KEEP IT SLEEK KEEP IT COOL

System Thermal Test Report

Model: **The Tower 600**

Version: **20240819A**

NO: RS202408190001

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A. Introduction

1. Objective
2. Equipment
3. Procedure

1. Objective

Our objective is to find out if **The Tower 600** 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 **38˚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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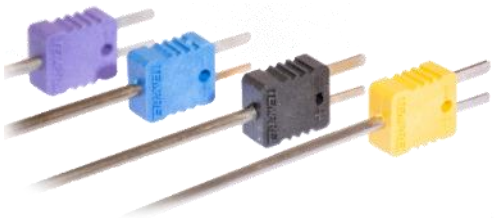
1. Laboratory Equipment



Thermocouple

Sound Level Meter

Thermal Imaging Camera

Temperature Data Acquisition

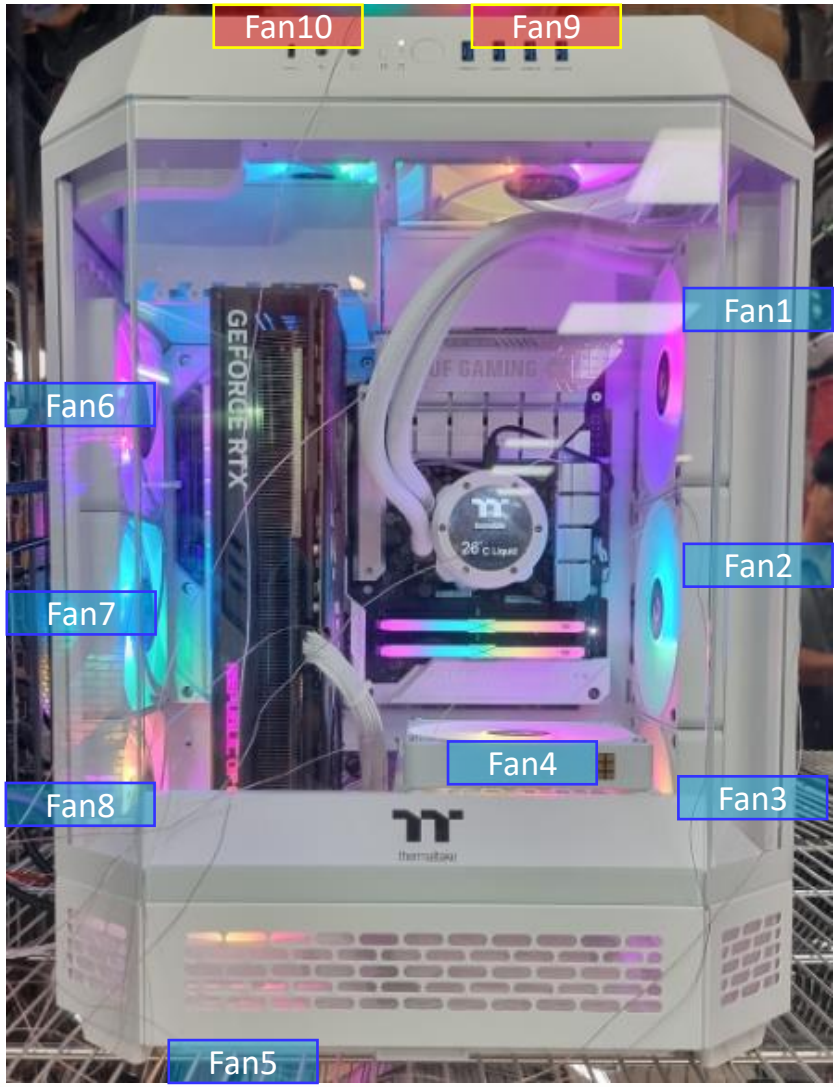
Temperature & Humidity Chamber

2. Chassis Hardware List

Component	Model
Chassis	The Tower 600
Motherboard	ASUS TUF Gaming Z790-BTF WIFI
CPU	Intel® Core™ i9-13900K Processor (TDP 253W)
GPU	ASUS ROG Strix GeForce RTX® 4090 OC 24GB GDDR6X
RAM	TOUGHRAM XG RGB D5 Memory DDR5 5600MT/s 32GB (16GB x2)
SSD	Seagate SSD 120G
PSU	Toughpower GF A3 1050W - TT Premium Edition
CPU Cooler	TH420 V2 Ultra EX ARGB Sync
Fans	AIO: CT EX 140mm x 3 (1800rpm) Chassis: CT EX140mm x 5 (1800 rpm) (Top x 2 , Rear x 1 , Bottom x 2) CT EX120mm x 3 (2000 rpm)(Left x 3)
Software	1. AIDA64 Extreme 2. FurMark ROG Edition V0.9.3.0 3. CPU-Z Ver.2.08.0 x64 4. Core Temp V1.18.1
Full load	30 minutes
Camera	FLIR E86 Thermal Imaging Camera

