

### Overview

### HP ZBook Firefly 14" G10 Mobile Workstation PC



1. Ambient Light Sensor (Optional)
2. Internal Microphones (2)
3. Webcam LED (Optional)
4. Webcam
5. Camera Shutter
6. IR Camera (Optional)
7. IR Camera LEDs (Optional)

#### Right

8. Glass Clickpad
9. Power Button Key
10. Audio Combo Jack
11. SuperSpeed USB Type-A 5Gbps signaling rate
12. Nano Security Lock Slot (Lock sold separately)
13. SIM Card Slot (Optional)
14. Touch Fingerprint Sensor (Select models)

### Overview

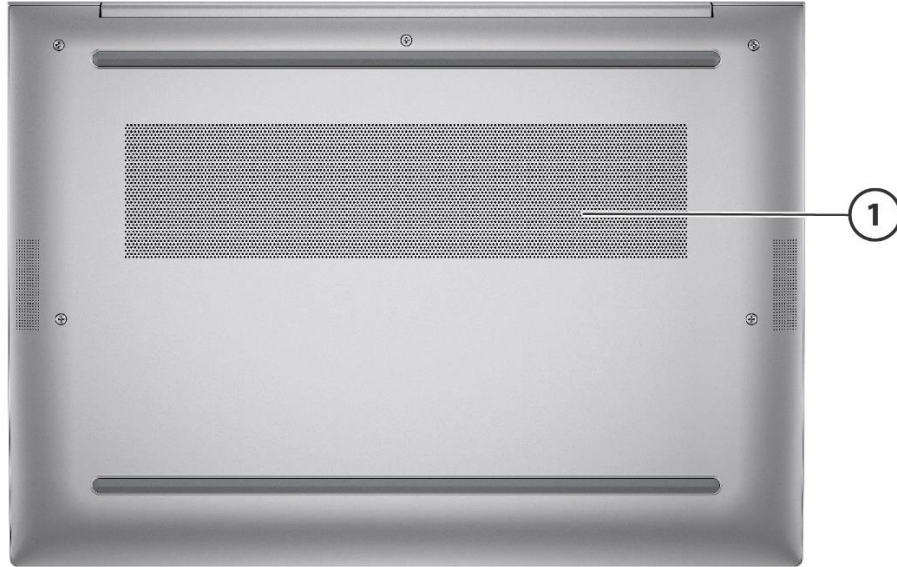


#### Left

1. HDMI 2.0b Port (Cable not included)
2. SuperSpeed USB Type-A 5Gbps signaling rate (Charging)
3. Thunderbolt™ 4 with USB4 Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)<sup>1</sup>
4. Thunderbolt™ 4 with USB4 Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)<sup>1</sup>
5. LED Indicator
6. Smartcard Reader (Optional)

<sup>1</sup>SuperSpeed USB 20Gbps is not available with Thunderbolt™ 4.

### Overview



### Bottom

#### 1. Fan Venting

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### Overview

#### At A Glance

- Premium ultraslim design with precision-crafted all-metal chassis for a premium look and feel
- 13th Generation Intel® Core™ i5, i7 U series and i5, i7 P series Processors up to fourteen-core
- Preinstalled with Windows 11 versions or FreeDOS
- 16:10 ratio screen reduces the need to scroll by showing more vertical content than 16:9
- 5MP camera with 88° field of view allows you to move around more freely in front on the camera or accommodate a group
- DDR5-4800 memory with up to 64GB capacity
- Choice of displays:
  - 35.6 cm (14") diagonal WUXGA IPS Anti-Glare LED-backlit, 250 nits, 45% NTSC
  - 35.6cm (14") diagonal WUXGA IPS Anti-Glare On-Cell LED-backlit touch, 250 nits, 45% NTSC
  - 35.6 cm (14") diagonal WUXGA IPS Anti-Glare LED-backlit non-touch 400 nits, 100% sRGB
  - 35.6cm (14") diagonal WUXGA IPS Anti-Glare LED-backlit non-touch, 1000 nits, 100% sRGB with HP Sure View Reflect
  - 35.6cm (14") diagonal WQXGA IPS Anti-Glare LED-backlit non-touch, 500 nits, 100% DCI-P3, DreamColor
- Enhanced HP Auto Frame provides improved face tracking and more natural framing movement
- Optional NVIDIA RTX A500 pro graphics for improved performance for heavier graphics workloads.
- HP Wolf Security for Business creates a hardware-enforced, always-on, resilient defense.
- Optional 14" DreamColor display for complete color accuracy with a 120Hz refresh rate for smooth motion.
- Connectivity with optional Intel® 5000 5G/WWAN available world-wide, and Thunderbolt™ Docking (Dock sold separately)
- Passes 19 MIL-STD 810H tests<sup>1</sup>
- Supports fast charging (50% in 30 minutes) with no impact on battery recharge cycles
- Designed to support all HP docking options including the HP Universal Dock G5
- 175 degree clamshell hinges lay almost flat, for easy collaboration and comfortable viewing at every angle.

<sup>1</sup>MIL-STD 810H is not intended to demonstrate fitness of 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.

**NOTE: See important legal disclosures for all listed specs in their respective features sections.**

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### Features

#### OPERATING SYSTEM

**Preinstalled OS** Windows 11 Pro - HP recommends Windows 11 Pro for business <sup>1</sup>  
 Windows 11 Pro Education <sup>1</sup>  
 Windows 11 Home - HP recommends Windows 11 Pro <sup>1</sup>  
 Windows 11 Home Single Language - HP recommends Windows 11 Pro <sup>1</sup>  
 Windows 11 Pro (preinstalled with Windows 10 Pro Downgrade)<sup>1,2</sup>  
 FreeDOS

<sup>1</sup> 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>.

<sup>2</sup>This system is preinstalled with Windows 10 Pro software and also comes with a license for Windows 11 Pro software and provision for recovery software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

**NOTE:** Your product does not support Windows 8 or Windows 7. 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>. A full list of HP products and the Windows 10 versions tested is available on the HP support website. <https://support.hp.com/us-en/document/c05195282>

#### PROCESSOR

| Name <sup>1,2,3,4,5</sup>                         | Cores | Number of P-cores | Number of E-cores | Threads | L3 Cache | Max Turbo Frequency |         | Base Frequency |         | Intel SIPP/vPro® Enterprise | Intel vPro® Essentials |
|---|-------|-------------------|-------------------|---------|----------|---------------------|---------|----------------|---------|-----------------------------|------------------------|
|   |       |                   |                   |         |          | P-cores             | E-cores | P-cores        | E-cores |                             |                        |
| 13 <sup>th</sup> Generation Intel® Core™ i7-1370P | 14    | 6                 | 8                 | 20      | 24 MB    | 5.2 GHz             | 3.9 GHz | 1.9 GHz        | 1.2 GHz | X                           |                        |
| 13 <sup>th</sup> Generation Intel® Core™ i7-1360P | 12    | 2                 | 8                 | 16      | 18 MB    | 5.0 GHz             | 3.7 GHz | 2.2 GHz        | 1.4 GHz |                             | X                      |
| 13 <sup>th</sup> Generation Intel® Core™ i5-1350P | 12    | 4                 | 8                 | 16      | 12 MB    | 4.7 GHz             | 3.5 GHz | 1.9 GHz        | 1.3 GHz | X                           |                        |
| 13 <sup>th</sup> Generation Intel® Core™ i5-1340P | 12    | 4                 | 8                 | 16      | 12 MB    | 4.6 GHz             | 3.4 GHz | 1.9 GHz        | 1.2 GHz |                             | X                      |
| 13 <sup>th</sup> Generation Intel® Core™ i7-1365U | 10    | 2                 | 8                 | 12      | 12 MB    | 5.2 GHz             | 3.9 GHz | 1.8 GHz        | 1.3 GHz | X                           |                        |
| 13 <sup>th</sup> Generation Intel® Core™ i7-1355U | 10    | 2                 | 8                 | 12      | 12 MB    | 5.0 GHz             | 3.7 GHz | 1.7 GHz        | 1.2 GHz |                             | X                      |
| 13 <sup>th</sup> Generation Intel® Core™ i5-1345U | 10    | 2                 | 8                 | 12      | 12 MB    | 4.7 GHz             | 3.5 GHz | 1.6 GHz        | 1.0 GHz | X                           |                        |
| 13 <sup>th</sup> Generation Intel® Core™ i5-1335U | 10    | 2                 | 8                 | 12      | 12 MB    | 4.6 GHz             | 3.4 GHz | 1.3 GHz        | 0.9 GHz |                             | X                      |

### Features

- <sup>1</sup> 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.
- <sup>2</sup> Intel Turbo Boost performance varies depending on hardware, software and overall system configuration. See <http://www.intel.com/technology/turboboost> for more information.
- <sup>3</sup> Intel vPro<sup>®</sup> 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<sup>®</sup> Essentials and Enterprise vary. See <http://intel.com/vpro>
- <sup>4</sup> 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>.
- <sup>5</sup> Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

### CHIPSET

Chipset is integrated with processor

### GRAPHICS

#### Integrated

Intel<sup>®</sup> Iris<sup>®</sup> Xe Graphics <sup>1,3</sup>

#### Discrete

NVIDIA RTX<sup>™</sup> A500 Laptop GPU (4 GB GDDR6 dedicated)<sup>1,2</sup>

#### Supports

Support HD decode, DX12, HDMI 2.0b, HDCP 2.3

<sup>1</sup> Both UMA & Discrete configurations support 4 independent displays when on the HP Thunderbolt Dock G4 (120W) (sold separately) - Max. resolution = 2.5K @60Hz (DP1) & 2.5K @60Hz (DP2) & FHD (VGA) OR 4K @60Hz (one DP Port) & 4K @60Hz (Type-C output port using a Type C-to-DP adapter).

<sup>2</sup> HDMI cable Sold Separately

<sup>3</sup> Intel<sup>®</sup> Iris<sup>®</sup> Xe Graphics capabilities require system to be configured with Intel<sup>®</sup> Core<sup>™</sup> i5 or i7 processors and dual channel memory. Intel<sup>®</sup> Iris<sup>®</sup> Xe Graphics with Intel<sup>®</sup> Core<sup>™</sup> i5 or 7 processors and single channel memory will only function as UHD graphics.

