Performance Test Report

SR200-X4-A2

Product Manager	R&D Leader	Mechanical Engineer	System Engineer	Test Engineer
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Revision Date: December 25, 2024


COM
USB3.0
DP
DP
LAN
DP
DP
7STARLAKE
DC-IN
9-36V


COM
USB3.0
DP
DP
LAN
DP
DP
7STARLAKE
DC-IN
9-36V


Mic-in
Line
-out

INDEX

1. SPECIFICATION

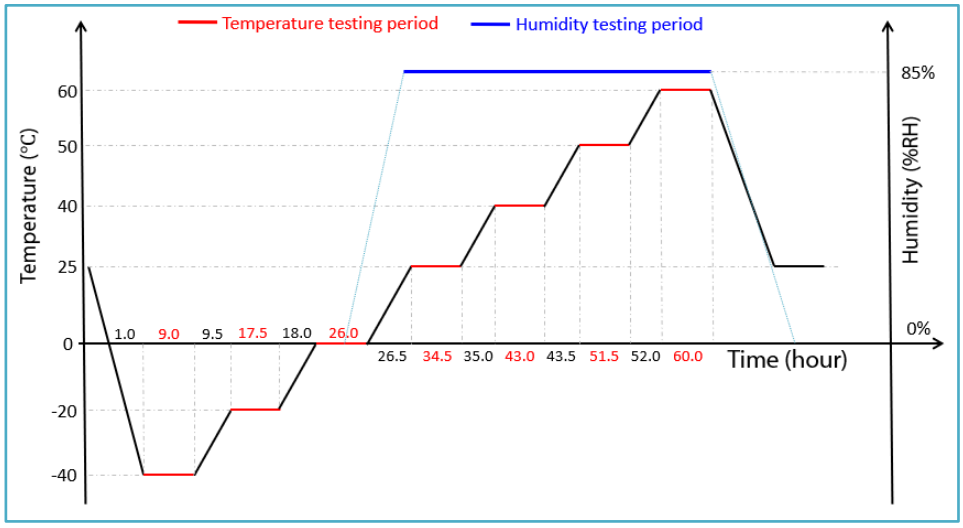
1-1. SYSTEM CONFIGURATION

Motherboard	OXY5741A Chipset: CM246 BIOS Version: 5.13 SMBIOS Version: 3.2
CPU	Intel® Xeon® E-2276ML Processor Total Cores: 6 Total Threads: 12 Max Turbo Frequency: 4.20 GHz Intel® Turbo Boost Technology 2.0 Frequency: 4.20 GHz Processor Base Frequency: 2.00 GHz Cache: 12 MB TDP 25 W
Memory	SAMSUNG M471A4G43AB1-CWE 32GB SO-DIMM
Storage	M.2 2280 4TB SSD
GPU	NVIDIA RTX A2000 Embedded GPU BIOS Version: 94.07.63.00.A2 Driver Version: 31.0.15.2895(NVIDIA 528.95) DCH / WIN64 CUDA Parallel-Processing Cores: 2560 CUDA® cores GPU Base/Boost Clock: 607 MHz / 1117 MHz

1-2. PRODUCT INTERIOR PHOTOS

2. TEST PLAN

2-1. THERMAL MEASUREMENT PROCESS

Test Purpose	The purpose of performing thermal profile testing is to identify potential thermal issues with the EUT. Considering that semiconductor failure rates rise rapidly with increasing junction temperature, it can aid product reliability assessment. As the system cools down, the mode will change with stack selection, temperature/heat. Mapping can help develop the best tracking arrangements.
Test Equipment	1. KSON THS-B4T-150 Chamber.
Quantity Tested	Minimum 1 Set
Test Software	1. Stress CPU: PassMark BurnInTest Professional 9.0 build 1014 2. Stress GPU: AIDA64_extreme590 3. LAN Speed: iPerf3 4. USB Test: PassMark USB 3.0 Loop Back Plug
Test Procedure	1. Thermal pre-scan measurement: Temperature: **-40˚C ~60˚C** Humidity: **85%RH** 2. Actual thermal measurement: 2-1. Select the test point based on the infrared photo and connect the thermocouple to the hot spot. 2-2. Place the EUT into the hot chamber and set the test temperature curve Specification. 2-3. Open the hot cell and power up the EUT, enter the Windows 10 Pro environment and perform a maximum power test + stress application. 2-4. After the EUT executes the test software for 8 hours, record the maximum heat generation of each thermocouple point. 2-5. Turn off the hot cell and EUT. 2-6. Verify and check that the recorded information for each component complies with the operating temperature range listed in the specification/approval sheet for each component being tested. 3. For the Operating system software compatibility testing: 3-1.open the thermal chamber and power on the device under test. Enter the Ubuntu 24.02 LTS environment and perform the maximum power test and stress test.
Test Diagram of Curves	Environment defines for 60 hours. 

2-2. Test Result

2-2-1. Temperature Cycle

Aging test of various parts at different temperatures under maximum load and full load conditions.

Test Temperature	Test Result
-40°C	PASS
-20°C	PASS
0°C	PASS
25°C / 85%RH	PASS
40°C / 85%RH	PASS
50°C / 85%RH	PASS
60°C / 85%RH	PASS

2-2-2. I/O Function

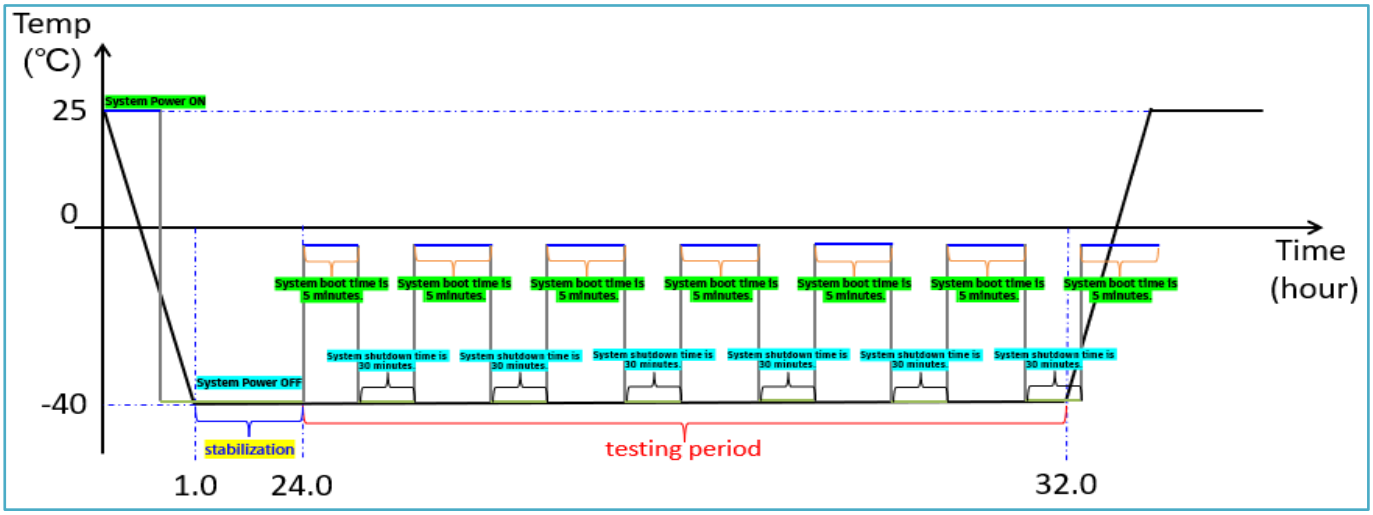
#Confirm the system specifications and I/O connection to ensure that they are functioning properly

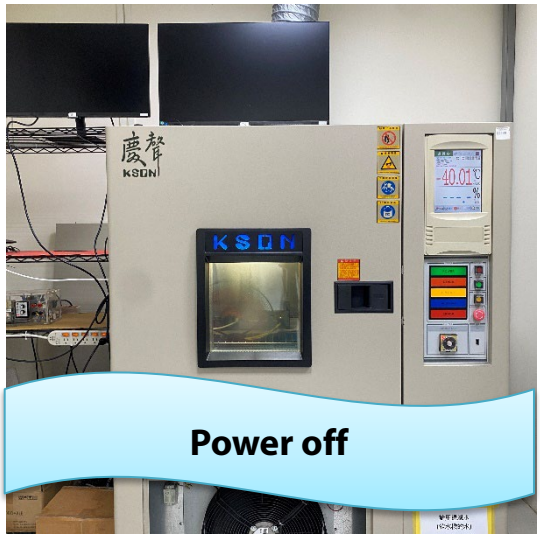
Item	Test Criteria	Result
LAN Port (1Gbps)	Connecting to a LAN switch/hub for data transmission test works properly.	PASS
LAN Port (1Gbps)	Connecting to a LAN switch/hub for data transmission test works properly.	PASS
COM Port (RS232)	The two devices RS232 are connected to each other, and the data transmission test shows no loss, functioning properly.	PASS
USB 3.0	Connect a PassMark USB 3.0 Loopback Plugs for testing, it can work normally.	PASS
USB 3.0	Connect a PassMark USB 3.0 Loopback Plugs for testing, it can work normally.	PASS
USB 3.0	Connect a PassMark USB 3.0 Loopback Plugs for testing, it can work normally.	PASS
USB 3.0	Connect a PassMark USB 3.0 Loopback Plugs for testing, it can work normally.	PASS
Display Port	Check work well. (4K Resolution: 3,840 x 2,160)	PASS
Display Port	Check work well. (4K Resolution: 3,840 x 2,160)	PASS
Display Port	Check work well. (4K Resolution: 3,840 x 2,160)	PASS
Display Port	Check work well. (4K Resolution: 3,840 x 2,160)	PASS
Mic-in	Connect the microphone and check if it is receiving sound properly.	PASS
Line-Out	Connect external speakers and ensure that music is outputting correctly.	PASS

