# System Test Report

# AV710-X4

| Product Manager | R&D Leader | System Engineer | Test Engineer |
|---|---|---|---|
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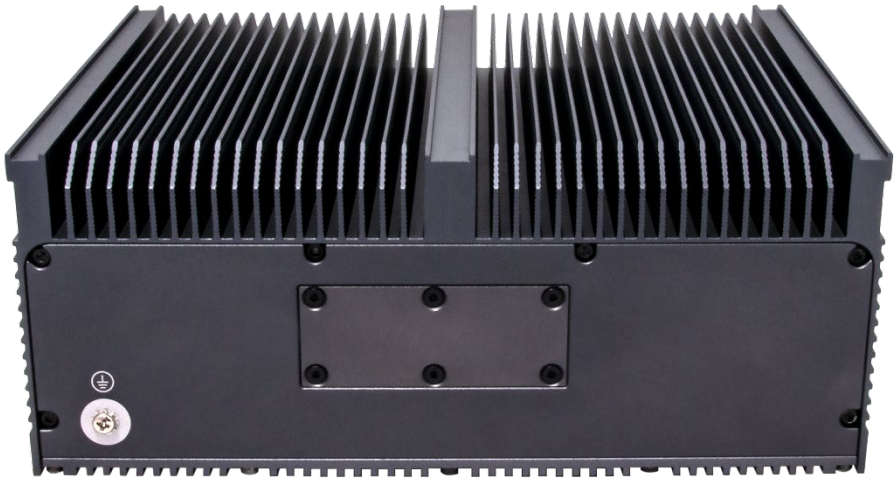
Revision Date: June 26, 2024

# System Test

AV710-X4

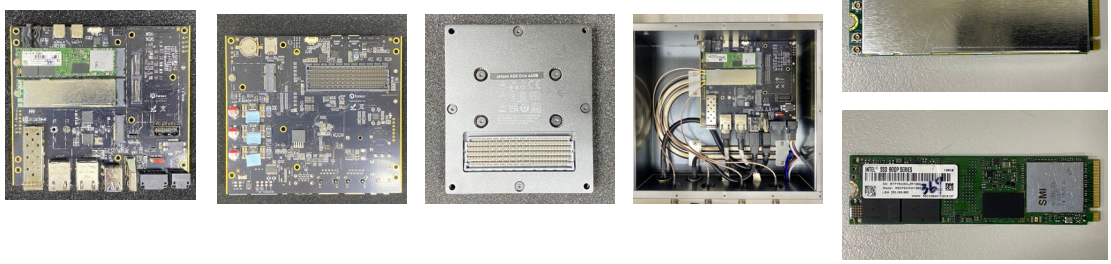




# INDEX

# 1. SPECIFICATION

## 1-1. PHOTO

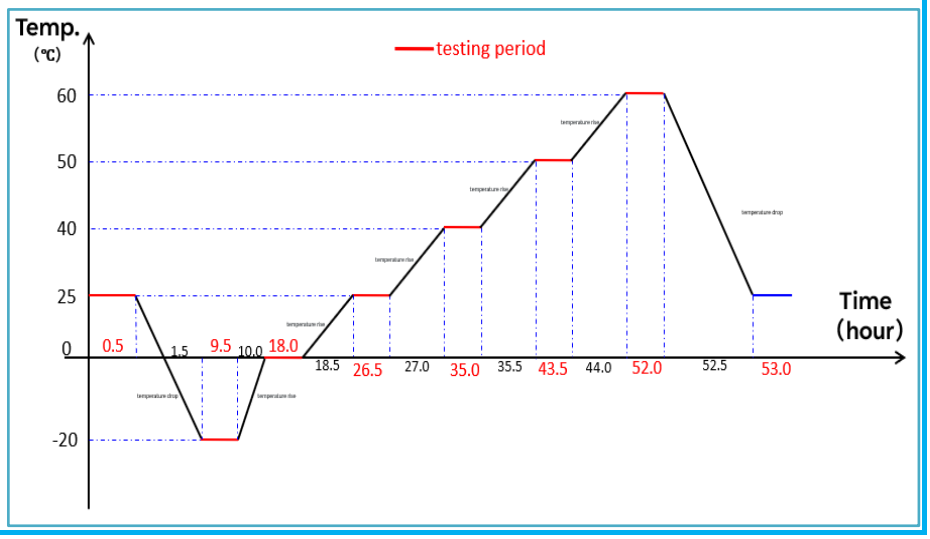


## 1-2. SYSTEM CONFIGURATION

| | |
|---|---|
| **Motherboard** | **NVIDIA Jetson AGX Orin 64GB**<br>**BIOS: EDK II version: 3.1-32827747**<br>**Graphics Interfaces: 1x HDMI 2.0(max resolution 3840x2160)**<br>**Serial: 1425023305691** |
| **CPU** | 12-core Arm® Cortex®-A78AE v8.2 64-bit CPU 3MB L2 + 6MB L3<br>CPU Max Freq: 2.2GHz |
| **Memory** | 64GB 256-bit LPDDR5<br>204.8 GB/s |
| **Storage** | OS: 64GB eMMC 5.1<br>Storage: Intel SSDPEKKW128G7X1 128GB<br>M.2 80mm PCIe 3.0 x4, 3D1, TLC |
| **GPU** | NVIDIA Ampere architecture with 2048 NVIDIA® CUDA® cores and 64 Tensor Cores<br>GPU Max Frequency: 1.3GHz |
| **Multi Media** | M2 SDI Capture Card |

# 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.<br>As the system cools down, the mode will change with stack selection, temperature/heat.<br>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: stress-ng<br>2. Stress GPU: glmark2 |
| Test Procedure | 1. Thermal pre-scan measurement:<br>Temperature: **-20˚C～60˚C/60%RH**<br>2. Actual thermal measurement:<br>2-1. Select the test point based on the infrared photo and connect the thermocouple to the hot spot.<br>2-2. Place the EUT into the hot chamber and set the test temperature curve Specification.<br>2-3. Open the hot cell and power up the EUT, enter the Ubuntu 20.04.6 LTS environment and perform a maximum power test + stress application.<br>2-4. After the EUT executes the test software for 8 hours, record the maximum heat generation of each thermocouple point.<br>2-5. Turn off the hot cell and EUT.<br>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. |
| Test Diagram of Curves | Environment defines for 53 hours.<br>  |

## 2-1. Test Rresult <Test Item>

### 2-2-1. Temperature Cycle

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

| Test Temperature | Test Result |
|---|---|
| -20˚C | PASS |
| 0˚C | PASS |
| 25˚C | PASS |
| 40˚C | PASS |
| 50˚C | PASS |
| 60˚C | PASS |

### 2-2-2. I/O Function

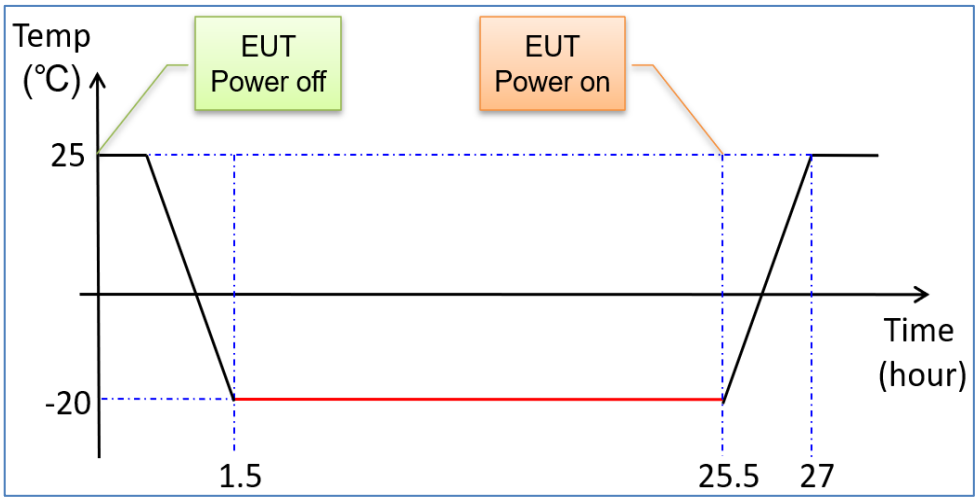
#Confirm the system specifications and I/O connection to ensure that they are functioning properly