NO: RS202408190001

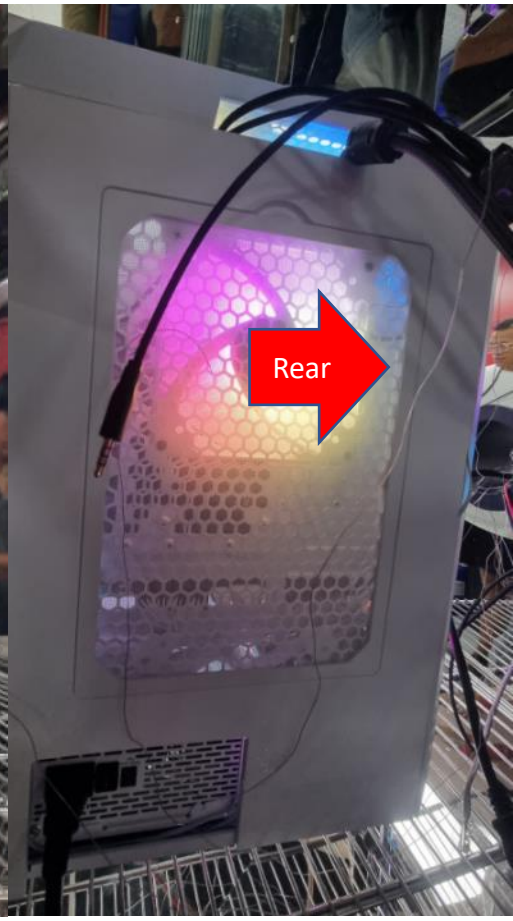
3. Chassis Fan Allocation



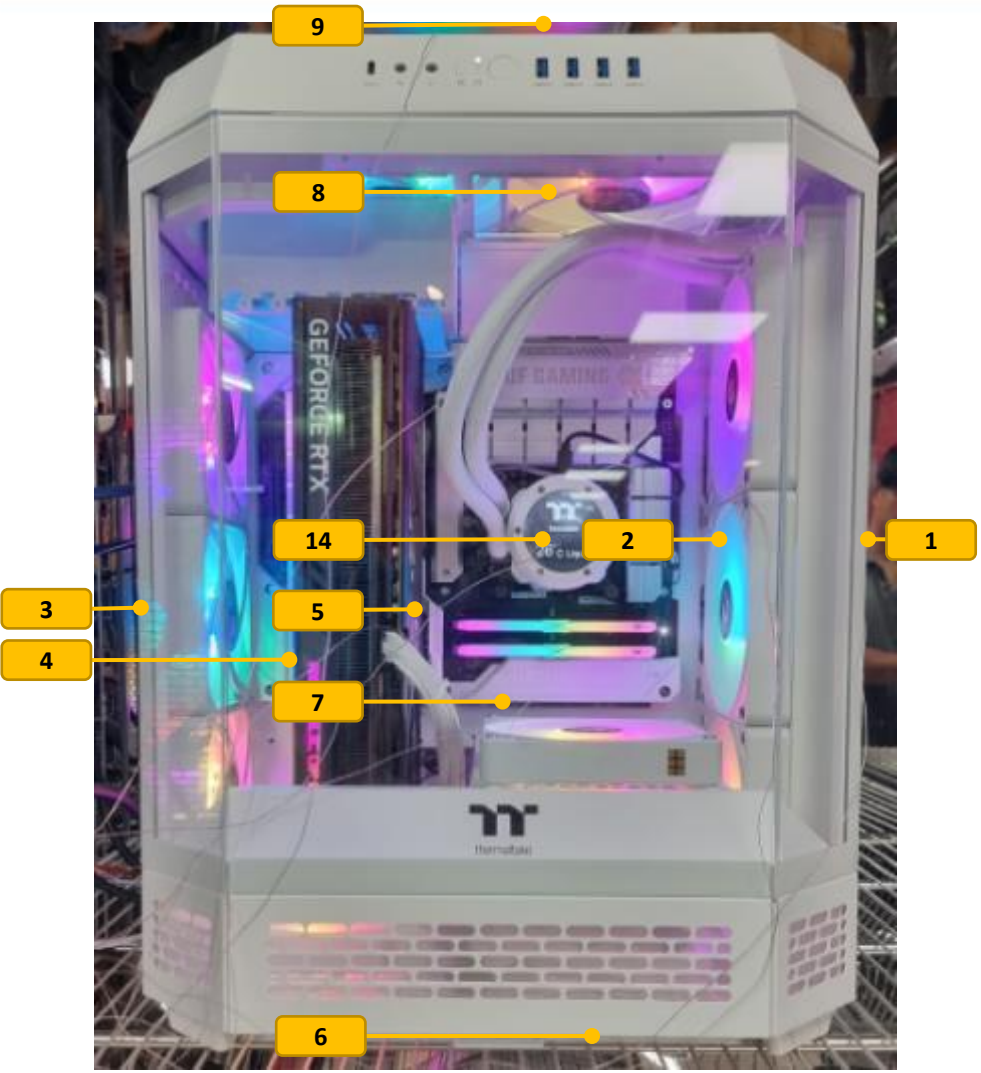
4. Chassis Thermal Airflow

Cool Airflow Inlets

Hot Airflow Exhausts

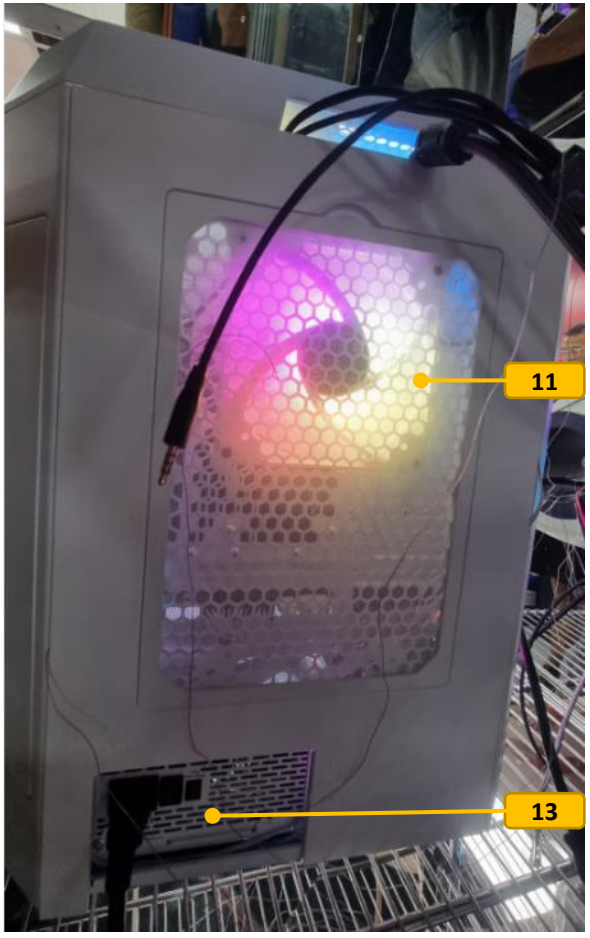


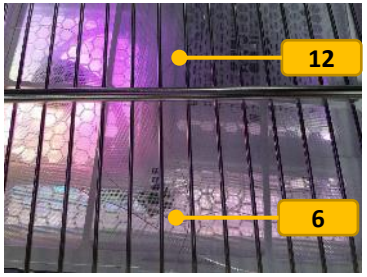
5. Chassis Measured Points



Measure Point	Description	Airflow	Thermocouple Number
1	Chassis Right Exhaust	Intake	101
2	Chassis Right Internal	Intake	102
3	Chassis Left Exhaust	Intake	103
4	GPU Left Fan	Intake	104
5	GPU Right Fan	Exhaust	105
6	Chassis Bottom Exhaust	Intake	106
7	Chassis Bottom Internal	Intake	107
8	Chassis Top Internal	Exhaust	108
9	Chassis Top Exhaust	Exhaust	109
10	Chassis Rear Internal	Exhaust	110
11	Chassis Rear Exhaust	Exhaust	111
12	PSU Bottom	Intake	112
13	PSU Rear	Exhaust	113
14	AIO Top Cover	Nature	114

5. Chassis Measured Points





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7	Chassis Bottom Internal	Intake	107
8	Chassis Top Internal	Exhaust	108
9	Chassis Top Exhaust	Exhaust	109
10	Chassis Rear Internal	Exhaust	110
11	Chassis Rear Exhaust	Exhaust	111
12	PSU Bottom	Intake	112
13	PSU Rear	Exhaust	113
14	AIO Top Cover	Nature	114