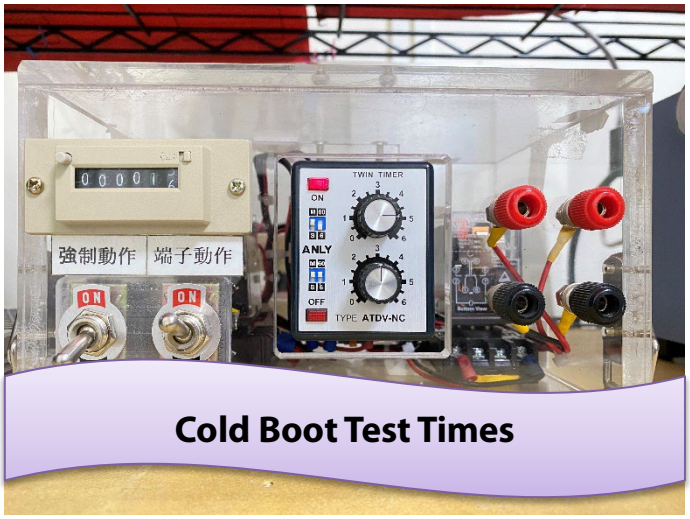
2-2-3. Low-temperature & Boot-up

#Power supply under -40°C and ensure that the system boot up properly

Ambient Temp.	Cold Boot Test Times	Test Result
-40°C	15 times	PASS

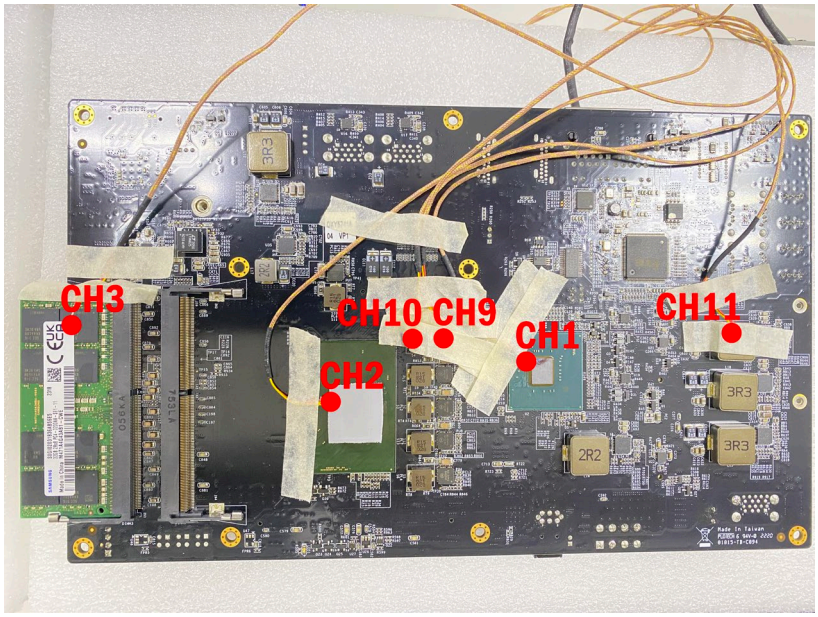


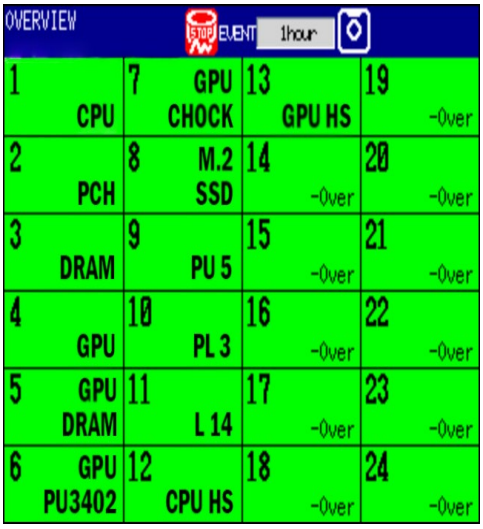


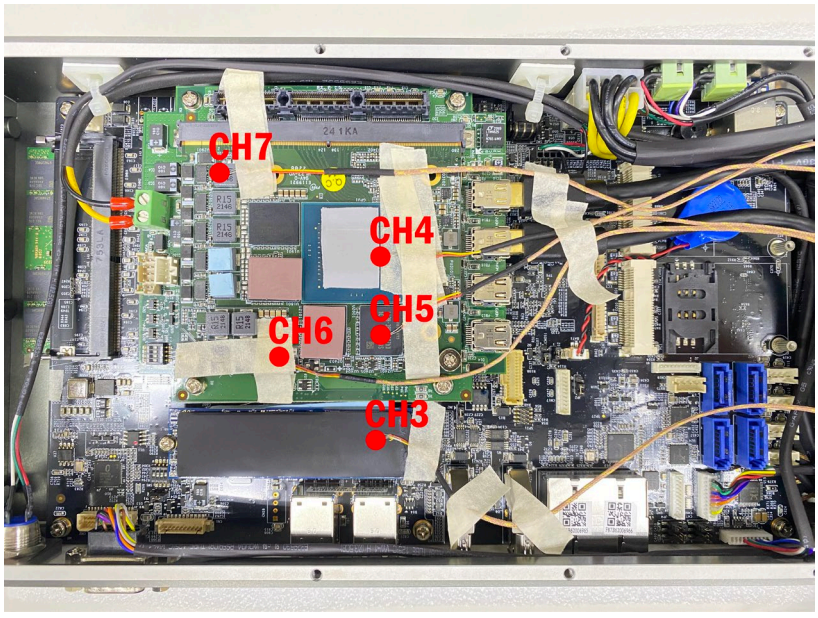


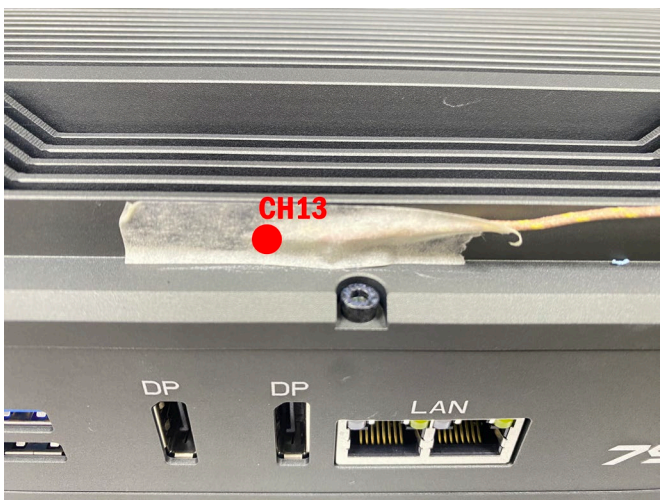
3. TEST PHOTO IN LAB

3-1. Thermocouple Placement



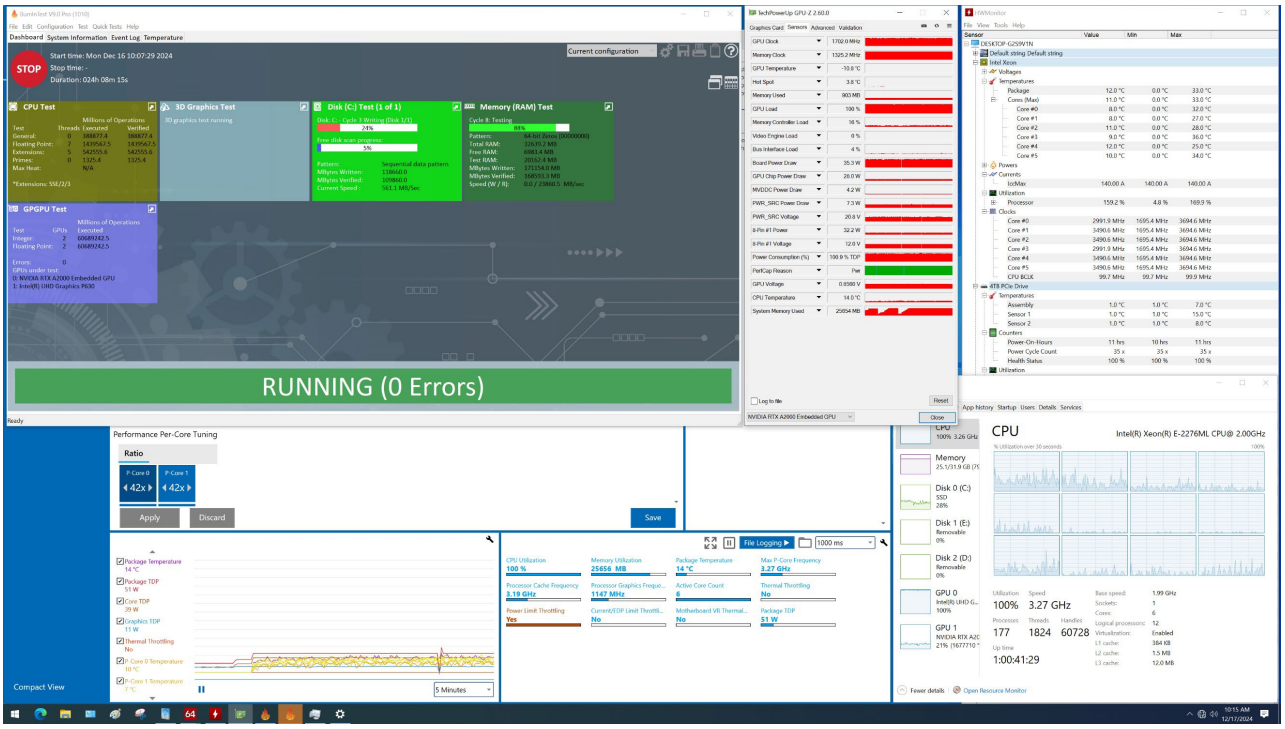






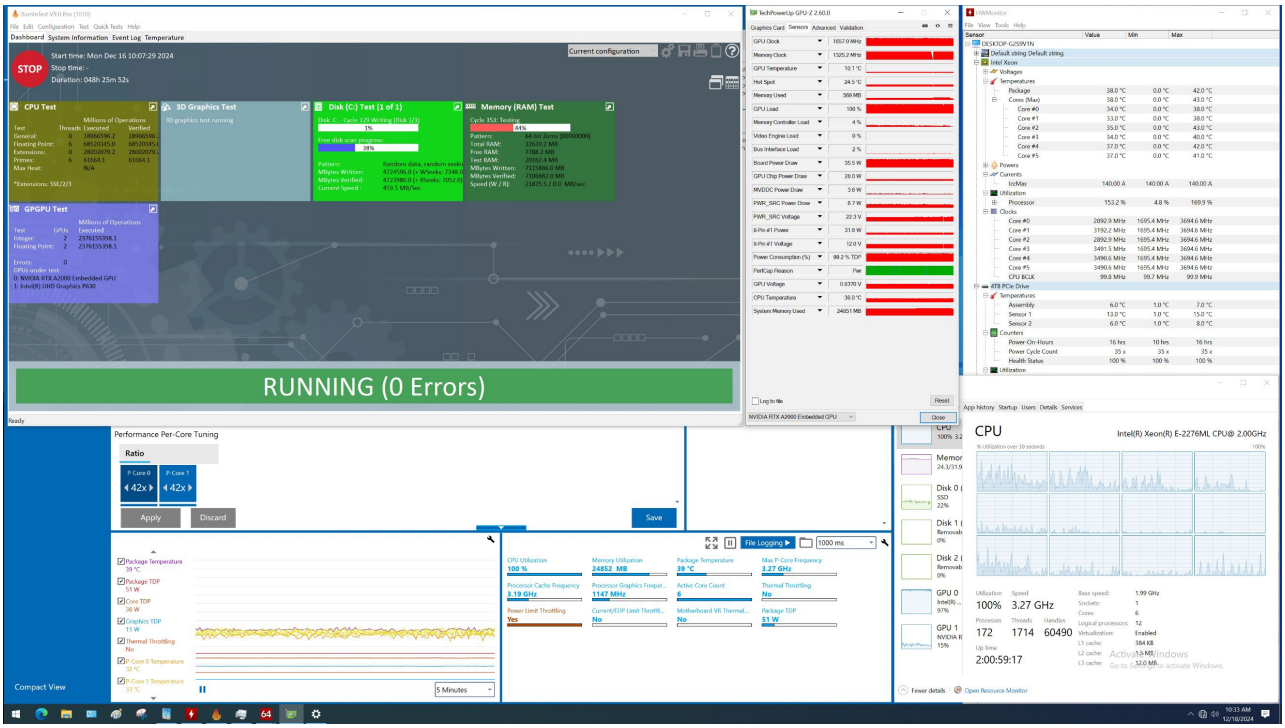
3-2. Environmental Temperature Test

- Chamber in -40°C



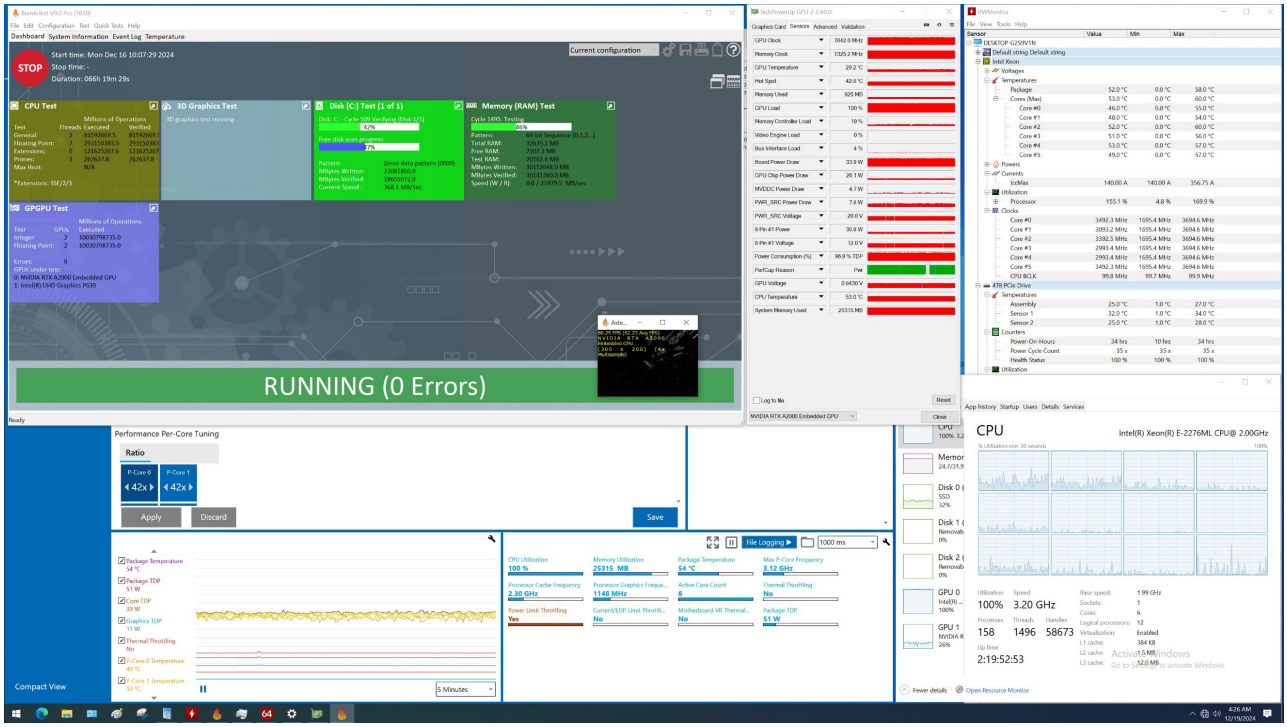
Measuring Point	Ambient Temp.	-40°C
	CPU Cores Max Temperature	11.0 °C
	CPU Cores Frequency (Unit: GHz)	3.27 GHz
	GPU Temperature	-10.8 °C
	GPU Hot Spot Temperature	3.8 °C
	GPU Frequency (Unit: MHz)	1702 MHz
CH1	CPU	-9.4 °C
CH2	PCH	-20.9 °C
CH3	DRAM	-24.1 °C
CH4	GPU	-20.0 °C
CH5	GPU-DRAM	-24.4 °C
CH6	GPU-PU3402	-10.7 °C
CH7	GPU-CHOCK	-18.0 °C
CH8	M.2 SSD	-28.1 °C
CH9	PU5	-6.3 °C
CH10	PL3	-14.1 °C
CH11	L14	-21.6 °C
CH12	CPU Heat sink	-28.1 °C
CH13	GPU Heat sink	-32.4 °C

