

## How HP Achieves Top Performance in a Laptop that is Cool & Quiet

HP EliteBook and Smart Sense: Optimal Performance for Business Productivity

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**COMMISSIONED BY** 





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## Building an Optimized Commercial Platform

Hybrid working environments mean businesses need laptops that offer performance and capability in any location.



In the market for a new laptop, it can be today compared to just a few years ago. easy to dissect every option into its base The hybrid work environment means that components, including the processor, more and more businesses are looking how much memory it has, how much for a machine that can function and offer storage it's configured with. In a retail productivity leadership in any location. environment or even browsing an online And the varying environments that you store, it becomes overwhelming to find might use a laptop in today require the right laptop for you, the best laptop differentiated system characteristics; that meets your needs and helps you cool in a coffee shop, higher performing get the work you need done, done. in a busy and time-constrained office, But selecting a computer that provides silent while watching a video in bed. the best balance of performance, In recent years, it was generally assumed productivity experiences, battery life, and that "any laptop will do" when selecting innovative features is still just as critical a computer for your next upgrade. But today as it was 10 years ago.

There are critical factors that have changed about how we use our laptops

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we have seen an increase in demand for performance as more applications integrate advanced imaging capabilities,

utilize video effects for conferencing, integrate modern AI workloads, or simply require multi-tasking across more complex apps. This puts additional strain on the cooling system of a laptop, requiring additional power and frequency without sacrificing the user experience that buyers expect in a modern machine.



# HP Smart Sense Technology

These system demands require more than just a high-performance processor, though that is a critical component. It also means a laptop that truly wants to delight its buyer needs advanced cooling technology, arrays of sensors to monitor current system status, and intelligent software solutions to pair with modern CPU platforms to create a solution that can balance performance and experience.

For HP, that solution is Smart Sense. Utilizing years of experience and customer input gathered from developing leading consumer and commercial PC platforms, HP uses

Smart Sense to build the quietest, most performant, and most user-friendly laptops in the segment.

Smart Sense was released in 2023, working in close collaboration with Intel, on the G10 series notebooks as a way to manage power and implement system state detection mechanisms to adjust performance settings on the fly. This second generation of Smart Sense, part of the HP 11th generation EliteBook 800, 805, and 1000 series notebooks, offers significant improvements in the hardware design, software implementation, and intelligence capabilities throughout the system.

HP Smart Sense has three primary goals for improving the experience of users. First, it can provide better physical characteristics for the system in all-day usage patterns including both lower surface temperatures and fan noise. Not having a laptop that gets hot to the touch or one that is loud enough to be intrusive on conference calls or during heavy use might seem like obvious traits, but many laptops in the market care only about performance and benchmarks at the expense of real-world usage.



HP uses Smart Sense to build the quietest, most performant, and most user-friendly laptops in the segment







### HP Smart Sense Technology

Second, HP Smart Sense still ensures that when the user needs it, the laptop can provide best-in-class performance without compromise. This translates into the ability to put the system into a highperformance mode to allow it to use more power, and thus increase frequency, when a heavy workload demands it. Imagine needing to transcode a video file into a smaller size so it will fit in a PowerPoint embed or maybe an image needing a slight tweak and re-rendering before a big presentation; these are times when you need the system to fully unlock the performance of the CPU platform it is designed around.

A third goal for this generation of HP Smart Sense is to simplify the user experience to enable faster and fewer mode changes. The software interface has two options: Smart Sense or Performance. For nearly all users and nearly all situations, the Smart Sense mode will utilize the EliteBook G11 laptop's on-board array of sensors to analyze the system state and adjust system power, fan speeds and noise, and an AI-based workload understanding to provide the right amount of performance when you need it. And when you want the maximum output of the laptop, a single click is all it takes and you'll be able to unlock everything the silicon engineers at Intel can provide.

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	DESKTOP-KILPM- LC	Optimize your PC performance, fan noise and cooling preferences.		
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¢	Settings			



## What HP Smart Sense Means for Business Users

These goals for HP Smart Sense are technically substantial and obviously require a high level of engineering and platform expertise to execute. But how that translates into the advantages an end user will see over another laptop from a different vendor that doesn't have Smart Sense or an equivalent isn't always obvious.

