



PERFORMANCE TEST REPORT

A large, white, rectangular electronic device with a prominent heat sink on top. The front panel features several connectors and ports, labeled X1, X2, X3, X4, and X5. The text "NV300-DH" is printed in large, bold, dark blue letters across the front.

NV300-DH

S/N: SR202603260101

Product Manager	Mechanical Engineer	System Engineer	Test Engineer
Honwen Huang	Fulin Chuang	William Cheng	Mike Chen

Date: October 1, 2026



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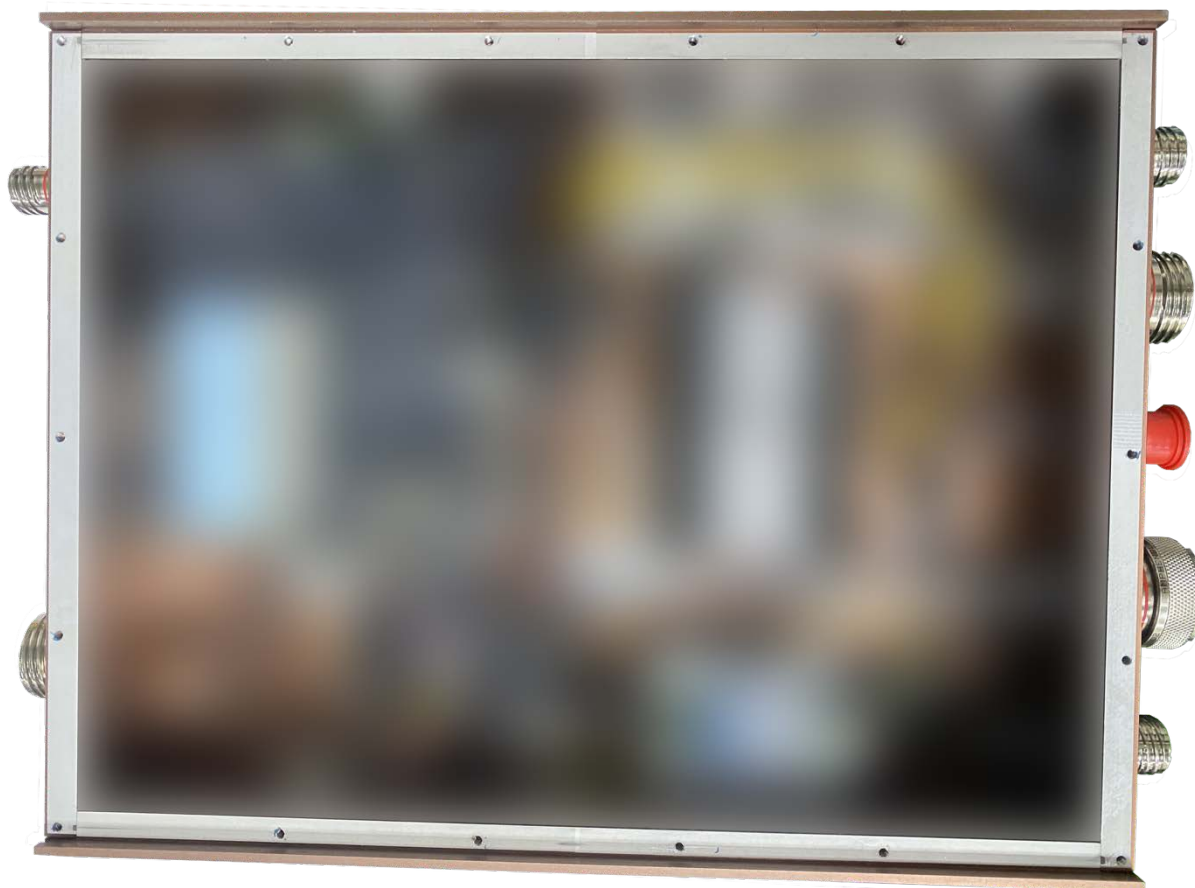
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1. SPECIFICATION

1-1. SYSTEM CONFIGURATION

Motherboard	AGX Orin for DSBOARD-AGXMAX Board Serial Number: 1425124333971 BIOS Firmware Version: 36.3.0-gcid-36191598
CPU	Product: ARMv8 Model name: Cortex-A78AE CPU max (MHz): 2201.6 MHz
Memory	64GB 256-bit LPDDR5 204.8GB/s
Storage	64GB eMMC 5.1
GPU	2048-core NVIDIA Ampere architecture GPU with 64 Tensor Cores GPU Max Frequency: 1.3 GHz
Add on Card	SDI Multimedia controller Module

1-2. PRODUCT INTERIOR PHOTO



The Product Interior Photo section provides a visual record of the internal construction, component arrangement, and assembly condition of the product under test.

The photographs are taken after the enclosure is opened or disassembled, allowing the major internal components, circuit boards, wiring, connectors, power modules, and other relevant parts to be clearly identified.

These photos are intended to document the actual configuration of the test sample and to provide supporting evidence for the evaluation and verification process.

Particular attention is given to the placement of critical components, cable routing, insulation, grounding connections, mechanical fastening, and separation between different functional sections where applicable.

The photographs also help confirm that the internal construction of the tested sample is consistent with the product information, technical documentation, and specifications provided for evaluation.

2. TEST PLAN

2-1. THERMAL MEASUREMENT PROCESS

Test Purpose	The purpose of conducting thermal profile testing is to identify potential thermal issues in the Equipment Under Test (EUT). Given that semiconductor failure rates increase significantly with rising junction temperatures, this testing contributes to the overall assessment of product reliability. As the system undergoes a cooling phase, operational modes may shift depending on stack configuration, temperature, and heat dissipation characteristics. Thermal mapping provides critical insight for optimizing thermal management strategies and determining the most effective component layout and monitoring arrangements.
Test Equipment	1. KSON THS-B4T-150 Chamber.
Quantity Tested	Minimum 1 Set
Test Software	CPU Stress: Stress-ng GPU Stress: glmark2 LAN Speed Test: iPerf3 Capture Card Test: Vlc
Test Procedure	1. Thermal Pre-Scan Measurement: Temperature Range: -35°C to 60°C Humidity Condition: 60% RH (when temperature exceeds 25°C) 2. Actual Thermal Measurement Procedure: 2.1. Identify the test points using the infrared thermal image and attach thermocouples to the identified hot spots. 2.2. Place the Equipment Under Test (EUT) in the thermal chamber and configure the test temperature profile according to the specified requirements. 2.3. Power on the EUT after closing the thermal chamber. Boot into Ubuntu 22.04 LTS and initiate a maximum power consumption and stress test. 2.4. After running the test software continuously for 8 hours, record the peak temperature observed at each thermocouple measurement point. 2.5. Power off both the thermal chamber and the EUT. 2.6. Verify that the recorded temperature data for each component remains within its specified operating temperature range, as defined in the component specification or approval documents.
Test Diagram of Curves	Environment defines for 52 hours.

2-2. TEST RESULT

2-2-1. Temperature Cycle

The system was tested under multiple specified temperature and humidity conditions while operating at full load. At each environmental condition, the system was continuously monitored to verify normal operation, functional stability, and overall performance. The test was conducted to evaluate the system's ability to maintain stable operation throughout the defined temperature range.

Test Temperature	Test Result
-35°C / 0%RH	PASS
0°C / 0%RH	PASS
25°C / 60%RH	PASS
40°C / 60%RH	PASS
50°C / 60%RH	PASS
60°C / 60%RH	PASS

2-2-2. I/O Function

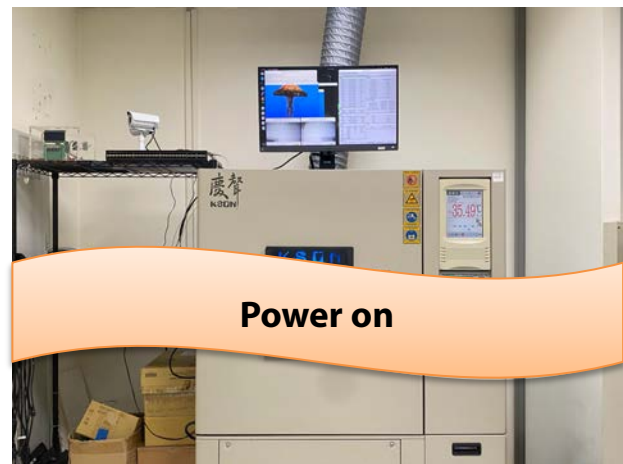
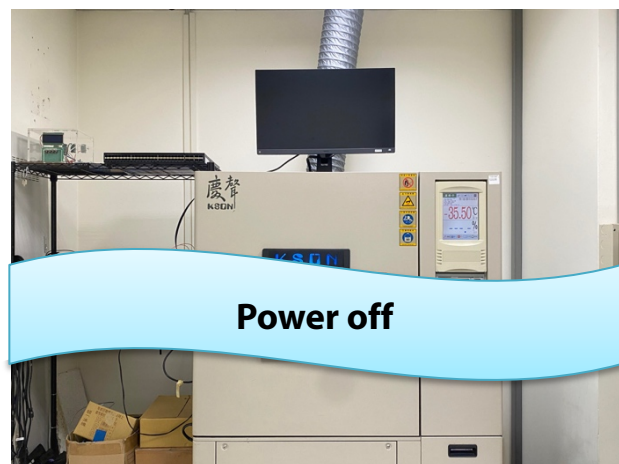
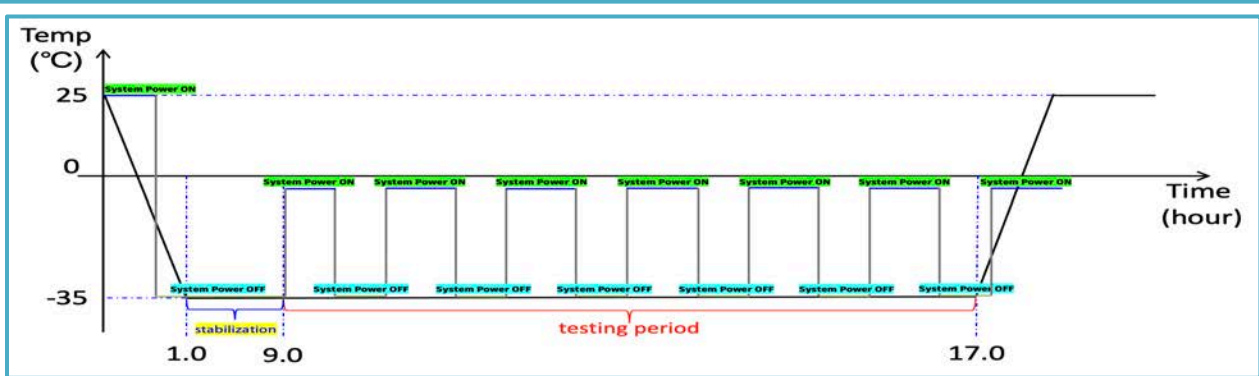
All input/output (I/O) interfaces were inspected and functionally tested to verify proper configuration, signal transmission, device communication, and operational stability. Each interface was tested under normal operating conditions to confirm correct response and reliable data transfer. The results were reviewed to ensure that all I/O functions operated as intended and complied with the specified system requirements.

Item	Test Criteria	Result
X1- Power in	The power input port shall be verified for normal operation. No abnormal behavior, instability, or unexpected shutdown shall occur during the test.	PASS
X2 – HDMI	The HDMI port shall support display output at resolutions up to 1920 × 1080, with stable and normal video transmission.	PASS
X3 – USB 2.0	The USB 2.0 port shall be verified under Ubuntu using a known-good USB 2.0 storage device. The system shall correctly detect and enumerate the connected device, and the USB link speed shall be confirmed as High-Speed operation. Continuous read and write operations shall be performed, and data integrity shall be verified using checksum comparison. No USB disconnection, reset, or I/O errors shall occur during the test.	PASS
X4 – 1GbE LAN	The Ethernet port shall be tested through a 1 Gbps LAN connection. Data transmission shall operate normally without packet loss, and network performance shall meet the specified requirements.	PASS
X5 – USB 2.0 / RS422	The USB 2.0 port shall be verified under Ubuntu using a known-good USB 2.0 storage device to confirm device detection, High-Speed operation, read/write functionality, and data integrity. The RS-422 port shall be verified using an RS-422 loopback test fixture to confirm normal communication and data transmission.	PASS
X6 – SDI	The SDI port shall be tested using an SDI camera and VLC media player to verify stable and normal video transmission.	PASS
X7 – RS422	The RS-422 port shall be verified using an RS-422 loopback test fixture to confirm normal communication and data transmission.	PASS

2-2-3.Low Temperature Power Cycle Test

The system shall be stabilized under the specified low-temperature condition before performing the power cycle test. A total of 10 cold boot cycles shall be conducted at -35°C. During each cycle, power shall be applied to the system and the system shall be allowed to boot into the operating system. The system shall remain powered on for 5 minutes to allow normal system initialization and OS operation. PassMark Rebooter shall then be executed to initiate a controlled operating system shutdown, after which system power shall be removed. The system shall remain powered off for 30 minutes before the next cold boot cycle. Successful boot-up, OS entry, proper initialization, controlled shutdown, and stable system operation shall be verified during each cycle. No boot failure, shutdown failure, system malfunction, or abnormal behavior shall occur throughout the test.

