



KEEP IT SLEEK KEEP IT COOL

System Thermal Test Report

Model: CTE E550 TG

Version: 20240812A

NO: RS202408120001

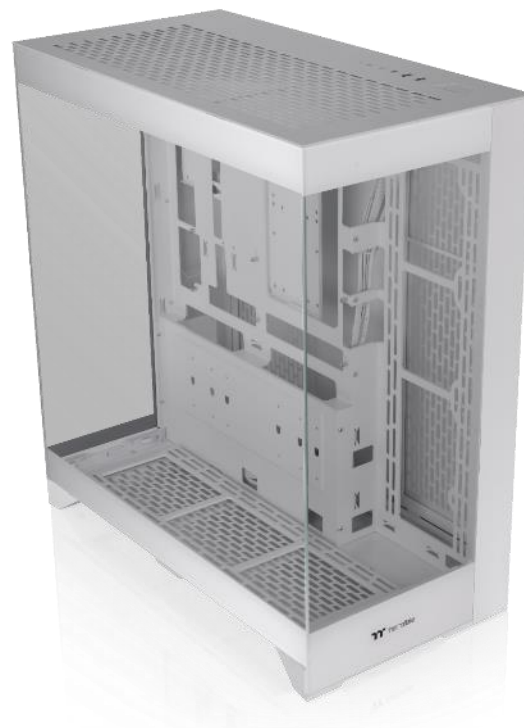
A. Introduction

B. Test Configuration

C. Conclusion

A. Introduction

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



Our objective is to find out if **CTE E550 TG** 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 **46°C** while the system is running at full load, with **five** 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.

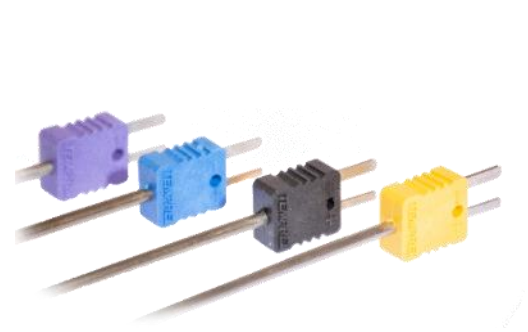
Testing steps:

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

Component	Model
Chassis	CTE E550 TG
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 RGB XG 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 (2000rpm) Chassis: SWAFAN EX ARGB 140mm x 3 (2000 rpm) (Bottom x 3) SWAFAN EX ARGB 120mm x 2 (2000 rpm) (Top x 2)
Software	<ol style="list-style-type: none"> AIDA64 Extreme FurMark ROG Edition V0.9.3.0 CPU-Z Ver.2.08.0 x64 Core Temp V1.18.1
Full load	30 minutes
Camera	FLIR E86 Thermal Imaging Camera





4. Chassis Thermal Airflow

Cool Airflow Inlets



Hot Airflow Exhausts

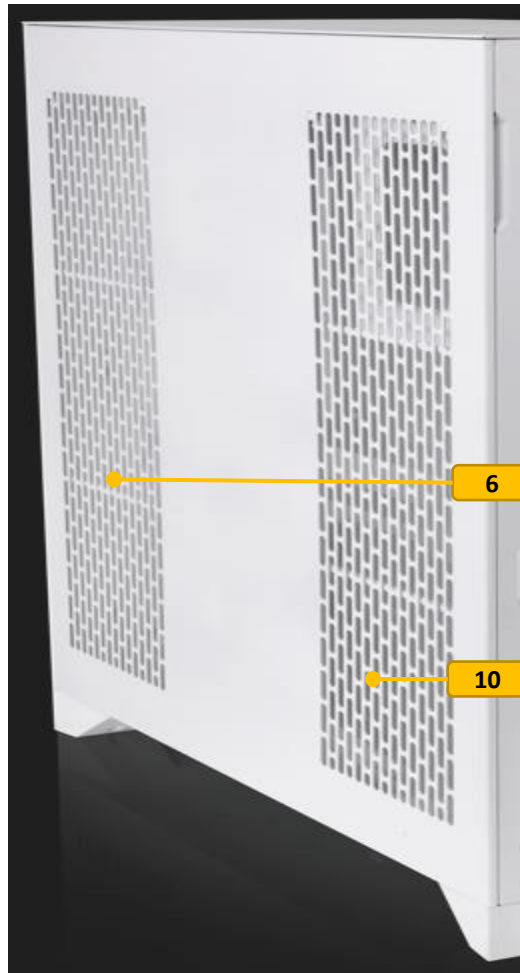
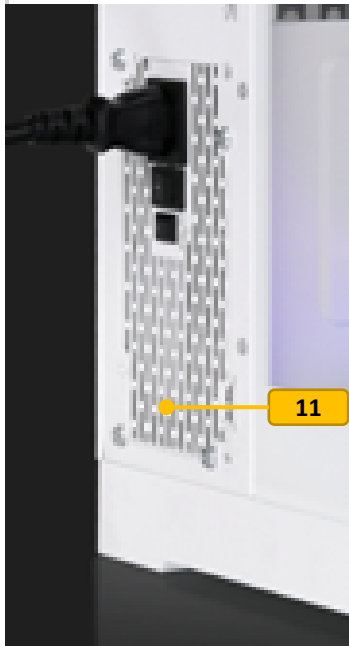