### DISPLAY

#### Non-touch

- 35.56 cm (14") diagonal WUXGA Bent, anti-glare UWVA, 250 nits, 45% NTSC for 5MP camera (1920 x 1200)<sup>1,3</sup>
- 35.56 cm (14") diagonal WUXGA Bent, anti-glare UWVA, 250 nits, 45% NTSC for 5MP+IR camera (1920 x 1200) <sup>1,3</sup>
- 35.56 cm (14") diagonal WUXGA Bent, anti-glare UWVA, 250 nits, 45% NTSC for WWAN (1920 x 1200) <sup>1,3</sup>
- 35.56 cm (14") diagonal WUXGA Bent, anti-glare UWVA, 250 nits, 45% NTSC for 5MP camera for WWAN (1920 x 1200) <sup>1,3</sup>
- 35.56 cm (14") diagonal WUXGA Bent, anti-glare UWVA, 250 nits, 45% NTSC for 5MP+IR camera for WWAN (1920 x 1200) <sup>1,3</sup>

### Features

- 35.56 cm (14") diagonal WUXGA Bent, anti-glare UWVA eDP1.2, micro-edge, 250 nits, 45% NTSC, (1920 x 1200) <sup>1,3</sup>
- 35.56 cm (14") diagonal WUXGA Bent, Low Blue Light, anti-glare UWVA eDP+PSR, 400 nits, 100% sRGB, Low Power, Ambient Light Sensor+Ambient Color Sensor for 5MP Camera (1920 x 1200) <sup>1,3</sup>
- 35.56 cm (14") diagonal WUXGA Bent, Low Blue Light, anti-glare UWVA eDP+PSR, 400 nits, 100% sRGB, Low Power, Ambient Light Sensor+Ambient Color Sensor for 5MP+IR Camera (1920 x 1200) <sup>1,3</sup>
- 35.56 cm (14") diagonal WUXGA Bent, Low Blue Light, anti-glare UWVA eDP+PSR, 400 nits, 100% sRGB, Low Power, Ambient Light Sensor+Ambient Color Sensor for 5MP+IR Camera for WWAN (1920 x 1200) <sup>1,3</sup>
- 35.56 cm (14") diagonal WUXGA Bent, Low Blue Light, anti-glare UWVA eDP1.3+PSR, 1000 nits, 100% sRGB with HP Sure View Reflect integrated privacy screen, Ambient Light Sensor+Ambient Color Sensor for 5MP camera (1920 x 1200) <sup>1,3,4,5</sup>
- 35.56 cm (14") diagonal WUXGA Bent, Low Blue Light, anti-glare UWVA eDP1.3+PSR, 1000 nits, 100% sRGB with HP Sure View Reflect integrated privacy screen, Ambient Light Sensor+Ambient Color Sensor for 5MP+IR camera (1920 x 1200) <sup>1,3,4,5</sup>
- 35.56 cm (14") diagonal WUXGA Bent, Low Blue Light, anti-glare UWVA eDP1.3+PSR, 1000 nits, 100% sRGB with HP Sure View Reflect integrated privacy screen, Ambient Light Sensor+Ambient Color Sensor for 5MP+IR camera for WWAN (1920 x 1200) <sup>1,3,4,5</sup>
- 35.6 cm (14") diagonal WQXGA Bent, anti-glare UWVA eDP 1.4+PSR, 500 nits, 100% HP DreamColor for 5MP Webcam + IR camera (2560 x 1600) <sup>1,3</sup>
- 35.6 cm (14") diagonal WQXGA Bent, anti-glare UWVA eDP 1.4+PSR, 500 nits, 100% HP DreamColor for 5MP Webcam + IR Camera for WWAN (2560 x 1600) <sup>1,3</sup>

#### Touch

- 35.56 cm (14") diagonal WUXGA Bent, anti-glare UWVA, 250 nits, 45% NTSC for 5MP+IR camera Touch on Panel (1920 x 1200) <sup>1,3,4,5</sup>
- 35.56 cm (14") diagonal WUXGA Bent, anti-glare UWVA, 250 nits, 45% NTSC for 5MP+IR camera for WWAN Touch on Panel (1920 x 1200) <sup>1,3,4,5</sup>

#### DisplayPort™ 1.4

HDMI 2.0 Support resolution up to 4K @60 Hz<sup>2</sup>

#### Displays support

Supports dual display through the dock

For more information, please reference the following ZBook docking whitepaper:

<https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=4AA5-2657ENW>

#### Display Size

14"

35.56 cm (14")

<sup>1</sup>HD content required to view HD images.

<sup>2</sup> HDMI cable sold separately.

<sup>3</sup>Resolutions are dependent upon monitor capability, and resolution and color depth settings.

<sup>4</sup>HP Sure View Reflect integrated privacy screen is an optional feature that must be configured at purchase and is designed to function in landscape orientation.

<sup>5</sup>Actual brightness will be lower with touchscreen or Sure View.

### Features

#### DOCKING

|   |  |
|---|--|
| <b>Docking station model #1</b>                                       | HP Thunderbolt 120W G4 Dock  |
| <b>Total number of supported displays (incl.the notebook display)</b> | 4  |
| <b>Max.resolutions supported</b>                                      | Quad 4K @60Hz Dual 8K single cable@30 for TB hosts or USB-C hosts DP 1.4 with DSC in high res mode   |
| <b>Dock Connectors</b>  | 2xDP, 1xVGA, 1xTB, 1xUSB-C alt-mode  |
| <b>Technical limitations</b>  | Thunderbolt Hosts:<br>Maximum of (4) displays with maximum resolution of 5K@ 30Hz running Thunderbolt host. Max 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>The highest resolution for dual displays running a non-Thunderbolt host in multi-function mode is<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 max 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 #2</b>                                       | HP USB-C Dock G5   |
| <b>Total number of supported displays (incl.the notebook display)</b> | 3  |
| <b>Max.resolutions supported</b>                                      | Dual 5K@ 30Hz + (1) 4K UHD (multi-function mode)   |
| <b>Dock Connectors</b>  | 1xHDMI, 2xDP   |
| <b>Technical limitations</b>  | Highest resolution with dual displays is two 8K@ 60Hz host in High Resolution mode. Three maximum displays supported are two 5K@ 30 Hz on DP ports plus one 4K UHD@ 30 Hz on HDMI in multi-function mode<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 #3</b>                                       | HP USB-C/A Universal Dock G2   |
| <b>Total number of supported displays (incl.the notebook display)</b> | 3  |
| <b>Max.resolutions supported</b>                                      | Triple 4K UHD@ 60Hz  |
| <b>Dock Connectors</b>  | 1xHDMI, 2xDP   |
| <b>Technical limitations</b>  | The best resolution for dual or triple displays is 4K UHD@ 60Hz.<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   |



### Features

#### STORAGE AND DRIVES\*

##### PCIe® NVMe™ M.2 2280 Storage

2 TB PCIe® Gen4x4 NVMe™ M.2 SSD TLC  
1 TB PCIe® Gen4x4 NVMe™ M.2 SSD TLC  
1 TB PCIe® Gen4x4 NVMe™ SED TLC OPAL2  
512 GB PCIe® Gen4x4 NVMe™ M.2 SSD TLC  
512 GB PCIe® Gen4x4 NVMe™ SED TLC OPAL2  
512 GB PCIe® NVMe™ Value M.2 SSD  
256 GB PCIe® Gen4x4 NVMe™ SED TLC OPAL2  
256 GB PCIe® NVMe™ Value M.2 SSD

\* For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35GB of disk is reserved for system recovery software.

#### DRIVE CONTROLLERS

M.2 Storage Bay (PCIe NVMe)  
RAID:

Supports up to PCIe® Gen4 x4 lanes NVMe™ Solid State Drive  
Not supported

#### MEMORY

##### Maximum Memory

64GB DDR5-4800 or 64GB DDR5-5200

##### Memory

64GB DDR5-4800 (2x32GB)  
32GB DDR5-4800 (2x16GB)  
32GB DDR5-4800 (1x32GB)  
16GB DDR5-4800 (2x8GB)  
16GB DDR5-4800 (1x16GB)  
8GB DDR5-4800 (1x8GB)

64GB DDR5-5200 (2x32GB)  
48GB DDR5-5200 (1x32GB+1x16GB)  
32GB DDR5-5200 (2x16GB)  
32GB DDR5-5200 (1x32GB)  
16GB DDR5-5200 (2x8GB)  
16GB DDR5-5200 (1x16GB)  
8GB DDR5-5200 (1x8GB)

##### Memory Slots

2 SODIMM

DDR5 SODIMMS, system runs at 4800 MT/s or 5200 MT/s (Memory speed is dependent on if 4800 SODIMMs or 5200 SODIMMs are installed.)

Supports Dual Channel Memory

**NOTE:** 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.

### Features

#### NETWORKING/COMMUNICATIONS

##### WLAN

Intel AX211 Wi-Fi 6E+BT5.3 M.2 160MHz CNVi World-Wide WLAN vPro<sup>1,2</sup>

Intel AX211 Wi-Fi 6E+BT5.3 M.2 160MHz CNVi World-Wide WLAN non-vPro<sup>1</sup>

<sup>1</sup>Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, and Windows 11 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.

<sup>2</sup> Intel vPro<sup>®</sup> 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<sup>®</sup> Essentials and Enterprise vary. See <http://intel.com/vpro>

##### WWAN<sup>1</sup>

Intel<sup>®</sup> 5000 5G Solution WWAN<sup>2</sup>

Intel<sup>®</sup> XMM 7560 R+ LTE-Advanced Pro WWAN(Cat 16)<sup>3</sup>

WWAN modules support both physical SIM and e-SIM

<sup>1</sup>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.

<sup>2</sup>Intel 5G module is optional and must be configured at the factory. Module designed for 5G NR NSA (non-standalone) networks as carriers deploy Evolved-Universal Terrestrial Radio Access New Radio Dual Connectivity (ENDC) with both 100Mhz of 5G NR and LTE channel bandwidth, using 256QAM 4x4 as defined by 3GPP. Module requires activation and separately purchased service contract. Check with service provider for coverage and availability in your area. Data connection, upload and download speeds will vary due to network, location, environment, network conditions, and other factors. Backwards compatible to 4G LTE and 3G HSPA technologies. 5G module planned to be available in select platforms and select countries, where carrier supported.

<sup>3</sup> Gigabit class Category 16 4G LTE module is optional and must be configured at the factory. Module designed for up to 1 Gbps download speeds as carriers deploy 5 carrier aggregation and 100Mhz channel bandwidth, requires activation and separately purchased service contract. Backwards compatible to HSPA 3G technologies. Check with service provider for coverage and availability in your area. Connection, upload and download speeds will vary due to network, location, environment, network conditions, and other factors. 4G LTE not available on all products, in all regions.

##### Near Field Communication (NFC) module

No Near Field Communication (NFC) module<sup>1</sup>

NFC Mirage WNC XRAV-1

<sup>1</sup>Sold separately or as an optional feature.

##### Miracast

Native Miracast Support

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

#### AUDIO/MULTIMEDIA

##### Audio

Audio by Bang & Olufsen

2 Integrated stereo speakers

Discrete Amplifiers

Integrated dual array microphone

### Features

**Speaker Power**

1W/8ohm Per speaker

**Camera<sup>1</sup>**

5 MP camera

5 MP+IR camera

**Sensors**

ALS (ambient light sensor)

Adaptive Color Sensor

Hall effect Sensor

HP Sure Platform

Motion AI LSM6DSL

Thermal Sensor

HP Tamper Lock<sup>2</sup>

<sup>1</sup> Sold separately or as an optional feature.

<sup>2</sup> HP Tamper Lock must be enabled by the customer or your administrator.

