

### Overview

#### HP EliteBook 660 16 inch G11 Notebook PC

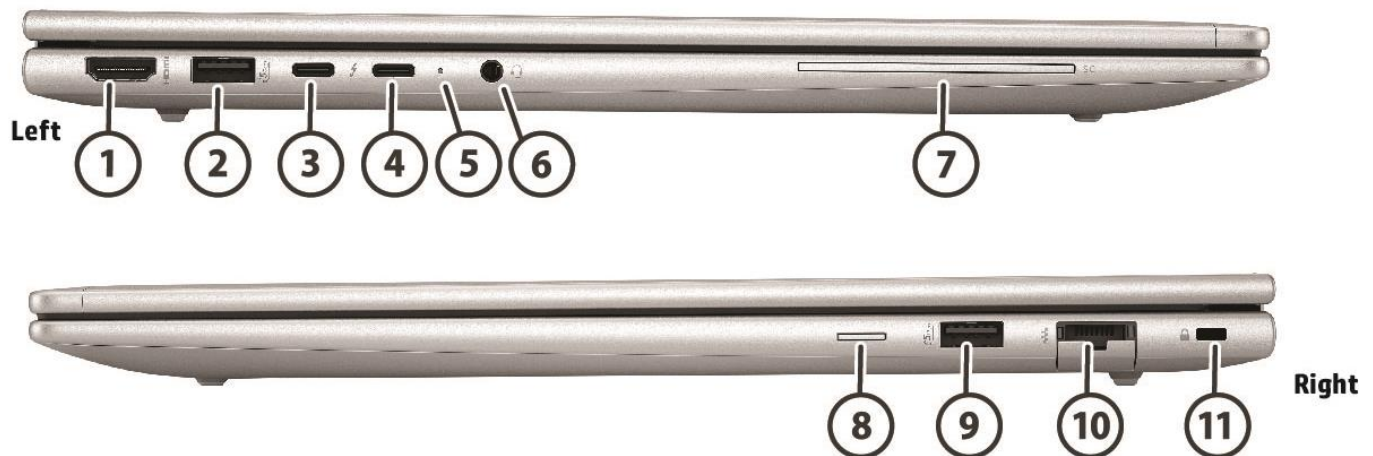


**Front**

- |                            |                                     |
|----------------------------|-------------------------------------|
| 1. Internal Microphone (2) | 4. Camera Shutter                   |
| 2. Webcam LED              | 5. Touchpad                         |
| 3. Webcam                  | 6. Near-field communication (NFC) * |

\* Select product only.

### Overview



### Sides

- |                                                                                                 |                                                          |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| 1. HDMI 2.1                                                                                     | 8. Nano SIM card slot (Optional)                         |
| 2. Super Speed USB Type-A 5Gbps signaling rate Power charging                                   | 9. Super Speed USB Type-A 5Gbps signaling rate Data only |
| 3. Thunderbolt™ 4 with USB Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 2.1) | 10. RJ45 Ethernet port                                   |
| 4. Thunderbolt™ 4 with USB Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 2.1) | 11. Security lock slot (Integrated)                      |
| 5. Power Indicator LED                                                                          |                                                          |
| 6. Headphone/mic combo jack                                                                     |                                                          |
| 7. Smart Card Reader (Optional)                                                                 |                                                          |

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

Technical Specifications

PRODUCT NAME

HP EliteBook 660 16 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 <sup>1</sup>
- Windows 11 Pro Education <sup>1</sup>
- Windows 11 Pro (Windows 11 Enterprise or Windows 10 Enterprise available with a Volume Licensing Agreement) <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 <sup>2,3,4,5,6,7</sup>    | Cores    | Number of P-cores | Number of E-cores | Number of LP E-core | Threads | L3 Cache | Max Turbo Frequency <sup>4</sup> |          | Intel SIPP/ vPro® Enterprise | Intel vPro® Essentials |
|-------------------------------------|----------|-------------------|-------------------|---------------------|---------|----------|----------------------------------|----------|------------------------------|------------------------|
|                                     |          |                   |                   |                     |         |          | P-cores                          | E-cores  |                              |                        |
| Intel® Core™ Ultra 7 processor 165U | 12 cores | 2                 | 8                 | 2                   | 14      | 12 MB    | 4.90 GHz                         | 3.80 GHz | X                            |                        |
| Intel® Core™ Ultra 7 processor 155U | 12 cores | 2                 | 8                 | 2                   | 14      | 12 MB    | 4.80 GHz                         | 3.80 GHz |                              |                        |
| Intel® Core™ Ultra 5 processor 135U | 12 cores | 2                 | 8                 | 2                   | 14      | 12 MB    | 4.40 Ghz                         | 3.60 GHz | X                            |                        |
| Intel® Core™ Ultra 5 processor 125U | 12 cores | 2                 | 8                 | 2                   | 14      | 12 MB    | 4.30 Ghz                         | 3.60 GHz |                              | X                      |
| Intel® Core™ Ultra 7 processor 165H | 16 cores | 6                 | 8                 | 2                   | 22      | 24 MB    | 5.00 GHz                         | 3.80 GHz | X                            |                        |
| Intel® Core™ Ultra 7 processor 155H | 16 cores | 6                 | 8                 | 2                   | 22      | 24 MB    | 4.80 GHz                         | 3.80 GHz |                              |                        |
| Intel® Core™ Ultra 5 processor 135H | 14 cores | 4                 | 8                 | 2                   | 18      | 18 MB    | 4.60 Ghz                         | 3.60 GHz | X                            |                        |
| Intel® Core™ Ultra 5 processor 125H | 14 cores | 4                 | 8                 | 2                   | 18      | 18 MB    | 4.50 Ghz                         | 3.60 GHz |                              |                        |

Processor Family

- Intel® Core™ Ultra7 processor
- Intel® Core™ Ultra5 processor



## Technical Specifications

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.
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. Intel vPro® requires Windows 10 Pro 64 bit or higher, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or Wi-Fi 6E WLAN and TPM 2.0. Some functionality requires additional 3rd party software in order to run. Features of vPro® Essentials and Enterprise vary. See <http://intel.com/vpro>
7. Features and software that require a NPU may require software purchase, subscription or enablement by a software or platform provider, and third party software may have specific configuration or compatibility requirements. Performance varies by use, configuration, and other factors.

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## GRAPHICS

### Integrated

Intel® ARC Graphics<sup>8</sup>  
Intel® Graphics

### Discrete

GeForce RTX 2050

### Supports

UMA: Support HDMI 2.1<sup>9</sup>  
Discrete: Support HDMI 2.1

Hardware acceleration for CODEC H.265/HEVC (High Efficiency Video Coding) is disabled on this platform.

8. Intel® ARC™ graphics only available on select Intel® Core™Ultra H-series processor-powered systems with at least 16GB of system memory in dual channel configuration.

9. HDMI cable sold separately.

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## DISPLAY

### Non-Touch

40.6 cm (16") diagonal, WUXGA (1920 x 1200), Bent, LCD, UWVA, anti-glare, LED, 300 nits, NTSC 45%<sup>10,11</sup>

40.6 cm (16") diagonal, WUXGA (1920 x 1200), Bent, LCD, UWVA, anti-glare, LED + Low Blue Light, 400 nits, low power, sRGB 100%<sup>10,11</sup>

40.6 cm (16") diagonal, WUXGA (1920 x 1200), Bent, LCD, UWVA, anti-glare, LED + Low Blue Light, 1000 nits, sRGB 100%, HP Sure View reflect integrated privacy screen<sup>10,11</sup>

Technical Specifications

- Touch**  
40.6 cm (16") diagonal, WUXGA (1920 x 1200), Bent, LCD, touch, UWVA, anti-glare, LED, 300 nits, NTSC 45% <sup>10,11,12</sup>
- Display Size (Diagonal)**  
40.6 cm (16.0")
- Screen to Body Ratio**  
90.60%
- Aspect Ratio**  
16.10
- Max Hinge Open Angle**  
177±3°

10. Sold separately or as an optional feature.  
11. Resolutions are dependent upon monitor capability, and resolution and color depth settings.  
12. Actual brightness will be lower with touchscreen.

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 G2 Universal Dock
- For additional aftermarket options and docking specs please see page .38.

## Technical Specifications

### STORAGE AND DRIVES

#### Primary 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® Gen4x4 NVMe™ Self Encrypted OPAL2 Three Layer Cell <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>

<sup>13</sup>. 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

64GB DDR5-5600 MT/s (2 x 32 GB) RAM <sup>14</sup>

#### Memory

64GB DDR5-5600 MT/s (2 x 32 GB) RAM <sup>14</sup>  
32GB DDR5-5600 MT/s (2 x 16 GB) RAM <sup>14</sup>  
32GB DDR5-5600 MT/s (1 x 32 GB) RAM <sup>14</sup>  
16GB DDR5-5600 MT/s (2 x 8 GB) RAM <sup>14</sup>  
16GB DDR5-5600 MT/s (1 x 16 GB) RAM <sup>14</sup>  
8GB DDR5-5600 MT/s (1 x 8 GB) RAM <sup>14</sup>

#### Memory Slots

2 SODIMM

System runs at 5600 MT/s

Supports Dual Channel Memory<sup>14</sup>

<sup>14</sup>. Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed.