5. Chassis Measured Points

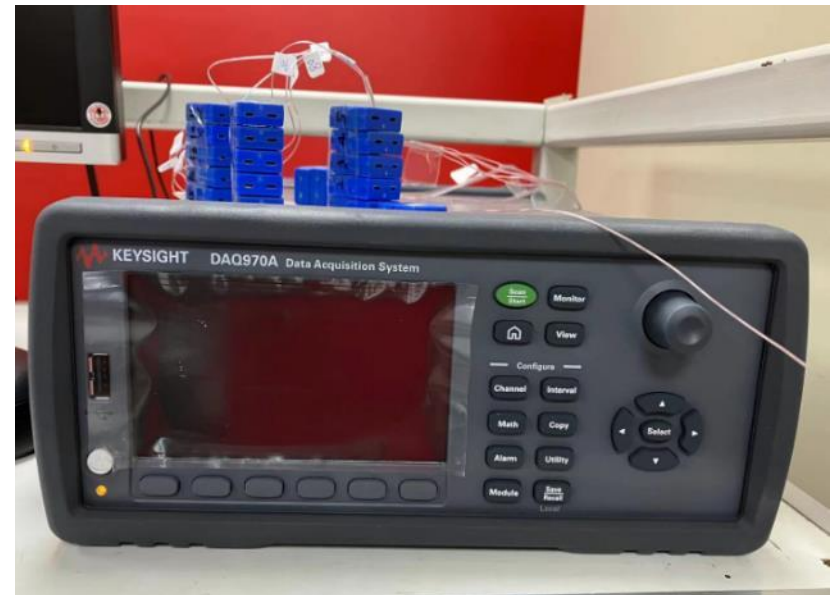


Measure Point	Description	Airflow	Thermocouple Number
1	Chassis Bottom External	Intake	101
2	Chassis Bottom Internal	Exhaust	102
3	Chassis Top Internal	Intake	103
4	Chassis Top External	Exhaust	104
5	Chassis Right Internal	Intake	105
6	Chassis Right External	Exhaust	106
7	GPU Left Fan	Intake	107
8	GPU Right	Exhaust	108
9	CPU Top	CPU Exhaust	109
10	PSU Right	Intake	110
11	PSU Rear	Exhaust	111

5. Chassis Measured Points



Measure Point	Description	Airflow	Thermocouple Number
1	Chassis Bottom External	Intake	101
2	Chassis Bottom Internal	Intake	102
3	Chassis Top Internal	Exhaust	103
4	Chassis Top External	Exhaust	104
5	Chassis Right Internal	Intake	105
6	Chassis Right External	Intake	106
7	GPU Left Fan	Intake	107
8	GPU Right	Exhaust	108
9	CPU Top	CPU Exhaust	109
10	PSU Right	Intake	110
11	PSU Rear	Exhaust	111