For starters, HP claims that Smart Sense running on the EliteBook 1040 G11 will enable it to be faster than a competing platform that is running in an equivalent 'balanced mode' setting. For the majority of time under use, laptops remain in the default, outof-box, balanced state, both in the Windows power settings and through any OEM-specific applications. So, it is critical that this state be one that is balanced between performance and other characteristics like power, heat, and noise. No one wants a laptop that is loud and hot to the touch, but a buyer also doesn't want to have middling performance during everyday tasks either.

HP Smart Sense also claims to offer quieter usage and cooler surface temperatures (skin temperatures) than competing systems. This is another area where balance is key and where it would be easy to overcompensate in either direction. When running similar workloads and applications, the HP EliteBook 1040 G11 is cooler to the touch, both where your hands rest on the keyboard and on the bottom where it makes contact with your lap, and outputs less fan noise. This is possible because of the advanced thermal solution HP has integrated in the G11, combining better designed heat pipes and high-quality fans.

And when you need performance the most, HP claims that when placed in its Performance mode, the G11 provides significantly more power to the platform than competing solutions. This means any multi-tasking or heavy applications that are mission critical will get done faster, and still without requiring the need for extremely loud fans or system temperatures.





# Analyzing HP Smart Sense Claims

HP asked us to put Smart Sense technology to the test, measuring the impact that the combination of hardware and software has on actual user experiences with the G11. To measure the advantages of HP Smart Sense, we will be comparing three different laptops across two different power/ performance modes each.



	HP EliteBook 1040 G11	HP EliteBook 1040 G9	<b>Competitive Commercial Laptop</b>
CPU	Intel Core Ultra 7 155H	Intel Core i7-1265U	Intel Core Ultra 7 155H
CPU Cores	6x P-cores 8x E-core	2x P-cores 8x E-core	6x P-cores 8x E-core
Memory	32GB	32GB	32GB
Memory Speed	LPDDR5X-6400	LPDDR5-4800	LPDDR5X-6400
Graphics	Intel Arc	Intel Iris Xe	Intel Arc
Screen Size & Resolution	14″ 2880x1800	14" 1920x1200	14" 2880x1800

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### Analyzing HP Smart Sense Claims

First up is the new HP EliteBook 1040 G11 notebook, powered by the Intel Core Ultra 7 155H processor that features 16 total CPU cores (6 P-cores, 8 E-cores and 2 low power E-cores) and a maximum clock speed of 4.8 GHz. Intel and HP worked closely to co-engineer this design, including the HP Smart Sense technology under test today, ensuring that the system is fully integrating the latest features and capabilities of the Core Ultra AI PC platform. This machine was configured with 32GB of memory and 1TB of storage.

For a generational comparison we went with the HP EliteBook 1040 G9, a model released to market in 2022. It is powered by the 12th Gen Core i7-1265U, a 10-core part (2 P-cores and 8 E-cores) with a 4.8 GHz maximum turbo clock. It also included 32GB of system memory and a 1TB SSD. Competitive comparisons are always a bit tricky and aligning the right models means looking at specifications, pricing, and even target markets. For this report we tested a leading commercial business PC brand, and its flagship model that addresses the commercial segment. It was configured we the same Intel Core Ultra 155H processor, 32GB of memory, and 1TB of storage. It offers a very similar form factor including 14" screen and traditional clamshell design

Our performance measurements and analysis will walk through a combination of performance data, acoustic and thermal data, CPU power consumption information, and wrap with a look inside the laptops to show the differentiated cooling components between the three devices under test. This will help us tell the story of HP Smart Sense and its advantages

t	for consumers in real world applications
IS	and use cases, but also highlight the
n	engineering proof points behind it.
	In these charts you will see the HP G11,
2	HP G9, and the competitive commercial
vith	system represented each with two distinct
	data pairs. One shows the laptop in either
	Smart Sense or Balanced mode, and the
а	other shows the laptops in their highest
n.	performance state. For the HP G11 and
	G9 devices this was handled via the HP
	Smart Sense software interface, and for the
	competitive system was configured using
	its own OEM-specific software settings.