## Technical Specifications

### NETWORKING/COMMUNICATIONS

**Ethernet**

Intel® I219-LM GbE, vPro® <sup>15</sup>

Intel® I219-V GbE, non-vPro® <sup>15</sup>

**WLAN**

Intel® AX211 Wi-Fi 6E Bluetooth® 5.3 wireless card vPro WLAN <sup>16</sup>

Intel® AX211 Wi-Fi 6E Bluetooth® 5.3 wireless card WLAN <sup>16</sup>

**WWAN**

HP 4G LTE-A Pro Cat16 WWAN eSIM <sup>17</sup>

**LPWAN**

Qualcomm® 9205 LTE-M (CAT-M1 fSVC)<sup>18</sup>

**NFC**

NFC Mirage WNC XRAV-1

**Miracast**

Native Miracast Support <sup>19</sup>

15. The term "10/100/1000" or "Gigabit" Ethernet indicates compatibility with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

16. 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.

17. WWAN module is an optional feature, requires factory configuration and requires separately purchased service contract. Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products, in all regions.

18. Cat M1 LPWAN (Mobile Narrowband) cards support select platforms with the HP Protect & Trace with Wolf Connect service, but do not support mobile broadband/Internet use.

19. 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

2 Integrated dual array microphones

##### Speaker Power

2W/4ohm per speaker

##### Camera

5MP+Infrared camera <sup>20,21</sup>

FHD camera <sup>20,21</sup>

##### Sensors

Ambient Light Sensor<sup>22</sup>

Hall Effect Sensor

Thermal Sensor

HP Tamper Lock

[20.HD content required to view HD images.](#)

[21. Sold separately or as an optional feature.](#)

[22.Select product only \(Privacy panel SKU\).](#)

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

##### Keyboard

HP Standard Keyboard with numeric keypad, spill-resistant, backlit, DuraKey keyboard. <sup>23</sup>

HP Standard Keyboard with numeric keypad, spill-resistant, Privacy, backlit, DuraKey keyboard. <sup>23</sup>

HP Standard Keyboard with numeric keypad, spill-resistant keyboard.

##### Pointing Device

Clickpad with multi-touch gesture support

Microsoft Precision Touchpad Default Gestures Support

##### Function Keys

ESC: System Information

F1 - Display Switching

F2 - Blank or SureView On/Off

F3 - Brightness Down

F4 - Brightness Up

F5 - Blank or Backlit Toggle

F6 - Audio Mute

F7 - Volume Down

F8 - Volume Up

F9 - Mic Mute

F10 - Play and Pause

F11 - HPX key

F12 - Print Screen

## Technical Specifications

Num Lock (with LED)  
Power Button (with LED)  
Insert  
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. Where Copilot in Windows is not available, the Copilot key will lead to the Bing search engine. See <http://aka.ms/WindowsAIFeatures>

## SOFTWARE AND SECURITY

### Software

Adobe Offer <sup>25</sup>  
Bing Search for IE11  
Buy Microsoft Office (Sold separately)  
HP Connection Optimizer  
HP Easy Clean<sup>26</sup>  
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 with Battery Health Manager<sup>27</sup>  
HP Privacy Settings  
HP Services Scan <sup>28</sup>  
HP Smart Support <sup>29</sup>  
HP Support Assistant <sup>30</sup>  
HSA Fusion for Commercial  
HSA Telemetry for Commercial  
Miro Offer <sup>31</sup>  
myHP <sup>32</sup>  
Poly Lens <sup>33</sup>

### Manageability Features

HP Client Catalog (download) <sup>34</sup>  
HP Client Management Script Library (download) <sup>35</sup>  
HP Cloud Recovery <sup>36</sup>  
HP Connect for Microsoft Endpoint Manager <sup>37</sup>  
HP Driver Packs (download) <sup>38</sup>  
HP Image Assistant (download) <sup>39</sup>  
HP Manageability Integration Kit (download) <sup>40</sup>  
HP Patch Assistant (download) <sup>41</sup>

## Technical Specifications

### Security Management

Secured-Core PC Enable <sup>42</sup>

Windows Hello Enhanced Sign-In Security (ESS)

**HP Wolf Security for Business which includes:**<sup>43</sup>

HP Sure Admin <sup>44</sup>

HP Sure Click <sup>45</sup>

HP Sure Recover <sup>46</sup>

HP Sure Run <sup>47</sup>

HP Sure Sense

HP Sure Start <sup>48</sup>

HP Tamper Lock

### Security TPM

Model: STM ST33KTPM2X32CKE2

TCG TPM 2.0

Version: 1.769

FIPS 140-2 Compliant: Yes

Model: Nuvoton NPCT760HABYX

TCG TPM 2.0

Version: 7.2.3.1

FIPS 140-2 Compliant: Yes

### BIOS

Absolute Persistence Module <sup>49</sup>

BIOS Update via Network

HP BIOSphere Gen6 <sup>50</sup>

HP DriveLock & Automatic DriveLock

HP Fingerprint Sensor <sup>51</sup>

HP Secure Erase <sup>52</sup>

HP Wake on WLAN

### Smartcard Reader

Model number: Alcor AK9563

FIPS 201 Compliant: Yes

### IPv6 Support

Yes

### FirstNet Certified

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

UEFI version: 2.7B

Class: 3

25. Click on Adobe icon in the start menu to take advantage of a 30 day trial membership of select Adobe software. The software is tied to the device and is not transferrable. You may also choose to enter your payment details to auto-renew and continue to use the software beyond the 30 day trial. See Adobe for complete details.

26. HP Easy Clean requires Windows 10 RS3 and higher and will disable the keyboard, touchscreen, and clickpad only. Ports are not disabled. See user guide for cleaning instructions.

27. HP Power Manager requires Windows 10 and higher and can be downloaded from the Microsoft Store. 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

## Technical Specifications

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)

28. HP Services Scan is preinstalled and/or provided thru Windows Update and checks for service entitlement on each hardware device and downloads the applicable software 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 around devices and applications and is not sold as a standalone service. HP follows stringent GDPR privacy regulations and is ISO27001, ISO27701, ISO27017 and SOC2 Type2 certified for Information Security. Internet access with connection to the HP Insights agent is required. For full system requirements, please visit <http://www.hpdaas.com/requirements>. Not available in China.

29. HP Smart Support requires the HP agent to be installed. For more information about how to enable or to download HP Smart Support, please visit <http://www.hp.com/smart-support>. HP Services Scan is provided thru Windows Update and will check entitlement on each hardware device to determine if an HP agent-enabled service has been purchased, and will download applicable software automatically. The HP agent is a telemetry and analytics platform that provides critical data around devices and applications and is not sold as a standalone service. HP follows stringent GDPR privacy regulations and is ISO27001, ISO27701, ISO27017 and SOC2 Type2 certified for Information Security. Internet access is required. For full system requirements or to disable this feature, please visit <http://www.hpdaas.com/requirements>.

30. HP Support Assistant is available on Windows. For more information, please visit [www.support.hp.com/help/hp-support-assistant](http://www.support.hp.com/help/hp-support-assistant)

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

32. MyHP Requires Windows 10 or higher OS.

33. Poly Lens Desktop requires a Windows OS

34. HP Client Catalog can be downloaded from <https://www.hp.com/us-en/solutions/client-management-solutions.html>

35. HP Client Management Script Library can be downloaded from <https://www.hp.com/us-en/solutions/client-management-solutions.html#tab=manageability-tools>

36. 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. Detail please refer to: <https://support.hp.com/us-en/computer>.

37. 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.

38. HP Driver Packs can be downloaded from <https://www.hp.com/us-en/solutions/client-management-solutions/drivers-pack.html>

39. HP Image Assistant can be downloaded from <https://ftp.ext.hp.com/pub/caps-softpaq/cmit/HPIA.html>

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

41. 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>.

42. 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.

43. 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.

44. 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

45. HP Sure Click requires Windows 10 or 11 Pro or higher. See [https://bit.ly/2PrLT6A\\_SureClick](https://bit.ly/2PrLT6A_SureClick) for complete details.

46. HP Sure Recover is available on select HP PCs and requires Windows 10 or Windows 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. Network based recovery using Wi-Fi is only available on select PCs.

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

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

49. 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/>

### Technical Specifications

- 50. HP BIOSphere Gen6 features may vary depending on the platform and configuration.
  - 51. HP Fingerprint Reader is an optional feature that requires Windows 10 or 11 and must be configured at purchase.
  - 52. 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™.
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## Technical Specifications

### POWER

#### Power Supply

HP Slim 100W USB Type-C® adapter <sup>53</sup>

HP Standard 65W USB Type-C® adapter <sup>53</sup>

HP Standard 65W USB Type-C® Halogen Free AC power adapter <sup>53</sup>

#### Battery

HP Long Life 3 cell 56Whr Polymer <sup>54,55</sup>

HP Long Life 3 cell 48Whr Polymer <sup>54,55,56</sup>

#### Battery Recharge Time

Supports battery HP Fast Charge: approximately 50% in 30 minutes <sup>57</sup>

#### Power Cord

3-wire plug - 1 m

#### Battery Life

Battery life Up to 13 hours and 52 minutes with 56whr battery (HP Long Life 3-Cell, 56 Whr Polymer, UMA graphic, Intel Ultra 7 U15, Display set to 250 nits display (on a 400-nit display), 2\*8GB DDR5 memory, 256 GB SSD) Up to 12 hours and 36 minutes with 56whr battery (HP Long Life 3-Cell, 56 Whr Polymer, UMA graphic, Intel Ultra 7 H28, Display set to 250 nits display (on a 400-nit display), 2\*8GB DDR5 memory, 256 GB SSD) Up to 9 hours and 35 minutes with 56whr battery (HP Long Life 3-Cell, 56 Whr Polymer, DSC graphic, Intel Ultra 7 H28, Display set to 250 nits display (on a 400-nit display), 2\*8GB DDR5 memory, 256 GB SSD) Up to 12 hours and 13 minutes with 48whr battery (HP Long Life 3-Cell, 48 Whr Polymer, UMA graphic, Intel Ultra 7 U15 , Display set to 250 nits display (on a 400-nit display), 2\*8GB DDR5 memory, 256 GB SSD) Up to 11 hours and 30 minutes with 48whr battery (HP Long Life 3-Cell, 48 Whr Polymer, UMA graphic, Intel Ultra 7 H28, Display set to 250 nits display (on a 400-nit display), 2\*8GB DDR5 memory, 256 GB SSD)<sup>58</sup>

53. Availability may vary by country.

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

55. 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.