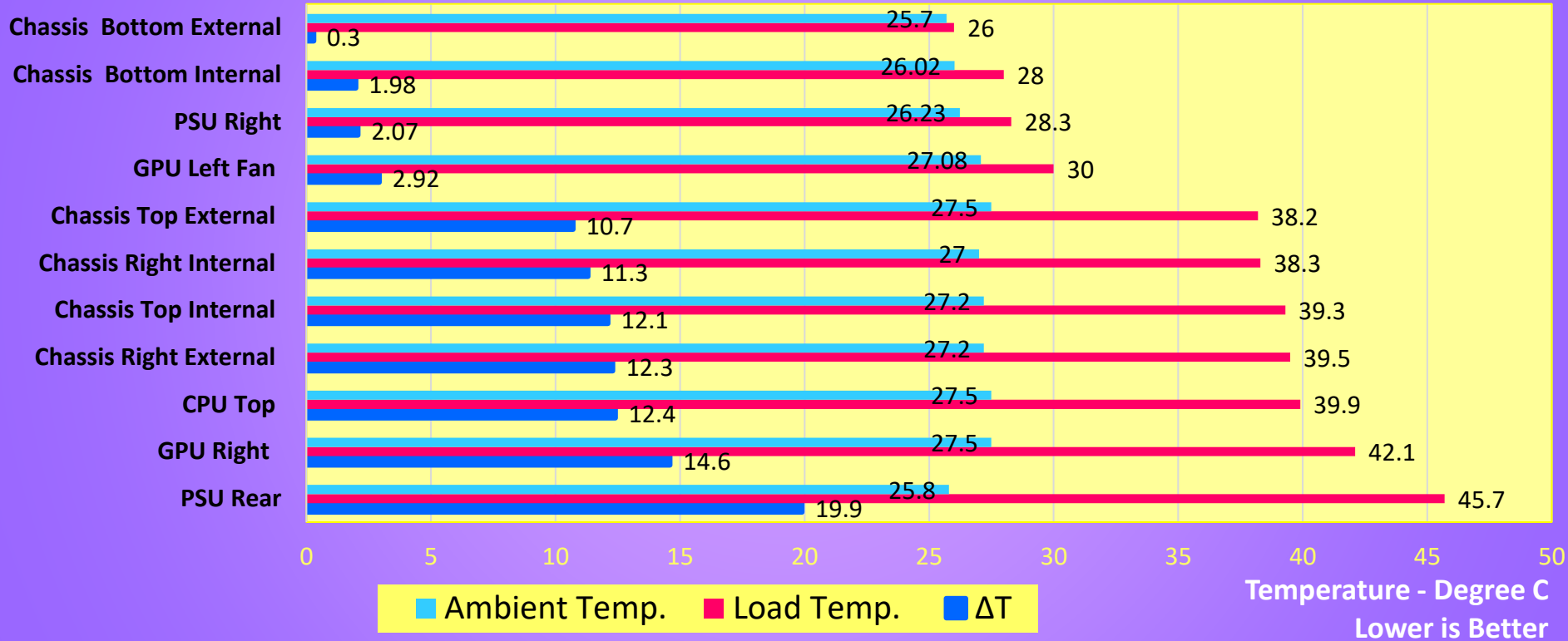
- Setting up the chamber temperature and humidity
- Temperature: 25°C
- Humidity: 50%
- Recording Data



Temperature Data Recoding

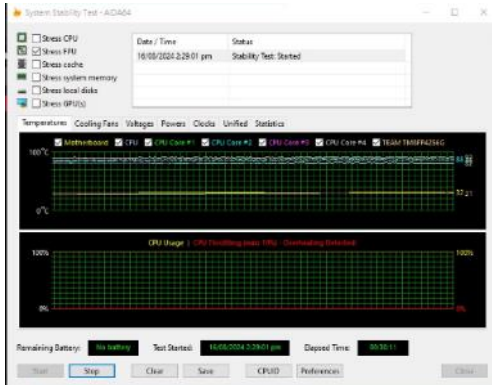
System Thermal Stress Test CTE E550 TG

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

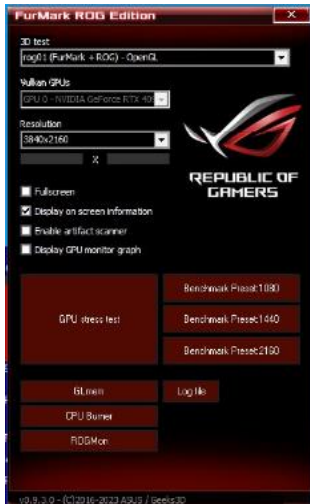


We expected to see higher temperature at the exhaust points and relatively lower temperature at the intake positions. The highest temperature was found at the AIO exhaust, which is reasonable given the CPU was running at full load. Most of the intake positions recorded a temperature lower than 46°C since they were drawing air from environment. Two critical positions we were looking at are **NO. 107 GPU Fan** and **NO. 109 CPU Top**, which were drawing internal air to cool two of the most important components.