What we want to look at specifically is a few comparisons:

- How does the G11 in HP Smart Sense compare to the previous generation HP G9 platform and how does it compare to the competing OEM in its balanced state?
- 2. How does the G11 in that same HP Smart Sense mode compare to the Performance mode of the competing system?
- **3.** How does the maximum performance state of the HP G11 compare to the same state of the competing system?





## System Performance Testing

To set the context for the rest of the technical deep dive, looking at some key benchmarks from these systems helps showcase the performance you can expect across a range of applications and workloads. At the end of the day, the performance and experiences you have with your laptop is the ultimate goal – the technology and software that gets you there is critical, but not ultimately what the user cares about.

**Geekbench 6** is a benchmark that measures system performance with the press of a button and allows for direct device comparisons. It is comprised of a collection of workloads that stress the CPU and GPU, through tests that are "real world" in that they represent applications from augmented reality to object detection to file compression and much more.



## Lightly Threaded, Burst Workload (Geekbench 6.3.0)

Geekbench 6.3.0, Multi-core Test

Measuring multi-core and multi-threaded performance in a test like Geekbench helps us understand the laptops performance in situations where a user is multi-tasking or running heavier applications like content creation or production. Results show a couple of clear advantages for the HP EliteBook 1040 G11, including a 42% maximum performance advantage when compared to the previous generation HP G9 laptop, a big jump for user productivity. The competitive comparison is interesting too. When running in the HP Smart Sense mode and compared to the competitive laptop in Balanced mode, the HP laptop is 25% faster, even though they are both using the same Intel Core Ultra 7 155H processor. In maximum performance mode, the HP G11 is still 5% ahead of the other OEM device. And maybe most interesting is that the HP EliteBook 1040 G11 in Smart Sense mode is nearly matching the performance of the competitor system in Performance mode.

## System Performance Testing

Cinebench has been a consistent benchmark used in analysis and reviews across the industry<br/>for years. It is based on the Maxon Cinema 4D rendering engine and runs in both single<br/>threaded and multi-threaded configurations to measure maximum, sustained performance of<br/>a processor. We use the phrase "sustained performance" since it can be run for 10-30 minute<br/>intervals and will saturate the cooling capability of a laptop or desktop machine to measure<br/>performance that a system can maintain over a longer period of time.A test like Cinebench really stresses a system's ability to run cool, quiet,<br/>and efficiently, and we can see how well the new HP EliteBook 1040 G11<br/>handles it. Compared to the HP 1040 G9, the new laptop is up to 2.3x<br/>faster in performance mode, and 2.1x faster in Smart Sense / Balanced.<br/>For a 2-3 year upgrade cycle, this translates into clear advantages like<br/>faster application load times, a better multi-tasking experience, and<br/>improved performance when you're in crunch time on a heavy project.



Cinebench 2024, MT Test

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Looking at the difference between the G11 and the competitive laptop, the differences are also significant. The HP G11 is up to 32% faster when both are in Performance mode, again note that this is when using the exact same Intel Core Ultra 7 155H platform! And when we look at the Smart Sense mode on the G11 against the Balanced mode on the competitive machine, we see an even better 40% performance advantage.

If you are looking for a modern commercial laptop that offers optimal performance and can fully utilize the power of the Intel Core Ultra processor family, the HP EliteBook 1040 G11 is one of the best solutions on the market. And as you'll find in the rest of this report, the G11 is able to perform like this without straining fans, temperatures, or power.



## Modern Laptops Require Modern Battery Life

Having a system with the performance you need to get your work done, regardless of where you are most productive, is a necessity for your next laptop purchase, not a nice-to-have. But having the ability extend your working time away from the desktop, away from the wall outlet, also translates into additional productivity and meeting strict timelines when necessary. To that end, the HP EliteBook 1040 G11 combines outstanding performance with a corresponding leadership position in battery life when compared to previous generation designs and that same competitive commercial device.