56. Only available for selected regions and selected configurations.

57. 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. Upon initial startup, it is necessary to use an minimum 45 W adapter.

58. 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 1.75 kg (3.86 lb) with 56Whr battery <sup>59</sup>  
Weight will vary by configuration. Does not include power adapter.

##### Product Dimensions (W x D x H)

359.4 mm (W) x 251.0 mm (D) x 10.9 mm (front) / 17 mm (rear)  
(14.15 in x 9.88 in x 0.43 in (front) / 0.67 in (rear))

Maximum height 19.9mm (Plastic); 20.9mm (Metal)

##### Pallet Dimensions (W x D x H)

16" to 17" boxes (345mm height): 1200mm x 1000mm x 1200mm <sup>60</sup>

59. Weight will vary by configuration. Does not include power adapter.

60. Product packaging size varies based on options chosen. Please contact your HP representative for your packaging size details. For detailed packaging information, access the [HP Commercial Notebooks Packaging Guide](#).

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#### PORTS/SLOTS

##### Left Side

- 1 Super Speed USB Type-A 5Gbps signaling rate Power charging
- 2 Thunderbolt™ 4 with USB Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™2.1) <sup>61</sup>
- 1 HDMI 2.1 <sup>62</sup>
- 1 Headphone/mic combo jack
- 1 Smart Card Reader (Integrated)

##### Right side

- 1 Super Speed USB Type-A 5Gbps signaling rate Data only
- 1 RJ45 Ethernet port
- 1 Nano SIM card slot (Optional)
- 1 Security lock slot (Integrated)

61. SuperSpeed USB 20Gbps signaling rate is not available with Thunderbolt™ 4.

62. 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. 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>63</sup>

63. 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.

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## Technical Specifications

## SYSTEM UNIT

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

|                           |                          |
|---------------------------|--------------------------|
| Nominal Operating Voltage | 20.0V                    |
| Average Operating Power   | W (TBD)                  |
| Max Operating Power       | UMA 65W<br>Discrete 100W |

**Temperature**

|               |                                                                                                                                |
|---------------|--------------------------------------------------------------------------------------------------------------------------------|
| Operating     | 0° to 35° C (32° to 95° F) No sustained direct exposure to sunlight, System performance may be reduced above 32°C (89.6°F)     |
| Non-operating | -20° to 60° C ( -4° to 140° F) No sustained direct exposure to sunlight, System performance may be reduced above 32°C (89.6°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-Q38C                                                 |
| CSA/UL 62368-1           | Yes                                                      |
| ENERGY STAR®             | Yes <sup>64</sup>                                        |
| EPEAT®                   | EPEAT® Gold in the United States <sup>65</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                                                      |
| MIL-STD 810H Testing     | Yes <sup>66</sup>                                        |

64. Configurations of the HP EliteBook 660 G11 that are ENERGY STAR® qualified are identified as HP EliteBook 660 G11 ENERGY STAR on HP websites and on <http://www.energystar.gov>.

## Technical Specifications

65. 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.

66. MIL STD 810H testing is not intended to demonstrate fitness for U.S. Department of Defense contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Accidental damage requires an optional HP Accidental Damage Protection Care Pack.

## 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>16.0 in WUXGA (1920 x 1200) Anti-Glare UWVA LED+LBL sRGB NB2Y 1000 eDP 1.3+PSR 100 PrivacyG4 Plus bent LCD Panel</b> | <b>Outline Dimensions (W x H)</b> | 349.980 x 225.420 (max) |
|                                                                                                                         | <b>Active Area</b>                | 344.680 x 215.420 (typ) |
|                                                                                                                         | <b>Weight</b>                     | 310 (max)               |
|                                                                                                                         | <b>Diagonal Size</b>              | 16                      |
|                                                                                                                         | <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>                  | LED                     |
|                                                                                                                         | <b>Pixel Resolution</b>           | RGB                     |
|                                                                                                                         | <b>Color Gamut Coverage</b>       | sRGB 100%               |
|                                                                                                                         | <b>Color Depth</b>                | 8                       |

**Viewing Angle** UWVA 85/85/85/85

**Low Blue Light** Yes

|                                                                                                                    |                                   |                         |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------|
| <b>16.0 in WUXGA (1920 x 1200) Anti-Glare UWVA LED+LBL sRGB NB2Y 400 eDP 1.4+PSR2 Low-Power 100 bent LCD Panel</b> | <b>Outline Dimensions (W x H)</b> | 350.680 x 226.470 (max) |
|                                                                                                                    | <b>Active Area</b>                | 344.678 x 215.424 (typ) |
|                                                                                                                    | <b>Weight</b>                     | 330g (max)              |
|                                                                                                                    | <b>Diagonal Size</b>              | 16                      |
|                                                                                                                    | <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>                 | 400 nits <sup>1</sup>   |
|                                                                                                                    | <b>Pixel Resolution - Format</b>  | 1920 x 1200 (WUXGA)     |
|                                                                                                                    | <b>Backlight</b>                  | LED                     |
|                                                                                                                    | <b>Pixel Resolution</b>           | RGB                     |
|                                                                                                                    | <b>Color Gamut Coverage</b>       | sRGB 100%               |
|                                                                                                                    |                                   |                         |

## Technical Specifications

|                                                       |                        |
|-------------------------------------------------------|------------------------|
| Color Depth                                           | 8                      |
| Viewing Angle                                         | UWVA 89/89/89/89       |
| Low Blue Light                                        | Yes                    |
| Power Consumption (W, EBL@ 150nits max/ 200nits max)) | 1.60 (max)/ 1.95 (max) |

|                                                                                                        |                                                              |                         |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-------------------------|
| <b>16.0 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>                            | 350.680 x 226.470 (max) |
|                                                                                                        | <b>Active Area</b>                                           | 344.6784x215.424 (typ)  |
|                                                                                                        | <b>Weight</b>                                                | 390g (max)              |
|                                                                                                        | <b>Diagonal Size</b>                                         | 16                      |
|                                                                                                        | <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 1280 (WUXGA)     |
|                                                                                                        | <b>Backlight</b>                                             | LED                     |
|                                                                                                        | <b>Pixel Resolution</b>                                      | RGB                     |
|                                                                                                        | <b>Color Gamut Coverage</b>                                  | NTSC 45%                |
|                                                                                                        | <b>Color Depth</b>                                           | 6 bits + 2FRC           |
|                                                                                                        | <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> | 2.7 (max)/3.4 (max)     |

|                                                                                                            |                                   |                         |
|------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------|
| <b>16.0 in WUXGA (1920 x 1200) Anti-Glare UWVA LED NTSC 45 NB2X 300 TOP eDP 1.2 w/o PSR bent LCD Panel</b> | <b>Outline Dimensions (W x H)</b> | 350.680 x 226.470 (max) |
|                                                                                                            | <b>Active Area</b>                | 344.6784x215.424 (typ)  |
|                                                                                                            | <b>Weight</b>                     | 390g (max)              |
|                                                                                                            | <b>Diagonal Size</b>              | 16                      |
|                                                                                                            | <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 1280 (WUXGA)     |
|                                                                                                            | <b>Backlight</b>                  | LED                     |
|                                                                                                            | <b>Pixel Resolution</b>           | RGB                     |
|                                                                                                            | <b>Color Gamut Coverage</b>       | NTSC 45%                |
|                                                                                                            | <b>Color Depth</b>                | 6 bits + 2FRC           |
|                                                                                                            | <b>Viewing Angle</b>              | UWVA 89/89/89/89        |

## Technical Specifications

|                                                              |                      |
|--------------------------------------------------------------|----------------------|
| <b>Low Blue Light</b>                                        | No                   |
| <b>Power Consumption (W, EBL@ 150nits max/ 200nits max))</b> | 2.7 (max)/3.24 (max) |

**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 ±20%         |
|                                                      | <b>Maximum Sequential Write</b> | 3500 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-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 ±20%         |
|                                                    | <b>Maximum Sequential Write</b> | 5000 MB/s ±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 ±20%         |
|                                                    | <b>Maximum Sequential Write</b> | 5000 MB/s ±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 ±20%   |