- Chamber in -20°C



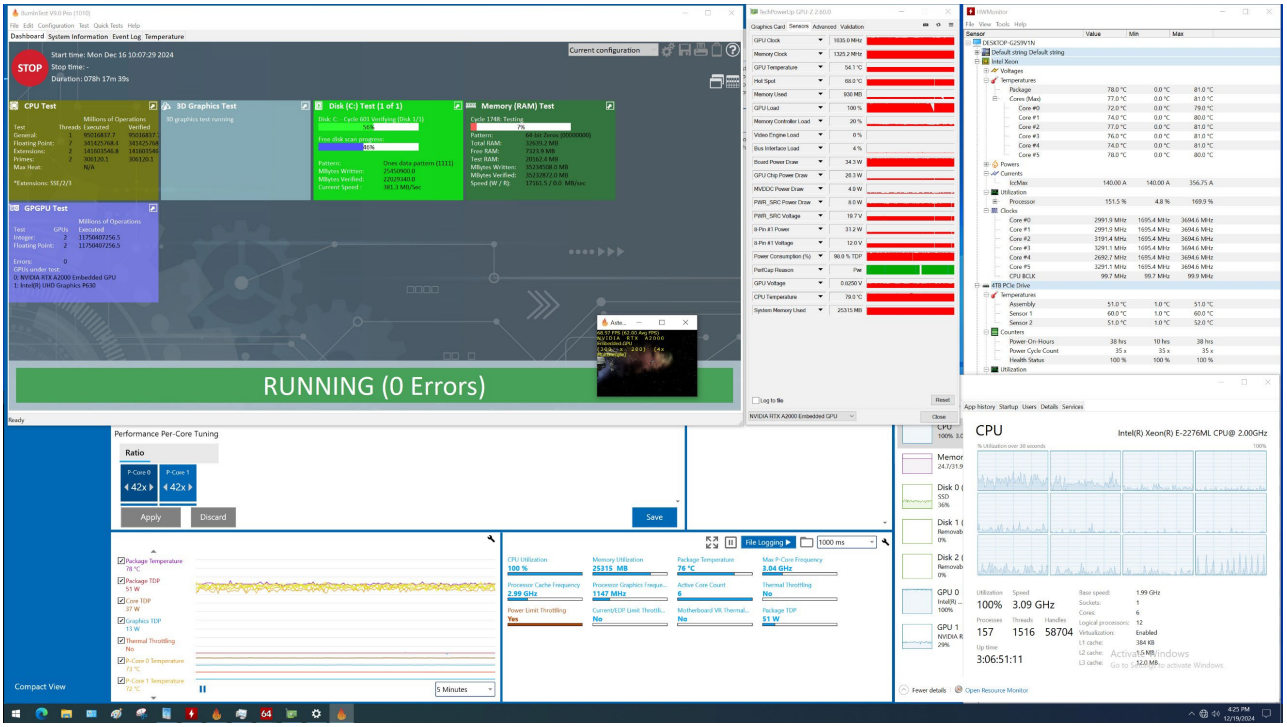
Measuring Point	Ambient Temp.	-20°C
	CPU P-Cores Max Temperature	38.0 °C
	CPU E-Cores Frequency (Unit: GHz)	3.27 GHz
	GPU Temperature	10.1 °C
	GPU Hot Spot Temperature	24.5 °C
	GPU Frequency (Unit: MHz)	1657 MHz
CH1	CPU	14.0 °C
CH2	PCH	1.8 °C
CH3	DRAM	-1.1 °C
CH4	GPU	2.3 °C
CH5	GPU-DRAM	-2.1 °C
CH6	GPU-PU3402	11.9 °C
CH7	GPU-CHOCK	4.6 °C
CH8	M.2 SSD	-5.9 °C
CH9	PU5	17.1 °C
CH10	PL3	9.2 °C
CH11	L14	0.4 °C
CH12	CPU Heat sink	-3.2 °C
CH13	GPU Heat sink	-10.0 °C

- Chamber in 0°C



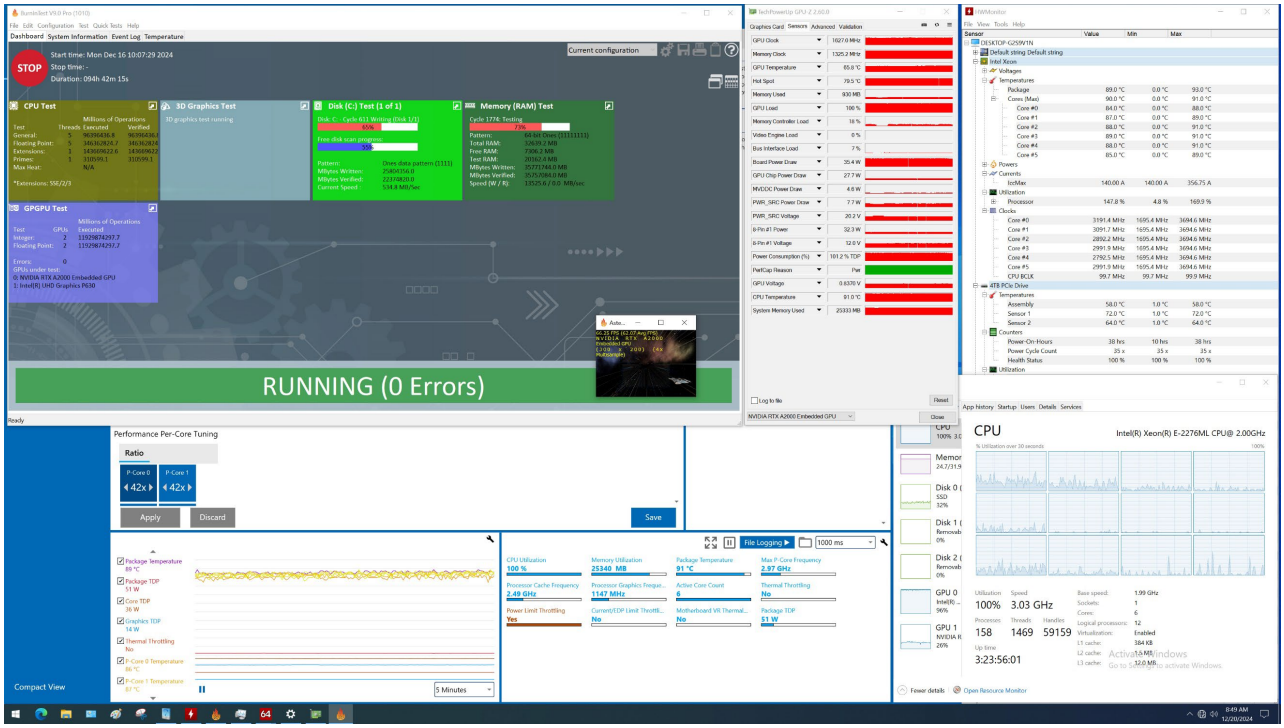
Measuring Point	Ambient Temp.	0°C
	CPU P-Cores Max Temperature	53.0 °C
	CPU E-Cores Frequency (Unit: GHz)	3.20 GHz
	GPU Temperature	29.2 °C
	GPU Hot Spot Temperature	42.8 °C
	GPU Frequency (Unit: MHz)	1642 MHz
CH1	CPU	28.8 °C
CH2	PCH	22.9 °C
CH3	DRAM	18.3 °C
CH4	GPU	21.2 °C
CH5	GPU-DRAM	17.0 °C
CH6	GPU-PU3402	31.2 °C
CH7	GPU-CHOCK	24.0 °C
CH8	M.2 SSD	14.6 °C
CH9	PU5	36.0 °C
CH10	PL3	28.8 °C
CH11	L14	22.0 °C
CH12	CPU Heat sink	17.4 °C
CH13	GPU Heat sink	11.5 °C

- Chamber in 25°C



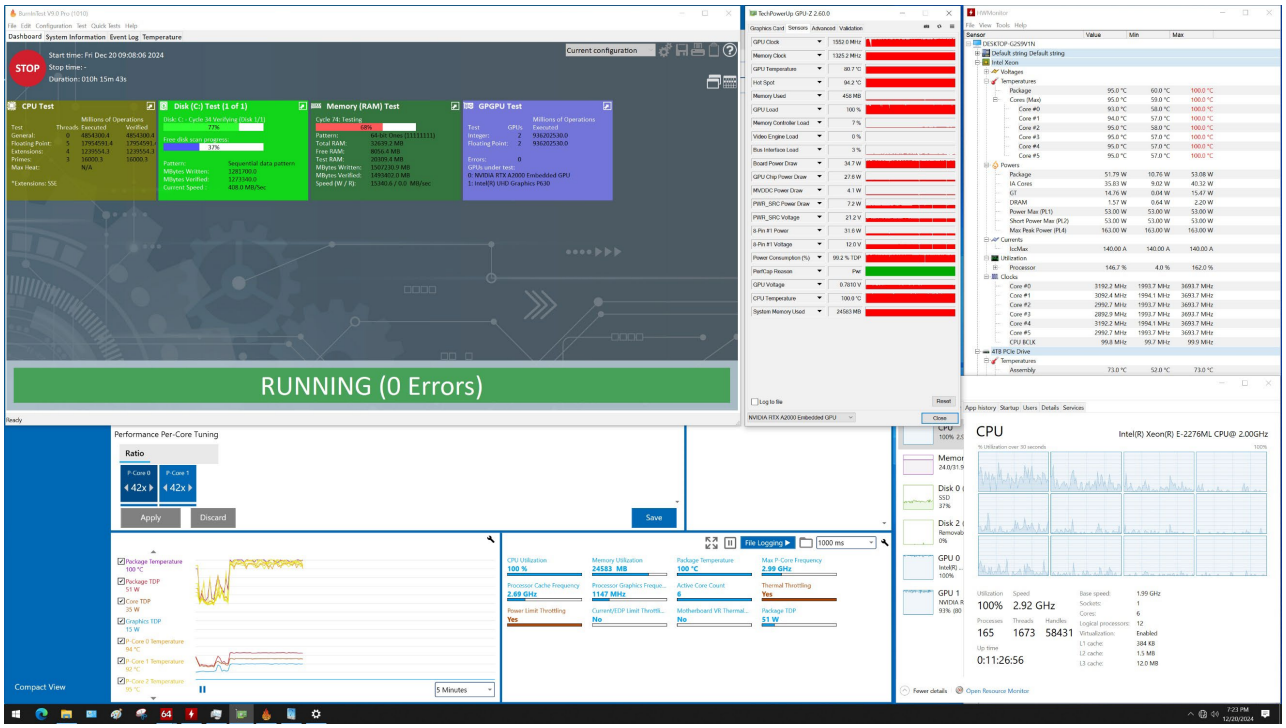
Measuring Point	Ambient Temp.	25°C
	CPU P-Cores Max Temperature	77.0 °C
	CPU E-Cores Frequency (Unit: GHz)	3.09 GHz
	GPU Temperature	54.1 °C
	GPU Hot Spot Temperature	68.0 °C
	GPU Frequency (Unit: MHz)	1635 MHz
CH1	CPU	53.7 °C
CH2	PCH	47.9 °C
CH3	DRAM	43.3 °C
CH4	GPU	45.8 °C
CH5	GPU-DRAM	42.1 °C
CH6	GPU-PU3402	55.8 °C
CH7	GPU-CHOCK	49.1 °C
CH8	M.2 SSD	39.6 °C
CH9	PU5	61.0 °C
CH10	PL3	53.4 °C
CH11	L14	47.5 °C
CH12	CPU Heat sink	42.4 °C
CH13	GPU Heat sink	36.2 °C

