The science behind the report:

HP EliteBook 845 G11 Notebook PC: Empower anywhere work for high-producing teams

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 HP EliteBook 845 G11 Notebook PC: Empower anywhere work for high-producing teams.

We concluded our hands-on testing on August 28, 2024. 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 June 28, 2024 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 hands-on testing. Higher benchmark scores and longer battery life results are better.

HP EliteBook 845 G11	Dell™ Latitude™ 7450	Lenovo® ThinkPad® T14 Gen 5
Microsoft Teams real-world collaboration (h:mm)		
5:37	5:48	4:41
PassMark PerformanceTest 11.0		
7,533	4,815	4,534
MobileMark 30 battery life results in Balanced power plan mode		
DC performance		
1,455	1,259	1,094
Battery life (h:mm)		
10:26	11:10	8:53
Index		
911	843	583

HP EliteBook 845 G11	Dell™ Latitude™ 7450	Lenovo® ThinkPad® T14 Gen 5
MobileMark 30 battery life results in Best power efficiency power mode		
DC performance		
1,021	856	820
Battery life (h:mm)		
12:13	12:42	9:32
Index		
748	652	469
3DMark® Fire Strike benchmark		
6,724	4,883	5,003
3DMark Time Spy benchmark		
2,619	2,306	2,254
Cinebench 2024 benchmark CPU multi-core		
731	498	532
Procyon Photo Editing Benchmark		
5,459	4,732	4,553
Procyon Video Editing Benchmark		
6,992	5,377	6,988
Geekbench AI ONNX DirectML CPU inference score		
3,404	2,292	2,503
Geekbench AI ONNX DirectML GPU inference score		
4,662	1,749	1,745
LM Studio Llama 3 time to fist token. Time in seconds (lower is better)		
3.21	4.89	6.01
LM Studio Llama 3 token per second		
10.49	5.67	6.84
Procyon AI Computer Vision Benchmark float32 GPU scores (Windows ML GPU on AMD. Intel® OpenVINO™ GPU on Intel)		
188	149	168
Cinebench 2024 performance scores during thermal and acoustic testing		
732	593	484
External temperatures while running a sustained Cinebench 2024 workload (°F)		
Keyboard deck		
113.2	117.1	106.9
Underside of chassis		
108.9	112.1	114.8
Average dBA while running a sustained Cinebench 2024 workload		
25.3	25.5	24.6

System configuration information

Table 2: Detailed information on the systems we tested.

System configuration information	HP Elitebook 845 G11	Dell Latitude 7450	Lenovo ThinkPad T14 Gen 5
Processor			
Vendor	AMD®	Intel	Intel
Model number	Ryzen™ 7 PRO 8840U	Core™ Ultra 7 165U	Core Ultra 7 165U
Core frequency (GHz)	3.3 – 5.1	1.2 – 4.9	1.2 – 4.9
Number of cores	8	12	12
Logical Processors	16	14	14
Cache (MB)	16	12	12
Memory			
Amount (GB)	32 (2 x 16)	32 (2 x 16)	32 (2 x 16)
Type	DDR5-5600	DDR5-5600	DDR5-5600
Integrated graphics			
Vendor	AMD	Intel	Intel
Model number	Radeon™ Graphics	Intel Graphics	Intel Graphics
Storage			
Model	KIOXIA KXG80ZNV512G	SK Hynix BC901	KIOXIA KXG8AZNV512G
Amount (GB)	512	512	512
Type	PCIe Gen4 x4 NVMe M.2 2280	PCIe Gen4 x4 NVMe M.2 2280	PCIe Gen4 x4 NVMe M.2 2280
Display			
Specifications	14" WUXGA 1920 x 1200, non-touch	14" FHD 1920x1200, non-touch	14.5" WUXGA 1920 x 1200, non-touch
Connectivity/expansion			
Wired internet	N/A	N/A	Intel Ethernet Connection I219-LM
Wireless internet	MediaTek Wi-Fi 6E MT7922 (RZ616)	Intel Wi-Fi 7 BE200	Intel Wi-Fi 6E AX211
Bluetooth	5.3	5.4	5.3
# of USB Type A	2	2	2
# of USB Type C	2	2	2
Video outputs	1 x HDMI	1 x HDMI	1 x HDMI
OS			
Vendor	Microsoft	Microsoft	Microsoft
Name	Windows 11 Pro	Windows 11 Pro	Windows 11 Pro
Build number or version	10.0.22631.3737 (23H2)	10.0.22631.3737 (23H2)	10.0.22631.3737 (23H2)

