System Thermal Test Report

Model: **The Tower 300**

Version: **20231123A**

NO: RS202311230001

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A. Introduction

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1. Objective

Our objective is to find out if **The Tower 300** 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 **45˚C** while the system is running at full load, with **Eight** 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

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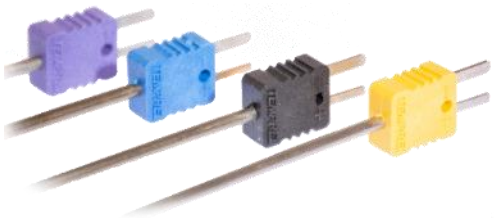
1. Laboratory Equipment



Thermocouple

Sound Level Meter

Temperature & Humidity Chamber

Thermal Imaging Camera

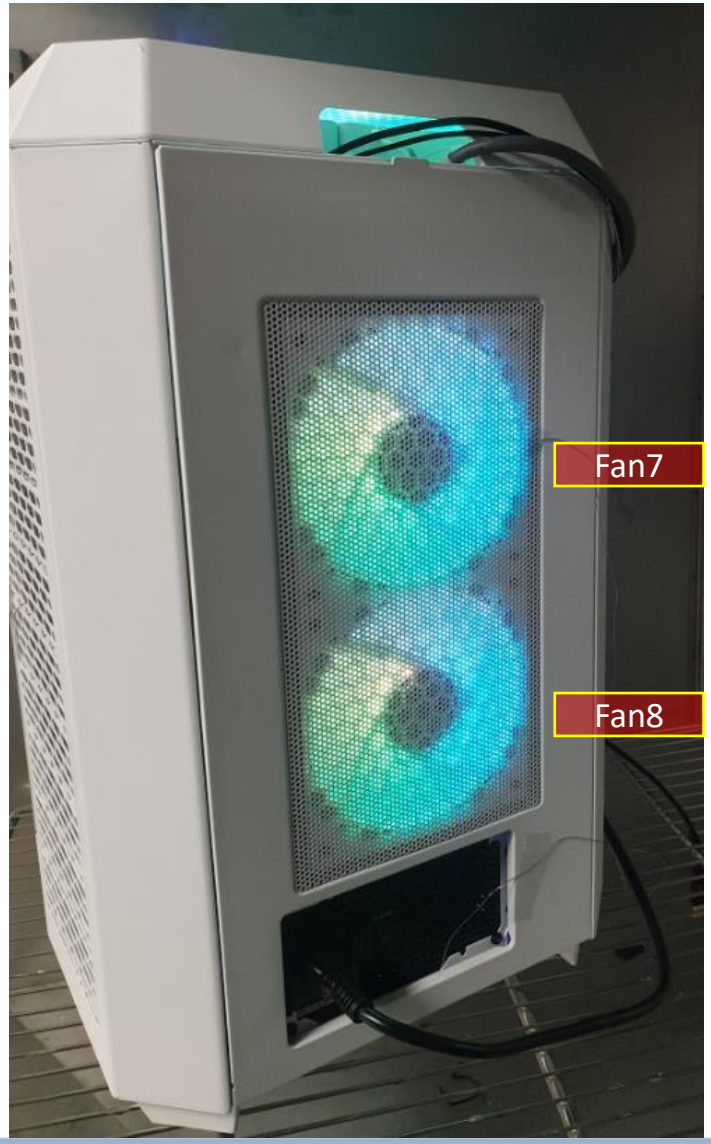
Temperature Data Acquisition

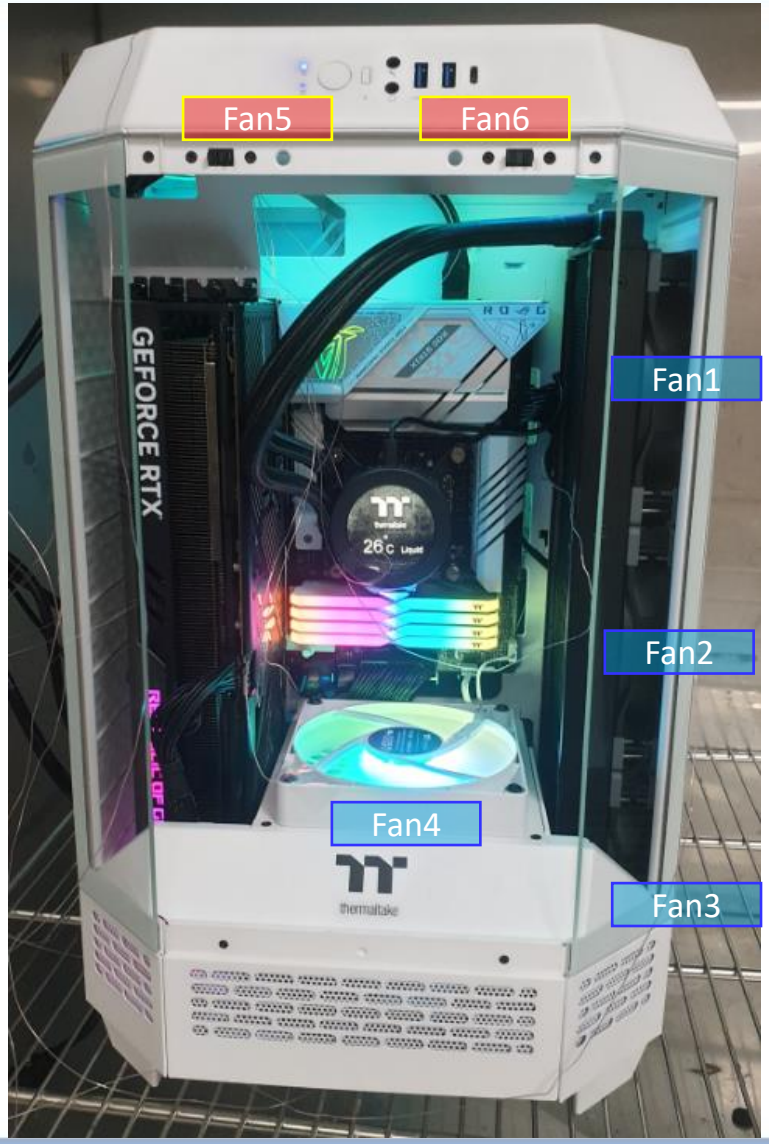
2. Chassis Hardware List

Component	Model
Chassis	The Tower 300
Motherboard	ASUS ROG STRIX B760-G GAMING WIFI
CPU	Intel® Core™ i9-13900K Processor (TDP 253W)
GPU	ASUS ROG Strix GeForce RTX® 4090 OC 24GB GDDR6X
RAM	TOUGHRAM XG RGB D5(16G x 4)
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 2 , Bottom x 1)
Software	1. AIDA64 Extreme 2. FurMark ROG Edition V0.9.1.0 3. CPU-Z Ver.2.015 x64 4. Core Temp V1.18
Full load	30 minutes
Camera	FLIR E86 Thermal Imaging Camera