- Chamber in 40°C



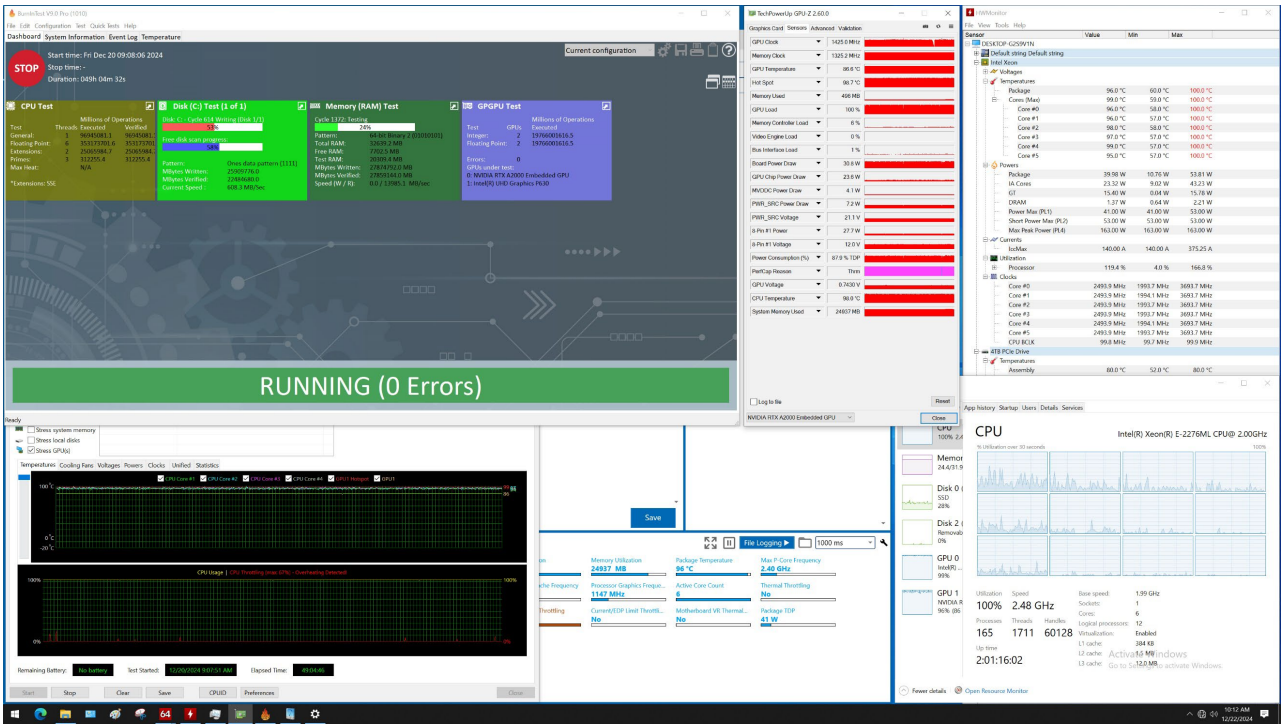
Measuring Point	Ambient Temp.	40°C
	CPU P-Cores Max Temperature	90.0 °C
	CPU E-Cores Frequency (Unit: GHz)	3.03 GHz
	GPU Temperature	65.8 °C
	GPU Hot Spot Temperature	79.5 °C
	GPU Frequency (Unit: MHz)	1627 MHz
CH1	CPU	66.2 °C
CH2	PCH	60.5 °C
CH3	DRAM	55.9 °C
CH4	GPU	58.4 °C
CH5	GPU-DRAM	54.9 °C
CH6	GPU-PU3402	68.2 °C
CH7	GPU-CHOCK	61.8 °C
CH8	M.2 SSD	52.3 °C
CH9	PU5	72.9 °C
CH10	PL3	65.3 °C
CH11	L14	59.5 °C
CH12	CPU Heat sink	54.7 °C
CH13	GPU Heat sink	49.5 °C

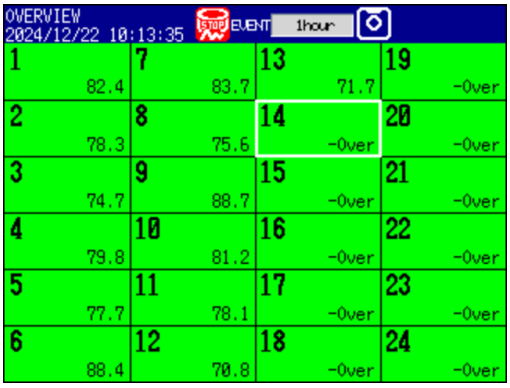
- Chamber in 50°C



Measuring Point	Ambient Temp.	50°C
	CPU P-Cores Max Temperature	95.0 °C
	CPU E-Cores Frequency (Unit: GHz)	2.92 GHz
	GPU Temperature	80.7 °C
	GPU Hot Spot Temperature	94.2 °C
	GPU Frequency (Unit: MHz)	1552 MHz
CH1	CPU	76.6 °C
CH2	PCH	71.0 °C
CH3	DRAM	66.7 °C
CH4	GPU	72.4 °C
CH5	GPU-DRAM	69.6 °C
CH6	GPU-PU3402	81.6 °C
CH7	GPU-CHOCK	76.5 °C
CH8	M.2 SSD	67.3 °C
CH9	PU5	83.9 °C
CH10	PL3	75.4 °C
CH11	L14	70.2 °C
CH12	CPU Heat sink	61.6 °C
CH13	GPU Heat sink	62.8 °C

- Chamber in 60°C





Measuring Point	Ambient Temp.	60°C
	CPU P-Cores Max Temperature	99.0 ℃
	CPU E-Cores Frequency (Unit: GHz)	2.48 GHz
	GPU Temperature	86.6 ℃
	GPU Hot Spot Temperature	98.7 ℃
	GPU Frequency (Unit: MHz)	1425 MHz
CH1	CPU	82.4 ℃
CH2	PCH	78.3 ℃
CH3	DRAM	74.7 ℃
CH4	GPU	79.8 ℃
CH5	GPU-DRAM	77.7 ℃
CH6	GPU-PU3402	88.4 ℃
CH7	GPU-CHOCK	83.7 ℃
CH8	M.2 SSD	75.6 ℃
CH9	PU5	88.7 ℃
CH10	PL3	81.2 ℃
CH11	L14	78.1 ℃
CH12	CPU Heat sink	70.8 ℃
CH13	GPU Heat sink	71.7 ℃

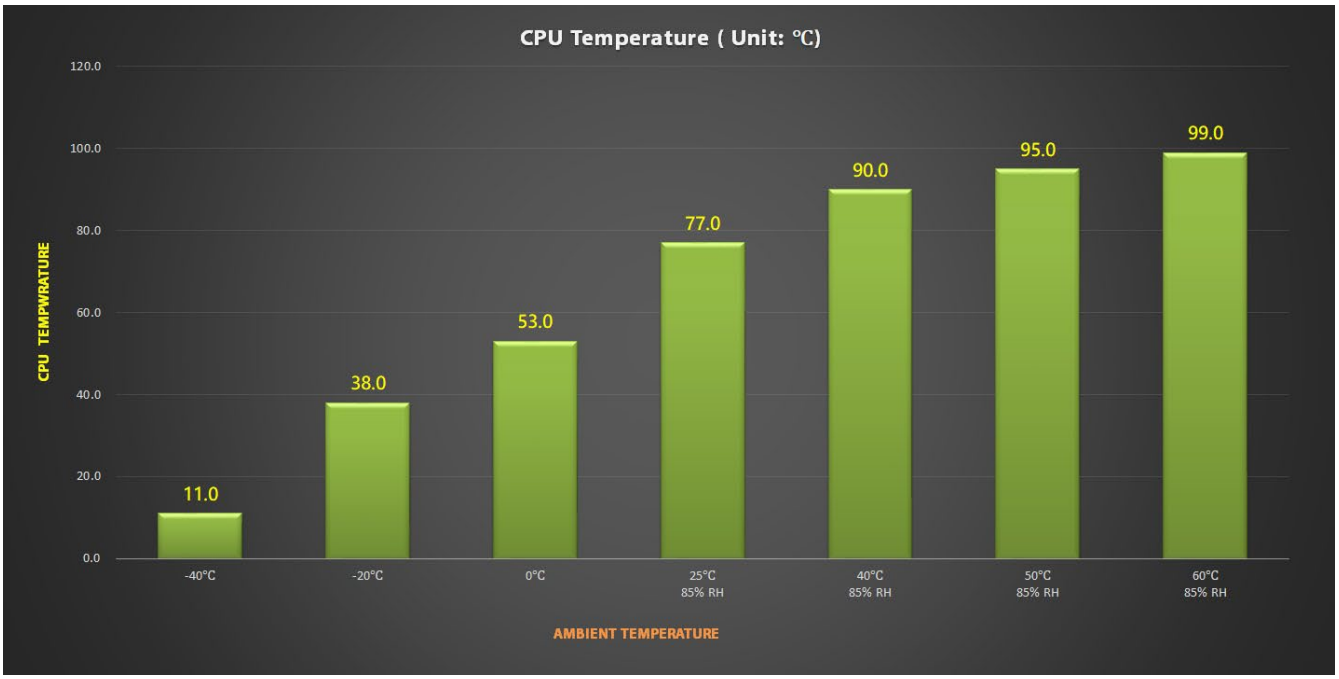
4. THERMAL TEST RESULT(-40°C ~ +60°C)

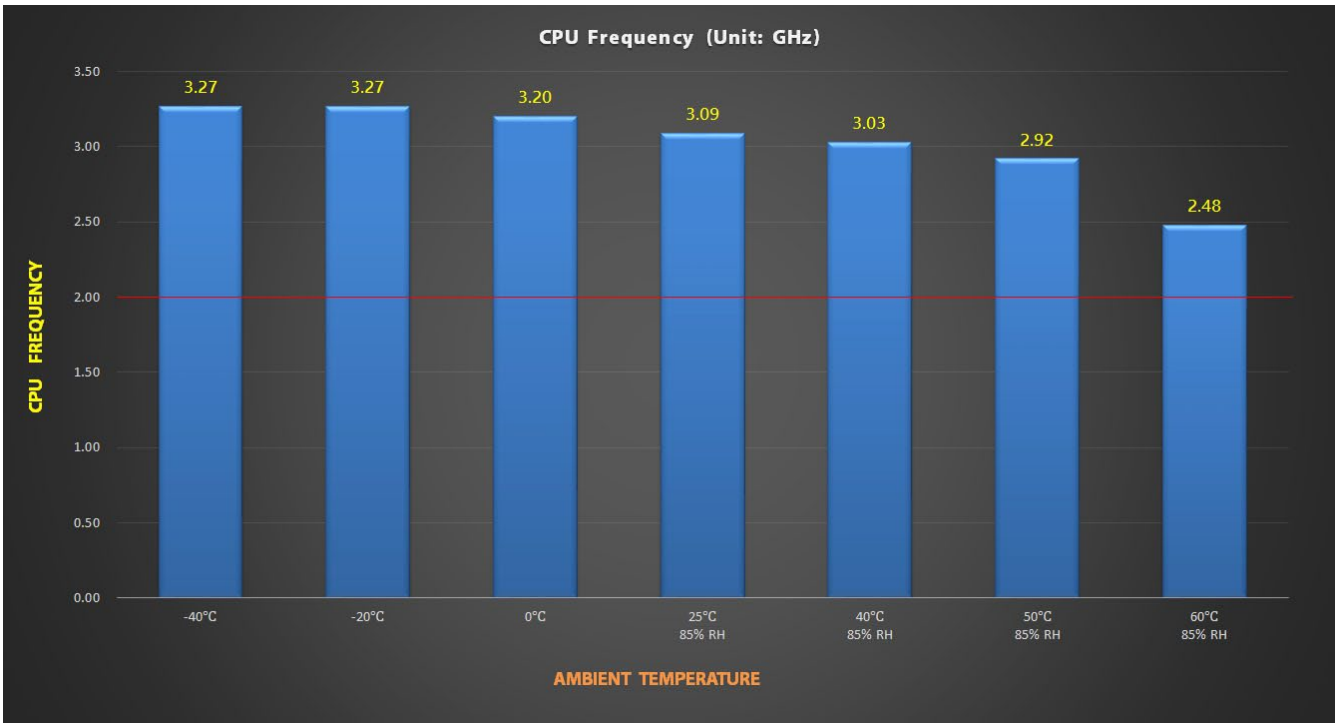
Temperature & Frequency / Thermocouple Measurements