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### Features

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

##### Keyboard\*

HP Premium Keyboard, spill resistant, Backlit keyboard and DuraKeys

HP Premium Keyboard, spill resistant, Non-Backlit keyboard and DuraKeys

HP Premium Keyboard, spill resistant, Backlit keyboard and DuraKeys Privacy

##### Pointing Devices

Clickpad with multi-touch gesture support, taps enabled as default

Microsoft Precision Touchpad Default Gestures Support

##### Function Keys

ESC: system information

F1 - Display Switching

F2 - Blank or Privacy

F3 - Brightness Down

F4 - Brightness Up

F5 - Audio Mute

F6 - Volume Down

F7 - Volume Up

F8 - Mic Mute

F9 - Blank or Backlit Toggle

F10 - Insert

F11 - Airplane Mode

F12 - HP Command Center

home

end

Power Button (with LED)

delete

##### Hidden Keys

Fn+R - Break

Fn+S - Sys Rq

Fn+C - Scroll Lock

[\\*Backlit keyboard is an optional feature.](#)

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#### SOFTWARE AND SECURITY

##### Software

HP Quick Touch

HP Quick Drop<sup>21</sup>

HP Easy Clean<sup>2</sup>

HP PC Hardware Diagnostics Windows

HSA Fusion for Commercial

HSA Telemetry for Commercial

Touchpoint Customizer for Commercial

myHP

HP Smart Support<sup>24</sup>

HP Connection Optimizer<sup>10</sup>

HP Mac Address Manager

HP Hotkey Support

HP Support Assistant<sup>1</sup>

HP Notifications

HP Privacy Settings

HP Power Manager<sup>3</sup>

Buy Microsoft Office (Sold separately)

### Features

HP audio Control<sup>33</sup>

#### Manageability Features

HP Connect for Microsoft Endpoint Manager<sup>26</sup>

HP Image Assistant Gen5 (download)

HP Manageability Integration Kit (download)<sup>12</sup>

HP Client Management Script Library (download)

HP Patch Assistant (download)<sup>27</sup>

HP Driver Packs (download)

HP Cloud Recovery <sup>28</sup>

HP Client Catalog (download)

#### Security Management

**HP Wolf Security of Business <sup>29</sup> includes:**

HP Sure Click <sup>30</sup>

HP Sure Sense<sup>19</sup>

HP Sure Run Gen5<sup>31</sup>

HP Sure Recover Gen5<sup>14</sup>

HP Sure Start Gen7<sup>16</sup>

HP Tamper Lock<sup>4</sup>

HP Sure Admin<sup>23</sup>

HP Client Security Manager Gen7<sup>18</sup>

#### BIOS

HP BIOSphere Gen6<sup>6</sup>

HP Secure Erase<sup>17</sup>

Absolute Persistence Module<sup>7</sup>

HP DriveLock & Automatic DriveLock

BIOS Update via Network

HP Wake on WLAN

HP Fingerprint Sensor<sup>32</sup>

Secured-Core PC Enable<sup>20</sup>

TPM 2.0 Embedded Security Chip (Common Criteria EAL4+ Certified) (FIPS 140-2 Level 2 Certified)

#### Security

##### TPM

Model: Infineon SLB9672VU2.0

Version: 15.21

Revision: TPM 2.0

FIPS 140-2 Compliant: Yes

##### Smartcard Reader

Model Number: Alcor AU9560

FIPS 201 Compliant: Yes

##### IPv6 Support

Yes

##### FirstNet Certified

Yes

**Is the BIOS on this notebook ISO/IEC 19678:2015(formerly NIST 800-147) compliant?:** Yes

UEFI version: 2.7

Class: 3

### Features

**For more information on HP Client Security Software Suite, refer to <http://www.hp.com/go/clientsecurity>.**

<sup>1</sup> HP Support Assistant - Requires Windows and Internet Access.

<sup>2</sup> 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.

<sup>3</sup> HP Power Manager requires Windows 10 and higher and can be downloaded from the Microsoft Store.

<sup>4</sup> HP Tamper Lock must be enabled by the customer or your administrator.

<sup>6</sup> HP BIOSphere Gen6 is available on select HP Pro, Elite and ZBook PCs. See product specifications for details. Features may vary depending on the platform and configurations.

<sup>7</sup> Absolute agent is shipped turned off, and will be activated when customers activate a purchased subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit:

<http://www.absolute.com/company/legal/agreements/computrace-agreement>. Data Delete is an optional service provided by Absolute Software. If utilized, the Recovery Guarantee is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software.

<sup>10</sup> HP Connection Optimizer requires Windows 10 and Windows 11.

<sup>12</sup> HP Manageability Integration Kit can be downloaded from <http://www.hp.com/go/clientmanagement>.

<sup>14</sup> HP Sure Recover Gen5 with Embedded Reimaging is an optional feature which requires Windows 10 and higher must be configured at purchase. You must back up important files, data, photos, videos, etc. before use to avoid loss of data. Network based recovery using Wi-Fi is only available on PCs with Intel Wi-Fi Module

<sup>15</sup> HP Sure Recover with Embedded Reimaging Gen3 is an optional feature which must be configured at purchase with a base unit that has the On System Recovery (OSR) module. See product specifications for availability. You must back up important files, data, photos, videos, etc. before use to avoid loss of data. HP Sure Recover with Embedded Reimaging (Gen1) does not support platforms with Intel® Optane™.

<sup>16</sup> HP Sure Start Gen7 is available on select HP PCs and requires Windows 10 and higher

<sup>17</sup> HP Secure Erase for the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 "Clear" sanitation method. HP Secure Erase does not support platforms with Intel® Optane™.

<sup>18</sup> HP Client Security Manager Gen7 requires Windows and is available on select HP Pro, Elite and ZBook PCs. See product specifications for details.

<sup>19</sup> HP Sure Sense is available on select HP PCs with Windows 10 Pro, Windows 10 Enterprise, Windows 11 Pro, or Windows 11 Enterprise OS.

<sup>20</sup> Secured-core PC requires an Intel® vPro® or AMD Ryzen™ Pro processor. Requires 8 GB or more system memory. Secured-core PC functionality can be enabled from the factory.

<sup>21</sup> Requires Internet access and Windows 10 PC preinstalled with HP QuickDrop app and either an Android device (phone or tablet) running Android 7 or higher with the Android HP QuickDrop app, and /or an iOS device (phone or tablet) running iOS 12 or higher with the iOS HP QuickDrop app.

<sup>23</sup> HP Sure Admin requires Windows 10, HP BIOS, HP Manageability Integration Kit from <http://www.hp.com/go/clientmanagement> and HP Sure Admin Local Access Authenticator smartphone app from the Android or Apple store.

<sup>24</sup> HP Smart Support requires HP TechPulse to be installed. For more information about how to enable or to download HP Smart Support, please visit <http://www.hp.com/smart-support>.

<sup>26</sup> 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.

<sup>27</sup> 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>.

<sup>28</sup> 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, wired 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/document/c05115630>.

<sup>29</sup> HP Wolf Security for Business requires Windows 10 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 and OS requirement.

<sup>30</sup> HP Sure Click requires Windows 10 Pro or higher or Enterprise. See [https://bit.ly/2PrLT6A\\_SureClick](https://bit.ly/2PrLT6A_SureClick) for complete details.

<sup>31</sup> HP Sure Run Gen5 is available on select HP PCs and requires Windows 10 and higher.

<sup>32</sup> HP Fingerprint Reader is an optional feature that requires Windows 10 IoT and must be configured at purchase.

<sup>33</sup> Microphone Noise Reduction and Speaker Noise Reduction feature included under HP Audio Control

### Features

#### POWER

##### Power Supply

HP Smart 65 W USB Type-C® adapter<sup>2</sup>

##### Battery

HP Long Life 3-cell, 51 Wh Polymer<sup>3,4</sup>

##### Power Cord

3-wire plug - 1m

2-wire plug - 1m

##### Battery life

TBC<sup>1</sup>

<sup>1</sup> MM18 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.

<sup>2</sup> Availability may vary by country.

<sup>3</sup> Battery is internal and not replaceable by customer. Serviceable by warranty.

<sup>4</sup> 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.

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#### ENVIRONMENTAL

ENERGY STAR® certified

EPEAT® registered where applicable. Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® registration varies by country. See [www.epeat.net](http://www.epeat.net) for registration status by country.

EPEAT® Gold

TCO 8.0 Certified

RCTA DO-160G

Medical EMC: IEC 60601-1-2:2014 EN60601-1-2: 2015

SEPA

GS Mark

Eyesafe Certification - Worldwide

##### Sustainable Impact Specifications

Recycled Aluminum and Magnesium, 75% PCR w/30% ITE plastics

<sup>1</sup> Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit [www.epeat.net](http://www.epeat.net) for more information.

<sup>2</sup> External power supplies, power cords, cables and peripherals are not low halogen. Service parts obtained after purchase may not be low halogen.

### Features

#### WEIGHTS & DIMENSIONS

**Dimensions (w x d x h)**

12.42 x 8.82 x 0.76 in

31.56 x 22.405 x 1.92 cm

**Weights\*****Product Weight- 51Whr**

Starting at 3.2 lb

Starting at 1.45 kg

\*Weight will vary by configuration. Does not include power adapter.

#### PORTS/SLOTS

2 Thunderbolt™ 4 with USB4 Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4) \*

1 Super Speed USB Type-A 5Gbps signaling rate (1 charging)

1 Super Speed USB Type-A 5Gbps signaling rate

1 HDMI 2.0\*\*

1 Headphone/microphone combo jack

1 Nano Security Lock Slot (Lock sold separately)

1 Smartcard reader (Optional)

1 nano SIM card slot

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

\*\*HDMI cable sold separately.

#### COMPATIBILITY

|   |         |
|---|---------|
| HP Wired USB-A Stereo Headset             | 428K6AA |
| HP Renew Business 17.3 Laptop Backpack    | 3E2U5AA |
| HP Universal USB-C Multiport Hub          | 50H55AA |
| HP Multi-Device 635 Black Wireless Mouse  | 1D0K2AA |
| HP 975 USB+BT Dual-Mode Wireless Keyboard | 3Z726AA |

#### SERVICE AND SUPPORT

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

<http://www.hp.com/go/cpc>.

<sup>1</sup>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.



### Features

#### SYSTEM UNIT

|  |                                      |   |
|--|--------------------------------------|---|
| <b>Stand-Alone Power Requirements (AC Power)</b> | <b>Nominal Operating Voltage</b>     | AC 20V  |
|  | <b>Average Operating Power(idle)</b> | System in idle mode   |
|  | <b>Integrated graphics</b>           | Yes   |
|  | <b>Discrete Graphics</b>             | N/A   |
| <b>Temperature</b>                               | <b>Max Operating Power</b>           | 65W   |
|  | <b>Operating</b>                     | 32° to 95° F (0° to 35° C)<br>(No sustained direct exposure to sunlight)<br>(System performance may be reduced above 32°C (89.6°F)) |
|  | <b>Non-operating</b>                 | -4° to 140° F (-20° to 60° C)   |
| <b>Relative Humidity</b>                         | <b>Operating</b>                     | 10% to 90%, non-condensing  |
|  | <b>Non-operating</b>                 | 5% to 95%<br>(38.7° C (101.6° F) maximum wet bulb tempera-ture; non-condensing)   |
| <b>Shock</b>                                     | <b>Operating</b>                     | 40 G, 2 ms, half-sine   |
|  | <b>Non-operating</b>                 | 240 G, 2 ms, half-sine  |
| <b>Random Vibration</b>                          | <b>Operating</b>                     | 1.043 grms  |
|  | <b>Non-operating</b>                 | 3.5 grms  |
| <b>Maximum Altitude (unpressurized)</b>          | <b>Operating</b>                     | 10,000 ft (3,048 m)   |
|  | <b>Non-operating</b>                 | 40,000 ft (12,192 m)  |
| <b>Planned Industry Standard Certifications</b>  | <b>Regulatory Model Number</b>       | HSN-I45C-4  |
|  | <b>CSA/UL 62368-1</b>                | Yes   |
|  | <b>ENERGY STAR®</b>                  | Yes   |
|  | <b>FCC/ICES/CISPR/VCCI</b>           | Yes   |
|  | <b>CE MARKING</b>                    | Yes   |
|  | <b>GS Mark</b>                       | Yes   |
|  | <b>China CCC/SRRC</b>                | Yes   |
|  | <b>Taiwan BSMI/NCC</b>               | Yes   |
|  | <b>Korea KCC/KC/KES</b>              | Yes   |
|  | <b>Ukraine NSoC/TEC</b>              | Yes   |
|  | <b>EAEU Compliance</b>               | Yes   |
|  | <b>Saudi Arabian Compliance</b>      | Yes   |
|  | <b>TCO</b>                           | Yes   |
|  | <b>EPEAT Gold</b>                    | Yes   |
|  | <b>Low Blue Light</b>                | Yes   |
|  | <b>WW RoHS</b>                       | Yes   |
| <b>Saudi Arabian Compliance (ICCP)</b>           | Yes                                  |   |
| <b>SABS</b>                                      | Yes                                  |   |

<sup>1</sup>Configurations of the HP ZBook Firefly 14" G10 Mobile Workstation PC that are ENERGY STAR® qualified are identified as HP ZBook Firefly 14" G10 Mobile Workstation PC ENERGY STAR on HP websites and on <http://www.energystar.gov>.

