

### Overview

#### HP mt46 Mobile Thin Client



#### Left

- |   |  |
|---|--|
| 1. Ambient Light Sensor (Optional)      | 6. Glass clickpad                              |
| 2. IR Camera LEDs (optional)            | 7. Smart Card Reader (Optional)                |
| 3. HD and IR Camera (Optional)          | 8. Audio combo jack                            |
| 4. Webcam LED (Optional)                | 9. USB 3.1 Gen 1 Port                          |
| 5. HP Privacy Webcam Shutter (Optional) | 10. USB 3.1 Gen 1 Port (Charging)              |
|   | 11. Security lock slot (Lock sold separately.) |

### Overview



#### Right

- |                                      |   |
|--------------------------------------|---|
| 1. Internal microphones (2)          | 6. HDMI port (Cable not included.)                    |
| 2. Power Button Key                  | 7. Power Connector                                    |
| 3. WWAN SIM with plug <sup>1,2</sup> | 8. HP Fingerprint Sensor (Select Models) <sup>1</sup> |
| 4. USB-C® 3.1 Gen 2 Alt Mode         | 9. Pointstick   |
| 5. USB-C® 3.1 Gen 2 Alt Mode         |   |

<sup>1</sup>Not available with HP ThinPro and HP Smart Zero

<sup>2</sup>All units have a SIM card tray but units that do not support WWAN are shipped with a non-removable SIM slot plug.

### Overview

#### AT A GLANCE

- Choice of Windows 10 IoT Enterprise 2019, HP ThinPro OS, HP Smart Zero OS
- AMD® Ryzen Pro 3 PRO 4450U
- Display includes your choice of 33.8cm (14") diagonal FHD IPS Wide viewing Angle, Touch or Non-Touch
- AMD Radeon™ Vega UMA Graphics
- Enhanced security features including Smart Card, NFC option, TPM 2.0, lock slot, HP BIOSphere, HP Sure Start, HP Privacy Camera\* (non-touch and touch), BIOS-level microphone enable/disable, HP Sure View, SecureBIO
- Passed 12 MIL-STD 810H testing, plus an additional 120,000 hours of reliability testing through HP's Total Test Process <sup>1</sup>
- Weight starting at 2.97lb (1.347kg)
- Battery life up to 14 hours<sup>5</sup>
- Supports wireless LAN and Wireless WAN<sup>2</sup> options for connectivity on the go
- Up to 8GB System Memory
- 720p HD webcam, IR camera for face authentication with Windows Hello<sup>3</sup>
- Full size, backlit, Keyboard and Clickpad with image sensor and glass surface, multi-touch gestures enabled, taps enabled as default<sup>4</sup>
- Enables AMD Memory Guard to help defend against cold boot attacks with real-time encryption and decryption of system's memory
- Support optional HP Sure View Reflect with 1000 nit<sup>6</sup> Anti-Glare Privacy Screen which prevents visual hacking

\*Not supported on ThinPro and Smart Zero

<sup>1</sup>MIL-STD-810H testing is not intended to demonstrate fitness of U.S. Department of Defense (DoD) 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.

<sup>2</sup>Wireless WAN not supported with Thin Pro / Smart Zero

<sup>3</sup>Not available with HP ThinPro and HP Smart Zero

<sup>4</sup>Touch functionality is limited on ThinPro

<sup>5</sup>Windows 10 MM14 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 <http://www.bapco.com> for additional details.

<sup>6</sup>Touch-enabled display and Sure View privacy panel will lower actual brightness

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

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## Features

### PRODUCT NAME

HP mt46 Mobile Thin Client

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### OPERATING SYSTEM

Windows 10 IoT Enterprise LTSC for Thin Clients 2019 RS5<sup>1</sup>

HP ThinPro<sup>2</sup>

HP Smart Zero

[1] Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com/>.

[2] Not all features or options are available with HP ThinPro and HP Smart Zero OS.

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### PROCESSOR

AMD Ryzen™ 3-PRO 4450U APU with Radeon™ Graphics (2.5 GHz base clock, up to 3.8 GHz max boost clock, 4 MB L3 cache, 4 cores)<sup>3,4,5</sup>

#### Processor Family

2nd Gen AMD® Ryzen™ PRO processor

[3] 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. AMD's numbering is not a measurement of clock speed.

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

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

### CHIPSET

Chipset is integrated with processor

### GRAPHICS

#### Integrated

AMD Radeon™ Vega Graphics<sup>6</sup>

#### Supports

Support HD decode, DX12, and HDMI 2.0

<sup>6</sup>HD content required to view HD images.

