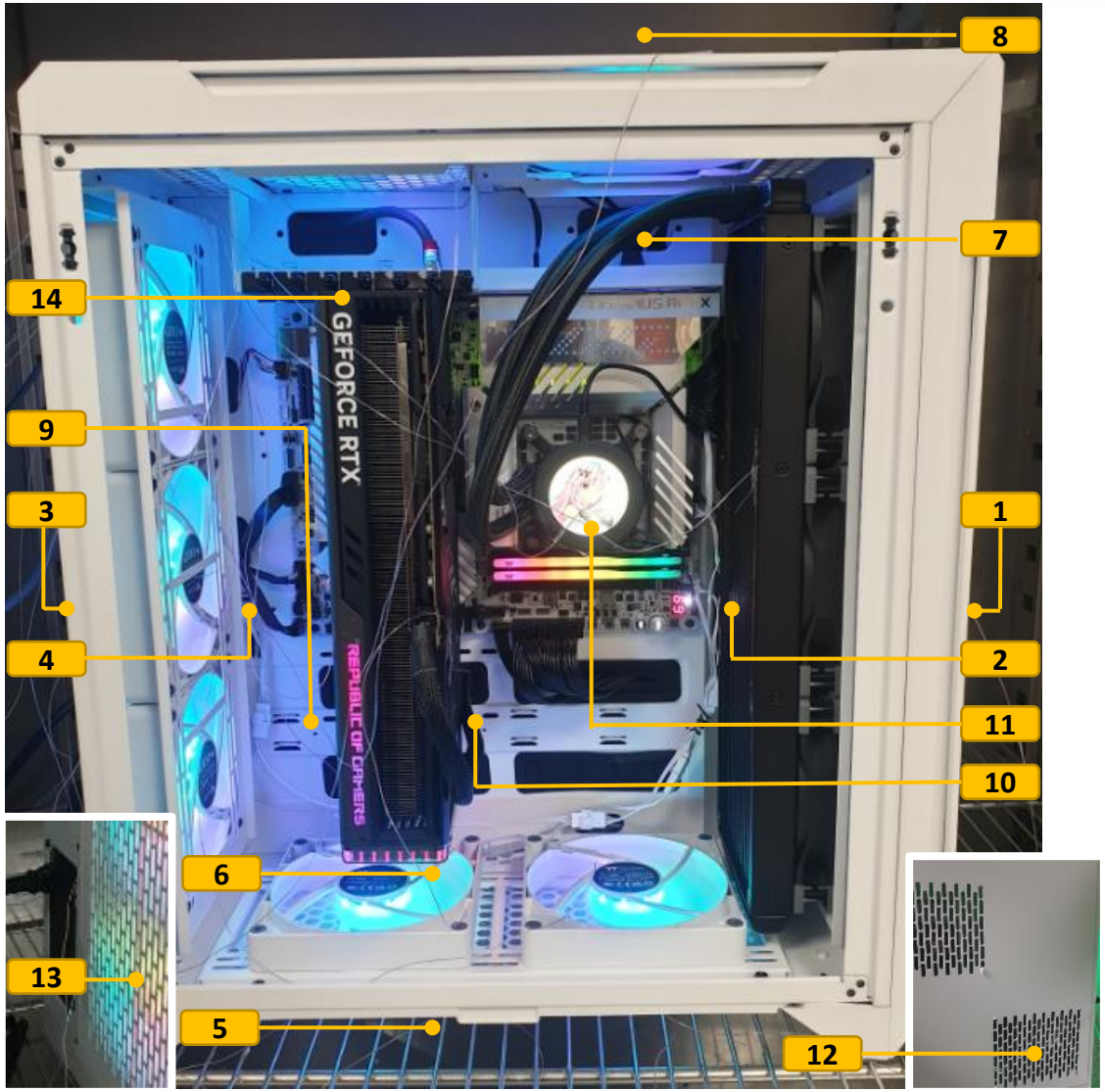
4. Chassis Thermal Airflow

Cool Airflow Inlets (Active)

