

### Overview

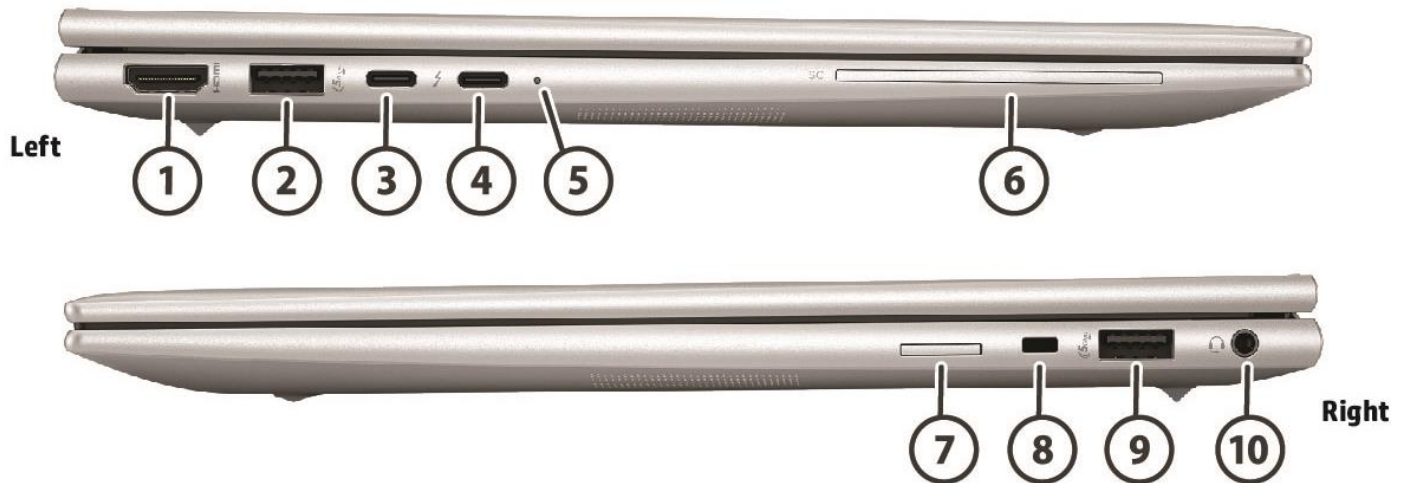
### HP EliteBook 830 13 inch G11 Notebook PC



#### Front

- |                            |                   |
|----------------------------|-------------------|
| 1. ACS & ALS               | 4. Webcam         |
| 2. Internal Microphone (2) | 5. Camera Shutter |
| 3. Webcam LED              | 6. Touchpad       |

### Overview



### Sides

- |   |   |
|---|---|
| 1. HDMI 2.1   | 7. Nano SIM card slot (Integrated)              |
| 2. Super Speed USB Type-A® 5Gbps Power charging                             | 8. Security lock slot (Integrated)              |
| 3. Thunderbolt™ 4 USB4™ Type-C® 40 Gbps USB Power Delivery DisplayPort™ 1.4 | 9. Super Speed USB Type-A® 5Gbps Power charging |
| 4. Thunderbolt™ 4 USB4™ Type-C® 40 Gbps USB Power Delivery DisplayPort™ 1.4 | 10. Headphone/mic combo jack                    |
| 5. Power Indicator LED  |   |
| 6. Smart Card Reader (Integrated)   |   |

1. SuperSpeed USB 20Gbps is not available with Thunderbolt™ 4.

### Technical Specifications

#### PRODUCT NAME

HP EliteBook 830 13 inch G11 Notebook PC

#### OPERATING SYSTEMS

##### Preinstalled

- Windows 11 Home - HP recommends Windows 11 Pro for business <sup>1</sup>
- Windows 11 Home Single Language - HP recommends Windows 11 Pro for business <sup>1</sup>
- Windows 11 Pro (Windows 11 Enterprise or Windows 10 Enterprise available with a Volume Licensing Agreement) <sup>1</sup>
- Windows 11 Pro <sup>1</sup>
- Windows 11 Pro Education <sup>1</sup>
- FreeDOS

1. Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows is automatically updated and enabled. High speed internet and Microsoft account required. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>.

#### PROCESSORS

Processor 2,3,4,5,6,	Cores	Number of P-cores	Number of E-cores	Number of LP E-core	Threads	L3 Cache	Max Turbo Frequency <sup>5</sup>		Intel SIPP/vPro® Enterprise
							P-cores	E-cores	
Intel® Core™ Ultra7 165U	12 cores	2	8	2	14	12MB	4.90 GHz	3.80 GHz	X
Intel® Core™ Ultra7 155U	12 cores	2	8	2	14	12MB	4.80 GHz	3.80 GHz	
Intel® Core™ Ultra5 135U	12 cores	2	8	2	14	12MB	4.40 Ghz	3.60 GHz	X
Intel® Core™ Ultra5 125U	12 cores	2	8	2	14	12MB	4.30 Ghz	3.60 GHz	

##### Processor Family

Intel® Core™ Ultra7 processor

Intel® Core™ Ultra5 processor

2. Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering, branding and/or naming is not a measurement of higher performance.

3. Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

4. Intel® Turbo Boost performance varies depending on hardware, software and overall system configuration. See [www.intel.com/technology/turboboost](http://www.intel.com/technology/turboboost) for more information.

### Technical Specifications

5. In accordance with Microsoft's support policy, HP does not support the Windows 8 or Windows 7 operating system on products configured with Intel and AMD 7th generation and forward processors or provide any Windows 8 or Windows 7 drivers on <http://www.support.hp.com>

6. For full Intel® vPro® functionality, Windows 10 Pro 64 bit, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or WLAN card and TPM 2.0 are required. Some functionality requires additional 3rd party software in order to run. See <http://intel.com/vpro>

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## GRAPHICS

### Integrated

Intel® Graphics

### Supports

UMA: Support HDMI 2.1 <sup>7</sup>

7. HDMI cable sold separately

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## DISPLAY

### Non-Touch

33.8 cm (13.3") diagonal, WUXGA (1920 x 1200), Bent, LCD, UWVA, anti-glare, WLED + Low Blue Light, 1000 nits, sRGB 100%, HP Sure View reflect integrated privacy screen <sup>9,10,11,12</sup>

33.8 cm (13.3") diagonal, WUXGA (1920 x 1200), Bent, LCD, UWVA, anti-glare, WLED + Low Blue Light, 400 nits, low power, sRGB 100% <sup>9,10,12</sup>

33.8 cm (13.3") diagonal, WUXGA (1920 x 1200), Bent, LCD, UWVA, anti-glare, LED, 300 nits, NTSC 45% <sup>9,10,12</sup>

### Touch

33.8 cm (13.3") diagonal, WUXGA (1920 x 1200), Bent, LCD, touch, UWVA, anti-glare, LED, 300 nits, NTSC 45% <sup>9,10,12</sup>

### Display Size (Diagonal)

33.8 cm

13.3"

9. HD content required to view HD images.

10. Resolutions are dependent upon monitor capability, and resolution and color depth settings.

11. HP Sure View Reflect integrated privacy screen is an optional feature that must be configured at purchase and is designed to function in landscape orientation.

12. Actual brightness will be lower with touchscreen or Sure View.

### Technical Specifications

#### DOCKING (Sold Separately)

Docking station model #1	HP USB-C Dock G5
Docking station model #2	HP Thunderbolt 120W G4 Dock
Docking station model #3	HP USB-C G5 Essential Dock
Docking station model #4	HP USB-C/A Universal Dock G2

For additional aftermarket options and docking specs please see page 41.

#### STORAGE AND DRIVES

##### Primary M.2 Storage

- 2 TB PCIe® Gen4x4 NVMe™ SSD Three Layer Cell <sup>13</sup>
- 1 TB PCIe® Gen4x4 NVMe™ SSD Three Layer Cell <sup>13</sup>
- 1 TB PCIe® NVMe™ SSD Value <sup>13</sup>
- 512 GB PCIe® Gen4x4 NVMe™ Self Encrypted OPAL2 SSD Three Layer Cell <sup>13</sup>
- 512 GB PCIe® Gen4x4 NVMe™ SSD Three Layer Cell <sup>13</sup>
- 512 GB PCIe® NVMe™ SSD Value <sup>13</sup>
- 256 GB PCIe® NVMe™ Self Encrypted OPAL2 SSD Value <sup>13</sup>
- 256 GB PCIe® NVMe™ SSD Value <sup>13</sup>

13. For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30GB of disk is reserved for system recovery software.

#### MEMORY

##### Maximum Memory

32GB LPDDR5-7500 MT/s RAM <sup>14</sup>

##### Memory

- 32GB LPDDR5-7500 MT/s RAM <sup>14</sup>
- 16GB LPDDR5-7500 MT/s RAM <sup>14</sup>
- 8GB LPDDR5-6400 MT/s RAM

##### Memory Slots

- Memory soldered down
- System runs at 6400
- Supports Dual Channel Memory
- Slot(s) are non-accessible / non-upgradable

14. 16GB/32GB 7500 LPDDR5X now Baymax13/13X run at 7467.

## Technical Specifications

### NETWORKING/COMMUNICATIONS

#### WLAN

Intel® AX211 Wi-Fi 6E Bluetooth® 5.3 vPro WLAN Wireless Card <sup>15</sup>

Intel® AX211 Wi-Fi 6E Bluetooth® 5.3 WLAN Wireless Card <sup>15</sup>

#### WWAN

HP 5G Sub-6 Cat 19 WWAN eSIM <sup>16,17</sup>

HP 4G LTE-A Pro Cat16 WWAN eSIM <sup>16</sup>

#### LPWAN

Qualcomm® 9205 <sup>18</sup>

#### NFC

NFC NXP NPC300 <sup>19</sup>

#### Miracast

Native Miracast Support <sup>20</sup>

15. Wi-Fi 6E requires a Wi-Fi 6E router, sold separately to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported.

16. 4G LTE module is optional, must be configured at the factory, requires activation and separately purchased service contract. Check with service provider for coverage and availability in your area. Connection, upload and download speeds will vary due to network, location, environment, network conditions, and other factors. 4G LTE not available on all products, in all regions.

17. 5G module is optional and must be configured at the factory. Module designed for 5G NR NSA (non-standalone) networks as carriers deploy Evolved-Universal Terrestrial Radio Access New Radio Dual Connectivity (ENDC) with both 100Mhz of 5G NR and LTE channel bandwidth, using 256QAM 4x4 as defined by 3GPP. Module requires activation and separately purchased service contract. Check with service provider for coverage and availability in your area. Data connection, upload and download speeds will vary due to network, location, environment, network conditions, and other factors. Backwards compatible to 4G LTE and 3G HSPA technologies. 5G module planned to be available in select platforms and select countries, where carrier supported.

