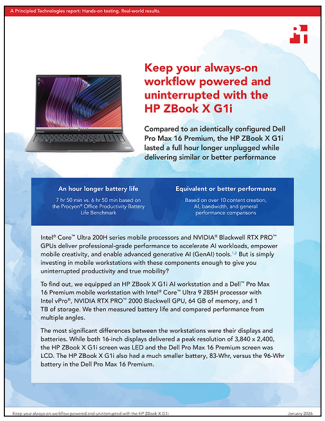

The science behind the report:

Keep your always-on workflow powered and uninterrupted with the HP ZBook X G1i

This document describes what we tested, how we tested, and what we found. To learn how these facts translate into real-world benefits, read the report Keep your always-on workflow powered and uninterrupted with the HP ZBook X G1i.

We concluded our hands-on testing on October 15, 2025. During testing, we determined the appropriate hardware and software configurations and applied updates as they became available. The results in this report reflect configurations that we finalized on August 21, 2025 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

Our results

To learn more about how we have calculated the wins in this report, go to http://facts.pt/calculating-and-highlighting-wins. Unless we state otherwise, we have followed the rules and principles we outline in that document.

Table 1: Median results of our testing. Higher battery life, bandwidth, and benchmark scores are better. Lower task completion times are better.

Test / Subtest	HP ZBook X G1i	Dell™ Pro Max 16 Premium
Procyon® Office Productivity Battery Life Benchmark (Best power efficiency mode)		
Total duration (hh:mm)	7:50	6:50
3DMark® PCI Express feature test		
Bandwidth (GB/sec)	25.15	23.14
PassMark PerformanceTest 11		
Overall rating	12,188	11,573
Cinebench 2024		
Overall score	128	123
Amuse 3.1 art generation tool		
Time to generate a high-res image (mm:ss)	18:30	19:29

Test / Subtest	HP ZBook X G1i	Dell™ Pro Max 16 Premium
PCMark 10		
Overall rating	17,287	17,104
GeekBench 6 Pro		
CPU single-core	2,935	2,852
Procyon AI Image Generation Benchmark - Stable Diffusion 1.5 (INT8)		
Overall score	14,252	13,900
Puget Bench for Adobe Photoshop		
Overall score	8,095	7,962
Chaos V-Ray CPU		
Overall score	19,598	19,565
Revit 2024 RFO Benchmark		
Model creation (sec)	153.30	153.87
Export all views as PNGs at 300 dpi (sec)	622.39	627.78
Export all views as DWFs (sec)	386.39	389.78
Export all views as DWGs (sec)	2,557.09	2,606.61
Create PDF all views as vector (sec)	1,482.92	1,501.71
SPECapc™ for Solidworks 2024		
CPU composite score	2.48	2.45
GPU composite score	4.55	4.47
SPECapc for Creo 9		
CPU composite score	2.59	2.58
GPU composite score	2.47	2.47

System configuration information

Table 2: Detailed information on the systems we tested.

System configuration information	HP ZBook X G1i	Dell Pro Max 16 Premium
Processor		
Vendor	Intel®	Intel®
Model number	Core™ Ultra 9 285H, vPro® Enterprise	Core™ Ultra 9 285H, vPro® Enterprise
Core frequency (GHz)	2.9 – 5.4	2.9 – 5.4
Number of cores	16	16
Number of threads	16	16
Cache (MB)	24	24
AI Engine capabilities (overall TOPS)	Up to 99	Up to 99
AI Engine capabilities (NPU TOP)S	Up to 13	Up to 13
Memory		
Amount (GB)	64 (2 x 32)	64 (2 x 32)
Type	DDR5 SODIMM	LPDDR5x
Speed (MT/s)	5,600	8,400
Graphics		
Vendor	NVIDIA®	NVIDIA®
Model number	RTX PRO™ 2000 Blackwell Generation Laptop GPU	RTX PRO™ 2000 Blackwell Generation Laptop GPU
Driver	NVIDIA v32.0.15.7344	NVIDIA v32.0.15.7351
Storage		
Amount (TB)	1	1
Type	NVMe® PCIe Gen 4 x4	NVMe PCIe Gen 4 x4
Connectivity/expansion		
Wireless internet	Intel® AX211 Wi-Fi 6E	Intel® Wi-Fi 7 BE201
Bluetooth	5.3	5.4
USB	2 x Thunderbolt™ 4 with USB Type-C® 40Gbps 2 x USB Type-A 5Gbps	2xThunderbolt 5 with USB Type-C 80/120Gbps 1xThunderbolt 4 with USB Type-C 40Gbps
Video	1 x HDMI® 2.1	1 x HDMI 2.1
Battery		
Type	Lithium-polymer	Lithium-polymer
Rated capacity (Wh)	83	96

