Metis Functional Test Guide

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Document revision history

Revision	Date	Description
1 – PRELIMINARY	2025-12-12	Initial issue.

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1 Functional Verification Test Plan

1.1 Purpose

This guide walks customers through essential checks to verify that the Axelera device and Voyager SDK are installed, enumerated, linked, and functioning correctly. Each test includes the exact commands to run, what success looks like, and the severity if the test fails.

1.2 Audience

Customers and field engineers validating a fresh install or troubleshooting performance and functionality.

1.3 Prerequisites

- Hardware: Axelera PCIe device correctly installed and powered.
- OS/Access: Linux shell access with sudo privileges.
- Software: Voyager SDK installed; Voyager SDK environment activated.
- Network: Internet access for model download (Test 5).

1.4 Severity Definitions

- **BLOCKING**: Customer cannot proceed; device or SDK unusable until resolved.
- **NOT BLOCKING**: Customer can proceed, but may experience degraded performance or limited functionality.

2 Tests

#	Test Name	Pass Criteria	Severity
1	Device enumeration	Axelera / vendor 1f9d, device 1100 appears in lspci	BLOCKING if missing
2	PCIe link speed	Link up; GEN3 (8.0 GT/s) preferred; lane width matches hardware	NOT BLOCKING
3	SDK device status & firmware upload	axdevice -v completes without errors	BLOCKING if errors
4	Device test (Triton)	All tests PASSED	BLOCKING if any fail
5	Inference test	Model downloads and runs without errors	BLOCKING if errors

2.1 Test 1 - Check Device Enumeration

What this verifies: The OS sees the PCIe device.

Command

```
lspci -tv
```

Expected Output:

```
(venv) ubuntu@dellxe5-flr:~/voyager-sdk/internal_tools$ lspci -tv
-+-[0000:00]-+-00.0  Intel Corporation Device 7d1b
 |           +-02.0  Intel Corporation Arrow Lake-S [Intel Graphics]
 |           +-04.0  Intel Corporation Device ad03
 |           +-06.0-[01]----00.0  Axelera AI Metis AIPU (rev 02)
 |           +-08.0  Intel Corporation Arrow Lake-HX Gauss Newton Algorithm (GNA)
```

Device "Axelera" OR vendor/device IDs 1f9d:1100 are listed in the PCI topology.

Pass/Fail

- PASS: Axelera / 1f9d:1100 listed.
- FAIL (BLOCKING): Not present → cannot proceed.

> **TIP:**
>
> If missing, check physical seating, power, BIOS/UEFI PCIe settings, and kernel logs:
>
> ```
> dmesg | grep -i pci
> ```
>
> ```
> sudo lspci -vv
> ```

2.2 Test 2 - Check PCIe Link Speed

What this verifies: The negotiated PCIe generation and lane width (performance).

Commands

1. Get device address

```
lspci -n | grep 1f9d | cut -d " " -f 1
```

2. Inspect link details (use address from above)

```
sudo lspci -s <DEV_ADDR> -vvv | egrep "0[0-9]:|Width\ "
```

3. Alternative (often clearer)

```
sudo lspci -s <DEV_ADDR> -vvv | egrep "LnkCap|LnkSta|Speed|Width"
```

Expected Output:

```
(venv) ubuntu@dellxe5-flr:~/voyager-sdk/internal_tools$ lspci -n|grep 1f9d |cut -d ' ' -f 1
0000:01:00.0
(venv) ubuntu@dellxe5-flr:~/voyager-sdk/internal_tools$ sudo lspci -s 0000:01:00.0 -vvv | egrep '0[0-9]:|Width\ '
[sudo] password for ubuntu:
0000:01:00.0 Processing accelerators: Axelera AI Metis AIPU (rev 02)
                LnkCap: Port #0, Speed 8GT/s, Width x4, ASPM L0s L1, Exit Latency L0s <4us, L1 <16us
                LnkSta: Speed 8GT/s, Width x4
(venv) ubuntu@dellxe5-flr:~/voyager-sdk/internal_tools$
```

Link Speed shows GEN3 (~8.0 GT/s) as preferred for full performance; lane width (e.g., x4) matches your hardware spec.