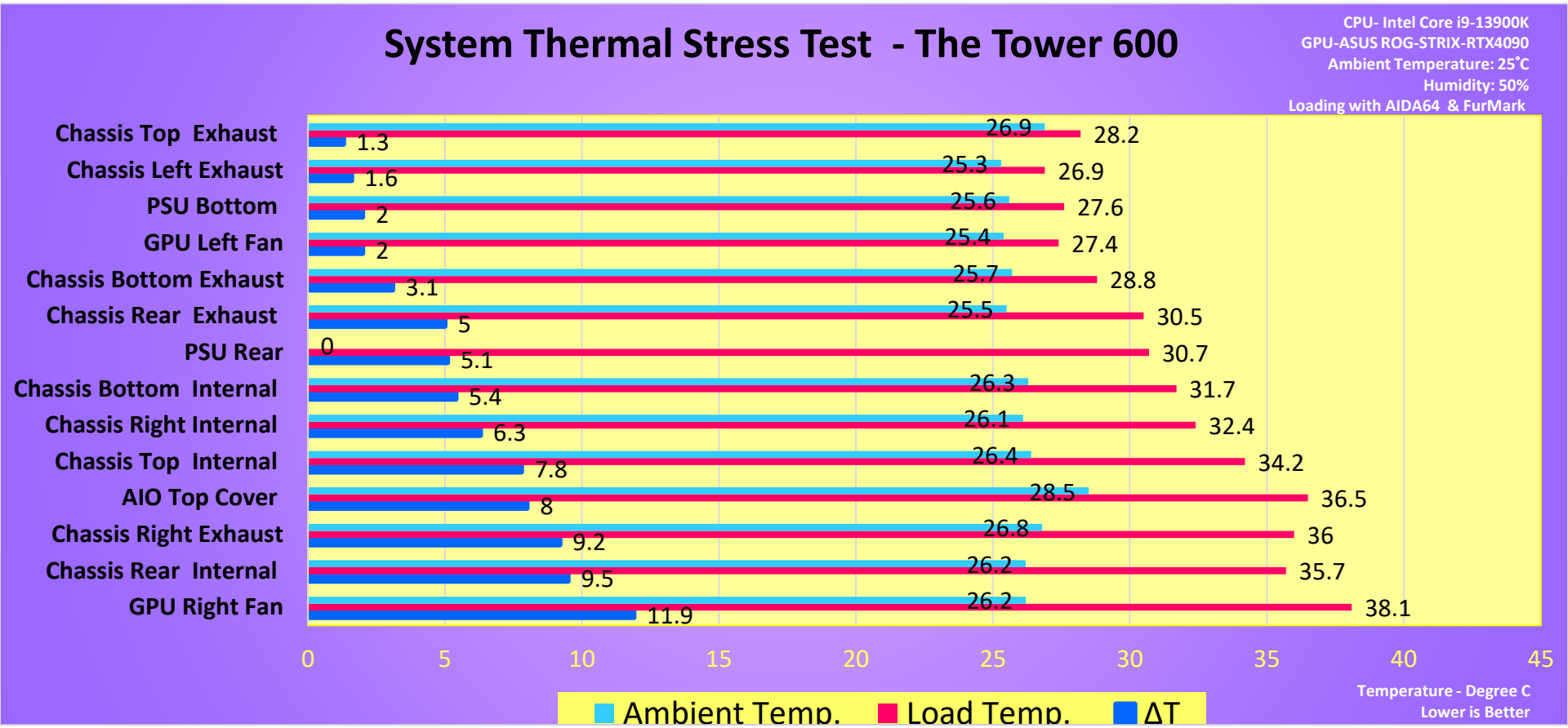
6. Thermal Stress Test

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

6. Thermal Stress Test

Temperature Data Recoding

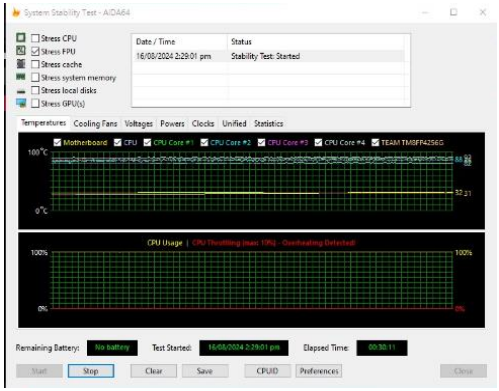
6. Thermal Stress Test



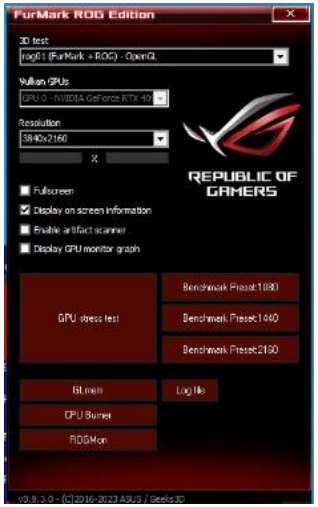
We expected to see higher temperature at the exhaust points and relatively lower temperature at the intake positions. The highest temperature was found at the AIO exhaust, which is reasonable given the CPU was running at full load. Most of the intake positions recorded a temperature lower than **38˚C** since they were drawing air from environment. Two critical positions we were looking at are **NO. 105 GPU 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

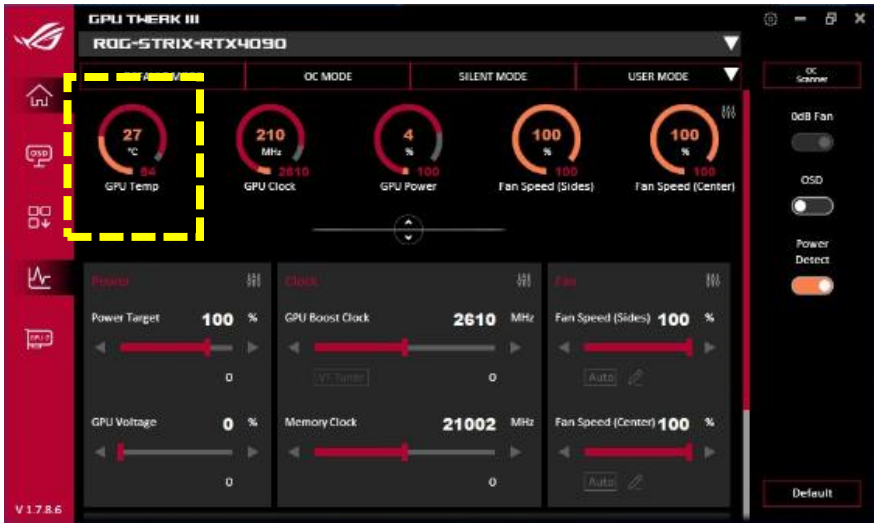


FurMark

	Idle	Full load
Date	16/08/2024	16/08/2024
Time (HH:MM)	2:25 pm	2:59 pm
CPU Clock	5500 MHz	5200 MHz
Motherboard Name	Asus TUF Gaming Z790-BTF WiFi	Asus TUF Gaming Z790-BTF WiFi
BIOS Version	1645	1645
Free Memory	27621 MB	27024 MB
GPU Clock	210 MHz	2835 MHz
Motherboard	27°C	31°C
CPU	31°C	82°C
CPU Package	40°C	95°C
GPU	27°C	73°C
GPU	3096 RPM	2001 RPM
CPU	1800 RPM	1802 RPM
AIO Pump	3075 RPM	3020 RPM
Chassis #1	1804 RPM	1807 RPM
Chassis #3	1991 RPM	1997 RPM
Chassis #4	1800 RPM	1797 RPM
CPU Core	1.341 V	1.279 V
GPU Core	0.885 V	1.050 V
CPU Package	34.35 W	253.43 W
GPU	20.82 W	480.78 W
GPU TDP%	4%	86%