Technical Specifications

|                                                                                  |                          |                          |
|----------------------------------------------------------------------------------|--------------------------|--------------------------|
|                                                                                  | Maximum Sequential Write | 900 MB/s ±20%            |
|                                                                                  | Logical Blocks           | 500,118,192              |
|                                                                                  | Features                 | TCG Opal 2.0; TRIM; L1.2 |
| 512GB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State Drive | Form Factor              | M.2 2280                 |
|                                                                                  | Capacity                 | 512GB                    |
|                                                                                  | NAND Type                | TLC                      |
|                                                                                  | Interface                | PCIe NVMe Gen4X4         |
|                                                                                  | Maximum Sequential Read  | 6400 MB/s ±20%           |
|                                                                                  | Maximum Sequential Write | 3500 MB/s ±20%           |
|                                                                                  | Logical Blocks           | 1,000,215,215            |
|                                                                                  | Features                 | TCG Opal 2.0; TRIM; L1.2 |
| SSD 256GB 2280 PCIe NVMe Value                                                   | Form Factor              | M.2 2280                 |
|                                                                                  | Capacity                 | 256 GB                   |
|                                                                                  | NAND Type                | TLC                      |
|                                                                                  | Interface                | PCIe NVMe Gen4X4         |
|                                                                                  | Maximum Sequential Read  | 2000 MB/s ±20%           |
|                                                                                  | Maximum Sequential Write | 900 MB/s ±20%            |
|                                                                                  | Logical Blocks           | 500,118,192              |
|                                                                                  | Features                 | Pyrite 2.0; TRIM; L1.2   |
| SSD 512GB 2280 PCIe NVMe Value                                                   | Form Factor              | M.2 2280                 |
|                                                                                  | Capacity                 | 512 GB                   |
|                                                                                  | NAND Type                | TLC                      |
|                                                                                  | Interface                | PCIe NVMe Gen4X4         |
|                                                                                  | Maximum Sequential Read  | 2200 MB/s ±20%           |
|                                                                                  | Maximum Sequential Write | 1000 MB/s ±20%           |
|                                                                                  | Logical Blocks           | 1,000,215,215            |
|                                                                                  | Features                 | Pyrite 2.0; TRIM; L1.2   |
| 1TB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State         | Form Factor              | M.2 2280                 |
|                                                                                  | Capacity                 | 1 TB                     |
|                                                                                  | NAND Type                | TLC                      |
|                                                                                  | Interface                | PCIe NVMe Gen4X4         |
|                                                                                  | Maximum Sequential Read  | 6400 MB/s ±20%           |
|                                                                                  | Maximum Sequential Write | 5000 MB/s ±20%           |
|                                                                                  | Logical Blocks           | 2,000,409,264            |

Technical Specifications

| Features                                                                         | Pyrite 2.0, TRIM; L1.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NETWORKING/COMMUNICATIONS                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Intel® AX211 Wi-Fi 6E<br>Bluetooth® 5.3 wireless<br>card vPro® WLAN <sup>1</sup> | <div>Wireless LAN Standards</div> <div>IEEE 802.11a<br/>IEEE 802.11ac<br/>IEEE 802.11ax<br/>IEEE 802.11b<br/>IEEE 802.11d<br/>IEEE 802.11e<br/>IEEE 802.11g<br/>IEEE 802.11h<br/>IEEE 802.11i<br/>IEEE 802.11k<br/>IEEE 802.11n<br/>IEEE 802.11r<br/>IEEE 802.11v</div> <div>Interoperability</div> <div>Wi-Fi certified</div> <div>Frequency Band</div> <div><ul style="list-style-type: none"><li>• 802.11b/g/n/ax<br/>2.402 – 2.482 GHz</li><li>• 802.11a/n/ac/ax<br/>4.9 – 4.95 GHz (Japan)<br/>5.15 – 5.25 GHz<br/>5.25 – 5.35 GHz<br/>5.47 – 5.725 GHz<br/>5.825 – 5.850 GHz<br/>5.955 – 6.415 GHz<br/>6.435 – 6.515 GHz<br/>6.535 – 6.875 GHz<br/>6.895 – 7.115 GHz</li></ul></div> <div>Data Rates</div> <div><ul style="list-style-type: none"><li>• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li><li>• 802.11ac : MCS0 ~ MCS9, (20MHz, 40MHz, 80MHz, 160MHz)</li><li>• 802.11ax : MCS0 ~ MCS11, (20MHz, 40MHz, 80MHz, 160MHz)</li><li>• 802.11b: 1, 2, 5.5, 11 Mbps</li><li>• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li><li>• 802.11n: MCS 0 ~ MCS 15, (20MHz, 40MHz)</li></ul></div> <div>Modulation</div> <div>Direct Sequence Spread Spectrum<br/>1024QAM, 16-QAM, 256-QAM, 4096QAM, 64-QAM, BPSK, CCK, OFDM, QPSK</div> <div>Security<sup>2</sup></div> <div><ul style="list-style-type: none"><li>• 802.1x authentication</li><li>• AES-CCMP: 128 bit in hardware</li><li>• IEEE 802.11i</li><li>• IEEE and WiFi certified 64 / 128 bit WEP encryption for a/b/g mode only</li><li>• WAPI</li><li>• WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li><li>• WPA2 certification</li><li>• WPA3 (personal) certification</li></ul></div> <div>Network Architecture</div> <div>Ad-hoc (Peer to Peer)</div> |

## Technical Specifications

|                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Models</b>                                                                                    | 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 : 2.3 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/Modern Standby : 10 mW</li> <li>• Radio disabled : 8 mW</li> </ul>                                                                                                                                                                                                                                                                                                                              |
| <b>Power Management</b>                                                                          | ACPI and PCI Express compliant power management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <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<br>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>                                                                                | 30.00 x 22.00 x 2.30 mm (1.18 x 0.87 x 0.09 inch)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Weight</b>                                                                                    | 1. Type 2230: 2.8 g<br>2. Type 1216: 1.3 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Operating Voltage</b>                                                                         | 3.3 v +/- 9 %                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <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 Card 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Technical Specifications

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Number of Available Channels</b>  | Legacy: 0~79 (1 MHz/CH)<br>BLE: 0~39 (2 MHz/CH)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Signaling Data Rate</b>           | Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps<br>BLE : 1 Mbps data rate; throughput up to 0.2 Mbps<br>Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels<br>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 + 4 dBm for BR and EDR.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Power Consumption</b>             | Peak (Tx): 330 mW<br>Peak (Rx): 230 mW<br>Selective Suspend: 17 mW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Bluetooth® Software Supported</b> | Microsoft Windows Bluetooth® Software                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Link Topology</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Power Management</b>              | Microsoft Windows ACPI, and USB Bus Support                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <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> | 2Mbps LE<br>Advanced Audio Distribution Profile (A2DP)<br>Basic Imaging Profile (BIP)<br>Bluetooth® 4.1-ESR 5/6/7 Compliance<br>Bluetooth® 4.2 ESR08 Compliance<br>Bluetooth® 5.2<br>Bluetooth® 5.3 Wireless Card<br>Channel Selection Algo<br>Encryption key size control enhancements<br>ESR9/10 Compliance<br>FAX Profile (FAX)<br>Hands Free Profile (HFP)<br>Headset Profile (HSP)<br>LE Advertisement Extensions<br>LE Data Packet Length Extension<br>LE Dual Mode<br>LE L2CAP Connection Oriented Channels<br>LE Link Layer<br>LE Link Layer Ping<br>LE Long Range<br>LE Low Duty Cycle Directed Advertising<br>LE Privacy 1.2 –Extended Scanner Filter Policies<br>LE Privacy 1.2 –Link Layer Privacy<br>LE Secure Connection- Basic/Full<br>Limited High Duty Cycle Non-Connectable Advertising<br>Periodic Advertisement interval<br>Train Nudging & Interlaced Scan<br>Windows Bluetooth® profiles support |

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.

Technical Specifications

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).

|                                                                            |                        |                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Intel® AX211 Wi-Fi 6E<br>Bluetooth® 5.3 wireless<br>card WLAN <sup>1</sup> | Wireless LAN Standards | IEEE 802.11a<br>IEEE 802.11ac<br>IEEE 802.11ax<br>IEEE 802.11b<br>IEEE 802.11d<br>IEEE 802.11e<br>IEEE 802.11g<br>IEEE 802.11h<br>IEEE 802.11i<br>IEEE 802.11k<br>IEEE 802.11n<br>IEEE 802.11r<br>IEEE 802.11v                                                                                                                                                             |
|                                                                            | Interoperability       | Wi-Fi certified                                                                                                                                                                                                                                                                                                                                                            |
|                                                                            | Frequency Band         | <ul style="list-style-type: none"><li>• 802.11b/g/n/ax<br/>2.402 – 2.482 GHz</li><li>• 802.11a/n/ac/ax<br/>4.9 – 4.95 GHz (Japan)<br/>5.15 – 5.25 GHz<br/>5.25 – 5.35 GHz<br/>5.47 – 5.725 GHz<br/>5.825 – 5.850 GHz<br/>5.955 – 6.415 GHz<br/>6.435 – 6.515 GHz<br/>6.535 – 6.875 GHz<br/>6.895 – 7.115 GHz</li></ul>                                                     |
|                                                                            | Data Rates             | <ul style="list-style-type: none"><li>• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li><li>• 802.11ac : MCS0 ~ MCS9, (20MHz, 40MHz, 80MHz, 160MHz)</li><li>• 802.11ax : MCS0 ~ MCS11, (20MHz, 40MHz, 80MHz, 160MHz)</li><li>• 802.11b: 1, 2, 5.5, 11 Mbps</li><li>• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li><li>• 802.11n: MCS 0 ~ MCS 15, (20MHz, 40MHz)</li></ul> |
|                                                                            | Modulation             | Direct Sequence Spread Spectrum<br>1024QAM, 16-QAM, 256-QAM, 64-QAM, BPSK, CCK, Direct Sequence Spread Spectrum, OFDM, QPSK                                                                                                                                                                                                                                                |
|                                                                            | Security <sup>2</sup>  | <ul style="list-style-type: none"><li>• 802.1x authentication</li><li>• AES-CCMP: 128 bit in hardware</li><li>• IEEE 802.11i</li><li>• IEEE and WiFi certified 64 / 128 bit WEP encryption for a/b/g mode only</li><li>• WAPI</li><li>• WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li><li>• WPA2 certification</li></ul>                                        |