<sup>2</sup>Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit [www.epeat.net](http://www.epeat.net) for more information.

### Technical Specifications – Displays

#### DISPLAYS

**14 in WUXGA (1920 x 1200) Anti-Glare UWVA LED NTSC NB2X 250 eDP 1.2 w/o PSR 45 bent LCD Panel**

|   |                         |                     |
|---|-------------------------|---------------------|
| <b>Outline Dimensions (W x H)</b>                           | 307.590 x 199.550 (max) |                     |
| <b>Active Area</b>  | 301.590 X 188.500 (typ) |                     |
| <b>Weight</b>   | 300 (max)               |                     |
| <b>Diagonal Size</b>  | 14                      |                     |
| <b>Thickness</b>  | 3.0 / 5.0 (max)         |                     |
| <b>Interface</b>  | eDP 1.2                 |                     |
| <b>Surface Treatment</b>                                    | Anti-Glare              |                     |
| <b>Touch enabled</b>  | No                      |                     |
| <b>Contrast Ratio</b>                                       | 1000:1 (typ)            |                     |
| <b>Refresh Rate</b>   | 60 Hz                   |                     |
| <b>Brightness</b>   | 250 nits                |                     |
| <b>Pixel Resolution</b>                                     | <b>Pitch</b>            | 1920 x 1200 (WUXGA) |
|   | <b>Format</b>           | RGB Stripe          |
| <b>Backlight</b>  | WLED                    |                     |
| <b>Color Gamut Coverage</b>                                 | NTSC 45%                |                     |
| <b>Color Depth</b>  | 8 bits                  |                     |
| <b>Viewing Angle</b>  | UWVA 89/89/89/89        |                     |
| <b>Low Blue Light</b>                                       | No                      |                     |
| <b>Power Consumption (W, EBL@ 150nits max/ 200nits max)</b> | 2.20 (max) / 2.70 (max) |                     |

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

**14 in WUXGA (1920 x 1200) Anti-Glare UWVA LED NTSC NB2X 250 TOP eDP 1.2 w/o PSR 45 bent LCD Panel**

|                                   |                         |                     |
|-----------------------------------|-------------------------|---------------------|
| <b>Outline Dimensions (W x H)</b> | 307.590 x 199.550 (max) |                     |
| <b>Active Area</b>                | 301.590 x 188.500 (typ) |                     |
| <b>Weight</b>                     | 300 (max)               |                     |
| <b>Diagonal Size</b>              | 14                      |                     |
| <b>Thickness</b>                  | 3.0 / 5.0 (max)         |                     |
| <b>Interface</b>                  | eDP 1.2                 |                     |
| <b>Surface Treatment</b>          | Anti-Glare              |                     |
| <b>Touch enabled</b>              | Yes                     |                     |
| <b>Contrast Ratio</b>             | 1000:1 (typ)            |                     |
| <b>Refresh Rate</b>               | 60 Hz                   |                     |
| <b>Brightness</b>                 | 250 nits                |                     |
| <b>Pixel Resolution</b>           | <b>Pitch</b>            | 1920 x 1200 (WUXGA) |
|                                   | <b>Format</b>           | RGB                 |
| <b>Backlight</b>                  | WLED                    |                     |
| <b>Color Gamut Coverage</b>       | NTSC 45%                |                     |
| <b>Color Depth</b>                | 8 bits                  |                     |
| <b>Viewing Angle</b>              | UWVA 89/89/89/89        |                     |
| <b>Low Blue Light</b>             | No                      |                     |

### Technical Specifications – Displays

**Power Consumption (W, EBL@ 150nits max/ 200nits max)** 2.10 (max) / 2.60 (max)

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

**14 in WUXGA (1920 x 1200) Anti-Glare UWVA WLED+LBL sRGB NB2X 400 eDP 1.4+PSR2 Low-Power 100 bent LCD Panel**

|   |                         |                     |
|---|-------------------------|---------------------|
| <b>Outline Dimensions (W x H)</b>                           | 307.590 x 199.550 (max) |                     |
| <b>Active Area</b>  | 301.590 X 188.500 (typ) |                     |
| <b>Weight</b>   | 210 (max)               |                     |
| <b>Diagonal Size</b>  | 14                      |                     |
| <b>Thickness</b>  | 2.0 / 3.8 (max)         |                     |
| <b>Interface</b>  | eDP 1.4                 |                     |
| <b>Surface Treatment</b>                                    | Anti-Glare              |                     |
| <b>Touch enabled</b>  | No                      |                     |
| <b>Contrast Ratio</b>                                       | 1000:1(typ)             |                     |
| <b>Refresh Rate</b>   | 60 Hz                   |                     |
| <b>Brightness</b>   | 400 nits                |                     |
| <b>Pixel Resolution</b>                                     | <b>Pitch</b>            | 1920 x 1200 (WUXGA) |
|   | <b>Format</b>           | RGB                 |
| <b>Backlight</b>  | WLED                    |                     |
| <b>Color Gamut Coverage</b>                                 | sRGB 100%               |                     |
| <b>Color Depth</b>  | 8 bits                  |                     |
| <b>Viewing Angle</b>  | UWVA 89/89/89/89        |                     |
| <b>Low Blue Light</b>                                       | Yes                     |                     |
| <b>Power Consumption (W, EBL@ 150nits max/ 200nits max)</b> | 1.29 (max) / 1.66 (max) |                     |

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

**14 in WUXGA (1920 x 1200) Anti-Glare UWVA WLED+LBL sRGB NB2Y 1000 eDP 1.3+PSR 100 PrivacyG4 Plus bent LCD Panel**

|                                   |                         |                     |
|-----------------------------------|-------------------------|---------------------|
| <b>Outline Dimensions (W x H)</b> | 307.600 x 199.550 (typ) |                     |
| <b>Active Area</b>                | 301.680 x 188.500 (typ) |                     |
| <b>Weight</b>                     | 238 (max)               |                     |
| <b>Diagonal Size</b>              | 14                      |                     |
| <b>Thickness</b>                  | 2.2 / 3.9 (max)         |                     |
| <b>Interface</b>                  | eDP 1.3                 |                     |
| <b>Surface Treatment</b>          | Anti-Glare              |                     |
| <b>Touch Enabled</b>              | No                      |                     |
| <b>Contrast Ratio</b>             | 1500:1(typ)             |                     |
| <b>Refresh Rate</b>               | 60 Hz                   |                     |
| <b>Brightness</b>                 | 1000 nits               |                     |
| <b>Pixel Resolution</b>           | <b>Pitch</b>            | 1920 x 1200 (WUXGA) |
|                                   | <b>Format</b>           | RGB                 |

### Technical Specifications – Displays

|   |                  |
|---|------------------|
| <b>Backlight</b>  | WLED             |
| <b>Color Gamut Coverage</b>                                 | sRGB 100%        |
| <b>Color Depth</b>  | 8 bits           |
| <b>Viewing Angle</b>  | UWVA 85/85/85/85 |
| <b>Low Blue Light</b>                                       | Yes              |
| <b>Power Consumption (W, EBL@ 150nits max/ 200nits max)</b> | N/A              |

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

|  |   |                         |                    |  |
|--|---|-------------------------|--------------------|--|
| <b>14 in WQXGA DRM (2560 x 1600) Anti-Glare UWVA LED DCI-P3 NB2X 500 eDP 1.4+PSR2 100 120Hz bent LCD Panel</b> | <b>Outline Dimensions (W x H)</b>                           | 307.594 x 199.546 (max) |                    |  |
|  | <b>Active Area</b>  | 301.594 x 188.496 (typ) |                    |  |
|  | <b>Weight</b>   | 230 (max)               |                    |  |
|  | <b>Diagonal Size</b>  | 14                      |                    |  |
|  | <b>Thickness</b>  | 2.0 / 3.8 (max)         |                    |  |
|  | <b>Interface</b>  | eDP 1.4                 |                    |  |
|  | <b>Surface Treatment</b>                                    | Anti-Glare              |                    |  |
|  | <b>Touch Enabled</b>  | No                      |                    |  |
|  | <b>Contrast Ratio</b>                                       | 1200:1(typ)             |                    |  |
|  | <b>Refresh Rate</b>   | 120 Hz                  |                    |  |
|  | <b>Brightness</b>   | 500 nits                |                    |  |
|  | <b>Pixel Resolution</b>                                     | <b>Pitch</b>            | 2560 x1600 (WQXGA) |  |
|  |   | <b>Format</b>           | RGB Stripe         |  |
|  |   | <b>Backlight</b>        | WLED               |  |
|  | <b>Color Gamut Coverage</b>                                 | DCI-P3 100%             |                    |  |
|  | <b>Delta E</b>  | <2                      |                    |  |
|  | <b>Color Depth</b>  | 8 bits                  |                    |  |
|  | <b>Viewing Angle</b>  | UWVA 85/85/85/85        |                    |  |
|  | <b>Low Blue Light</b>                                       | No                      |                    |  |
|  | <b>Power Consumption (W, EBL@ 150nits max/ 200nits max)</b> | 2.88 (max) / 3.44 (max) |                    |  |

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

### Technical Specifications – Storage

#### STORAGE AND DRIVES

|  |                              |   |                                 |  |
|--|------------------------------|---|---------------------------------|--|
| <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>Height</b>                | 0.09 in (2.3 mm)  |                                 |  |
|  | <b>Width</b>                 | 0.87 in (22 mm)   |                                 |  |
|  | <b>Weight</b>                | 0.02 lb (10 g)  |                                 |  |
|  | <b>Interface</b>             | PCIe NVMe Gen4X4  |                                 |  |
|  | <b>Performance</b>           | <b>Maximum Sequential Read</b>  | <b>Maximum Sequential Write</b> |  |
|  |                              | 6400 MB/s ±20%  | 3500 MB/s ±20%                  |  |
|  |                              | <b>Logical Blocks</b>   | 1,000,215,215                   |  |
|  | <b>Operating Temperature</b> | 32° to 158°F (0° to 70°C) [ambient temp]  |                                 |  |
|  | <b>Features</b>              | Pyrite 2.0; TRIM; L1.2  |                                 |  |
|  |                              | <b>NOTE:</b> For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software. |                                 |  |
| <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>Height</b>                | 0.09 in (2.3 mm)  |                                 |  |
|  | <b>Width</b>                 | 0.87 in (22 mm)   |                                 |  |
|  | <b>Weight</b>                | 0.02 lb (10 g)  |                                 |  |
|  | <b>Interface</b>             | PCIe NVMe Gen4X4  |                                 |  |
|  | <b>Performance</b>           | <b>Maximum Sequential Read</b>  | <b>Maximum Sequential Write</b> |  |
|  |                              | 6400 MB/s ±20%  | 5000 MB/s ±20%                  |  |
|  |                              | <b>Logical Blocks</b>   | 2,000,409,264                   |  |
|  | <b>Operating Temperature</b> | 32° to 158°F (0° to 70°C) [ambient temp]  |                                 |  |
|  | <b>Features</b>              | Pyrite 2.0; TRIM; L1.2  |                                 |  |
|  |                              | <b>NOTE:</b> For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software. |                                 |  |
| <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>Height</b>                | 0.09 in (2.3 mm)  |                                 |  |
|  | <b>Width</b>                 | 0.87 in (22 mm)   |                                 |  |
|  | <b>Weight</b>                | 0.02 lb (10 g)  |                                 |  |
|  | <b>Interface</b>             | PCIe NVMe Gen4X4  |                                 |  |
|  | <b>Performance</b>           | <b>Maximum Sequential Read</b>  | <b>Maximum Sequential Write</b> |  |
|  |                              | 6400 MB/s ±20%  | 5000 MB/s ±20%                  |  |
|  |                              | <b>Logical Blocks</b>   | 4,000,797,360                   |  |
|  | <b>Operating Temperature</b> | 32° to 158°F (0° to 70°C) [ambient temp]  |                                 |  |
|  | <b>Features</b>              | Pyrite 2.0; TRIM; L1.2  |                                 |  |

### Technical Specifications – Storage

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.