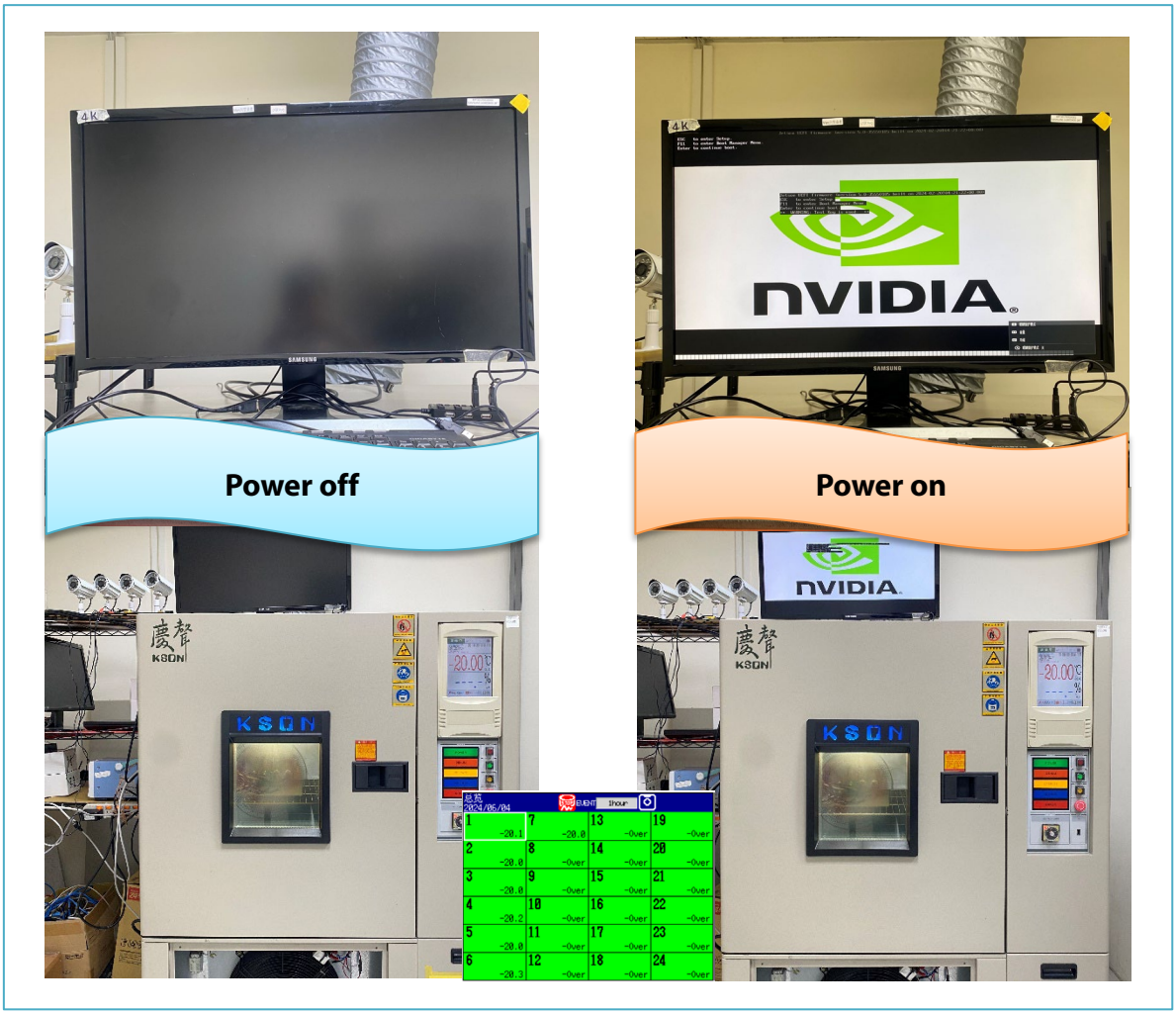
| Item | Test Criteria | Result |
|---|---|---|
| LAN ( 1Gbps) | Connection 1G/10G/100G SWITCH HUB transfer data test, it can work normally. | PASS |
| LAN ( 1Gbps ) | Connection 1G/10G/100G SWITCH HUB transfer data test, it can work normally. | PASS |
| USB3.2 | Connect a PassMark USB 3.0 Loopback Plugs for testing, it can work normally. | PASS |
| SDI Port | Connected the SDI camera for testing and it works normally. | PASS |
| HDMI Port | Check work well. | PASS |

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

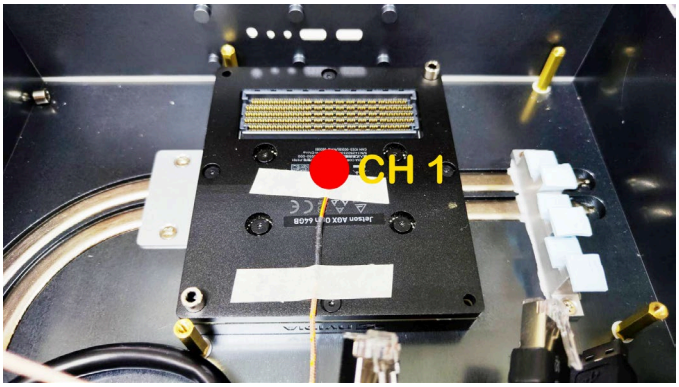
# Below -20℃, cool down at low temperature for 8 hours after power outage, and then power on again to ensure that the system starts normally.

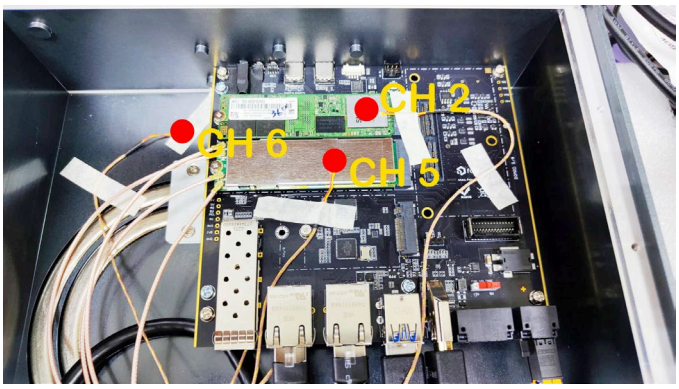
| Ambient Temp. | Test Result |
|---|---|
| -20°C | PASS |