Hot Airflow Exhausts

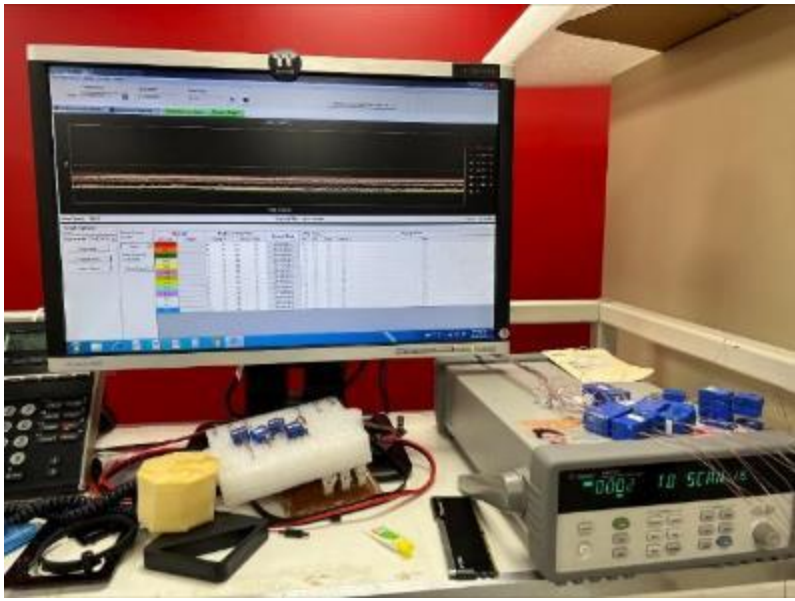


5. Chassis Measured Points



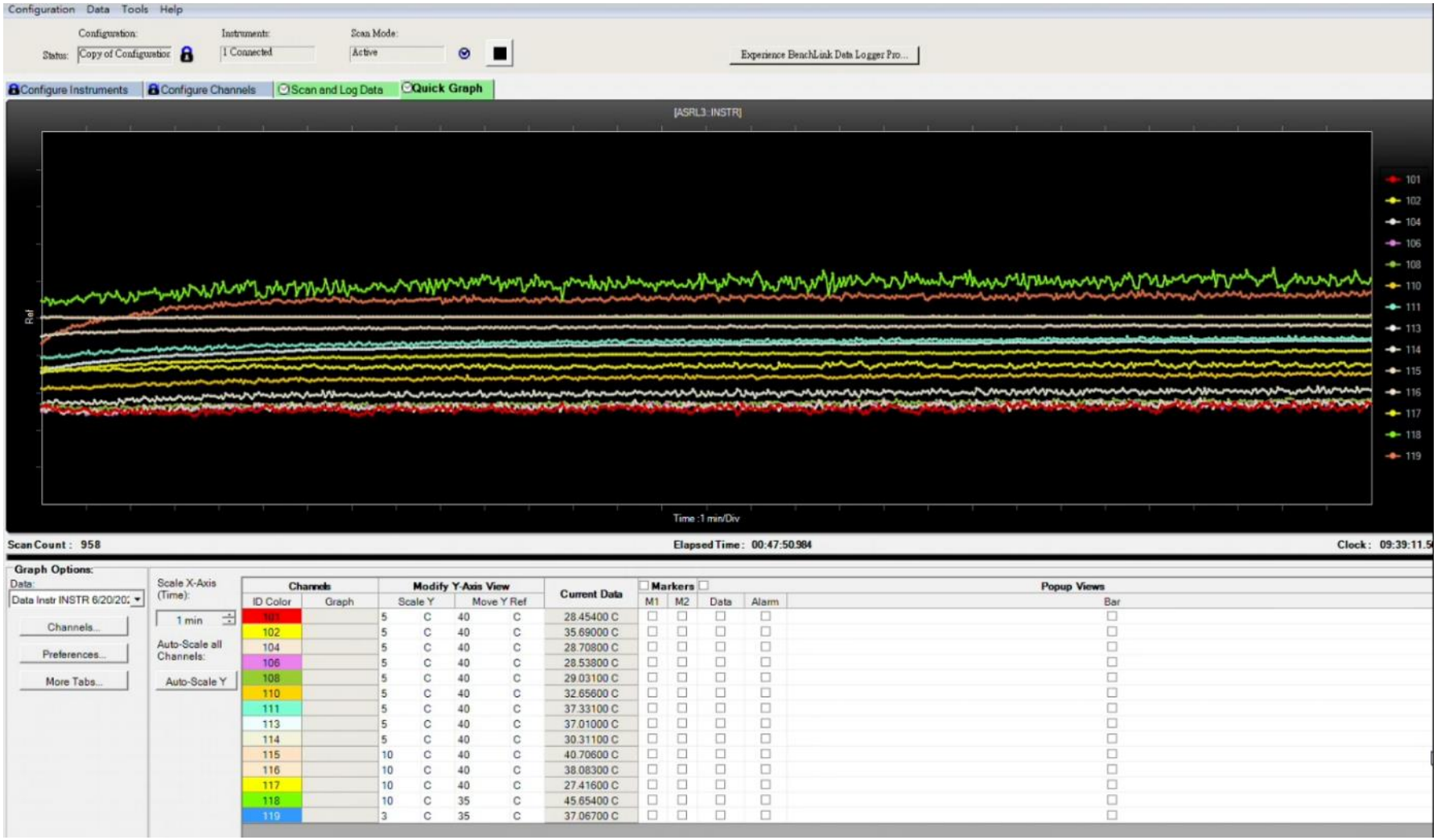
Measure Point	Description	Airflow	Thermocouple Number
1	Chassis Front External	Intake	101
2	Chassis Front Internal	Intake	102
3	Chassis Rear External	Intake	104
4	Chassis Rear Internal	Intake	106
5	Chassis Bottom External	Intake	108
6	Chassis Bottom Internal	Intake	110
7	Chassis Top Internal	Exhaust	111
8	Chassis Top External	Exhaust	113
9	GPU Left	Intake	114
10	GPU Right	Exhaust	115
11	AIO Top Cover	-	116
12	PSU Right	Intake	117
13	PSU Rear	Exhaust	118
14	VGA Righ Slot	Exhaust	119