NO: RS202311230001

3. Chassis Fan Allocation

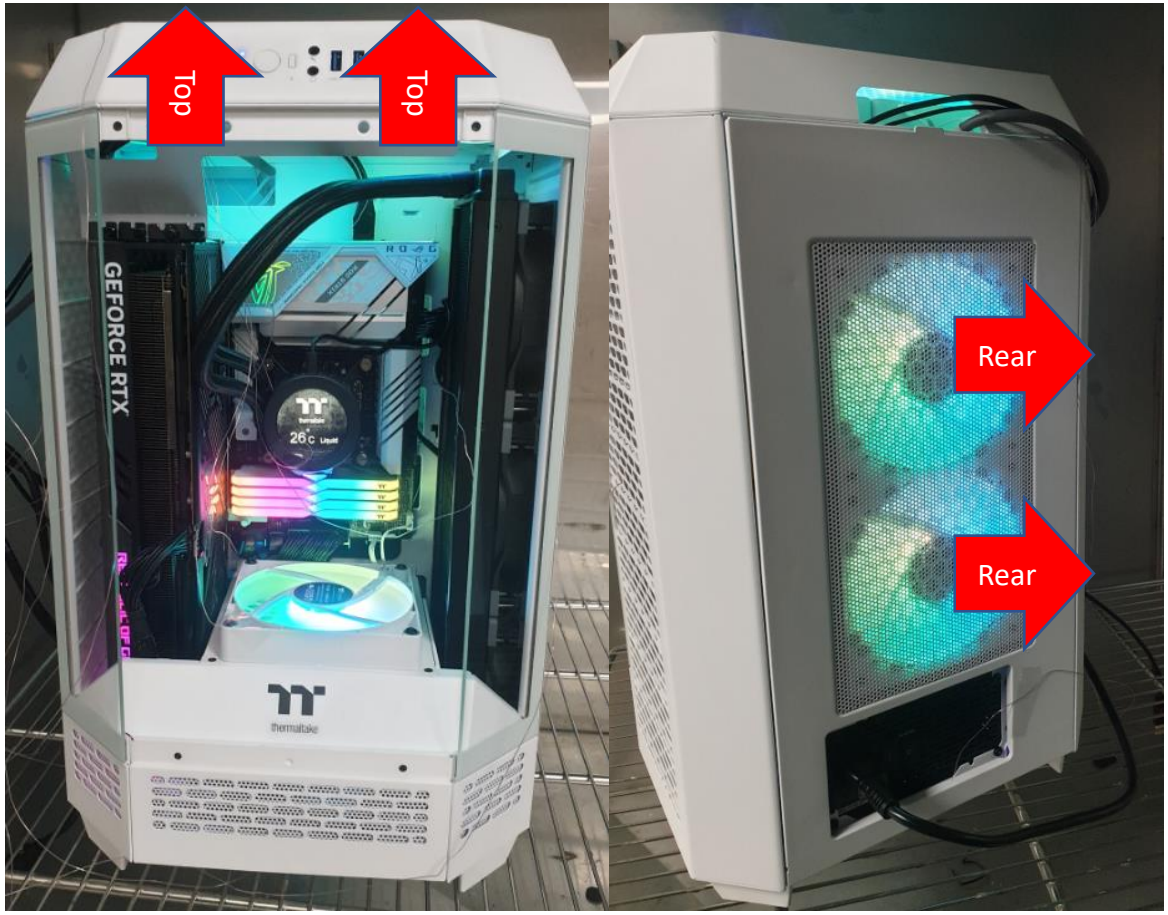




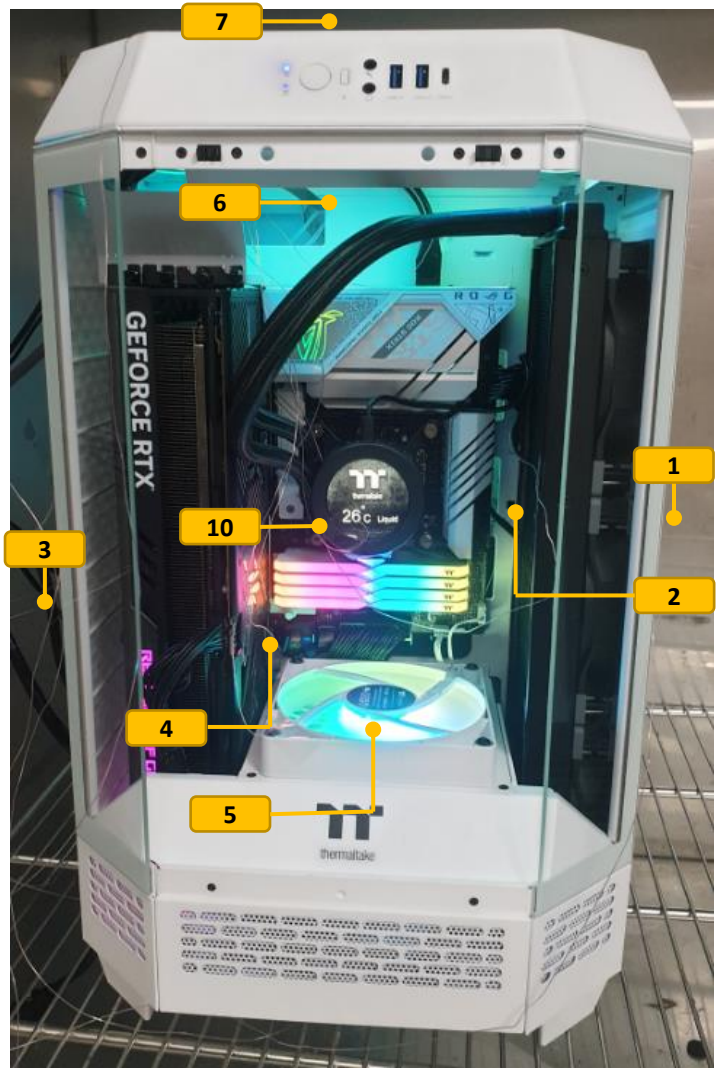
4. Chassis Thermal Airflow

Cool Airflow Inlets

Hot Airflow Exhausts

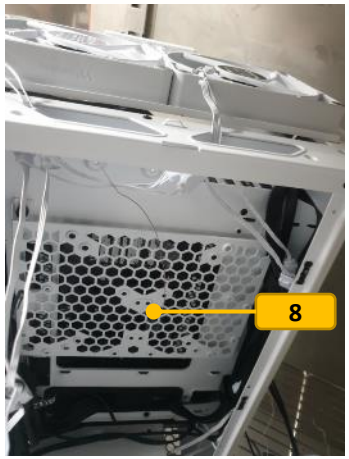


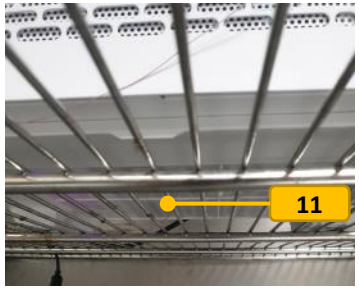
5. Chassis Measured Points

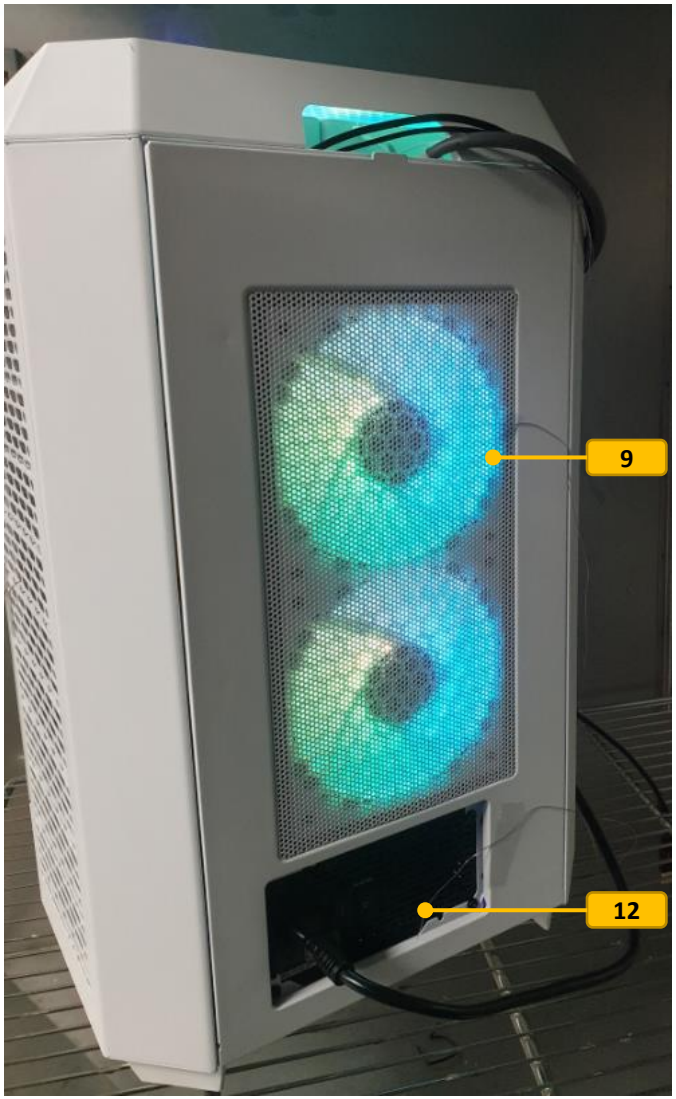


Measure Point	Description	Airflow	Thermocouple Number
1	Chassis Right External	Intake	101
2	Chassis Right Internal	Exhaust	102
3	Chassis Left External	Intake	103
4	GPU Right Fan	Exhaust	104
5	Chassis Bottom Internal	Exhaust	105
6	Chassis Top Internal	Intake	106
7	Chassis Top External	Exhaust	107
8	Chassis Rear Internal	Intake	108
9	Chassis Rear External	Exhaust	109
10	AIO Top Cover	Nature	110
11	PSU Bottom	Intake	113
12	PSU Rear	Exhaust	114