18. LPWAN (also called Mobile Narrowband) support HP Protect & Trace with Wolf Connect service through the subscription term, but do not support mobile broadband use.

19. Sold separately or as an optional feature.

20. Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming.

### Technical Specifications

#### AUDIO/MULTIMEDIA

##### Audio

Audio by Poly Studio

2 Integrated stereo speakers

Discrete Amplifiers

2 Integrated dual array microphones

##### Speaker Power

1W/8ohm per speaker

##### Camera

5MP+Infrared camera <sup>21</sup>

5MP camera <sup>21</sup>

##### Sensors

Ambient Light Sensor

Adaptive Color Sensor

Hall Effect Sensor

Thermal Sensor

HP Tamper Lock <sup>22</sup>

HP Sure Platform

Fingerprint Sensor

21. Sold separately or as an optional feature.

22. HP Tamper Lock must be enabled by the customer or your administrator.

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#### KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

##### Keyboard

HP Premium Keyboard, spill-resistant, Privacy, Backlit, Durakey keyboard. <sup>23</sup>

HP Premium Keyboard, spill-resistant, Backlit, Durakey keyboard. <sup>23</sup>

HP Premium Keyboard, spill-resistant, Durakey keyboard.

##### Pointing Device

Clickpad with multi-touch gesture support

Microsoft Precision Touchpad Default Gestures Support

Multi-touch gesture support

##### Function Keys

ESC: System Information

F1 - Display Switching

F2 - Blank or Privacy

F3 - Brightness Down

F4 - Brightness Up

F5 - Audio Mute

F6 - Volume Down

F7 - Volume Up

F8 - Mic Mute

### Technical Specifications

F9 - Blank or Backlit Toggle

F10 - Insert

F11 - Airplane Mode

F12 - HP Command Center

Power Button (with LED)

Delete

Home

End

Microsoft Copilot <sup>24</sup>

#### Hidden Function Keys

Fn+R - Break, Fn+S - Sys Rq, Fn+C - Scroll Lock

23. Backlit keyboard is an optional feature.

24. Requires Windows 11 and an NPU. Timing of feature delivery and availability varies by market and device. Requires Microsoft account to log in. See <http://aka.ms/WindowsAIFeatures>

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### SOFTWARE AND SECURITY

#### Software

Adobe Offer

Bing Search for IE11

Buy Microsoft Office (Sold separately)

HP Connection Optimizer

HP Easy Clean

HP Easy Clean Keyboard Driver

HP Hotkey Support

HP Mac Address Manager

HP Notifications

HP PC Hardware Diagnostics UEFI

HP PC Hardware Diagnostics Windows

HP Power Manager

HP Privacy Settings

HP Services Scan <sup>25</sup>

HP Support Assistant <sup>26</sup>

HSA Fusion for Commercial

Miro Offer <sup>27</sup>

#### Manageability Features

HP Client Catalog (download)

HP Client Management Script Library (download)

HP Cloud Recovery <sup>28</sup>

HP Connect for Microsoft Endpoint Manager <sup>29</sup>

HP Driver Packs (download)

HP Image Assistant (download)

HP Manageability Integration Kit (download) <sup>30</sup>

HP Patch Assistant (download) <sup>31</sup>



### Technical Specifications

#### Security Features

HP Client Security Manager

HP Sure Admin <sup>32</sup>

HP Sure Click

HP Sure Recover <sup>33</sup>

HP Sure Run <sup>34</sup>

HP Sure Sense

HP Sure Start <sup>35</sup>

HP Tamper Lock

HP Wolf Security of Business <sup>36</sup>

Secured-Core PC Enable <sup>37</sup>

Windows Hello Enhanced Sign-In Security (ESS)

#### Security TPM

Model: Nuvoton NPCT760HABYX

TCG TPM 2.0

Version: 7.2.3.1

FIPS 140-2 Compliant: Yes

Model: Infineon SLB9672VU2.0 FW15.23

TCG TPM 2.0

Version: 15.23

FIPS 140-2 Compliant: Yes

#### BIOS

Absolute Persistence Module <sup>38</sup>

BIOS Update via Network

HP BIOSphere <sup>39</sup>

HP DriveLock & Automatic DriveLock

HP Fingerprint Sensor <sup>40</sup>

HP Secure Erase <sup>41</sup>

HP Wake on WLAN

Battery Health Manager <sup>42</sup>

#### Smartcard Reader

Model number: Alcorlink AK9563

FIPS 201 Compliant: Yes

#### IPv6 Support

Yes

#### FirstNet Certified

TBD

**Does the BIOS implement the ISO/IEC 19678:2015 (formerly NIST 800-147) guidelines?:** Yes

**UEFI version:** 2.7

**Class:** 3

25. HP Services Scan is preinstalled and/or provided thru Windows Update and checks for service entitlement on each hardware device and downloads the HP Insights agent automatically. To disable this feature, please follow the instructions at <http://www.hpdaas.com/requirements>. The HP Insights agent is a telemetry and analytics platform that provides critical data

## Technical Specifications

around devices and applications and is not sold as a standalone service. Select HP Workforce Solutions require an HP Insights agent for Windows, Mac, & Android, available for download at <https://admin.hp.com/software>. For full system requirements and services that require the agent, please visit <https://admin.hp.com/requirements>. The agent collects telemetry and analytics around devices and applications that integrate into the Workforce Experience platform and is not sold as a standalone service. Internet access with connection to the Workforce Experience platform is required. HP follows stringent GDPR privacy regulations, and the platform is ISO27001, ISO27701, ISO27017 and SOC2 Type2 certified for Information Security. Not available in China.

26. HP Support Assistant is available on Windows. For more information, please visit <http://www.support.hp.com/help/hp-support-assistant>

27. HP customers qualify for a 90 day trail of Miro, this offer ends September 2025. Complete terms and conditions are provided by Miro when accepting the offer.

28. HP Cloud Recovery is available for Z by HP, HP Elite and Pro desktops and laptops PCs with Intel® or AMD processors and requires an open, network connection. **NOTE:** You must back up important files, data, photos, videos, etc. before use to avoid loss of data. Details, please refer to: <https://support.hp.com/us-en/document/c05115630>.

29. HP Connect for Microsoft Endpoint Manager is available from the Azure Market Place for HP Pro, Elite, Z and Point-of-Sale PCs managed with Microsoft Endpoint Manager. Subscription to Microsoft Endpoint Manager required and sold separately. Network connection required.

30. HP Manageability Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>.

31. HP Patch Assistant available on select HP PCs with the HP Manageability Kit that are managed through Microsoft System Center Configuration Manager. HP Manageability Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>.

32. HP Sure Admin requires HP G8 or newer platforms, Windows 10 or higher, HP BIOS, HP Manageability Kit or KMS Service from <http://www.hp.com/go/clientmanagement> and HP Sure Admin Local Access Authenticator smartphone app from the Android or Apple store

33. HP Sure Recover is available on select HP PCs and requires Windows 10 or 11 and an open network connection. You must back up important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data.

34. HP Sure Run is available on select HP PCs and requires Windows 10 and higher.

35. HP Sure Start is available on select HP PCs and requires Windows 10 and higher

36. HP Wolf Security for Business requires Windows 10 or 11 Pro or higher, includes various HP security features and is available on HP Pro, Elite, RPOS and Workstation products. See product details for included security features.

37. Secured-Core PC Enable requires an Intel® vPro®, AMD Ryzen™ Pro processor or Qualcomm® processor with SD850 or higher and requires 8 GB or more system memory. Secured-core PC is enabled from the factory.

38. Absolute firmware module is shipped turned off and can only be activated with the purchase a license subscription and full activation of the software agent. License subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. Certain conditions apply. For full details visit: <https://www.absolute.com/about/legal/agreements/absolute/>

39. HP BIOSphere features may vary depending on the platform and configuration.

40. HP Fingerprint Reader is an optional feature that requires Windows 10 or 11 and must be configured at purchase.

41. HP Secure Erase implements the methods outlined in the National Institute of Standards and Technology Special Publication 800-88r "Clear" sanitation method. HP Secure Erase does not support platforms with Intel® Optane™.

42. Depending on what version of HP Battery Health Manager (BHM) is available for your device, HP BHM may look at a number of factors to determine how to adjust battery charging over time to optimize battery health. HP BHM is preset to "Let HP Manage my Battery Charging" to allow the system to balance charging between battery health and battery duration. As Let HP Manage My Battery Charging adjusts charge capacity, the amount of run-time on battery will be reduced over time. HP may utilize BIOS updates to adjust BHM settings on select systems to optimize battery health and reduce exposure to those factors that can accelerate battery degradation. To update or change HP BHM settings and for complete details, see [https://support.hp.com/us-en/document/ish\\_4449597-3519507-16](https://support.hp.com/us-en/document/ish_4449597-3519507-16)

## Technical Specifications

### POWER

#### Power Supply

HP Standard 65W USB Type-C® adapter <sup>43</sup>

HP Slim 65W USB Type-C® adapter <sup>43</sup>

#### Battery

HP Long Life 3 cell 56Whr Polymer <sup>44,45</sup>

#### Battery Recharge Time

Supports battery HP Fast Charge: approximately 50% in 30 minutes <sup>46</sup>

#### Power Cord

3-wire plug - 1m <sup>43</sup>

#### Battery Life

Up to 16 hours with 56whr battery (HP Long Life 3-Cell, 56 Whr Polymer, UMA graphic, Intel Ultra 7 U15 vPro, Display set to 250 nits display (on a 400-nit display), 2\*8G LPDDR5 memory, 256 GB SSD) <sup>47</sup>

43. Availability may vary by country.

44. Battery is internal and not replaceable by customer. Serviceable by warranty.

45. Actual battery Watt-hours (Wh) will vary from design capacity. Battery capacity will naturally decrease with shelf life, time, usage, environment, temperature, system configuration, loaded apps, features, power management settings and other factors.

46. Recharges your battery up to 50% within 30 minutes when the system is off or in standby mode. Power adapter minimum of 65 watts required for battery capacities 56Whr or less. Power adapter minimum of 100 watts required for battery capacities greater than 56Whr and less than 83Whr. Power adapter minimum of 120 watts required for battery capacities greater than 83Whr and less than 100Whr. After charging has reached 50% capacity, charging will return to normal. Charging time may vary +/-10% due to System tolerance.

47. Mobile Mark 25 battery life will vary depending on various factors including product model, configuration, loaded applications, features, use, wireless functionality, and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See [www.bapco.com](http://www.bapco.com) for additional details.

### Technical Specifications

#### WEIGHTS & DIMENSIONS

##### Product Weight

Starting at 1.293 kg (2.85 lb) with 56.00 Wh battery  
Weight will vary by configuration. Does not include power adapter.