System configuration information	HP Elitebook 845 G11	Dell Latitude 7450	Lenovo ThinkPad T14 Gen 5
BIOS			
BIOS name and version	HP W82 Ver. 01.01.06 (06/19/2024)	Dell Inc 1.3.0 (04/11/2024)	Lenovo N47ET17W 1.06 (05/20/2024)
Battery			
Type (Whr)	3-cell, 56	3-cell, 57	4-cell, 52.5
Dimensions			
Height (in.)	0.35 – 0.64	0.72	0.70
Width (in.)	12.42	12.32	12.44
Depth (in.)	8.83	8.77	8.81
Weight (lbs)	3.12	2.98	3.08

How we tested

Setting up the system

Setting up and updating the OEM image

1. Boot the system.
2. To complete installation, follow the on-screen instructions, 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. Under Screen and Sleep, select Never for all power options.

5. Disable User Account Control notifications:

    a. Select Windows Start, type `UAC`, and press Enter.
    b. Move the slider control to Never notify, and click OK.

6. Run Windows Update, and install all updates available.
7. Verify the date and time are correct, and synchronize the system clock with the time server.
8. Pause Automatic Windows Updates:

    a. Click the Windows Start button.
    b. Type `Windows Update settings`, and press Enter.
    c. From the Pause updates drop-down menu, select Pause for 5 weeks.

Measuring performance with benchmarks

Testing with 3DMark

Setting up the tests

1. Double-click the 3DMark-setup.exe file, and install with default options.
2. To launch 3DMark, double-click the 3DMark desktop icon.
3. Click Options, enter the registration code, and click Register.
4. Exit 3DMark.
5. Launch 3DMark, click Update, and click Install.
6. If prompted, update the DLC packages.

Running the tests

1. Boot the system.
2. Select Windows Start.
3. Type `cmd`, and press Ctrl+Shift+Enter.
4. Type `Rundll32.exe advapi32.dll,ProcessIdleTasks`. Do not interact with the system until the command completes.
5. After the command completes, wait five minutes before running the tests.
6. To launch the benchmark, double-click the 3DMark desktop icon.
7. At the top of the 3DMark home screen, click Benchmarks.
8. Select the Fire Strike benchmark.
9. To turn off the Include Demo feature, move the slider button.
10. Click Run.
11. When the benchmark run completes, record the results.
12. Wait five minutes before re-running.
13. Perform steps 7 through 12 two more times.
14. Repeat steps 1 though 13, selecting the Time Spy workload in step 8.
15. Report the median results for both workloads.

Testing with Cinebench 2024

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 multi-core test

1. Launch Cinebench 2024.
2. Next to CPU (Multi Core), click Start.
3. Record the result.
4. Wait five minutes before re-running.
5. Repeat steps 1 through 4 two more times.
6. Report the median results.

Testing with Geekbench AI

Setting up the test

1. Download and install Geekbench AI from https://www.geekbench.com/ml/download/.

Running the test

1. Launch Geekbench AI.
2. From the Inference Backend drop-down menu, choose either CPU, GPU, or Neural Engine.
3. Click Run Inference Benchmark.
4. Record the result.
5. Wait five minutes before re-running.
6. Repeat steps 1 through 5 two more times.
7. Report the median results.

Testing with LM Studio

Running the test

1. Download and install LM Studio from https://lmstudio.ai.
2. Launch LM Studio, search for lmstudio-community, and click Enter.
3. Find and download the lmstudio-community/Meta-Llama-3-8B-Instruct-GGUF model.
4. Choose the Meta-Llama-3-8B-Instruct-Q4_K_M.gguf file, and click Download.
5. Once the file has downloaded, click the AI Chat icon, and click Select a model to load.
6. Select the Meta Llama 3 Instruct model you recently downloaded.
7. Once the model loads, enter a message at the bottom of the chat window. Once the AI response is completed, token information is available at the bottom of the window.
8. Record time to first token and tokens per second metrics.
9. To run the response again, click the Eject Model at the top, and load it again by performing step 5.
10. Repeat steps 5 through 8 two more times.
11. Report the median results.