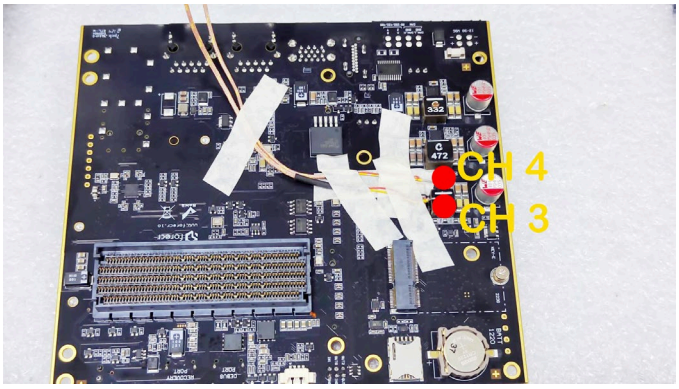


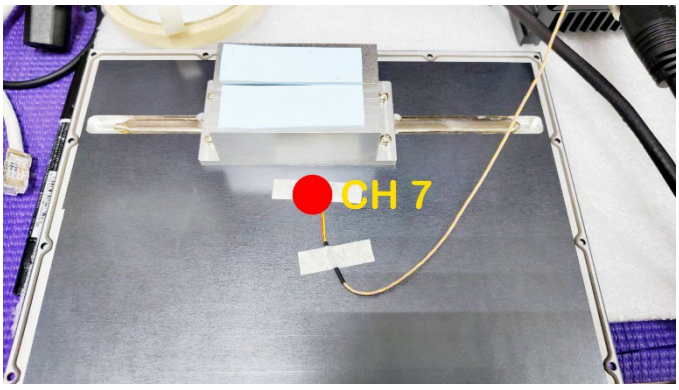



# 3. THERMAL TEST POINT



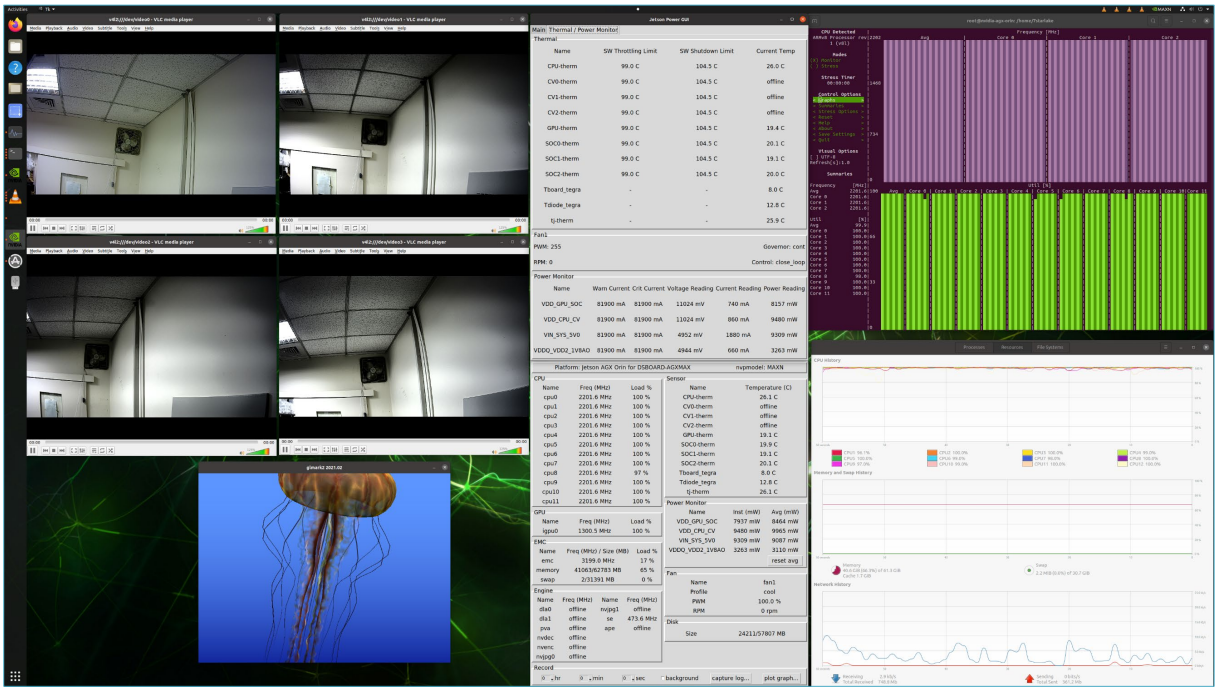




| Test Point | Test Point |
|---|---|
| CH1 | CPU |
| CH2 | M.2 SSD |
| CH3 | Carrier Board Choke |
| CH4 | Carrier Board MOS-FET |
| CH5 | SDI Capture Card |
| CH6 | CPU Heat Sink |
| CH7 | Bottom of Heat Sink |

# 4. TEST PHOTO IN LAB

## - Chamber in -20°C




| Test Point | Ambient Temp. | -20°C |
|---|---|---|
| | CPU Tj. Temperature | 26.1 °C |
| | CPU Frequency | 2201.6 MHz |
| | GPU Tj. Temperature | 19.1 °C |
| | GPU Frequency | 1300.5 MHz |
| CH1 | CPU | -7.3 °C |
| CH2 | M.2 SSD | -13.7 °C |
| CH3 | Carrier Board Choke | -14.0 °C |
| CH4 | Carrier Board MOS-FET | -13.3 °C |
| CH5 | SDI Capture Card | -12.6 °C |
| CH6 | CPU Heat Sink | -16.2 °C |
| CH7 | Bottom of Heat Sink | -14.6 °C |

# System Test

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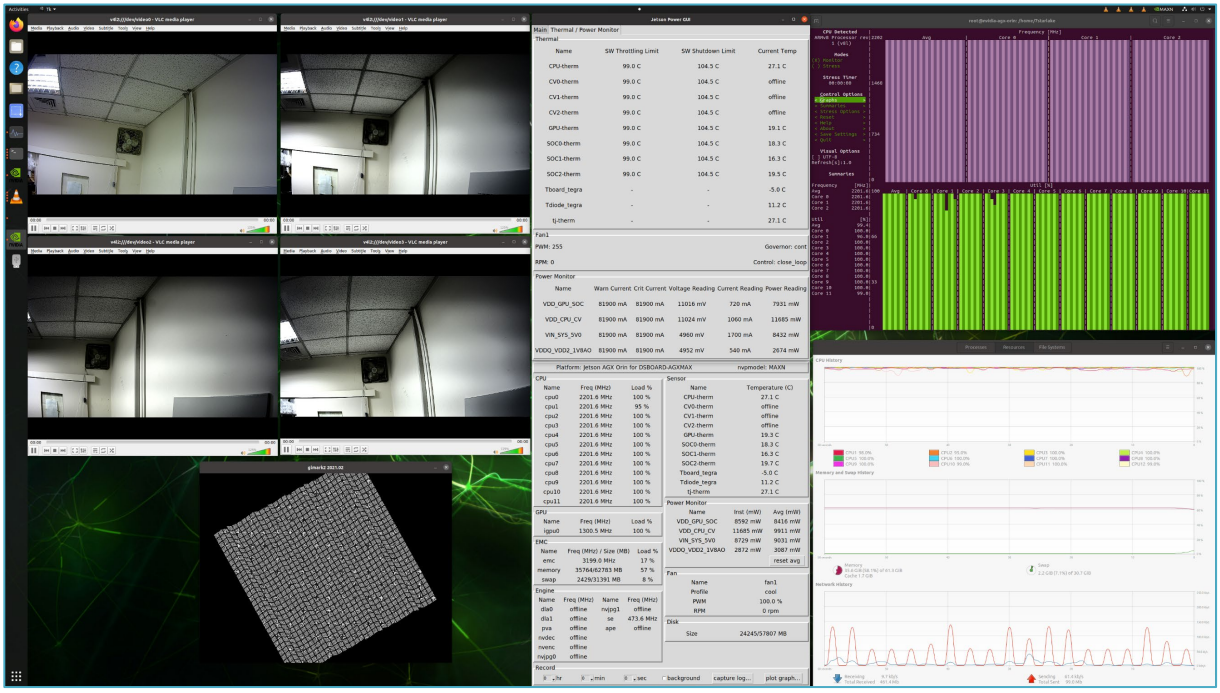
## - Chamber in 0°C




| Test Point | Ambient Temp. | 0°C |
|---|---|---|
| | CPU Tj. Temperature | 27.1 °C |
| | CPU Frequency | 2201.6 MHz |
| | GPU Tj. Temperature | 19.3 °C |
| | GPU Frequency | 1300.5 MHz |
| CH1 | CPU | 9.1 °C |
| CH2 | M.2 SSD | 6.1 °C |
| CH3 | Carrier Board Choke | 5.8 °C |
| CH4 | Carrier Board MOS-FET | 6.1 °C |
| CH5 | SDI Capture Card | 6.3 °C |
| CH6 | CPU Heat Sink | 3.6 °C |
| CH7 | Bottom of Heat Sink | 4.8 °C |