6. Thermal Stress Test



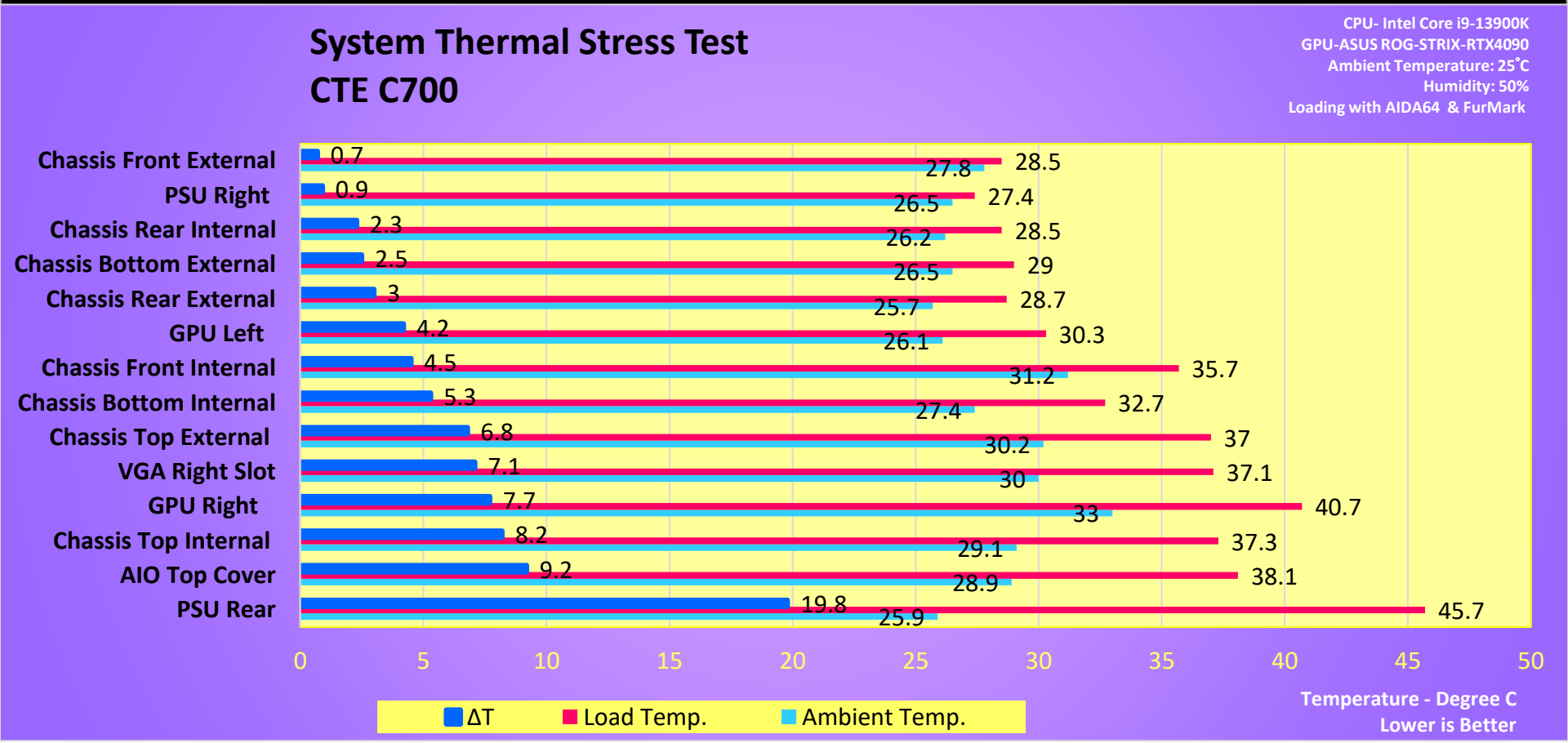
- Setting up the chamber temperature and humidity
- Temperature: 25°C
- Humidity: 50%
- Recording Data