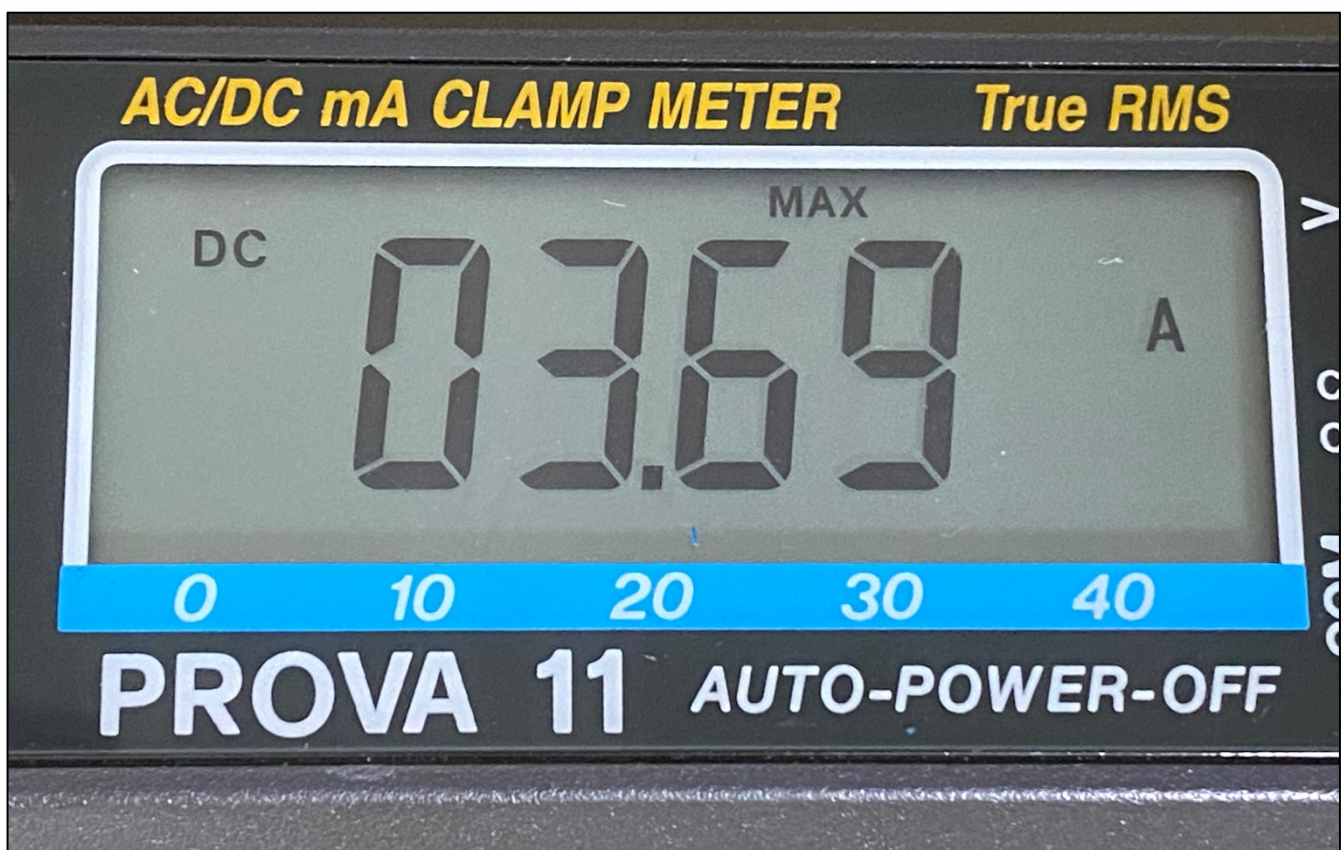
Ambient Temp.	Cold Boot Test Times	Test Result
-35°C	10 times	PASS



2-3. PEAK STARTUP CURRENT AND POWER

The maximum current and corresponding power consumption were measured and evaluated throughout the complete system startup process, beginning from the moment power was applied until the operating system completed its initialization and became ready for normal operation.

Voltage (V)	Peak Instantaneous Current (A)	Peak Instantaneous Power (W)
DC 24V	3.69A	88.56W



Peak Instantaneous Current and Power Test Results

The peak startup current and power verification was conducted to evaluate how much electrical current and power the system required during the complete startup process. Monitoring began when power was first applied to the system and continued until the operating system completed initialization and became ready for normal operation. This test was intended to identify the highest electrical demand that may occur while the hardware is starting, internal devices are being initialized, and the operating system and related software are being loaded.

Throughout the startup period, the system's electrical input was monitored to determine the highest current and power demand observed during startup. The measured electrical load reflects

the combined power required by major system components, including the CPU, memory, storage devices, motherboard circuitry, and connected peripheral interfaces. Particular attention was given to short increases in current that may occur when individual devices are powered on, initialized, or activated in sequence during the startup process.

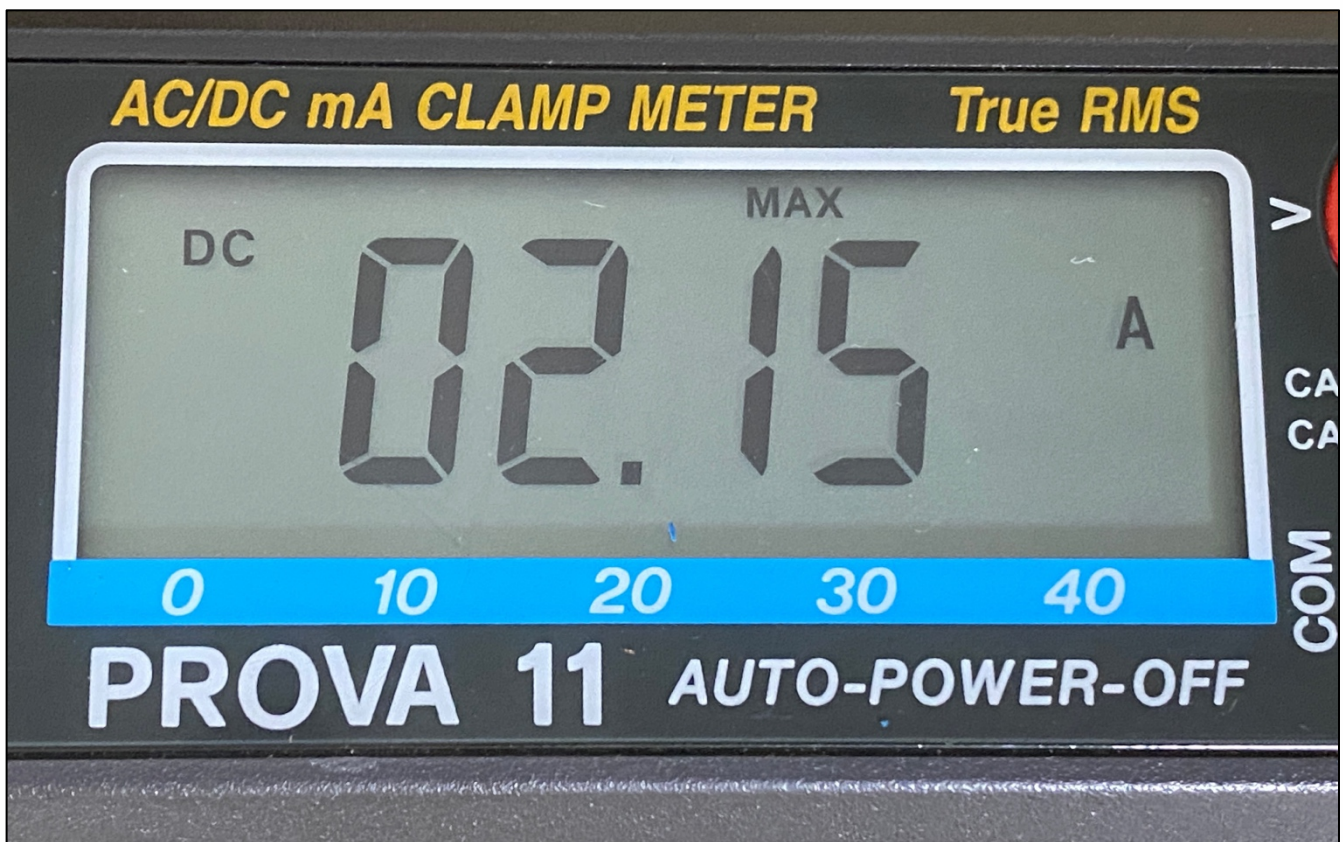
The recorded test results show that the system completed the entire startup process successfully and operated normally from initial power-on through operating system initialization. No abnormal current increase, excessive power consumption, unexpected system reset, shutdown, or other power-related fault was observed during the test. The measured maximum startup current was 3.69 A at a DC 24 V input, corresponding to a calculated peak power of 88.56 W. These results indicate that the system power supply remained stable while the CPU, memory, storage devices, motherboard, and peripheral interfaces were being initialized during startup.

The successful completion of this verification demonstrates that the system can start normally while maintaining stable electrical operation throughout the complete boot process. The measured startup current and power demand did not result in any system instability, unexpected reset, shutdown, or other power-related abnormal condition. The test results therefore confirm that the system receives adequate and stable power for reliable operation during normal startup conditions.

2-4. LOW TEMPERATURE HEATER STARTUP CURRENT

Verify the operation, heating performance, and current consumption of the internal heater during system startup under a -35°C ambient condition.

Voltage (V)	Peak Instantaneous Current (A)	Peak Instantaneous Power (W)
DC 24V	2.15A	51.60W



Low Temperature Heater Current and Operation Test Results

The system is equipped with an internal heater to support reliable startup and operation under extremely low ambient temperatures. When the product is exposed to an ambient temperature of -35°C, the internal temperature may be below the normal operating range required by temperature-sensitive system components. The heater is therefore used to increase the internal temperature before and during the startup process, providing a suitable thermal environment for stable system initialization.

When system power is applied at -35°C, the internal temperature sensor detects the low-temperature condition and automatically activates the heater. The heater then begins warming the internal environment until the measured internal temperature reaches approximately 23.96°C.

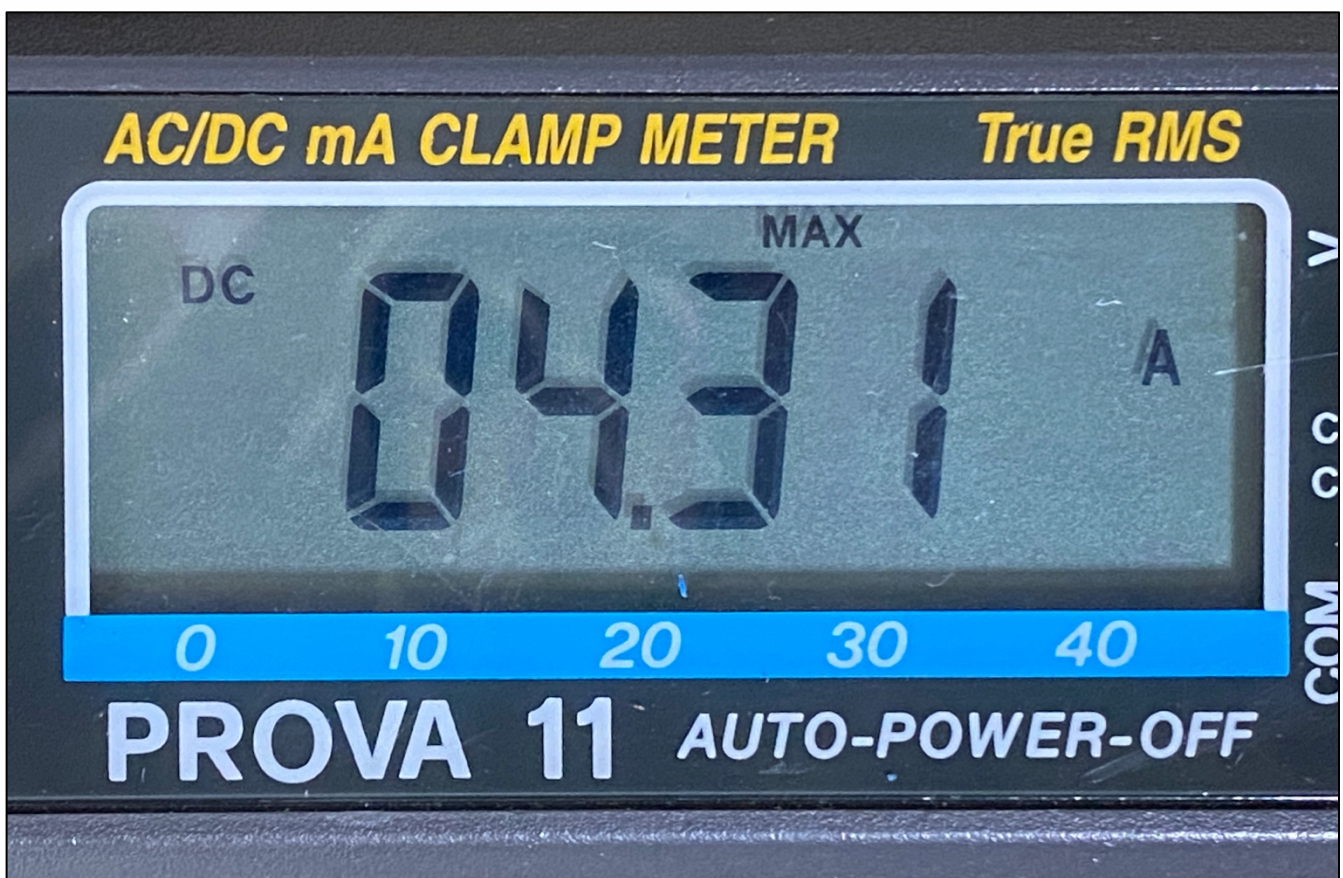
During this heating period, the heater draws approximately 2.15 A from the DC power source. The heating process provides the required thermal condition for the system hardware to initialize and start normally.