Battery life was measured using the Procyon Office Productivity battery benchmark, used to emulate real-world office application experiences and workloads. The HP EliteBook 1040 G11 was tested in its Smart Sense power mode, while the competitive system was set to Balanced. The HP laptop gets over 14 hours of usable, productive battery life, making the user more productive while on the road or just when you need to spend the day away from a wall outlet. The competitive system, by comparison, can't break the 10-hour mark, giving the HP G11 a 44% advantage in our battery life comparison.

## Battery Life - Office Productivity



## Noise and Surface Temperature Testing

While performance will dictate how fast your applications can run and how effectively you can balance your video calls, presentation edits, and spreadsheet macros, there are other factors that impact your experience while using a laptop. Though it might not seem like it at first, a system with a loud running fan will not just be annoying but can make conference calls frustratingly unclear. And having a system that is hot to the touch while getting your work down can lead to discomfort on the lap and palm rest, or worse!

Our sound level measurements were tested in a quiet, empty office environment with a sound meter placed 2 feet from the device under test. We used the Cinebench 2024 workload in our analysis and looked at the sound levels coming from each of the three systems in both Smart Sense/Balanced and Performance settings.

Sound measurement and dBA is part of a logarithmic scale, so increases in measurements are more than they might seem. Typically, we consider 10db to equate to a human breathing, 20db to a ticking watch, 30db to a whisper, and 40db to a quiet office environment.





### Noise and Surface Temperature Testing



Compared to the previous generation HP EliteBook 1040 G9 platform in its Balanced state, the new G11 with Smart Sense is notably quieter. Keep in mind that the G11 is running at a lower sound level while also offering performance that is 2.1x faster in our testing. In the Performance mode, the HP EliteBook 1040 G11 is 2.3x faster despite only coming up a moderate 0.6 dbA in our testing.

When looking at the competing commercial system with the same Intel Core Ultra 7 155H processor, the HP EliteBook 1040 G11 operates at nearly equivalent sound levels in the Balanced/Smart Sense and the Performance modes. This might seem like a draw for the two devices, but remember, the HP G11 is able to outperform the competing by up to 40%, doing so without additional noise, thanks to the innovations of HP engineers across thermals, cooler design, and software implementation. The HP G11 is able to outperform the competing by up to 40% without additional noise



Noise and Surface Temperature Testing

Another critical area to compare the user experience of modern laptops is around what we call skin temperature, or surface temperature. This is the measurement of how hot the surfaces of the laptop get during different usage scenarios. It's important to look at both the wrist rest area of the laptop, next to the trackpad and in front the keyboard, and the bottom of the laptop where it would rest on your legs.

We used thermocouples to take direct temperature measurements during the same workloads and testing cycles as our sound level testing, placed as you see in the images below.









### Noise and Surface Temperature Testing

Measurements are shown in a "average delta over ambient" state, meaning these are the degrees of difference between the surface with the thermocouple and another thermocouple measuring ambient temperature 2 feet from the device. The four measurements are averaged over the test run to get the results we see below.



On the HP EliteBook 1040 G11 in Smart Sense mode, the system runs 3.8C over ambient while running Cinebench 2024 in its multi-threaded test. The previous generation HP EliteBook 1040 G9 is more than 5C hotter than ambient in Balanced, and the competing Core Ultra 7 155H commercial system is 5.5C hotter.

In Performance mode, the HP G11 is slightly cooler to the touch than in Smart Sense mode since it enables the fans to spin faster (resulting in slightly more noise but also much higher performance), reaching 2.75C over ambient in our testing. For the competitive system in performance mode the temperature delta is nearly 6C.

For context, a 6C temperature delta in this range is roughly 11 degrees Fahrenheit and can significantly impact the comfort level of resting this notebook on your lap or even keeping your hands from sweating while typing on the keyboard. Seeing that the HP EliteBook 1040 G11 is maintaining lower surface temperatures, along with lower noise levels, and higher performance is an impressive feat of engineering.



## HP Motion Al Lap Mode

Another advancement that HP has integrated on the EliteBook 1040 G11 is part of its Motion AI family of features, Lap Mode. This technology uses embedded accelerometers and a pre-trained AI model to intelligently lower skin and surface temperatures by up to 5C when it detects that you are working with the system on your lap versus a table.