PassMark PerformanceTest 11 testing

Setting up the test

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

Running the test

1. Boot the system.
2. Select Windows Start.
3. Type `cmd`, and press Ctrl+Shift+Enter.
4. Type `Cmd.exe /c start /wait Rundll32.exe advapi32.dll,ProcessIdleTasks`. Do not interact with the system until the command completes.
5. After the command completes, wait five minutes before running the test.
6. To launch PassMark PerformanceTest, press the PassMark PerformanceTest icon.
7. To start the benchmark, press Run Benchmark.
8. When the test completes, record the results.
9. Repeat steps 6 through 8 two more times.
10. Report the median results.

Testing with Procyon AI Computer Vision Benchmark

Setting up the test

1. Purchase and download the Procyon benchmark from https://benchmarks.ul.com/procyon.
2. Install the Procyon benchmark.
3. Launch Procyon.
4. Select Settings, and input the Procyon AI Computer Vision license key.
5. Close Procyon.

Running the test

1. Launch Procyon.
2. Select the Computer Vision test.
3. For the hardware under test, select the appropriate tab.
4. If applicable, select the device and precision.
5. To begin the test, click Run.
6. When the test completes, record the results, and wait 15 minutes before re-running.
7. Repeat steps 4 through 6 two more times.
8. Report the median results.

Testing with Procyon Photo Editing Benchmark

Setting up the test

1. Download and install Procyon.
2. Open Procyon.
3. Click Photo Editing Benchmark.
4. Click Register.
5. Enter the license key for the Photo Editing Benchmark, and click Register.
6. Before running the benchmarks, install licensed versions of Adobe® Photoshop® 22.0 or higher and Adobe Lightroom® Classic 10.0 or higher.
7. Check for updates in the Adobe Creative Cloud® desktop application.

Running the test

1. Boot the system.
2. Launch Procyon.
3. Click Photo Editing Benchmark.
4. Click Run.
5. When the benchmark is complete, record the results.
6. Wait 15 minutes before re-running the benchmark.
7. Repeat steps 1 through 6 two more times.
8. Report the median results.

Testing with Procyon Video Editing Benchmark

Setting up the test

1. Download and install Procyon.
2. Open Procyon.
3. Click Video Editing Benchmark.
4. Click Register.
5. Enter the license key for the Video Editing Benchmark, and click Register.
6. Before running the benchmarks, make sure to install a licensed version of Adobe Premiere® 14.5 or higher.
7. Check for updates in the Adobe Creative Cloud desktop application.

Running the test

1. Boot the system.
2. Select Windows Start.
3. Type `cmd`, and press Ctrl+Shift+Enter.
4. Type `Cmd.exe /c start /wait Rundll32.exe advapi32.dll,ProcessIdleTasks.` Do not interact with the system until the command completes.
5. After the command completes, wait five minutes before running the test.
6. Launch Procyon with administrator privileges.
7. Click Video Editing Benchmark.
8. Enable Prefer GPU Acceleration
9. Click Run.
10. When the benchmark is complete, record the results.
11. Wait 15 minutes before re-running the benchmark.
12. Repeat steps 8 through 11 two more times.
13. Report the median results.

Testing with MobileMark 30

This test requires a lux meter.

Avoiding antivirus software conflicts

MobileMark 30 is not compatible with any virus-scanning software, so we uninstalled any such software present on the PCs before we installed the benchmark.

Avoiding pre-installed software conflicts

MobileMark 30 installs the following applications, which its test scripts employ:

Productivity

- Corel WinZip 26.0 Enterprise
- Microsoft Excel 2021 Professional Plus
- Microsoft Outlook 2021 Professional Plus
- Microsoft PowerPoint 2021 Professional Plus
- Microsoft Word 2021 Professional Plus

Creativity

- Adobe Photoshop CC

If any of these applications already exist on the system under test, they could cause problems with the benchmark due to software conflicts. To avoid any such issues, we uninstalled all conflicting pre-installed software applications—including different versions of any of the programs MobileMark 30 uses—before we installed the benchmark.