6. Thermal Stress Test



Temperature Data Recoding

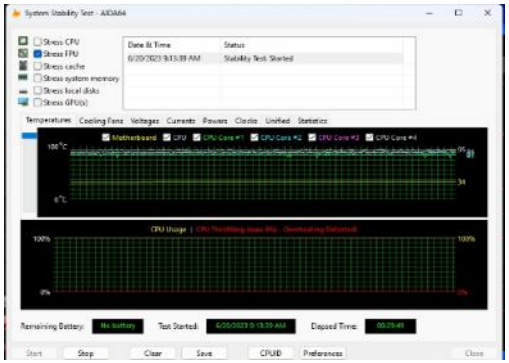
6. Thermal Stress Test



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 **41˚C** since they were drawing Air from environment. Two critical positions we were looking at are **NO. 115 GPU Right** and **NO. 116 AIO Top 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

Idle	
Date	6/20/2023
Time (HH:MM)	9:05 AM
CPU Clock	5501 MHz
Motherboard	Asus ROG Maximus Z790 Apex
BIOS Version	0904
Free Memory	26254 MB
GPU Clock	210 MHz
Motherboard	31°C
CPU	39°C
CPU Package	43°C
GPU Diode	42°C
GPU Hotspot	50°C
AIO Pump	3183 RPM
CPU	644 RPM
CPU OPT	724 RPM
GPU	0 RPM
GPU	0%
CPU Core	1.039 V
GPU Core	0.875 V
CPU Package	28.02 W
GPU	13.36 W
GPU TDP%	3%

Idle

Full load	
Date	6/20/2023
Time (HH:MM)	9:43 AM
CPU Clock	5200 MHz
Motherboard	Asus ROG Maximus Z790 Apex
BIOS Version	0904
Free Memory	26173 MB
GPU Clock	2760 MHz
Motherboard	34°C
CPU	85°C
CPU Package	96°C
GPU Diode	81°C
GPU Hotspot	90°C
AIO Pump	3154 RPM
CPU	2051 RPM
CPU OPT	1419 RPM
GPU	2677 RPM
GPU	86%
CPU Core	1.190 V
GPU Core	1.050 V
CPU Package	252.41 W
GPU	495.03 W
GPU TDP%	90%