### Features

#### DISPLAY

##### Non-Touch

35.56 cm (14") diagonal FHD IPS eDP anti-glare WLED-backlit bent, 250 nits, 45% NTSC (1920 x 1080) <sup>6,7,8,11</sup>

35.56 cm (14") diagonal FHD IPS eDP anti-glare WLED-backlit bent, 250 nits, 45% NTSC for HD camera (1920 x 1080) <sup>6,7,8,11</sup>

35.56 cm (14") diagonal FHD IPS eDP anti-glare WLED-backlit bent, 250 nits, 45% NTSC for HD camera for WWAN (1920 x 1080) <sup>6,7,8,11</sup>

35.56 cm (14") diagonal FHD IPS eDP anti-glare WLED-backlit bent, 250 nits, 45% NTSC for HD + IR camera for WWAN (1920 x 1080) <sup>6,7,8,11</sup>

35.56 cm (14") diagonal FHD IPS eDP + PSR anti-glare WLED-backlit bent, 1000 nits with HP Sure View Integrated Privacy Screen, 72% NTSC with Ambient Light Sensor and HD + IR camera (1920 x 1080) <sup>6,7,8,9,11</sup>

##### Touch

35.56 cm (14") diagonal FHD IPS eDP anti-glare On-Cell WLED-backlit bent touch screen, 250 nits, 45% NTSC, for HD+IR camera for WWAN (1920 x 1080) <sup>6,7,8,10,11</sup>

##### HDMI 2.0

Supports resolution up to 4k @ 60Hz

[6] HD content required to view HD images.

[7] Sold separately or as an optional feature.

[8] Resolutions are dependent upon monitor capability, and resolution and color depth settings.

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

[10] Touch capabilities are limited on HP ThinPro and HP Smart Zero OS.

[11] Touch-enabled display and Sure View privacy panel will lower actual brightness.

### Features

#### STORAGE AND DRIVES

##### Primary M.2 Storage

128 GB SATA-3 SS TLC<sup>11</sup>

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

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#### MEMORY

##### Memory

8 GB DDR4-3200 SDRAM (1 x 8 GB) [12]

8 GB DDR4-3200 SDRAM (2 x 4 GB) [12]

4 GB DDR4-3200 SDRAM (1 x 4 GB) [12]

##### Memory Slots

2 SODIMM

Both slots are customer accessible/upgradeable

DDR4 SODIMMS, system runs at 2400

Supports Dual Channel Memory

<sup>13</sup>Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed.

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#### NETWORKING/COMMUNICATIONS

##### WLAN

Intel® AX200 Wi-Fi® 6 (2x2) and Bluetooth® 5 Combo 802.11 ax 2x2 Wi-Fi®, non-vPro® (supporting gigabit file transfer speeds)<sup>13</sup>

Realtek RTL8822BE 802.11 ac (2x2) and Bluetooth® 5 Combo<sup>13</sup>

##### WWAN\*

Intel® XMM™ 7360 LTE-Advanced Cat 9<sup>14,17,18</sup>

##### NFC\*\*

NXP NPC300 Near Field Communication Module<sup>18</sup>

##### Miracast\*\*

Native Miracast Support<sup>16</sup>

\* Option not available on HP ThinPro

\*\* Not supported on ThinPro / Smart Zero

[13] Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi® 6 is backwards compatible with prior 802.11 specs. The specifications for Wi-Fi® 6 (802.11 ax) are draft and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ax devices.

### Features

[14] 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.

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

[17] 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.

[18] Standalone GPS is an optional feature and requires factory configuration. GPS and WWAN are mutually exclusive.

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### AUDIO/MULTIMEDIA

#### Audio

Audio by Bang & Olufsen

2 Integrated Stereo Speakers

Integrated 3 Multi Array Microphone

#### Camera

720p HD camera <sup>6,7</sup>

720p HD+IR camera <sup>6,7,8,20</sup>

#### Sensors

Ambient light sensor (Select models only)

Hall Sensor

[6] HD content required to view HD images.

[7] Sold separately or as an optional feature.

[8] Not supported on ThinPro / Smart Zero.

[20] Internet access required.