The system successfully completed the startup process without heater malfunction, abnormal current behavior, low-temperature startup failure, unexpected reset, or other temperature-related abnormal conditions. The successful completion of this verification demonstrates that the internal heater and temperature control mechanism can provide sufficient heating capability to support reliable system startup under the specified -35°C low-temperature condition.

2-5. POWER CONSUMPTION

Verify the total electrical power consumption of the system under the defined hardware configuration and normal operating condition, measured at the DC 24 V power input after completion of system startup and operating system initialization.

Voltage (V)	Current (A)	Wattage (W)
DC 24V	4.31A	103.44W



Power Consumption Test Results

The system power consumption test was conducted to evaluate the total electrical power required by the complete system under the defined hardware configuration and normal operating conditions. The purpose of this test was to determine the amount of electrical power consumed by the platform after system startup had been completed and the operating system had entered a stable operating state. The measurement was performed at the DC 24 V power input so that the total power demand of the complete system could be evaluated.

Before power measurements were recorded, the system was powered on and allowed to complete hardware initialization, operating system startup, and background initialization processes. After the

system reached a stable operating condition, the input current was continuously monitored using calibrated measurement equipment. The system remained fully operational during the measurement period, with major components including the motherboard, processor, memory, storage devices, network interfaces, and peripheral controllers operating normally.

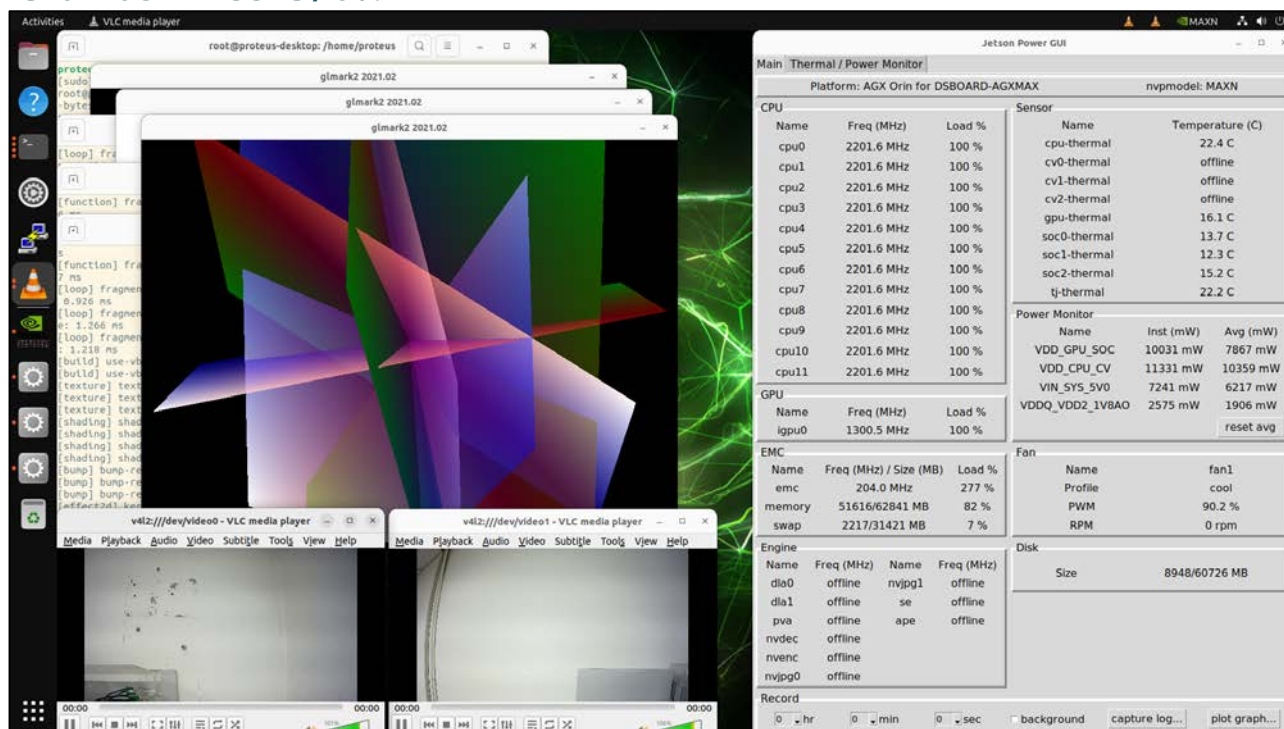
During the measurement period, the DC input current was monitored to determine the electrical demand of the complete system under the specified operating condition. A current of 4.31 A was recorded at a DC input voltage of 24 V. Based on the measured input voltage and current, the corresponding electrical power consumption was calculated to be approximately 103.44 W. This value represents the total power required by the system and its installed hardware during the defined operating condition.

The recorded results indicate that the system operated normally and maintained stable power consumption throughout the measurement period. No abnormal current fluctuation, unexpected increase in power demand, system reset, shutdown, or other power-related instability was observed. The measured current and calculated power remained stable while the system components continued to operate normally, indicating that the electrical demand of the platform remained consistent under the specified test condition.

The successful completion of this test demonstrates that the platform maintains stable electrical performance during normal operation and that the power delivery system is capable of supporting the complete hardware configuration under the specified operating condition. The measured power consumption also provides a practical reference for power supply selection, system power budgeting, thermal design, and long-term reliability evaluation.