Full load

7. AIDA64 & FurMark Test

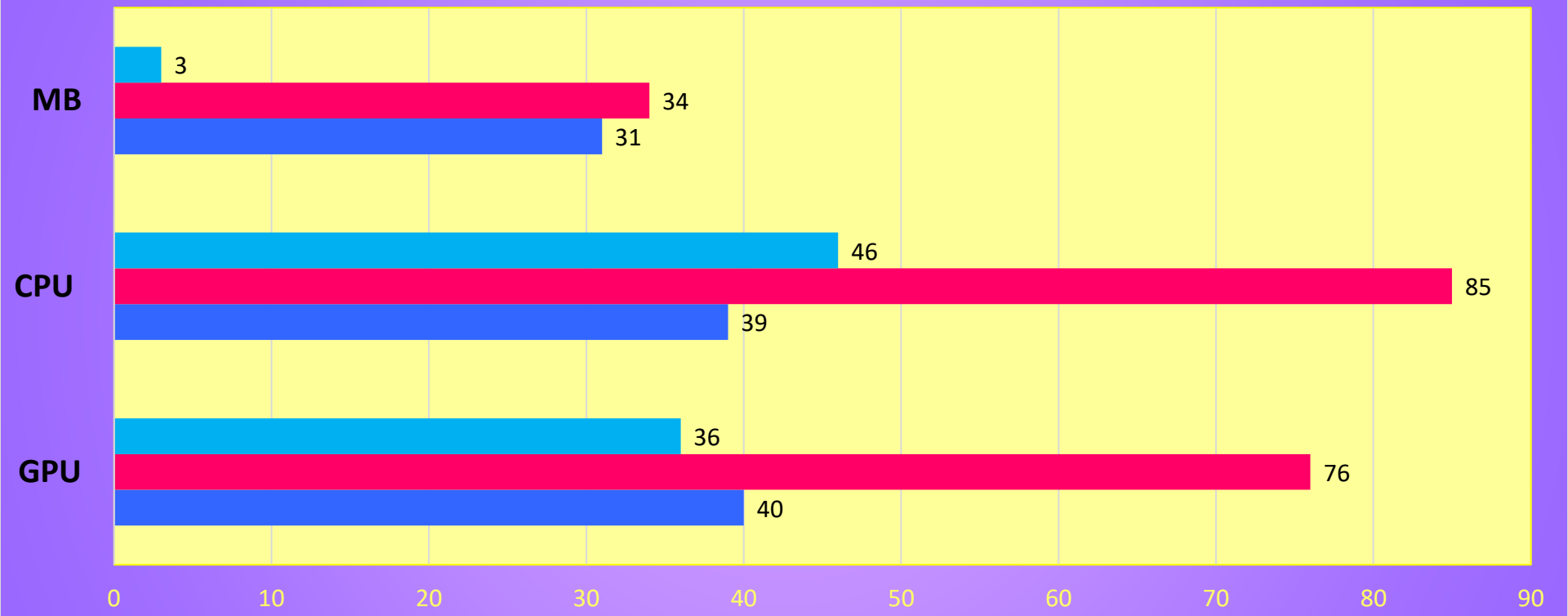
We used **AIDA64 Extreme** (stress FPU) and **FurMark ROG Edition** (**resolution: 3840 x 2160) to push 100% load** on the CPU and GPU for 30 minutes.