## Technical Specifications

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|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Network Architecture Models</b>                                                               | <ul style="list-style-type: none"> <li>• WPA3 (personal) certification</li> </ul> Ad-hoc (Peer to Peer)<br>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>                                                                         | Transmit mode : 2.3 W<br>Receive mode : 1.6 W<br>Idle mode (PSP) : 180 mW (WLAN Associated)<br>Idle mode: 50 mW (WLAN unassociated)<br>Connected Standby/Modern Standby : 10 mW<br>Radio disabled : 8 mW                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Power Management</b>                                                                          | ACPI and PCI Express compliant power management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <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<br>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>                                                                                | 30.00 x 22.00 x 2.30 mm (1.18 x 0.87 x 0.09 inch)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Weight</b>                                                                                    | 1. Type 2230: 2.8 g<br>2. Type 1216: 1.3 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Operating Voltage</b>                                                                         | 3.3v +/- 9%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <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 Card Technology</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Bluetooth® Specification</b>                                                                  | 4.0/4.1/4.2/5.0/5.1/5.2/5.3 Compliant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## Technical Specifications

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Frequency Band</b>                | 2402 to 2480 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Number of Available Channels</b>  | Legacy : 0~79 (1 MHz/CH)<br>BLE : 0~39 (2 MHz/CH)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Signaling Data Rate</b>           | Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps<br>BLE : 1 Mbps data rate; throughput up to 0.2 Mbps<br>Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels<br>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 + 4 dBm for BR and EDR.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Power Consumption</b>             | Peak (Tx): 330 mW<br>Peak (Rx): 230 mW<br>Selective Suspend: 17 mW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Bluetooth® Software Supported</b> | Microsoft Windows Bluetooth® Software                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Link Topology</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Power Management</b>              | Microsoft Windows ACPI, and USB Bus Support                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <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> | 2Mbps LE<br>Advanced Audio Distribution Profile (A2DP)<br>Basic Imaging Profile (BIP)<br>Bluetooth® 4.1-ESR 5/6/7 Compliance<br>Bluetooth® 4.2 ESR08 Compliance<br>Bluetooth® 5.2<br>Bluetooth® 5.3 Wireless Card<br>Channel Selection Algo<br>Encryption key size control enhancements<br>ESR9/10 Compliance<br>FAX Profile (FAX)<br>Hands Free Profile (HFP)<br>Headset Profile (HSP)<br>LE Advertisement Extensions<br>LE Data Packet Length Extension<br>LE Dual Mode<br>LE L2CAP Connection Oriented Channels<br>LE Link Layer<br>LE Link Layer Ping<br>LE Long Range<br>LE Low Duty Cycle Directed Advertising<br>LE Privacy 1.2 –Extended Scanner Filter Policies<br>LE Privacy 1.2 –Link Layer Privacy<br>LE Secure Connection- Basic/Full<br>Limited High Duty Cycle Non-Connectable Advertising<br>Periodic Advertisement interval<br>Train Nudging & Interlaced Scan<br>Windows Bluetooth® profiles support |

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

## Technical Specifications

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).

### HP 4G LTE-A Pro Cat16 WWAN eSIM<sup>1</sup>

### Technology/Operating 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 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 2: 1850 to 1910 MHz (UL), 1930 to 1990 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 3: 1710 to 1785 MHz (UL), 1805 to 1880 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 4: 1710 to 1755 MHz (UL), 2110 to 2155 MHz (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 5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)

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

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

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

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

### Wireless protocol standards

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

kbps, DL DC-HSPA+: 42 Mbps (CAT24)/UL 11.5 Mbps (CAT7)

### GPS

### GPS bands

WCDMA R99,

3GPP Release 5, 6, 7 and 8 UMTS Specification

Standalone/A-GPS (MS-A, MS-B)

GPS L1 (1575.42MHz), GLONASS L1 (1602MHz), Beidou B1

Technical Specifications

|                                         |                                                                                      |
|-----------------------------------------|--------------------------------------------------------------------------------------|
|                                         | (1561.098MHz), Galileo E1 (1575.42MHz), QZSS (1575.42MHz)                            |
| Maximum data rates                      | DC-HSPA+: 42.00 Mbps(Download), 11.50 Mbps (Upload)                                  |
| Maximum output power                    | HSPA+: 23.5 dBm<br>LTE (all bands except B41): 23.0 dBm                              |
| Maximum power consumption               | LTE: 1,300 mA (peak); 1,100 mA (average)<br>HSPA+: 1,100 mA (peak); 800 mA (average) |
| Form Factor                             | M.2; 3052-S3 Key B                                                                   |
| Weight                                  | 8.0 g (0.282 oz)                                                                     |
| Dimensions (Length x Width x Thickness) | 52.00 x 30.00 x 2.30 mm (2.05 x 1.18 x 0.09 inch)                                    |
| embedded eSIM                           | 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..

## Technical Specifications

|                       |                                                                           |                                                                                                                                   |
|-----------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>NFC NXP NPC300</b> | <b>Dimensions (L x W x H)</b>                                             | 17.00 x 10.00 x 2.00 mm (0.67 x 0.39 x 0.08 inch)                                                                                 |
|                       | <b>Chipset</b>                                                            | NPC300                                                                                                                            |
|                       | <b>System interface</b>                                                   | I2C                                                                                                                               |
|                       | <b>NFC RF standards</b>                                                   | ISO/IEC 14443 A<br>ISO/IEC 14443 B<br>ISO/IEC 15693<br>ISO/IEC 18092<br>ECMA-340 NFCIP-1 Target and Initiator<br>ECMA-320 NFCIP-2 |
|                       | <b>NFC Forum Support</b>                                                  | Type 1, Type 2, Type3 / Type 4, NFCIP-1 and NFCIP-2                                                                               |
|                       | <b>Reader (PCD-VCD) Mode</b>                                              | ISO/IEC 14443 A<br>ISO/IEC 14443 B<br>ISO/IEC 15693<br>MIFARE 1K<br>MIFARE 4K<br>MIFARE DESFire<br>FeliCa<br>Jewel and Topaz      |
|                       | <b>Card Emulation (PICC-VICC) Mode</b>                                    | ISO/IEC 14443 A<br>ISO/IEC 14443 B and B'<br>MIFARE<br>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>                                              | Operating: 0 °C to 70 °C (32 °F to 158 °F)<br>Storage: -20 °C to 125 °C (-4 °F to 257 °F)                                         |
|                       | <b>Humidity</b>                                                           | Operating: 10% - 90% (non-condensing)<br>Non-Operating: 5% - 95% (non-condensing)                                                 |
|                       | <b>Supply Operating voltage</b>                                           | 4.35 to 5.25 Volts                                                                                                                |
|                       | <b>I/O Voltage</b>                                                        | 1.8V or 3.3V                                                                                                                      |
|                       | <b>Power Consumption<br/>(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<br>Net Module 236.8 mA                                                                                             |
|                       | <b>Detected Test Tag Type 2</b>                                           | Total 288.8 mA<br>Net Module 241.8 mA                                                                                             |
|                       | <b>Detected Test Tag Type 3</b>                                           | Total 287.7 mA<br>Net Module 240.7 mA                                                                                             |
|                       | <b>Detected Test Tag Type 4</b>                                           | Total 282.3 mA<br>Net Module 235.3 mA                                                                                             |
|                       | <b>Antenna</b>                                                            | Antenna connector, 0.5mm pitch, 7 connector FPC. Antenna matching is external to module.                                          |

## Technical Specifications

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|----------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Intel® I219-LM 1 Gigabit Network Connection LOM (vPro®)</b> | <b>Connector</b>                             | RJ-45                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                | <b>System Interface</b>                      | PCI (Intel proprietary) + SMBus                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                | <b>Data rates supported</b>                  | 10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14)<br>100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30)<br>1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40)<br>Auto-Negotiation (Automatic Speed Selection)<br>Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s                                                  |
|                                                                | <b>IEEE Compliance</b>                       | IEEE 802.1p QoS (Quality of Service) Support<br>IEEE 802.1q VLAN support<br>IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)<br>IEEE 802.3az EEE (Energy Efficient Ethernet)                                                                                                                                                                                                                   |
|                                                                | <b>Performance</b>                           | TCP/IP/UDP Checksum Offload (configurable)<br>Protocol Offload (ARP & NS)<br>Large send offload and Giant send offload<br>Receiving Side Scaling (Hash Mode Only)<br>Jumbo Frame 9K                                                                                                                                                                                                                             |
|                                                                | <b>Power consumption</b>                     | Cable Disconnection: 25mW<br>100Mbps Full Run: 450mW<br>1000bp Full Run: 1000mW<br>WoL Enable (S3/S4/S5): 50mW<br>WoL Disable (S3/S4/S5): 25mW                                                                                                                                                                                                                                                                  |
|                                                                | <b>Power Management</b>                      | ACPI compliant – multiple power modes<br>Situation-sensitive features reduce power consumption<br>Advanced link down power saving for reducing link down power consumption                                                                                                                                                                                                                                      |
|                                                                | <b>Management Interface IT Manageability</b> | Auto MDI/MDIX Crossover cable detection<br>Wake-on-LAN from modern standby or sleep state (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only)<br>PXE 2.1 Remote Boot<br>Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))<br>Comprehensive diagnostic and configuration software suite<br>Virtual Cable Doctor for Ethernet cable status |
|                                                                | <b>Security &amp; Manageability</b>          | Intel® vPro™ support with appropriate Intel® chipset components                                                                                                                                                                                                                                                                                                                                                 |

|                                                                  |                             |                                                                                                                                                   |
|------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Intel® I219v 1 Gigabit Network Connection LOM (non-vPro®)</b> | <b>Connector</b>            | RJ-45                                                                                                                                             |
|                                                                  | <b>System Interface</b>     | PCI (Intel proprietary) + SMBus                                                                                                                   |
|                                                                  | <b>Data rates supported</b> | 10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14)<br>100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) |