3. TEST PHOTO IN LAB

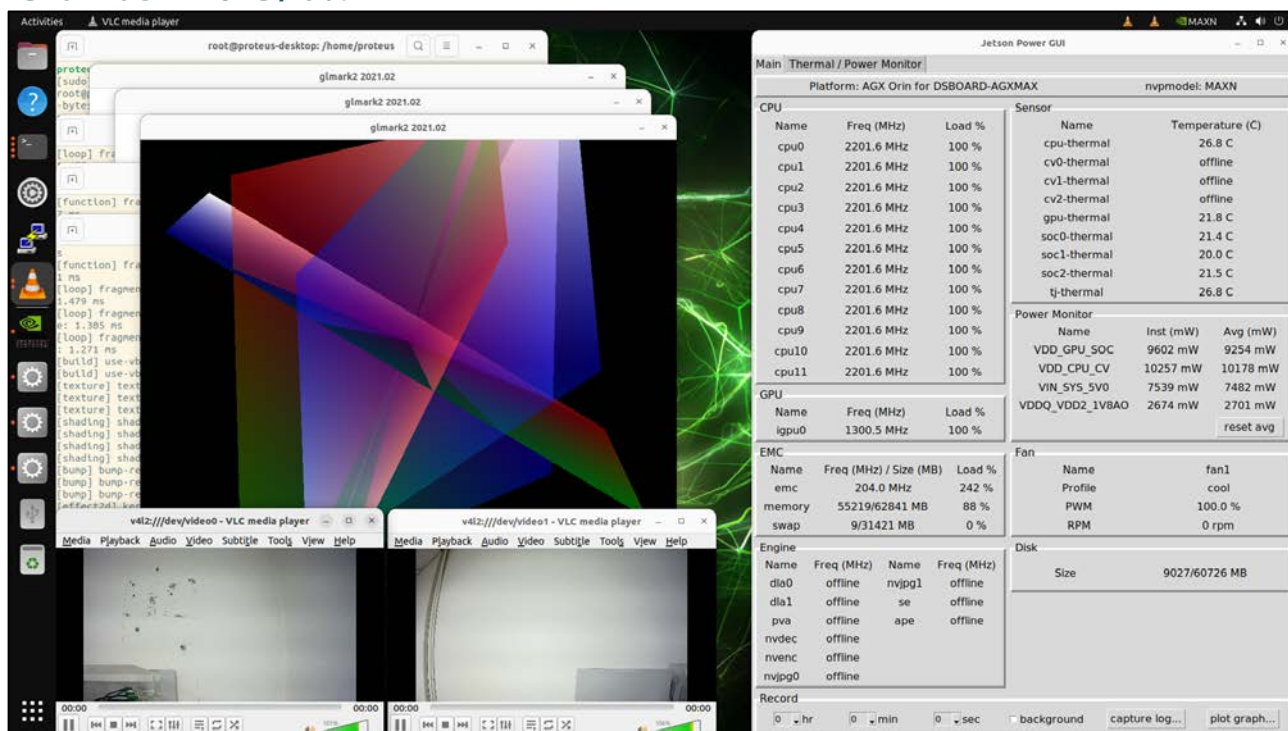
- Chamber in -35°C / 0%RH



PERFORMANCE TEST REPORT

NV300-DH

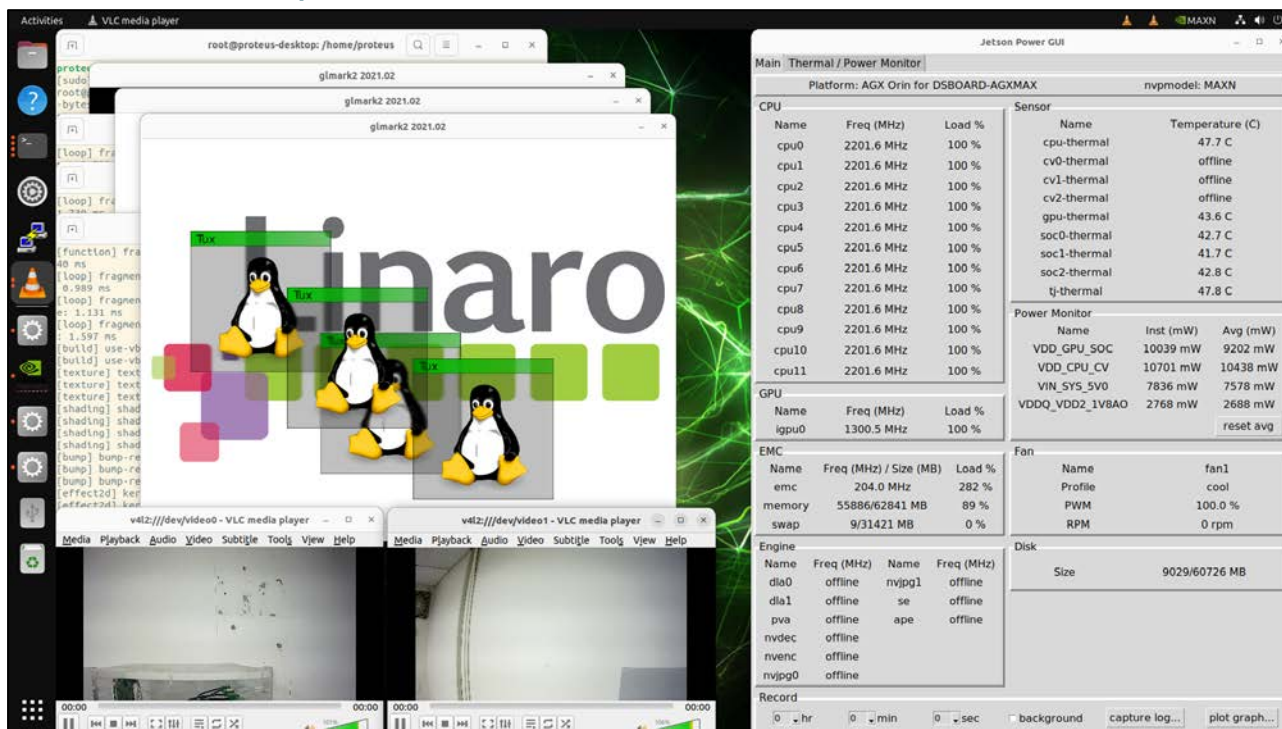
- Chamber in 0°C / 0%RH



PERFORMANCE TEST REPORT

NV300-DH

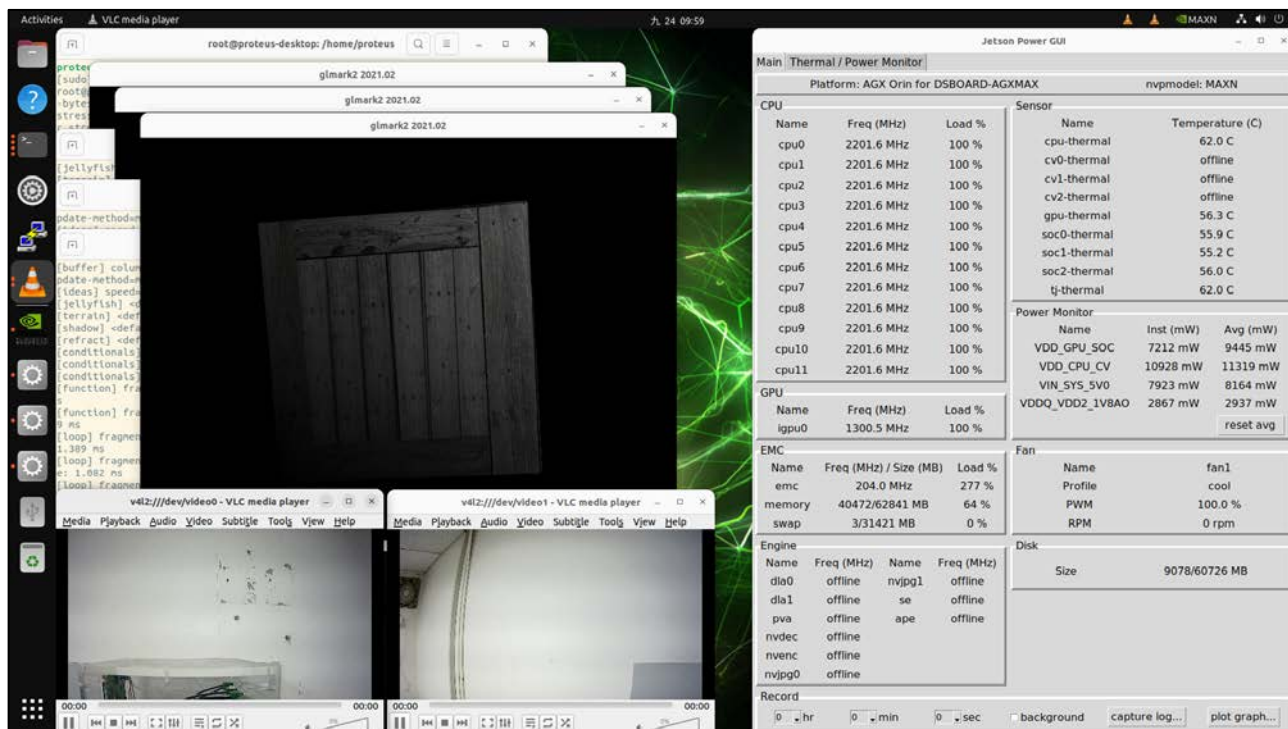
- Chamber in 25°C / 60%RH



PERFORMANCE TEST REPORT

NV300-DH

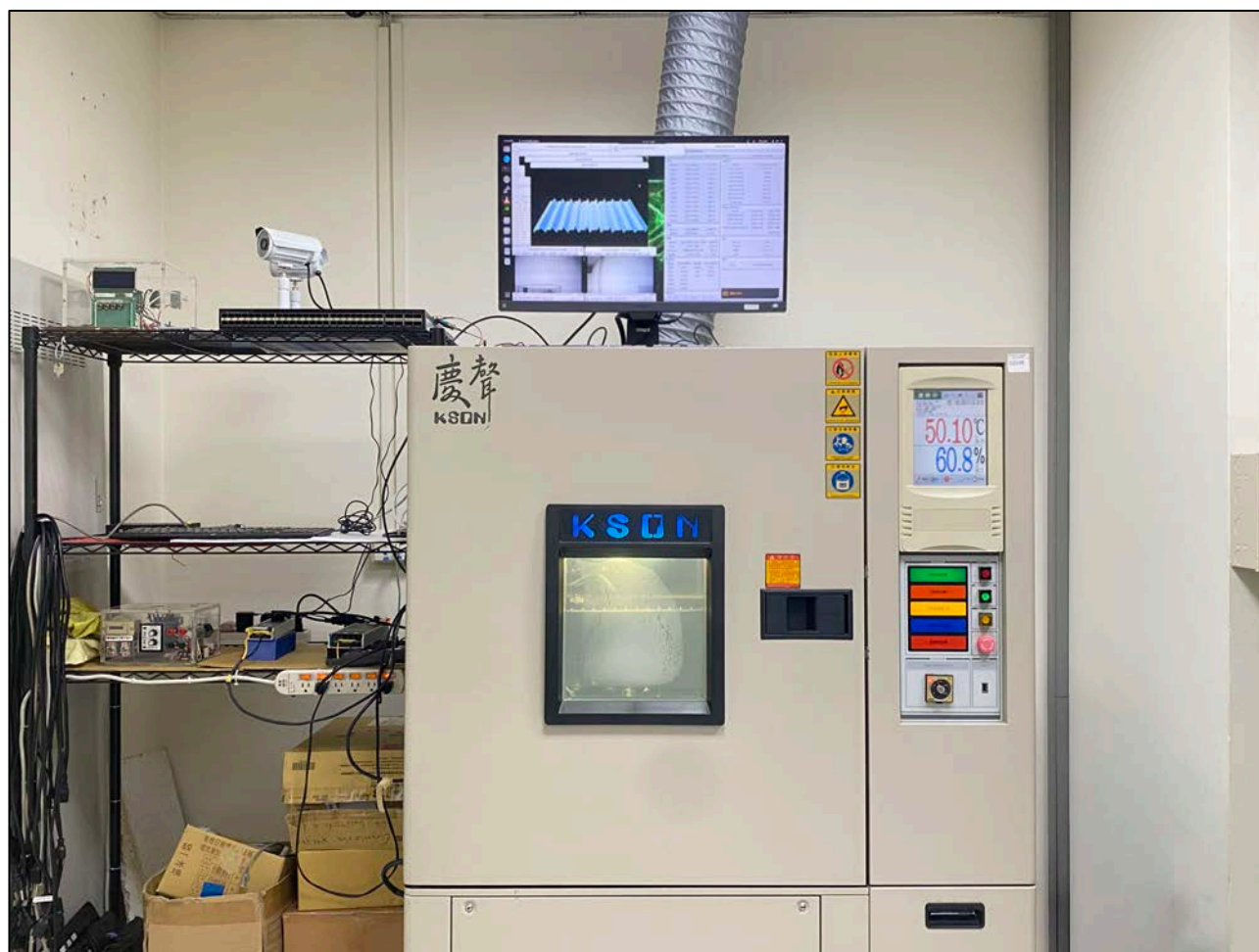
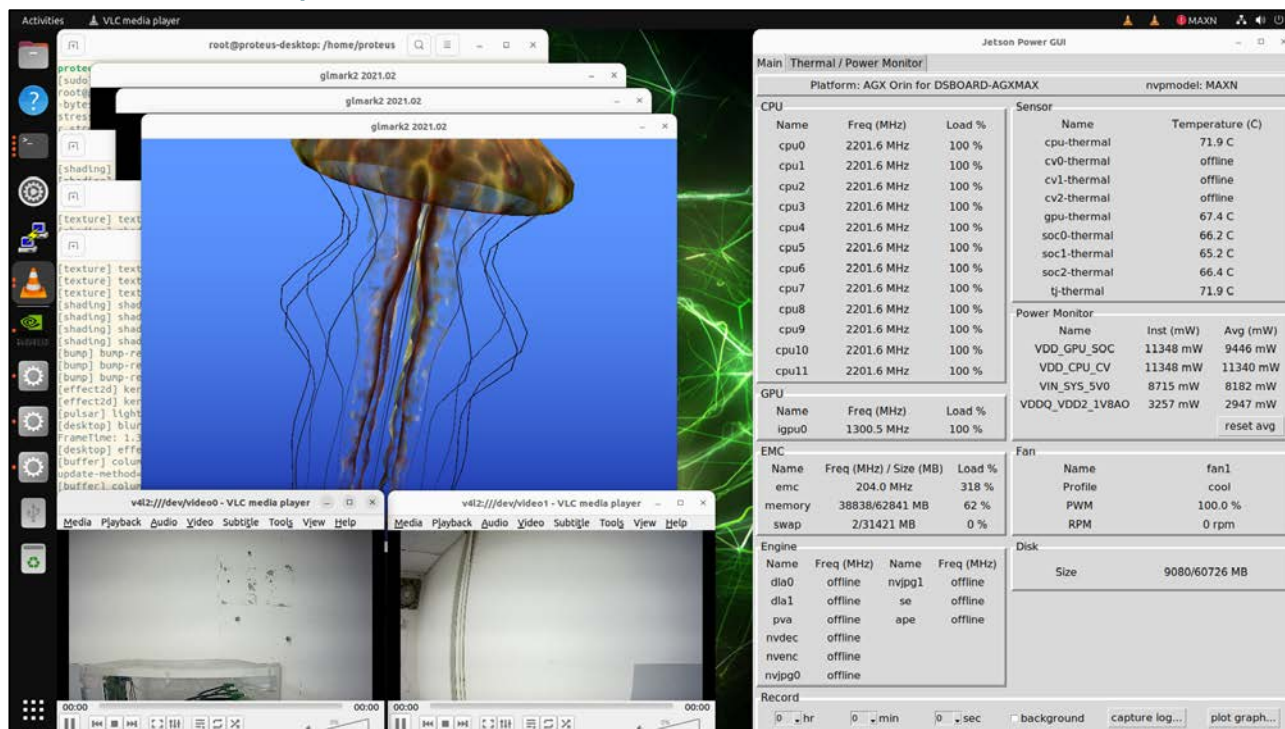
- Chamber in 40°C / 60%RH



PERFORMANCE TEST REPORT

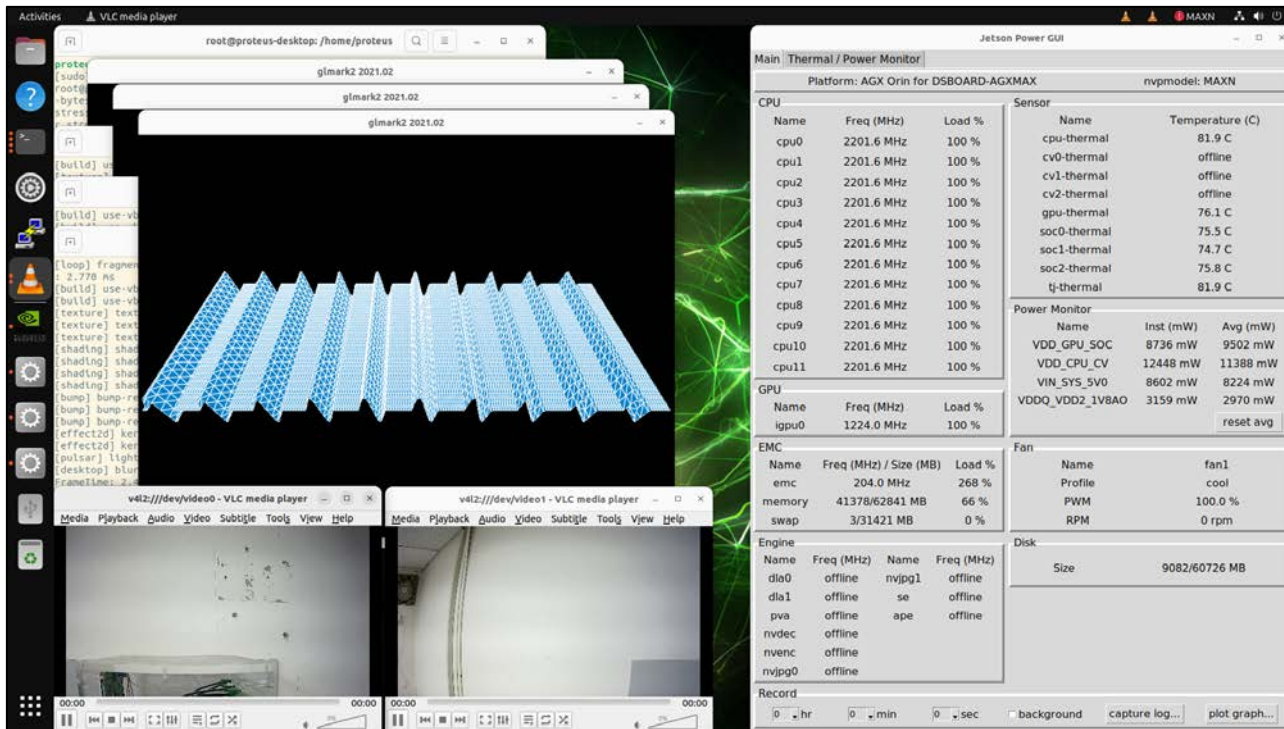
NV300-DH

- Chamber in 50°C / 60%RH



NV300-DH

- Chamber in 60°C / 60%RH



4. THERMAL TEST RESULT(-35°C ~ +60°C)

CPU & GPU Temperature and Frequency

Temperature Frequency	Ambient Temp.	-35°C 0% RH	0°C 0% RH	25°C 60% RH	40°C 60% RH	50°C 60% RH	60°C 60% RH
CPU Cores Max Temperature (Unit: °C)		22.4	26.8	47.7	62.0	71.9	81.9
CPU Cores Frequency (Unit: MHz)		2201.6	2201.6	2201.6	2201.6	2201.6	2201.6
GPU Temperature (Unit: °C)		16.1	21.8	43.6	56.3	67.4	76.1
GPU Frequency (Unit: MHz)		1300.5	1300.5	1300.5	1300.5	1300.5	1224.0

CPU & GPU Thermal Performance Test Results Explanation

Test Purpose

The purpose of this thermal test is to verify that the NV300-DH can maintain stable operation and acceptable CPU and GPU thermal performance across the specified ambient temperature range from -35°C to 60°C.