Idle

Full load

7. AIDA64 & FurMark Test

CPU & GPU Thermal Stress Test
CTE C700 Air

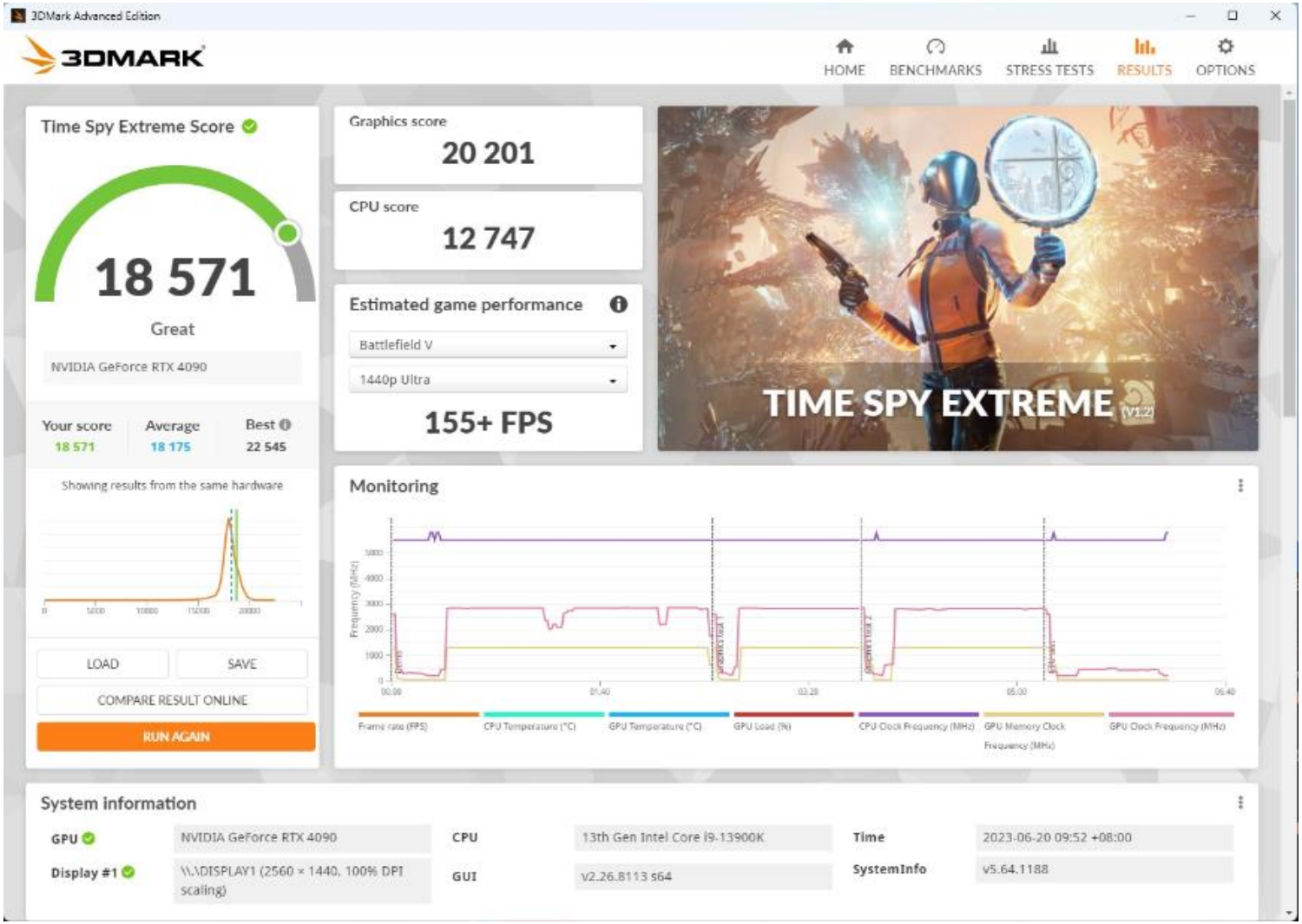


CPU- Intel Core i9-13900K
GPU-ASUS ROG-STRIX-RTX4090
Ambient Temperature: 25˚C
Humidity: 50%
Loading with AIDA64 & FurMark