5. Chassis Measured Points







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7	Chassis Top External	Exhaust	107
8	Chassis Rear Internal	Intake	108
9	Chassis Rear External	Exhaust	109
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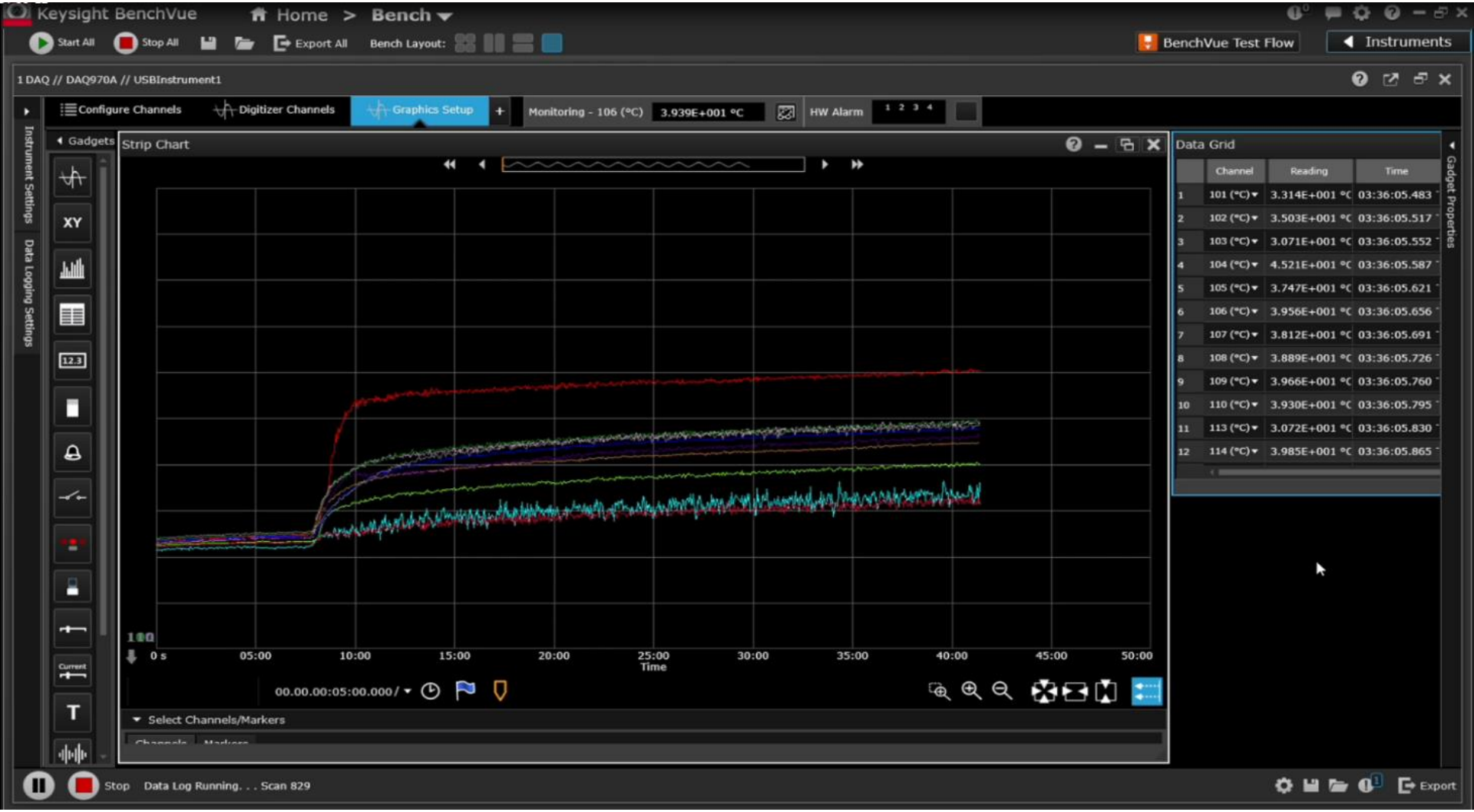
11	PSU Bottom	Intake	113
12	PSU Rear	Exhaust	114

6. Thermal Stress Test

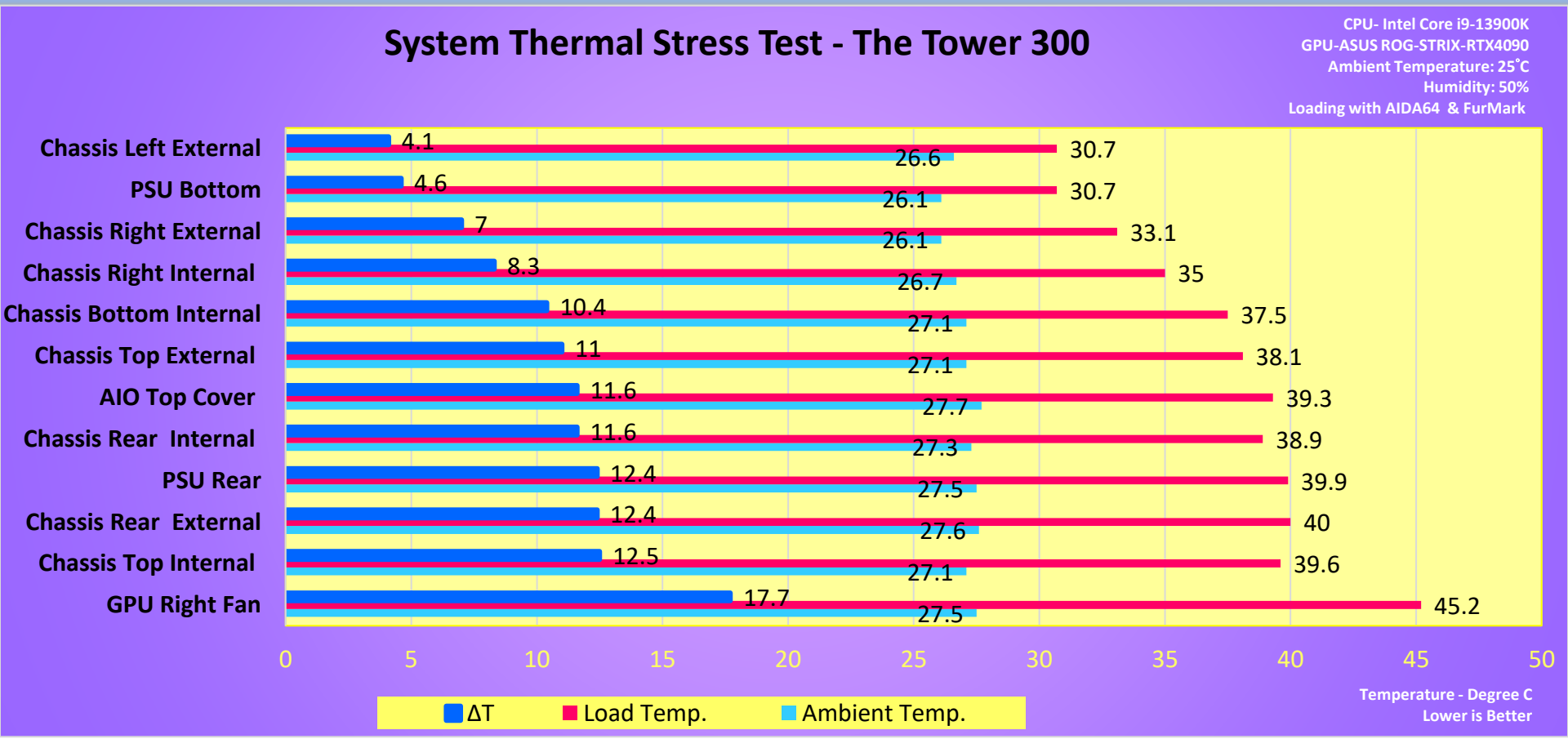
- Setting up the chamber temperature and humidity
- Temperature: 25˚C
- Humidity: 50%
- Recording Data