# System Test

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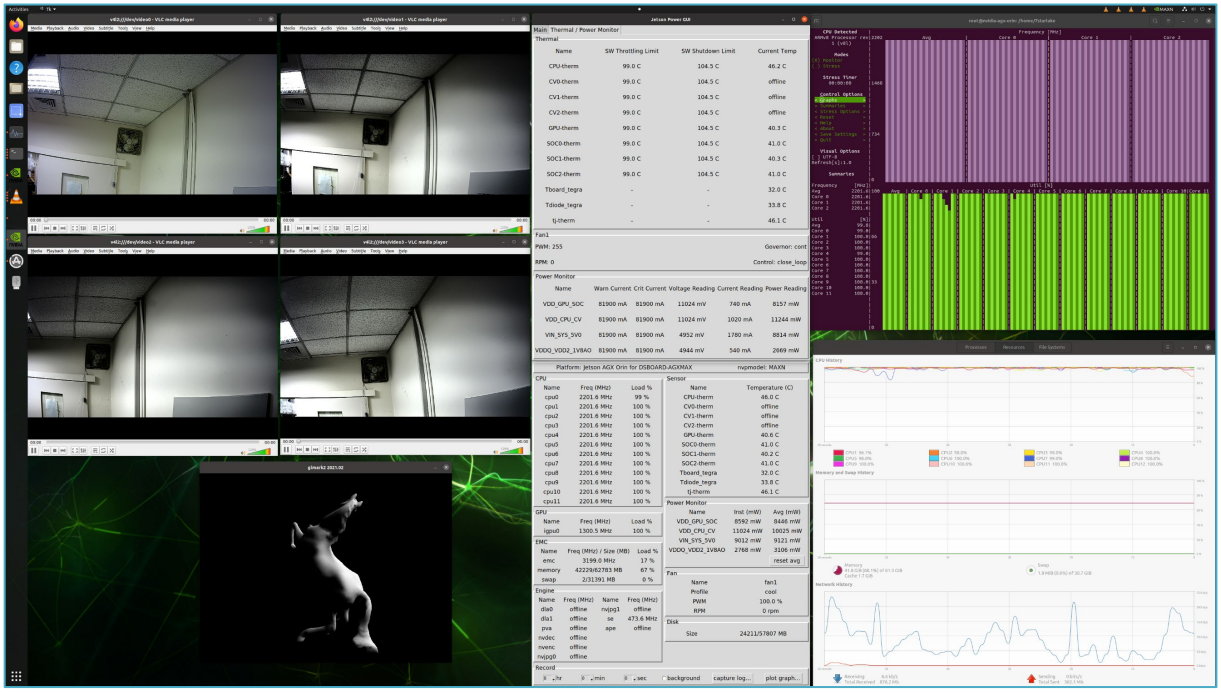
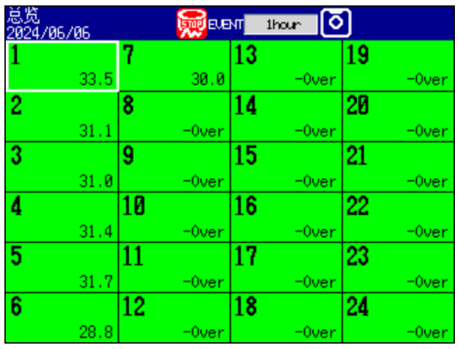
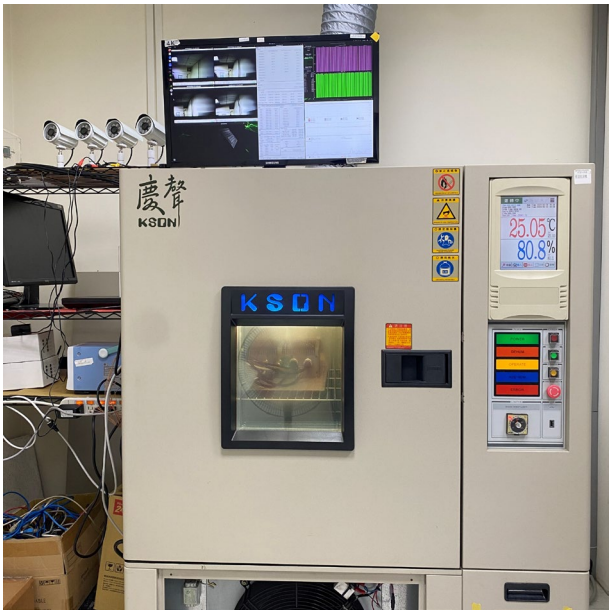
## - Chamber in 25°C






| Test Point | Ambient Temp. | 25°C |
|---|---|---|
| | CPU Tj. Temperature | 46.0 °C |
| | CPU Frequency | 2201.6 MHz |
| | GPU Tj. Temperature | 40.6 °C |
| | GPU Frequency | 1300.5 MHz |
| CH1 | CPU | 33.5 °C |
| CH2 | M.2 SSD | 31.1 °C |
| CH3 | Carrier Board Choke | 31.0 °C |
| CH4 | Carrier Board MOS-FET | 31.4 °C |
| CH5 | SDI Capture Card | 31.7 °C |
| CH6 | CPU Heat Sink | 28.8 °C |
| CH7 | Bottom of Heat Sink | 30.0 °C |



# System Test

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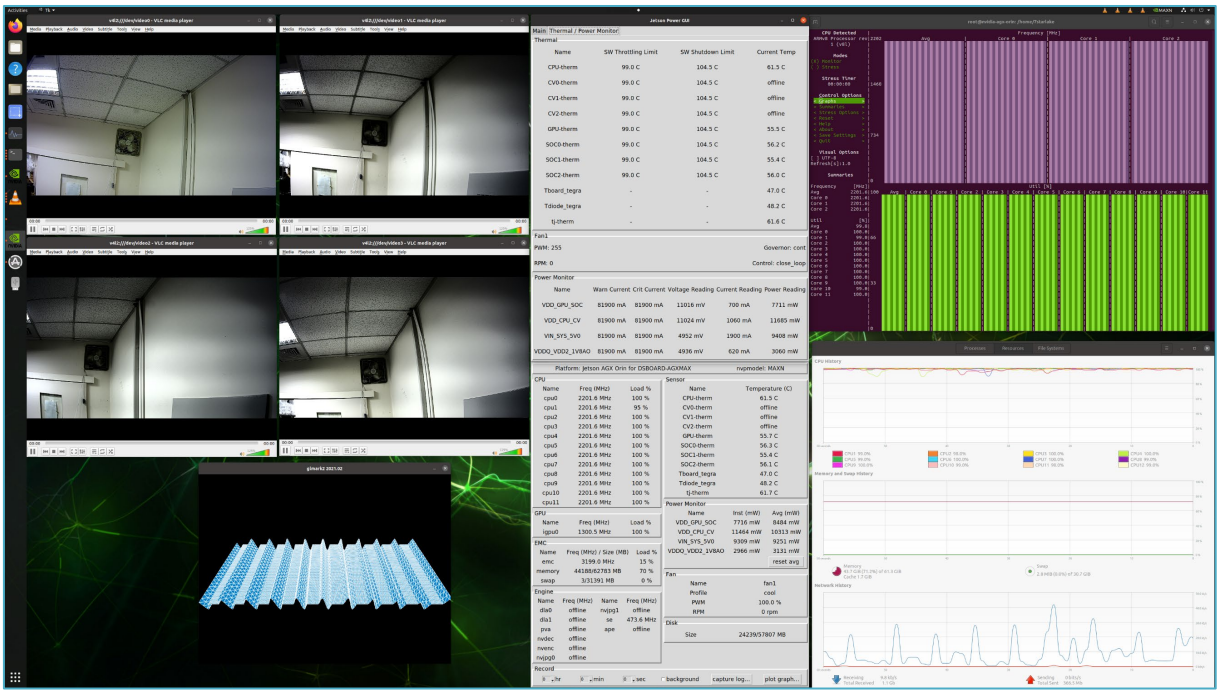
## - Chamber in 40°C




| Test Point | Ambient Temp. | 40°C |
|---|---|---|
| | CPU Tj. Temperature | 61.5 °C |
| | CPU Frequency | 2201.6 MHz |
| | GPU Tj. Temperature | 55.7 °C |
| | GPU Frequency | 1300.5 MHz |
| CH1 | CPU | 49.0 °C |
| CH2 | M.2 SSD | 46.5 °C |
| CH3 | Carrier Board Choke | 46.2 °C |
| CH4 | Carrier Board MOS-FET | 46.7 °C |
| CH5 | SDI Capture Card | 47.0 °C |
| CH6 | CPU Heat Sink | 44.1 °C |
| CH7 | Bottom of Heat Sink | 45.2 °C |

