



The science behind the report:

Comparing Intel Core i5 H-class vs. Intel Core i5 U-class processors: Dell Latitude 5511 vs. Latitude 5510

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 [Comparing Intel Core i5 H-class vs. Intel Core i5 U-class processors: Dell Latitude 5511 vs. Latitude 5510](#).

We concluded our hands-on testing on August 11, 2020. 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 30, 2020 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

Our results

Table 2: Results of our testing. We report the median of three runs.

	Dell Latitude™ 5511 Intel® Core® i5-10400H	Dell Latitude 5510 Intel Core i5-10310U	Win percentage
BrowserBench.org (score, higher is better)			
JetStream2	147.358	127.797	13.27%
MotionMark	498.39	408.06	18.12%
Speedometer	120.0	107.2	10.67%
SYSmark® 2018 v1.0.2.58 (score, higher is better)			
Three-iteration benchmark run			
Overall rating performance score	1,422	1,209	14.98%
Productivity performance score	1,358	1,187	12.59%
Creativity performance score	1,689	1,320	21.85%
Responsiveness performance score	1,254	1,126	10.21%
WebXPRT 3 (score, higher is better)			
HTML5 Benchmark	213	202	5.16%

	Dell Latitude™ 5511 Intel® Core® i5-10400H	Dell Latitude 5510 Intel Core i5-10310U	Win percentage
Microsoft Word version 2007, build 13029.20344 (seconds, lower is better)			
Open large .docx file	11.79	13.07	9.79%
Export large .docx file to PDF	24.71	27.15	8.99%
Microsoft PowerPoint version 2007, build 13029.20344 (seconds, lower is better)			
Open large .pptx file	2.34	2.55	8.24%
Export large .pptx file to PDF	28.99	32.12	9.74%
Microsoft Excel version 2007, build 13029.20344 (seconds, lower is better)			
Open large .xlsm file	5.23	5.98	12.54%
Export large .xlsm file to PDF	29.92	33.71	11.24%
Monte Carlo Simulation of Black-Scholes	6.42	6.79	5.45%
Microsoft Teams version .3.00.13565 (seconds, lower is better)			
Open Excel document in File Browser	18.64	23.56	20.88%
Adobe® After Effects® CC version 17.1.2 (seconds, lower is better)			
Launch app	10.86	12.87	15.62%
Render five-minute video (lossless)	784.56	883.36	11.18%
Adobe Lightroom® Classic version 9.4 (seconds, lower is better)			
Launch app	6.44	7.61	15.37%
Batch process 100 camera RAW photos (.DNG)	67.38	86.07	21.71%
Adobe Photoshop® CC version 21.2.2 (seconds, lower is better)			
Launch app	7.53	8.72	13.65%
Photomerge (52 photos)	136.74	163.67	16.45%
Adobe Audition® CC version 13.0.9 (seconds, lower is better)			
Launch app	3.36	4.16	19.23%
Open large .mp3 file	21.34	25.65	16.80%
Export large .mp3 file	20.35	26.40	22.92%
Linux® kernel, time to compile - kcbench -j 8 version 4.4.0-19041-Microsoft Ubuntu® Image (seconds, lower is better)			
kcbench.sh (Windows Subsystem for Linux - Ubuntu)	277.41	452.08	38.64%
POV-Ray version 3.7.0 (elapsed time, lower is better)			
CPU benchmark - 8 threads	146.03	181.55	19.56%
CPU benchmark - 1 thread	566.67	598.34	5.29%
7-Zip LZMA Benchmark version 19.00 (million instructions per second [MIPS], higher is better)			
Compression Benchmark	24,858	20,375	18.03%
Decompression Benchmark	39,371	33,831	14.07%

System configuration information

Table 3: Detailed information about our test systems.