System configuration information	HP ZBook X G1i	Dell Pro Max 16 Premium
Display		
Size (in.)	16	16
Resolution	1,920 x 1,200	1,920 x 1,200
Touchscreen	No	No
Operating system		
Vendor	Microsoft	Microsoft
Name	Windows 11 Pro	Windows 11 Pro
Build number or version	24H2 Build 26100.4946	24H2 Build 26100.4946
BIOS		
BIOS name and version	HP X97 v01.02.04 06/20/2025	Dell v1.2.0 06/24/2025
Dimensions		
Height (in.)	0.9	0.82 – 0.87
Width (in.)	14.15	13.39
Depth (in.)	9.88	9.46
Weight (lbs)	4.5	4.82

How we tested

Setting up the systems

Setting up and updating the OEM image

1. Boot the system.
2. Follow the on-screen instructions to complete installation, using the default selections when appropriate.
3. Set the Windows (plugged in) Power Mode to Best Performance.
4. Set Screen and Sleep options to Never:
    a. Right-click the desktop, and select Display settings.
    b. From the left column, select System.
    c. Click Power & Battery.
    d. For all power options listed under Screen and Sleep, select Never.
5. Disable User Account Control notifications:
    a. Select Windows Start, type `UAC` and press the Enter key.
    b. Move the slider control to Never notify, and click OK.
6. Run Windows Update, and install all updates available.
7. Run the HP/Dell/Lenovo Support Assistant utilities, and install all recommended BIOS and driver updates available.
8. Verify the date and time are correct and synchronize the system clock with the time server.
9. Pause Automatic Windows Updates:
    a. Click the Windows Start button.
    b. Type `Windows Update settings` and press the Enter key.
    c. From the Pause updates drop-down menu, select Pause for 5 weeks.

Capturing an image

1. Connect an external HDD to the system.
2. Click the Windows Menu button, and type `Control Panel` in the search bar. Click Control Pane l → System and Security → Backup and Restore (Windows 7) → Create a system image.
3. Verify that the external HDD is selected as the save drive, and click Next.
4. Verify that all drives are selected to back up, and click Next.
5. Click Start backup.
6. When you see the prompt to create a system repair disc, select No, and close the dialogs.

Restoring an image

1. Connect an external HDD to the system.
2. Press and hold the Shift key while restarting the system.
3. Select Troubleshoot.
4. Select Advanced options.
5. Select See more recovery options.
6. Select System image recovery.
7. Select the User account.
8. Enter the system password, and click Continue.
9. At the Restore system files and settings screen, select Next.
10. Verify that the external HDD is selected, and click Next.
11. Once the recovery has completed, click Finish.

3DMark PCI Express feature testing

Setting up the test

1. Download 3DMark from http://www.futuremark.com/benchmarks/3dmark/all.
2. To install 3DMark with the default options, double-click the 3DMark installer.exe file.
3. To launch 3DMark, double-click the 3DMark desktop icon.
4. Enter the registration code, and click Register.
5. Exit 3DMark.

Running the test

1. To launch the benchmark, double-click the 3DMark desktop icon.
2. At the 3DMark Home screen, click the More Tests button.
3. Select the PCI Express feature test.
4. Click Run.
5. When the benchmark run completes, record the results.
6. Perform steps 1 through 5 two more times for each benchmark, and report the median result of the three runs.

Amuse 3.1 testing

Setting up the test

1. Download the Amuse application from https://www.amuse-ai.com/.
2. Using all the defaults, run the installer, and install the application.

Running the test

1. Launch Amuse.
2. In the prompt, type `A cute raccoon playing guitar on the beach.`
3. Select Image, and set the following parameters:
   - Image Count = 4
   - Aspect Ratio = Landscape (v3.0.1=768 x 512). (v3.1.0=1280x768)
   - Performance slider = Quality (Note: If the system is an AMD system and supports AMD XDNA Super Resolution, allow the toggle to be enabled [default setting].)
4. Select Create new variant each generation.
5. Click Generate Images. If prompted to, download needed model files. Accept the license agreement, and click Download.
6. After the image generation has completed, record the elapsed time.
7. Wait 5 minutes, repeat steps 2 through 6 twice, and capture the median result of the three runs.

Chaos V-Ray testing

Setting up the test

1. Download the V-Ray benchmark from https://www.chaos.com/benchmark-download. We used version 6.00.01.

Running the test

1. Run V-Ray benchmark
2. Using V-Ray for CPU, run v-Ray for 5 minutes. Record the results.
3. Wait 5 minutes, then repeat step 2 twice.
4. Using V-Ray for GPU select CUDA, select only the CPU, and run the test for 5 minutes. Record the results.
5. Wait 5 minutes, then repeat step 4 twice.