## Technical Specifications

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|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>IEEE Compliance</b>                   | 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 802.3 clauses 40)                                                             |
|                                          | Auto-Negotiation (Automatic Speed Selection)                                                                                        |
| <b>Performance</b>                       | Full Duplex Operation at all Speeds, Half Duplex operation at 10, 100 & 1000 Mbit/s                                                 |
|                                          | IEEE 802.1p QoS (Quality of Service) Support                                                                                        |
| <b>Power consumption</b>                 | IEEE 802.1q VLAN support                                                                                                            |
|                                          | IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)                                                                   |
| <b>Power Management</b>                  | IEEE 802.3az EEE (Energy Efficient Ethernet)                                                                                        |
|                                          | IEEE 802.3i 10BASE-T                                                                                                                |
| <b>Management Interface</b>              | IEEE 802.3u 100BASE-TX                                                                                                              |
|                                          | IEEE 802.3ab 1000BASE-T                                                                                                             |
| <b>IT Manageability</b>                  | IEEE 802.3bz 2.5GBASE-T                                                                                                             |
|                                          | TCP/IP/UDP Checksum Offload (configurable)                                                                                          |
| <b>Security &amp; Manageability</b>      | Protocol Offload (ARP & NS)                                                                                                         |
|                                          | Large send offload and Giant send offload                                                                                           |
| <b>Wireless protocol standards</b>       | Receiving Side Scaling (Hash Mode only)                                                                                             |
|                                          | Jumbo Frame 9K                                                                                                                      |
| <b>Qualcomm 9205 LTE-M (no Internet)</b> | Cable Disconnection: 25mW                                                                                                           |
|                                          | 100Mbps Full Run: 450mW                                                                                                             |
| <b>Technology/Operating bands</b>        | 1000bps Full Run: 1000mW                                                                                                            |
|                                          | WoL Enable(S3/S4/S5): 50mW                                                                                                          |
| <b>Wireless protocol standards</b>       | WoL Disable(S3/S4/S5): 25mW                                                                                                         |
|                                          | ACPI compliant – multiple power modes                                                                                               |
| <b>Wireless protocol standards</b>       | Situation-sensitive features reduce power consumption                                                                               |
|                                          | Advanced link down power saving for reducing link down power consumption                                                            |
| <b>Wireless protocol standards</b>       | Auto MDI/MDIX Crossover cable detection                                                                                             |
|                                          | Wake-on-LAN from modern standby or sleep state (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) |
| <b>Wireless protocol standards</b>       | PXE 2.1 Remote Boot                                                                                                                 |
|                                          | Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))                                             |
| <b>Wireless protocol standards</b>       | Comprehensive diagnostic and configuration software suite                                                                           |
|                                          | Virtual Cable Doctor for Ethernet cable status                                                                                      |
| <b>Wireless protocol standards</b>       | Intel® non-vPro™ support with appropriate Intel® chipset components                                                                 |
|                                          |                                                                                                                                     |

|                                          |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Qualcomm 9205 LTE-M (no Internet)</b> | <b>Technology/Operating bands</b>  | FDD LTE: 1700/2100 (Band 4), 1700/2100 (Band 66), 1800 (Band 3), 1900 (Band 2), 1900 (Band 25), 2100 (Band 1), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 14 upper), 700 (Band 28), 700 (band 85), 800 (Band 20), 800 (Band 27), 850 (Band 18 lower), 850 (Band 19 upper), 850 (Band 26), 850 (Band 5), 900 (Band 8) MHz                                                                                                                                    |
|                                          | <b>Wireless protocol standards</b> | GSM/GPRS/EGPRS: 1800, 1900, 850, 900 MHz<br>3GPP TS 21.111 V10.0.0: USIM and IC card requirements<br>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)<br>3GPP TS 27.007 V10.0.8: AT command set for User Equipment (UE)<br>3GPP TS 31.102 V10.11.0: Characteristics of the Universal Subscriber Identity Module (USIM) application |

Technical Specifications

|                                         |                                                                                                                                                                    |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                         | 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 36.521-1 V14.3.0: User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing                             |
|                                         | 3GPP TS 51.010-1 V10.5.0: Mobile Station (MS) conformance specification; Part 1: Conformance specification                                                         |
|                                         | 3GPP TS 51.011 V4.15.0: Specification of the Subscriber Identity Module -Mobile Equipment (SIM-ME) interface                                                       |
| GPS                                     | Standalone GPS/Beidou/GLONASS                                                                                                                                      |
| GPS bands                               | 1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz                                                                                                 |
| Maximum data rates                      | LTE FDD: 375.00 Kbps (Download), 1119.00 Kbps (Upload)<br>GPRS: 107.00 Kbps (Download), 85.60 Kbps (Upload)<br>EGPRS: 296.00 Kbps (Download), 236.80 Kbps (Upload) |
| Maximum output power                    | LTE (all bands except B41): 21.5 dBm<br>GSM: 34.0 dBm                                                                                                              |
| Maximum power consumption               | LTE: 147 mA(peak), 60 mA(average)                                                                                                                                  |
| Form Factor                             | M.2, 2242-S3 Key B                                                                                                                                                 |
| Weight                                  | 4.0 g (0.141 oz)                                                                                                                                                   |
| Dimensions (Length x Width x Thickness) | 22.00 x 42.00 x 2.30 mm (0.87 x 1.65 x 0.09 inch)                                                                                                                  |
| embedded eSIM                           | Support                                                                                                                                                            |

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<br>Standard USB type C<br>Straight 1.8m | Weight                                                                                                                                                                                                                                                                                                                                                            | 240g ± 10g                                                                                                                                                                                                   |
|                                                                 | Input                                                                                                                                                                                                                                                                                                                                                             | 100-240Vac                                                                                                                                                                                                   |
|                                                                 | Input Efficiency                                                                                                                                                                                                                                                                                                                                                  | 81.50% min at 115 Vac/ 230 Vac @5.00V<br>86.70% min at 115 Vac/ 230 Vac @9.00V<br>88.00% min at 115 Vac/ 230 Vac @12.00V<br>89.00% min at 115 Vac/ 230 Vac @15.00V<br>89.00% min at 115 Vac/ 230 Vac @20.00V |
|                                                                 | Input frequency range                                                                                                                                                                                                                                                                                                                                             | 47-63Hz                                                                                                                                                                                                      |
|                                                                 | Input AC current                                                                                                                                                                                                                                                                                                                                                  | Max. 1.6 A at 90 Vac                                                                                                                                                                                         |
|                                                                 | Output power                                                                                                                                                                                                                                                                                                                                                      | 5V/15W<br>9V/27W<br>12V/60W<br>15V/65W<br>20V/65W                                                                                                                                                            |
|                                                                 | DC output                                                                                                                                                                                                                                                                                                                                                         | 5V/9V/12V/15V/20V                                                                                                                                                                                            |
|                                                                 | Hold-up time                                                                                                                                                                                                                                                                                                                                                      | 100% load 5ms at 115 Vac input                                                                                                                                                                               |
|                                                                 | Output current limit                                                                                                                                                                                                                                                                                                                                              | < 8.0A                                                                                                                                                                                                       |
|                                                                 | AC Inlet Type                                                                                                                                                                                                                                                                                                                                                     | C6                                                                                                                                                                                                           |
| Connector                                                       | DC Cable Connector                                                                                                                                                                                                                                                                                                                                                | USB type C                                                                                                                                                                                                   |
|                                                                 | DC Cable Material                                                                                                                                                                                                                                                                                                                                                 | PVC                                                                                                                                                                                                          |
|                                                                 | C6                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                              |
| Environmental Design                                            | Operating temperature                                                                                                                                                                                                                                                                                                                                             | 32° F to 95° F (0° to 35° C)                                                                                                                                                                                 |
|                                                                 | Non-operating (storage) temperature                                                                                                                                                                                                                                                                                                                               | -4° F to 185° F (-20° to 85° C)                                                                                                                                                                              |
|                                                                 | Altitude                                                                                                                                                                                                                                                                                                                                                          | 0 to 16,400 ft (0 to 5000m)                                                                                                                                                                                  |
|                                                                 | Humidity                                                                                                                                                                                                                                                                                                                                                          | 20% to 95%                                                                                                                                                                                                   |
|                                                                 | Storage Humidity                                                                                                                                                                                                                                                                                                                                                  | 10% to 95%                                                                                                                                                                                                   |
| EMI and Safety Certifications                                   | 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<br>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 Standard USB-C Straight AC Power Adapter | Weight               | 240g ± 10g                                                                                                                                                                                                                                                       |                                                                                                                                                                                                              |
|                                                 | Input                | 100-240Vac                                                                                                                                                                                                                                                       |                                                                                                                                                                                                              |
|                                                 | Output               | Input Efficiency                                                                                                                                                                                                                                                 | 81.50% min at 115 Vac/ 230 Vac @5.00V<br>86.70% min at 115 Vac/ 230 Vac @9.00V<br>88.00% min at 115 Vac/ 230 Vac @12.00V<br>89.00% min at 115 Vac/ 230 Vac @15.00V<br>89.00% min at 115 Vac/ 230 Vac @20.00V |
|                                                 |                      | Input frequency range                                                                                                                                                                                                                                            | 47-63Hz                                                                                                                                                                                                      |
|                                                 |                      | Input AC current                                                                                                                                                                                                                                                 | Max. 1.6 A at 90 Vac                                                                                                                                                                                         |
|                                                 |                      | Output power                                                                                                                                                                                                                                                     | 5V/15W<br>9V/27W<br>12V/60W<br>15V/65W<br>20V/65W                                                                                                                                                            |
|                                                 |                      | DC output                                                                                                                                                                                                                                                        | 5V/9V/12V/15V/20V                                                                                                                                                                                            |
|                                                 |                      | Hold-up time                                                                                                                                                                                                                                                     | 100% load 5ms at 115 Vac input                                                                                                                                                                               |
|                                                 |                      | Output current limit                                                                                                                                                                                                                                             | < 8.0A                                                                                                                                                                                                       |
|                                                 |                      | AC Inlet Type                                                                                                                                                                                                                                                    | C6                                                                                                                                                                                                           |
|                                                 |                      | DC Cable Connector                                                                                                                                                                                                                                               | USB type C                                                                                                                                                                                                   |
| Connector                                       | Environmental Design | DC Cable Material                                                                                                                                                                                                                                                | Halogen Free                                                                                                                                                                                                 |
|                                                 |                      | C6                                                                                                                                                                                                                                                               |                                                                                                                                                                                                              |
|                                                 |                      | Operating temperature                                                                                                                                                                                                                                            | 32° F to 95° F (0° to 35° C)                                                                                                                                                                                 |
|                                                 |                      | Non-operating (storage) temperature                                                                                                                                                                                                                              | -4° F to 185° F (-20° to 85° C)                                                                                                                                                                              |
|                                                 |                      | Altitude                                                                                                                                                                                                                                                         | 0 to 16,400 ft (0 to 5000m)                                                                                                                                                                                  |
| EMI and Safety Certifications                   |                      | Humidity                                                                                                                                                                                                                                                         | 20% to 95%                                                                                                                                                                                                   |
|                                                 |                      | Storage Humidity                                                                                                                                                                                                                                                 | 10% to 95%                                                                                                                                                                                                   |
|                                                 |                      | 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 |                                                                                                                                                                                                              |