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

#### Keyboard

HP Premium Collaboration Keyboard, spill resistant with drain

Backlit keyboard and DuraKeys available as an option

#### Pointing Devices

Clickpad with multi-touch gestures enabled, taps enabled as default

Microsoft Precision Touchpad Default Gestures Support

\*Not supported on ThinPro / Smart Zero

#### Function Keys

F1 - Display Switching

F2 - Blank or Privacy (with LED)

F3 - Brightness Down

F4 - Brightness Up

F5 - Audio Mute

F6 - Volume Down

F7 - Volume Up

### Features

- F8 - Mic Mute
- F9 - Blank or Backlit Toggle
- F10 - Insert
- F11 - Airplane Mode
- F12 - HP Command Center
- Print Screen
- Power Button (with LED)

#### **Hidden Function Keys**

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

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### Features

#### SOFTWARE AND SECURITY

##### Preinstalled Software

###### BIOS

- HP BIOSphere Gen5 [20]
- BIOS Update via Network
- Power On Authentication
- HP Secure Erase [21]
- Absolute Persistence Module [22]
- Pre-boot Authentication

###### Software

- HP Connection Optimizer
- HP Native Miracast Support
- HP Hotkey Support
- HP Noise Cancellation Software
- "Supported Protocols: Microsoft RDP; HP ZCentral Remote Boost, VMWare Horizon RDP/PCoIP/Blast Extreme, Citrix ICA/HDX  
\*protocols dependent on operating system installed."

###### Manageability Features

- HP ThinUpdate
- HP Device Manager
- HP BIOS Config Utility (BCU)

###### Client Security Software

- HP Fingerprint Sensor [27]\*
- Windows Defender [28]\*

###### Security Management

- Pre-boot Authentication
- TPM 2.0 Embedded Security Chip shipped with Windows 10 (Common Criteria EAL4+ Certified) [29]
- USB enable/disable (via BIOS)
- Power-on password (via BIOS)
- Setup password (via BIOS)
- Support for chassis padlocks and cable lock devices
- HP Sure Start Gen6 [31]

\*Not supported on ThinPro/SmartZero

[20] HP BIOSphere Gen5 is available on select HP Pro and Elite PCs. Features may vary depending on the platform and configurations.

[21] 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™.

[22] 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.

[27] HP Fingerprint sensor is an optional feature that must be configured at purchase.

[28] Windows Defender Opt in and internet connection required for updates.

[29] Firmware TPM is version 2.0. Hardware TPM is v1.2, which is a subset of the TPM 2.0 specification version v0.89 as implemented by Intel Platform Trust Technology (PTT).re TPM is version 2.0. Hardware TPM is v1.2, which is a subset of the TPM 2.0 specification version v0.89 as implemented by Intel Platform Trust Technology (PTT).

[31] HP Sure Start Gen6 is available on select HP PCs.

### Features

<b>Recommended TC config for Microsoft Teams media optimization</b>			
	<b>TC CPU</b>	<b>VMware Teams Optimization</b>	<b>Citrix Teams Optimization</b>
<b>t430</b>	1.10 GHz 2 Core	-	-
<b>t530</b>	1.50 GHz 2 Core	-	-
<b>t540</b>	1.50 GHz 2 Core	-	-
<b>t630</b>	2.00 GHz 4 Core	✓	✓
<b>t628</b>	1.99 GHz 4 Core	-	✓
<b>t638</b>	2.00 GHz 4 Core	✓	✓
<b>t640</b>	2.40 GHz 2 Core	✓	✓
<b>t730</b>	2.70 GHz 4 Core	✓	✓
<b>t740</b>	3.25 GHz 4 Core	✓	✓
<b>mt21</b>	1.80 GHz 2 Core	-	✓
<b>mt22</b>	1.90 GHz 2 Core	-	✓
<b>mt31</b>	1.80 GHz 2 Core	-	✓
<b>mt32</b>	2.70 GHz 4 Core	✓	✓
<b>mt45</b>	2.10 GHz 4 Core	✓	✓
<b>mt46</b>	2.50 GHz 4 Core	✓	✓

- Not recommended, ✓ recommended

## Features

### POWER

#### Power Supply

HP Smart 45 W External AC power adapter [35]  
HP Smart 45 W External AC power adapter, 2-prong (Japan only) [35]  
HP Smart 65 W External AC power adapter [35]  
HP Smart 65 W EM External AC power adapter [35]  
65 W USB Type-C® adapter [35]

#### Primary Battery

HP Long Life 3-cell, 53 Wh Li-ion [36,37]  
Support HP Fast Charge (Up to 50% in 30 minutes with 65W AC Adapter)[36,37]

#### Power Cord

2-wire plug - 1.0m  
3-wire plug - 1.0m

#### Battery life

Up to 14 hours ( 2nd Gen AMD® Ryzen™ PRO APU processor, 14" 400nits panel and 3-cell 53Whr battery ) [38]

[35] Availability may vary by country.

[36] Battery is internal and not replaceable by customer. Serviceable by warranty.

[37] Supports HP Fast Charge with 65W AC Adapter. Recharges the battery up to 50% within 30 minutes when the system is off or in standby mode. Power adapter with a minimum capacity of 65 watts is required. After charging has reached 50% capacity, charging will return to normal. Charging time may vary +/-10% due to System tolerance.