Cinebench 2024 testing

Setting up the test

1. Download and install Cinebench 2024 from https://www.maxon.net/en/downloads/cinebench-2024-downloads
2. Launch Cinebench 2024.
3. Select File → Advanced benchmark.
4. From the Minimum Test Duration drop-down menu, select Off.

Running the test

1. Launch Cinebench 2024.
2. Click File, Run All tests.
3. Record the result.
4. Wait 10 minutes before re-running.
5. Repeat steps 1 through 4 two more times and record the median result of the three runs.

Geekbench 6 Pro testing

Setting up the test

1. Purchase a Pro license and download and install Geekbench 6 Pro from https://www.geekbench.com/download/.

Running the test

1. Launch Geekbench.
2. Click Run CPU or Compute Benchmark.
3. Record the result.
4. Wait 5 minutes before re-running.
5. Repeat steps 1 through 4 two more times, and record the median result of the three runs.

PassMark PerformanceTest 11 testing

Setting up the test

1. Install PassMark PerformanceTest.
2. Download PassMark PerformanceTest from https://www.passmark.com/products/performancetest/download.php.
3. To begin the installation, click Install.
4. Select Accept to accept the license agreement, and click Next.
5. After the installation is complete, deselect Launch Performance Test, and click Finish.

Running the test

1. To launch PassMark PerformanceTest, press the PassMark PerformanceTest icon.
2. To start the benchmark, click Run Benchmark.
3. When the test completes, record the results.
4. Repeat steps 1 through 3 twice, and report the median result of the three runs.

PCMark10 testing

Setting up the test

1. Download and install PCMark 10.
2. Open PCMark 10.
3. Click Options.
4. Enter the license key, and click Register.
5. Before running the benchmarks, install a licensed version of Microsoft 365 and verify that you are properly signed into the following apps: Excel, PowerPoint, and Word.

Running the test

1. Launch PCMark 10.
2. Click Benchmarks.
3. Click PCMark 10 Applications.
4. Click Run.
5. When the benchmark is complete, record the results.
6. Wait 15 minutes before rerunning the benchmark.
7. Repeat steps 2 through 6 twice, and report the median result of the three runs.

Procyon AI Image Generation Benchmark testing

Setting up the test

1. Purchase and download the Procyon AI Image Generation benchmark from https://benchmarks.ul.com/procyon.
2. Install the Procyon benchmark.
3. Double-click the installer.
4. Click Next.
5. Click to agree to the EULA, and click Next.
6. Click Next.
7. Launch Procyon.
8. Select Settings, and input the Procyon AI Image Generation license key.
9. Close Procyon.

Running the test

1. Launch Procyon.
2. Select the AI Image Generation test.
3. Choose the GPU and select the model.
4. To begin the test, click Run.
5. When the test completes, record the results, and wait 15 minutes before re-running.
6. Complete three runs of each model, and record the median results.

Procyon Battery Life Benchmark testing

Setting up the test

1. Boot the system.
2. Verify the following display and power settings:
   - Right-click the desktop, and select Display settings.
   - Uncheck the box next to Change brightness automatically when lighting changes, if available.
   - Uncheck the box next to Change brightness based on content, if available.
   - In the Scale drop-down menu, select 100%.
   - Select System from the left-hand pane.
   - Click Power & Battery.
   - For all power options listed under Screen and Sleep, select Never.
3. Download and install Procyon.
4. Open Procyon.
5. Click Battery Life Office Productivity Benchmark.
6. Click Register.
7. Enter the license key for the Office Productivity Battery Life Benchmark, and click Register.
8. Click Calibrate screen.
9. Using a nit meter, adjust the screen brightness to as close to 200 nits as possible.
10. Close Procyon.
11. Before running the benchmark, make sure to install a licensed version of Microsoft 365 and open Word, Excel, and PowerPoint applications and disable tips when possible.

Running the test

1. Boot the system.
2. Ensure the system is fully charged.
3. Go to the Windows Start Menu.
4. Type `CMD` to bring up command prompt.
5. Type `cd C:\Program Files\UL\Procyon`
6. To start the test, type `ProcyonCMD.exe -d "custom_definitions/office_productivity_mp_batterylife.def" -o "<Export_folder>/resultfilename.procyon-result"`
7. When prompted, unplug the system.
8. When the benchmark completes, plug in the system and power up the system.
9. Record the results.
10. Repeat steps 2 through 9 twice, and report the median result of the three runs.