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



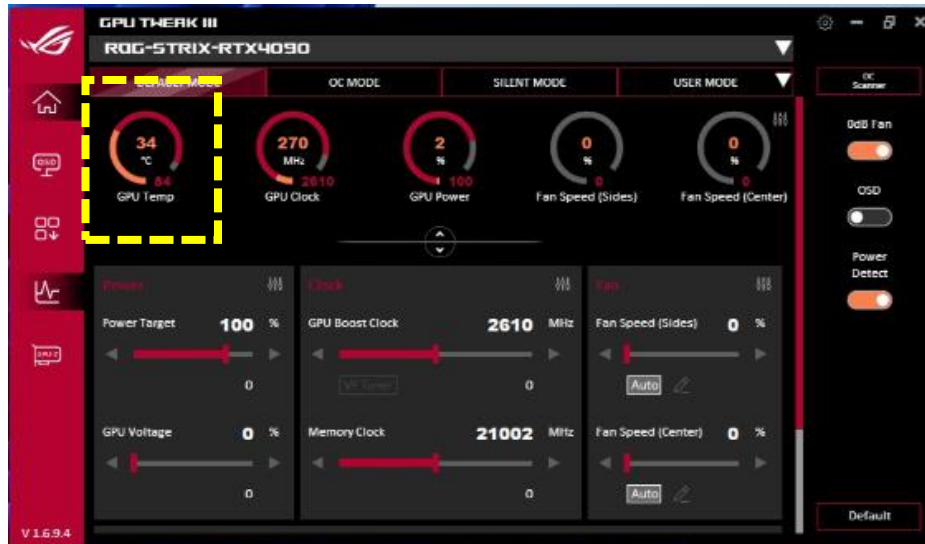
FurMark

Date	8/7/2024	Date	8/7/2024
Time (HH:MM)	1:39 PM	Time (HH:MM)	4:03 PM
CPU Clock	1400 MHz	CPU Clock	5200 MHz
Motherboard Name	Asus TUF Gaming Z790-BTF WiFi	Motherboard Name	Asus TUF Gaming Z790-BTF WiFi
BIOS Version	1645	BIOS Version	1645
Free Memory	25879 MB	Free Memory	25679 MB
GPU Clock	210 MHz	GPU Clock	2730 MHz
Motherboard	30°C	Motherboard	37°C
CPU	32°C	CPU	82°C
CPU Package	39°C	CPU Package	93°C
GPU	34°C	GPU	82°C
CPU	1997 RPM	CPU	1988 RPM
AIO Pump	3082 RPM	AIO Pump	3026 RPM
GPU	0 RPM	GPU	3099 RPM
CPU Core	1.137 V	CPU Core	1.279 V
GPU Core	0.880 V	GPU Core	0.990 V
CPU Package	31.01 W	CPU Package	252.85 W
GPU	14.82 W	GPU	500.98 W
GPU TDP%	3%	GPU TDP%	100%

Idle

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.