6. Thermal Stress Test



Temperature Data Recoding

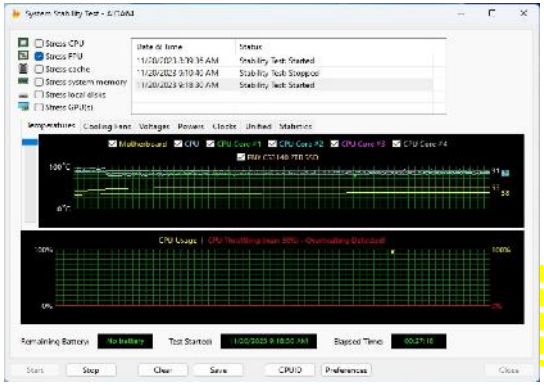
6. Thermal Stress Test



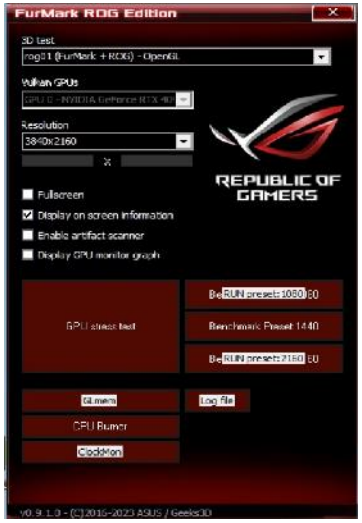
We expected to see higher temperature at the exhaust points and relatively lower temperature at the intake positions. The highest temperature was found at the AIO exhaust, which is reasonable given the CPU was running at full load. Most of the intake positions recorded a temperature lower than **45˚C** since they were drawing air from environment. Two critical positions we were looking at are **NO. 104 GPU Fan** and **NO. 110 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

Idle	
Date	11/20/2023
Time (HH:MM)	9:18 AM
CPU Clock	5487 MHz
Motherboard Name	Asus ROG Strix B760-G Gaming WiFi
BIOS Version	1220
Free Memory	60153 MB
GPU Clock	210 MHz
Motherboard	31°C
CPU	28°C
CPU Package	33°C
GPU	35°C
CPU	2048 RPM
AIO Pump	3206 RPM
GPU	0 RPM
Chassis #1	1437 RPM
CPU Core	1.359 V
GPU Core	0.875 V
CPU Package	29.64 W
GPU	12.30 W
GPU TDP%	2%

Full load	
Date	11/20/2023
Time (HH:MM)	9:45 AM
CPU Clock	5088 MHz
Motherboard Name	Asus ROG Strix B760-G Gaming WiFi
BIOS Version	1220
Free Memory	59922 MB
GPU Clock	2730 MHz
Motherboard	38°C
CPU	83°C
CPU Package	94°C
GPU	79°C
CPU	2017 RPM
AIO Pump	3229 RPM
GPU	2932 RPM
Chassis #1	1446 RPM
CPU Core	1.305 V
GPU Core	0.995 V
CPU Package	253.06 W
GPU	494.12 W
GPU TDP%	99%