Puget Bench for Photoshop testing

Setting up the test

1. Launch Adobe Photoshop.
2. Click through the Tutorial pop-up tips.
3. Close Adobe Photoshop.
4. Purchase a PugetBench for Creators license from https://www.pugetsystems.com/pugetbench/creators/.
5. Click the Download PugetBench for Creators for Windows or Mac.
6. After the download completes, double-click the installation file to install PugetBench.
7. Enter the license key in the license field. Click Activate.
8. Click Download Assets.

Running the test

1. Boot the system.
2. Open PugetBench for Creators.
3. Select the Photoshop test on the left side of the app.
4. Click Start Test.
5. When the benchmark finishes, record the overall score.
6. Close PugetBench for Creators, and restart the system under test.
7. Wait 30 minutes before performing the next run.
8. Repeat steps 1 through 7 twice, and record the median result of the three runs.

Revit 2024 RFO testing

Setting up the test

1. Purchase, download and install Revit 2025 from https://www.autodesk.com/products/revit/overview.
2. Launch Revit 2025, and sign in with the account information.
3. At the Tutorial screen, click Don't show this again.
4. Close Revit 2025.
5. Download the Revit 2025 RFO Benchmark Tool from https://www.revitforum.org/forum/revit-all-flavors/hardware-and-infrastructure/36875-rfo-benchmark-v3-updated-for-2025.
6. Extract the Revit 2025 RFO Benchmark Tool.

Running the test

1. Open the Extracted Revit 2025 RFO Benchmark Tool directory.
2. To launch the benchmark, click _RFO Benchmark – Full_Expanded shortcut.
3. When the benchmark finishes, record the results.
4. Wait 15 minutes before performing the next run.
5. Repeat steps 1 through 3 twice, and record the median result of the three runs.

SPECapc for Creo 9 testing

Setting up the test

1. Purchase a license for Creo 9.
2. To log into your PTC account, use the Welcome email, and designate a site administrator. (Note: For valid SPECapc for Creo 9 results to be submitted, Creo 9 v9.0.4.0 must be used for testing. Download the Win64 Creo 9.0.4.0 installer from here https://support.ptc.com/appserver/auth/it/esd/product.jsp?prodFamily=ENG.)
3. Extract the Creo 9.0.4.0 zip file.
4. Inside the extracted file, copy the install_license_server.exe onto a separate Windows system.
5. On a separate Windows system, run install_license_server.exe.
6. In the Creo Installation Assistant – Creo 9.0.4.0 Window, select Install License Server, and click Next.
7. Accept the Software License Agreement, and click Next.
8. On the License Identification screen, select Simple license entry, and click Next.
9. Next to License Generation for Server Install, expand the drop-down menu, and select Simple License entry.
10. Enter the sales order number located on your purchase order, and click Install License.
11. In the new window, log into PTC.com with your credentials.
12. Click Finish.
13. To verify that the license server is running, browse to the server IP and port 8090 or [server_ip]:8090.
14. Log in with the default credentials, admin/admin, enter a new password, and verify that the license server is running with
15. available licenses.
16. On the system under test, copy the Creo Installation folder above to the target system.
17. Run Setup.exe.
18. At the Introduction screen, click Next.
19. At the Software License Agreement screen, accept the agreement, export the agreement, and click Next.
20. Add the license server using 7788@[ip_of_license server]. Select the License server, and click Next.
21. At the Application Selection screen, accept the Defaults, and click Next.
22. At the Customize Application screen, confirm that Creo Render Studio is selected, and click Install.
23. Once the installation completes, click Finish.
24. Launch Creo Parametric, and close any prompts.
25. Download SPECapc for Creo 9 from https://gwpg.spec.org/benchmarks/benchmark/specapc-ptc-creo-9/.
26. Extract and complete the installation, using all default options.

Running the test

1. Open SPECapc for Creo 9.
2. Click Run.
3. Record the results.
4. Repeat steps 1 and 2 twice, and record the median result of the three runs.

SPECapc for Solidworks 2024 testing

Setting up the test

1. Purchase and install a full Premium license of Solidworks 2024 Premium version from https://www.solidworks.com/.
2. Go to https://gwpg.spec.org/benchmarks/benchmark/specapc-solidworks-2024/ and purchase and download the vendor license of the benchmark.
3. Click on the SPECapc_sw2024_1.13.exe to install the benchmark.
4. Set the DPI scaling to 100%
   - Right-click the desktop, and select Display settings.
   - From the Scale drop-down menu, select 100%.
5. Shut down the system.

Running the test

1. Launch the SPECapc Solidworks 2024 benchmark by clicking on the desktop icon.
2. Click Run Benchmark.
3. When the test is complete, record the results.
4. Repeat steps 1 through 3 twice, and record the median result of the three runs.

Read the report ▶

This project was commissioned by HP.

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