System	Dell Latitude 5511	Dell Latitude 5510
Processor	Intel Core i5-10400H	Intel Core i5-10310U
Processor frequency (GHz)	2.7	1.7
Processor cores	4	4
Memory (GB)	8	8
Storage (GB)	256	256
Storage Device	SK Hynix PC611	KIOXIA KBG40ZNS
USB	1x USB 3.1 Type-C, 3x USB 3.1 Gen 1	1x USB 3.1 Type-C, 3x USB 3.1 Gen 1
Display	15" 1920x1080	15" 1920x1080
Display Device	NVIDIA® GeForce® MX250	AMD Radeon RX640
OS (version)	Windows 10 Pro 2004	Windows 10 Pro 2004
System Weight (lbs.)	4.16	3.92

How we tested

Adobe Creative Cloud

Setting up

1. The following scenarios require applications found in the [Adobe Creative Cloud®](#) application.
2. Download and install with default options:
 - Adobe After Effects
 - Adobe Lightroom Classic
 - Adobe Photoshop
 - Adobe Audition
3. Run Process Idle Tasks any time the system boots or reboots, at least once a day.
4. Boot the system.
5. Select Windows Start.
6. Bring up an elevated command prompt by typing `cmd`, and press Ctrl + Shift + Enter.
7. Type `cmd.exe /c start /wait Rundll32.exe advapi32.dll,ProcessIdleTasks`.
8. Until the command completes, do not interact with the system.
9. After the command completes, wait five minutes before running the test.

Adobe After Effects CC

Launching the application

1. Open the Adobe Creative Cloud application.
2. From the All Apps screen, simultaneously start the timer and click Open next to Adobe After Effects.
3. Stop the timer when the application is fully loaded.

Rendering a five-minute video

1. Launch Adobe After Effects CC.
2. Select New Project, and give the project a name.
3. Press Ctrl + I to Import the test file, and select the timeline box.
4. To bring up the Export Media dialog, press Ctrl + M.
5. Name the file, and from the Format dropdown menu, choose AVI.
6. Simultaneously start the stopwatch and click Render.
7. When the progress bar disappears, stop the stopwatch, and record the result.

Adobe Lightroom Classic

Launching the application

1. Open the Adobe Creative Cloud application.
2. From the All Apps screen, simultaneously start the timer and click Open next to Adobe Lightroom Classic.
3. When the application fully loads, stop the timer.

Batch processing 100 camera RAW photos

1. Launch Adobe Lightroom.
2. Click Import.
3. Select the test file directory, and click Import.
4. Click Library→Convert Photos to DNG.
5. Use the default settings of Medium Size.
6. Simultaneously start the stopwatch and click OK.
7. When the progress bar in the top left corner disappears, stop the stopwatch, and record the result.

Adobe Photoshop CC

Launching the application

1. Open the Adobe Creative Cloud application.
2. From the All Apps screen, simultaneously start the timer and click Open next to Adobe Photoshop CC.
3. When the application fully loads, stop the timer.

Merging 52 RAW camera images into a panorama

1. Launch Adobe Photoshop CC.
2. Select File→Automate→Photomerge.
3. Select the panoramic test files, and click OK.
4. Simultaneously start the stopwatch and click OK.
5. When the panoramic picture appears, stop the stopwatch, and record the result.

Adobe Audition CC

Launching the application

1. Open the Adobe Creative Cloud application.
2. From the All Apps screen, simultaneously start the timer and click Open next to Adobe Audition CC.
3. When the application fully loads, stop the timer.

Opening the .mp3 file

1. Launch Adobe Audition CC.
2. To launch the Open File dialog, press Ctrl + O.
3. Navigate to the test file location, and select the test file.
4. Simultaneously start the stopwatch and click Open.
5. When the Reading MP3 Audio dialog closes and the waveform fully loads, stop the stopwatch, and record the result.

Exporting the .mp3 file

1. Launch Adobe Audition CC.
2. To launch the Open File dialog, press Ctrl + O.
3. Navigate to the test file location, and click to select the test file.
4. Click Open.
5. To launch the Export File dialog, press Ctrl + Shift + E.
6. Leave the default file Format settings.
7. Simultaneously start the stopwatch and click OK.
8. When the Exporting File dialog closes, stop the stopwatch, and record the result.

BrowserBench.org

Running JetStream2

1. Open the Chrome web browser, and navigate to <https://browserbench.org/JetStream/>.
2. Click Start Test.
3. When the test completes, record the results.

Running MotionMark

1. Open the Chrome web browser, and navigate to <https://browserbench.org/MotionMark1.1/>.
2. Click Start Test.
3. When the test completes, record the results.

Running Speedometer

1. Open the Chrome web browser, and navigate to <https://browserbench.org/Speedometer2.0/>.
2. Click Start Test.
3. When the test completes, record the results.