# System Test

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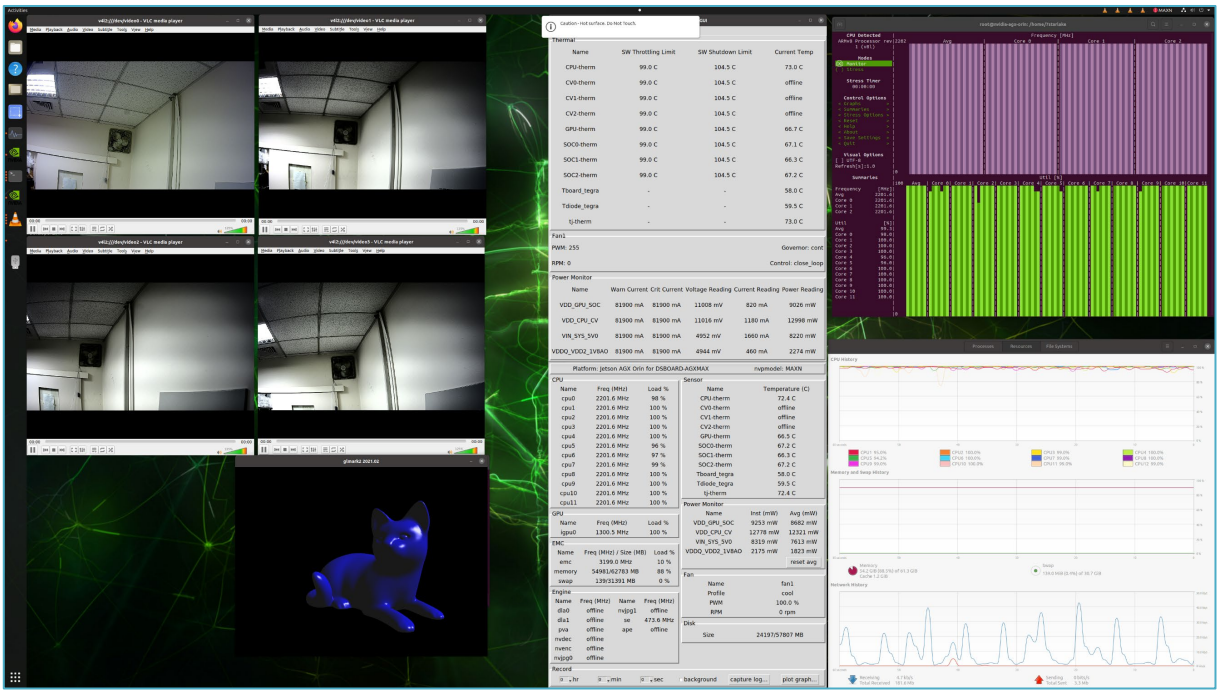
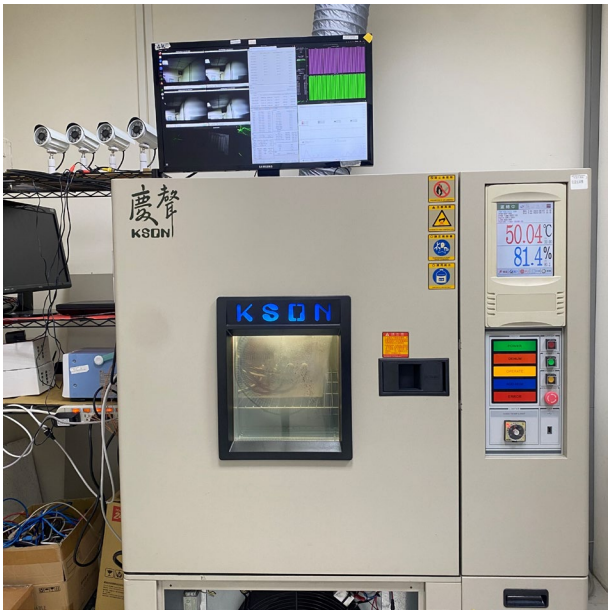
## - Chamber in 50°C




| Test Point | Ambient Temp. | 50°C |
|---|---|---|
| | CPU Tj. Temperature | 72.4 °C |
| | CPU Frequency | 2201.6 MHz |
| | GPU Tj. Temperature | 66.5 °C |
| | GPU Frequency | 1300.5 MHz |
| CH1 | CPU | 59.1 °C |
| CH2 | M.2 SSD | 56.7 °C |
| CH3 | Carrier Board Choke | 56.4 °C |
| CH4 | Carrier Board MOS-FET | 56.9 °C |
| CH5 | SDI Capture Card | 57.3 °C |
| CH6 | CPU Heat Sink | 54.1 °C |
| CH7 | Bottom of Heat Sink | 55.3 °C |



# System Test

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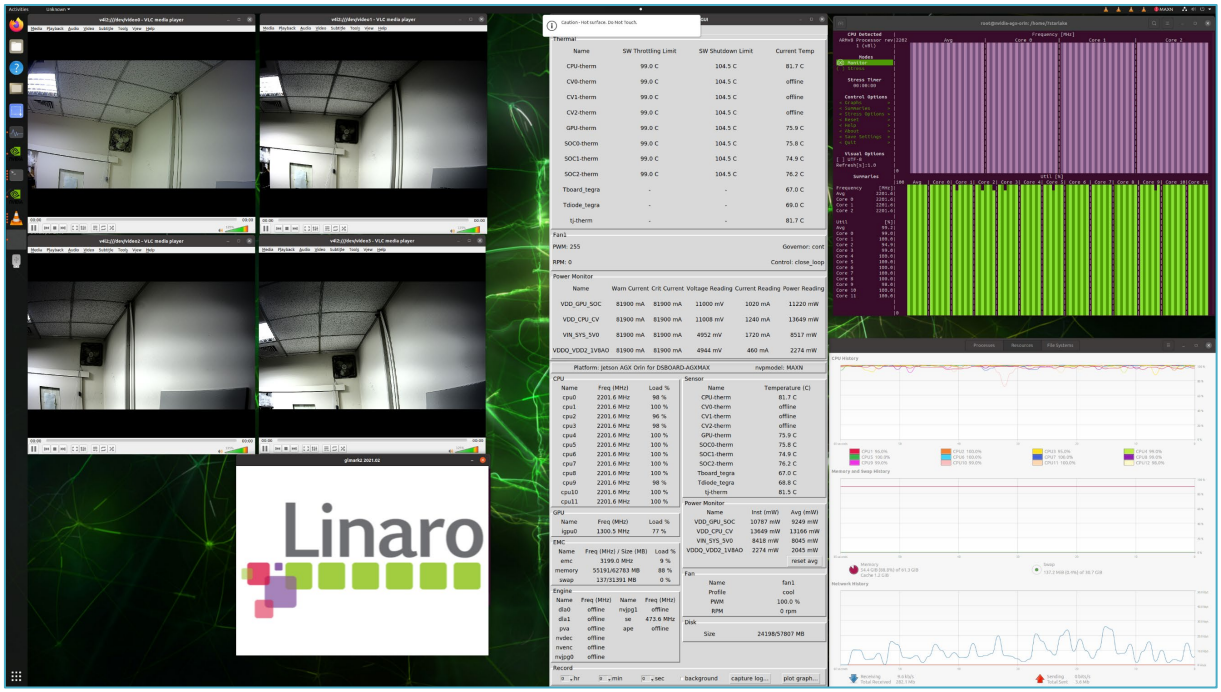
## - Chamber in 60°C





| Test Point | Ambient Temp. | 60°C |
|---|---|---|
| | CPU Tj. Temperature | 81.7 °C |
| | CPU Frequency | 2201.6 MHz |
| | GPU Tj. Temperature | 75.9 °C |
| | GPU Frequency | 1300.5 MHz |
| CH1 | CPU | 69.4 °C |
| CH2 | M.2 SSD | 66.7 °C |
| CH3 | Carrier Board Choke | 66.4 °C |
| CH4 | Carrier Board MOS-FET | 67.0 °C |
| CH5 | SDI Capture Card | 67.4 °C |
| CH6 | CPU Heat Sink | 64.3 °C |
| CH7 | Bottom of Heat Sink | 65.3 °C |