7. AIDA64 & FurMark Test

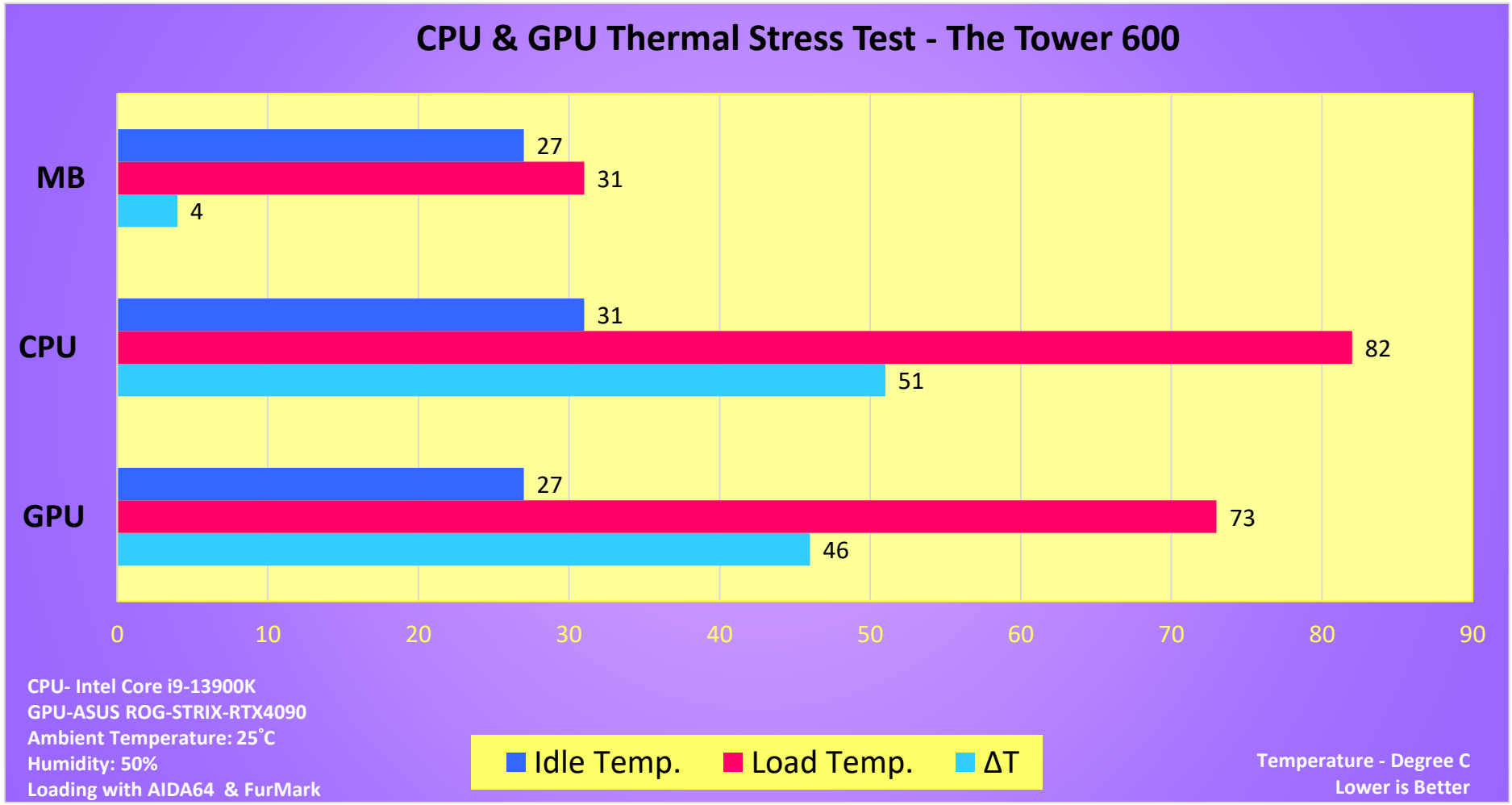
We used **AIDA64 Extreme** (stress FPU) and **FurMark ROG Edition (resolution: 3840 x 2160) to push 100% load** on the CPU and GPU for 30 minutes.