|                                              |        |                       |                                                                                                                                                                                                              |
|----------------------------------------------|--------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HP 100W Slim USB-C Straight AC Power Adapter | Weight | 380g ± 10g            |                                                                                                                                                                                                              |
|                                              | Input  | 100-240Vac            |                                                                                                                                                                                                              |
|                                              |        | Input Efficiency      | 81.50% min at 115 Vac/ 230 Vac @5.00V<br>86.70% min at 115 Vac/ 230 Vac @9.00V<br>88.00% min at 115 Vac/ 230 Vac @12.00V<br>89.00% min at 115 Vac/ 230 Vac @15.00V<br>89.00% min at 115 Vac/ 230 Vac @20.00V |
|                                              |        | Input frequency range | 47-63Hz                                                                                                                                                                                                      |
|                                              |        | Input AC current      | Max. 1.6 A at 90 Vac                                                                                                                                                                                         |



Technical Specifications

|                               |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output                        | Output power          | 5V/15W                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                               |                       | 9V/27W                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                               |                       | 12V/60W                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                               |                       | 15V/75W                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                               |                       | 20V/100W                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                               | DC output             | 5V/9V/12V/15V/20V                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                               | Hold-up time          | 100% load 5ms at 115 Vac input/80% load<br>10ms at 115 Vac input                                                                                                                                                                                                                                                                                                                                                                      |
|                               | Output current limit  | 5V/9V/12V/15V<125% max current,<br>20V<135% max current                                                                                                                                                                                                                                                                                                                                                                               |
|                               | AC Inlet Type         | C6                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                               | DC Cable Connector    | USB type C                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Connector                     | DC Cable Material     | PVC                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                               | C6                    |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Environmental Design          | Operating temperature |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                               |                       | 32° F to 95° F (0° to 35° C)                                                                                                                                                                                                                                                                                                                                                                                                          |
|                               |                       | Non-operating (storage) temperature                                                                                                                                                                                                                                                                                                                                                                                                   |
|                               |                       | -4° F to 185° F (-20° to 85° C)                                                                                                                                                                                                                                                                                                                                                                                                       |
|                               |                       | Altitude                                                                                                                                                                                                                                                                                                                                                                                                                              |
| EMI and Safety Certifications | Humidity              | 0 to 16,400 ft (0 to 5000m)                                                                                                                                                                                                                                                                                                                                                                                                           |
|                               |                       | 20% to 95%                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                               |                       | Storage Humidity                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                               |                       | 10% to 95%                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                               |                       | CE Mark - full compliance with LVD and EMC directives<br>Worldwide safety standards - IEC60950-1, IEC 62368-1:2014 and IEC62368-1 : 2018, EN62368-1:2020+A11, UL 62368-1<br>Agency approvals - C-UL-US, TUV/GS, TUV/PSE, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC, CU(EAC), KCC(Safety+EMC), NOM-001 NYCE, NRcan, NRCS, ISC, SEC, PSB, Argentina S-mark, Australia RCM, BIS, BSMI, UAE, UKCA DoC, Ukraine(CoC+DoC+RoHS+ECO) |

Technical Specifications

|                                                              |             |                                                                                        |
|--------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------|
| RX 48Whr Long Life<br>Polymer Fast Charge 3<br>cell Battery* | Weight      | 0.192kg +/- 10g (0.423 lb)                                                             |
|                                                              | Cells/Type  | 3cell Lithium-Ion Polymer cell / NCM 565875                                            |
|                                                              | Energy      | <b>Voltage</b> 11.4V                                                                   |
|                                                              |             | <b>Amp-hour capacity</b> 4.285Ah                                                       |
|                                                              |             | <b>Watt-hour capacity<sup>1</sup></b> 48.84Wh                                          |
|                                                              | Temperature | <b>Operating (Charging)</b> 32° to 113° F (0° to 45° C)<br>32° to 122° F (0° to 50° C) |
|                                                              |             | <b>Operating (Discharging)</b> 14° to 140° F (10° to 60° C)                            |
|                                                              |             | <b>Optional Travel Battery Available</b> No                                            |

NOTE\*: Only available for selected regions and selected configurations.

|                                                             |             |                                                                                        |
|-------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------|
| RX 56Whr Long Life<br>Polymer Fast Charge 3<br>cell Battery | Weight      | 0.208kg +/- 10g (0.459 lb)                                                             |
|                                                             | Cells/Type  | 3cell Lithium-Ion Polymer cell / 586075                                                |
|                                                             | Energy      | <b>Voltage</b> 11.58V                                                                  |
|                                                             |             | <b>Amp-hour capacity</b> 4.840Ah                                                       |
|                                                             |             | <b>Watt-hour capacity<sup>1</sup></b> 56.04Wh                                          |
|                                                             | Temperature | <b>Operating (Charging)</b> 32° to 113° F (0° to 45° C)<br>32° to 122° F (0° to 50° C) |
|                                                             |             | <b>Operating (Discharging)</b> 14° to 140° F (-10° to 60° C)                           |
|                                                             |             | <b>Optional Travel Battery Available</b> No                                            |

AUDIO

|                            |                                                                                                                                                                                             |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HD Stereo Codec            | ALC3247                                                                                                                                                                                     |
| Audio I/O Ports            | 3.5mm Headset: CTIA only; Headphone-out                                                                                                                                                     |
| Internal Speaker Amplifier | Integrate in ALC3247                                                                                                                                                                        |
| Multi-streaming Capable    | 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.,<br>Following MSFT Behavior |
| Sampling                   | DAC: Supports resolutions from 16-bit to 16-bit;48.0 kHz to 48.0 kHz<br>ADC: Supports resolutions from 16-bit to 16-bit;48.0 kHz to 48.0 kHz                                                |
| Wavetable Syntheses        | Yes - Uses OS soft wavetable                                                                                                                                                                |
| Internal Speaker           | Yes                                                                                                                                                                                         |

FINGERPRINT READER

|                      |                |
|----------------------|----------------|
| Sensor vendor        | ELAN           |
| Sensor type          | Capacitive     |
| DPI resolution       | 508 DPI        |
| Scan area            | 80 x 80 pixels |
| False Rejection Rate | < 3%           |

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## Technical Specifications

|                                 |                                    |
|---------------------------------|------------------------------------|
| <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</b>     |                                    |
| <b>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 |

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|                                 |                                    |
|---------------------------------|------------------------------------|
| <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> | 2.7 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>Environmental Data</b> | <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 Fan and Speaker</li> <li>• 20% post-consumer recycled plastic</li> <li>• 50% 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>                                                | The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a "Typically Configured Notebook".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |                     |
|                           | <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)                                               | 4.19 W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 4.29 W              | 3.97 W              |
|                           | Normal Operation (Long idle)                                               | 0.82 W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.83 W              | 0.79 W              |
|                           | Sleep                                                                      | 0.82 W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.83 W              | 0.79 W              |
|                           | Off                                                                        | 0.34 W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.38 W              | 0.33 W              |
|                           |                                                                            | <p><b>NOTE:</b><br/>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)                                              | 14.29 BTU/hr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 14.63 BTU/hr        | 13.54 BTU/hr        |
|                           | Normal Operation (Long idle)                                               | 2.80 BTU/hr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2.83 BTU/hr         | 2.69 BTU/hr         |
|                           | Sleep                                                                      | 2.80 BTU/hr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2.83 BTU/hr         | 2.69 BTU/hr         |
|                           | Off                                                                        | 1.16 BTU/hr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.30 BTU/hr         | 1.13 BTU/hr         |

## Technical Specifications

|  |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                        |
|--|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
|  |                                                                               | <p><b>*NOTE:</b> Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                        |
|  | <b>Declared Noise Emissions</b><br>(in accordance with ISO 7779 and ISO 9296) | <b>Sound Power</b><br>(L <sub>WAd</sub> , bels)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Sound Pressure</b><br>(L <sub>pAm</sub> , decibels) |
|  | Typically Configured – Idle                                                   | 2.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 13.9                                                   |
|  | Fixed Disk – Random writes                                                    | 3.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 21.4                                                   |
|  | Optical Drive – Sequential reads                                              | 4.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 30.3                                                   |
|  | <b>Longevity and Upgrading</b>                                                | <p>This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the</p> <p>Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                        |
|  | <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 95.0% recycle-able when properly disposed of at end of life.</li> </ul>                                                               |                                                        |
|  | <b>Packaging Materials</b>                                                    | <b>External:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | PAPER/Corrugated<br>245 g                              |
|  |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PAPER/Paperboard<br>50 g                               |
|  |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | PAPER/Molded Pulp<br>150 g                             |
|  |                                                                               | <b>Internal:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | PLASTIC/Polyethylene low density - LDPE<br>10 g        |
|  |                                                                               | The plastic packaging material contains at least 0.0% recycled content.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                        |
|  |                                                                               | The corrugated paper packaging materials contains at least 55.6% 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</p> |                                                        |