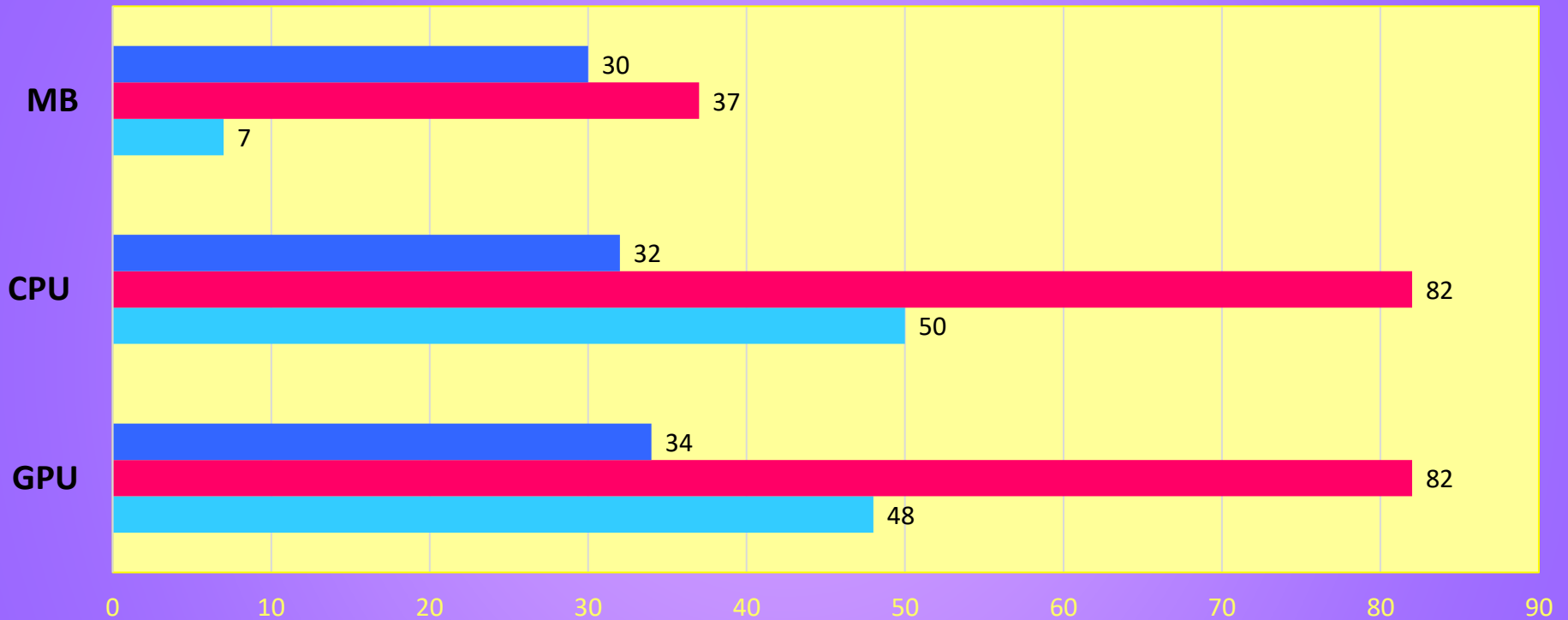


Idle



Full load

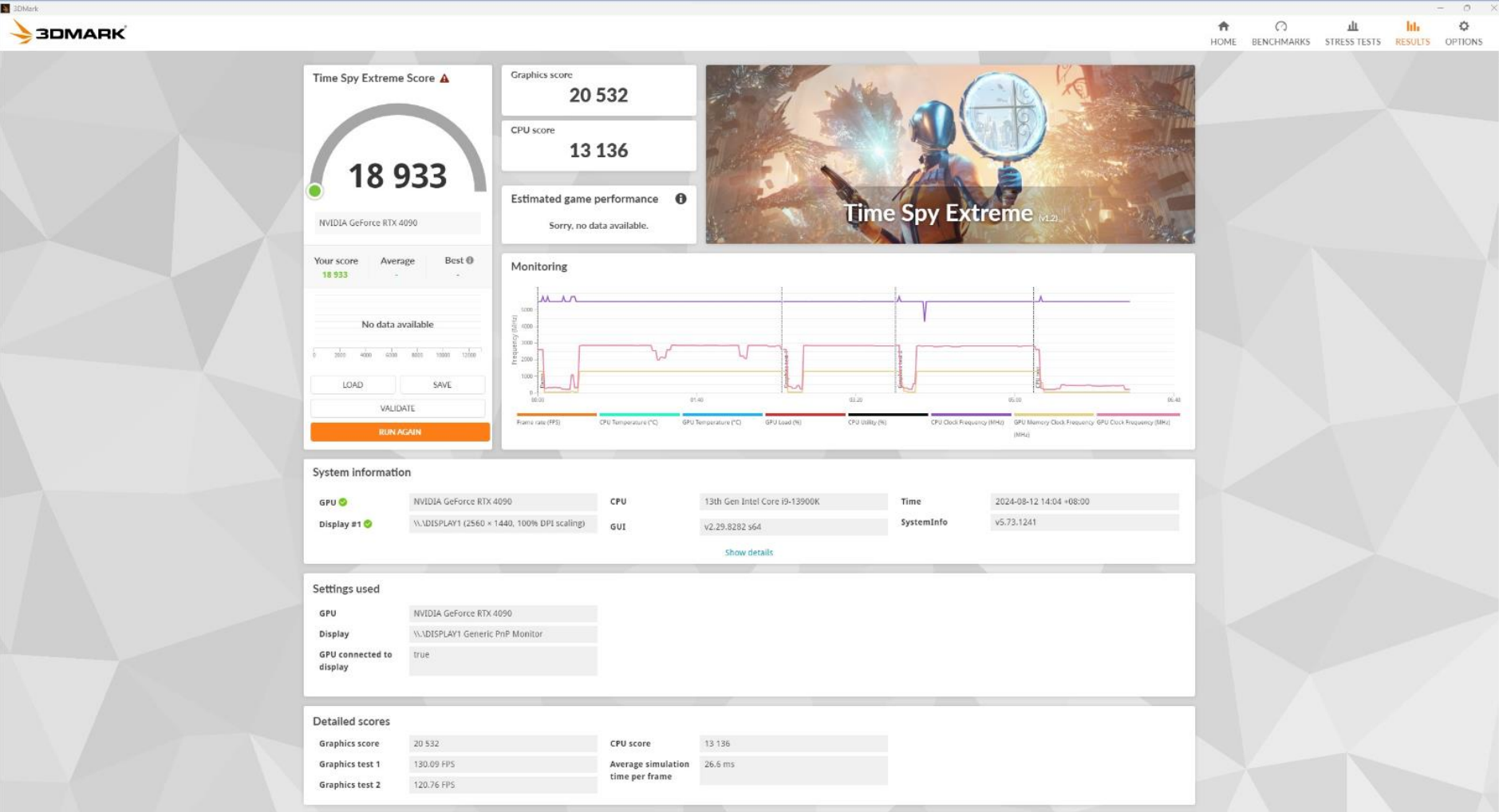
CPU & GPU Thermal Stress Test CTE E550 TG