##### Product Dimensions (W x D x H) <sup>48</sup>

300.05 (W) x 215 (D) x 8.905 mm (front) / 16.35mm (rear)  
11.81 in x 8.46 in x 0.35 in (front) / 0.64 in (rear)  
Maximum height 19.2mm / Maximum height 0.75 in

##### Pallet Dimensions (W x D x H) <sup>49</sup>

12" to 15" boxes (305mm height): 1200mm x 1000mm x 1080mm

48. Product packaging size varies based on options chosen. Please contact your HP representative for your packaging size details.

49. Front height measurement is near the front edge where the mechanical chassis taper begins. Back height measurement is near the rear edge where the mechanical chassis taper ends.

#### PORTS/SLOTS

##### Left Side

2 Thunderbolt™ 4 USB4™ Type-C® 40 Gbps USB Power Delivery DisplayPort™ 1.4 <sup>50</sup>  
1 Super Speed USB Type-A 5Gbps Power charging  
1 HDMI 2.1 <sup>8</sup>  
1 Smart Card Reader (Integrated)

##### Right side

1 Super Speed USB Type-A 5Gbps Power charging  
1 Headphone/mic combo jack  
1 Nano SIM card slot (Integrated)  
1 Security lock slot (Integrated)

50. SuperSpeed USB 20Gbps is not available with Thunderbolt™ 4.

8. HDMI cable sold separately.

### Technical Specifications

#### SERVICE AND SUPPORT

1-year warranty and 90 day software limited warranty options depending on country. Batteries have a default one year limited warranty except for HP Long Life batteries which will follow the one or three year warranty of the platform. Refer to <http://www.hp.com/support/batterywarranty/> for additional battery information. On-site service and extended coverage is also available. HP Care Pack Services are optional extended service contracts that go beyond the standard limited warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: <http://www.hp.com/go/cpc>.<sup>51</sup>

51. HP Care Packs are sold separately. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit <http://www.hp.com/go/cpc>. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.

## Technical Specifications

### SYSTEM UNIT

#### Stand-Alone Power Requirements (AC Power)

Nominal Operating Voltage	20.0V
Max Operating Power	UMA 65W

#### Temperature

Operating	0° to 35° C ( 32° to 95° F)
Non-operating	-20° to 60° C ( -4° to 140° F)

#### Relative Humidity

Operating	10% to 90 % (non-condensing)
Non-operating	5% to 95 %, 38.7° C (101.6° F) maximum wet bulb temperature

#### Shock

Operating	40 G, 2 ms, half-sine
Non-operating	240 G, 2 ms, half-sine

#### Random Vibration

Operating	1.043 grams
Non-operating	3.500 grams

#### Altitude (unpressurized)

Operating	3048 m (10000 ft)
Non-operating	12192 m (40000 ft)

#### Planned Industry Standard Certifications

Regulatory Model Number	HSN-I45C-3
CSA/UL 62368-1	Yes
ENERGY STAR®	Yes <sup>52</sup>
EPEAT®	EPEAT® Gold in the United States <sup>53</sup>
FCC/ICES/CISPR/VCCI	Yes
CE MARKING	Yes
GS Mark	Yes

Related commodity should comply with ISO 9241 Standards.

China CCC/SRRC	Yes
Taiwan BSMI/NCC	Yes
Korea KCC/KC/KES	Yes
Ukraine NSoC/TEC	Yes
EAEU Compliance	Yes
Saudi Arabian Compliance	Yes
TCO	Yes
WW RoHS	Yes
Low Blue Light	Yes

52. Configurations of the HP EliteBook 830 G13 that are ENERGY STAR® qualified are identified as HP EliteBook 830 G13 ENERGY STAR on HP websites and on <http://www.energystar.gov>.

53. Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® status varies by country. Visit <http://www.epeat.net> for more information.

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#### DISPLAYS

1. Actual brightness will be lower with touchscreen or HP Sure View.

**NOTE:** All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

<b>13.3 in WUXGA (1920 x 1200) Anti-Glare UWVA WLED+LBL sRGB NB2Y 1000 eDP 1.3+PSR 100 PrivacyG4 Plus bent LCD Panel</b>	<b>Outline Dimensions (W x H)</b>	291.380 x 188.640 (max)
	<b>Active Area</b>	286.080 x 178.800 (typ)
	<b>Weight</b>	210 (max)
	<b>Diagonal Size</b>	13.3
	<b>Thickness</b>	2.2 / 3.9 (max)
	<b>Interface</b>	eDP 1.3
	<b>Surface Treatment</b>	Anti-Glare
	<b>Touch Enabled</b>	No
	<b>Contrast Ratio</b>	1500:1 (typ)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness</b>	1000 nits <sup>1</sup>
	<b>Pixel Resolution - Format</b>	1920 x1200 (WUXGA)
	<b>Backlight</b>	WLED
	<b>Pixel Resolution</b>	RGB
	<b>Color Gamut Coverage</b>	sRGB 100%
	<b>Color Depth</b>	8
	<b>Viewing Angle</b>	UWVA 85/85/85/85
<b>Low Blue Light</b>	Yes	
<b>Power Consumption (W, EBL@ 150nits max/ 200nits max))</b>	N/A	

<b>13.3 in WUXGA (1920 x 1200) Anti-Glare UWVA WLED+LBL sRGB NB2X 400 eDP 1.4+PSR2 Low-Power 100 bent LCD Panel</b>	<b>Outline Dimensions (W x H)</b>	292.040 x 189.830 (max)
	<b>Active Area</b>	286.040 x 178.780 (typ)
	<b>Weight</b>	185 (max)
	<b>Diagonal Size</b>	13.3
	<b>Thickness</b>	2.0 / 3.8 (max)
	<b>Interface</b>	eDP 1.4
	<b>Surface Treatment</b>	Anti-Glare
	<b>Touch Enabled</b>	No
	<b>Contrast Ratio</b>	1200:1(typ)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness</b>	400 nits <sup>1</sup>
	<b>Pixel Resolution - Format</b>	1920 x 1200 (WUXGA)
	<b>Backlight</b>	WLED
	<b>Pixel Resolution</b>	RGB
<b>Color Gamut Coverage</b>	sRGB 100%	
<b>Color Depth</b>	8	

### Technical Specifications

<b>Viewing Angle</b>	UWVA 89/89/89/89
<b>Low Blue Light</b>	Yes
<b>Power Consumption (W, EBL@ 150nits max/ 200nits max))</b>	1.21 (max) / 1.45 (max)

<b>13.3 in WUXGA (1920 x 1200) Anti-Glare UWVA LED NTSC 45 NB2X 300 eDP 1.2 w/o PSR bent LCD Panel</b>	<b>Outline Dimensions (W x H)</b>	291.74 x 189.53 (max)
	<b>Active Area</b>	286.04 x 178.78 (typ)
	<b>Weight</b>	280 (max)
	<b>Diagonal Size</b>	13.3
	<b>Thickness</b>	3.0 / 5.0 (max)
	<b>Interface</b>	eDP 1.2
	<b>Surface Treatment</b>	Anti-Glare
	<b>Touch Enabled</b>	No
	<b>Contrast Ratio</b>	1000:1(typ)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness</b>	300 nits <sup>1</sup>
	<b>Pixel Resolution - Format</b>	1920 x 1200 (WUXGA)
	<b>Backlight</b>	WLED
	<b>Pixel Resolution</b>	RGB
	<b>Color Gamut Coverage</b>	NTSC 45%
	<b>Color Depth</b>	6+2 FRC
	<b>Viewing Angle</b>	UWVA 89/89/89/89
<b>Low Blue Light</b>	No	
<b>Power Consumption (W, EBL@ 150nits max/ 200nits max))</b>	2.26 (max) / 2.78 (max)	

<b>13.3 in WUXGA (1920 x 1200) Anti-Glare UWVA LED NTSC 45 NB2X 300 TOP eDP 1.2 w/o PSR bent LCD Panel+PSR2 Low-Power 100 bent LCD Panel</b>	<b>Outline Dimensions (W x H)</b>	292.040 x 189.830 (max)
	<b>Active Area</b>	286.042 x 178.780 (typ)
	<b>Weight</b>	280 (max)
	<b>Diagonal Size</b>	13.3
	<b>Thickness</b>	3.0 / 5.0 (max)
	<b>Interface</b>	eDP1.2
	<b>Surface Treatment</b>	Anti-Glare
	<b>Touch Enabled</b>	Yes
	<b>Contrast Ratio</b>	1000:1 (typ)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness</b>	300 nits <sup>1</sup>
	<b>Pixel Resolution - Format</b>	1920 x 1200 (WUXGA)
	<b>Backlight</b>	WLED
	<b>Pixel Resolution</b>	RGB



### Technical Specifications

<b>Color Gamut Coverage</b>	NTSC 45%
<b>Color Depth</b>	6+2 FRC
<b>Viewing Angle</b>	UWVA 89/89/89/89
<b>Low Blue Light</b>	No
<b>Power Consumption (W, EBL@ 150nits max/ 200nits max))</b>	2.39 (max) / 2.96 (max)

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## Technical Specifications

**STORAGE AND DRIVES**

For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10 and 11) is reserved for system recovery software.