[38] Windows 10 MM14 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.

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## WEIGHTS & DIMENSIONS

#### Weight

Non-touch  
Starting at 2.97 lb  
Starting at 1.347 kg  
Touch<sup>39</sup>  
Starting at 3.26 lb  
Starting at 1.477 kg

#### Product Dimensions (w x d x h)

Non-touch  
12.73 x 8.45 x 0.71 in  
32.33 x 21.45 x 1.79 cm  
Touch  
12.73 x 8.45 x 0.75 in  
32.33 x 21.45 x 1.75 cm

<sup>39</sup>Weight will vary by configuration.

### Features

#### PORTS/SLOTS

##### Ports

- 2 USB Type-C® 3.1 Gen2 (Alt mode)
- 1 USB 3.1 Gen 1 port
- 1 USB 3.1 Gen 1 (1 charging)
- 1 HDMI 2.0 [6]
- 1 headphone/microphone combo
- 1 AC power
- 1 SIM card slot [40]
- 1 Smartcard reader

[6] HD content required to view HD images.

[40] SIM slot is not user accessible without WWAN configuration.

#### SERVICE AND SUPPORT

HP Services offers 1-year or 3-year limited warranties and 90 day software limited warranty options depending on country. Batteries have a default one year limited warranty except for Long Life batteries which will have same 1-year or 3-year limited warranty as 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>. [41]

[41] 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 [www.hp.com/go/cpc](http://www.hp.com/go/cpc). HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.

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### Technical Specifications

#### SYSTEM UNIT

<b>Stand-Alone Power Requirements</b> (AC Power)	<b>Nominal Operating Voltage</b>	19 V
	<b>Average Operating Power</b>	2.65W
	<b>Integrated graphics</b>	6.78W
	<b>Max Operating Power</b>	Discrete < 65W UMA < 45W
<b>Temperature</b>	<b>Operating</b>	32° to 95° F (0° to 35° C) (not writing optical)
	<b>Non-operating</b>	41° to 95° F (5° to 35° C) (writing optical)
<b>Relative Humidity</b>	<b>Operating</b>	10% to 90%, non-condensing
	<b>Non-operating</b>	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
<b>Shock</b>	<b>Operating</b>	40 G, 2 ms, half-sine
	<b>Non-operating</b>	200 G, 2 ms, half-sine
<b>Random Vibration</b>	<b>Operating</b>	0.75 grms
	<b>Non-operating</b>	1.50 grms
<b>Altitude (unpressurized)</b>	<b>Operating</b>	-50 to 10,000 ft (-15.24 to 3,048 m)
	<b>Non-operating</b>	-50 to 40,000 ft (-15.24 to 12,192 m)
<b>Planned Industry Standard Certifications</b>	<b>UL</b>	Yes
	<b>CSA</b>	Yes
	<b>FCC Compliance</b>	Yes
	<b>ENERGY STAR®</b>	Yes, Select models <sup>11</sup>
	<b>EPEAT® 2019</b>	EPEAT 2019 Golden in United States [8]
	<b>ICES</b>	Yes
	<b>Australia / NZ RCM Compliance</b>	Yes
	<b>CCC</b>	Yes
	<b>Japan VCCI Compliance</b>	Yes
	<b>KC</b>	Yes
	<b>BSMI</b>	Yes
	<b>CE Marking Compliance</b>	Yes
	<b>BNCI or BELUS</b>	Yes
	<b>CIT</b>	Yes
	<b>GOST</b>	Yes
<b>Saudi Arabian Compliance (ICCP)</b>	Yes	
<b>SABS</b>	Yes	
<b>UKRSERTCOMPUTER</b>	Yes	