Using the MobileMark built-in configuration tool

This tool supports three levels of configuration:

1. Only makes changes that are REQUIRED for the benchmark to run.
2. Additionally, makes changes that are RECOMMENDED for repeatable results.
3. Additionally, makes OPTIONAL changes that help ensure best results.

The configuration tool makes the following configuration changes at each of the three levels:

Level 1 - Required

- Disables User Account Control (UAC)
- Set DPI Scaling to 100%
- Disables Low Battery Actions
- Disables Network Proxies
- Disables System Sleep and Hibernate
- Disables Windows Update
- Enables Windows Search
- Disables WinSAT

Level 2 - Recommended

- Create BAPCo power scheme
- Set Power Plan Type to Balanced
- Set CPU Adaptive Mode
- Disables Battery Saver Dimming
- Verifies Battery Saver Threshold
- Disables Disk Defrag
- Disables Windows Error Reporting
- Disables Windows Lock Screen
- Disables Screen Saver and Monitor Timeout
- Set Font Smoothing

Level 3 - Optional

- Disables Battery Saver
- Disables Hard Disk Timeout
- Disables System Restore
- Ignores Laptop Lid Close
- Enables Dark Mode

We chose the official BAPCo "Run Benchmark" default as outlined in the BAPCo MobileMark 30 User Guide (https://bapco.com/wp-content/uploads/2024/04/BAPCo-MobileMark30_User-Guide-v1.0.pdf), which runs the benchmark using the Required and Recommended options.

Setting up the performance-qualified battery life test

1. On the system under test, verify that the wireless adapter is disabled.
2. On the system under test, verify that the Lower screen brightness when using battery saver is turned off:

   a. Select Windows Start, type `Battery saver`, and press Enter.
   b. Next to Turns on at 20%, click the down arrow. Next to Lower screen brightness when using battery saver, toggle the button to Off.

3. On the system under test, verify that the volume is set to 50%.
4. On systems with AMD processors, disable Vari-Bright to prevent the screen from automatically dimming:

   a. Launch AMD Software.
   b. Click the Settings gear icon.
   c. Select the Display tab, and disable Vari-Bright.

5. Verify the system is no less than 250 nits.
6. On the system under test, install MobileMark 30 with the default options.

Running the performance-qualified battery life test

1. Boot the system.
2. Select Windows Start.
3. Type `cmd`, and press Ctrl+Shift+Enter.
4. Type `Cmd.exe /c start /wait Rundll32.exe advapi32.dll,ProcessIdleTasks`. Do not interact with the system until the command completes.
5. After the command completes, wait five minutes before running the test.
6. Launch MobileMark 30.
7. Click Run Benchmark.
8. Click the Brightness Profiler button.
9. Allow the white screen to warm up for 30 minutes. After 30 minutes, click Skip.
10. At the Panel Dark Luminance pop-up, to use the value that is queried from the display, select Yes.
11. Place the nit meter in the outlined spot on the screen.
12. On the system under test, toggle the F1 button to turn off the test overlay.
13. On the system under test, adjust the slider until the system meets the desired nits value.
14. Click Done, and click Continue.
15. The test will begin immediately. When prompted, unplug the AC power adapter.

The benchmark is complete when the notebook PC has fully depleted its battery and is no longer operational when running on battery power.

We executed the MobileMark 30 benchmark three times on the system and took the median battery life score run as the representative performance score result for that test.

Testing collaboration performance with Microsoft Teams

This test requires the following:

- Nine non-testing systems as permanent meeting attendees; one of these with a licensed account to host
- Microsoft Teams
- PT Internal battery life logger