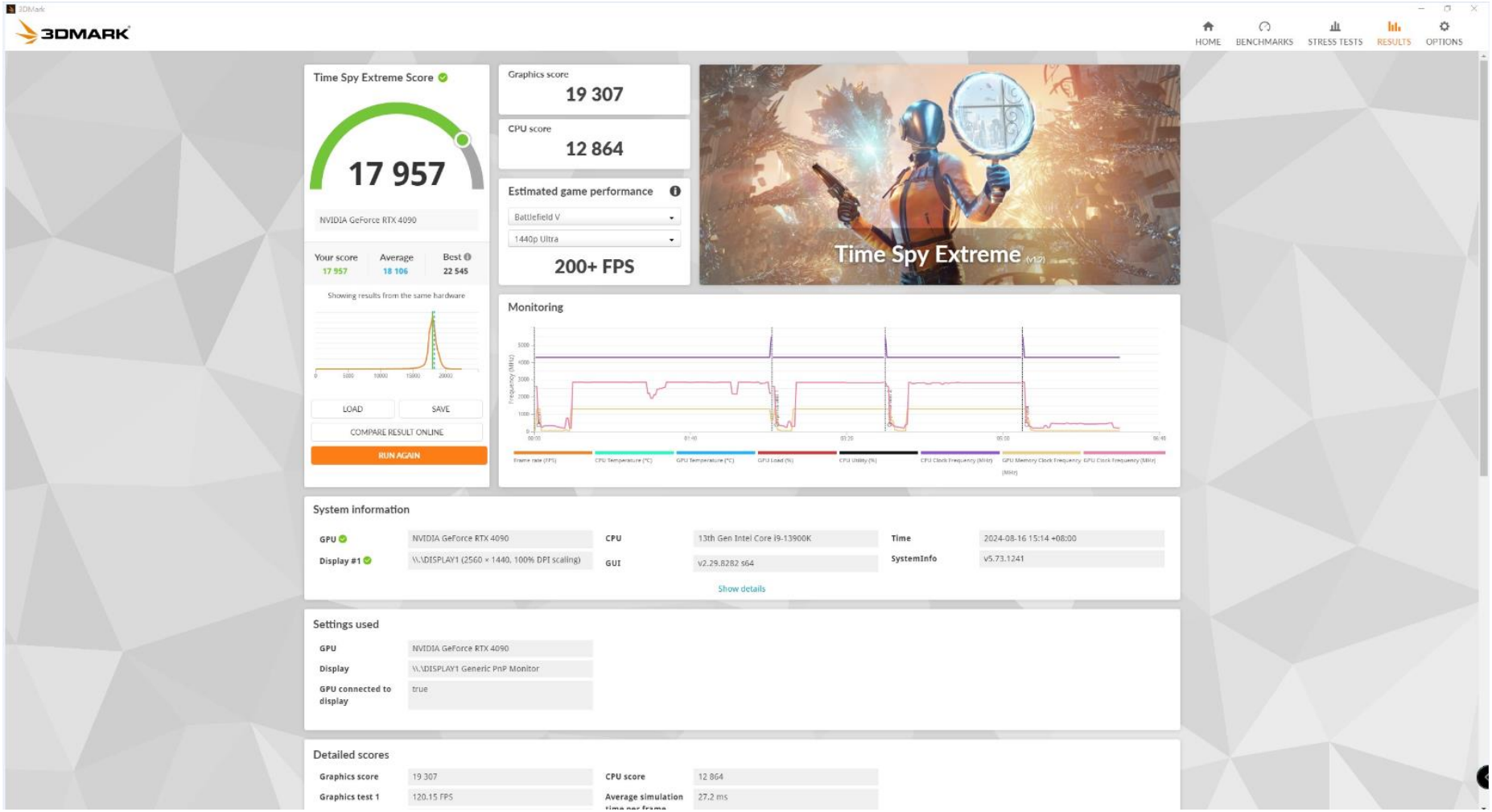
Idle

Full load

7. AIDA64 & FurMark Test

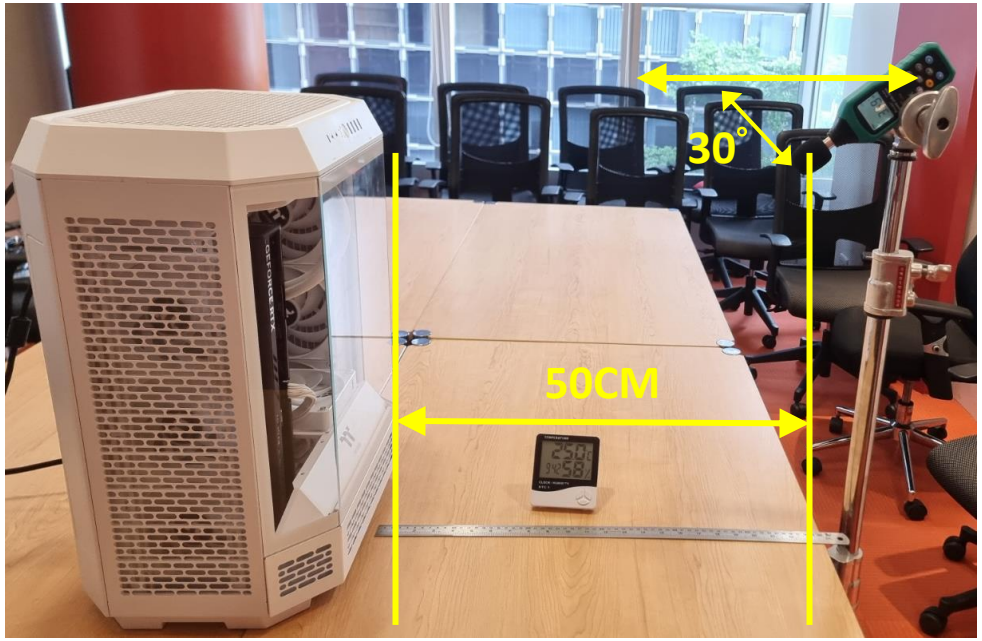


8. Graphics Performance Testing



9. Acoustic Sound Pressure Level Test

Test Environment：**Thermaltake Taipei Office**
Test Model: **The Tower 600**
Test Ambience: **25.0 ℃(Temperature) / 58% R.H.(Relative Humidity)**
Microphone position: **50 cm / in front of PC system**
Background Noise：**35.5 dBA.**