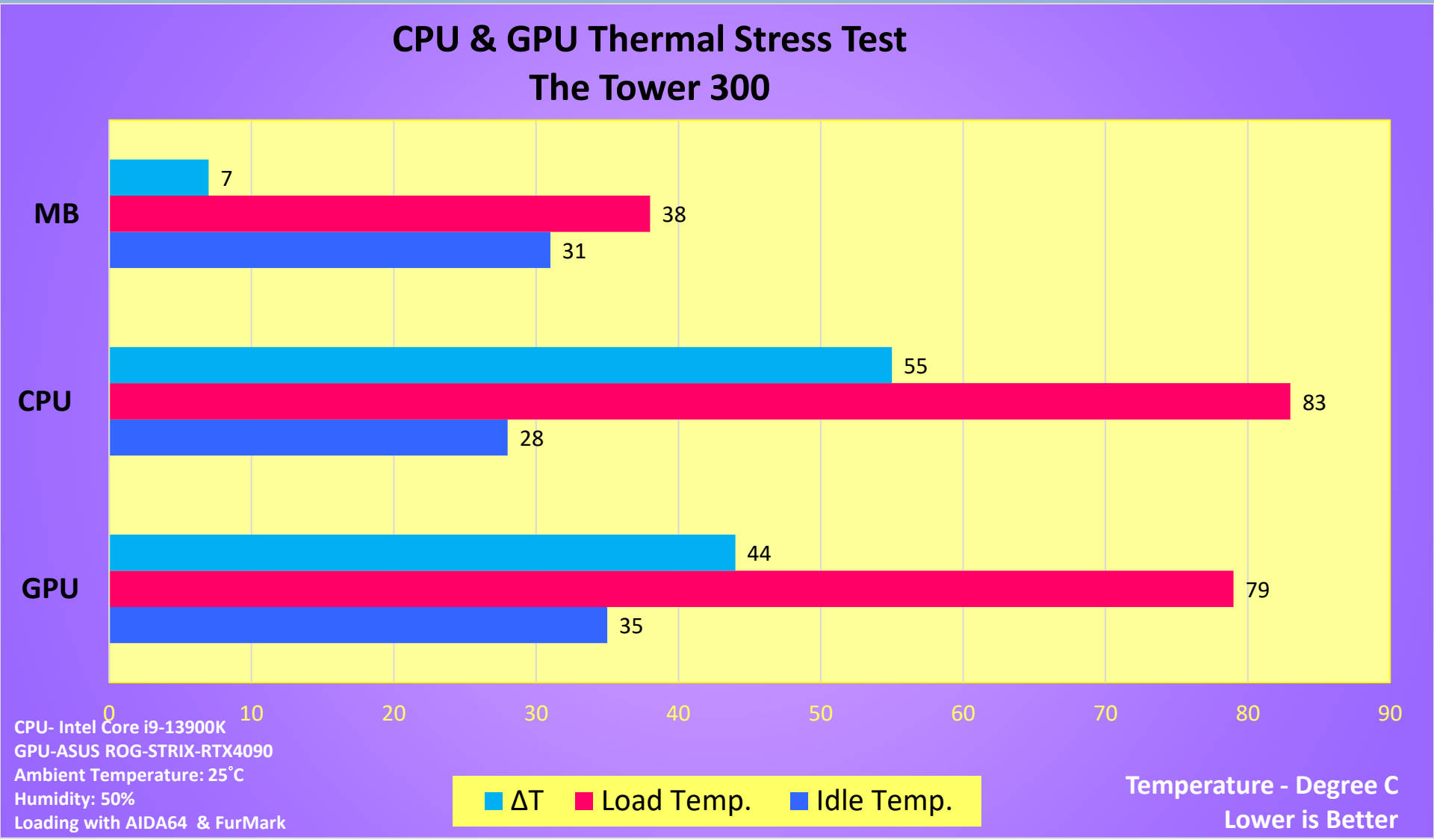
7. AIDA64 & FurMark Test

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

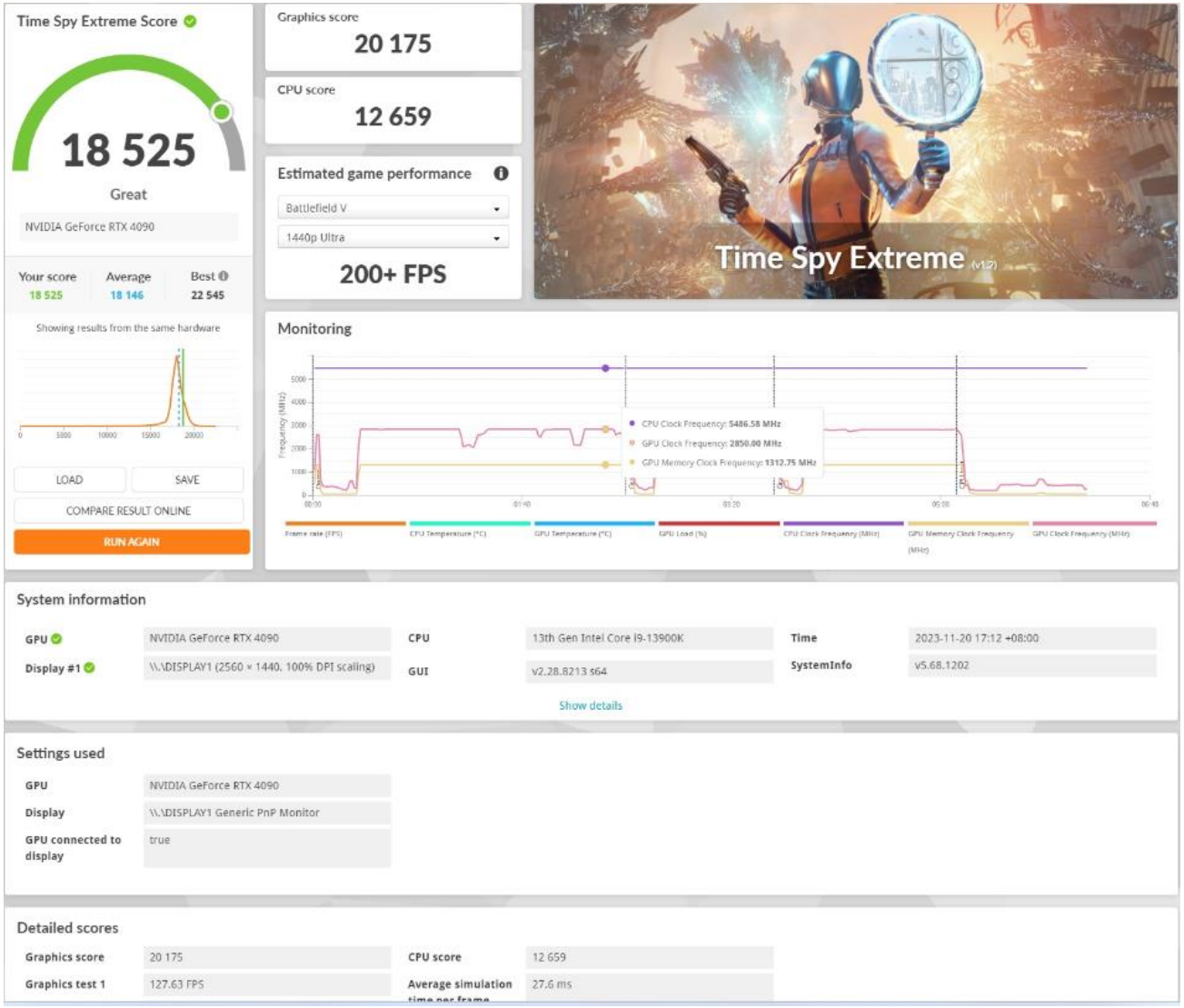


CPU- Intel Core i9-13900K
GPU-ASUS ROG-STRIX-RTX4090
Ambient Temperature: 25˚C
Humidity: 50%
Loading with AIDA64 & FurMark

Temperature - Degree C
Lower is Better