<b>SSD 512GB 2280 PCIe-4x4 NVMe Three Layer Cell</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	512GB
	<b>NAND Type</b>	TLC
	<b>Interface</b>	PCIe NVMe Gen4X4
	<b>Maximum Sequential Read</b>	6400 MB/s $\pm$ 20%
	<b>Maximum Sequential Write</b>	3500 MB/s $\pm$ 20%
	<b>Logical Blocks</b>	1,000,215,215
	<b>Features</b>	Pyrite 2.0; TRIM; L1.2

<b>SSD 1TB 2280 PCIe-4x4 NVMe Three Layer Cell</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	1TB
	<b>NAND Type</b>	TLC
	<b>Interface</b>	PCIe NVMe Gen4X4
	<b>Maximum Sequential Read</b>	6400 MB/s $\pm$ 20%
	<b>Maximum Sequential Write</b>	5000 MB/s $\pm$ 20%
	<b>Logical Blocks</b>	2,000,409,264
	<b>Features</b>	Pyrite 2.0; TRIM; L1.2

<b>SSD 2TB 2280 PCIe-4x4 NVMe Three Layer Cell</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	2TB
	<b>NAND Type</b>	TLC
	<b>Interface</b>	PCIe NVMe Gen4X4
	<b>Maximum Sequential Read</b>	6400 MB/s $\pm$ 20%
	<b>Maximum Sequential Write</b>	5000 MB/s $\pm$ 20%
	<b>Logical Blocks</b>	4,000,797,360
	<b>Features</b>	Pyrite 2.0; TRIM; L1.2

<b>256GB PCIe 2280 NVMe Self Encrypted OPAL2 Value Solid State Drive</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	256GB
	<b>NAND Type</b>	TLC
	<b>Interface</b>	PCIe NVMe Gen4X4
	<b>Maximum Sequential Read</b>	2000 MB/s $\pm$ 20%
	<b>Maximum Sequential Write</b>	900 MB/s $\pm$ 20%
	<b>Logical Blocks</b>	500,118,192
	<b>Features</b>	TCG Opal 2.0; TRIM; L1.2

### Technical Specifications

<b>512GB PCIe-4x4 2280 NVMe Self Encrypted OPAL2 Three Layer Cell Solid State Drive</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	512GB
	<b>NAND Type</b>	TLC
	<b>Interface</b>	PCIe NVMe Gen4X4
	<b>Maximum Sequential Read</b>	6400 MB/s ±20%
	<b>Maximum Sequential Write</b>	3500 MB/s ±20%
	<b>Logical Blocks</b>	1,000,215,215
	<b>Features</b>	TCG Opal 2.0; TRIM; L1.2

<b>SSD 256GB 2280 PCIe NVMe Value</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	256 GB
	<b>NAND Type</b>	TLC
	<b>Interface</b>	PCIe NVMe Gen4X4
	<b>Maximum Sequential Read</b>	2000 MB/s ±20%
	<b>Maximum Sequential Write</b>	900 MB/s ±20%
	<b>Logical Blocks</b>	500,118,192
	<b>Features</b>	Pyrite 2.0; TRIM; L1.2

<b>SSD 512GB 2280 PCIe NVMe Value</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	512 GB
	<b>NAND Type</b>	TLC
	<b>Interface</b>	PCIe NVMe Gen4X4
	<b>Maximum Sequential Read</b>	2200 MB/s ±20%
	<b>Maximum Sequential Write</b>	1000 MB/s ±20%
	<b>Logical Blocks</b>	1,000,215,215
	<b>Features</b>	Pyrite 2.0; TRIM; L1.2

<b>SSD 1TB 2280 PCIe NVMe Value</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	1TB
	<b>NAND Type</b>	TLC
	<b>Interface</b>	PCIe NVMe Gen4X4
	<b>Maximum Sequential Read</b>	2200 MB/s ±20%
	<b>Maximum Sequential Write</b>	1600 MB/s ±20%
	<b>Logical Blocks</b>	2,000,409,264
	<b>Features</b>	Pyrite 2.0; TRIM; L1.2

### Technical Specifications

#### NETWORKING/COMMUNICATIONS

<p><b>Intel® AX211 Wi-Fi 6E +BT Wireless LAN Standards</b></p> <p><b>5.3 M.2 160MHz CNVi</b></p> <p><b>World-wide WLAN vPro®<sup>1</sup></b></p>	<p>IEEE 802.11a</p> <p>IEEE 802.11b</p> <p>IEEE 802.11g</p> <p>IEEE 802.11n</p> <p>IEEE 802.11ac</p> <p>IEEE 802.11ax</p> <p>IEEE 802.11d</p> <p>IEEE 802.11e</p> <p>IEEE 802.11h</p> <p>IEEE 802.11i</p> <p>IEEE 802.11k</p> <p>IEEE 802.11r</p> <p>IEEE 802.11v</p>
<p><b>Interoperability</b></p>	<p>Wi-Fi certified</p>
<p><b>Frequency Band</b></p>	<ul style="list-style-type: none"> <li>• 802.11b/g/n/ax 2.402 – 2.482 GHz</li> <li>• 802.11a/n/ac/ax 4.9 – 4.95 GHz (Japan)</li> <li>5.15 – 5.25 GHz</li> <li>5.25 – 5.35 GHz</li> <li>5.47 – 5.725 GHz</li> <li>5.825 – 5.850 GHz</li> <li>5.955 – 6.415 GHz</li> <li>6.435 – 6.515 GHz</li> <li>6.535 – 6.875 GHz</li> <li>6.895 – 7.115 GHz</li> </ul>
<p><b>Data Rates</b></p>	<ul style="list-style-type: none"> <li>• 802.11b: 1, 2, 5.5, 11 Mbps</li> <li>• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11n: max 300Mbps</li> <li>• 802.11ac: 1733Mbps</li> <li>• 802.11ax: max 2.4Gbps</li> </ul>
<p><b>Modulation</b></p>	<p>Direct Sequence Spread Spectrum</p> <p>OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM</p>
<p><b>Security<sup>2</sup></b></p>	<ul style="list-style-type: none"> <li>• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only</li> <li>• AES-CCMP: 128 bit in hardware</li> <li>• 802.1x authentication</li> <li>• WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>• WPA2 certification</li> <li>• WPA3 certification</li> <li>• IEEE 802.11i</li> <li>• WAPI</li> </ul>
<p><b>Network Architecture</b></p>	<p>Ad-hoc (Peer to Peer)</p>
<p><b>Models</b></p>	<p>Infrastructure (Access Point Required)</p>
<p><b>Roaming</b></p>	<p>IEEE 802.11 compliant roaming between access points</p>
<p><b>Output Power<sup>3</sup></b></p>	<ul style="list-style-type: none"> <li>• 802.11b : +17dBm minimum</li> </ul>

### Technical Specifications

	<ul style="list-style-type: none"> <li>• 802.11g : +16dBm minimum</li> <li>• 802.11a : +17dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +14dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +13dBm minimum</li> <li>• 802.11n HT20(5GHz) : +14dBm minimum</li> <li>• 802.11n HT40(5GHz) : +13dBm minimum</li> <li>• 802.11ac VHT80(5GHz) : +10dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE40(2.4GHz) : +12dBm minimum</li> <li>• 802.11ax HE80(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE160(5GHz) : +10dBm minimum</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>4</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b, 1Mbps : -93.5dBm maximum</li> <li>• 802.11b, 11Mbps : -84dBm maximum</li> <li>• 802.11a/g, 6Mbps : -86dBm maximum</li> <li>• 802.11a/g, 54Mbps : -72dBm maximum</li> <li>• 802.11n, MCS07 : -67dBm maximum</li> <li>• 802.11n, MCS15 : -64dBm maximum</li> <li>• 802.11ac, MCS0(VHT80) : -84dBm maximum</li> <li>• 802.11ac, MCS9(VHT80) : -59dBm maximum</li> <li>• 802.11ac, MCS9(VHT160) : -58.5dBm maximum</li> <li>• 802.11ax, MCS11(HE40) : -57dBm maximum</li> <li>• 802.11ax, MCS11(HE80) : -54dBm maximum</li> <li>• 802.11ax, MCS11(HE160) : -53.5dBm maximum</li> </ul>
<b>Antenna type</b>	High efficiency antenna with spatial diversity Two embedded tri-band 2.4/5/6 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
<b>Form Factor</b>	PCI-Express M.2 MiniCard
<b>Dimensions</b>	Type 2230: 2.3 x 22.0 x 30.0 mm
<b>Weight</b>	Type 2230: 2.8g
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	<b>Operating</b> 14° to 158° F (-10° to 70° C) <b>Non-operating</b> -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	<b>Operating</b> 10% to 90% (non-condensing) <b>Non-operating</b> 5% to 95% (non-condensing)
<b>Altitude</b>	<b>Operating</b> 0 to 10,000 ft (3,048 m) <b>Non-operating</b> 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF; LED OFF – Radio ON

### HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1/5.2/5.3 Wireless Technology



## Technical Specifications

<b>Bluetooth Specification</b>	4.0/4.1/4.2/5.0/5.1/5.2/5.3 Compliant
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
<b>Signaling Data Rate</b>	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps BLE: 1 Mbps data rate; throughput up to 0.2 Mbps Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
<b>Bluetooth Software Supported</b>	1. Microsoft Windows Bluetooth Software 2. Linux/Chrome OS Bluetooth Software.
<b>Link Topology</b>	
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<b>Certifications</b>	FCC (47 CFR) Part 15C/E, Section 15.247, 15.249, 15.407 ETSI 300 328, ETSI 301 893, ETSI 303 687
<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) BT5.2 ESR9/10 Compliance LE Advertisement Extensions Channel Selection Algo Limited High Duty Cycle Non-Connectable Advertising 2Mbps LE LE Long Range BT5.3 Host to Controller Encryption Key Control Enhancements Compliance to the latest Errata Sectipn 12.3 of BT 5.3 specification

1. Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported. Wi-Fi 6E

### Technical Specifications

is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels.

2. Check latest software/driver release for updates on supported security features.

3. The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.

4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

#### Intel® AX211 Wi-Fi 6E +BT Wireless LAN Standards

#### 5.3 M.2 160MHz CNVi

#### World-wide WLAN

#### non-vPro® 1

IEEE 802.11a  
 IEEE 802.11b  
 IEEE 802.11g  
 IEEE 802.11n  
 IEEE 802.11ac  
 IEEE 802.11ax  
 IEEE 802.11d  
 IEEE 802.11e  
 IEEE 802.11h  
 IEEE 802.11i  
 IEEE 802.11k  
 IEEE 802.11r  
 IEEE 802.11v

#### Interoperability

Wi-Fi certified

#### Frequency Band

- 802.11b/g/n/ax  
2.402 – 2.482 GHz
- 802.11a/n/ac/ax  
4.9 – 4.95 GHz (Japan)  
5.15 – 5.25 GHz  
5.25 – 5.35 GHz  
5.47 – 5.725 GHz  
5.825 – 5.850 GHz  
5.955 – 6.415 GHz  
6.435 – 6.515 GHz  
6.535 – 6.875 GHz  
6.895 – 7.115 GHz

#### Data Rates

- 802.11b: 1, 2, 5.5, 11 Mbps
- 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
- 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
- 802.11n: max 300Mbps
- 802.11ac: 1733Mbps
- 802.11ax: max 2.4Gbps

#### Modulation

Direct Sequence Spread Spectrum  
 OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM

#### Security<sup>2</sup>

- IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only
- AES-CCMP: 128 bit in hardware
- 802.1x authentication
- WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.
- WPA2 certification
- WPA3 certification