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

 Idle Temp.  Load Temp.  ΔT

Temperature - Degree C
Lower is Better



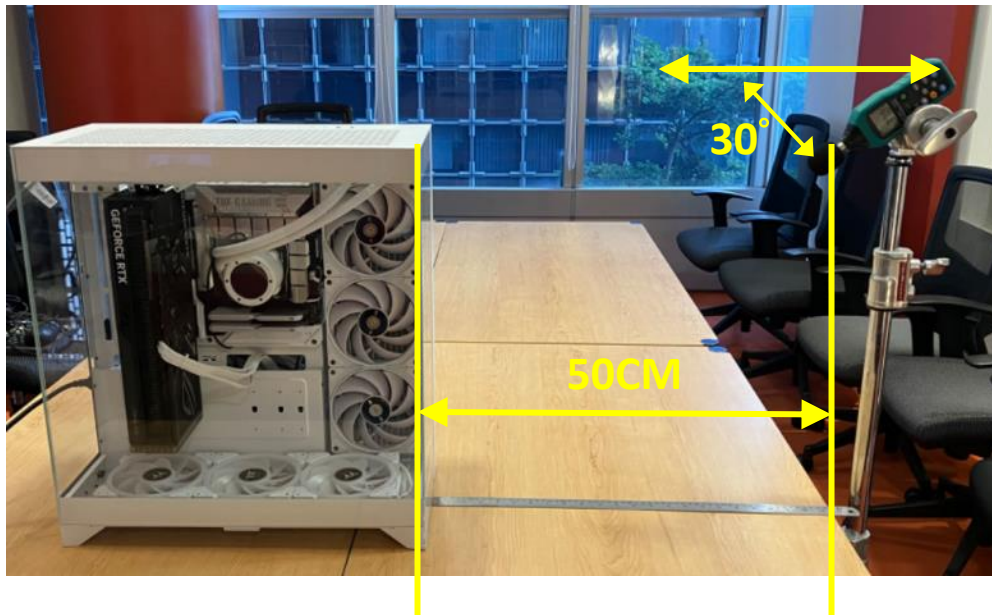
Test Environment : **Thermaltake Taipei Office**

Test Model: **CTE 550 TG**

Test Ambience: **25.0 °C(Temperature) / 50% 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 – 36.3dBA

Fan Speed 550rpm – 36.8dBA

Fan Speed 750rpm – 37.2dBA

Fan Speed 2000rpm – 52.7dBA



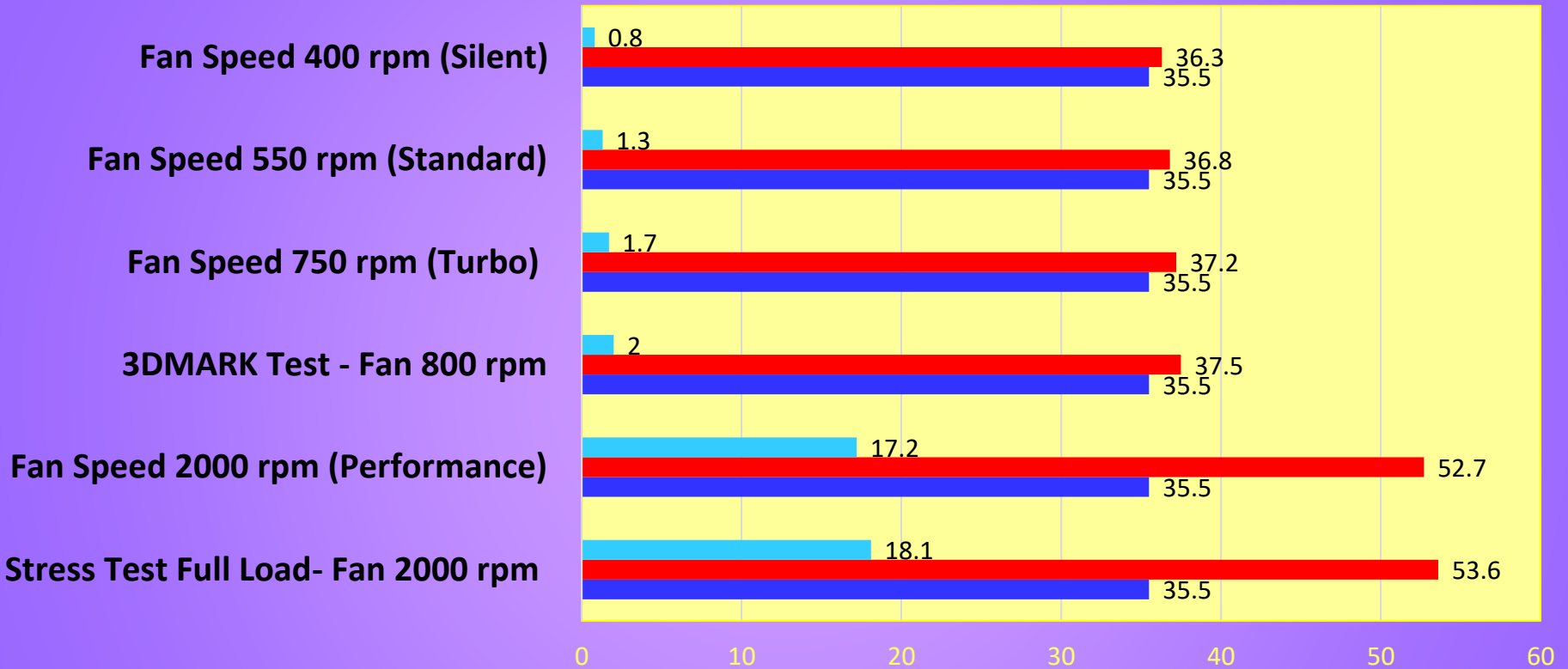
Date	8/12/2024
Time (HH:MM)	3:06 PM
CPU Clock	5500 MHz
Motherboard Name	Asus TUF Gaming Z790-BTF WiFi
BIOS Version	1645
Free Memory	25928 MB
GPU Clock	2610 MHz
Motherboard	27°C
CPU	31°C
CPU Package	38°C
GPU	32°C
CPU	399 RPM
AIO Pump	2745 RPM
GPU	0 RPM
CPU Core	1.314 V
GPU Core	0.950 V
CPU Package	29.29 W
GPU	37.83 W
GPU TDP%	8%