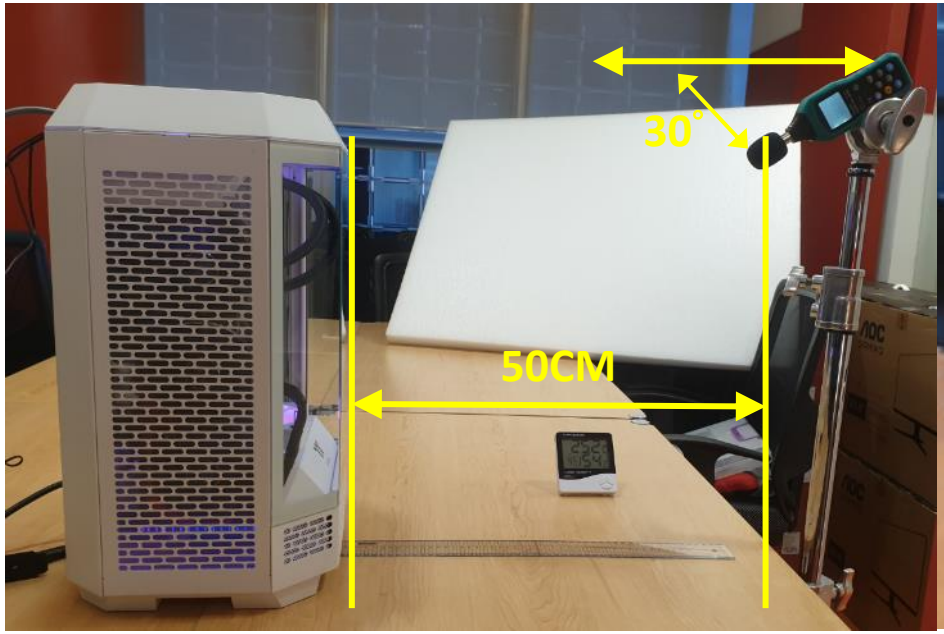
NO: RS202311230001

8. Graphics Performance Testing



9. Acoustic Sound Pressure Level Test

Test Environment：**Thermaltake Taipei Office**
Test Model: **The Tower 300**
Test Ambience: **25.2 ℃(Temperature) / 54% R.H.(Relative Humidity)**
Microphone position: **50 cm / in front of PC system**
Background Noise：**35.6 dBA**.