## Technical Specifications

	<ul style="list-style-type: none"> <li>• IEEE 802.11i</li> <li>• WAPI</li> </ul>
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
<b>Output Power<sup>3</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b : +17dBm minimum</li> <li>• 802.11g : +16dBm minimum</li> <li>• 802.11a : +17dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +14dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +13dBm minimum</li> <li>• 802.11n HT20(5GHz) : +14dBm minimum</li> <li>• 802.11n HT40(5GHz) : +13dBm minimum</li> <li>• 802.11ac VHT80(5GHz) : +10dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE40(2.4GHz) : +12dBm minimum</li> <li>• 802.11ax HE80(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE160(5GHz) : +10dBm minimum</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>4</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b, 1Mbps : -93.5dBm maximum</li> <li>• 802.11b, 11Mbps : -84dBm maximum</li> <li>• 802.11a/g, 6Mbps : -86dBm maximum</li> <li>• 802.11a/g, 54Mbps : -72dBm maximum</li> <li>• 802.11n, MCS07 : -67dBm maximum</li> <li>• 802.11n, MCS15 : -64dBm maximum</li> <li>• 802.11ac, MCS0(VHT80) : -84dBm maximum</li> <li>• 802.11ac, MCS9(VHT80) : -59dBm maximum</li> <li>• 802.11ac, MCS9(VHT160) : -58.5dBm maximum</li> <li>• 802.11ax, MCS11(HE40) : -57dBm maximum</li> <li>• 802.11ax, MCS11(HE80) : -54dBm maximum</li> <li>• 802.11ax, MCS11(HE160) : -53.5dBm maximum</li> </ul>
<b>Antenna type</b>	High efficiency antenna with spatial diversity Two embedded tri-band 2.4/5/6 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
<b>Form Factor</b>	PCI-Express M.2 MiniCard
<b>Dimensions</b>	Type 2230: 2.3 x 22.0 x 30.0 mm
<b>Weight</b>	Type 2230: 2.8g
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	<b>Operating</b> 14° to 158° F (-10° to 70° C) <b>Non-operating</b> -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	<b>Operating</b> 10% to 90% (non-condensing)



## Technical Specifications

	<b>Non-operating</b>	5% to 95% (non-condensing)
<b>Altitude</b>	<b>Operating</b>	0 to 10,000 ft (3,048 m)
	<b>Non-operating</b>	0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF; LED OFF – Radio ON	
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1/5.2/5.3 Wireless Technology</b>		
<b>Bluetooth Specification</b>	4.0/4.1/4.2/5.0/5.1/5.2/5.3 Compliant	
<b>Frequency Band</b>	2402 to 2480 MHz	
<b>Number of Available Channels</b>	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)	
<b>Signaling Data Rate</b>	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps BLE: 1 Mbps data rate; throughput up to 0.2 Mbps Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)	
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.	
<b>Power Consumption</b>	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW	
<b>Bluetooth Software Supported</b>	1. Microsoft Windows Bluetooth Software 2. Linux/Chrome OS Bluetooth Software.	
<b>Link Topology</b>		
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
<b>Certifications</b>	FCC (47 CFR) Part 15C/E, Section 15.247, 15.249, 15.407 ETSI 300 328, ETSI 301 893, ETSI 303 687	
<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) BT5.2 ESR9/10 Compliance LE Advertisement Extensions Channel Selection Algo Limited High Duty Cycle Non-Connectable Advertising 2Mbps LE LE Long Range	

### Technical Specifications

#### BT5.3

Host to Controller Encryption Key Control Enhancements

Compliance to the latest Errata Section 12.3 of BT 5.3 specification

1. Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported. Wi-Fi 6E is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels.
  2. Check latest software/driver release for updates on supported security features.
  3. The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.
  4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
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## Technical Specifications

### HP 5G Sub-6 Cat 19 WWAN Technology/Operating eSIM bands

#### WCDMA/HSPA+ operating bands:

Band 1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)

Band 2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)

Band 4: 1710 to 1755 MHz (UL), 2110 to 2155 MHz (DL)

Band 5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)

Band 8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)

#### LTE FDD/TDD operating bands:

Band 1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)

Band 2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)

Band 3: 1710 to 1785 MHz (UL), 1805 to 1880 MHz (DL)

Band 4: 1710 to 1755 MHz (UL), 2110 to 2155 MHz (DL)

Band 5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)

Band 7: 2500 to 2570 MHz (UL), 2620 to 2690 MHz (DL)

Band 8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)

Band 12: 699 to 716 MHz (UL), 729 to 746 MHz (DL)

Band 13: 777 to 787 MHz (UL), 746 to 756 MHz (DL)

Band 14: 788 to 798 MHz (UL), 758 to 768 MHz (DL)

Band 17: 704 to 716 MHz (UL), 734 to 746 MHz (DL)

Band 18: 815 to 830 MHz (UL), 860 to 875 MHz (DL)

Band 19: 830 to 845 MHz (UL), 875 to 890 MHz (DL)

Band 20: 832 to 862 MHz (UL), 791 to 821 MHz (DL)

Band 25: 1850 to 1915 MHz (UL), 1930 to 1995 MHz (DL)

Band 26: 814 to 849 MHz (UL), 859 to 894 MHz (DL)

Band 28: 703 to 748 MHz (UL), 758 to 803 MHz (DL)

Band 29: 717 to 728 MHz (DL)

Band 30: 2305 to 2315 MHz (UL) 2350 to 2360 MHz (DL)

Band 32: 1452 to 1496 MHz (DL)

Band 34: 2010 to 2025 MHz (UL/DL)

Band 38: 2570 to 2620 MHz (UL/DL)

Band 39: 1880 to 1920 MHz (UL/DL)

Band 40: 2300 to 2400 MHz (UL/DL)

Band 41: 2496 to 2690 MHz (UL/DL)

Band 42: 3400 to 3600 MHz (UL/DL)

Band 43: 3400 to 3800 MHz (UL/DL)

Band 46: 5150 to 5925 MHz (DL)

Band 48: 3550 to 3700 MHz (UL/DL)

Band 66: 1710 to 1800 MHz (UL), 2110 to 2200 MHz (DL)

Band 71: 663 to 698 MHz (UL), 617 to 652 MHz (DL)

#### 5G NR Sub 6GHz

n1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)

n2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)

n3: 1710 to 1785 MHz (UL), 1805 to 1880 MHz (DL)

n5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)

n7: 2500 to 2570 MHz (UL), 2620 to 2690 MHz (DL)

n8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)

n20: 832 to 862 MHz (UL), 791 to 821 MHz (DL)

n25: 1850 to 1915 MHz (UL), 1930 to 1995 MHz (DL)

n28: 703 to 748 MHz (UL), 758 to 803 MHz (DL)

n30: 2305 to 2315 MHz (UL) 2350 to 2360 MHz (DL)

n38: 2570 to 2620 MHz (UL/DL)

n40: 2300 to 2400 MHz (UL/DL)

n41: 2496 to 2690 MHz (UL/DL)

n48: 3550 to 3700 MHz (UL/DL)

n66: 1710 to 1800 MHz (UL), 2110 to 2200 MHz (DL)

n71: 663 to 698 MHz (UL), 617 to 652 MHz (DL)

n77: 3300 to 4200 MHz (UL/DL)

## Technical Specifications

	n78: 3300 to 3800 MHz (UL/DL) n79: 4400 to 5000 MHz (UL/DL)
<b>Wireless protocol standards</b>	NR Sub6G rel15 200MHz 2 DLCA, 256 QAM 200MHz 2 ULCA, 256 QAM 15KHz/30KHz SCS for FDD/TDD LTE Rel15 100MHz 5 DLCA, 256 QAM 40MHz 2 ULCA, 256 QAM UMTS Rel8
<b>GPS</b>	GPS only support L1 C/A GPS: L1 (1575.42MHz) GLONASS: L1 (1602MHz)
<b>GPS bands</b>	BeidouB1(1561.098MHz) Galileo E1 (1575.42) QZSS (1575.42 MHz)
<b>Maximum data rates</b>	Sub-6 SA Peak DL 4.67Gbps/UL 1.25Gbps Sub-6 NSA Peak DL 3.74Gbps/UL 835Mbps LTE Peak DL 1.6Gbps (CAT19)/UL 211Mbps (CAT18) UMTS/HSPA+ DL DC-HSPA+: 42 Mbps (CAT24)/UL 11.5 Mbps (CAT7)
<b>Maximum output power</b>	NR: 23 dBm in all band except (n30 = 22dBm & n48=21dBm & n77=25dBm & n41/n77/n78 = 26dBm) LTE: 23 dBm in all band except (B30 = 22dBm & B48=21dBm & B41=26dBm) UMTS: 23.5 dBm
<b>Maximum power consumption</b>	3500 mA (peak); 1674mA (average)
<b>Form Factor</b>	M.2, 3052-S3 Key B
<b>Weight</b>	8.7g
<b>Dimensions (Length x Width x Thickness)</b>	52 mm x 30 mm x 2.3 mm
<b>embedded eSIM</b>	Support

1. 5G module is optional and must be configured at the factory. Module designed for 5G NR NSA (non-standalone) networks as carriers deploy Evolved-Universal Terrestrial Radio Access New Radio Dual Connectivity (ENDC) with both 100Mhz of 5G NR and LTE channel bandwidth, using 256QAM 4x4 as defined by 3GPP. Module requires activation and separately purchased service contract. Check with service provider for coverage and availability in your area. Data connection, upload and download speeds will vary due to network, location, environment, network conditions, and other factors. Backwards compatible to 4G LTE and 3G HSPA technologies. 5G module planned to be available in select platforms and select countries, where carrier supported.