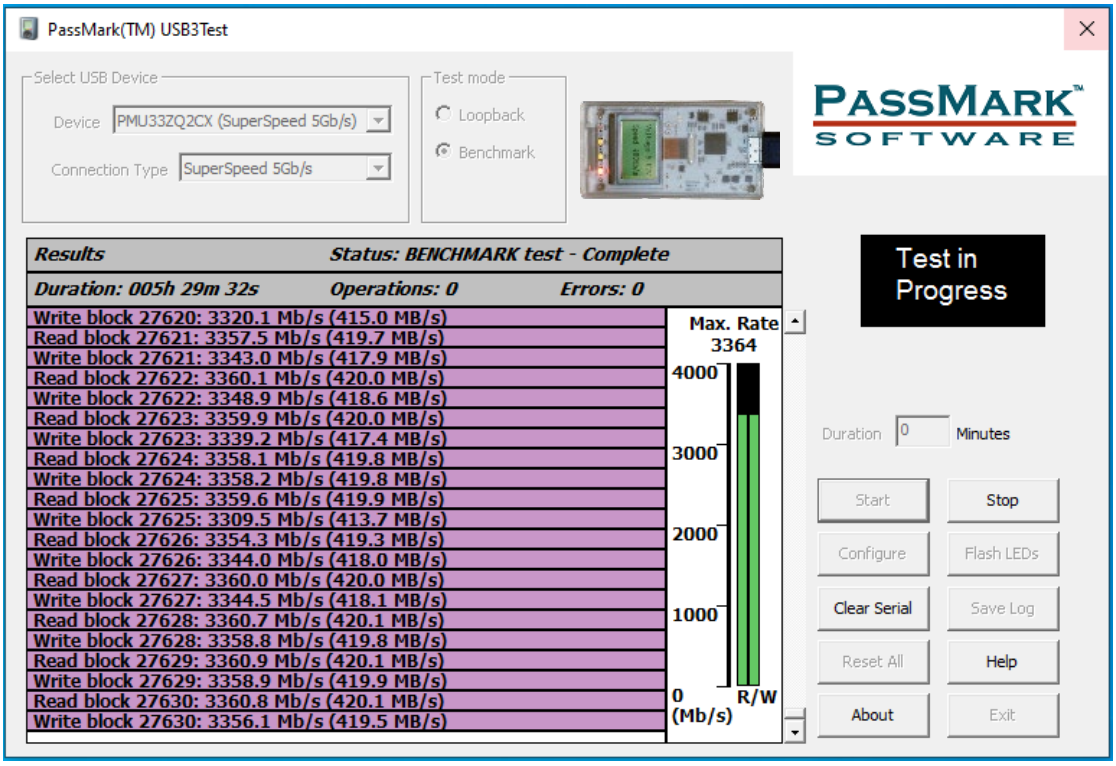
# 5. THERMAL TEST RESULT(-20˚C ~ +60˚C)

| | Core Temp / Ambient Temp / CPU Frequency | -20°C | 0°C | 25°C 80% RH | 40°C 80% RH | 50°C 80% RH | 60°C 80% RH |
|---|---|---|---|---|---|---|---|
| | CPU Tj. Temperature | 26.1 °C | 27.1 °C | 46.0 °C | 61.5 °C | 72.4 °C | 81.7 °C |
| | CPU Frequency | 2201.6 MHz | 2201.6 MHz | 2201.6 MHz | 2201.6 MHz | 2201.6 MHz | 2201.6 MHz |
| | GPU Tj. Temperature | 19.1 °C | 19.3 °C | 40.6 °C | 55.7 °C | 66.5 °C | 75.9 °C |
| | GPU Frequency | 1300.5 MHz | 1300.5 MHz | 1300.5 MHz | 1300.5 MHz | 1300.5 MHz | 1300.5 MHz |

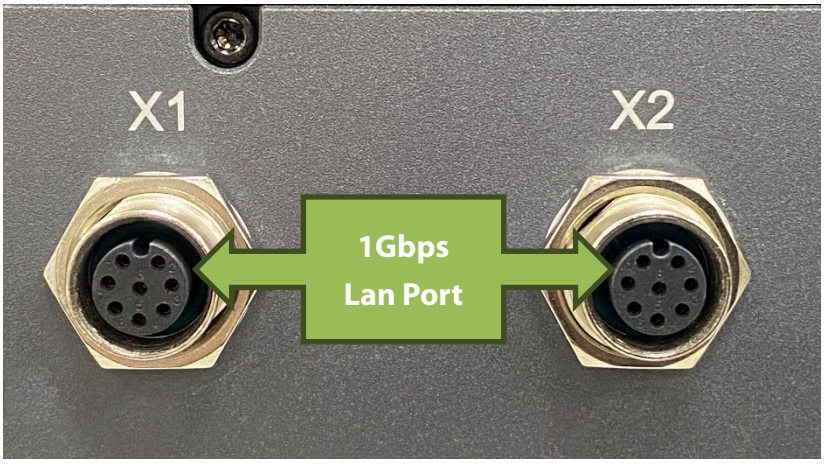
| | Measurement Point / Ambient Temp | -20°C | 0°C | 25°C 80% RH | 40°C 80% RH | 50°C 80% RH | 60°C 80% RH |
|---|---|---|---|---|---|---|---|
| CH1 | CPU | -7.3 °C | 9.1 °C | 33.5 °C | 49.0 °C | 59.1 °C | 69.4 °C |
| CH2 | M.2 SSD | -13.7 °C | 6.1 °C | 31.1 °C | 46.5 °C | 56.7 °C | 66.7 °C |
| CH3 | Carrier Board Choke | -14.0 °C | 5.8 °C | 31.0 °C | 46.2 °C | 56.4 °C | 66.4 °C |
| CH4 | Carrier Board MOS-FET | -13.3 °C | 6.1 °C | 31.4 °C | 46.7 °C | 56.9 °C | 67.0 °C |
| CH5 | SDI Capture Card | -12.6 °C | 6.3 °C | 31.7 °C | 47.0 °C | 57.3 °C | 67.4 °C |
| CH6 | CPU Heat Sink | -16.2 °C | 3.6 °C | 28.8 °C | 44.1 °C | 54.1 °C | 64.3 °C |
| CH7 | Bottom of Heat Sink | -14.6 °C | 4.8 °C | 30.0 °C | 45.2 °C | 55.3 °C | 65.3 °C |