We decided to evaluate the surface temperature differences that Lap Mode creates by running tests in Smart Sense mode with the system on a flat table and when running on our angled, slightly moving surface. The charts you'll see below measure surface temperature of the same four thermocouple locations used above but show ambient temperature deltas over time.



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When running in Lap Mode, the top surface of the EliteBook 1040 G11 is up to 2.4C cooler. There is a bit more advantage for the left side of the device than the right side in our testing, but the net-result is a more comfortable typing experience for the consumer.



### HP Motion AI Lap Mode

On the bottom of the G11 laptop the temperature differences between Lap Mode and desk mode are more pronounced, hitting up to 4.5C on the bottom left sensor location and 3.5C on the right sensor. The temperature differences level out a bit, but since this is nearly 9 minutes of an all-core workload, this is definitely stressing the system and platform more than nearly any real-world user experience will.

Lap Mode is another example of how thoughtful design and engineering can create technologies that improve daily usage of your laptop in elegant ways.





## Visualizing Thermal Characteristics

## HP EliteBook 1040 G11 (Smart Sense) vs Competing system (Balanced)



HP EliteBook 1040 G11 Top (Smart Sense)



Competing Commercial System Top (Balanced)



HP EliteBook 1040 G11 Bottom (Smart Sense)



**Competing Commercial System Bottom** (Balanced)

Measuring the thermal profiles of these competing machines with thermocouples is an important way to analyze performance, but a more visual interpretation can help explain the behavior of the HP EliteBook 1040 G11 and the competing system under load. We used a Flir thermal camera to look at both the top and bottom of the system while under our multithreaded Cinebench workload and the results are compelling.

When comparing the Smart Sense and Balanced modes of these two devices we can see a couple of patterns emerge. First, the top of the laptop is

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warmer on the HP EliteBook 1040 G11, with a max temperature of 48.8C, located right at the top of the keyboard where it meets the screen, where one of the exhausts is located. Compared to the competing device that only hits 43C peak temperature, that might seem like the advantage goes to the competitive system. But considering the average temperature across the surface is essentially the same (39.3C on the G11 and 40.6C on the competitive system) and that the "hot spot" for the competition machine is dead center of the keyboard, the experience of typing on a loaded machine is better for the HP.

The bottom thermal images show similarly differentiated behavior. The maximum temperatures are roughly the same (40.1C vs 40.9C) but the average temperatures across the bottom panel on the HP EliteBook 1040 G11 is 8C cooler than the competing device. And the hot areas are much larger on the competing system, meaning more of your legs or computing surface are exposed to the heat.

Now let's look at the same comparisons but in the Performance mode of both laptops.





G11 (Performance) vs Competing system (Performance)

### Visualization Thermal Characteristics



HP EliteBook 1040 G11 Top (Performance)



HP EliteBook 1040 G11 Bottom (Performance)



**Competing Commercial System Bottom** (Performance)

The shapes of these thermal images look similar in Performance Mode as they did in Smart Sense and Balanced, but with critical temperature deltas to point out. On the tops of the machines, the HP EliteBook 1040 G11 has a peak temperature of 49.3C near the exhaust between the keyboard and the screen, with an average across the panel of 38.8C. The competing system has a peak that is slightly higher at 50.6C but that is again dead center of the keyboard, right where ethe user is typing, impacting the user experience. And note the average temperature on the top panel:



Competing Commercial System Top (Performance)

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its again 9C higher than the HP machine.

On the bottom, the G11 has a higher maximum temperature at its exhaust area at 48.7C compared to 45.5C on the competitive device, but the average temperature for the entirety of the bottom panel is more than 13C higher when compared to the EliteBook! That is a significant difference, equating to 86F and 111F, and directly impacts the usability of the devices sitting on your legs when working on the couch, a crowded conference room, or even a tight airplane environment.

We aren't quite at the level of burning bare skin at these levels, but we're closer than I'd like when you consider the extended use sessions laptops can have.

The HP EliteBook 1040 G11 shows a clear advantage in its integrated thermal solution versus the competition based on these images and it highlights the impact that engineering and design can have not only on performance, but the physical experience business users have with their laptops.