### Technical Specifications

#### DISPLAYS

<b>65650 - Panel LCD 14 inch FHD (1920x1080) Anti-Glare WLED UWVA 45percent cg 250nits eDP 1.2 w/o PSR bent NWBZ</b>	<b>Outline Dimensions</b> (W x H)	316.17 x 186.4 mm (max) (w/ PCB)
	<b>Active Area</b>	309.37 x 174.02 mm (typ.)
	<b>Weight</b>	300 g (max)
	<b>Diagonal Size</b>	14.0 inch
	<b>Thickness</b>	3.0 mm/ 5.0 mm (PCB) (max)
	<b>Interface</b>	eDP 1.2
	<b>Surface Treatment</b>	Anti-Glare
	<b>Touch Enabled</b>	No
	<b>Contrast Ratio</b>	600:1 (typ.)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness</b>	250 nits
	<b>Pixel Resolution</b>	1920 x 1080 (FHD)
	<b>Format</b>	RGB Stripe
	<b>Backlight</b>	LED
	<b>Color Gamut Coverage</b>	NTSC 45%
<b>Color Depth</b>	6 bits (Hi FRC supportive w/ condition to enable)	
<b>Viewing Angle</b>	UWVA 85/85/85/85	
<b>Panel LCD 14 inch FHD (1920x1080) Anti-Glare WLED UWVA 45percent cg 250nits eDP 1.2 w/o PSR bent Touch on Panel NWBZ</b>	<b>Outline Dimensions</b> (W x H)	316.17 x 186.4 mm (max) (w/ PCB)
	<b>Active Area</b>	309.37 x 174.02 mm (typ.)
	<b>Weight</b>	305 g (max)
	<b>Diagonal Size</b>	14.0 inch
	<b>Thickness</b>	3.0 mm/ 5.0 mm (PCB) (max)
	<b>Interface</b>	eDP 1.2
	<b>Surface Treatment</b>	Anti-Glare On-cell
	<b>Touch Enabled</b>	Yes
	<b>Contrast Ratio</b>	600:1 (typ.)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness</b>	250 nits
	<b>Pixel Resolution</b>	1920 x 1080 (FHD)
	<b>Format</b>	RGB Stripe
	<b>Backlight</b>	LED
	<b>Color Gamut Coverage</b>	NTSC 45%
<b>Color Depth</b>	6 bits (Hi FRC supportive w/ condition to enable)	
<b>Viewing Angle</b>	UWVA 85/85/85/85	

### Technical Specifications

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

<b>Panel LCD 14 inch FHD (1920x1080) Anti-Glare WLED UWVA sRGB 100percent cg 400nits eDP 1.4+PSR2 bent LP NB2X</b>	<b>Outline Dimensions</b> (W x H)	315.07 x 186.6 mm (max)
	<b>Active Area</b>	309.37 X 174.02 mm (typ.)
	<b>Weight</b>	200 g (max)
	<b>Diagonal Size</b>	14.0 inch
	<b>Thickness</b>	2.0 mm/4.0 mm (w/PCB) (max)
	<b>Interface</b>	eDP 1.4
	<b>Surface Treatment</b>	Anti-Glare
	<b>Touch Enabled</b>	No
	<b>Contrast Ratio</b>	1200:1 (typ.)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness</b>	400 nits
	<b>Pixel Resolution</b>	1920 x 1080 (FHD)
	<b>Format</b>	RGB Stripe
	<b>Backlight</b>	LED
	<b>Color Gamut Coverage</b>	sRGB 100% (NTSC 72%)
<b>Color Depth</b>	8 bits	
<b>Viewing Angle</b>	UWVA 85/85/85/85	

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

### Technical Specifications

#### STORAGE

<b>SSD 128 GB 2280 M2 SATA-3 TLC</b>	<b>Form Factor</b>	M.2 2280	
	<b>Capacity</b>	128 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>	ATA-8, SATA 3.0	
	<b>Performance</b>	<b>Maximum Sequential Read</b>	<b>Performance</b>
		550 ~ 560 MB/s	380 ~ 530 MB/s
	<b>Logical Blocks</b>	250,069,680	
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]	
	<b>Features</b>	ATA Security; DIPM; TRIM; DEVSLP	
	*For storage drives, GB = 1 billion bytes. Actual formatted capacity is less. Up to 30GB is reserved for system recovery software.		

#### NETWORKING/COMMUNICATIONS

<b>Intel Wi-Fi® 6 AX200 + BT5 (802.11ax 2x2, non-vPro®, supporting gigabit file transfer speeds) non-vPro® [1,2]</b>	<b>Wireless LAN Standards</b>	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
	<b>Interoperability</b>	Features Wi-Fi® 6 technology [1]
	<b>Frequency Band</b>	802.11b/g/n • 2.402 – 2.482 GHz 802.11a/n/ac • 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
	<b>Data Rates</b>	•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: MCS 0 ~ MCS 15, (20MHz, and 40MHz) •802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz) • 802.11ax: MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz)
	<b>Modulation</b>	Direct Sequence Spread Spectrum