# 6. I/O FUNCTION TEST

## 6-1. USB 3.2

## 6-2. LAN Port (1Gbps)




LAN Speed Test

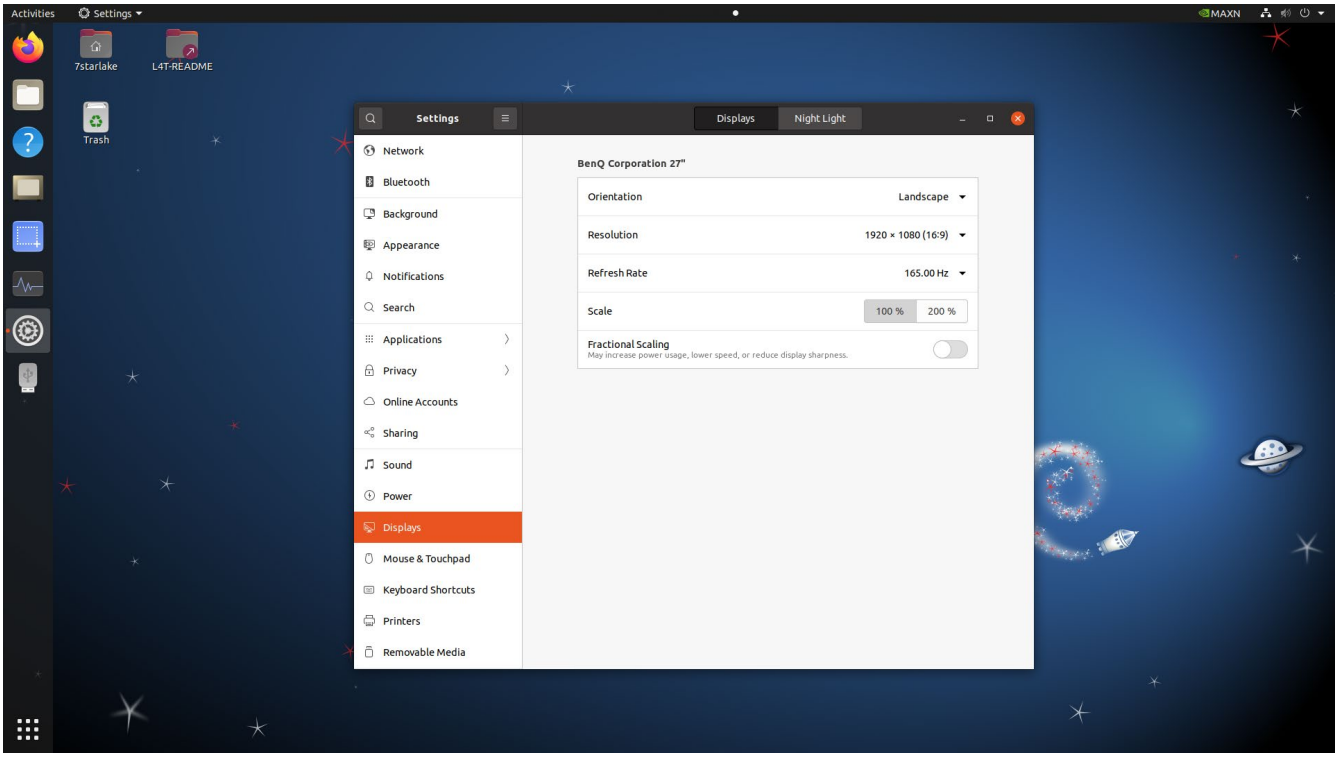
```
root@nvidia-agx-or…  …e/7starlake
[ 5] 70296.00-70297.00 sec  4.50 GBytes  38.6 Gbits/sec    0   3.12 MBytes
[ 5] 70297.00-70298.00 sec  4.47 GBytes  38.4 Gbits/sec    0   3.12 MBytes
[ 5] 70298.00-70299.00 sec  4.44 GBytes  38.1 Gbits/sec    0   3.12 MBytes
[ 5] 70299.00-70300.00 sec  4.55 GBytes  39.1 Gbits/sec    0   3.12 MBytes
[ 5] 70300.00-70301.00 sec  4.59 GBytes  39.5 Gbits/sec    0   3.12 MBytes
[ 5] 70301.00-70302.00 sec  4.45 GBytes  38.2 Gbits/sec    0   3.12 MBytes
[ 5] 70302.00-70303.00 sec  4.42 GBytes  38.0 Gbits/sec    0   3.12 MBytes
[ 5] 70303.00-70304.00 sec  4.53 GBytes  38.9 Gbits/sec    0   3.12 MBytes
[ 5] 70304.00-70305.00 sec  4.53 GBytes  38.9 Gbits/sec    0   3.12 MBytes
[ 5] 70305.00-70306.00 sec  4.49 GBytes  38.6 Gbits/sec    0   3.12 MBytes
[ 5] 70306.00-70307.00 sec  4.53 GBytes  38.9 Gbits/sec    0   3.12 MBytes
[ 5] 70307.00-70308.00 sec  4.14 GBytes  35.5 Gbits/sec    0   3.12 MBytes
[ 5] 70308.00-70309.00 sec  4.49 GBytes  38.6 Gbits/sec    0   3.12 MBytes
[ 5] 70309.00-70310.00 sec  4.50 GBytes  38.6 Gbits/sec    0   3.12 MBytes
[ 5] 70310.00-70311.00 sec  4.49 GBytes  38.6 Gbits/sec    0   3.12 MBytes
[ 5] 70311.00-70312.00 sec  4.50 GBytes  38.7 Gbits/sec    0   3.12 MBytes
[ 5] 70312.00-70313.00 sec  4.50 GBytes  38.7 Gbits/sec    0   3.12 MBytes
[ 5] 70313.00-70314.00 sec  4.35 GBytes  37.4 Gbits/sec    0   3.12 MBytes
[ 5] 70314.00-70315.00 sec  4.37 GBytes  37.6 Gbits/sec    0   3.12 MBytes
[ 5] 70315.00-70316.00 sec  4.34 GBytes  37.3 Gbits/sec    0   3.12 MBytes
[ 5] 70316.00-70317.00 sec  4.51 GBytes  38.7 Gbits/sec    0   3.12 MBytes
[ 5] 70317.00-70318.00 sec  4.45 GBytes  38.2 Gbits/sec    0   3.12 MBytes
[ 5] 70318.00-70319.00 sec  4.47 GBytes  38.4 Gbits/sec    0   3.12 MBytes
[ 5] 70319.00-70320.00 sec  4.46 GBytes  38.3 Gbits/sec    0   3.12 MBytes
[ 5] 70320.00-70321.00 sec  4.51 GBytes  38.8 Gbits/sec    0   3.12 MBytes
[ 5] 70321.00-70322.00 sec  4.44 GBytes  38.1 Gbits/sec    0   3.12 MBytes
[ 5] 70322.00-70323.00 sec  4.52 GBytes  38.8 Gbits/sec    0   3.12 MBytes
[ 5] 70323.00-70324.00 sec  4.48 GBytes  38.5 Gbits/sec    0   3.12 MBytes
[ 5] 70324.00-70325.00 sec  4.58 GBytes  39.4 Gbits/sec    0   3.12 MBytes
[ 5] 70325.00-70326.00 sec  4.53 GBytes  38.9 Gbits/sec    0   3.12 MBytes
[ 5] 70326.00-70327.00 sec  4.47 GBytes  38.4 Gbits/sec    0   3.12 MBytes
[ 5] 70327.00-70328.00 sec  4.51 GBytes  38.7 Gbits/sec    0   3.12 MBytes
[ 5] 70328.00-70329.00 sec  4.52 GBytes  38.8 Gbits/sec    0   3.12 MBytes
[ 5] 70329.00-70330.00 sec  4.46 GBytes  38.3 Gbits/sec    0   3.12 MBytes
[ 5] 70330.00-70331.00 sec  4.53 GBytes  38.9 Gbits/sec    0   3.12 MBytes
[ 5] 70331.00-70332.00 sec  4.51 GBytes  38.7 Gbits/sec    0   3.12 MBytes
[ 5] 70332.00-70333.00 sec  4.50 GBytes  38.7 Gbits/sec    0   3.12 MBytes
[ 5] 70333.00-70334.00 sec  4.53 GBytes  38.9 Gbits/sec    0   3.12 MBytes
[ 5] 70334.00-70335.00 sec  4.52 GBytes  38.8 Gbits/sec    0   3.12 MBytes
[ 5] 70335.00-70336.00 sec  4.52 GBytes  38.8 Gbits/sec    0   3.12 MBytes
[ 5] 70336.00-70337.00 sec  4.53 GBytes  38.9 Gbits/sec    0   3.12 MBytes
[ 5] 70337.00-70338.00 sec  4.59 GBytes  39.5 Gbits/sec    0   3.12 MBytes
[ 5] 70338.00-70339.00 sec  4.47 GBytes  38.4 Gbits/sec    0   3.12 MBytes
[ 5] 70339.00-70340.00 sec  4.14 GBytes  35.5 Gbits/sec    0   3.12 MBytes
[ 5] 70340.00-70341.00 sec  4.39 GBytes  37.7 Gbits/sec    0   3.12 MBytes
[ 5] 70341.00-70342.00 sec  4.51 GBytes  38.8 Gbits/sec    0   3.12 MBytes
[ 5] 70342.00-70343.00 sec  4.48 GBytes  38.5 Gbits/sec    0   3.12 MBytes
[ 5] 70343.00-70344.00 sec  4.44 GBytes  38.1 Gbits/sec    0   3.12 MBytes
[ 5] 70344.00-70345.00 sec  4.49 GBytes  38.6 Gbits/sec    0   3.12 MBytes
[ 5] 70345.00-70346.00 sec  4.33 GBytes  37.2 Gbits/sec    0   3.12 MBytes
[ 5] 70346.00-70347.00 sec  4.40 GBytes  37.8 Gbits/sec    0   3.12 MBytes
[ 5] 70347.00-70348.00 sec  4.49 GBytes  38.6 Gbits/sec    0   3.12 MBytes
[ 5] 70348.00-70349.00 sec  4.57 GBytes  39.2 Gbits/sec    0   3.12 MBytes
[ 5] 70349.00-70350.00 sec  4.47 GBytes  38.4 Gbits/sec    0   3.12 MBytes
```