Microphone position

Test Ambience

9. Acoustic Sound Pressure Level Test

Fan Speed 500rpm – **36.5dBA**	Fan Speed 600rpm – **36.9dBA**	Fan Speed 800rpm – **37.5dBA**	Fan Speed 1500rpm – **54.9dBA**

Date	11/20/2023
Time (HH:MM)	4:01 PM
CPU Clock	3491 MHz
Motherboard Name	Asus ROG Strix B760-G Gaming WiFi
BIOS Version	1220
Free Memory	59116 MB
GPU Clock	210 MHz
Motherboard	28°C
CPU	29°C
CPU Package	37°C
GPU	33°C
CPU	460 RPM
AIO Pump	2903 RPM
GPU	0 RPM
Chassis #1	526 RPM
CPU Core	1.323 V
GPU Core	0.880 V
CPU Package	30.71 W
GPU	14.53 W
GPU TDP%	3%

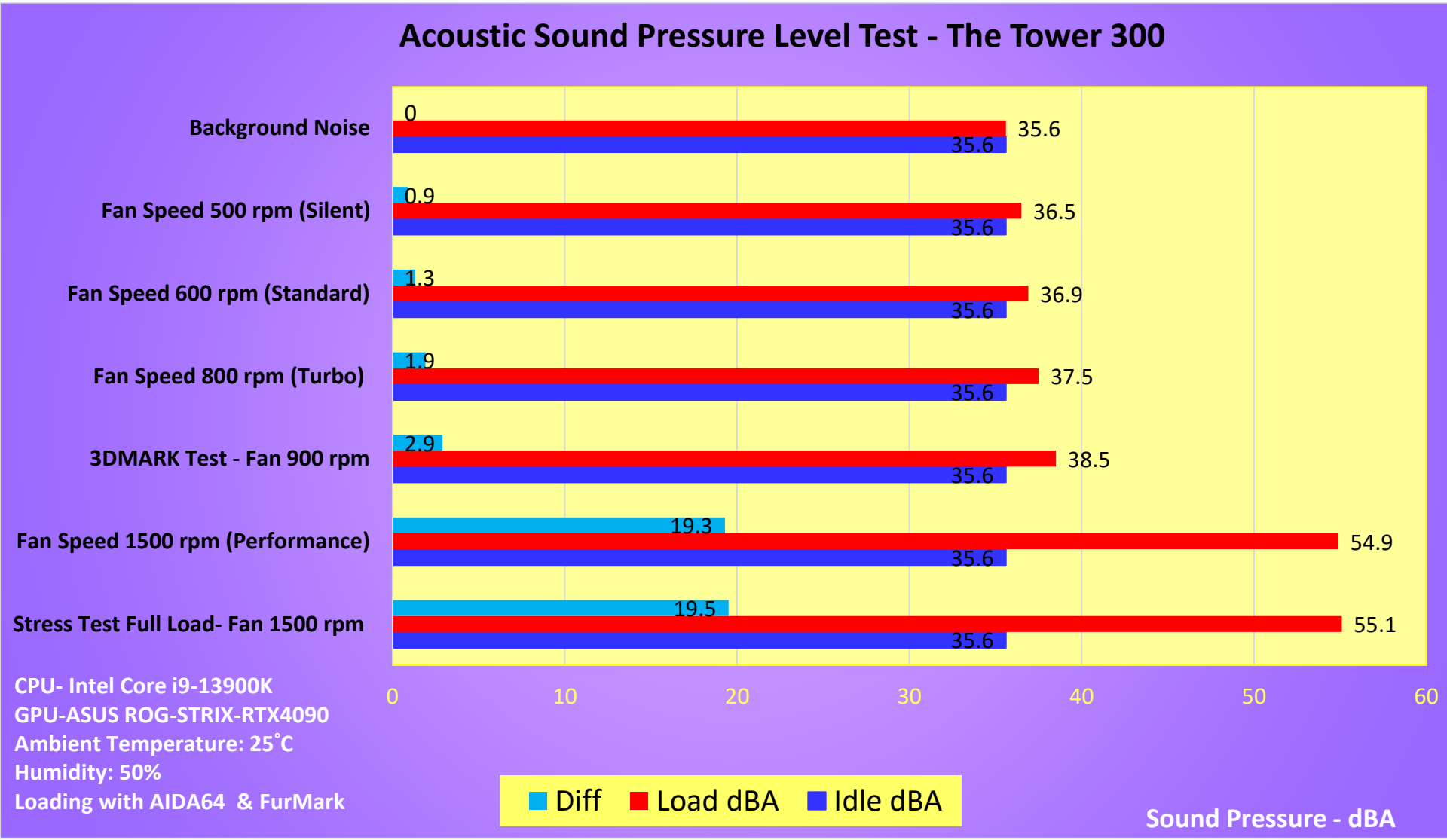
Date	11/20/2023
Time (HH:MM)	4:04 PM
CPU Clock	1097 MHz
Motherboard Name	Asus ROG Strix B760-G Gaming WiFi
BIOS Version	1220
Free Memory	59391 MB
GPU Clock	210 MHz
Motherboard	29°C
CPU	30°C
CPU Package	37°C
GPU	35°C
CPU	459 RPM
AIO Pump	2922 RPM
GPU	0 RPM
Chassis #1	584 RPM
CPU Core	1.172 V
GPU Core	0.880 V
CPU Package	30.57 W
GPU	15.19 W
GPU TDP%	3%

Date	11/20/2023
Time (HH:MM)	4:10 PM
CPU Clock	5487 MHz
Motherboard Name	Asus ROG Strix B760-G Gaming WiFi
BIOS Version	1220
Free Memory	59403 MB
GPU Clock	210 MHz
Motherboard	29°C
CPU	30°C
CPU Package	37°C
GPU	37°C
CPU	701 RPM
AIO Pump	3089 RPM
GPU	0 RPM
Chassis #1	788 RPM
CPU Core	1.359 V
GPU Core	0.880 V
CPU Package	30.35 W
GPU	15.81 W
GPU TDP%	3%