## An Advanced Cooling Solution



HP EliteBook 1040 G9

The HP EliteBook 1040 G11 upgrades the cooling system compared to the previous G9 design with a second fan and slightly wider heatsink fin array. This allows the fans to spin more slowly, while still moving the same or more air through exhaust on the system, enabling lower noise levels without reducing the thermal capacity of the system.



HP EliteBook 1040 G11

The competitive commercial machine uses a two-fan design as well, but the surrounding components. fans are smaller, and the heat pipe and fin combination are less substantial. Smaller fans HP's commitment to improving both the hardware implementation and the software tend to need to spin faster to move the same amount of air, and that translates into more layer for Smart Sense gives engineers noise at the same air flow. The result is a more tools to dial in and create the perfect cooling solution that needs to work harder to balance of performance, thermal and sound

How is all this possible? A quick removal of the bottom panel of the machines shows some clear differences in cooling implementation.





Competitive Commercial Core Ultra 7 155H System

be as effective at cooling the Intel CPU and

characteristics, while adapting to your workload and environment.



## CPU Power Comparisons

Another angle and tool we can use to visualize the difference between all three of these competing systems is by looking at the CPU power draw. While running our sustained workload, and our new understanding both the resulting performance, thermals, and acoustics, seeing how much power each laptop is able to feed the Intel Core Ultra 7 155H processor can show why our performance deltas are so significant.



These charts show the CPU package power while running the Cinebench 2024 multi-threaded workload, with time on the horizontal axis and wattage on the vertical axis. This visual compares the HP EliteBook 1040 G11 in both Smart Sense and Performance mode, and there are a couple of key characteristics to point out. First, both configurations have idle CPU power draw of about 4-6 watts and spike up to ~68 watts when the workload is first applied. Mobile platforms often do this in hopes of the workload being short and completed in just a handful of seconds. When that isn't the case, the power draw comes down and normalizes to some steady state. This steady state is the systems ability to maintain a sustained performance level, balancing all those user experience metrics we discussed earlier: skin and surface temperatures, fan noise, battery life, performance.

The G11 in Performance mode uses 40 watts with the Core Ultra 7 155H while using about 22 watts with Smart Sense. The performance difference between these modes is 35%; you get more system throughput in the Performance mode, as you'd expect.

### **CPU Power Comparisons**

The next two charts will compare the HP EliteBook 1040 G11 to the G9, in both Smart Sense/Balanced and Performance modes.



In the lower power mode, the HP G11 does start the workload at a much higherWhen running in the Performance mode there is a more dramatic delta betweeninitial power draw (~68 watts vs ~38 watts) and then levels off at its 22-wattthe G11 and the G9 power. The G11 with the Core Ultra 7 155H runs at 40 wattssustained power as we showed above. The HP G9 system is using about 15sustained while the G9 with the 12th Gen Core i7 is at about 16-17 watts.watts of power, the result of which is much lower performance for this previousRemember, the G11 outperforms the G9 system by more than 2x and does so withgeneration Intel 12th Gen platform.Iower skin temperatures on the laptop itself and equivalent noise levels.



## **CPU Power Comparisons**

These next two charts will look at the HP EliteBook 1040 G11 and the competitive commercial platform using the same Intel Core Ultra 7 155H processor.



When we compare the HP EliteBook 1040 G11 against the competing Core Ultra 7 155H platform, the differences are substantial. In Smart Sense mode, the G11 uses that same 22 watts of power on the CPU while the competitive laptop is only drawing 10 watts of power for the same CPU. This means that performance is significantly slower on the competing system, but as we have seen previously, the thermals and noise levels of the systems are not improved over the HP G11.

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G11 Performance vs Competitor Performance - Cinebench 2024 - Multi-Thread

In Performance Mode, the HP G11 draws about 40 watts to achieve the maximum CPU frequency, while the competing device averages around 28 watts of sustained power and exhibits an oscillating pattern to the reported power consumption. This definitely improves the performance of the competitive system, but the G11 still 32% faster in our testing.