Data Packet Loss Check

```
root@nvidia-agx-orin: /home/…ake/Documents
2024-06-13 12:06:15
    tx_dma_out_of_sync: 0
2024-06-13 12:16:15
    tx_dma_out_of_sync: 0
2024-06-13 12:26:15
    tx_dma_out_of_sync: 0
2024-06-13 12:36:15
    tx_dma_out_of_sync: 0
2024-06-13 12:46:15
    tx_dma_out_of_sync: 0
2024-06-13 12:56:15
    tx_dma_out_of_sync: 0
2024-06-13 13:06:15
    tx_dma_out_of_sync: 0
2024-06-13 13:16:15
    tx_dma_out_of_sync: 0
2024-06-13 13:26:15
    tx_dma_out_of_sync: 0
2024-06-13 13:36:15
    tx_dma_out_of_sync: 0
2024-06-13 13:46:15
    tx_dma_out_of_sync: 0
2024-06-13 13:56:15
    tx_dma_out_of_sync: 0
2024-06-13 14:06:15
    tx_dma_out_of_sync: 0
2024-06-13 14:16:15
    tx_dma_out_of_sync: 0
2024-06-13 14:26:15
    tx_dma_out_of_sync: 0
2024-06-13 14:36:15
    tx_dma_out_of_sync: 0
2024-06-13 14:46:15
    tx_dma_out_of_sync: 0
2024-06-13 14:56:15
    tx_dma_out_of_sync: 0
```

## 6-3. HDMI Port


X4
GTC


Activities
Settings
7starlake
L4T-README
Trash
Settings
Displays
Night Light
Network
Bluetooth
Background
Appearance
Notifications
Search
Applications
Privacy
Online Accounts
Sharing
Sound
Power
Displays
Mouse & Touchpad
Keyboard Shortcuts
Printers
Removable Media
BenQ Corporation 27"
Orientation
Landscape
Resolution
1920 × 1080 (16:9)
Refresh Rate
165.00 Hz
Scale
100 %
200 %
Fractional Scaling
May increase power usage, lower speed, or reduce display sharpness.

## 6-4. SDI Port

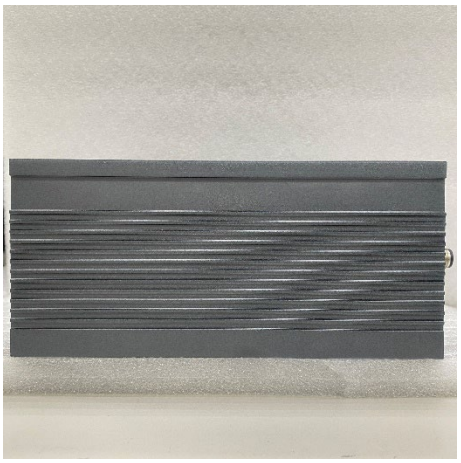
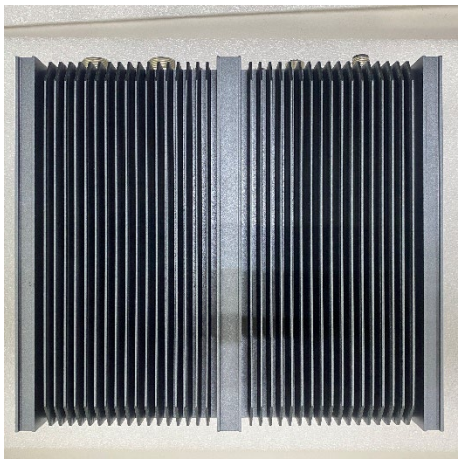

3G-SDI


Media Playback Audio Video Subtitle Tools View Help
v4l2:///dev/video2 - VLC media player
v4l2:///dev/video3 - VLC media player
00:00
00:00

# 7. COSMETIC INSPECTION

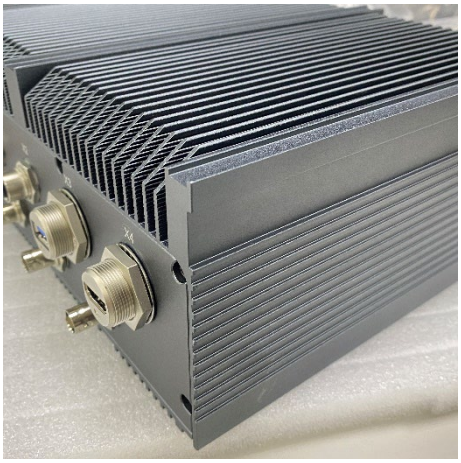
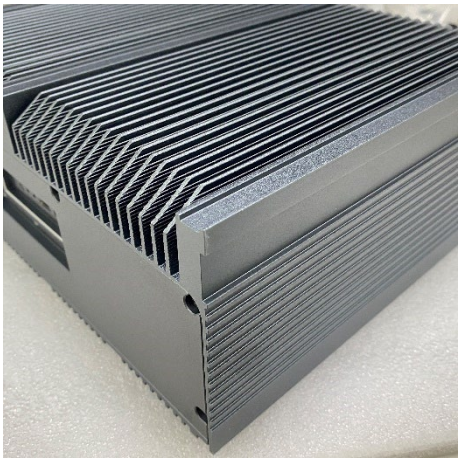
| No. | Result | | | Inspection items | Remark |
|---|---|---|---|---|---|
| | OK | NG | NA | | |
| 1 | ✔ | | | Whether there are Scratch mark on the appearance? | |
| 2 | ✔ | | | Whether the cutting edge is oxidized in appearance? | |
| 3 | ✔ | | | Whether there are impact scars on the appearance? | |
| 4 | ✔ | | | Whether there is any burr on the exterior? | |
| 5 | ✔ | | | Whether there is a deformation in the appearance? | |
| 6 | ✔ | | | Is there any dirt or glue residue on the outside? | |
| 7 | ✔ | | | Is the baking paint peeling or spilled on the appearance? | |
| 8 | ✔ | | | Is the version of the nameplate correct and not skewed or warped? | |
| 9 | ✔ | | | Is the serial number version sticker affixed and is the version correct? | |
| 10 | ✔ | | | HDD CAGE/TRAY trial installation and actual configuration to confirm whether there is interference? | |

## Cosmetic Inspection Photo

| FRONT SIDE | BACK SIDE |
|---|---|
|  |  |
| **LEFT SIDE** | **RIGHT SIDE** |
|  |  |
| **TOP SIDE** | **BOTTOM SIDE** |
|  |  |

# System Test

AV710-X4

| FRONT LEFT CORNER | FRONT RIGHT CORNER |
| --- | --- |
|  |  |
| **BACK LEFT CORNER** | **BACK RIGHT CORNER** |
|  |  |

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