Pass/Fail

- PASS (NOT BLOCKING): Any link up; GEN3 is recommended for full performance.
- FAIL: Link down or abnormally narrow width → performance issues; proceed with caution.

> **TIP:**
>
> Lower speeds (e.g., GEN2) will work but may degrade performance.
>
> If link is down: reseat device, check BIOS PCIe generation settings, power cables, and try a different slot.

2.3 Test 3 - Check Device Status & Firmware Upload (Voyager SDK)

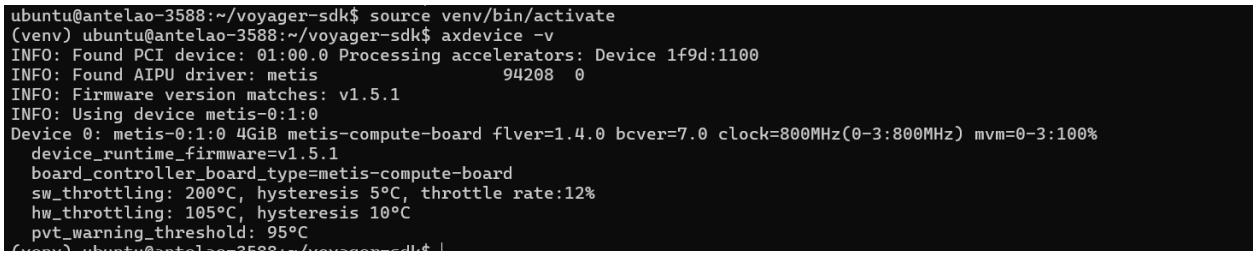
What this verifies: SDK can see and initialize the device; firmware upload is successful.

Run inside the Voyager SDK with the environment activated.

Command

```
axdevice -v
```

Expected Output:



No error messages. Device detection and firmware load steps report success.

Pass/Fail

- PASS: No errors; device status OK; firmware load successful.
- FAIL (BLOCKING): Any error reported → cannot proceed; collect logs.

> **TIP:**
>
> If errors occur, capture full console output and SDK logs, then retry after reboot.

2.4 Test 4 - Test Device (Triton)

What this verifies: End-to-end functional health in SDK's test suite.

Run inside the Voyager SDK with the environment activated.

Command

```
test-triton.sh
```

Expected Output:

All tests PASSED.

Pass/Fail

- PASS: All PASSED.
- FAIL (BLOCKING): Any failure indicates device or stack malfunction.

> **TIP:**
>
> `test-triton.sh | tee triton-test.log`

2.5 Test 5 - Test Inference

What this verifies: Model download, deployment, and inference pipeline work without errors.

Run inside the Voyager SDK with the environment activated.

Commands

1. Download a prebuilt model

```
axdownloadmodel yolov5m-v7-coco-onnx
```

2. Run the model (adjust path if your SDK install differs)

```
axrunmodel /home/ubuntu/voyager-sdk/build/yolov5m-v7-coco-
onnx/yolov5m-v7-coco-onnx/1/model.json
```

Expected Output:

No errors during inference. (Optional) Inference timing/throughput printed by the tool.

Pass/Fail

- PASS: No errors.
- FAIL (BLOCKING): Any error → cannot use Voyager SDK; capture logs.

> **TIP:**
>
> `find ~/voyager-sdk -name model.json`

3 Quick-Run (All Steps)

1. Enumerate device

```
lspci -tv
```

2. Link speed (auto-capture device address)

```
DEV_ADDR=$(lspci -n | grep 1f9d | awk '{print $1}')
sudo lspci -s "$DEV_ADDR" -vvv | egrep "LnkCap|LnkSta|Speed|Width"
```

3. SDK device status & firmware

```
axdevice -v
```

4. Triton device test

```
test-triton.sh | tee triton-test.log
```

5. Inference test (download + run)

```
axdownloadmodel yolov5m-v7-coco-onnx
axrunmodel /home/ubuntu/voyager-sdk/build/yolov5m-v7-coco-
onnx/yolov5m-v7-coco-onnx/1/model.json
```

4 Support

For further information and support please visit:

- **Axelera AI Community**: https://community.axelera.ai/
- **Axelera AI Customer Portal**: https://support.axelera.ai

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