Temperature - Degree C
Lower is Better

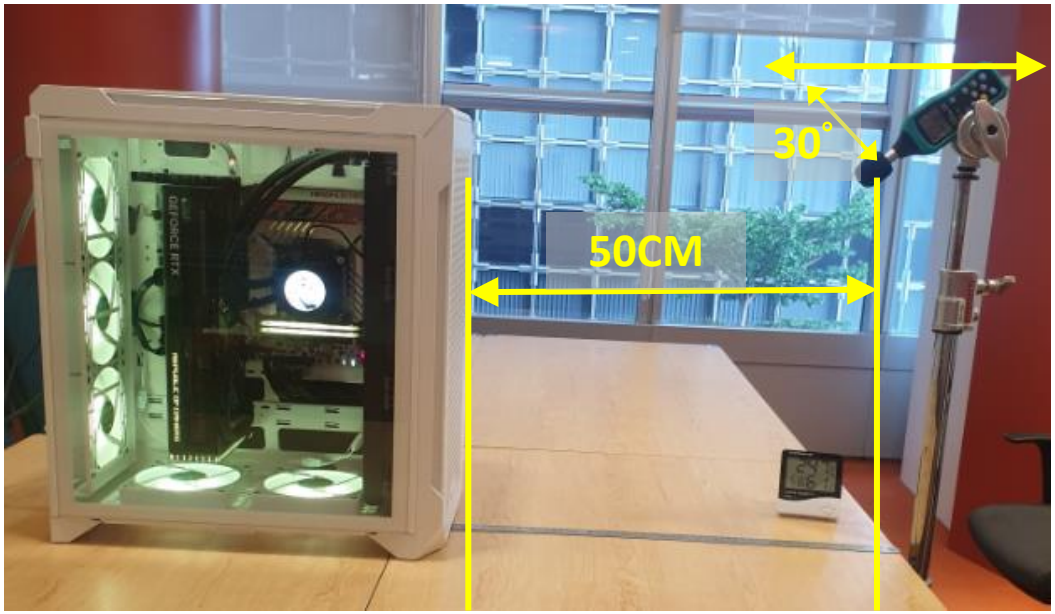
NO: RS202306210002

8. Graphics Performance Testing



9. Acoustic Sound Pressure Level Test

Test Environment：**Thermaltake Taipei Office**
Test Model: CTE C700 Air
Test Ambience: **24.7 ℃(Temperature) / 61% R.H.(Relative Humidity)**
Microphone position: **50 cm / in front of PC system**
Background Noise：**35.7 dBA.**



Microphone position

Test Ambience

9. Acoustic Sound Pressure Level Test

Fan Speed 500rpm – **36.7dBA**	Fan Speed 650rpm – **37.7dBA**	Fan Speed 850rpm – **38.4dBA**	Fan Speed 1500rpm – **57.4dBA**

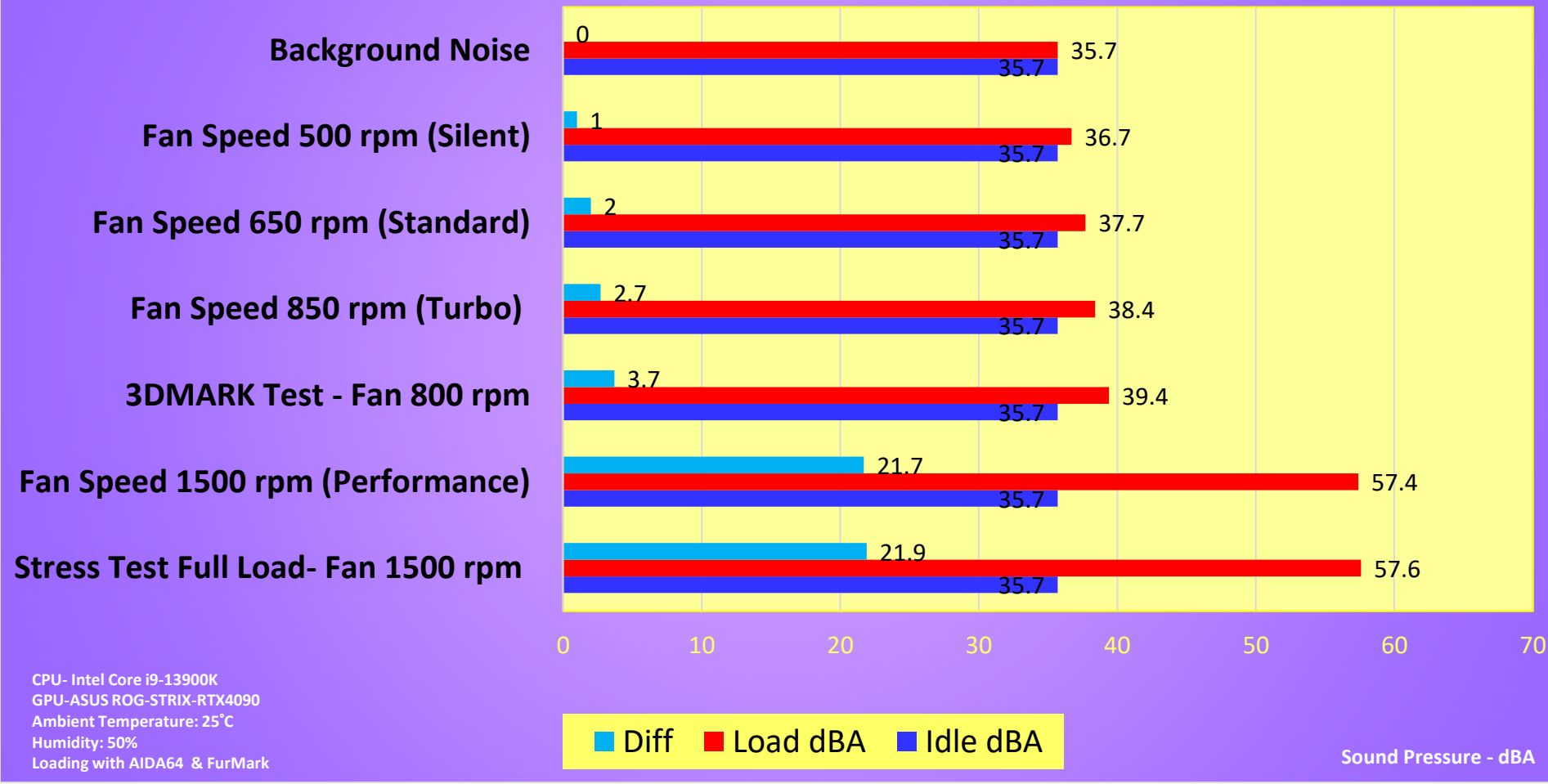
Date	6/20/2023	6/20/2023	6/20/2023
Time (HH:MM)	5:16 PM	5:19 PM	5:19 PM
CPU Clock	5200 MHz	5500 MHz	5501 MHz
Motherboard	Asus ROG Maximus Z790 Apex	Asus ROG Maximus Z790 Apex	Asus ROG Maximus Z790 Apex
BIOS Version	0904	0904	0904
Free Memory	26539 MB	26201 MB	26201 MB
GPU Clock	210 MHz	210 MHz	210 MHz
Motherboard	31°C	30°C	30°C
CPU	37°C	38°C	39°C
CPU Package	43°C	42°C	46°C
GPU Diode	42°C	41°C	42°C
GPU Hotspot	50°C	49°C	50°C
AIO Pump	2360 RPM	2890 RPM	2667 RPM
CPU OPT	472 RPM	644 RPM	841 RPM
GPU	0 RPM	0 RPM	0 RPM
GPU	0%	0%	0%
CPU Core	1.217 V	1.305 V	1.305 V
GPU Core	0.875 V	0.875 V	0.875 V
CPU Package	34.25 W	37.74 W	44.28 W
GPU	13.69 W	16.24 W	17.34 W
GPU TDP%	3%	3%	3%