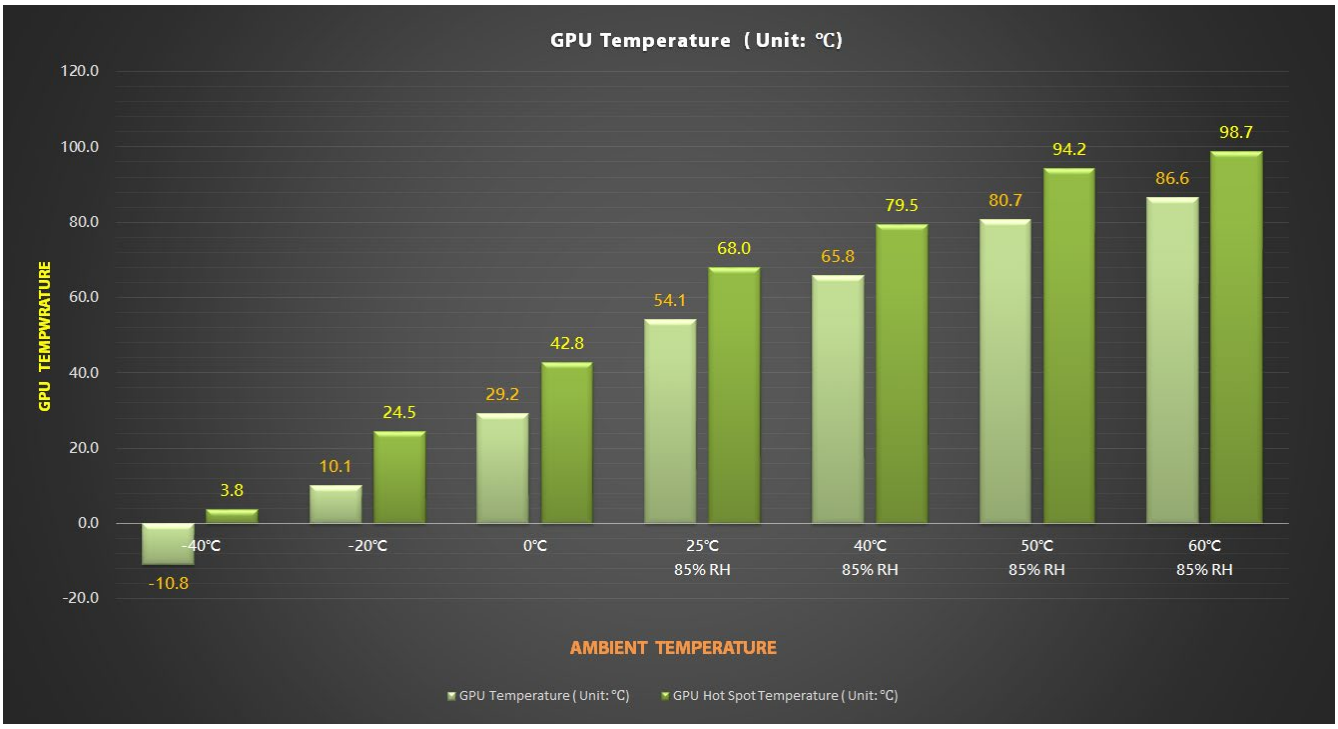
Temperature / Ambient Temp. / Frequency	-40°C	-20°C	0°C	25°C 85% RH	40°C 85% RH	50°C 85% RH	60°C 85% RH
CPU Cores Max Temperature (Unit: °C) Base Frequency: 2.00 GHz	11.0	38.0	53.0	77.0	90.0	95.0	99.0
CPU Cores Frequency (Unit: GHz)	3.27	3.27	3.20	3.09	3.03	2.92	2.48

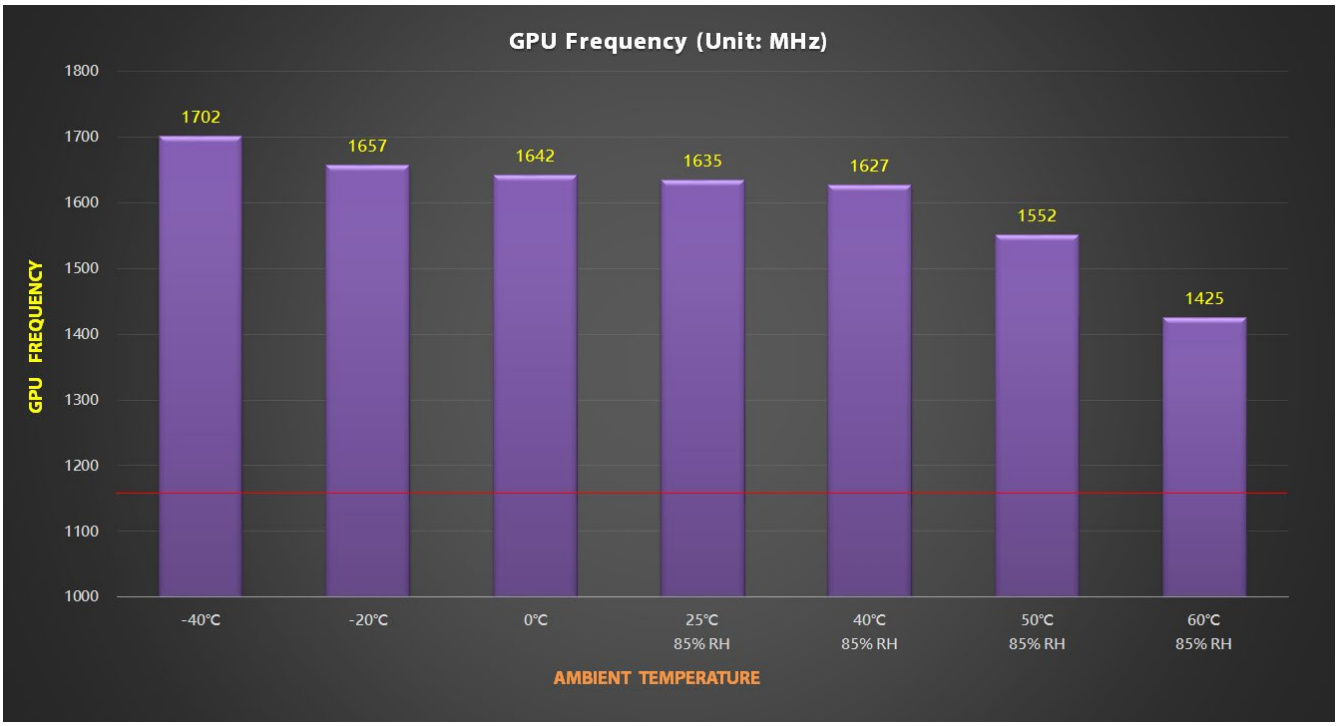
Temperature / Ambient Temp. / Frequency	-40°C	-20°C	0°C	25°C 85% RH	40°C 85% RH	50°C 85% RH	60°C 85% RH
GPU Temperature (Unit: °C)	-10.8	10.1	29.2	54.1	65.8	80.7	86.6
GPU Hot Spot Temperature (Unit: °C)	3.8	24.5	42.8	68.0	79.5	94.2	98.7
GPU Frequency (Unit: MHz) Base Frequency: 1117 MHz	1702.0	1657.0	1642.0	1635.0	1627.0	1552.0	1425.0

Thermocouple measuring point / Ambient Temp.		-40°C	-20°C	0°C	25°C 85% RH	40°C 85% RH	50°C 85% RH	60°C 85% RH
CH1	CPU	-9.4	14.0	28.8	53.7	66.2	76.6	82.4
CH2	PCH	-20.9	1.8	22.9	47.9	60.5	71.0	78.3
CH3	DRAM	-24.1	-1.1	18.3	43.3	55.9	66.7	74.7
CH4	GPU	-20.0	2.3	21.2	45.8	58.4	72.4	79.8
CH5	GPU-DRAM	-24.4	-2.1	17.0	42.1	54.9	69.6	77.7
CH6	GPU-PU3402	-10.7	11.9	31.2	55.8	68.2	81.6	88.4
CH7	GPU-CHOCK	-18.0	4.6	24.0	49.1	61.8	76.5	83.7
CH8	M.2 SSD	-28.1	-5.9	14.6	39.6	52.3	67.3	75.6
CH9	PU5	-6.3	17.1	36.0	61.0	72.9	83.9	88.7
CH10	PL3	-14.1	9.2	28.8	53.4	65.3	75.4	81.2
CH11	L14	-21.6	0.4	22.0	47.5	59.5	70.2	78.1
CH12	CPU Heat sink	-28.1	-3.2	17.4	42.4	54.7	61.6	70.8
CH13	GPU Heat sink	-32.4	-10.0	11.5	36.2	49.5	62.8	71.7


CPU Temperature (Unit: ℃)
CPU TEMPWRATURE
120.0
100.0
80.0
60.0
40.0
20.0
0.0
11.0
38.0
53.0
77.0
90.0
95.0
99.0
-40°C
-20°C
0°C
25°C 85% RH
40°C 85% RH
50°C 85% RH
60°C 85% RH
AMBIENT TEMPERATURE

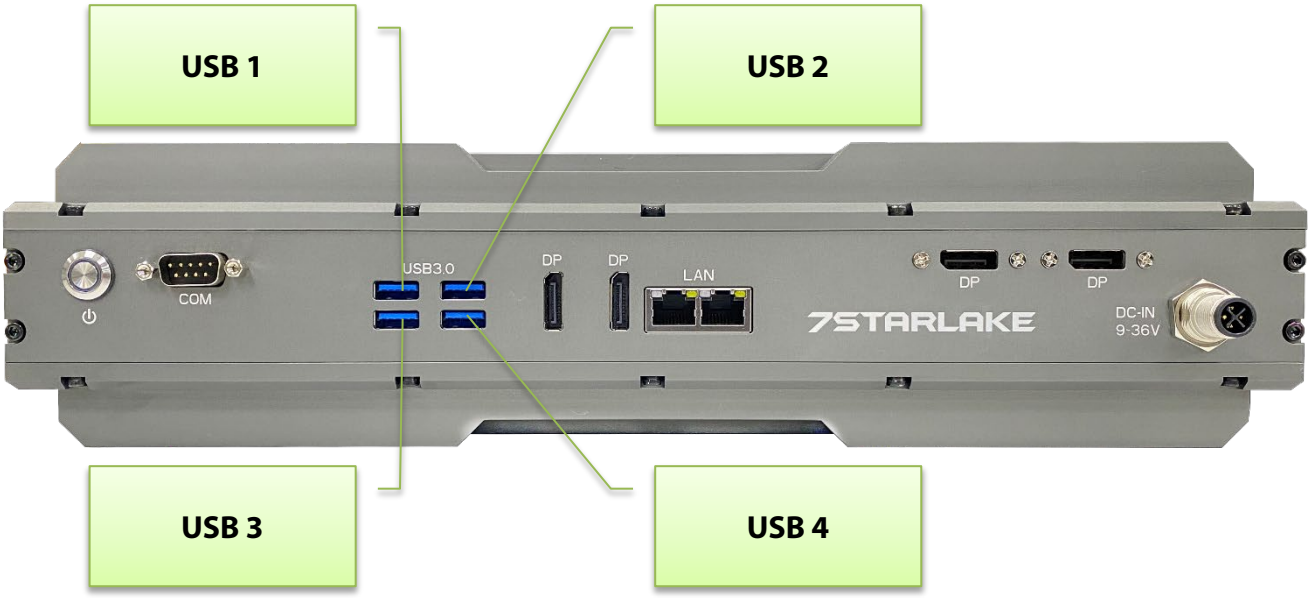

CPU Frequency (Unit: GHz)
CPU FREQUENCY
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
3.27
3.27
3.20
3.09
3.03
2.92
2.48
-40°C
-20°C
0°C
25°C 85% RH
40°C 85% RH
50°C 85% RH
60°C 85% RH
AMBIENT TEMPERATURE