### **CPU Power Comparisons**

The first impression might be that using less power is always better, but if youPower consumption is fairly equivalent, with the G11 atcan get the job done faster without spinning up loud fans or overheating the<br/>chassis, then there is a strong advantage to doing so. But it does require improved<br/>engineering, components, and design work.Power consumption is fairly equivalent, with the G11 at<br/>around 22 watts and the competitive commercial device<br/>moving between 24-28 watts.

One more interesting comparison is to look at the HP EliteBook 1040 G11 in its Smart Sense mode against the competing system in its high performance state.



Note that in this situation, the HP G11 is both notably quieter and also provides lower skin/surface temperatures on the device itself. And performance is nearly equivalent, with the competing system offering just a 2% higher benchmark score.

For most mainstream users, this data indicates that getting an HP EliteBook 1040 G11 and keeping it in the Smart Sense mode will offer the best combination of performance, thermals, and sound levels. This is a testament to the engineering and innovation that the HP team has invested in Smart Sense technology to truly differentiate in the market. In Performance Mode, the HP G11 draws about 40 watts to achieve the maximum CPU frequency, while the competing device averages around 28 watts of sustained power and exhibits an oscillating pattern to the reported power consumption. This definitely improves the performance of the competitive system, but the G11 still 32% faster in our testing. The HP EliteBook 1040 G11 in Smart Sense mode will offer the best combination of performance, thermals, and sound levels.



## The Best of Both Worlds: HP Smart Sense

HP Smart Sense goes beyond traditional cool and quiet designs to improve both performance and the user's physical experience with the device. In our testing, the HP EliteBook 1040 G11 showed impressive benchmark and workload benefits over both previous generation devices and other leading competing commercial systems while also creating less fan noise and lower surface temperatures.

It is this kind of technological innovation that can improve and differentiate platforms from one another in crowded markets, offering a value-add above standard off-the-shelf engineering efforts that other vendors might employ. This doesn't just translate into good benchmark numbers either; it fundamentally improves and expands how you use your laptop for work and personal functions. You are free to run highly threaded workloads and multitask even in a quiet office or library without worry that your system will sound like a jet engine ready to take flight. You can be sure that your system will have optimal and peak performance with the Intel Core Ultra processor when needed without sacrificing basic tenets of a good laptop design like surface and skin temperatures.

If you are due for a system upgrade on the traditional 2-4 year cycle, the

value of moving from a system like the HP EliteBook 1040 G9 to the G11 is readily apparent in our testing. Not only can you expect a performance uplift that is as much as 2x in our testing, you'll see that performance increase with a corresponding user experience improvement including lower fan noise and lower surface temperatures on the chassis. That means you can tackle those 3x3 Teams calls while exporting your PowerPoint to a PDF faster than ever and without disturbing your neighbors in the coffee shop.





Important Information About this Report

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Contact us if you would like to discuss this report and Signal65 will respond promptly.

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# System Configurations

	HP EliteBook 1040 G11	HP EliteBook 1040 G9	Competing Commercial System
CPU	Intel Core Ultra 7 155H	Intel Core i7-1265U	Intel Core Ultra 7 155H
Graphics	Intel Arc Graphics	Intel Iris Xe Graphics	Intel Arc Graphics
NPU	Intel Al Boost	N/A	Intel Al Boost
RAM	32GB LPDDR5X-7467	32GB LPDDR5-4800	32GB LPDDR5X-6400
Storage	1TB Samsung MZVL31T0HCLR-00BH1	1TB WD SN810	1TB Kioxia KXG8AZNV1T02
OS Build	22631.4169	22631.4169	22631.4169
Windows Power Mode (Performance)	High Performance	High Performance	High Performance
Windows Power Mode (Battery Tests)	Best Power Efficiency	Best Power Efficiency	Best Power Efficiency
<b>OEM Power Settings (Performance)</b>	Smart Sense	N/A	Balanced
OEM Power Settings (Battery Tests)	Performance	N/A	Best Performance
Virtualization Based Security	Enabled	Enabled	Enabled

### **Applications Used**

Geekbench 6.3.0 Cinebench 2024.0.1 UL Procyon 2.8.1352 Microsoft Office 2409