The system was operated under CPU and GPU stress workloads inside a controlled environmental chamber while component temperatures and operating frequencies were monitored. This test evaluates whether the system can continue operating normally under extremely cold, normal, and high-temperature conditions.

Test Conditions and Pass / Fail Criteria

The NV300-DH was tested at -35°C, 0°C, 25°C, 40°C, 50°C, and 60°C under the defined humidity conditions. During testing, the system was monitored for operational stability, CPU and GPU temperatures, and operating frequencies.

The test is considered **PASS** when the system remains operational and functionally stable without thermal-related malfunction or instability, and the monitored components remain within the applicable operating requirements defined by their specifications or approval documents. NV300-DH Performance Test Report

CPU Thermal Performance

As the ambient temperature increased from -35°C to 60°C, the maximum CPU core temperature increased from 22.4°C to 81.9°C. Despite the increasing temperature, the CPU maintained an operating frequency of approximately 2201.6 MHz throughout the entire test range.

This indicates that no CPU frequency reduction was observed at the measured test points, even at the highest ambient temperature.

GPU Thermal Performance

The GPU temperature increased from 16.1°C at -35°C ambient to 76.1°C at 60°C ambient. The GPU maintained approximately 1300.5 MHz from -35°C through 50°C and adjusted its operating frequency to 1224.0 MHz at 60°C.

The frequency adjustment at 60°C does not, by itself, indicate a failure. The system remained operational, and the corresponding 60°C temperature-cycle condition was recorded as **PASS**.

Conclusion — PASS

The NV300-DH successfully completed the thermal test across the specified -35°C to 60°C environmental range. The CPU maintained a stable operating frequency throughout the test, while the GPU showed a frequency adjustment only at the highest ambient temperature.

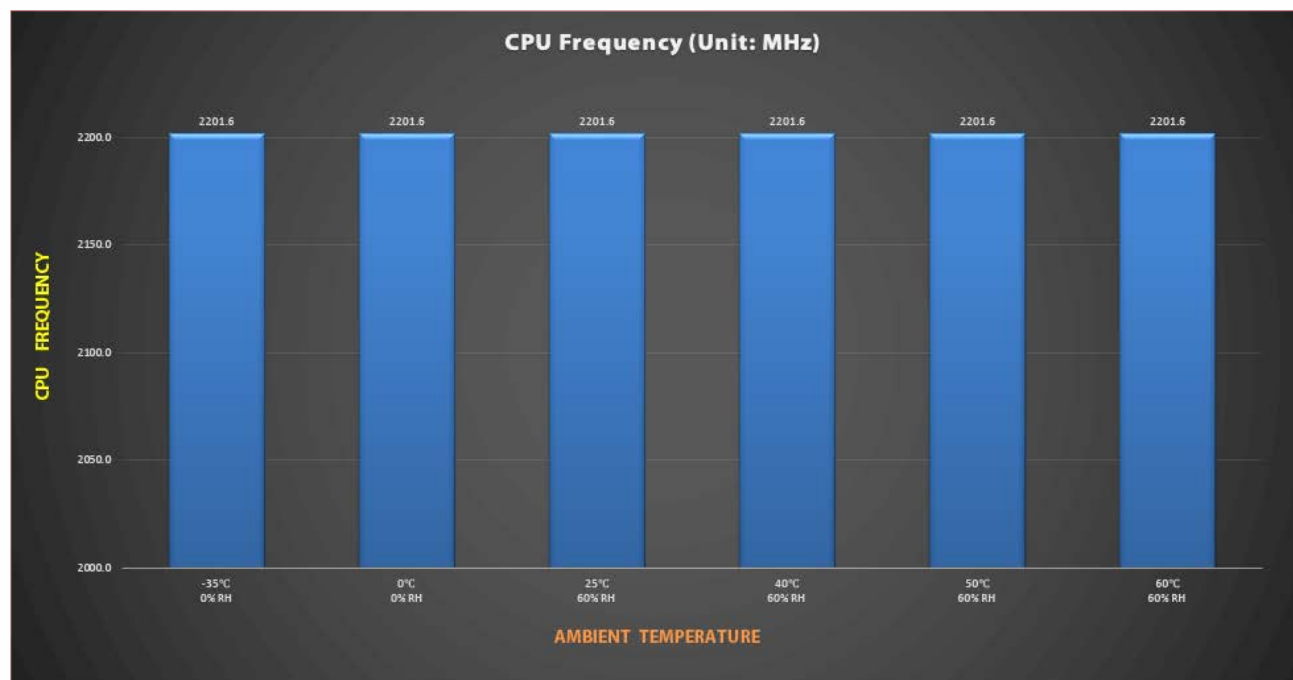
All specified temperature conditions were recorded as **PASS**, confirming that the system maintained functional and thermal stability under the defined test conditions. NV300-DH Performance Test Report

Overall Thermal Test Result: PASS

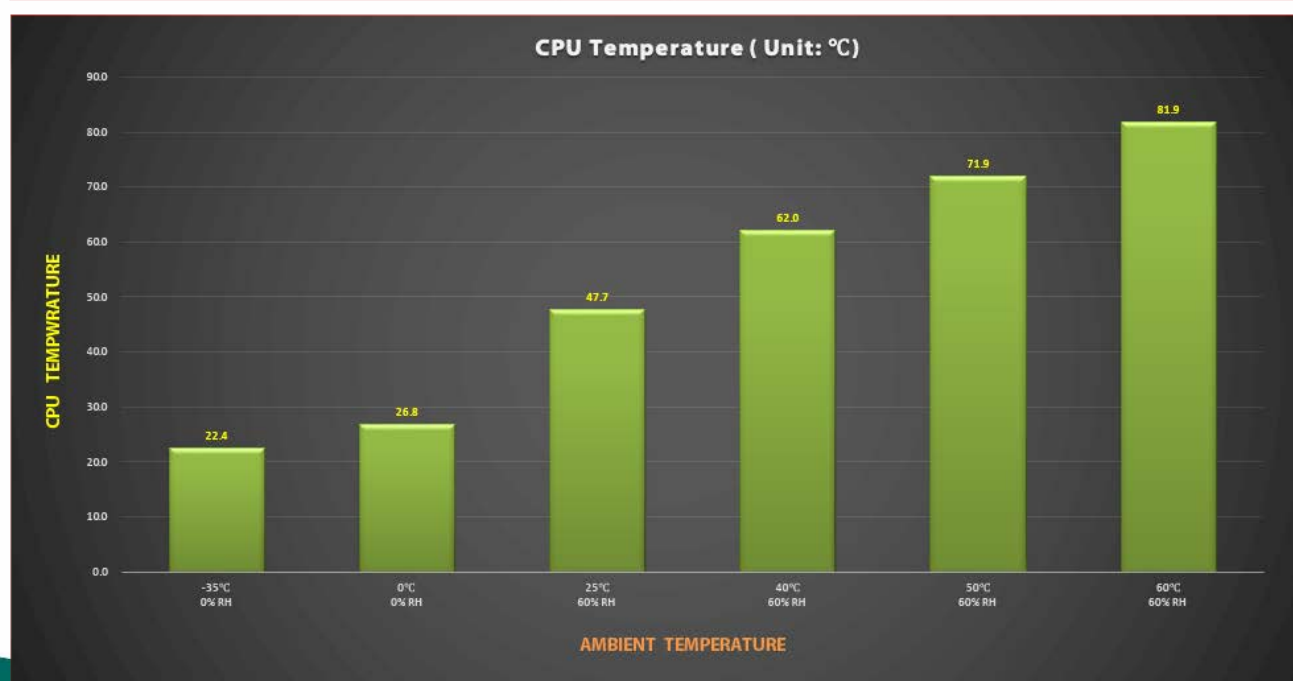
PERFORMANCE TEST REPORT

NV300-DH

CPU Frequency	Ambient Temperature	-35°C 0% RH	0°C 0% RH	25°C 60% RH	40°C 60% RH	50°C 60% RH	60°C 60% RH
CPU E-Cores Frequency (Unit: MHz)		2201.6	2201.6	2201.6	2201.6	2201.6	2201.6



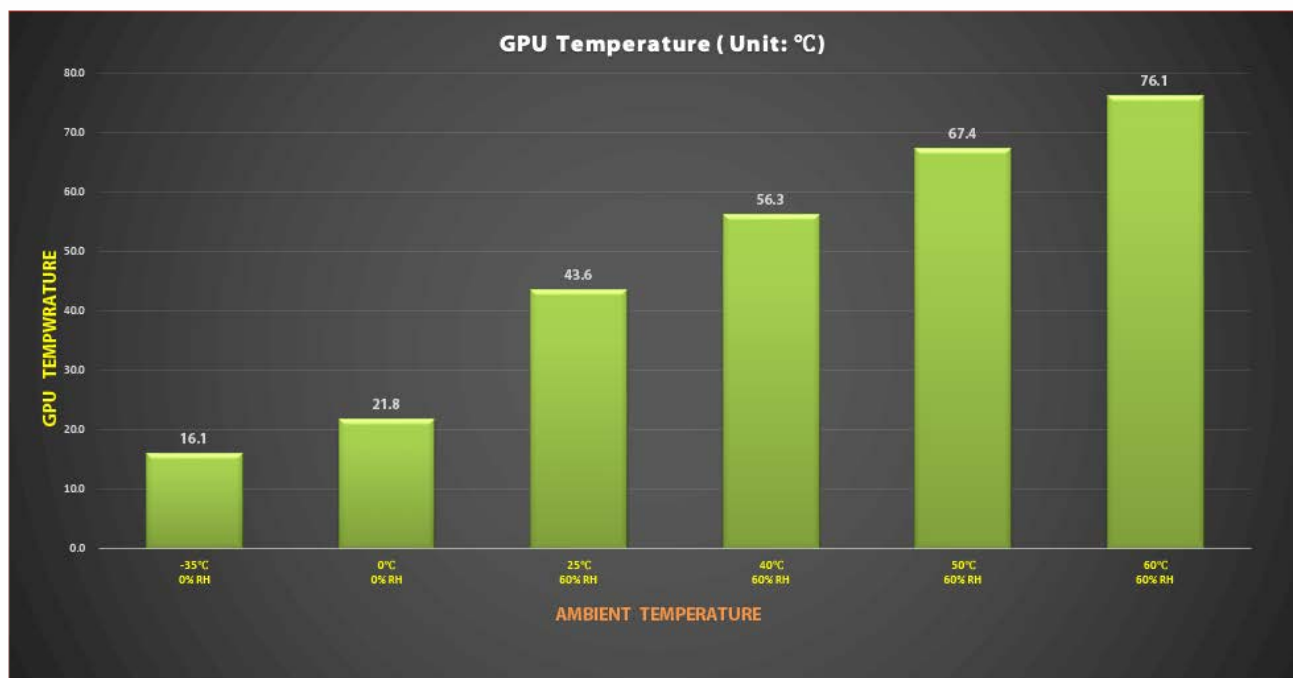
CPU Core Temperature	Ambient Temperature	-35°C 0% RH	0°C 0% RH	25°C 60% RH	40°C 60% RH	50°C 60% RH	60°C 60% RH
CPU Cores Max Temperature (Unit: °C)		22.4	26.8	47.7	62.0	71.9	81.9