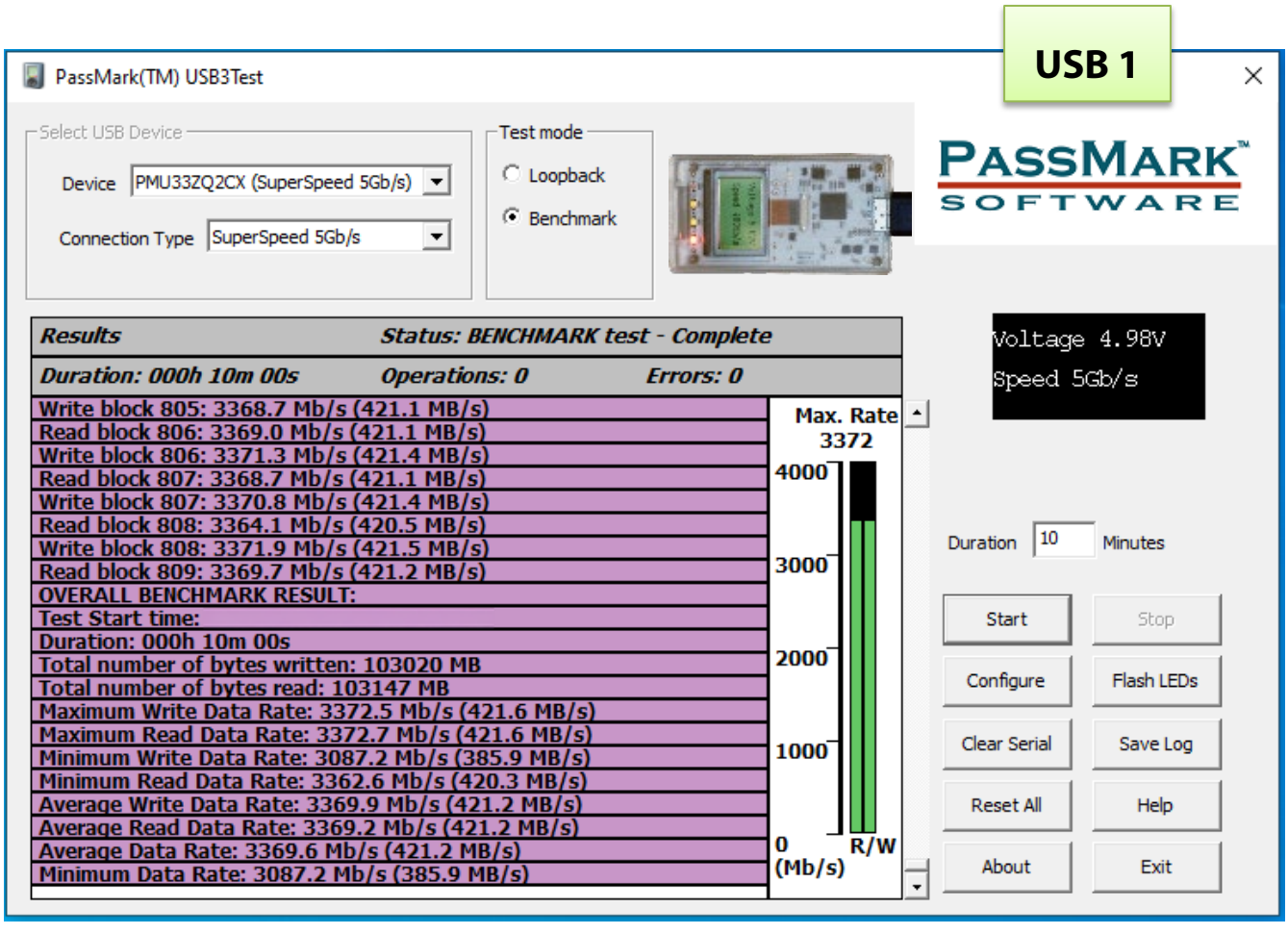

GPU Temperature (Unit: ℃)
120.0
100.0
80.0
60.0
40.0
20.0
0.0
-20.0
GPU TEMPWRATURE
-10.8
3.8
10.1
24.5
29.2
42.8
54.1
68.0
65.8
79.5
80.7
94.2
86.6
98.7
-40℃
-20℃
0℃
25℃ 85% RH
40℃ 85% RH
50℃ 85% RH
60℃ 85% RH
AMBIENT TEMPERATURE
GPU Temperature (Unit: ℃)
GPU Hot Spot Temperature (Unit: ℃)

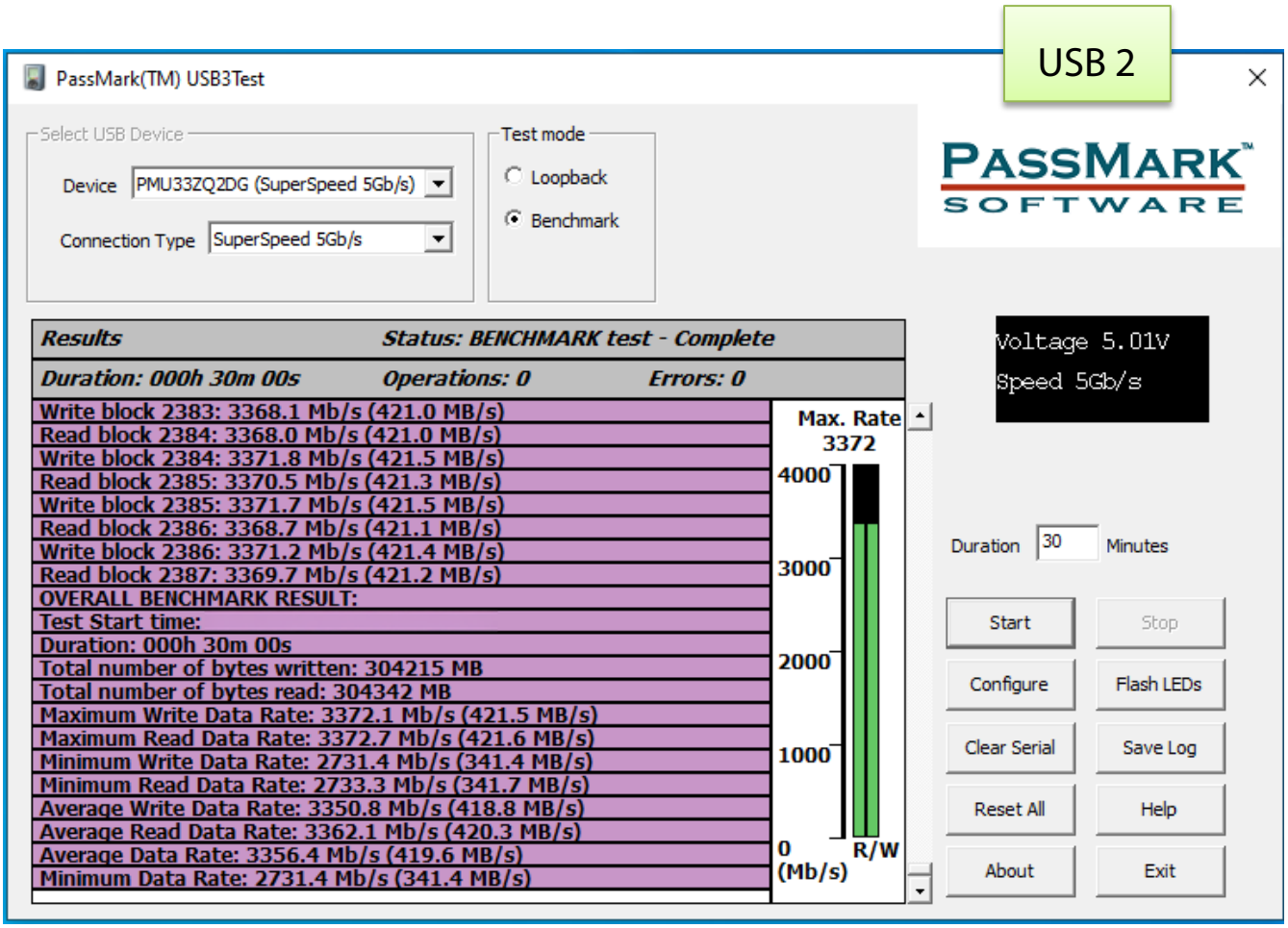

GPU Frequency (Unit: MHz)
1800
1700
1600
1500
1400
1300
1200
1100
1000
GPU FREQUENCY
1702
1657
1642
1635
1627
1552
1425
-40℃
-20℃
0℃
25℃ 85% RH
40℃ 85% RH
50℃ 85% RH
60℃ 85% RH
AMBIENT TEMPERATURE

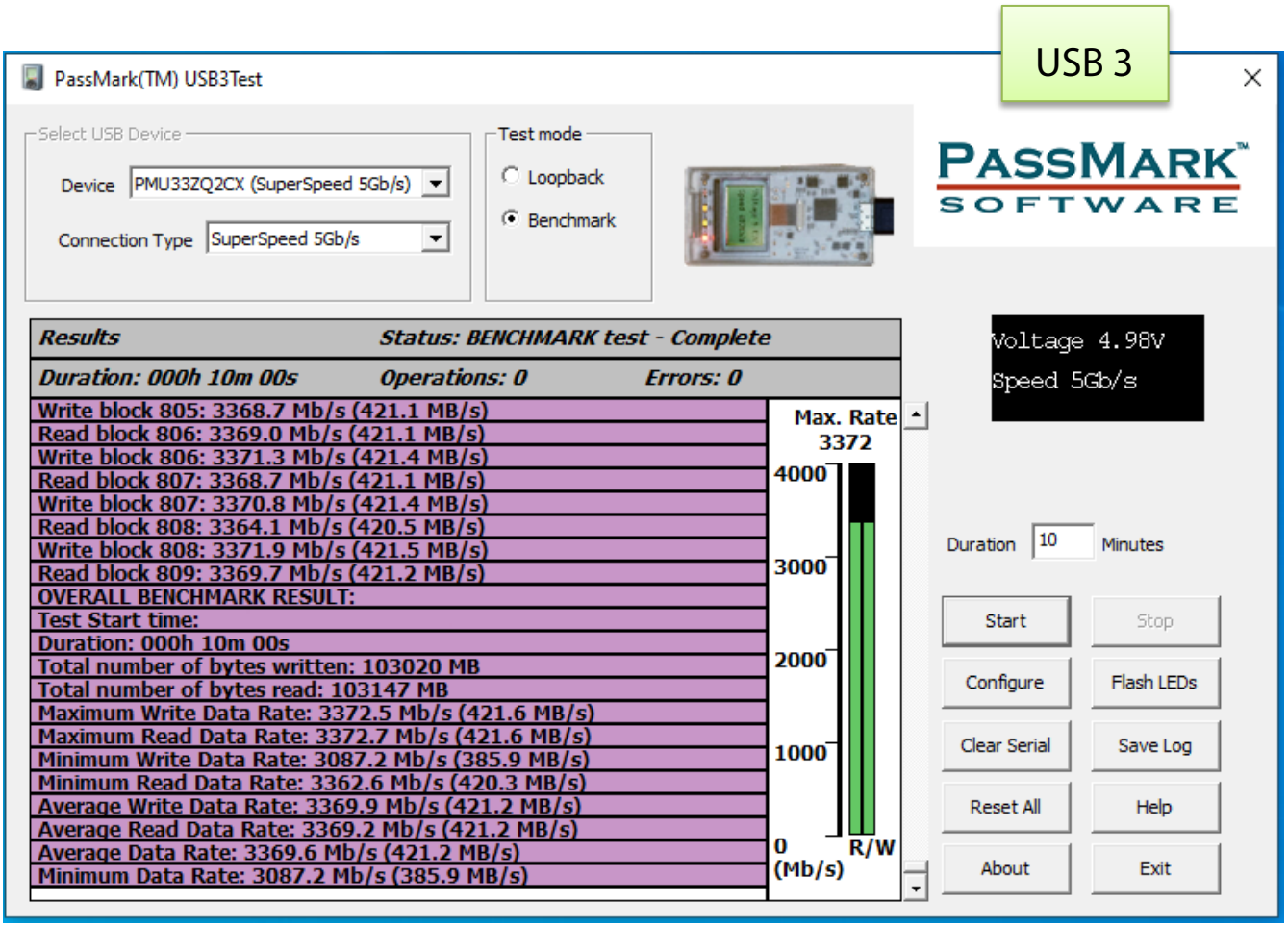
5. I/O FUNCTION TEST

5-1. USB 3.0






USB 2
PassMark(TM) USB3Test
Select USB Device
Device
PMU33ZQ2DG (SuperSpeed 5Gb/s)
Connection Type
SuperSpeed 5Gb/s
Test mode
Loopback
Benchmark
PASSMARK SOFTWARE
Results
Status: BENCHMARK test - Complete
Duration: 000h 30m 00s
Operations: 0
Errors: 0
Write block 2383: 3368.1 Mb/s (421.0 MB/s)
Read block 2384: 3368.0 Mb/s (421.0 MB/s)
Write block 2384: 3371.8 Mb/s (421.5 MB/s)
Read block 2385: 3370.5 Mb/s (421.3 MB/s)
Write block 2385: 3371.7 Mb/s (421.5 MB/s)
Read block 2386: 3368.7 Mb/s (421.1 MB/s)
Write block 2386: 3371.2 Mb/s (421.4 MB/s)
Read block 2387: 3369.7 Mb/s (421.2 MB/s)
OVERALL BENCHMARK RESULT:
Test Start time:
Duration: 000h 30m 00s
Total number of bytes written: 304215 MB
Total number of bytes read: 304342 MB
Maximum Write Data Rate: 3372.1 Mb/s (421.5 MB/s)
Maximum Read Data Rate: 3372.7 Mb/s (421.6 MB/s)
Minimum Write Data Rate: 2731.4 Mb/s (341.4 MB/s)
Minimum Read Data Rate: 2733.3 Mb/s (341.7 MB/s)
Average Write Data Rate: 3350.8 Mb/s (418.8 MB/s)
Average Read Data Rate: 3362.1 Mb/s (420.3 MB/s)
Average Data Rate: 3356.4 Mb/s (419.6 MB/s)
Minimum Data Rate: 2731.4 Mb/s (341.4 MB/s)
Max. Rate
3372
4000
3000
2000
1000
0
(Mb/s)
R/W
Voltage 5.01V
Speed 5Gb/s
Duration
30
Minutes
Start
Stop
Configure
Flash LEDs
Clear Serial
Save Log
Reset All
Help
About
Exit