Date	11/20/2023
Time (HH:MM)	4:12 PM
CPU Clock	5187 MHz
Motherboard Name	Asus ROG Strix B760-G Gaming WiFi
BIOS Version	1220
Free Memory	59411 MB
GPU Clock	210 MHz
Motherboard	30°C
CPU	31°C
CPU Package	36°C
GPU	37°C
CPU	2057 RPM
AIO Pump	3268 RPM
GPU	0 RPM
Chassis #1	1511 RPM
CPU Core	1.523 V
GPU Core	0.880 V
CPU Package	29.89 W
GPU	15.25 W
GPU TDP%	3%

NO: RS202311230001

9. Acoustic Sound Pressure Level Test



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

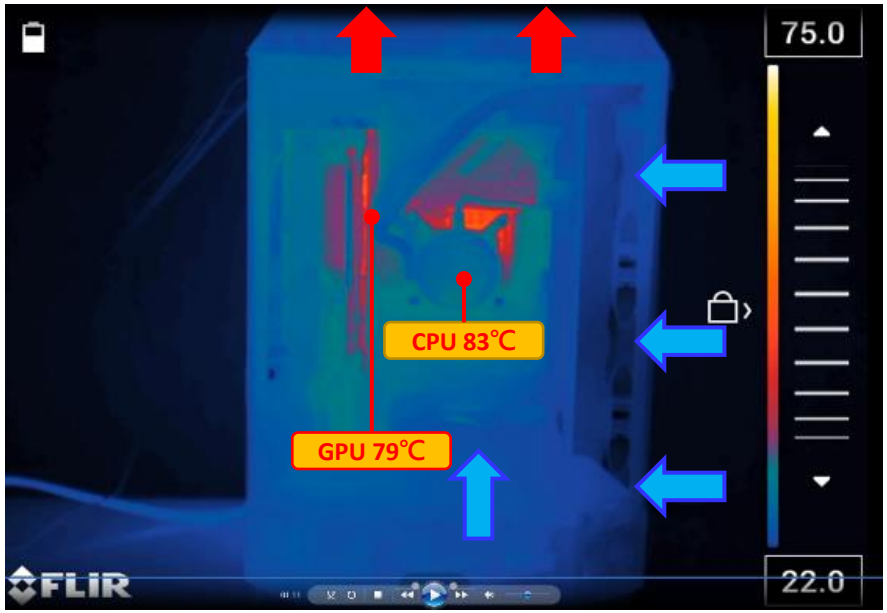
NO: RS202311230001

C. Conclusion

Left View

Idle

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)：83℃ (TDP 253W)

-ASUS ROG Strix GeForce RTX® 4090 OC / GPU Temp. (Max)：79℃

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 Tower 300 is regarding cooling performance.

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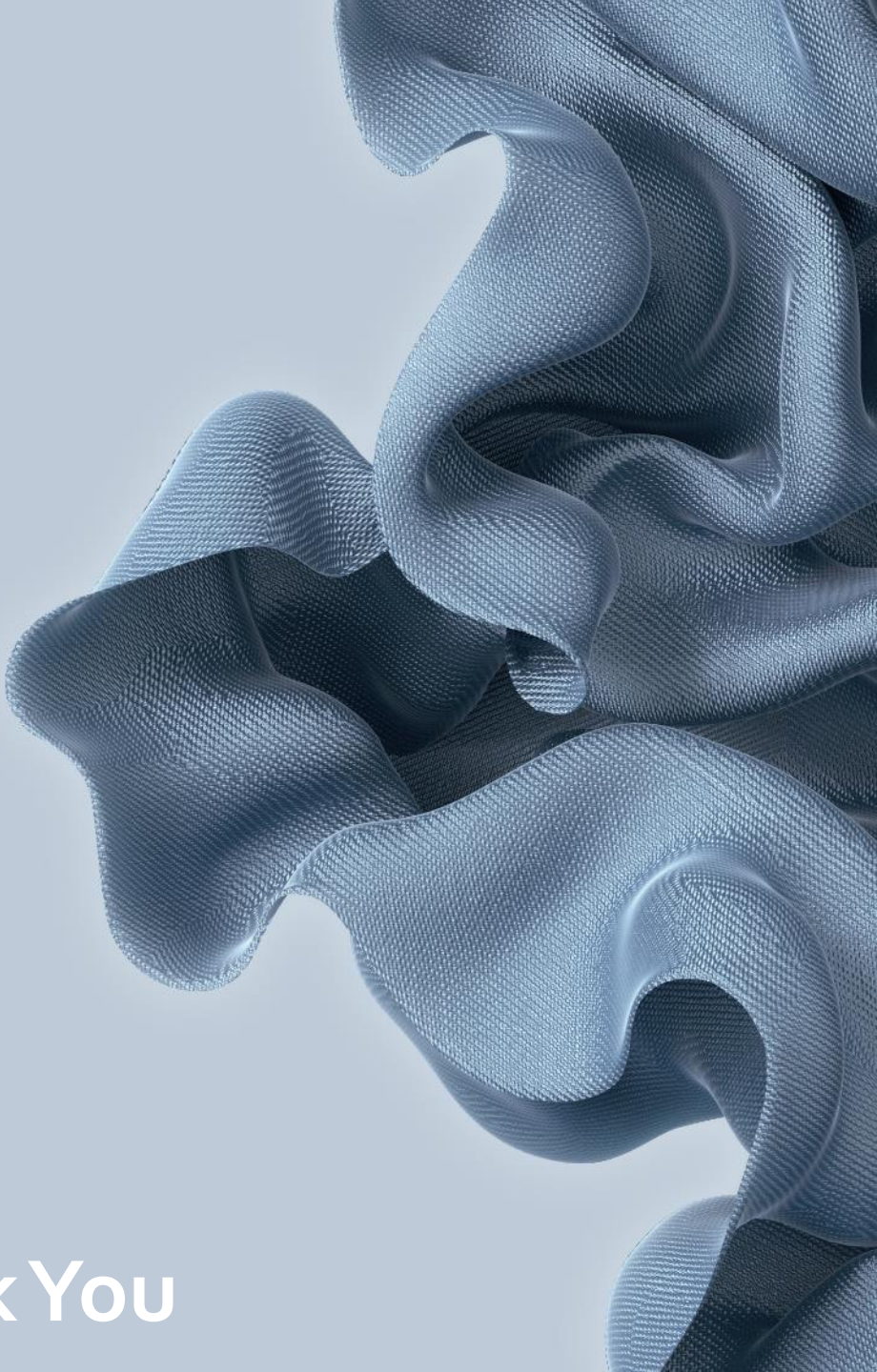
KEEP IT SLEEK
KEEP IT COOL



Thank You