Time to compile Linux kernel: kcbench

Installing Windows Subsystem for Linux

1. From the device Control Panel, click Turn Windows features on or off.
2. Scroll down, and check Windows Subsystem for Linux. Click OK.
3. After the changes apply, click Restart now to finish installation.

Installing and updating Ubuntu 20.04 LTS

1. From the Start menu, open the Microsoft Store.
2. Search for Ubuntu, and select the Ubuntu on Windows app.
3. Click Install.
4. When the download completes, click Launch.
5. Verify that the Ubuntu terminal launches. Installation should complete in a few minutes.
6. When installation completes, enter the new UNIX username and password for testing.
7. To update and upgrade packages, run `sudo apt update` and `sudo apt upgrade -y`.

Installing kcbench

1. Launch the Ubuntu terminal.
2. Follow the installation instructions for kcbench, available from <https://gitlab.com/knurd42/kcbench>.
3. To install the prerequisites for our system, we ran `sudo apt install bc bison curl flex util-linux make time perl-base pkg-config procps libssl-dev libelf-dev gcc binutils`.
4. Run `curl -O`, available from <https://gitlab.com/knurd42/kcbench/-/raw/master/kcbench>.

Running kcbench

1. Launch the Ubuntu terminal.
2. From the kcbench install directory, run `bash kcbench`.
3. The program will download the Linux 4.19 kernel and execute the benchmark.
4. When the test is complete, record the result from the fastest job count. For our test, we used the results on both systems from `-j 8`.

SYSmark 2018 v1.0.2.58

Avoiding antivirus software conflicts

SYSmark 2018 is not compatible with any virus-scanning software, so we uninstalled any such software present on the notebook PCs before we installed the benchmark.

Avoiding pre-installed software conflicts

SYSmark 2018 installs the following applications, which its test scripts employ:

- Productivity
 - Adobe® Acrobat Pro DC
 - AutoIT 3.3.14.2
 - BowPad64-2.3.3 installer
 - Google® Chrome®
 - Microsoft Excel 2016
 - Microsoft OneNote 2016
 - Microsoft Outlook 2016
 - Microsoft PowerPoint 2016
 - Microsoft Word 2016
 - Windows Zip
- Creativity
 - Adobe Photoshop CC 2017
 - Adobe Lightroom Classic CC
 - CyberLink PowerDirector® 2015
- Responsiveness
 - Adobe Acrobat Pro DC
 - Adobe Lightroom Classic CC
 - Adobe Photoshop CC 2017
 - CyberLink PowerDirector 2015

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 SYSmark 2018 uses—before we installed the benchmark.

Using the SYSmark built-in Configuration Tool

1. This tool supports three levels of configuration:
 - Only makes changes that are REQUIRED for the benchmark to run.
 - Additionally, makes changes that are RECOMMENDED for repeatable results.
 - Additionally, makes OPTIONAL changes that help ensure best results.
2. The three levels of configuration options have the following details:
 - 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
 - Level 2 - Recommended
 - Create BAPCo power scheme
 - Set Power Plan Type to High Performance
 - Set CPU High Performance
 - Disables Disk Defrag
 - Disables Windows Error Reporting
 - Disables Windows Lock Screen
 - Disables Windows Pop-ups
 - Disables Screen Saver and Monitor Timeout
 - Disables Windows Sidebar/Gadgets
 - Disables Desktop Slideshow
 - Disables Windows Defender
 - Disables Windows Firewall
 - Set Font Smoothing
 - Level 3 - Optional
 - Disables Hard Disk Timeout
 - Disables System Restore
 - Ignores Laptop Lid Close

We chose the official BAPCo 'Run Benchmark' default as outlined in the BAPCo SYSmark2018 User Guide: http://bapco.com/wp-content/uploads/2018/10/BAPCo_SYSmark2018_user_guide.pdf, which runs the benchmark using the Required and Recommended options.

Setting up the test

Install SYSmark 2018 with the default options.

Running the test

1. Launch SYSmark 2018.
2. Click the Settings Gear icon.
3. For iterations, type 3.
4. Verify that Conditioning Run is enabled.
5. Enable Process Idle Tasks.
6. Enter a name for the benchmark run.
7. To return to the main menu, click Back.
8. Click Run Benchmark.
9. When the benchmark finishes, record the SYSmark 2018 benchmark results.