## Technical Specifications

<b>HP 4G LTE-A Pro Cat16 WWAN eSIM</b>	<b>Technology/Operating bands</b>	<p>WCDMA/HSPA+ operating bands:          Band 1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)          Band 2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)          Band 4: 1710 to 1755 MHz (UL), 2110 to 2155 MHz (DL)          Band 5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)          Band 8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)</p> <p>LTE FDD/TDD operating bands:          Band 1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)          Band 2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)          Band 3: 1710 to 1785 MHz (UL), 1805 to 1880 MHz (DL)          Band 4: 1710 to 1755 MHz (UL), 2110 to 2155 MHz (DL)          Band 5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)          Band 7: 2500 to 2570 MHz (UL), 2620 to 2690 MHz (DL)          Band 8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)          Band 12: 699 to 716 MHz (UL), 729 to 746 MHz (DL)          Band 13: 777 to 787 MHz (UL), 746 to 756 MHz (DL)          Band 14: 788 to 798 MHz (UL), 758 to 768 MHz (DL)          Band 17: 704 to 716 MHz (UL), 734 to 746 MHz (DL)          Band 18: 815 to 830 MHz (UL), 860 to 875 MHz (DL)          Band 19: 830 to 845 MHz (UL), 875 to 890 MHz (DL)          Band 20: 832 to 862 MHz (UL), 791 to 821 MHz (DL)          Band 25: 1850 to 1915 MHz (UL), 1930 to 1995 MHz (DL)          Band 26: 814 to 849 MHz (UL), 859 to 894 MHz (DL)          Band 28: 703 to 748 MHz (UL), 758 to 803 MHz (DL)          Band 29: 717 to 728 MHz (DL)          Band 30: 2305 to 2315 MHz (UL) 2350 to 2360 MHz (DL)          Band 32: 1452 to 1496 MHz (DL)          Band 34: 2010 to 2025 MHz (UL/DL)          Band 38: 2570 to 2620 MHz (UL/DL)          Band 39: 1880 to 1920 MHz (UL/DL)          Band 40: 2300 to 2400 MHz (UL/DL)          Band 41: 2496 to 2690 MHz (UL/DL)          Band 42: 3400 to 3600 MHz (UL/DL)          Band 43: 3400 to 3800 MHz (UL/DL)          Band 48: 3550 to 3700 MHz (UL/DL)          Band 66: 1710 to 1800 MHz (UL), 2110 to 2200 MHz (DL)          Band 71: 663 to 698 MHz (UL), 617 to 652 MHz (DL)</p>
	<b>Wireless protocol standards</b>	<p>3GPP LTE Rel15          LTE Specification, 100MHz 5 DLCA, 256 QAM, DL 1.0Gbps (CAT16)/          40MHz 2 ULCA, 256 QAM, UL 211Mbps (CAT18)          WCDMA 3GPP Release 8 UMTS Specification, DL UMTS: 384 kbps/UL          384 kbp, DL DC-HSPA+: 42 Mbps (CAT24)/UL 11.5 Mbps (CAT7)</p>
	<b>GPS GPS bands</b>	<p>WCDMA R99,          3GPP Release 5, 6, 7 and 8 UMTS Specification          Standalone, A-GPS (MS-A, MS-B)</p> <p>GPS: L1 (1575.42MHz)          GLONASS: L1 (1602MHz)          BeidouB1(1561.098MHz)          Galileo E1 (1575.42)          QZSS (1575.42 MHz)</p>
	<b>Maximum data rates</b>	<p>LTE: ue-CategoryDL 16, (DL: 1 Gbps)          ue-CategoryUL 18, (UL: 211Mbps)          DC-HSPA+: 42 Mbps (Download), 11.5 Mbps (Upload)</p>

### Technical Specifications

<b>Maximum output power</b>	HPUE: Not supported LTE: 23 dBm in all band except (B30= 22dBm& B48= 21dBm) UMTS: 23.5 dBm
<b>Maximum power consumption</b>	LTE: 1300 mA (peak); 1100 mA (average) HSPA+: 1,100 mA (peak); 800 mA (average)
<b>Form Factor</b>	M.2, 3052-S3 Key B
<b>Weight</b>	8 g
<b>Dimensions (Length x Width x Thickness)</b>	52 mm x 30 mm x 2.3 mm
<b>embedded eSIM</b>	Support

1. Mobile Broadband is an optional feature. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products or in all countries.

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## Technical Specifications

<b>NFC NXP NPC300</b>	<b>Dimensions (L x W x H)</b>	17 x 10 x 2.0 mm
	<b>Chipset</b>	NPC300
	<b>System interface</b>	I2C
	<b>NFC RF standards</b>	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 ISO/IEC 18092 ECMA-340 NFCIP-1 Target and Initiator ECMA-320 NFCIP-2
	<b>NFC Forum Support</b>	Tag Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2
	<b>Reader (PCD-VCD) Mode</b>	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 MIFARE 1K MIFARE 4K MIFARE DESFire FeliCa Jewel and Topaz cards
	<b>Card Emulation (PICC-VICC) Mode</b>	ISO/IEC 14443 A ISO/IEC 14443 B and B' MIFARE FeliCa
	<b>Frequency</b>	13.56 MHz
	<b>NFC Modes Supported</b>	Reader/Writer, Peer-to-Peer
	<b>Raw RF Data Rates</b>	106, 212, 424, 848 kbps
	<b>Operating temperature</b>	0°C to 70°C
	<b>Storage temperature</b>	-20°C to 125°C
	<b>Humidity</b>	10-90% operating 5-95% non-operating
	<b>Supply Operating voltage</b>	4.35 to 5.25 Volts
	<b>I/O Voltage</b>	1.8V or 3.3V
	<b>Power Consumption (Booster enable, VBAT= 3.3V, VCC_BOOST = 5V)</b>	
	<b>Mode</b>	Power Consumption, Typical
	<b>Polling</b>	7.3 mA
	<b>Detected Test Tag Type 1</b>	Total 283.8 mA Net Module 236.8 mA
	<b>Detected Test Tag Type 2</b>	Total 288.8 mA Net Module 241.8 mA
	<b>Detected Test Tag Type 3</b>	Total 287.7 mA Net Module 240.7 mA
	<b>Detected Test Tag Type 4</b>	Total 282.3 mA Net Module 235.3 mA
	<b>Antenna</b>	Antenna connector, 0.5mm pitch, 7 connector FPC. Antenna matching is external to module.

## Technical Specifications

<b>Qualcomm® 9205</b> <sup>1</sup>	<b>Technology/Operating bands</b>	FDD LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3), 1700/2100 (Band 4), 850 (Band 5), 900 (Band 8), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 14 upper), 850 (Band 18 lower), 850 (Band 19 upper), 800 (Band 20), 1900 (Band 25), 850 (Band 26), 800 (Band 27), 700 (Band 28), 1700/2100 (Band 66), 700 (band 85) MHz. GSM/GPRS/EGPRS: 850, 900, 1800, 1900MHz.
	<b>Wireless protocol standards</b>	3GPP TS 51.010-1 V10.5.0: Mobile Station (MS) conformance specification; Part 1: Conformance specification 3GPP TS 36.521-1 V14.3.0: User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing 3GPP TS 21.111 V10.0.0: USIM and IC card requirements 3GPP TS 51.011 V4.15.0: Specification of the Subscriber Identity Module -Mobile Equipment (SIM-ME) interface 3GPP TS 31.102 V10.11.0: Characteristics of the Universal Subscriber Identity Module (USIM) application 3GPP TS 31.11 V10.16.0: Universal Subscriber Identity Module (USIM) Application Toolkit (USAT) 3GPP TS 36.124 V10.3.0: Electro Magnetic Compatibility (EMC) requirements for mobile terminals and ancillary equipment 3GPP TS 27.007 V10.0.8: AT command set for User Equipment (UE) 3GPP TS 27.005 V10.0.1: Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS) Standalone GPS/Beidou/Glonass, A-GPS (MS-A, MS-B)
	<b>GPS</b>	
	<b>GPS bands</b>	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz
	<b>Maximum data rates</b>	LTE FDD: 375 Kbps (Download), 1119 Kbps (Upload) GSM: GPRS: 107 Kbps (Download), 85.6 Kbps (Upload) EGPRS: 296 Kbps (Download), 236.8 Kbps (Upload)
	<b>Maximum output power</b>	LTE: 21.5 dBm in all band GSM:34dBm
	<b>Maximum power consumption</b>	LTE: 1,200 mA (peak); 900 mA (average) HSPA+: 1,100 mA (peak); 800 mA (average)
	<b>Form Factor</b>	M.2, 2242-S3 Key B
	<b>Weight</b>	5.5 g
	<b>Dimensions (Length x Width x Thickness)</b>	22 x 42 x 2.3 mm
	<b>embedded eSIM</b>	Support

1. LPWAN (also called Mobile Narrowband) supports HP Protect & Trace with Wolf Connect service through the subscription term, but does not support mobile broadband use.



### Technical Specifications

#### POWER

1. Actual battery Watt-hours (Wh) will vary from design capacity. Battery capacity will naturally decrease with shelf life, time, usage, environment, temperature, system configuration, loaded apps, features, power management settings and other factors

##### AC Adapter 65 Watt nPFC

##### Standard USB type C

##### Straight 1.8m

<b>Weight</b>	240g ± 10g
<b>Input</b>	100-240Vac
<b>Input Efficiency</b>	81.50% min at 115 Vac/ 230 Vac @5.00V 86.70% min at 115 Vac/ 230 Vac @9.00V 88.00% min at 115 Vac/ 230 Vac @12.00V 89.00% min at 115 Vac/ 230 Vac @15.00V 89.00% min at 115 Vac/ 230 Vac @20.00V
<b>Input frequency range</b>	47-63Hz
<b>Input AC current</b>	Max. 1.6 A at 90 Vac
<b>Output</b>	<b>Output power</b> 5V/15W 9V/27W 12V/60W 15V/65W 20V/65W
<b>DC output</b>	5V/9V/12V/15V/20V
<b>Hold-up time</b>	100% load 5ms at 115 Vac input
<b>Output current limit</b>	< 8.0A
<b>AC Inlet Type</b>	C6
<b>DC Cable Connector</b>	USB type C
<b>DC Cable Material</b>	PVC
<b>Connector</b>	C6
<b>Environmental Design</b>	<b>Operating temperature</b> 32° F to 95° F (0° to 35° C) <b>Non-operating (storage) temperature</b> -4° F to 185° F (-20° to 85° C) <b>Altitude</b> 0 to 16,400 ft (0 to 5000m) <b>Humidity</b> 20% to 95% <b>Storage Humidity</b> 10% to 95%
<b>EMI and Safety Certifications</b>	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950-1 and IEC62368-1 : 2018, EN62368-1:2014+A11, UL 62368-1 Agency approvals - C-UL-US, TUV/GS, TUV/PSE, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC and CECP, CU(EAC), EAEU, KCC(Safety+EMC) and K-MEPS, NOM-001 and 029 NYCE, NRcan, NRCS, ISC, SEC, PSB, Argentina S-mark, Australia RCM, BIS, BSMI, UAE, UKCA DoC

### Technical Specifications

#### HP 65W Slim USB-C Straight AC Power Adapter

<b>Weight</b>	220g ± 10g
<b>Input</b>	100-240Vac
<b>Input Efficiency</b>	81.50% min at 115 Vac/ 230 Vac @5.00V 86.70% min at 115 Vac/ 230 Vac @9.00V 88.00% min at 115 Vac/ 230 Vac @12.00V 89.00% min at 115 Vac/ 230 Vac @15.00V 89.00% min at 115 Vac/ 230 Vac @20.00V
<b>Input frequency range</b>	47-63Hz
<b>Input AC current</b>	Max. 1.6 A at 90 Vac
<b>Output</b>	<b>Output power</b> 5V/15W 9V/27W 12V/60W 15V/65W 20V/65W
<b>DC output</b>	5V/9V/12V/15V/20V
<b>Hold-up time</b>	100% load 5ms at 115 Vac input
<b>Output current limit</b>	< 8.0A
<b>AC Inlet Type</b>	C6
<b>DC Cable Connector</b>	USB type C
<b>DC Cable Material</b>	PVC
<b>Connector</b>	C6
<b>Environmental Design</b>	<b>Operating temperature</b> 32° F to 95° F (0° to 35° C) <b>Non-operating (storage) temperature</b> -4° F to 185° F (-20° to 85° C) <b>Altitude</b> 0 to 16,400 ft (0 to 5000m) <b>Humidity</b> 20% to 95% <b>Storage Humidity</b> 10% to 95%
<b>EMI and Safety Certifications</b>	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950-1 and IEC62368-1 : 2018, EN62368-1:2014+A11, UL 62368-1 Agency approvals - C-UL-US, TUV/GS, TUV/PSE, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC and CECP, CU(EAC), EAEU, KCC(Safety+EMC) and K-MEPS, NOM-001 and 029 NYCE, NRcan, NRCS, ISC, SEC, PSB, Argentina S-mark, Australia RCM, BIS, BSMI, UAE, UKCA DoC