#### 256GB PCIe 2280 NVMe Self Encrypted OPAL2 Value Solid State Drive

|                              |  |
|------------------------------|--|
| <b>Form Factor</b>           | M.2 2280   |
| <b>Capacity</b>              | 256GB  |
| <b>NAND Type</b>             | TLC  |
| <b>Height</b>                | 0.09 in (2.3 mm)   |
| <b>Width</b>                 | 0.87 in (22 mm)  |
| <b>Weight</b>                | 0.02 lb (10 g)   |
| <b>Interface</b>             | PCIe NVMe Gen4X4   |
| <b>Performance</b>           | <b>Maximum Sequential Read</b> <b>Maximum Sequential Write</b> |
|                              | 2000 MB/s ±20%                      900 MB/s ±20%              |
| <b>Logical Blocks</b>        | 500,118,192  |
| <b>Operating Temperature</b> | 32° to 158°F (0° to 70°C) [ambient temp]                       |
| <b>Features</b>              | TCG Opal 2.0; TRIM; L1.2                                       |

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.

#### 512GB PCIe-4x4 2280 NVMe Self Encrypted OPAL2 Three Layer Cell Solid State Drive

|                              |  |
|------------------------------|--|
| <b>Form Factor</b>           | M.2 2280   |
| <b>Capacity</b>              | 512GB  |
| <b>NAND Type</b>             | TLC  |
| <b>Height</b>                | 0.09 in (2.3 mm)   |
| <b>Width</b>                 | 0.87 in (22 mm)  |
| <b>Weight</b>                | 0.02 lb (10 g)   |
| <b>Interface</b>             | PCIe NVMe Gen4X4   |
| <b>Performance</b>           | <b>Maximum Sequential Read</b> <b>Maximum Sequential Write</b> |
|                              | 6400 MB/s ±20%                      3500 MB/s ±20%             |
| <b>Logical Blocks</b>        | 1,000,215,215  |
| <b>Operating Temperature</b> | 32° to 158°F (0° to 70°C) [ambient temp]                       |
| <b>Features</b>              | TCG Opal 2.0; TRIM; L1.2                                       |

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.

#### 1TB PCIe-4x4 2280 NVMe Self Encrypted OPAL2 Three Layer Cell Solid State Drive

|                              |  |
|------------------------------|--|
| <b>Form Factor</b>           | M.2 2280   |
| <b>Capacity</b>              | 1TB  |
| <b>NAND Type</b>             | TLC  |
| <b>Height</b>                | 0.09 in (2.3 mm)   |
| <b>Width</b>                 | 0.87 in (22 mm)  |
| <b>Weight</b>                | 0.02 lb (10 g)   |
| <b>Interface</b>             | PCIe NVMe Gen4X4   |
| <b>Performance</b>           | <b>Maximum Sequential Read</b> <b>Maximum Sequential Write</b> |
|                              | 6400 MB/s ±20%                      5000 MB/s ±20%             |
| <b>Logical Blocks</b>        | 2,000,409,264  |
| <b>Operating Temperature</b> | 32° to 158°F (0° to 70°C) [ambient temp]                       |
| <b>Features</b>              | TCG Opal 2.0; TRIM; L1.2                                       |

### Technical Specifications – Storage

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.

|                                       |  |                                |                                 |
|---------------------------------------|--|--------------------------------|---------------------------------|
| <b>SSD 256GB 2280 PCIe NVMe Value</b> | <b>Form Factor</b>                       | M.2 2280                       |                                 |
|                                       | <b>Capacity</b>                          | 256 GB                         |                                 |
|                                       | <b>NAND Type</b>                         | TLC                            |                                 |
|                                       | <b>Height</b>                            | 0.09 in (2.3 mm)               |                                 |
|                                       | <b>Width</b>                             | 0.87 in (22 mm)                |                                 |
|                                       | <b>Weight</b>                            | 0.02 lb (10 g)                 |                                 |
|                                       | <b>Interface</b>                         | PCIe NVMe Gen4X4               |                                 |
|                                       | <b>Performance</b>                       | <b>Maximum Sequential Read</b> | <b>Maximum Sequential Write</b> |
|                                       |  | 2000 MB/s ±20%                 | 900 MB/s ±20%                   |
|                                       | <b>Logical Blocks</b>                    | 500,118,192                    |                                 |
| <b>Operating Temperature</b>          | 32° to 158°F (0° to 70°C) [ambient temp] |                                |                                 |
| <b>Features</b>                       | Pyrite 2.0; TRIM; L1.2                   |                                |                                 |

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.

|                                       |  |                                |                                 |
|---------------------------------------|--|--------------------------------|---------------------------------|
| <b>SSD 512GB 2280 PCIe NVMe Value</b> | <b>Form Factor</b>                       | M.2 2280                       |                                 |
|                                       | <b>Capacity</b>                          | 512 GB                         |                                 |
|                                       | <b>NAND Type</b>                         | TLC                            |                                 |
|                                       | <b>Height</b>                            | 0.09 in (2.3 mm)               |                                 |
|                                       | <b>Width</b>                             | 0.87 in (22 mm)                |                                 |
|                                       | <b>Weight</b>                            | 0.02 lb (10 g)                 |                                 |
|                                       | <b>Interface</b>                         | PCIe NVMe Gen4X4               |                                 |
|                                       | <b>Performance</b>                       | <b>Maximum Sequential Read</b> | <b>Maximum Sequential Write</b> |
|                                       |  | 2200 MB/s ±20%                 | 1000 MB/s ±20%                  |
|                                       | <b>Logical Blocks</b>                    | 1,000,215,215                  |                                 |
| <b>Operating Temperature</b>          | 32° to 158°F (0° to 70°C) [ambient temp] |                                |                                 |
| <b>Features</b>                       | Pyrite 2.0; TRIM; L1.2                   |                                |                                 |

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35 GB (for Windows 10) is reserved for system recovery software.

### Technical Specifications – Networking

#### NETWORKING/COMMUNICATION

**Intel AX211 Wi-Fi 6E +BT Wireless LAN Standards**  
**5.3 M.2 160MHz CNVi**  
**World-Wide WLAN vPro**

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

**Interoperability**  
**Frequency Band**

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

**Data Rates**

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

**Modulation**

Direct Sequence Spread Spectrum

**Security<sup>1</sup>**

OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM  
 • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only  
 • AES-CCMP: 128 bit in hardware  
 • 802.1x authentication  
 • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.  
 • WPA2 certification  
 • WPA3 certification  
 • IEEE 802.11i  
 • WAPI

**Network Architecture Models**

Ad-hoc (Peer to Peer)

Infrastructure (Access Point Required)

**Roaming**

IEEE 802.11 compliant roaming between access points



### Technical Specifications – Networking

|   |   |           |                               |               |                                |
|---|---|-----------|-------------------------------|---------------|--------------------------------|
| <b>Output Power<sup>2</sup></b>         | <ul style="list-style-type: none"> <li>• 802.11b : +17dBm minimum</li> <li>• 802.11g : +16dBm minimum</li> <li>• 802.11a : +17dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +14dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +13dBm minimum</li> <li>• 802.11n HT20(5GHz) : +14dBm minimum</li> <li>• 802.11n HT40(5GHz) : +13dBm minimum</li> <li>• 802.11ac VHT80(5GHz) : +10dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE40(2.4GHz) : +12dBm minimum</li> <li>• 802.11ax HE80(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE160(5GHz) : +10dBm minimum</li> </ul>                        |           |                               |               |                                |
| <b>Power Consumption</b>                | <ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>   |           |                               |               |                                |
| <b>Power Management</b>                 | ACPI and PCI Express compliant power management<br>802.11 compliant power saving mode   |           |                               |               |                                |
| <b>Receiver Sensitivity<sup>3</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, mounted in the display enclosure<br><br>Two embedded dual band 2.4/5 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>                       | <ol style="list-style-type: none"> <li>1. Type 2230 : 2.3 x 22.0 x 30.0 mm</li> <li>2. Type 1216: 1.67 x 12.0 x 16.0 mm</li> </ol>  |           |                               |               |                                |
| <b>Weight</b>                           | <ol style="list-style-type: none"> <li>1. Type 2230 : 2.8g</li> <li>2. Type 1216: 1.3g</li> </ol>   |           |                               |               |                                |
| <b>Operating Voltage</b>                | 3.3v +/- 9%   |           |                               |               |                                |
| <b>Temperature</b>                      | <table> <tr> <td>Operating</td> <td>14° to 158° F (-10° to 70° C)</td> </tr> <tr> <td>Non-operating</td> <td>-40° to 176° F (-40° to 80° C)</td> </tr> </table>   | Operating | 14° to 158° F (-10° to 70° C) | Non-operating | -40° to 176° F (-40° to 80° C) |
| Operating                               | 14° to 158° F (-10° to 70° C)   |           |                               |               |                                |
| Non-operating                           | -40° to 176° F (-40° to 80° C)  |           |                               |               |                                |
| <b>Humidity</b>                         | <table> <tr> <td>Operating</td> <td>10% to 90% (non-condensing)</td> </tr> <tr> <td>Non-operating</td> <td>5% to 95% (non-condensing)</td> </tr> </table>   | Operating | 10% to 90% (non-condensing)   | Non-operating | 5% to 95% (non-condensing)     |
| Operating                               | 10% to 90% (non-condensing)   |           |                               |               |                                |
| Non-operating                           | 5% to 95% (non-condensing)  |           |                               |               |                                |
| <b>Altitude</b>                         | <table> <tr> <td>Operating</td> <td>0 to 10,000 ft (3,048 m)</td> </tr> <tr> <td>Non-operating</td> <td>0 to 50,000 ft (15,240 m)</td> </tr> </table>   | Operating | 0 to 10,000 ft (3,048 m)      | Non-operating | 0 to 50,000 ft (15,240 m)      |
| Operating                               | 0 to 10,000 ft (3,048 m)  |           |                               |               |                                |
| Non-operating                           | 0 to 50,000 ft (15,240 m)   |           |                               |               |                                |
| <b>LED Activity</b>                     | LED Amber – Radio Off; LED Off – Radio ON   |           |                               |               |                                |

### Technical Specifications – Networking

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

|  |  |
|--|--|
| <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>Data Rates and Throughput</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 + 9.5 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, Section 15.247 & 15.249   |
| <b>Power Management Certifications</b> | ETS 300 328, ETS 300 826<br>Low Voltage Directive IEC950<br>UL, CSA, and CE Mark   |
| <b>Bluetooth Profiles Supported</b>    | BT4.1-ESR 5/6/7 Compliance<br>LE Link Layer Ping<br>LE Dual Mode<br>LE Link Layer<br>LE Low Duty Cycle Directed Advertising<br>LE L2CAP Connection Oriented Channels<br>Train Nudging & Interlaced Scan<br>BT4.2 ESR08 Compliance<br>LE Secure Connection- Basic/Full<br>LE Privacy 1.2 –Link Layer Privacy<br>LE Privacy 1.2 –Extended Scanner Filter Policies<br>LE Data Packet Length Extension<br>FAX Profile (FAX)<br>Basic Imaging Profile (BIP)2<br>Headset Profile (HSP)<br>Hands Free Profile (HFP)<br>Advanced Audio Distribution Profile (A2DP)<br>BT5.2<br>ESR9/10 Compliance<br>LE Advertisement Extensions<br>Channel Selection Algo<br>Limited High Duty Cycle Non-Connectable Advertising<br>2Mbps LE<br>LE Long Range |

\* Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, and Windows 11 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.