Date	8/12/2024
Time (HH:MM)	3:18 PM
CPU Clock	3000 MHz
Motherboard Name	Asus TUF Gaming Z790-BTF WiFi
BIOS Version	1645
Free Memory	26134 MB
GPU Clock	210 MHz
Motherboard	30°C
CPU	30°C
CPU Package	38°C
GPU	35°C
CPU	555 RPM
AIO Pump	2749 RPM
GPU	0 RPM
CPU Core	1.341 V
GPU Core	0.880 V
CPU Package	25.33 W
GPU	13.87 W
GPU TDP%	3%

Date	8/12/2024
Time (HH:MM)	3:22 PM
CPU Clock	5500 MHz
Motherboard Name	Asus TUF Gaming Z790-BTF WiFi
BIOS Version	1645
Free Memory	26140 MB
GPU Clock	210 MHz
Motherboard	30°C
CPU	30°C
CPU Package	36°C
GPU	36°C
CPU	745 RPM
AIO Pump	2842 RPM
GPU	0 RPM
CPU Core	1.296 V
GPU Core	0.880 V
CPU Package	22.41 W
GPU	14.15 W
GPU TDP%	3%

Date	8/12/2024
Time (HH:MM)	3:23 PM
CPU Clock	3500 MHz
Motherboard Name	Asus TUF Gaming Z790-BTF WiFi
BIOS Version	1645
Free Memory	26066 MB
GPU Clock	210 MHz
Motherboard	30°C
CPU	29°C
CPU Package	35°C
GPU	36°C
CPU	2000 RPM
AIO Pump	5068 RPM
GPU	0 RPM
CPU Core	1.323 V
GPU Core	0.880 V
CPU Package	20.24 W
GPU	12.26 W
GPU TDP%	3%

Acoustic Sound Pressure Level Test - CTE E550 TG



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

■ Diff ■ Load dBA ■ Idle dBA

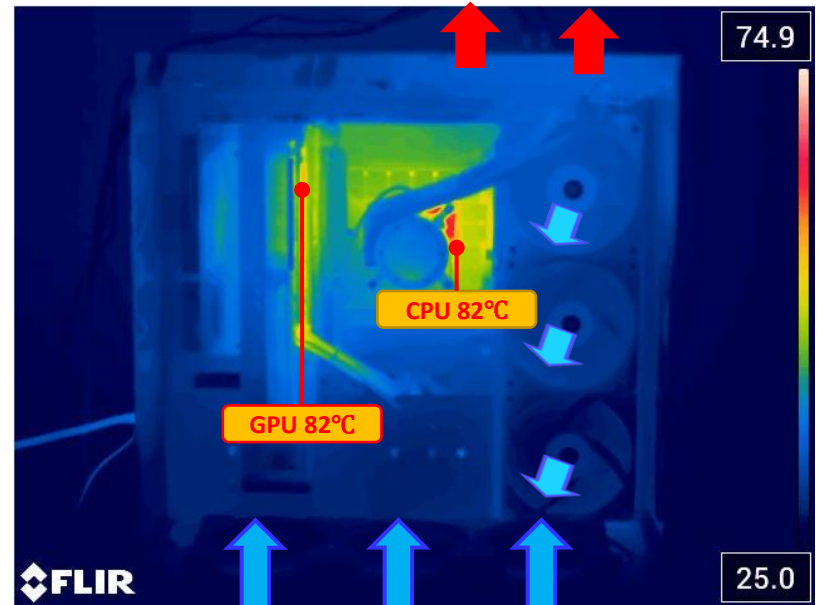
Temperature - Degree C
 Lower is Better

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.