Microphone position

Test Ambience

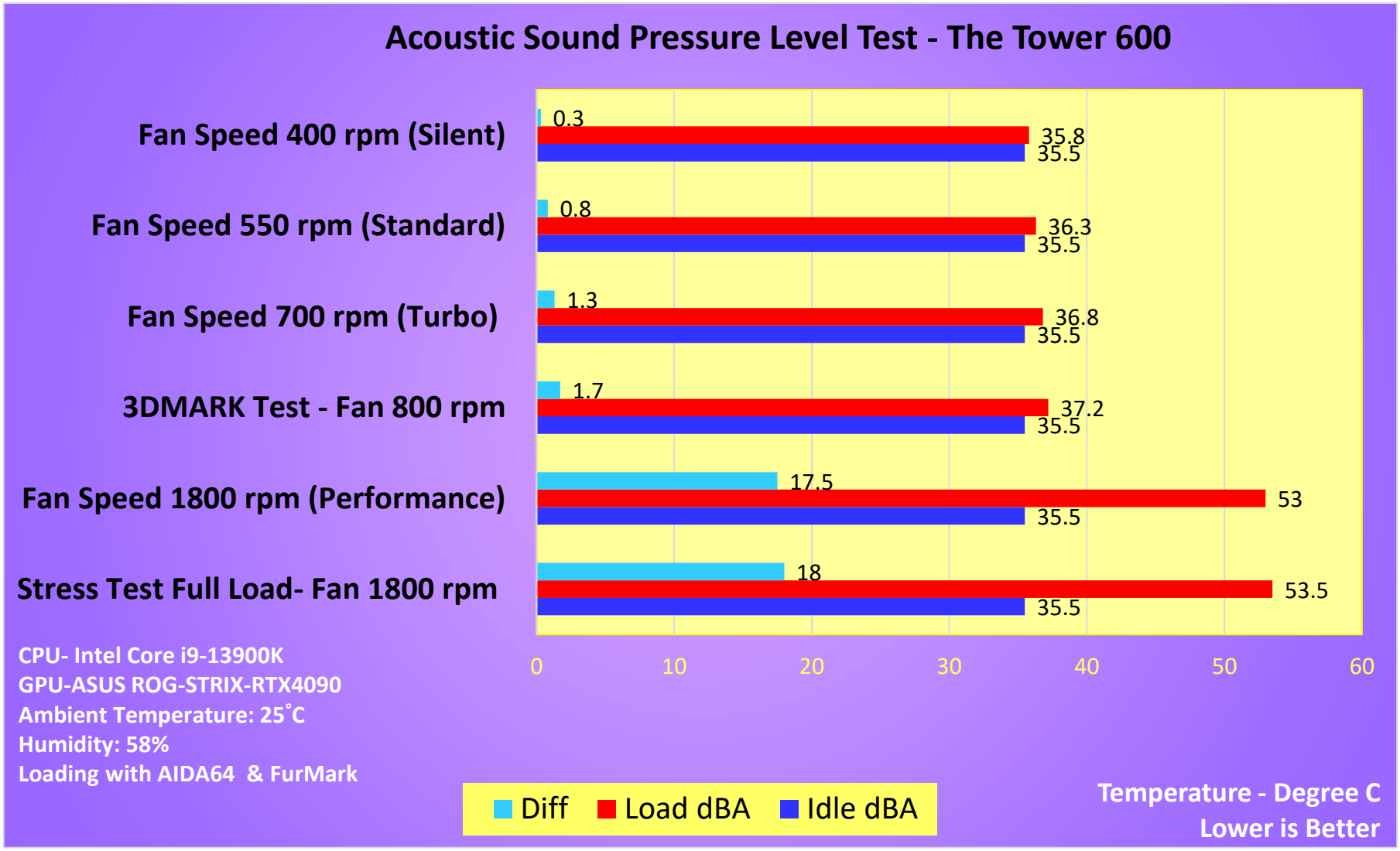
9. Acoustic Sound Pressure Level Test

Fan Speed 400rpm – **35.8dBA**	Fan Speed 550rpm – **36.3dBA**	Fan Speed 700rpm – **36.8dBA**	Fan Speed 1800rpm – **53.0dBA**




Date	19/08/2024	19/08/2024	19/08/2024
Time (HH:MM)	9:04 am	9:07 am	9:10 am	9:13 am
CPU Clock	5500 MHz	5500 MHz	5500 MHz	5500 MHz
Motherboard Name	Asus TUF Gaming Z790-BTF WiFi	Asus TUF Gaming Z790-BTF WiFi	Asus TUF Gaming Z790-BTF WiFi	Asus TUF Gaming Z790-BTF WiFi
BIOS Version	1645	1645	1645	1645
Free Memory	27664 MB	27763 MB	27742 MB	27792 MB
GPU Clock	210 MHz	210 MHz	210 MHz	210 MHz
Motherboard	28°C	29°C	29°C	28°C
CPU	34°C	34°C	34°C	34°C
CPU Package	42°C	43°C	43°C	41°C
GPU	33°C	35°C	35°C	33°C
GPU	0 RPM	0 RPM	0 RPM	0 RPM
CPU	401 RPM	556 RPM	726 RPM	1802 RPM
AIO Pump	2727 RPM	2918 RPM	2941 RPM	3110 RPM
Chassis #1	402 RPM	556 RPM	727 RPM	1797 RPM
Chassis #3	460 RPM	624 RPM	814 RPM	1997 RPM
Chassis #4	407 RPM	562 RPM	732 RPM	1800 RPM
CPU Core	1.341 V	1.350 V	1.341 V	1.341 V
GPU Core	0.880 V	0.880 V	0.880 V	0.880 V
CPU Package	34.42 W	34.35 W	33.18 W	33.67 W
GPU	19.22 W	19.71 W	20.30 W	20.96 W
GPU TDP%	4%	4%	4%	4%