Setting up the test

1. Boot the systems under test.
2. Verify the following display and power settings:
   a. Right-click the desktop, and select Display settings.
   b. Uncheck the box next to Change brightness automatically when lighting changes, if available.
   c. Uncheck the box next to Change brightness based on content, if available.
   d. In the Scale drop-down menu, select 100%.
   e. From the left-hand pane, select System.
   f. Click Power & Battery.
   g. For all power options listed under Screen and Sleep, select Never.
   h. Set Power mode while unplugged to the desired setting.
   i. To bring up a white screen, open a web browser, and type `about:blank` into the address bar.
3. Unplug the system.
4. Using a nit meter, adjust the screen brightness to as close to 250 nits as possible.
5. Plug in the system.
6. Open Settings, and click Bluetooth & Devices.
7. Click Cameras, and select the built-in connected camera.
8. Under Windows Studio Effects, turn on all settings.
9. To each system under test, copy the battery life logger.
10. Open PowerShell as administrator, and run `Set-ExecutionPolicy Unrestricted`.
11. On one of the non-testing systems, launch Teams, and log into a licensed Microsoft account.
12. In the left-hand pane, click Calendar
13. Click Meet Now, and click Start Meeting.
14. Ensure the camera is turned on, and click Join now.
15. In the top toolbar, click More, and click Meeting Info.

16. Note the meeting ID and passcode.
17. On the remaining eight non-testing systems, launch Teams, and click Join a meeting.
18. Enter the meeting ID and passcode, and click Join meeting.
19. Ensure the camera is turned on, and click Join now.

Running the test

1. Verify that the system's battery is fully charged.
2. Launch Teams, and click Join a meeting.
3. Enter the meeting ID and passcode, and click Join meeting.
4. Ensure the camera and audio are turned on, and click Join now.
5. In the top toolbar, click View.
6. Ensure Gallery View is selected, and set the Max Gallery Size to 9 people.
7. Open PowerShell as administrator, and navigate to the directory containing the battery life logger script.
8. To run the script, type `.\<battery_script_name>.ps1`, and click Enter.
9. When prompted, unplug the system, and switch back to the Teams meeting.
10. When the system has shut down, plug in the system, and start it.
11. In Explorer, navigate to C:\ProgramData\ptbat\.
12. Open the folder corresponding with the date and time of the test, and record the results from batresults_minutes.txt.
13. Repeat steps 1 though 12 two more times.
14. Report the median results.

Measuring acoustics while running Cinebench 2024

These tests require the following items:

- Extech SDL600 Sound Level Meter/Datalogger with SD card
- Cinebench 2024

Setting up the test

1. Place the system under test in a sound-proofed professional sound booth.
2. Set the Extech SDL600 on a tripod so that it is 2 feet in front of and 1 foot above the system under test.
3. Download and install Cinebench 2024 from https://www.maxon.net/en/downloads/cinebench-2024-downloads.
4. Launch Cinebench 2024.
5. Select File→Advanced benchmark.
6. Select File→Preferences, change the Custom Minimum Test Duration to 30 minutes, and click OK.
7. Exit Cinebench.

Running the test

1. Launch Cinebench 2024.
2. In the Minimum Test Duration field, select Custom (30 minutes).
3. Simultaneously start the Extech SDL600 Sound Level Meter/Datalogger and click the Cinebench 2024 CPU (Multi Core) Start button.
4. At the end of the 30-minute Cinebench 2024 run, stop the Extech SDL600, and record the average sound level (dB) while running Cinebench 2024.
5. Shut down the system for 40 minutes, and let it return to room temperature.
6. Repeat steps 1 through 5 two more times.
7. Report the median results.

Measuring thermals while running Cinebench 2024

These tests require the following:

- A FLIR E6xt Infrared Camera
- Cinebench 2024

Running the test

1. Boot the system.
2. Select Windows Start.
3. Type `cmd`, and press Ctrl+Shift+Enter.
4. Type `Rundll32.exe advapi32.dll,ProcessIdleTasks`. Do not interact with the system until the command completes.
5. After the command completes, wait five minutes before running the test.
6. Launch Cinebench 2024.
7. Select File | Advanced benchmark.
8. Verify that the Minimum Test Duration is set to the default 10 minutes (Test Throttling).
9. Select CPU (Multi Core), and click Start.
10. Record the performance results for the next five back-to-back 10-minute iterations, and at the end of each run, note the ambient room temperature and take a skin temperature photo with the FLIR E6xt Infrared Camera of the top and bottom, and report the hottest spots.
11. Shut down the system for 40 minutes, and let it return to room temperature.
12. Repeat steps 1 through 11 two more times.
13. Report the median results.

Read the report at https://facts.pt/rhwIW9S ▶

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