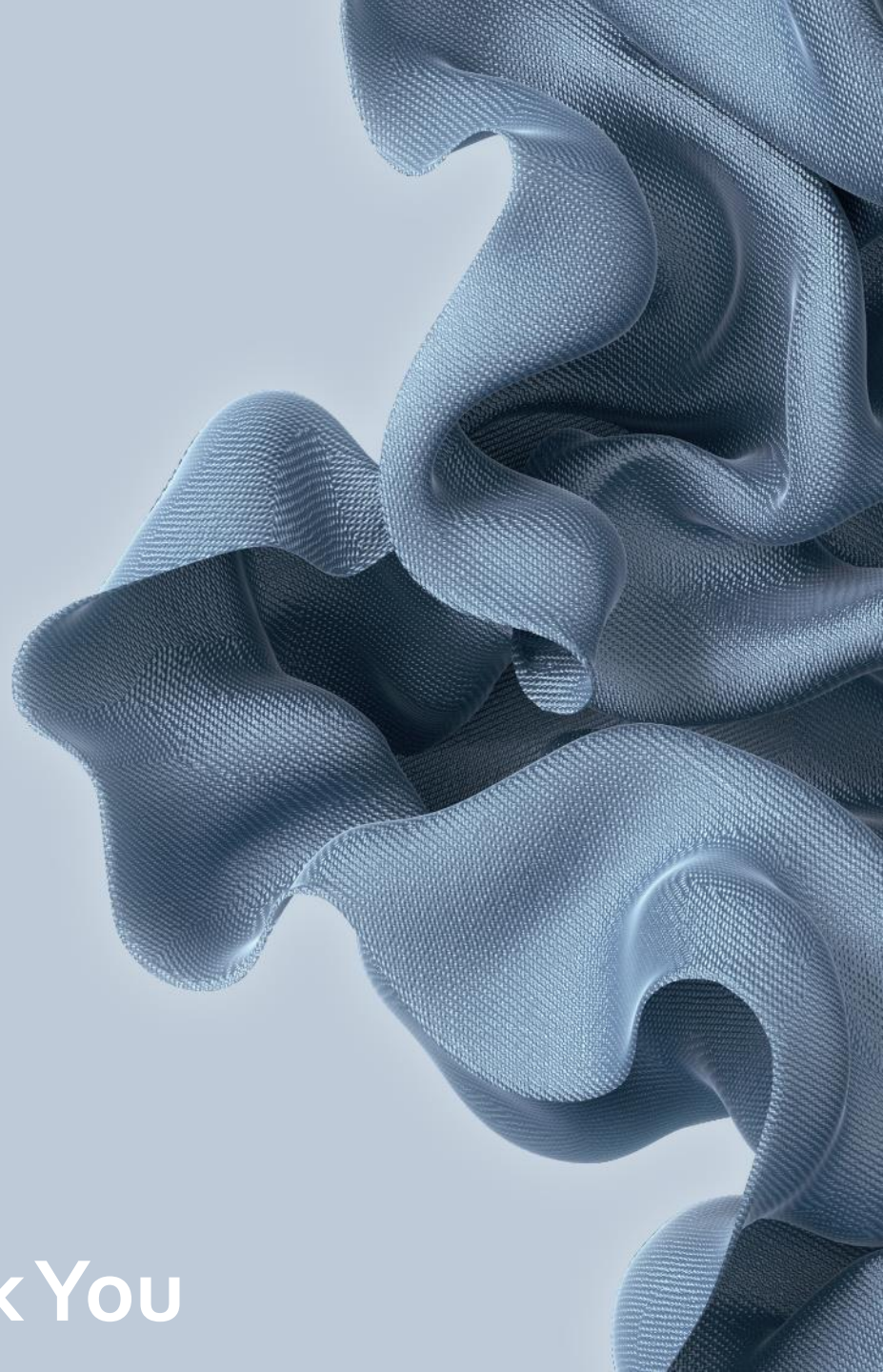
-INTEL i9 13900K / CPU Temp. (Max) : **82°C (TDP 253W)**

-ASUS ROG Strix GeForce RTX® 4090 OC / GPU Temp. (Max) : **82°C**

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 E550 TG is regarding cooling performance.



KEEP IT SLEEK
KEEP IT COOL



Thank You