9. Acoustic Sound Pressure Level Test



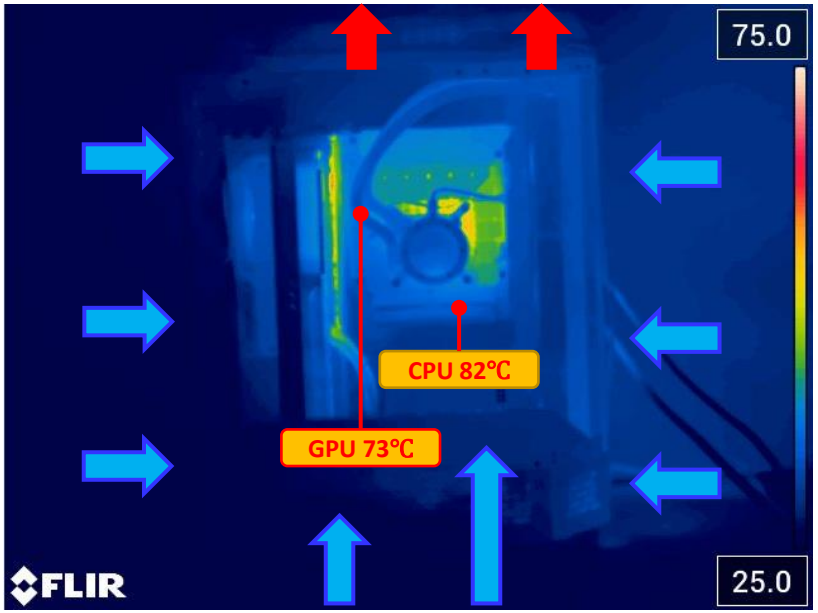
C. Conclusion

Conclusion

Idle

Left View

Full Load



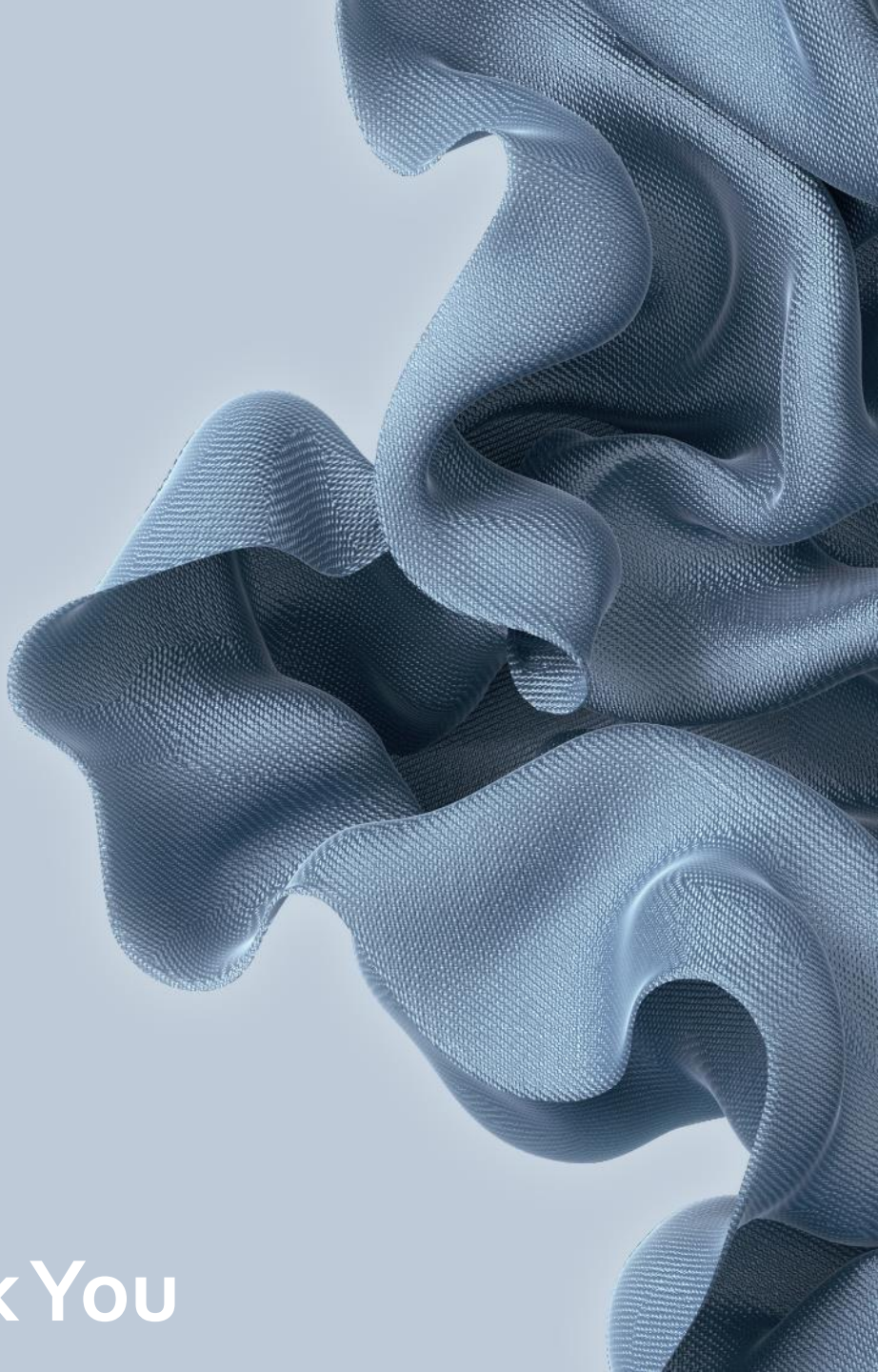
AIDA64 Extreme (stress FPU) and **FurMark ROG Edition** (**resolution: 3840 x 2160) to push 100% load** on the CPU and GPU for 30 minutes**.**

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

-ASUS ROG Strix GeForce RTX® 4090 OC / GPU Temp. (Max)：73℃

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 600 is regarding cooling performance.

KEEP IT SLEEK
KEEP IT COOL



Thank You