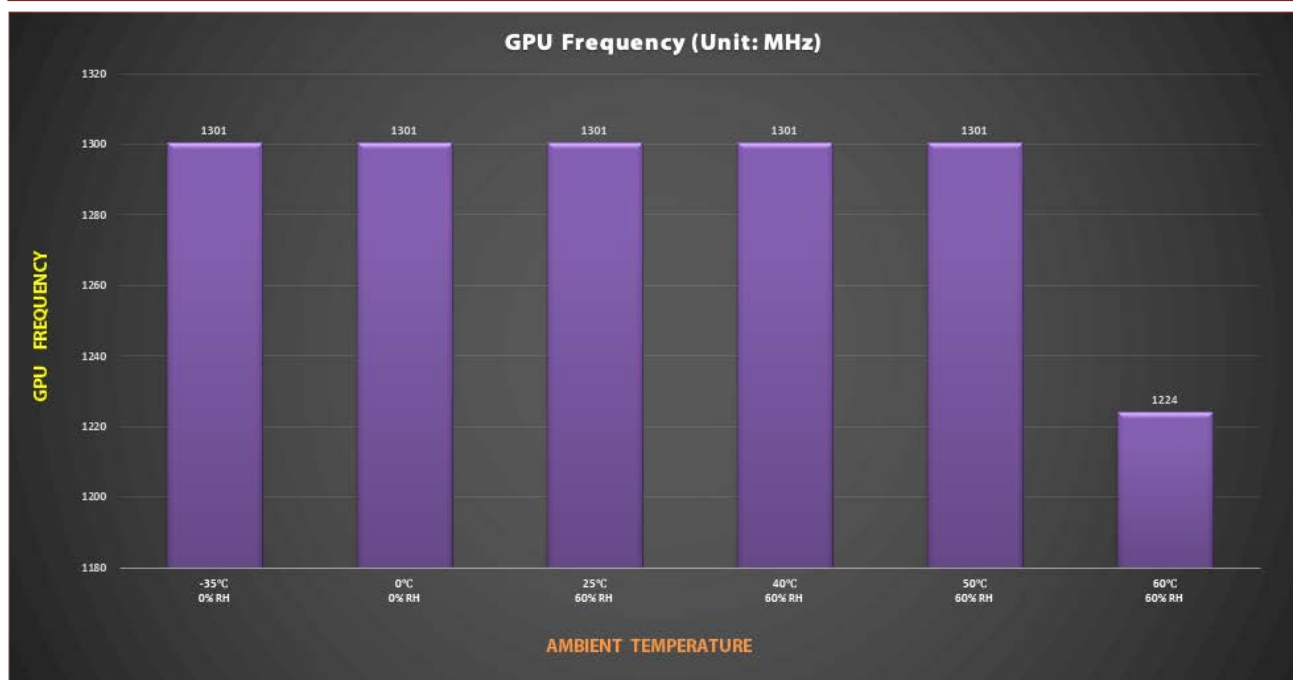
PERFORMANCE TEST REPORT

NV300-DH

GPU Temperature	Ambient Temperature	-35°C 0% RH	0°C 0% RH	25°C 60% RH	40°C 60% RH	50°C 60% RH	60°C 60% RH
GPU Temperature (Unit: °C)		16.1	21.8	43.6	56.3	67.4	76.1

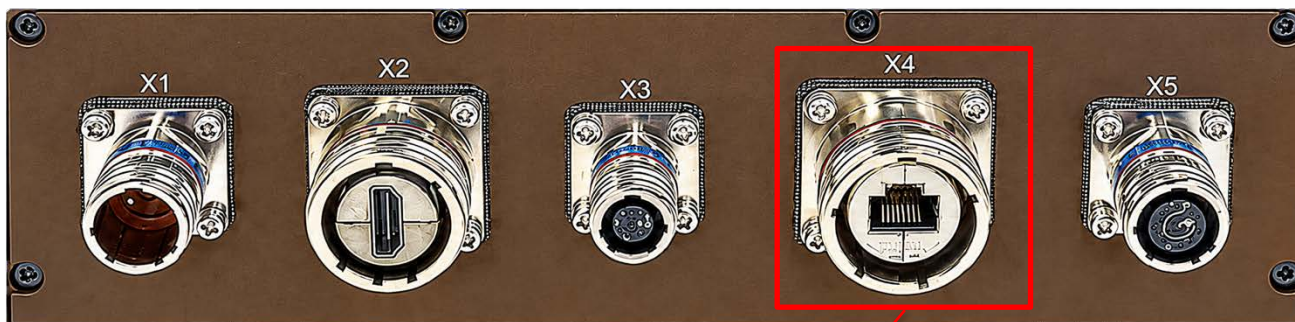


GPU Frequency	Ambient Temperature	-35°C 0% RH	0°C 0% RH	25°C 60% RH	40°C 60% RH	50°C 60% RH	60°C 60% RH
GPU Frequency (Unit: MHz)		1301	1301	1301	1301	1301	1224



5. I/O FUNCTION TEST

5-1. LAN PORT (1GbE)



1GbE

LAN SPEED

LAN Data-Packet

LAN #1

```

root@proteus-desktop: /home/proteus
[5] 559.00-560.00 sec 112 Mbytes 944 Mb/s 0 860 Kbytes
[5] 560.00-561.00 sec 112 Mbytes 944 Mb/s 0 860 Kbytes
[5] 561.00-562.00 sec 112 Mbytes 944 Mb/s 0 860 Kbytes
[5] 562.00-563.00 sec 112 Mbytes 944 Mb/s 0 860 Kbytes
[5] 563.00-564.00 sec 111 Mbytes 933 Mb/s 0 860 Kbytes
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[5] 598.00-599.00 sec 112 Mbytes 944 Mb/s 0 860 Kbytes
[5] 599.00-600.00 sec 112 Mbytes 944 Mb/s 0 860 Kbytes

ID Interval Transfer Bitrate Retr
[5] 0.00-600.00 sec 65.8 Gbytes 942 Mb/s 0
[5] 0.00-599.99 sec 65.8 Gbytes 941 Mb/s 0

sender receiver
iperf Done.
root@proteus-desktop: /home/proteus#

root@proteus-desktop: /home/proteus
64 bytes from 192.168.1.10: icmp_seq=558 ttl=128 time=0.676 ms
64 bytes from 192.168.1.10: icmp_seq=559 ttl=128 time=0.288 ms
64 bytes from 192.168.1.10: icmp_seq=560 ttl=128 time=0.366 ms
64 bytes from 192.168.1.10: icmp_seq=561 ttl=128 time=0.655 ms
64 bytes from 192.168.1.10: icmp_seq=562 ttl=128 time=0.518 ms
64 bytes from 192.168.1.10: icmp_seq=563 ttl=128 time=0.293 ms
64 bytes from 192.168.1.10: icmp_seq=564 ttl=128 time=0.295 ms
64 bytes from 192.168.1.10: icmp_seq=565 ttl=128 time=0.477 ms
64 bytes from 192.168.1.10: icmp_seq=566 ttl=128 time=0.309 ms
64 bytes from 192.168.1.10: icmp_seq=567 ttl=128 time=0.531 ms
64 bytes from 192.168.1.10: icmp_seq=568 ttl=128 time=0.311 ms
64 bytes from 192.168.1.10: icmp_seq=569 ttl=128 time=0.348 ms
64 bytes from 192.168.1.10: icmp_seq=570 ttl=128 time=0.411 ms
64 bytes from 192.168.1.10: icmp_seq=571 ttl=128 time=0.315 ms
64 bytes from 192.168.1.10: icmp_seq=572 ttl=128 time=0.365 ms
64 bytes from 192.168.1.10: icmp_seq=573 ttl=128 time=0.460 ms
64 bytes from 192.168.1.10: icmp_seq=574 ttl=128 time=0.439 ms
64 bytes from 192.168.1.10: icmp_seq=575 ttl=128 time=0.333 ms
64 bytes from 192.168.1.10: icmp_seq=576 ttl=128 time=0.274 ms
64 bytes from 192.168.1.10: icmp_seq=577 ttl=128 time=0.313 ms
64 bytes from 192.168.1.10: icmp_seq=578 ttl=128 time=0.327 ms
64 bytes from 192.168.1.10: icmp_seq=579 ttl=128 time=0.389 ms
64 bytes from 192.168.1.10: icmp_seq=580 ttl=128 time=0.517 ms
64 bytes from 192.168.1.10: icmp_seq=581 ttl=128 time=0.531 ms
64 bytes from 192.168.1.10: icmp_seq=582 ttl=128 time=0.462 ms
64 bytes from 192.168.1.10: icmp_seq=583 ttl=128 time=0.540 ms
64 bytes from 192.168.1.10: icmp_seq=584 ttl=128 time=0.516 ms
64 bytes from 192.168.1.10: icmp_seq=585 ttl=128 time=0.793 ms
64 bytes from 192.168.1.10: icmp_seq=586 ttl=128 time=0.066 ms
64 bytes from 192.168.1.10: icmp_seq=587 ttl=128 time=0.576 ms
64 bytes from 192.168.1.10: icmp_seq=588 ttl=128 time=0.353 ms
64 bytes from 192.168.1.10: icmp_seq=589 ttl=128 time=0.543 ms
64 bytes from 192.168.1.10: icmp_seq=590 ttl=128 time=0.314 ms
64 bytes from 192.168.1.10: icmp_seq=591 ttl=128 time=0.340 ms
64 bytes from 192.168.1.10: icmp_seq=592 ttl=128 time=0.595 ms
64 bytes from 192.168.1.10: icmp_seq=593 ttl=128 time=0.586 ms
64 bytes from 192.168.1.10: icmp_seq=594 ttl=128 time=0.485 ms
64 bytes from 192.168.1.10: icmp_seq=595 ttl=128 time=0.481 ms
64 bytes from 192.168.1.10: icmp_seq=596 ttl=128 time=1.29 ms
64 bytes from 192.168.1.10: icmp_seq=597 ttl=128 time=1.20 ms
64 bytes from 192.168.1.10: icmp_seq=598 ttl=128 time=1.03 ms
64 bytes from 192.168.1.10: icmp_seq=599 ttl=128 time=0.734 ms
64 bytes from 192.168.1.10: icmp_seq=600 ttl=128 time=1.10 ms

--- 192.168.1.10 ping statistics ---
600 packets transmitted, 599 received, 0.166667% packet loss, time 612302ms
rtt min/avg/max/mdev = 0.258/0.431/1.289/0.146 ms
root@proteus-desktop: /home/proteus#
    
```

LAN Speed Test

LAN Speed Test Result: PASS

The LAN speed test was performed using iPerf3 on Windows 10 Pro to evaluate the data

transmission performance of the Ethernet interface. The test system established a network connection with a remote host running the iPerf3 server, and continuous TCP traffic was generated to measure network throughput and transmission stability.

Throughout the test, the LAN interface successfully maintained communication with the remote system and demonstrated stable data transmission. No abnormal interruptions, unexpected connection losses, or significant throughput fluctuations were observed during the test period. The measured throughput demonstrated that the Ethernet interface and associated network functions operated normally under the specified test conditions.

The test results confirm that the LAN interface provides stable and consistent network communication for continuous data transmission under the tested operating conditions.

LAN Data-Packet Test

LAN Data-Packet Test Result: 0 Lost (0% Packet Loss)

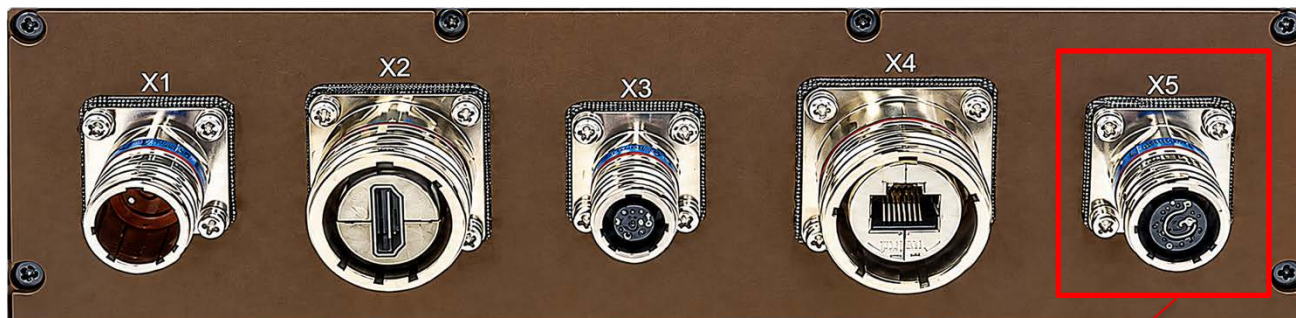
The LAN data-packet test was conducted using the standard Ping (ICMP Echo Request/Reply) utility on Windows 10 Pro to verify basic network connectivity and packet transmission reliability between the test system and a remote host.

During the test, a continuous sequence of ICMP Echo Request packets was transmitted to the remote host, and the corresponding ICMP Echo Reply packets were monitored. Packet transmission, packet loss, response time (latency), and communication stability were observed throughout the test period.

All transmitted packets received corresponding replies, with no packet loss observed during the test. The measured response time remained stable throughout the test period, indicating consistent point-to-point network communication.

The test results confirm that the Ethernet interface maintained stable network connectivity and reliable packet transmission under the specified test conditions.