POV-Ray 3.7.0

Running the benchmark tool: All CPUs

1. Download and install POV-Ray for Windows from <https://www.povray.org/download/>
2. Launch POV-Ray.
3. Click Render.
4. Select Run Benchmark (All CPU's), and click Yes to confirm.
5. When the benchmark completes, record the results.

Running the benchmark: One CPU

1. Launch POV-Ray.
2. Click Render.
3. Select Run Benchmark (One CPU), and click Yes to confirm.
4. When the benchmark completes, record the results.

7-Zip LZMA Benchmark

Run 7-Zip benchmark

1. From <https://www.7-zip.org/download.html>, download 7-Zip 19.00 for Windows (x64), and install it.
2. Launch 7-Zip File Manager.
3. Click Tools.
4. Select Benchmark.
5. The Benchmark will begin automatically.
6. After 100 passes, record the Resulting Rating for Compression and Decompression (in MIPS).

Microsoft Word

Opening a .docx file

1. From the Start menu, launch Microsoft Word.
2. Click Open, and click Browse. Navigate to the test file location, and click to highlight the test file.
3. Simultaneously start the stopwatch and click Open.
4. Stop the stopwatch as indicated by the page and word count fully loading.

Exporting a .docx file to PDF

1. From the Start menu, launch Microsoft Word.
2. Click Open, and click Browse. Navigate to the test file location, and click to highlight the test file.
3. Click Open.
4. Once the file loads, click File, and click Export.
5. Select Create PDF/XPS Document.
6. Click Create PDF/XPS.
7. Enter a file name, and choose the file destination.
8. Simultaneously start the stopwatch and click Publish.
9. When the exporting dialog completes, stop the stopwatch.

Microsoft PowerPoint

Opening a .pptx file

1. From the Start menu, launch Microsoft PowerPoint.
2. Click Open, and click Browse. Navigate to the test file location, and click to highlight the test file.
3. Simultaneously start the stopwatch and click Open.
4. Stop the stopwatch as indicated by the slide images and slide count fully loading.

Exporting a .pptx file to PDF

1. From the Start menu, launch Microsoft PowerPoint.
2. Click Open, and click Browse. Navigate to the test file location, and click to highlight the test file.
3. Click Open.
4. When the file is loaded, click File, and click Export.
5. Select Create PDF/XPS Document.
6. Click Create PDF/XPS.
7. Enter a file name, and choose the file destination.
8. Simultaneously start the stopwatch and click Publish.
9. When the exporting dialog completes, stop the stopwatch.

Microsoft Excel

Opening a .xlsm file

1. From the Start menu, launch Microsoft Excel.
2. Click Open, and click Browse. Navigate to the test file location, and click to highlight the test file.
3. Simultaneously start the stopwatch, and click Open.
4. Stop the stopwatch as indicated by the Excel document fully loading.

Exporting a .xlsm file to PDF

1. From the Start menu, launch Microsoft Excel.
2. Click Open, and click Browse. Navigate to the test file location, and click to highlight the test file.
3. Click Open.
4. When the file is loaded, click File, and click Export.
5. Select Create PDF/XPS Document.
6. Click Create PDF/XPS.
7. Enter a file name, and choose the file destination.
8. Simultaneously start the stopwatch and click Publish.
9. When the exporting dialog completes, stop the stopwatch.

Running a Monte Carlo Simulation of Black-Scholes

1. Download the test sheet from http://vbacompile.com/downloads/samples/qmc_black_scholes.xlsm.
2. Open the macro-enabled worksheet in Excel.
3. Leave the default number of simulations, and click Click Here!
4. Record the Precise Calculation Time.

WebXPRT

Running WebXPRT 3 Benchmark

1. Open the Chrome web browser, and navigate to https://www.principledtechnologies.com/benchmarkxpert/webxpert/2018/3_v5/.
2. Click Start.
3. When the test completes, record the results.

Microsoft Teams

Opening an Excel document in file browser

1. From the Start menu, launch Microsoft Teams.
2. From the navigation menu, click Files.
3. From the File Browser view, navigate to the test file location.
4. Simultaneously start the stopwatch and click the name of the test file.
5. When the Excel sheet fully loads, stop the stopwatch.

Read the report at <http://facts.pt/QeuQkgu> ►

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