### Technical Specifications

|  |                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |                        | <p>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>  | <p>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 <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> |
|  | <b>Packaging Usage</b> | <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>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

### Technical Specifications

|  |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>End-of-life Management and Recycling</b>         | <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 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> |
|  | <b>HP, Inc. Corporate Environmental Information</b> | <p>For more information about HP's commitment to the environment:</p> <p>Global Citizenship Report<br/> <a href="http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html">http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</a><br/> Eco-label certifications<br/> <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><br/> ISO 14001 certificates:<br/> <a href="http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842">http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842</a><br/> and<br/> <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf">http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf</a></p>                                                          |
|  | <b>footnotes</b>                                    | <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<br>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><br><br><b>Highest resolution with dual displays is two 8K@ 60Hz host in High Resolution mode.</b><br>Three maximum displays supported are two 5K@ 30 Hz on DP ports plus one 4K UHD@ 30 Hz on HDMI in Multi-function mode.<br>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<br>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>                                                 | 2 x HDMI 2.0, 1 x USB-C Alt Mode, 1 x Thunderbolt 4, 2 x DisplayPort 1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Technical limitations</b>                                           | <b>Maximum resolution and display support is dependent on the maximum capability of the notebook.</b><br><br>Thunderbolt Hosts:<br>Maximum of (4) displays with maximum resolution of 5K@ 30Hz running Thunderbolt host.<br>Maximum resolution possible is dual 8K displays @ 60Hz running Thunderbolt host or running a non-Thunderbolt host in high resolution mode @30Hz.<br>Non-Thunderbolt hosts:<br><b>The highest resolution for dual displays running a non-Thunderbolt host in multi-function mode is</b><br>(1) 5K dual cable (using both DP ports) +(1) 4K on USB-C DP port.<br>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<br>High-Resolution Mode: (2) 5k @ 60Hz on DisplayPort ports and (1) 4k UHD @ 60Hz on HDMI port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dock Connectors                                                 | 1x HDMI 2.0, 2x DisplayPort 1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Technical limitations                                           | <b>Maximum resolution and display support is dependent on the maximum capability of the notebook.</b><br><br><b>Highest resolution with dual displays is two 8K@ 60Hz host in High Resolution mode.</b><br>Three maximum displays supported are two 5K@ 30 Hz on DP ports plus one 4K UHD@ 30 Hz on HDMI in Multi-function mode<br>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.<br>HP USB-C/A Universal Dock G2 |
| Docking station model #4                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Total number of supported displays (incl. the notebook display) | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Max. resolutions supported                                      | Multi-Function Mode: (3) 4K DCI @ 30Hz on any port<br>High-Resolution Mode: (3) 4K DCI @ 30Hz on any port                                                                                                                                                                                                                                                                                                                                                                                                          |
| Dock Connectors                                                 | 1x HDMI 2.0, 2x DisplayPort 1.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Technical limitations                                           | <b>Maximum resolution and display support is dependent on the maximum capability of the notebook.</b><br><br><b>The best resolution for dual or triple displays is 4K UHD@ 60Hz.</b><br>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 HDMI to VGA Adapter                                | H4F02AA          |
|                       | HP USB 3.0 to Gigabit RJ45 Adapter G2                 | 4Z7Z7AA          |
|                       | HP USB-C to DisplayPort Adapter                       | 6M148AA          |
|                       | HP USB-C to DisplayPort Adapter G2                    | 8Y8Y1AA, 8Y8Y2AA |
|                       | HP USB-C to HDMI 2.0 Adapter                          | 1WC36AA          |
|                       | HP USB-C to RJ45 Adapter G2                           | 4Z527AA          |
|                       | HP USB-C to USB 3.0 Adapter                           | N2Z63AA          |
|                       | HP USB-C to VGA Adapter                               | N9K76AA          |
| <b>Cases</b>          | HP Campus XL Marble Stone Backpack                    | 7K0E2AA          |
|                       | HP Campus XL Tie Dye Backpack                         | 7K0E3AA          |
|                       | HP Renew Business 17.3 Laptop Backpack                | 3E2U5AA          |
|                       | HP Renew Business 17.3 Laptop Bag                     | 3E2U6AA          |
|                       | HP Renew Executive 16 Laptop Backpack                 | 6B8Y1AA          |
|                       | HP Renew Executive 16 Laptop Bag                      | 6B8Y2AA          |
| <b>Commodity</b>      | HP USB DVD-Writer External ODD                        | F2B56AA          |
|                       | HP Nano Keyed Cable Lock                              | 1AJ39AA          |
|                       | HP Nano Master Keyed Cable Lock                       | 1AJ40AA          |
|                       | HP SureKey Standard/Nano/Wedge Cable Lock             | 6UW42AA          |
| <b>Docking</b>        | HP Thunderbolt™ 120W G4 Dock                          | 4J0A2AA          |
|                       | HP USB-C™ 120W G5 Dock                                | 5TW10AA          |
|                       | HP USB-C™ G5 Essential Dock                           | 72C71AA          |
|                       | HP USB-C™/A 120W G2 Universal Dock                    | 5TW13AA          |
| <b>Hub</b>            | HP 4K USB-C Multiport Hub                             | 6G843AA          |
|                       | HP Universal USB-C Hub and Laptop Charger Combo       | 9H0H9AA          |
|                       | HP Universal USB-C Multiport Hub                      | 50H55AA          |
|                       | HP USB-C to USB-A Hub                                 | Z6A00AA          |
|                       | HP USB-C Travel Hub G3                                | 86S97AA          |
| <b>Keyboard/Combo</b> | HP 655 Wireless Keyboard and Mouse Combo              | 4R009AA          |
|                       | HP 655 Wireless Keyboard and Mouse Combo (Blk Qty.10) | 4R009A6          |
|                       | HP 655 Wireless Keyboard and Mouse Combo White        | 860P8AA          |
|                       | HP Wireless Rechargeable 950MK Mouse and Keyboard     | 3M165AA          |
|                       | HP 405 Multi-Device Backlit Wired Keyboard            | 7N7C1AA          |
|                       | HP 455 Programmable Wireless Keyboard                 | 4R177AA          |
|                       | HP 455 Programmable Wireless Keyboard (Bulk Qty.12)   | 4R177A6          |

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

|              |                                                   |         |
|--------------|---------------------------------------------------|---------|
|              | HP 475 Dual-Mode Wireless Keyboard                | 7N7B9AA |
|              | HP 965 black Ergonomic Wireless Keyboard          | 7E756AA |
|              | HP 975 Dual-Mode USB+Bluetooth® Wireless Keyboard | 3Z726AA |
| <b>Mouse</b> | HP 125 Wired Mouse                                | 265A9AA |
|              | HP 125 Wired Mouse (Bulk Qty.120)                 | 265A9A6 |
|              | HP 128 Laser Wired Mouse                          | 265D9AA |
|              | HP 128 Laser Wired Mouse (Bulk Qty.120)           | 265D9A6 |
|              | HP 320M Wired Mouse                               | 9VA80AA |
|              | HP 425 Programmable Wireless Mouse                | 7M1D5AA |
|              | HP 435 Multi-Device Wireless Mouse                | 3B4Q5AA |
|              | HP 715 Rechargeable Multi-Device Bluetooth® Mouse | 6E6F0AA |
|              | HP 925 Ergonomic Vertical Wireless Mouse          | 6H1A5AA |
|              | HP Creator Black 935 Wireless Mouse               | 1D0K8AA |
|              | HP Multi-Device Black 635 Wireless Mouse          | 1D0K2AA |
|              | HP Premium Wireless Mouse                         | 1JR31AA |
| <b>Power</b> | HP 110W USB-C Laptop Charger                      | 8B3Y2AA |
|              | HP 65W GaN USB-C Laptop Charger                   | 600Q8AA |
|              | HP 65W USB-C Laptop Charger                       | 671R3AA |
|              | HP 65W USB-C LC AC Power Adapter                  | 1P3K6AA |
| <b>Video</b> | HP USB-A 325 Webcam                               | 53X27AA |
|              | HP Streaming 965 Webcam                           | 695J5AA |
|              | HP 625 Webcam                                     | 6Y7L1AA |
|              | HP 435 Webcam                                     | 77B10AA |

Change Log

| Date of change:  | Version History: |         | Description of change:                       |
|------------------|------------------|---------|----------------------------------------------|
| June 10, 2024    | V1 to V2         | Added   | System unit Section                          |
| June 11, 2024    | V2 to V3         | Added   | Display Section                              |
| June 17, 2024    | V3 to V4         | Added   | Graphics Section                             |
| July 9, 2024     | V4 to V5         | Added   | Display Section                              |
| July 15, 2024    | V5 to V6         | Updated | Weight and Dimensions Section                |
| August 9, 2024   | V6 to V7         | Updated | Graphics Section                             |
| October9, 2024   | V7 to V8         | Updated | Update Port Specification to: Thunderbolt™ 4 |
| December 5, 2024 | V14 to V15       | Updated | UEFI version                                 |
| January 22, 2025 | V15 to V16       | Updated | Display Section                              |

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