Date	6/20/2023
Time (HH:MM)	5:21 PM
CPU Clock	5501 MHz
Motherboard	Asus ROG Maximus Z790 Apex
BIOS Version	0904
Free Memory	26216 MB
GPU Clock	210 MHz
Motherboard	29°C
CPU	36°C
CPU Package	41°C
GPU Diode	41°C
GPU Hotspot	49°C
AIO Pump	3245 RPM
CPU OPT	1474 RPM
GPU	0 RPM
GPU	0%
CPU Core	1.039 V
GPU Core	0.875 V
CPU Package	36.76 W
GPU	16.88 W
GPU TDP%	3%

NO: RS202306210002

9. Acoustic Sound Pressure Level Test

Acoustic Sound Pressure Level Test - CTE C700 Air



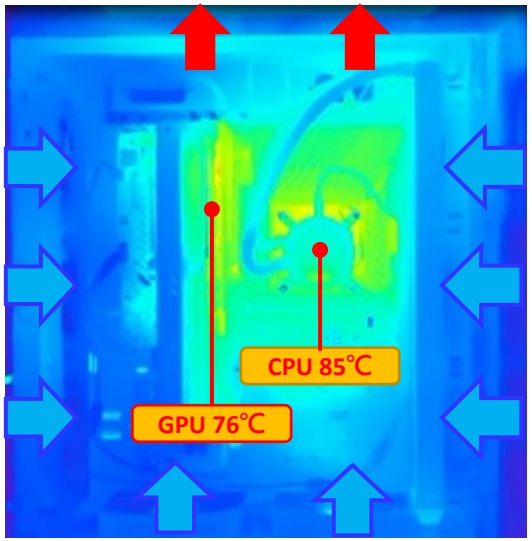
CPU- Intel Core i9-13900K
GPU-ASUS ROG-STRIX-RTX4090
Ambient Temperature: 25˚C
Humidity: 50%
Loading with AIDA64 & FurMark

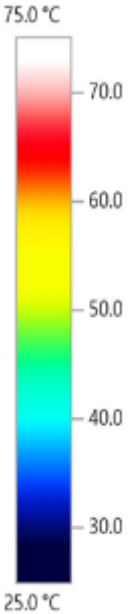
C. Conclusion

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)：85℃ (TDP 253W)

-ASUS ROG Strix GeForce RTX® 4090 OC / GPU Temp. (Max)：76℃

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 The CTE C700 Air is regarding cooling performance.

thermaltake

Thank you!