5-2. RS422 & USB 3.0 PORT



RS422 & USB3.0

```

root@proteus-desktop: /home/proteus/Downloads

[965/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[966/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[967/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[968/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[969/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[970/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[971/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[972/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[973/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[974/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[975/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[976/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[977/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[978/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[979/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[980/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[981/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[982/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[983/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[984/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[985/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[986/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[987/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[988/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[989/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[990/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[991/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[992/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[993/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[994/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[995/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[996/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[997/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[998/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[999/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[1000/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS

=====
TEST SUMMARY
=====
Port A : /dev/ttyUSB0
Port B : /dev/ttyTHS2
Baud   : 115200 8N1

-----
USB0 -> THS2 : PASS 1000/1000   FAIL 0/1000   Success 100.00%
THS2 -> USB0 : PASS 1000/1000   FAIL 0/1000   Success 100.00%
-----
OVERALL RESULT : PASS
=====
root@proteus-desktop: /home/proteus/Downloads#
    
```

< Figure X. RS-422 Two-Way Communication Test Result between X5-Port and X7-Port >

RS-422 Two-Way Communication Test Results Explanation

The RS-422 two-way communication test was performed to verify the communication functionality and data transmission reliability between the system's **front X5-Port** and **rear X7-Port**.

For this test, the **X5-Port (/dev/ttyUSB0)** and **X7-Port (/dev/ttyTHS2)** were connected to establish an RS-422 communication link. Data was transmitted in both directions to confirm that each port could properly send and receive data:

- **X5-Port → X7-Port:** Data transmitted from the front X5-Port and received by the rear X7-Port.
- **X7-Port → X5-Port:** Data transmitted from the rear X7-Port and received by the front X5-Port.

The test was performed at **115200 baud, 8 data bits, no parity, and 1 stop bit (8N1)**. A total of **1,000 communication cycles** were executed in each direction.

Both transmission directions successfully completed all 1,000 test cycles with **zero failures**, resulting in a **100% success rate**.

Overall Result: PASS

The test results confirm that the X5-Port and X7-Port can successfully transmit and receive RS-422 data in both directions under the specified test conditions, demonstrating stable and reliable two-way serial communication.

```

root@test-desktop: /home/user/Desktop
root@test-desktop:/home/user/Desktop# sh fio.sh
randread: (g=0): rw=randread, bs=(R) 4096B-4096B, (W) 4096B-4096B, (T) 4096B-4096B, ioengine=psync, iodepth=1
fio-3.28
Starting 1 process
Jobs: 1 (f=1): [r(1)][100.0%][r=15.0MiB/s][r=3829 IOPS][eta 00m:00s]
randread: (groupid=0, jobs=1): err= 0: pid=7071: Mon May 19 13:49:51 2025
  read: IOPS=3759, BW=14.7MiB/s (15.4MB/s)(881MiB/60001msec)
    clat (usec): min=197, max=10660, avg=264.82, stdev=80.54
    lat (usec): min=197, max=10661, avg=264.96, stdev=80.54
    clat percentiles (usec):
      | 1.00th=[ 212], 5.00th=[ 217], 10.00th=[ 221], 20.00th=[ 227],
      | 30.00th=[ 235], 40.00th=[ 241], 50.00th=[ 260], 60.00th=[ 265],
      | 70.00th=[ 269], 80.00th=[ 281], 90.00th=[ 314], 95.00th=[ 330],
      | 99.00th=[ 627], 99.50th=[ 889], 99.90th=[ 1106], 99.95th=[ 1287],
      | 99.99th=[ 1467]
    bw ( KIB/s): min=10088, max=15656, per=100.00%, avg=15054.00, stdev=1012.19, samples=119
    iops   : min= 2522, max= 3914, avg=3763.50, stdev=253.04, samples=119
    lat (usec)  : 250=46.31%, 500=52.62%, 750=0.09%, 1000=0.79%
    lat (msec)  : 2=0.18%, 4=0.01%, 10=0.01%, 20=0.01%
    cpu         : usr=0.52%, sys=3.25%, ctx=225587, majf=0, minf=10
    IO depths   : 1=100.0%, 2=0.0%, 4=0.0%, 8=0.0%, 16=0.0%, 32=0.0%, >=64=0.0%
                  submit   : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
                  complete  : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
                  issued rwts: total=225568,0,0,0 short=0,0,0,0 dropped=0,0,0,0
                  latency   : target=0, window=0, percentile=100.00%, depth=1

Run status group 0 (all jobs):
  READ: bw=14.7MiB/s (15.4MB/s), 14.7MiB/s-14.7MiB/s (15.4MB/s-15.4MB/s), io=881MiB (924MB), run=60001-60001msec

Disk stats (read/write):
  sda: ios=225084/0, merge=0/0, ticks=58200/0, in_queue=58199, util=99.99%
root@test-desktop:/home/user/Desktop#

```

USB Device Detection and Connection Status Test Results Explanation

The USB interface verification was performed under the Ubuntu operating system to confirm that the system can properly detect and identify connected USB devices.

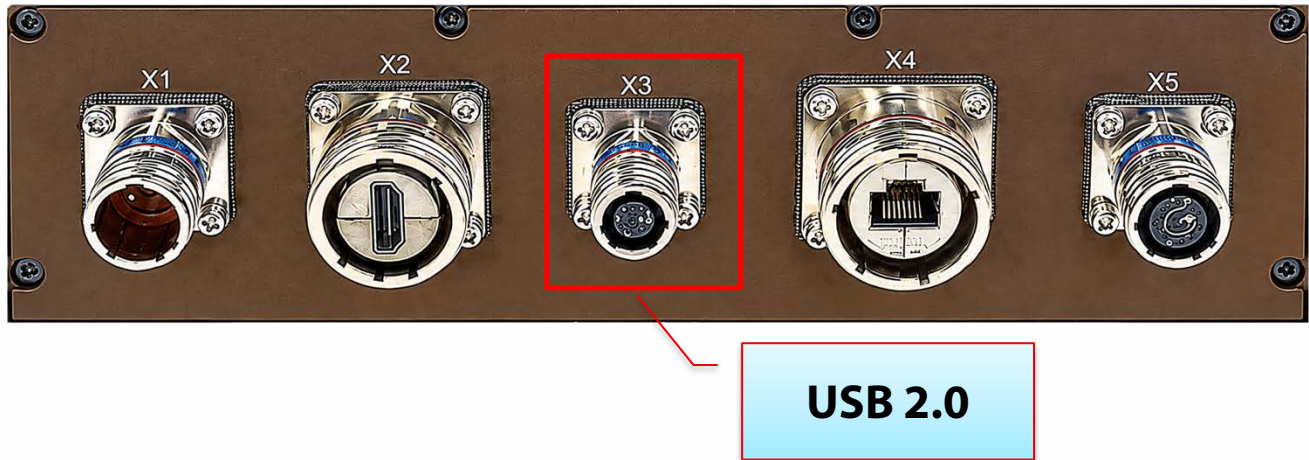
The `lsusb` command was used to display the USB devices recognized by the operating system, including the connected USB hubs, storage device, serial interface, keyboard, and mouse. The `lsusb -t` command was additionally used to display the USB connection topology, device hierarchy, driver information, and negotiated connection speed.

As shown in the test result, the connected USB devices were successfully detected by the operating system and associated with the appropriate USB controllers and device drivers. The USB topology information also confirms that the system supports different USB connection speeds according to the capabilities of the connected devices and interfaces.

The test results confirm that the system's USB interfaces are properly recognized and functional under Ubuntu, with the connected USB devices successfully enumerated and accessible by the operating system.

Test Result: PASS

5-3. USB 2.0 PORT



```
root@test-desktop: /home/user/Desktop
root@test-desktop:/home/user/Desktop# sh fio.sh
randread: (g=0): rw=randread, bs=(R) 4096B-4096B, (W) 4096B-4096B, (T) 4096B-4096B, ioengine=psync, iodepth=1
fio-3.28
Starting 1 process
randread: Laying out IO file (1 file / 512MiB)
Jobs: 1 (f=1): [r(1)][100.0%][r=14.5MiB/s][r=3710 IOPS][eta 00m:00s]
randread: (groupid=0, jobs=1): err= 0: pid=6827: Mon May 19 13:42:57 2025
  read: IOPS=3947, BW=15.4MiB/s (16.2MB/s)(463MiB/30001msec)
    clat (usec): min=221, max=2383, avg=252.20, stdev=84.51
    lat (usec): min=221, max=2386, avg=252.34, stdev=84.51
    clat percentiles (usec):
      | 1.00th=[ 233], 5.00th=[ 237], 10.00th=[ 239], 20.00th=[ 241],
      | 30.00th=[ 241], 40.00th=[ 243], 50.00th=[ 245], 60.00th=[ 245],
      | 70.00th=[ 247], 80.00th=[ 249], 90.00th=[ 251], 95.00th=[ 255],
      | 99.00th=[ 293], 99.50th=[ 1106], 99.90th=[ 1434], 99.95th=[ 1450],
      | 99.99th=[ 1549]
    bw ( KiB/s): min= 7864, max=16368, per=100.00%, avg=15797.75, stdev=1210.56, samples=59
    iops   : min= 1966, max= 4092, avg=3949.41, stdev=302.65, samples=59
    lat (usec) : 250=85.74%, 500=13.48%, 750=0.05%, 1000=0.12%
    lat (msec) : 2=0.62%, 4=0.01%
    cpu      : usr=0.56%, sys=3.27%, ctx=118422, majf=0, minf=10
    IO depths : 1=100.0%, 2=0.0%, 4=0.0%, 8=0.0%, 16=0.0%, 32=0.0%, >=64=0.0%
    submit    : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
    complete  : 0=0.0%, 4=100.0%, 8=0.0%, 16=0.0%, 32=0.0%, 64=0.0%, >=64=0.0%
    issued rwts: total=118418,0,0,0 short=0,0,0,0 dropped=0,0,0,0
    latency   : target=0, window=0, percentile=100.00%, depth=1

Run status group 0 (all jobs):
  READ: bw=15.4MiB/s (16.2MB/s), 15.4MiB/s-15.4MiB/s (16.2MB/s-16.2MB/s), io=463MiB (485MB), run=30001-30001msec

Disk stats (read/write):
  sda: ios=117583/2, merge=0/1, ticks=28953/0, in_queue=28954, util=99.79%
root@test-desktop:/home/user/Desktop#
```

USB Device Detection and Connection Status Test Results Explanation

The USB interface verification was performed under the Ubuntu operating system to confirm that the system can properly detect and identify connected USB devices.

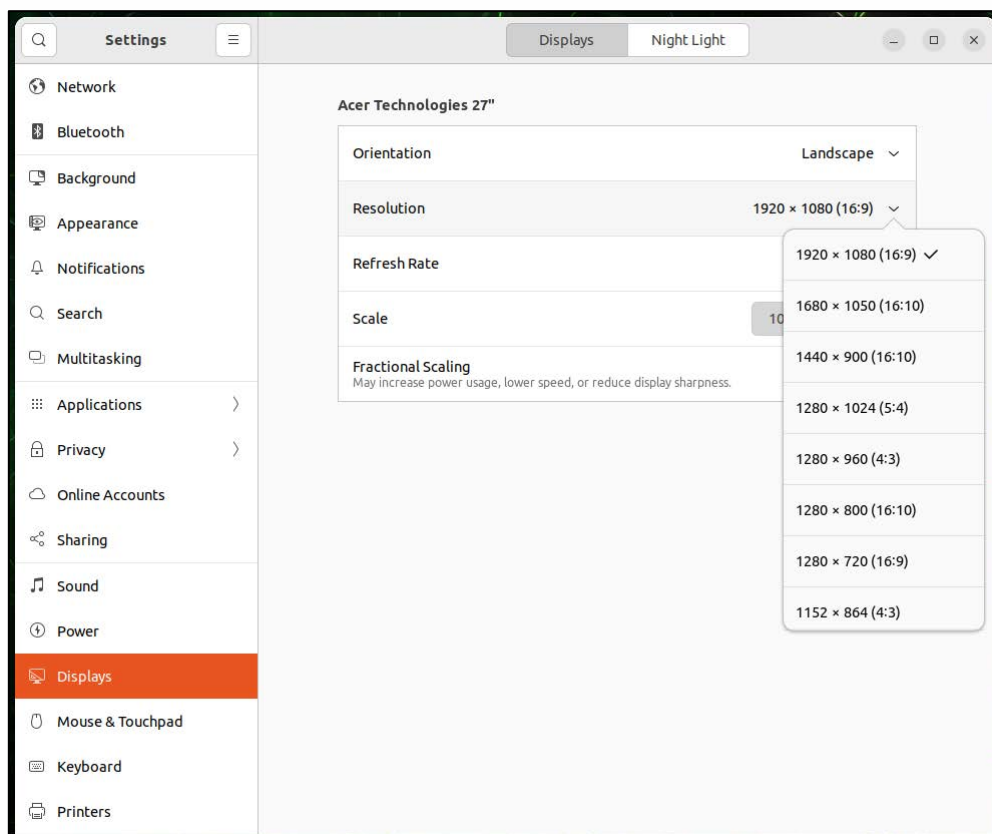
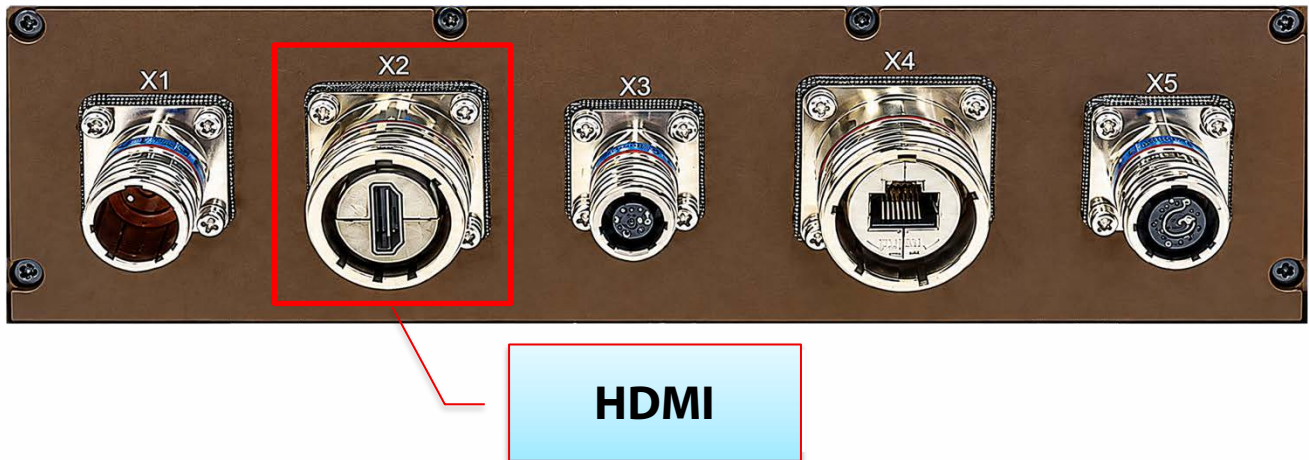
The `lsusb` command was used to display the USB devices recognized by the operating system, including the connected USB hubs, storage device, serial interface, keyboard, and mouse. The `lsusb -t` command was additionally used to display the USB connection topology, device hierarchy, driver information, and negotiated connection speed.