USB 3
PassMark(TM) USB3Test
Select USB Device
Device
PMU33ZQ2CX (SuperSpeed 5Gb/s)
Connection Type
SuperSpeed 5Gb/s
Test mode
Loopback
Benchmark
PASSMARK SOFTWARE
Results
Status: BENCHMARK test - Complete
Duration: 000h 10m 00s
Operations: 0
Errors: 0
Write block 805: 3368.7 Mb/s (421.1 MB/s)
Read block 806: 3369.0 Mb/s (421.1 MB/s)
Write block 806: 3371.3 Mb/s (421.4 MB/s)
Read block 807: 3368.7 Mb/s (421.1 MB/s)
Write block 807: 3370.8 Mb/s (421.4 MB/s)
Read block 808: 3364.1 Mb/s (420.5 MB/s)
Write block 808: 3371.9 Mb/s (421.5 MB/s)
Read block 809: 3369.7 Mb/s (421.2 MB/s)
OVERALL BENCHMARK RESULT:
Test Start time:
Duration: 000h 10m 00s
Total number of bytes written: 103020 MB
Total number of bytes read: 103147 MB
Maximum Write Data Rate: 3372.5 Mb/s (421.6 MB/s)
Maximum Read Data Rate: 3372.7 Mb/s (421.6 MB/s)
Minimum Write Data Rate: 3087.2 Mb/s (385.9 MB/s)
Minimum Read Data Rate: 3362.6 Mb/s (420.3 MB/s)
Average Write Data Rate: 3369.9 Mb/s (421.2 MB/s)
Average Read Data Rate: 3369.2 Mb/s (421.2 MB/s)
Average Data Rate: 3369.6 Mb/s (421.2 MB/s)
Minimum Data Rate: 3087.2 Mb/s (385.9 MB/s)
Max. Rate
3372
4000
3000
2000
1000
0
(Mb/s)
R/W
Voltage 4.98V
Speed 5Gb/s
Duration
10
Minutes
Start
Stop
Configure
Flash LEDs
Clear Serial
Save Log
Reset All
Help
About
Exit

USB 4

PassMark(TM) USB3Test

Select USB Device

Device: PMU33ZQ2DG (SuperSpeed 5Gb/s)

Connection Type: SuperSpeed 5Gb/s

Test mode: Loopback / Benchmark

PASSMARK SOFTWARE

Voltage 5.01V
Speed 5Gb/s

Results	Status: BENCHMARK test - Complete	
Duration: 000h 10m 00s	Operations: 0	Errors: 0

Write block 805: 3371.2 Mb/s (421.4 MB/s)
Read block 806: 3363.3 Mb/s (420.4 MB/s)
Write block 806: 3371.1 Mb/s (421.4 MB/s)
Read block 807: 3371.7 Mb/s (421.5 MB/s)
Write block 807: 3371.6 Mb/s (421.4 MB/s)
Read block 808: 3362.5 Mb/s (420.3 MB/s)
Write block 808: 3091.8 Mb/s (386.5 MB/s)
Read block 809: 3372.8 Mb/s (421.6 MB/s)
OVERALL BENCHMARK RESULT:
Test Start time:
Duration: 000h 10m 00s
Total number of bytes written: 103020 MB
Total number of bytes read: 103147 MB
Maximum Write Data Rate: 3372.5 Mb/s (421.6 MB/s)
Maximum Read Data Rate: 3372.8 Mb/s (421.6 MB/s)
Minimum Write Data Rate: 3091.8 Mb/s (386.5 MB/s)
Minimum Read Data Rate: 3361.3 Mb/s (420.2 MB/s)
Average Write Data Rate: 3370.2 Mb/s (421.3 MB/s)
Average Read Data Rate: 3369.3 Mb/s (421.2 MB/s)
Average Data Rate: 3369.7 Mb/s (421.2 MB/s)
Minimum Data Rate: 3091.8 Mb/s (386.5 MB/s)

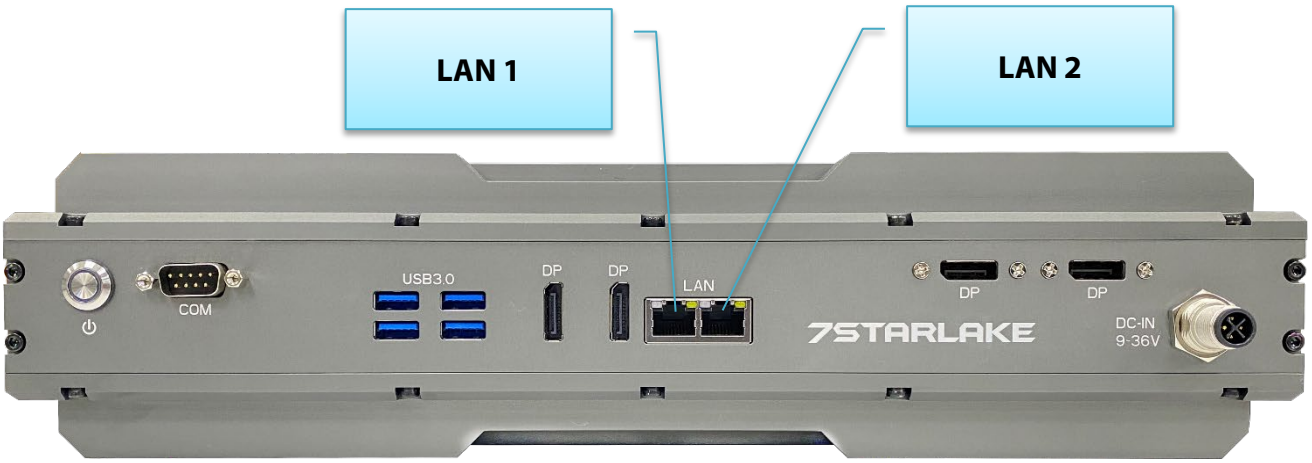
Max. Rate
3372

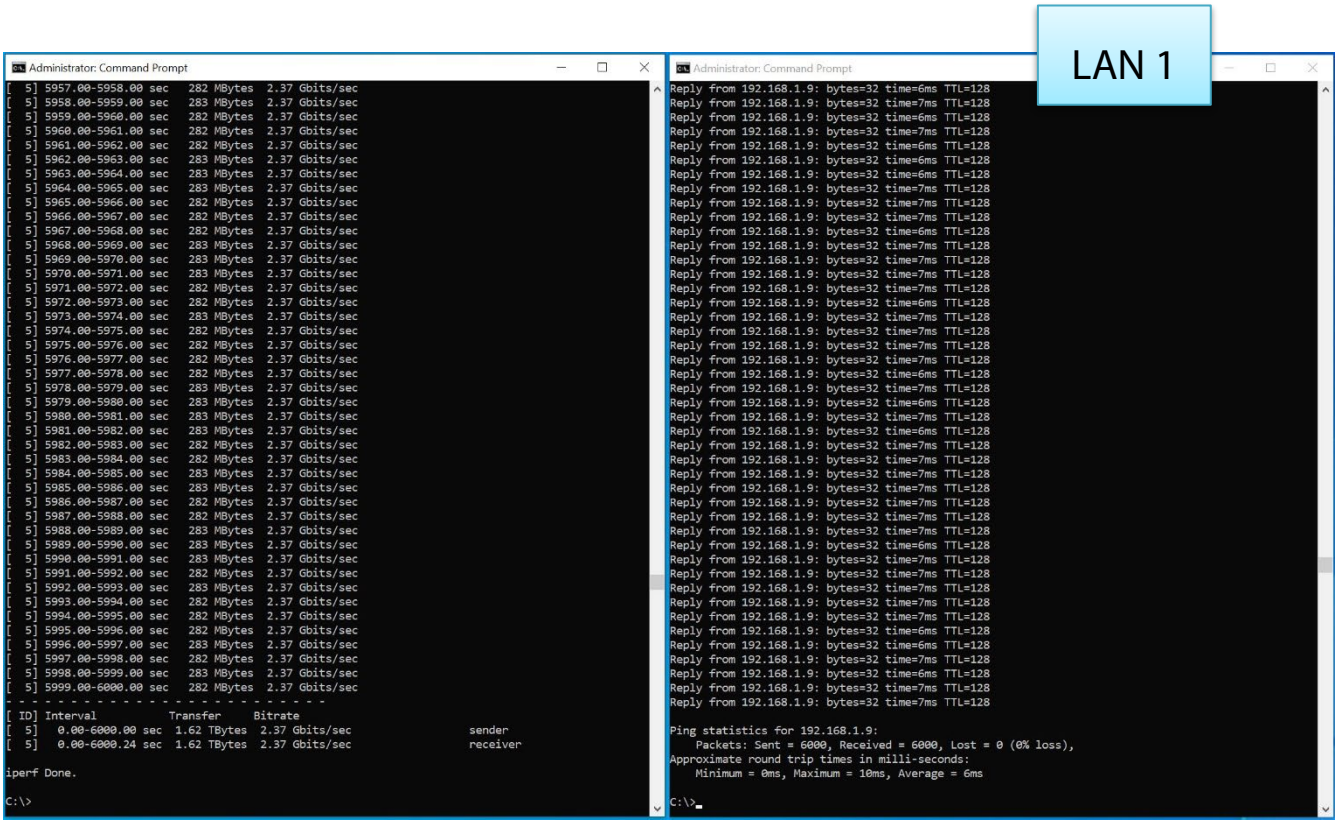
4000
3000
2000
1000
0
(Mb/s)
R/W

Duration: 10 Minutes

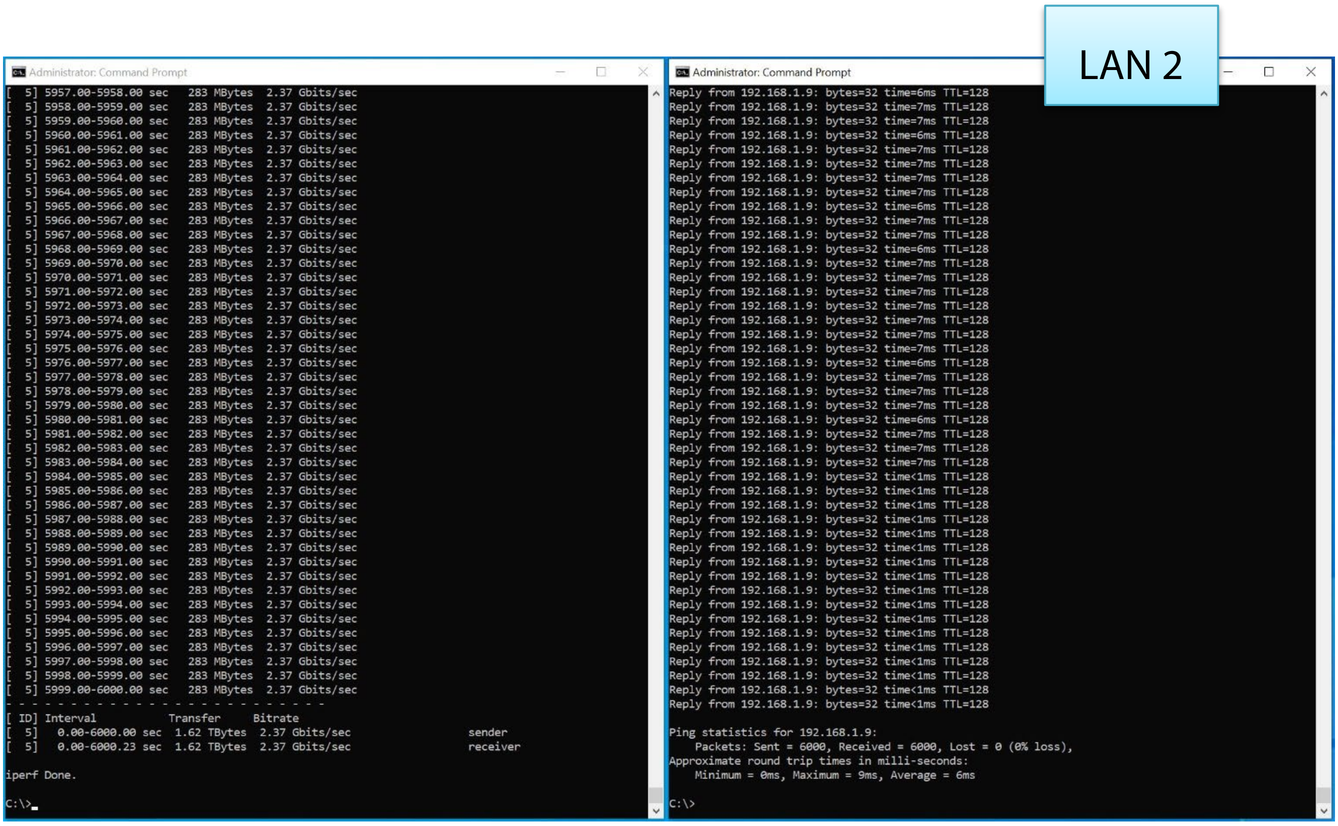
Start | Stop
Configure | Flash LEDs
Clear Serial | Save Log
Reset All | Help
About | Exit

5-2. LAN 1_(1Gbps)