### Technical Specifications

#### HP 3-cell Long Life Li-Ion (56Wh)<sup>1</sup>

<b>Weight</b>	0.205kg +/- 10g (0.474 lb)
<b>Cells/Type</b>	3cell Lithium-Ion Polymer cell / 586075
<b>Energy</b>	<b>Voltage</b> 11.58V
	<b>Amp-hour capacity</b> 4.84Ah
	<b>Watt-hour capacity<sup>1</sup></b> 56.04Wh
<b>Temperature</b>	<b>Operating (Charging)</b> 32° to 113° F (0° to 45° C)
	<b>Operating (Discharging)</b> 14° to 140° F (-10° to 60° C)
	<b>Optional Travel Battery Available</b> No

### AUDIO

<b>HD Stereo Codec</b>	Realtek ALC3315
<b>Audio I/O Ports</b>	3.5mm Headset: CTIA only; Headphone-out
<b>Internal Speaker Amplifier</b>	Cirrus Logic High-Efficiency Boosted Class D Amplifier
<b>Multi-streaming Capable</b>	Playback multi-streaming can be enabled in the audio control panel to allow independent audio streams to be sent to/from the front jacks or integrated speaker., Following MSFT Behavior
<b>Sampling</b>	DAC: 48.0 kHz to 48.0 kHz ADC: 48.0 kHz to 48.0 kHz
<b>Wavetable Syntheses</b>	N/A
<b># of Channels on Line-Out</b>	N/A
<b>Internal Speaker</b>	Yes

### FINGERPRINT READER

<b>Sensor vendor</b>	ELAN 80SW
<b>Sensor type</b>	Capacitive
<b>DPI resolution</b>	508 DPI
<b>Scan area</b>	80 x 80 pixels
<b>False Rejection Rate</b>	< 3%
<b>False Acceptance Rate</b>	< 0.001%
<b>Mobile Voltage Operation</b>	2.7 V ~ 3.6 V
<b>Operating Temperature</b>	-20°C ~ 80°C (-4°F ~ 176°F)
<b>Current Consumption</b>	
<b>Image</b>	35 mA max
<b>Low Latency Wait For Finger</b>	300 uA
<b>Capture Rate</b>	50 frames/sec
<b>ESD Resistance</b>	IEC 61000-4-2 4B (+15KV)
<b>Detection Matrix</b>	508 dpi / 4.0 x 4.0 mm sensor area

### Technical Specifications

<b>Sensor vendor</b>	SYNAPTICS
<b>Sensor type</b>	Capacitive
<b>DPI resolution</b>	363 DPI
<b>Scan area</b>	104 x 86 pixels
<b>False Rejection Rate</b>	< 3%
<b>False Acceptance Rate</b>	< 0.001%
<b>Mobile Voltage Operation</b>	3 V ~ 3.6 V
<b>Operating Temperature</b>	0°C ~ 60°C (32°F ~ 140°F)
<b>Current Consumption</b>	
<b>Image</b>	100 mA max
<b>Low Latency Wait For</b>	
<b>Finger</b>	260 uA
<b>Capture Rate</b>	50 frames/sec
<b>ESD Resistance</b>	IEC 61000-4-2 4B (+15KV)
<b>Detection Matrix</b>	363 dpi / 7.4 x 6.0 mm sensor area

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### Technical Specifications

#### ENVIRONMENTAL DATA

<b>Eco-Label Certifications &amp; declarations</b>	<p>This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:</p> <ul style="list-style-type: none"> <li>• IT ECO declaration</li> <li>• US ENERGY STAR®</li> <li>• US Federal Energy Management Program (FEMP)</li> <li>• EPEAT® Gold registered in the United States. See <a href="http://www.epeat.net">http://www.epeat.net</a> for registration status in your country.</li> <li>• TCO Certified</li> <li>• China Energy Conservation Program (CECP)</li> <li>• China State Environmental Protection Administration (SEPA)</li> <li>• Taiwan Green Mark</li> <li>• Korea Eco-label</li> <li>• Japan PC Green label*</li> </ul>		
<b>Sustainable Impact Specifications</b>	<ul style="list-style-type: none"> <li>• <a href="#">Product Carbon Footprint</a></li> <li>• Ocean-bound plastic in Speaker</li> <li>• 60% post-consumer recycled plastic</li> <li>• 65% recycled metal</li> <li>• Low halogen</li> <li>• Outside Box and corrugated cushions are 100% sustainably sourced and recyclable</li> <li>• Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable</li> <li>• Bulk packaging available</li> </ul>		
<b>System Configuration</b>	<p>The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a “Typically Configured Notebook”.</p>		
<b>Energy Consumption (in accordance with US ENERGY STAR® test method)</b>	<b>115VAC, 60Hz</b>	<b>230VAC, 50Hz</b>	<b>100VAC, 50Hz</b>
Normal Operation (Sort idle)	3.33 W	3.34 W	3.50 W
Normal Operation (Long idle)	1.53 W	2.23 W	1.74 W
Sleep	0.65 W	0.66 W	0.63 W
Off	0.32 W	0.35 W	0.33 W
	<p><b>NOTE:</b> Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.</p>		
<b>Heat Dissipation*</b>	<b>115VAC, 60Hz</b>	<b>230VAC, 50Hz</b>	<b>100VAC, 50Hz</b>
Normal Operation (Short idle)	11 BTU/hr	11 BTU/hr	12 BTU/hr
Normal Operation (Long idle)	5 BTU/hr	8 BTU/hr	6 BTU/hr
Sleep	2 BTU/hr	2 BTU/hr	2 BTU/hr
Off	1 BTU/hr	1 BTU/hr	1 BTU/hr
	<p>* <b>NOTE:</b> Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.</p>		

### Technical Specifications

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L <sub>WAd</sub> , bels)	Sound Pressure (L <sub>pAm</sub> , decibels)	
Typically Configured – Idle	2.6	14.0	
Fixed Disk – Random writes	3.4	23.4	
Optical Drive – Sequential reads	4.0	33.0	
<b>Longevity and Upgrading</b>	This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the		
	Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.		
<b>Additional Information</b>	<ul style="list-style-type: none"> <li>This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.</li> <li>This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.</li> <li>This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).</li> <li>This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see <a href="http://www.epeat.net">www.epeat.net</a></li> <li>Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.</li> <li>This product is 93.5% recycle-able when properly disposed of at end of life.</li> </ul>		
<b>Packaging Materials</b>	<b>External:</b>	PAPER/Corrugated	261 g
		PAPER/Molded Pulp	116 g
		PAPER/Paper	3 g
	<b>Internal:</b>	PLASTIC/Polyethylene low density - LDPE	14 g
	The plastic packaging material contains at least 100% recycled content.		
	The corrugated paper packaging materials contains at least 56.5% recycled content.		
<b>RoHS Compliance</b>	<p>HP Inc. complies fully with materials regulations. We were among the first companies to extend the restrictions in the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive to our products worldwide through the HP GSE. HP has contributed to the development of related legislation in Europe, as well as China, India, and Vietnam.</p> <p>We believe the RoHS directive and similar laws play an important role in promoting industry-wide elimination of substances of concern. We have supported the inclusion of additional substances—including PVC, BFRs, and certain phthalates—in future RoHS legislation that pertains to electrical and electronics products.</p> <p>We met our voluntary objective to achieve worldwide compliance with the new EU RoHS requirements for virtually all relevant products by July 2013, and we will continue to extend the scope of the commitment to include further restricted substances as regulations continue to evolve.</p> <p>To obtain a copy of the HP RoHS Compliance Statement, see <a href="#">HP RoHS position statement</a>.</p>		
<b>Material Usage</b>	This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at		

### Technical Specifications

	<p><a href="http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html">http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html</a> ):</p> <ul style="list-style-type: none"> <li>• Asbestos</li> <li>• Certain Azo Colorants</li> <li>• Certain Brominated Flame Retardants – may not be used as flame retardants in plastics</li> <li>• Cadmium</li> <li>• Chlorinated Hydrocarbons</li> <li>• Chlorinated Paraffins</li> <li>• Bis(2-Ethylhexyl) phthalate (DEHP)</li> <li>• Benzyl butyl phthalate (BBP)</li> <li>• Dibutyl phthalate (DBP)</li> <li>• Diisobutyl phthalate (DIBP)</li> <li>• Formaldehyde</li> <li>• Halogenated Diphenyl Methanes</li> <li>• Lead carbonates and sulfates</li> <li>• Lead and Lead compounds</li> <li>• Mercuric Oxide Batteries</li> <li>• Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.</li> <li>• Ozone Depleting Substances</li> <li>• Polybrominated Biphenyls (PBBs)</li> <li>• Polybrominated Biphenyl Ethers (PBBEs)</li> <li>• Polybrominated Biphenyl Oxides (PBBOs)</li> <li>• Polychlorinated Biphenyl (PCB)</li> <li>• Polychlorinated Terphenyls (PCT)</li> <li>• Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.</li> <li>• Radioactive Substances</li> <li>• Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)</li> </ul>
<p><b>Packaging Usage</b></p>	<p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none"> <li>• Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.</li> <li>• Eliminate the use of ozone-depleting substances (ODS) in packaging materials.</li> <li>• Design packaging materials for ease of disassembly.</li> <li>• Maximize the use of post-consumer recycled content materials in packaging materials.</li> <li>• Use readily recyclable packaging materials such as paper and corrugated materials.</li> <li>• Reduce size and weight of packages to improve transportation fuel efficiency.</li> <li>• Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.</li> </ul>
<p><b>End-of-life Management and Recycling</b></p>	<p>HP offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <a href="http://www.hp.com/go/reuse-recycle">http://www.hp.com/go/reuse-recycle</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.</p> <p>The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly</p>