### Technical Specifications

<b>Security<sup>3</sup></b>	OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM <ul style="list-style-type: none"><li>•IEEE and WiFi® compliant 64 / 128-bit WEP encryption for a/b/g mode only</li><li>•AES-CCMP: 128 bits in hardware</li><li>•802.1x authentication</li><li>•WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li><li>•WPA2 certification</li><li>•IEEE 802.11i</li><li>•WAPI</li></ul>
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
<b>Output Power<sup>2</sup></b>	<ul style="list-style-type: none"><li>• 802.11b : +18.5dBm minimum</li><li>• 802.11g : +17.5dBm minimum</li><li>• 802.11a : +18.5dBm minimum</li><li>• 802.11n HT20(2.4GHz) : +15.5dBm minimum</li><li>• 802.11n HT40(2.4GHz) : +14.5dBm minimum</li><li>• 802.11n HT20(5GHz) : +15.5dBm minimum</li><li>• 802.11n HT40(5GHz) : +14.5dBm minimum</li><li>• 802.11ac VHT80(5GHz) : +11.5dBm minimum</li><li>• 802.11ac VHT160(5GHz) : +11.5dBm minimum</li><li>• 802.11ax HT40(2.4GHz) : +10dBm minimum</li><li>• 802.11ax VHT160(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/Modern Standby: 10mW</li><li>•Radio disabled: 8 mW</li></ul>
<b>Power Management</b>	ACPI compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>4</sup></b>	<ul style="list-style-type: none"><li>•802.11b, 1Mbps : -93.5dBm maximum</li><li>•802.11b, 11Mbps : -84dBm maximum</li><li>• 802.11a/g, 6Mbps : -86dBm maximum</li><li>• 802.11a/g, 54Mbps : -72dBm maximum</li><li>• 802.11n, MCS07 : -67dBm maximum</li><li>• 802.11n, MCS15 : -64dBm maximum</li><li>• 802.11ac, MCS0 : -84dBm maximum</li><li>• 802.11ac, MCS9 : -59dBm maximum</li><li>•802.11ax, MCS11(HT40): -59dBm maximum</li><li>•802.11ax, MCS11(VHT160): -58.5dBm maximum</li></ul>
<b>Antenna Type</b>	High efficiency antenna with spatial diversity, mounted in the display enclosure  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 2. Type 1216: 1.67 x 12.0 x 16.0 mm
<b>Weight</b>	1. Type 2230: 2.8g 2. Type 126: 1.3g

### Technical Specifications

<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
<b>Altitude</b>	Operating Non- 0 to 10,000 ft (3,048 m) operating 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF LED OFF – Radio ON
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1 Wireless Technology</b>	
<b>Bluetooth Specification</b>	4.0/4.1/4.2/5.0/5.1 Compliant
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
<b>Data Rates and Throughput</b>	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
<b>Bluetooth Software Supported Link Topology</b>	Microsoft Windows Bluetooth Software
<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 Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2

### Technical Specifications

Headset Profile (HSP)  
 Hands Free Profile (HFP)  
 Advanced Audio Distribution Profile (A2DP)

[1] Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi® 6 is backwards compatible with prior 802.11 specs. The specifications for Wi-Fi® 6 (802.11ax) are draft and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ax devices.

[2] Wi-Fi® supporting gigabit speeds is achievable with Wi-Fi 6 (802.11ax) when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 160MHz channels.

<b>Realtek RTL8822CE 802.11ac 2x2 Wi-Fi® + BT5</b>	<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
	<b>Interoperability</b>	Wi-Fi® certified modules
	<b>Frequency Band</b>	802.11b/g/n • 2.402 – 2.482 GHz 802.11a/n • 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
	<b>Data Rates</b>	• 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: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)
	<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	<b>Security<sup>3</sup></b>	•IEEE and WiFi® compliant 64 / 128-bit WEP encryption for a/b/g mode only •AES-CCMP: 128 bits in hardware •802.1x authentication •WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. •WPA2 certification •IEEE 802.11i •WAPI
	<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
	<b>Output Power<sup>2</sup></b>	802.11b : +18.5dBm minimum

### Technical Specifications

	<ul style="list-style-type: none"> <li>• 802.11g : +17.5dBm minimum</li> <li>• 802.11a : +18.5dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +15.5dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +14.5dBm minimum</li> <li>• 802.11n HT20(5GHz) : +15.5dBm minimum</li> <li>• 802.11n HT40(5GHz) : +14.5dBm minimum</li> <li>• 802.11ac VHT80(5GHz) : +11.5dBm minimum</li> <li>• 802.11ac VHT160(5GHz) : +11.5dBm minimum</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode 2.0 W</li> <li>• Receive mode 1.6 W</li> <li>• Idle mode (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode 50 mW (WLAN unassociated)</li> <li>• Connected Standby 10mW</li> <li>• Radio disabled 8 mW</li> </ul>
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>4</sup></b>	802.11b, 1Mbps : -93.5dBm maximum 802.11b, 11Mbps : -84dBm maximum 802.11a/g, 6Mbps : -86dBm maximum 802.11a/g, 54Mbps : -72dBm maximum 802.11n, MCS07 : -67dBm maximum 802.11n, MCS15 : -64dBm maximum 802.11ac, MCS0 : -84dBm maximum 802.11ac, MCS9 : -59dBm maximum
<b>Antenna Type</b>	High efficiency antenna with spatial diversity, mounted in the display enclosure
	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 2. Type 1216: 1.67 x 12.0 x 16.0 mm
<b>Weight</b>	1. Type 2230 : 2.8g 2. Type 126: 1.3g
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
<b>Altitude</b>	Operating Non- 0 to 10,000 ft (3,048 m) operating 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 Wireless Technology</b>	
<b>Bluetooth Specification</b>	4.0/4.1/4.2/5.0 Compliant
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
<b>Data Rates and Throughput</b>	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps

### Technical Specifications

<b>Transmit Power</b>	BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5) The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW 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 Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

### Technical Specifications

#### Intel® XMM™ 7360 LTE-Advanced (CAT9)<sup>1</sup>

<b>Technology/Operating bands</b>	FDD LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3), 1700/2100 (Band 4), 850 (Band 5), 2600 (Band 7), 900 (Band 8), 1400 (Band 11), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 17 lower), 850 (Band 18 lower), 850 (Band 19 upper), 800 (Band 20), 1400 (Band 21), 850 (Band 26), 700 (Band 28), 700 (Band 29 RX only), 2300 (Band 30), 2100 (Band 66).  TDD LTE: 2600 (Band 38), 1900 (Band 39), 2400 (Band 40), 2500 (Band 41). 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 11 LTE Specification CAT.9, DL 60MHz BW throughput up to 450Mbps; UL 20MHz throughput up to 50Mbps WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification
<b>GPS</b>	Standalone, 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: 450 Mbps (Download), 50 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21Mbps (Download), 5.76 Mbps (Upload)
<b>Maximum output power</b>	LTE: 23 dBm HSPA+: 23.5 dBm
<b>Maximum power consumption</b>	LTE: 1,200 mA (peak); 900 mA (average) HSPA+: 1,100 mA (peak); 800 mA (average)
<b>Form Factor</b>	M.2, 3042-S3 Key B
<b>Weight</b>	5.8 g
<b>Dimensions</b> (Length x Width x Thickness)	42 x 30 x 2.3 mm

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

[2] WWAN is an optional feature, requires factory configuration and separately purchased service contract. Check with service provider for coverage and availability in your area. 4G LTE not available on all products, in all regions.

<b>Near Field Communications Controller (optional)</b>	<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 ISO/IEC 14443 B ISO/IEC 15693 ISO/IEC 18092 ECMA-340 NFCIP-1 Target and Initiator ECMA-320 NFCIP-2
	<b>NFC Forum Support</b>	Tag Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2
	<b>Reader (PCD-VCD) Mode(1)</b>	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 MIFARE 1K

### Technical Specifications

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

### Technical Specifications

#### POWER

<b>AC Adapter 45 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m</b>	<b>Dimensions (H x W x D)</b>	95x45x26.8mm	
	<b>Weight</b>	unit: 200g +/- 10g	
	<b>Input</b>	<b>Input Efficiency</b>	87.74 % at 115 Vac and 88.4 % at 230Vac
		<b>Input frequency range</b>	47 to 63 Hz
	<b>Output</b>	<b>Input AC current</b>	Max. 1.4 A at 90 Vac
		<b>Output power</b>	Average Efficiency of 25%, 50%, 75%, 100% load condition with 115Vac/230Vac Spec:
		<b>DC output</b>	45W
		<b>Hold-up time</b>	19.5V
		<b>Output current limit</b>	5ms at 115 Vac input
		<b>Output current limit</b>	<8.0A
		<b>Connector</b>	4.5mm Barrel Type
	<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 5,000 m)
		<b>Humidity</b>	20% to 95%
		<b>Storage Humidity</b>	10% to 95%
	<b>EMI and Safety Certifications</b>	*CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.	