### Technical Specifications – Networking

**Intel AX211 Wi-Fi 6E +BT Wireless LAN Standards**  
**5.3 M.2 160MHz CNVi**  
**World-Wide WLAN non-**  
**vPro**

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

**Interoperability**

Wi-Fi certified

**Frequency Band**

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

**Data Rates**

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

**Modulation**

Direct Sequence Spread Spectrum

OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM

**Security<sup>1</sup>**

• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only  
 • AES-CCMP: 128 bit in hardware  
 • 802.1x authentication  
 • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.  
 • WPA2 certification  
 • WPA3 certification  
 • IEEE 802.11i  
 • WAPI

**Network Architecture Models**

Ad-hoc (Peer to Peer)

Infrastructure (Access Point Required)

**Roaming**

IEEE 802.11 compliant roaming between access points

**Output Power<sup>2</sup>**

• 802.11b : +17dBm minimum  
 • 802.11g : +16dBm minimum  
 • 802.11a : +17dBm minimum  
 • 802.11n HT20(2.4GHz) : +14dBm minimum  
 • 802.11n HT40(2.4GHz) : +13dBm minimum

### Technical Specifications – Networking

|  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>• 802.11n HT20(5GHz) : +14dBm minimum</li> <li>• 802.11n HT40(5GHz) : +13dBm minimum</li> <li>• 802.11ac VHT80(5GHz) : +10dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE40(2.4GHz) : +12dBm minimum</li> <li>• 802.11ax HE80(5GHz) : +10dBm minimum</li> <li>• 802.11ax HE160(5GHz) : +10dBm minimum</li> </ul>   |
| <b>Power Consumption</b>   | <ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>  |
| <b>Power Management</b>  | ACPI and PCI Express compliant power management<br>802.11 compliant power saving mode  |
| <b>Receiver Sensitivity<sup>3</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, mounted in the display enclosure<br><br>Two embedded dual band 2.4/5 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>  | 1. Type 2230 : 2.3 x 22.0 x 30.0 mm<br>2. Type 1216: 1.67 x 12.0 x 16.0 mm   |
| <b>Weight</b>  | 1. Type 2230 : 2.8g<br>2. Type 1216: 1.3g  |
| <b>Operating Voltage</b>   | 3.3v +/- 9%  |
| <b>Temperature</b>   | Operating 14° to 158° F (-10° to 70° C)<br>Non-operating -40° to 176° F (-40° to 80° C)  |
| <b>Humidity</b>  | Operating 10% to 90% (non-condensing)<br>Non-operating 5% to 95% (non-condensing)  |
| <b>Altitude</b>  | Operating Non-operating 0 to 10,000 ft (3,048 m)<br>0 to 50,000 ft (15,240 m)  |
| <b>LED Activity</b>  | LED Amber – Radio OFF; LED White – Radio ON  |
| <b>HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1/5.2/5.3 Wireless Technology</b> |  |
| <b>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)  |

### Technical Specifications – Networking

|  |  |
|--|--|
| <b>Data Rates and Throughput</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 + 9.5 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, Section 15.247 & 15.249   |
| <b>Power Management Certifications</b> | ETS 300 328, ETS 300 826<br>Low Voltage Directive IEC950<br>UL, CSA, and CE Mark   |

|                                     |  |
|-------------------------------------|--|
| <b>Bluetooth Profiles Supported</b> | BT4.1-ESR 5/6/7 Compliance<br>LE Link Layer Ping<br>LE Dual Mode<br>LE Link Layer<br>LE Low Duty Cycle Directed Advertising<br>LE L2CAP Connection Oriented Channels<br>Train Nudging & Interlaced Scan<br>BT4.2 ESR08 Compliance<br>LE Secure Connection- Basic/Full<br>LE Privacy 1.2 –Link Layer Privacy<br>LE Privacy 1.2 –Extended Scanner Filter Policies<br>LE Data Packet Length Extension<br>FAX Profile (FAX)<br>Basic Imaging Profile (BIP)2<br>Headset Profile (HSP)<br>Hands Free Profile (HFP)<br>Advanced Audio Distribution Profile (A2DP)<br>BT5.2<br>ESR9/10 Compliance<br>LE Advertisement Extensions<br>Channel Selection Algo<br>Limited High Duty Cycle Non-Connectable Advertising<br>2Mbps LE<br>LE Long Range |
|-------------------------------------|--|

|                                     |   |
|-------------------------------------|---|
| <b>Security &amp; Manageability</b> | Intel® vPro™ support with appropriate Intel® chipset components |
|-------------------------------------|---|

\* Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, and Windows 11 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.

### Technical Specifications – Networking

#### Intel® 5G Solution 5000

#### 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 2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)  
Band 3: 1710 to 1785 MHz (UL), 1805 to 1880 MHz (DL)  
Band 4: 1710 to 1755 MHz (UL), 2110 to 2155 MHz (DL)  
Band 5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)  
Band 7: 2500 to 2570 MHz (UL), 2620 to 2690 MHz (DL)  
Band 8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)  
Band 12: 699 to 716 MHz (UL), 729 to 746 MHz (DL)  
Band 13: 777 to 787 MHz (UL), 746 to 756 MHz (DL)  
Band 14: 788 to 798 MHz (UL), 758 to 768 MHz (DL)  
Band 17: 704 to 716 MHz (UL), 734 to 746 MHz (DL)  
Band 18: 815 to 830 MHz (UL), 860 to 875 MHz (DL)  
Band 19: 830 to 845 MHz (UL), 875 to 890 MHz (DL)  
Band 20: 832 to 862 MHz (UL), 791 to 821 MHz (DL)  
Band 25: 1850 to 1915 MHz (UL), 1930 to 1995 MHz (DL)  
Band 26: 814 to 849 MHz (UL), 859 to 894 MHz (DL)  
Band 28: 703 to 748 MHz (UL), 758 to 803 MHz (DL)  
Band 29: 717 to 728 MHz (DL)  
Band 30: 2305 to 2315 MHz (UL) 2350 to 2360 MHz (DL)  
Band 32: 1452 to 1496 MHz (DL)  
Band 34: 2010 to 2025 MHz (UL/DL)  
Band 38: 2570 to 2620 MHz (UL/DL)  
Band 39: 1880 to 1920 MHz (UL/DL)  
Band 40: 2300 to 2400 MHz (UL/DL)  
Band 41: 2496 to 2690 MHz (UL/DL)  
Band 42: 3400 to 3600 MHz (UL/DL)  
Band 43: 3400 to 3800 MHz (UL/DL)  
Band 46: 5150 to 5925 MHz (DL)  
Band 48: 3550 to 3700 MHz (UL/DL)  
Band 66: 1710 to 1800 MHz (UL), 2110 to 2200 MHz (DL)  
n1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)  
n2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)  
n3: 1710 to 1785 MHz (UL), 1805 to 1880 MHz (DL)  
n5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)  
n7: 2500 to 2570 MHz (UL), 2620 to 2690 MHz (DL)  
n8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)  
n20: 832 to 862 MHz (UL), 791 to 821 MHz (DL)  
n25: 1850 to 1915 MHz (UL), 1930 to 1995 MHz (DL)  
n28: 703 to 748 MHz (UL), 758 to 803 MHz (DL)  
n38: 2570 to 2620 MHz (UL/DL)  
n40: 2300 to 2400 MHz (UL/DL)  
n41: 2496 to 2690 MHz (UL/DL)  
n48: 3550 to 3700 MHz (UL/DL)  
n66: 1710 to 1800 MHz (UL), 2110 to 2200 MHz (DL)  
n77: 3300 to 4200 MHz (UL/DL)  
n78: 3300 to 3800 MHz (UL/DL)  
n79: 4400 to 5000 MHz (UL/DL)

### Technical Specifications – Networking

|   |   |
|---|---|
| <b>Wireless protocol standards</b>                | 5G NR Air Interface<br>3GPP Rel15 5G NR sub-6<br>LTE Rel14<br>20 layers and 2 Gbps downlink (DL) throughput – 4 × 4 MIMO across 5x CA<br>200 Mbps/uplink (UL) throughput – 40 MHz ULCA and 256 QAM<br>WCDMA R99,<br>3GPP Release 5, 6, 7 and 8 UMTS Specification |
| <b>GPS</b>  | Standalone, A-GPS (MS-A, MS-B)  |
| <b>GPS bands</b>                                  | GPS: L1 (1575.42MHz)<br>GLONASS: L1 (1602MHz)<br>BeidouB1(1561.098MHz)<br>Galileo E1 (1575.42)<br>QZSS(1575.42 MHz)   |
| <b>Maximum data rates</b>                         | SA 5G/NR sub-6 Peak: DL4.67Gbps/ UL 1.25Gbps<br>5G NSA sub 6G : DL: 3.8 Gbps/UL 700Mbps<br>LTE: ue-CategoryDL 19, (DL : 1.6 Gbps )<br>ue-CategoryUL 13 , (UL: 150Mbps)<br>DC-HSPA+: 42 Mbps (Download), 11.5 Mbps (Upload)  |
| <b>Maximum output power</b>                       | LTE: 23 dBm in all band except B41<br>LTE B41 HPUE = 26dBm<br>NR: 23 dBm in all band except n41, n77, n78 and n79<br>LTE n41, n77, n78 and n79 HPUE = 26dBm<br>HSPA+: 23.5 dBm  |
| <b>Maximum power consumption</b>                  | 5G Sub 6 : 2500 mA<br>LTE: 1,300 mA (peak); 1100 mA (average)<br>HSPA+: 1,100 mA (peak); 800 mA (average)   |
| <b>Form Factor</b>                                | M.2, 3042-S3 Key B  |
| <b>Weight</b>                                     | 8 g   |
| <b>Dimensions</b><br>(Length x Width x Thickness) | 52 mm × 30 mm × 2.6 mm  |