As shown in the test result, the connected USB devices were successfully detected by the operating system and associated with the appropriate USB controllers and device drivers. The USB topology information also confirms that the system supports different USB connection speeds according to the capabilities of the connected devices and interfaces.

The test results confirm that the system's USB interfaces are properly recognized and functional under Ubuntu, with the connected USB devices successfully enumerated and accessible by the operating system.

Test Result: PASS

5-4. HDMI Port



HDMI Display Output Test Results Explanation

Test Purpose

The purpose of the HDMI test is to verify that the **X2 HDMI output port** of the NV300-DH can correctly provide video output to an external display and maintain stable image transmission during normal system operation.

For non-technical users, this test can be understood as connecting the NV300-DH to an external monitor through the HDMI port and confirming that the system can display the operating system and graphical content correctly without abnormal video behavior.

Test Method

The external display is connected to the **X2 HDMI port** of the NV300-DH using an HDMI cable. After the system is powered on and the operating system has completed initialization, the HDMI video output is checked to confirm that the external display is properly detected and a normal image is displayed.

The display output is then operated at the specified test resolution while the image is observed for stability and normal operation.

Pass / Fail Criteria

According to the NV300-DH I/O functional test requirements, the HDMI interface shall support display output at resolutions up to **1920 × 1080** with stable and normal video transmission. NV300-DH Performance Test Report

The HDMI test is considered **PASS** when:

- The external display can receive a video signal from the X2 HDMI port.
- The system can correctly output the specified **1920 × 1080** display resolution.
- The displayed image remains stable and normal during the test.
- No abnormal loss of video output or functional failure is observed during the verification.

If the HDMI output cannot be established, the required resolution cannot be displayed, or abnormal video behavior prevents normal operation, the test shall be considered **FAIL**.

Understanding the Test

This test does not measure the computing performance of the CPU or GPU. Instead, it verifies the complete HDMI display-output function of the system.

In simple terms, the test answers the following question:

“Can the NV300-DH X2 HDMI port correctly output a stable Full HD image to an external monitor?”

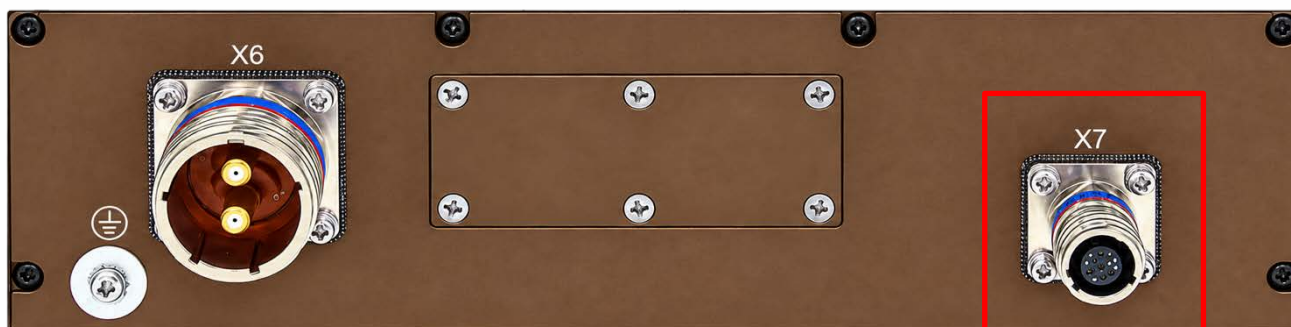
A successful test indicates that the system can generate and transmit the required HDMI display output through the X2 port under the specified test conditions.

Conclusion

The X2 HDMI interface was verified for display output functionality according to the defined NV300-DH I/O test criteria. The HDMI output supported the specified **1920 × 1080 resolution** and maintained stable and normal video transmission during the test.

Overall HDMI Test Result: PASS

5-5. RS422 PORT



RS422

```

root@proteus-desktop: /home/proteus/Downloads
[965/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[966/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[967/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[968/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[969/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[970/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[971/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[972/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[973/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[974/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[975/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[976/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[977/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[978/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[979/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[980/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[981/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[982/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[983/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[984/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[985/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[986/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[987/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[988/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[989/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[990/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[991/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[992/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[993/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[994/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[995/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[996/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[997/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[998/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[999/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS
[1000/1000] USB0 -> THS2 : PASS    THS2 -> USB0 : PASS

=====
TEST SUMMARY
=====
Port A : /dev/ttyUSB0
Port B : /dev/ttyTHS2
Baud   : 115200 8N1
-----
USB0 -> THS2 : PASS 1000/1000   FAIL 0/1000   Success 100.00%
THS2 -> USB0 : PASS 1000/1000   FAIL 0/1000   Success 100.00%
-----
OVERALL RESULT : PASS
=====
root@proteus-desktop: /home/proteus/Downloads#
    
```

< Figure X. RS-422 Two-Way Communication Test Result between X5-Port and X7-Port >

RS-422 Two-Way Communication Test Results Explanation

The RS-422 two-way communication test was performed to verify the communication functionality and data transmission reliability between the system's **front X5-Port** and **rear X7-Port**.

For this test, the **X5-Port (/dev/ttyUSB0)** and **X7-Port (/dev/ttyTHS2)** were connected to establish an RS-422 communication link. Data was transmitted in both directions to confirm that each port could properly send and receive data:

- **X5-Port → X7-Port:** Data transmitted from the front X5-Port and received by the rear X7-Port.
- **X7-Port → X5-Port:** Data transmitted from the rear X7-Port and received by the front X5-Port.

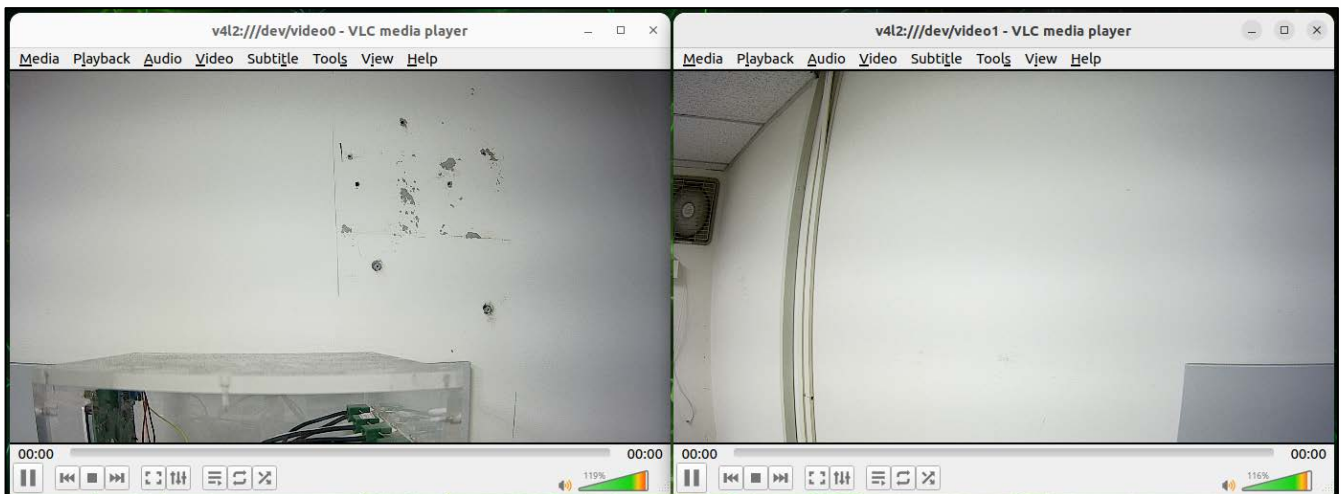
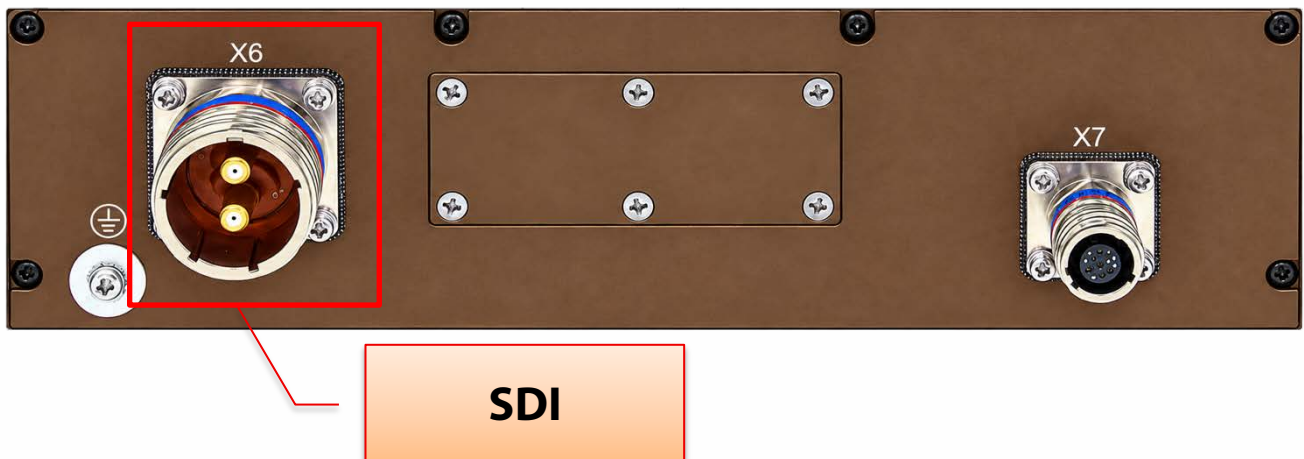
The test was performed at **115200 baud, 8 data bits, no parity, and 1 stop bit (8N1)**. A total of **1,000 communication cycles** were executed in each direction.

Both transmission directions successfully completed all 1,000 test cycles with **zero failures**, resulting in a **100% success rate**.

Overall Result: PASS

The test results confirm that the X5-Port and X7-Port can successfully transmit and receive RS-422 data in both directions under the specified test conditions, demonstrating stable and reliable two-way serial communication.

5-6. 3G-SDI PORT



3G-SDI Video Capture Test

The purpose of this test is to verify that the **3G-SDI video input and capture function** operates correctly. External SDI video sources are connected to the system, and the corresponding video capture channels are opened through **VLC Media Player** to confirm that the SDI signals can be correctly received, captured, and displayed.

According to the Release Note, the SDI capture function supports video formats including **720p50/60, 1080i50/60, and 1080p24/50/60**, with a maximum tested configuration of **1080p60**. The documented 2-channel SDI configuration uses **1080p60 × 2 channels**, and supports YUYV, NV12, YV12, and YU12 pixel formats. ReleaseNote

As shown in the test result, the system successfully recognized the SDI video capture devices as **/dev/video0** and **/dev/video1**, and both channels were successfully opened in VLC with live video images displayed. The test is considered **PASS** when the SDI channels can be recognized and opened normally, incoming video can be continuously captured and displayed, and no abnormal image loss or capture failure is observed during the test.

Test Result: PASS

-----END-----