### Technical Specifications

	<p>instructions) is posted on the Hewlett Packard web site at: <a href="http://www.hp.com/go/recyclers">http://www.hp.com/go/recyclers</a>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.</p>
<p><b>HP, Inc. Corporate Environmental Information</b></p>	<p>For more information about HP's commitment to the environment:</p> <p>Global Citizenship Report  <a href="http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html">http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</a></p> <p>Eco-label certifications  <a href="http://www8.hp.com/us/en/hp-information/environment/ecolabels.html">http://www8.hp.com/us/en/hp-information/environment/ecolabels.html</a></p> <p>ISO 14001 certificates:  <a href="http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842">http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842</a>          and  <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf">http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf</a></p>
<p><b>footnotes</b></p>	<ul style="list-style-type: none"> <li>• Percentage of ocean-bound plastic contained in each component varies by product</li> <li>• Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard.</li> <li>• External power supplies, WWAN modules, power cords, cables and peripherals excluded.</li> <li>• 100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers.</li> <li>• Fiber cushions made from 100% recycled wood fiber and organic materials.</li> <li>• Disclaimer: recycled metal is expressed as a percentage of the total weight of the metal according to ISO 14021 definitions for metal parts over 25 grams.</li> </ul>



### Options and Accessories (Sold separately and availability may vary by country)

#### DOCKING (Sold Separately)

<b>Docking station model #1</b>	HP USB-C Dock G5
<b>Total number of supported displays (incl. the notebook display)</b>	3
<b>Max. resolutions supported</b>	Multi-Function Mode: (2) 5k @ 30Hz and (1) 4k UHD @ 30Hz on any port High-Resolution Mode: (2) 5k @ 60Hz on DisplayPort ports and (1) 4k UHD @ 60Hz on HDMI port
<b>Dock Connectors</b>	1x HDMI 2.0, 2x DisplayPort 1.4
<b>Technical limitations</b>	<b>Maximum resolution and display support is dependent on the maximum capability of the notebook.</b>  <b>Highest resolution with dual displays is two 8K@ 60Hz host in High Resolution mode.</b> Three maximum displays supported are two 5K@ 30 Hz on DP ports plus one 4K UHD@ 30 Hz on HDMI in Multi-function mode The highest resolution for a non-Thunderbolt host in Multi-function mode is a single 5K dual cable (using both DP ports) + (1) 4K on HDMI port.
<b>Docking station model #2</b>	HP Thunderbolt 120W G4 Dock
<b>Total number of supported displays (incl. the notebook display)</b>	4
<b>Max. resolutions supported</b>	Quad 4K @60Hz Dual 8K single cable@30 for Thunderbolt hosts or USB-C hosts DisplayPort 1.4 with Display Stream Compression in High-Resolution Mode
<b>Dock Connectors</b>	2x HDMI 2.0, 2x DisplayPort 1.4, 1x Thunderbolt 4, 1x USB-C 3.2 Gen 2 DisplayPort
<b>Technical limitations</b>	<b>Maximum resolution and display support is dependent on the maximum capability of the notebook.</b>  Thunderbolt Hosts: Maximum of (4) displays with maximum resolution of 5K@ 30Hz running Thunderbolt host. Maximum resolution possible is dual 8K displays @ 60Hz running Thunderbolt host or running a non-Thunderbolt host in high resolution mode @30Hz Non-Thunderbolt hosts: The highest resolution for dual displays running a non-Thunderbolt host in multi-function mode is (1) 5K dual cable (using both DP ports) +(1) 4K on USB-C DP port Non-Thunderbolt hosts support (3) displays with a maximum resolution of (2) 5K single cable + (1) 4K UHD @ 60 Hz in high resolution mode. In multi-function mode the maximum resolution for (3) displays is (2) 5K single cable @ 30Hz + (1) 4K UHD @ 30Hz.
<b>Docking station model #3</b>	HP USB-C G5 Essential Dock
<b>Total number of supported displays (incl. the notebook display)</b>	3
<b>Max. resolutions supported</b>	Multi-Function Mode: (2) 5k @ 30Hz and (1) 4k UHD @ 30Hz on any port

### Options and Accessories (Sold separately and availability may vary by country)

#### Dock Connectors

#### Technical limitations

High-Resolution Mode: (2) 5k @ 60Hz on DisplayPort ports and (1) 4k UHD @ 60Hz on HDMI port

1x HDMI 2.0, 2x DisplayPort 1.4

**Maximum resolution and display support is dependent on the maximum capability of the notebook.**

**Highest resolution with dual displays is two 8K@ 60Hz host in High Resolution mode.**

Three maximum displays supported are two 5K@ 30 Hz on DP ports plus one 4K UHD@ 30 Hz on HDMI in Multi-function mode

The highest resolution for a non-Thunderbolt host in Multi-function mode is a single 5K dual cable (using both DP ports) + (1) 4K on HDMI port.

HP USB-C/A Universal Dock G2

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#### Docking station model #4

#### Total number of supported displays (incl. the notebook display)

#### Max. resolutions supported

Multi-Function Mode: (3) 4K DCI @ 30Hz on any port

High-Resolution Mode: (3) 4K DCI @ 30Hz on any port

1x HDMI 2.0, 2x DisplayPort 1.2

**Maximum resolution and display support is dependent on the maximum capability of the notebook.**

#### Dock Connectors

#### Technical limitations

**The best resolution for dual or triple displays is 4K UHD@ 60Hz.**

For use with the USB-A adapter that comes in the box the maximum number of displays supported is (2) 4k x 60 Hz on the Type-A Gen 1 connection from the host.

## Options and Accessories (Sold separately and availability may vary by country)

Type	Description	Part Number
<b>Adapter</b>	HP USB-C to HDMI 2.0 Adapter	1WC36AA
	HP USB-C to RJ45 Adapter G2	4Z527AA
	HP USB 3.0 to Gigabit RJ45 Adapter G2	4Z7Z7AA
	HP USB-C to DisplayPort Adapter G2	8Y8Y1AA
	HP HDMI to VGA Adapter	H4F02AA
	HP USB-C to USB 3.0 Adapter	N2Z63AA
	HP USB-C to VGA Adapter	N9K76AA
	HP USB-C to DisplayPort Adapter	N9K78AA
<b>Audio</b>	HP Bluetooth™ 365 Speaker	567D3AA
	HP USB G2 Stereo Headset	428K6AA
	HP 3.5mm G2 Stereo Headset	428K7AA
<b>Cases</b>	HP Prelude 15.6 Backpack	1E7D6AA
	HP Prelude 15.6 Top Load	1E7D7AA
	HP Prelude Pro Recycled 15.6 Backpack	1X644AA
	HP Prelude Pro Recycled 15.6 Top Load	1X645AA
	HP Renew Business 17.3 Laptop Backpack	3E2U5AA
	HP Renew Business 17.3 Laptop Bag	3E2U6AA
	HP Renew Business 14.1 Laptop Sleeve	3E2U7AA
	HP Renew Business 15.6 Laptop Bag	3E5F8AA
	HP Renew Business 14.1 Laptop Bag	3E5F9AA
	HP Prelude 15.6 Top Load	50P31AA
	HP Prelude 15.6 Backpack	50P32AA
	HP Renew Executive 16 Laptop Backpack	6B8Y1AA
	HP Renew Executive 16 Laptop Bag	6B8Y2AA
	HP Renew Executive 14.1 Laptop Sleeve	6B8Y3AA
	HP Travel 15.6 iron gray Laptop Backpack	6H2D8AA
	HP Travel 15.6 iron gray Laptop Backpack	6H2D9AA
<b>Commodity</b>	HP USB DVD-Writer External ODD	F2B56AA
	HP Nano Keyed Cable Lock	1AJ39AA
	HP Nano Master Keyed Cable Lock	1AJ40AA
	HP Combination Nano Cable Lock	63B28AA
	HP Essential Combination Nano Cable Lock	63B31AA
	HP SureKey Standard/Nano/Wedge Cable Lock	6UW42AA
<b>Docking</b>	HP USB-C G5 Dock	5TW10AA
	HP USB-C/A G2 Universal Dock	5TW13AA

## Options and Accessories (Sold separately and availability may vary by country)

	HP Thunderbolt 120W G4 Dock	4J0A2AA
	HP Thunderbolt 280W G4 Dock w/ Combo Cable	4J0G4AA
	HP USB-C G5 Essential Dock	72C71AA
<b>Hub</b>	HP Universal USB-C Multiport Hub	50H55AA
	HP 4K USB-C Multiport Hub	6G843AA
	HP USB-C Travel Hub G3	86S97AA
	HP Universal USB-C Hub and Laptop Charger Combo	9H0H9AA
	HP USB-C to USB-A Hub	Z6A00AA
<b>Keyboard/Combo</b>	HP Wireless Rechargeable 950MK Mouse and Keyboard	3M165AA
	HP 655 Wireless Keyboard and Mouse Combo	4R009AA
	HP Wired Desktop 320MK Mouse and Keyboard	9SR36AA
	HP 975 Dual-Mode USB+Bluetooth Wireless Keyboard	3Z726AA
	HP 455 Programmable Wireless Keyboard	4R177AA
	HP 965 black Ergonomic Wireless Keyboard	7E756AA
	HP 475 Dual-Mode Wireless Keyboard	7N7B9AA
	HP 405 Multi-Device Backlit Wired Keyboard	7N7C1AA
	HP 435 Programmable Wireless Keypad	7N7C3AA
	HP 320K USB Wired Keyboard	9SR37AA
<b>Mouse</b>	HP Multi-Device Black 635 Wireless Mouse	1D0K2AA
	HP Creator Black 935 Wireless Mouse	1D0K8AA
	HP Premium Wireless Mouse	1JR31AA
	HP 435 Multi-Device Wireless Mouse	3B4Q5AA
	HP 235 Slim Wireless Mouse	4E407AA
	HP 715 Rechargeable Multi-Device Bluetooth Mouse	6E6F0AA
	HP 925 Ergonomic Vertical Wireless Mouse	6H1A5AA
	HP Travel Bluetooth Mouse	6SP30AA
	HP 320M Wired Mouse	9VA80AA
<b>Power</b>	HP 65W LC USB-C AC power adapter	1P3K6AA
	HP 65W USB-C Laptop Charger	600Q8AA
	HP 65W USB-C Laptop Charger	671R3AA
	HP 110W USB-C Laptop Charger	8B3Y2AA
<b>Video</b>	HP USB-A 325 Webcam	53X27AA
	HP Streaming 965 Webcam	695J5AA
	HP 625 Webcam	6Y7L1AA

### Change Log

Date of change:	Version History:		Description of change:
March 15, 2024	V1 to V2	Added Removed Updated Updated Added Updated	Battery Health Manager HP Smart Support HP Sure Recover Footnote HP Wolf Security Footnote Battery Life Dimensions and Weight
March 26, 2024	V2 to V3	Added	Memory Disclaimer
April 12, 2024	V3 to V4	Added	Memory Slot

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