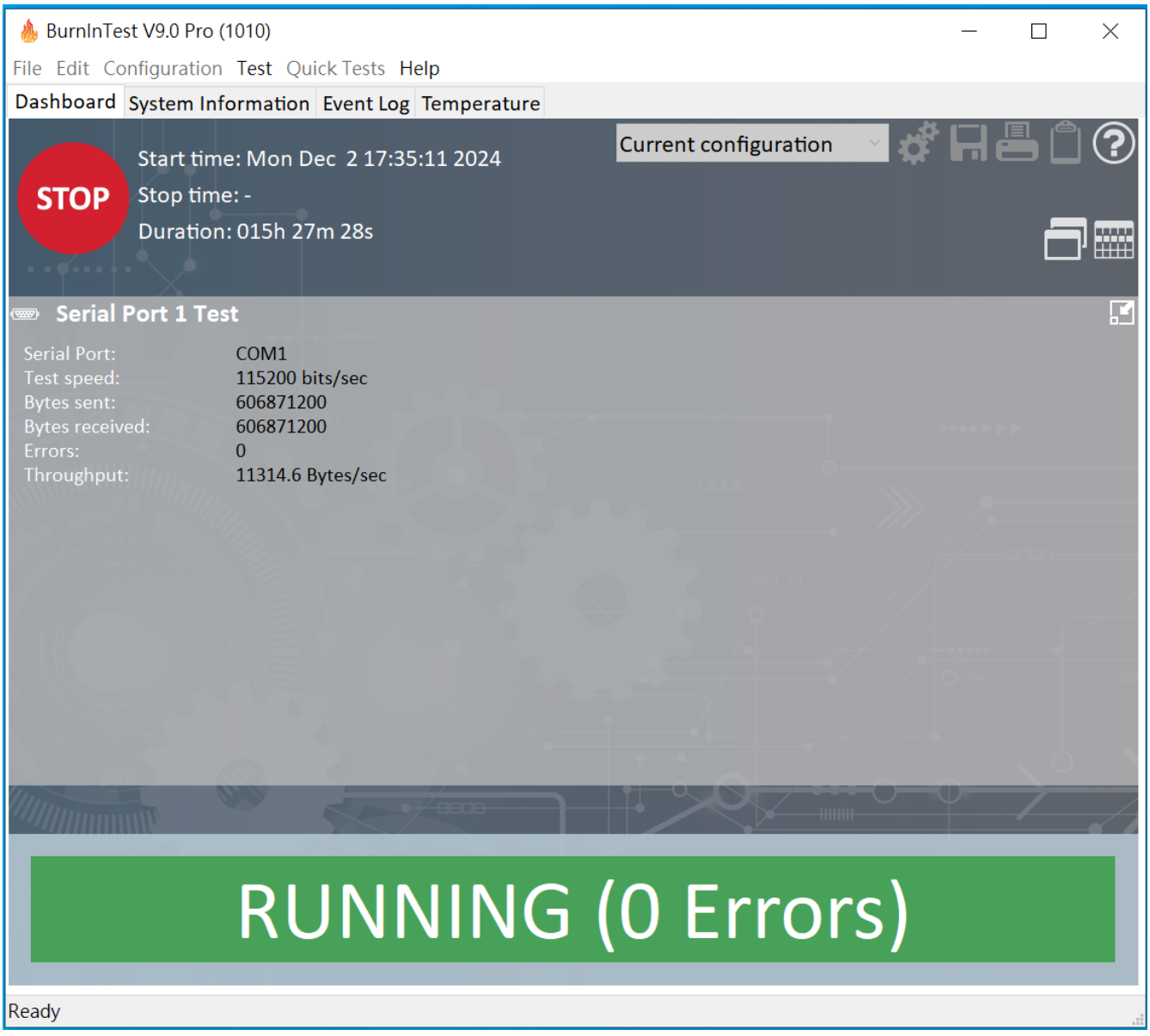


LAN Speed Test Result: Pass
LAN Data-Packet Test Result: 0 Lost (0% loss)

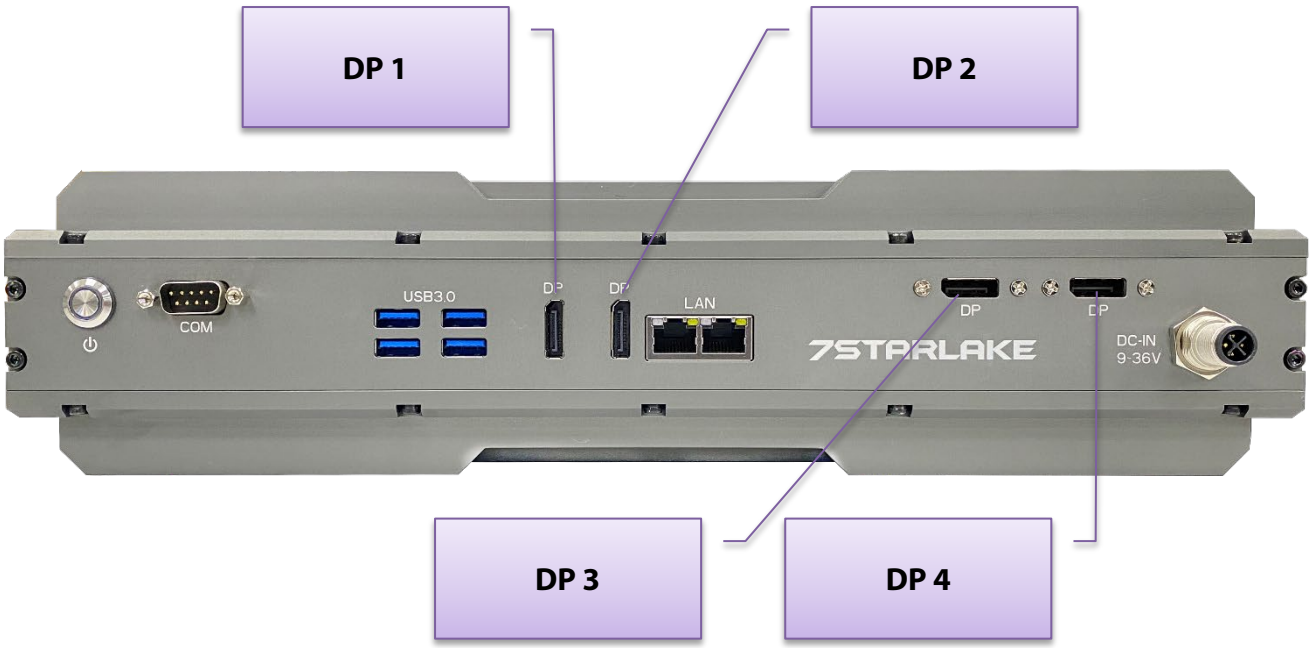


LAN Speed Test Result: Pass
LAN Data-Packet Test Result: 0 Lost (0% loss)

5-3. Serial Port (RS232)



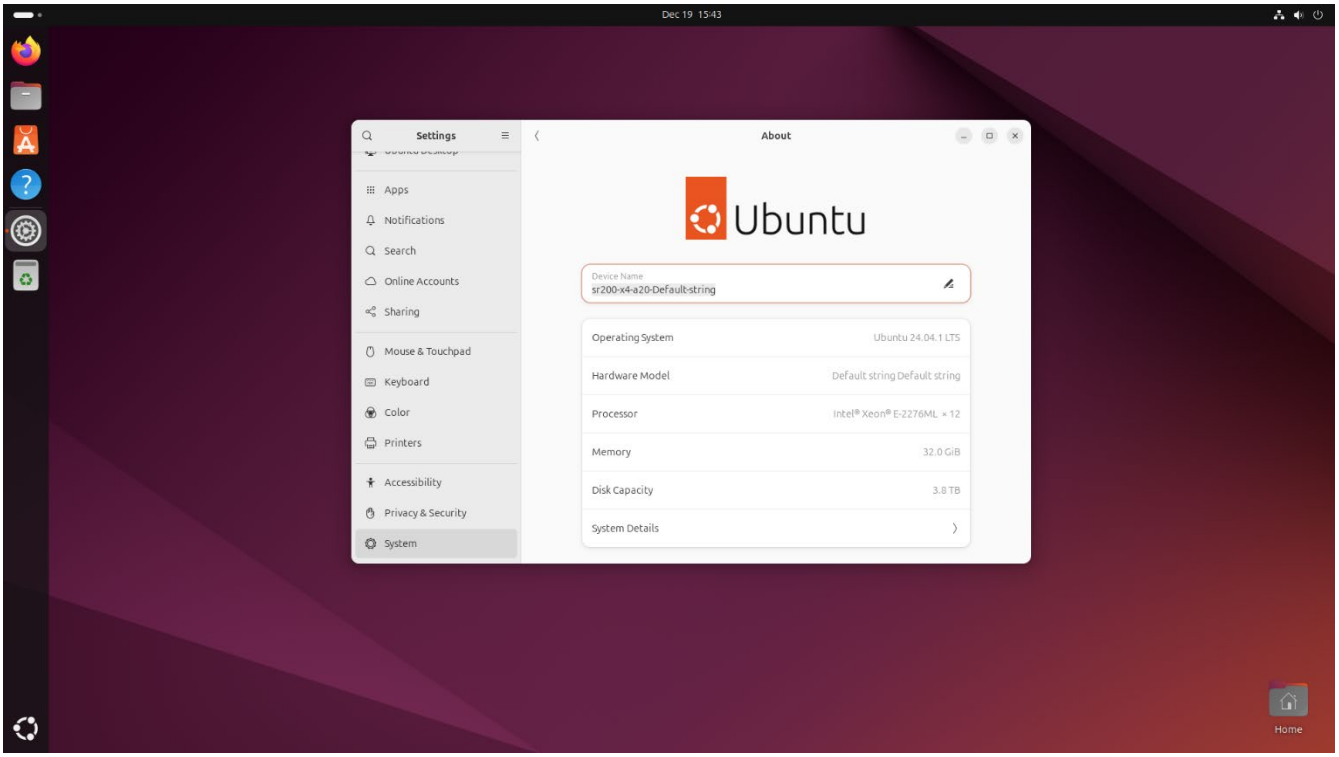
5-4. Display Port (Resoution 4K)



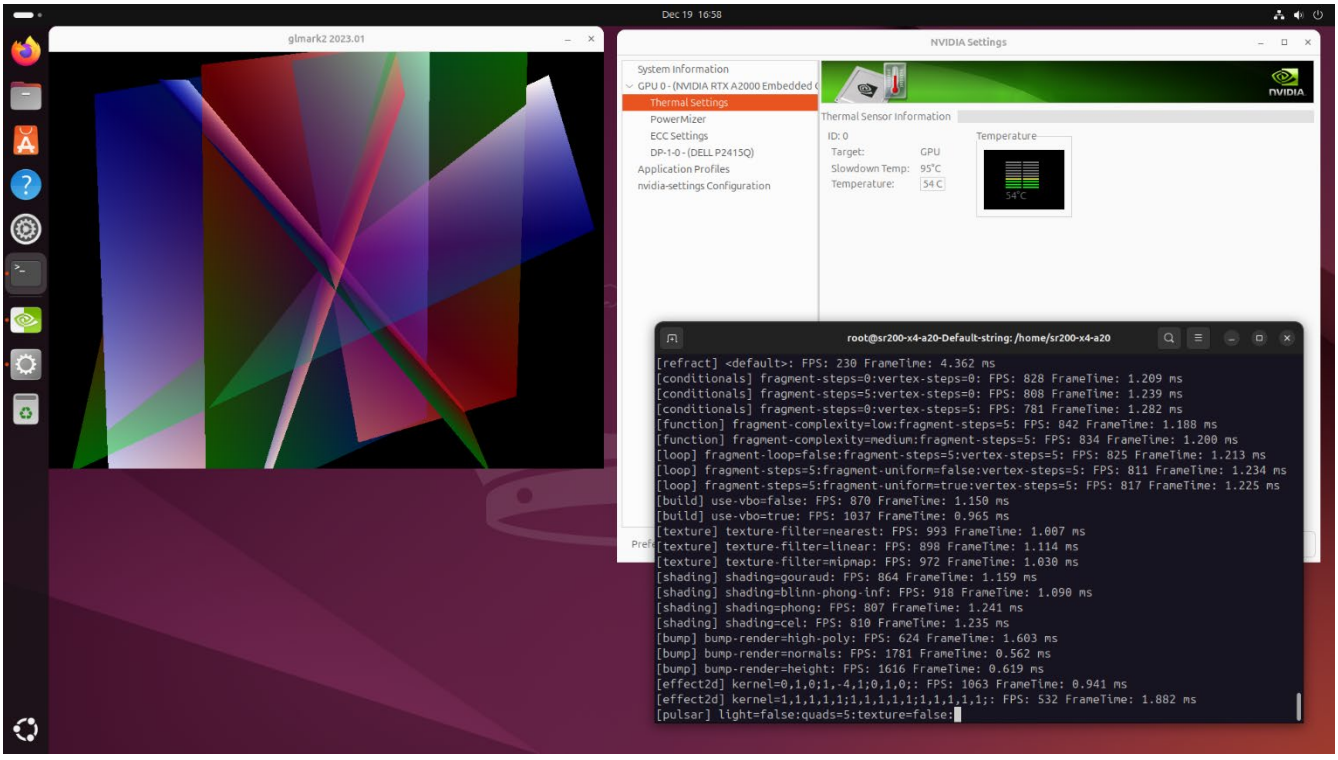
Simultaneous output of 4K resolution poses no problems.

6. OPERTING SYSTEM COMPATIBILITY

6-1. UBUNTU 24.04 LTS



6-1-1. GPU Burn-in Test under Ubuntu



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