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

#### Intel® XMM™ 7560 R+ LTE-Advanced Pro\*\*

|                                    |  |
|------------------------------------|--|
| <b>Technology/Operating bands*</b> | FDD LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3),<br>1700/2100 (Band 4), 850 (Band 5), 2600 (Band 7), 900 (Band 8), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 14 upper), 700 (Band 17 lower), 850 (Band 18 lower), 850 (Band 19 upper), 800 (Band 20), 1900 (Band 25), 850 (Band 26), 700 (Band 28), 700 (Band 29 RX only), 2300 (Band 30), 1700/2100 (Band 66), 600 (band 71).<br>TDD LTE: 2100 (Band 34), 2600 (Band 38), 1900 (Band 39), 2400 (Band 40), 2500 (Band 41), 3500 (Band 42), 3700 (Band 43), 3700 (band 48), 5200 (Band 46 RX only) MHz;<br>HSPA+: 2100 (Band 1), 1900 (Band 2), 1700/2100 (Band 4), 850 (Band 5), 900 (Band 8) MHz |
|------------------------------------|--|

|                                    |  |
|------------------------------------|--|
| <b>Wireless protocol standards</b> | 3GPP Release 12 LTE Specification DL-CAT.16, DL 100MHz BW throughput up to 978Mbps; UL-CAT.13 40MHz throughput up to 150Mbps<br>WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification |
|------------------------------------|--|

### Technical Specifications – Networking

|   |   |
|---|---|
| <b>GPS</b>  | Standalone GPS/Beidou/Glonass, A-GPS (MS-A, MS-B)   |
| <b>GPS Bands</b>                                  | 1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz  |
| <b>Maximum Data Rates</b>                         | LTE: 978 Mbps (Download), 150 Mbps (Upload)<br>DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload)<br>HSPA+: 21Mbps (Download), 5.76 Mbps (Upload) |
| <b>Maximum Output Power</b>                       | LTE: 23 dBm in all band except B41<br>LTE B41 HPUE = 26dBm<br>HSPA+: 23.5 dBm   |
| <b>Maximum Power Consumption</b>                  | LTE: 1,200 mA (peak); 900 mA (average)<br>HSPA+: 1,100 mA (peak); 800 mA (average)  |
| <b>Form Factor</b>                                | M.2, 3042-S3 Key B  |
| <b>Weight</b>                                     | 6 g   |
| <b>Dimensions</b><br>(Length x Width x Thickness) | 42 x 30 x 2.3 mm  |

\*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.

\*\*Gigabit class Category 16 4G LTE module is optional and must be configured at the factory. Module designed for up to 1 Gbps download speeds as carriers deploy 5 carrier aggregation and 100MHz channel bandwidth, requires activation and separately purchased service contract. Backwards compatible to HSPA 3G technologies. Check with service provider for coverage and availability in your area. Connection, upload and download speeds will vary due to network, location, environment, network conditions, and other factors. 4G LTE not available on all products, in all regions.

#### Near Field Communications Controller (optional)

|   |  |
|---|--|
| <b>Dimensions (L x W x H)</b>             | Module 25 mm by 10 mm by 2.0 mm  |
| <b>Chipset</b>                            | NPC100   |
| <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>                  | Tag Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2  |
| <b>Reader (PCD-VCD) Mode(1)</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 cards |
| <b>Card Emulation (PICC-VICC) Mode(1)</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  |



### Technical Specifications – Networking

|                                 |  |                                 |                                       |
|---------------------------------|--|---------------------------------|---------------------------------------|
| <b>Raw RF Data Rates</b>        | 106, 212, 424, 848 kbps  |                                 |                                       |
| <b>Operating temperature</b>    | 0°C to 70°C  |                                 |                                       |
| <b>Storage temperature</b>      | -20°C to 125°C   |                                 |                                       |
| <b>Humidity</b>                 | 10-90% operating<br>5-95% non-operating  |                                 |                                       |
| <b>Supply Operating voltage</b> | 4.35 to 5.25 Volts   |                                 |                                       |
| <b>I/O Voltage</b>              | 1.8V or 3.3V   |                                 |                                       |
| <b>Power Consumption</b>        | <b>Booster enable, VCC_BOOST = 5V) Mode Power Consumption, Typical</b>                   | VBAT= 3.3V,<br><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. |                                 |                                       |

### AUDIO

|                                   |   |
|-----------------------------------|---|
| <b>HD Stereo Codec</b>            | Realtek ALC3315   |
| <b>Audio I/O Ports</b>            | Headset: CTIA only and Headphone-out  |
| <b>Internal Speaker Amplifier</b> | Cirrus Logic High-Efficiency Boosted Class D Amplifier  |
| <b>Multi-streaming Capable</b>    | Playback multi-streaming can be enabled in the audio control panel to allow independent audio. Following MSFT Behaviour |
| <b>Sampling</b>                   | DAC:48kHz<br>ADC:48kHz  |
| <b>Wavetable Syntheses</b>        | N/A   |
| <b>Analog Audio</b>               | Support 3.5mm Headset: CTIA only and Headphone-out  |
| <b># of Channels on Line-Out</b>  | N/A   |
| <b>Internal Speaker</b>           | Yes   |

### FINGERPRINT READER

|                                 |                  |
|---------------------------------|------------------|
| <b>Sensor vendor</b>            | Synaptics FS7605 |
| <b>Sensor type</b>              | Capacitive       |
| <b>DPI resolution</b>           | 363 DPI          |
| <b>Scan area</b>                | 104 x 86 pixels  |
| <b>False Rejection Rate</b>     | FRR= $\leq$ 3%   |
| <b>False Acceptance Rate</b>    | FAR 1/100K       |
| <b>Mobile Voltage Operation</b> | 3.0V to 3.6V     |

### Technical Specifications – Networking

|                                    |   |
|------------------------------------|---|
| <b>Operating Temperature</b>       | 0~60C                                     |
| <b>Current Consumption Image</b>   | 100mA max                                 |
| <b>Low Latency Wait For Finger</b> | 260uA                                     |
| <b>Capture Rate</b>                | Image transmitter output frequency 9.6MHz |
| <b>ESD Resistance</b>              | IEC 61000-4-2 4B (+15KV)                  |
| <b>Detection Matrix</b>            | 363 dpi / 7.4x6mm sensor area             |

### POWER

|  |                                      |  |
|--|--------------------------------------|--|
| <b>AC Adapter 65 Watt nPFC Standard USB type C Straight 1.8m</b> | <b>Dimensions</b>                    | 3.543 x 2.008 x 1.122 in (9.0x5.1x2.85cm)  |
|  | <b>Weight</b>                        | 0.53 lb (240 g) max (Not including power cord. Power cord varies by country.)  |
|  | <b>Input</b>                         | <b>Input Efficiency</b><br>Average Efficiency of 25%, 50%, 75%, 100% load condition with 115Vac/230Vac Spec:<br>5V : 81.5%<br>9V : 86.7%<br>12V : 88%<br>15V : 88%<br>20V : 89%  |
|  |                                      | <b>Input frequency range</b> 47 ~ 63 Hz  |
|  |                                      | <b>Input AC current</b> Max. 1.6 A at 90 Vac   |
|  | <b>Output</b>                        | <b>Output power</b><br>5V/15W<br>9V/27W<br>12V/60W<br>15V/60W<br>20V/65W   |
|  |                                      | <b>DC output</b> 5V/9V/12V/15V/20V   |
|  |                                      | <b>Hold-up time</b> 100% load 5ms at 115 Vac input   |
|  |                                      | <b>Output current limit</b> <8.0A  |
|  | <b>Connector</b>                     | C6   |
|  | <b>Environmental Design</b>          | <b>Operating temperature</b> 32° to 95° F (0° to 35° C)<br><b>Non-operating (storage) temperature</b> -4° to 185° F (-20° to 85° C)<br><b>Altitude</b> 0 to 16,400 ft (0 to 5000m)<br><b>Humidity</b> 20% to 95%<br><b>Storage Humidity</b> 10% to 95%   |
|  | <b>EMI and Safety Certifications</b> | CE Mark - full compliance with LVD and EMC directives<br>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 |
|  | <b>Dimensions</b>                    | 3.819 x 2.106 x 0.827 in (9.7x5.35x2.1cm)  |

### Technical Specifications – Networking

|  |                                      |  |                               |
|--|--------------------------------------|--|-------------------------------|
|  | <b>Weight</b>                        | 0.49 lb (220 g) max (Not including power cord. Power cord varies by country.)  |                               |
|  | <b>Input</b>                         | <b>Input Efficiency</b> Average Efficiency of 25%, 50%, 75%, 100% load condition with 115Vac/230Vac Spec:<br>5V : 81.5%<br>9V : 86.7%<br>12V : 88.0%<br>15V : 89.0%<br>20V : 89.0%   |                               |
|  |                                      | <b>Input frequency range</b> 47-63Hz   |                               |
|  |                                      | <b>Input AC current</b> Max. 1.6 A at 90 Vac   |                               |
|  | <b>Output</b>                        | <b>Output power</b> 5V/15W<br>9V/27W<br>12V/60W<br>15V/65W<br>20V/65W  |                               |
| <b>HP 65W Slim USB-C Straight AC Power Adapter</b> |                                      | <b>DC output</b> 5V/9V/12V/15V/20V   |                               |
|  |                                      | <b>Hold-up time</b> 100% load 5ms at 115 Vac input   |                               |
|  |                                      | <b>Output current limit</b> < 8.0A   |                               |
|  | <b>Connector</b>                     | C6   |                               |
|  | <b>Environmental Design</b>          | <b>Operating temperature</b>   | 32° to 95° F (0° to 35° C)    |
|  |                                      | <b>Non-operating (storage) temperature</b>   | -4° to 185° F (-20° to 85° C) |
|  |                                      | <b>Altitude</b>  | 0 to 16,400 ft (0 to 5000m)   |
|  |                                      | <b>Humidity</b>  | 20% to 95%                    |
|  |                                      | <b>Storage Humidity</b>  | 10% to 95%                    |
|  | <b>EMI and Safety Certifications</b> | CE Mark - full compliance with LVD and EMC directives<br>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 |                               |
| <b>HP 3-cell Long Life Li-Ion (51 WHr)</b>         | <b>Dimensions (H x W x L)</b>        | 251.8*70.3*6.82mm (9.91*2.77*0.27 inch)  |                               |
|  | <b>Weight</b>                        | 0.229kg +/- 10g(0.505 lb)  |                               |
|  | <b>Cells/Type</b>                    | 3cell Lithium-Ion Polymer cell / 566075  |                               |
|  | <b>Energy</b>                        | <b>Voltage</b>   | 11.58V                        |
|  |                                      | <b>Amp-hour capacity</b>   | 4.431Ah                       |
|  |                                      | <b>Watt-hour capacity</b>  | 51.3Wh                        |
|  | <b>Temperature</b>                   | <b>Operating (Charging)</b>  | 32° to 113° F (0° to 45° C)   |
|  |                                      | <b>Operating (Discharging)</b>   | 14° to 140° F (-10° to 60° C) |
|  | <b>Fuel Gauge LED</b>                | NA   |                               |
|  | <b>Warranty</b>                      | Follow product spec  |                               |
| <b>Optional Travel Battery Available</b>           | No                                   |  |                               |

### Technical Specifications – Networking

\*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.

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### Technical Specifications – Environmental

#### ENVIRONMENTAL DATA

##### Eco-Label Certifications & declarations

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:

- IT ECO declaration
- US ENERGY STAR®
- US Federal Energy Management Program (FEMP)
- EPEAT<sup>®</sup> Gold registered in the United States. See <http://www.epeat.net> for registration status in your country.
- TCO Certified
- China Energy Conservation Program (CECP)
- China State Environmental Protection Administration (SEPA)
- Taiwan Green Mark
- Korea Eco-label
- Japan PC Green label\*

##### Sustainable Impact Specifications

- Ocean-bound plastic in Speaker
- 60% post-consumer recycled plastic
- Low halogen
- Outside Box and corrugated cushions are 100% sustainably sourced and recyclable
- Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable
- Bulk packaging available

##### System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a “Typically Configured Notebook”.

##### Energy Consumption (in accordance with US ENERGY STAR® test method)

|                               | 115VAC, 60Hz | 230VAC, 50Hz | 100VAC, 50Hz |
|-------------------------------|--------------|--------------|--------------|
| Normal Operation (Short idle) | 5.88 W       | 6.17 W       | 5.92 W       |
| Normal Operation (Long idle)  | 1.66 W       | 1.85 W       | 1.76 W       |
| Sleep                         | 1.66 W       | 1.85 W       | 1.76 W       |
| Off                           | 0.46 W       | 0.48 W       | 0.41 W       |

##### NOTE:

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.

##### Heat Dissipation\*

|                               | 115VAC, 60Hz | 230VAC, 50Hz | 100VAC, 50Hz |
|-------------------------------|--------------|--------------|--------------|
| Normal Operation (Short idle) | 20.1 BTU/hr  | 21.1 BTU/hr  | 20.2 BTU/hr  |
| Normal Operation (Long idle)  | 5.7 BTU/hr   | 6.3 BTU/hr   | 6.0 BTU/hr   |
| Sleep                         | 5.7 BTU/hr   | 6.3 BTU/hr   | 6.0 BTU/hr   |
| Off                           | 1.6 BTU/hr   | 1.6 BTU/hr   | 1.4 BTU/hr   |

\*NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

### Technical Specifications – Environmental

#### Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

Sound Power  
( $L_{WAd}$ , bels)

Sound Pressure  
( $L_{pAm}$ , decibels)

Typically Configured – Idle

3.1

20.6

Fixed Disk – Random writes

3.3

22.8

Optical Drive – Sequential reads

4.0

31.5

#### Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the

Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.

#### Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see [www.epeat.net](http://www.epeat.net)
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product is 93.4% recycle-able when properly disposed of at end of life.

#### Packaging Materials

|                  |   |       |
|------------------|---|-------|
| <b>External:</b> | PAPER/Corrugated                        | 220 g |
|                  | PAPER/Corrugated                        | 49 g  |
|                  | PAPER/Molded Pulp                       | 52 g  |
|                  | PAPER/Molded Pulp                       | 56 g  |
|                  | PAPER/Paper                             | 3 g   |
| <b>Internal:</b> | PLASTIC/Polyethylene low density - LDPE | 13 g  |

The plastic packaging material contains at least 0.0% recycled content.

The corrugated paper packaging materials contains at least 59.1% recycled content.

#### RoHS Compliance

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.

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.

We met our voluntary objective to achieve worldwide compliance with the new EU RoHS requirements for virtually all relevant products by July 2013, and we will continue to extend the scope of the commitment to include further restricted substances as regulations continue to evolve.

To obtain a copy of the HP RoHS Compliance Statement, see [HP RoHS position statement](#).

### Technical Specifications – Environmental

#### Material Usage

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 [http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen\\_specifications.html](http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html)):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Bis(2-Ethylhexyl) phthalate (DEHP)
- Benzyl butyl phthalate (BBP)
- Dibutyl phthalate (DBP)
- Diisobutyl phthalate (DIBP)
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

#### Packaging Usage

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

#### End-of-life Management and Recycling

HP offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <http://www.hp.com/go/reuse-recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

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: <http://www.hp.com/go/recyclers>.

### Technical Specifications – Environmental

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.

#### HP Inc. Corporate Environmental Information

For more information about HP's commitment to the environment:

Global Citizenship Report

<http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>

Eco-label certifications

<http://www8.hp.com/us/en/hp-information/environment/ecolabels.html>

ISO 14001 certificates:

<http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842>

and

<http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf>

#### Footnotes

- Percentage of ocean-bound plastic contained in each component varies by product
- Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard.
- External power supplies, WWAN modules, power cords, cables and peripherals excluded.
- 100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers.
- Fiber cushions made from 100% recycled wood fiber and organic materials.



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

| Type                             | Description                               | Part #  |
|----------------------------------|---|---------|
| <b>Audio/Video</b>               | HP Wired USB-A Stereo Headset             | 428K6AA |
|                                  | HP Wired 3.5mm Stereo Headset             | 428K7AA |
|                                  | HP USB G2 Stereo Headset                  | 428H5AA |
|                                  | HP 3.5mm G2 Stereo Headset                | 428H6AA |
|                                  | HP 365 BT Speaker                         | 567D3AA |
|                                  | HP 325 FHD USB-A Webcam                   | 53X27AA |
|                                  | HP 965 4K Streaming Webcam                | 695J5AA |
| <b>Cases</b>                     | HP Executive 15.6 Backpack                | 6KD07AA |
|                                  | HP Executive 15.6 Top Load                | 6KD06AA |
|                                  | HP Executive Slim 14.1 Top Load           | 6KD04AA |
|                                  | HP Prelude G2 15.6 Backpack               | 1E7D6AA |
|                                  | HP Prelude G2 15.6 Top Load               | 1E7D7AA |
|                                  | HP Prelude 15.6 Backpack                  | 2Z8P3AA |
|                                  | HP Prelude 15.6 Backpack                  | 50P32AA |
|                                  | HP Prelude 15.6 Top Load                  | 2Z8P4AA |
|                                  | HP Prelude 15.6 Top Load                  | 50P31AA |
|                                  | HP Prelude Pro Recycled 15.6 Backpack     | 1X644AA |
|                                  | HP Prelude Pro Recycled 15.6 Top Load     | 1X645AA |
|                                  | HP Renew Business 14.1 Laptop Bag         | 3E5F9AA |
|                                  | HP Renew Business 14.1 Laptop Sleeve      | 3E2U7AA |
|                                  | 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>Docking station</b>           | HP USB-C 120W G5 Dock                     | 5TW10AA |
|                                  | HP USB-C/A 120W G2 Universal Dock         | 5TW13AA |
|                                  | HP USB-C Dock G5                          | 26D32AA |
|                                  | HP Thunderbolt 120W G4 Dock               | 4JOA2AA |
|                                  | HP Thunderbolt 280W G4 Dock w/Combo Cable | 4JOG4AA |
| <b>Hub</b>                       | HP Universal USB-C Multiport Hub          | 50H55AA |
|                                  | HP USB-C Travel Dock G2                   | 7PJ38AA |
|                                  | HP USB-C to USB-A Hub                     | Z6A00AA |
|                                  | HP Universal USB-C Multiport Hub          | 50H98AA |
|                                  | HP 4K USB-C Multiport Hub                 | 6G842AA |
|                                  | HP 4K USB-C Multiport Hub                 | 6G843AA |
| <b>Adapter</b>                   | HP USB 3.0 to Gigabit RJ45 Adapter G2     | 4Z7Z7AA |
|                                  | HP HDMI to VGA Adapter                    | H4F02AA |
|                                  | HP USB-C to DisplayPort Adapter           | N9K78AA |
|                                  | HP USB-C to RJ45 Adapter                  | V7W66AA |

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

|                       |  |         |
|-----------------------|--|---------|
|                       | HP USB-C to USB 3.0 Adapter                              | N2Z63AA |
|                       | HP USB-C to VGA Adapter                                  | N9K76AA |
|                       | HP USB-C to VGA Adapter                                  | P7Z54AA |
|                       | HP USB-C to HDMI 2.0 Adapter                             | 2PC54AA |
| <b>Keyboard/Combo</b> | HP 975 USB+BT Dual-Mode Wireless Keyboard                | 3Z726AA |
|                       | HP 355 Compact Multi-Device Keyboard                     | 692S9AA |
|                       | HP 455 Programmable Wireless Keyboard                    | 4R177AA |
|                       | HP 125 WD USB Keyboard                                   | 266C9AA |
|                       | HP 320K WD USB Keyboard                                  | 9SR37AA |
|                       | HP 655 Wireless Keyboard and Mouse Combo                 | 4R009AA |
|                       | HP 225 Wired Mouse and Keyboard Combo                    | 286J4AA |
|                       | HP 235 Wireless Mouse and Keyboard Combo                 | 1Y4D0AA |
|                       | HP Wired Desktop 320MK Mouse and Keyboard                | 9SR36AA |
| <b>Mouse</b>          | HP 155 Wired Mouse                                       | 5B8B7AA |
|                       | HP 715 Rechargeable Multi-Device Bluetooth Mouse         | 6E6F0AA |
|                       | HP 925 Ergonomic Vertical Wireless Mouse                 | 6H1A5AA |
|                       | HP USB Premium Wireless Mouse                            | 1JR31AA |
|                       | HP 435 Multi-Device Wireless Mouse                       | 3B4Q5AA |
|                       | HP 125 USB-A Wired Mouse                                 | 265A9AA |
|                       | HP 128 USB Laser Wired Mouse                             | 265D9AA |
|                       | HP 320M USB-A Wired Mouse                                | 9VA80AA |
|                       | HP Creator USB-A+Bluetooth 935 Wireless Mouse Black      | 1D0K8AA |
|                       | HP USB-A+Bluetooth Multi-Device 635 Wireless Mouse Black | 1D0K2AA |
|                       | HP USB-A+Bluetooth Travel Bluetooth Mouse                | 6SP30AA |
| <b>Power</b>          | HP 65W USB-C LC AC Power Adapter                         | 1P3K6AA |
|                       | HP 65W Gallium Nitride USB-C Laptop Charger              | 600Q7AA |
|                       | HP 65W Gallium Nitride USB-C Laptop Charger              | 600Q8AA |
|                       | HP 65W USB-C Laptop Charger                              | 671R2AA |
|                       | HP 65W USB-C Laptop Charger                              | 671R3AA |
| <b>Commodity</b>      | HP USB DVD-Writer EXT ODD                                | Y3T76AA |
|                       | HP Nano Combination Cable Lock                           | 63B28AA |
|                       | HP Essential Nano Combination Cable Lock                 |         |
|                       | HP Nano Keyed Cable Lock                                 | 1AJ39AA |
|                       | HP Nano Master Keyed Cable Lock                          | 1AJ40AA |
|                       | HP SureKey Standard/Nano/Wedge Cable Lock                | 6UW42AA |
|                       | HP 32GB DDR5 4800 SODIMM Memory                          | 5S4C0AA |
|                       | HP 8GB DDR5 4800 SODIMM Memory                           | 5S4C3AA |
|                       | HP 16GB DDR5 4800 SODIMM Memory                          | 5S4C4AA |
|                       | HP 512GB PCIe-4x4 NVMe M.2 Solid State Drive             | 5R8X9AA |
|                       | HP 1TB PCIe-4x4 NVMe M.2 Solid State Drive               | 5R8Y0AA |

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

HP 2TB PCIe-4x4 NVMe TLC M.2 Solid State Drive

6D8L6AA

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| <b>Date of change:</b> | <b>Version History:</b> |         | <b>Description of change:</b> |
|------------------------|-------------------------|---------|-------------------------------|
| April 3, 2023          | From v1 to v2           | Changed | ENVIRONMENTAL DATA section    |