<b>AC Adapter 65 Watt nPFC Slim USB type C® Straight 1.8m</b>	<b>Dimensions (H x W x D)</b>	88x53.5x21mm		
	<b>Weight</b>	unit: 220g +/- 10g		
	<b>Input</b>	<b>Input Efficiency</b>	81.5% min at 115 Vac/ 230Vac @ 5V/3A 86.7% min at 115 Vac/ 230Vac @ 9V/3A 88% min at 115 Vac/ 230Vac @ 12V/5A 89% min at 115 Vac/ 230Vac @ 15V/4.33A 89% min at 115 Vac/ 230Vac @ 20V/3.25A	
		<b>Input frequency range</b>	47 to 63 Hz	
		<b>Input AC current</b>	Max. 1.4 A at 90 Vac	
		<b>Output</b>	<b>Output power</b>	65W
			<b>DC output</b>	5V/9V/12V/15V/20V
	<b>Hold-up time</b>		5ms at 115 Vac input	
	<b>Output current limit</b>		<8.0A	
	<b>Connector</b>	USB Type C®		
	<b>Environmental Design</b>	<b>Operating temperature</b>	32° to 95° F (0° to 35° C)	



### Technical Specifications

<b>EMI and Safety Certifications</b>	<b>Non-operating (storage) temperature</b>	-4° to 185° F (-20° to 85° C)
	<b>Altitude</b>	0 to 16,400 ft (0 to 5,000 m)
	<b>Humidity</b>	20% to 95%
	<b>Storage Humidity</b>	10% to 95%
	<p>*CE Mark - full compliance with LVD and EMC directives            * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.            * MTBF - over 200,000 hours at 25°C ambient condition.</p>	

<b>AC Adapter 65 Watt nPFC Standard USB type C® Straight 1.8m</b>	<b>Dimensions (H x W x D)</b>	90.0x51x28.5mm	
	<b>Weight</b>	unit: 250g +/- 10g	
	<b>Input</b>	<b>Input Efficiency</b>	81.5% min at 115 Vac/ 230Vac @ 5V/3A 86.7% min at 115 Vac/ 230Vac @ 9V/3A 88% min at 115 Vac/ 230Vac @ 12V/5A 89% min at 115 Vac/ 230Vac @ 15V/4.33A 89% min at 115 Vac/ 230Vac @ 20V/3.25A
		<b>Input frequency range</b>	47 to 63 Hz
	<b>Output</b>	<b>Input AC current</b>	1.6 A at 90 VAC and maximum load
		<b>Output power</b>	65W
		<b>DC output</b>	5V/9V/12V/15V/20V
		<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	8.0A Max.
	<b>Connector</b>	USB TYPE C®	
<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 5,000 m)	
	<b>Humidity</b>	20% to 95%	
	<b>Storage Humidity</b>	10% to 95%	
<b>EMI and Safety Certifications</b>	<p>*CE Mark - full compliance with LVD and EMC directives            * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.            * MTBF - over 200,000 hours at 25°C ambient condition.</p>		

<b>AC Adapter 65 Watt Smart nPFC EM Barrel 4.5mm New EM</b>	<b>Dimensions (H x W x D)</b>	102x55x30mm	
	<b>Weight</b>	unit: 250g +/- 10g	
	<b>Input</b>	<b>Input Efficiency</b>	88.0 % at 115 Vac and 89.0 % at 230Vac
		<b>Input frequency range</b>	47 ~ 63 Hz

### Technical Specifications

<b>Output</b>	<b>Input AC current</b>	Max. 1.7 A at 90 Vac
	<b>Output power</b>	65W
	<b>DC output</b>	19.5V
	<b>Hold-up time</b>	5 ms at 115 Vac input
	<b>Output current limit</b>	<11.0A
<b>Connector</b>	4.5mm Barrel Type	
<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 5,000 m)
	<b>Humidity</b>	20% to 95%
<b>EMI and Safety Certifications</b>	<b>Storage Humidity</b>	10% to 95%
	*CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.	

### Technical Specifications

**AC Adapter 65 Watt  
Smart nPFC Standard  
Barrel 4.5mm Right  
Angle 1.8m**

**Dimensions**

90x51x28.5mm

**Weight**

unit: 230g +/- 10g

**Input**

**Input Efficiency**

88.0 % at 115 Vac and 89.0 % at 230 Vac

**Input frequency range**

47 to 63 Hz

**Input AC current**

Max 1.7 A at 90 Vac

**Output**

**Output power**

65W

**DC output**

19.5V

**Hold-up time**

5 ms at 115 Vac input

**Output current limit**

<11.0A

**Connector**

4.5mm Barrel Type

**Environmental Design**

**Operating temperature**

32° to 95° F (0° to 35° C)

**Non-operating (storage) temperature**

-4° to 185° F (-20° to 85° C)

**Altitude**

0 to 16,400 ft (0 to 5000m)

**Humidity**

20% to 95%

**Storage Humidity**

10% to 95%

**EMI and Safety Certifications**

\*CE Mark - full compliance with LVD and EMC directives

\* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.

\* MTBF - over 200,000 hours at 25°C ambient condition.

### Technical Specifications

<b>Battery CC 3 Cell WHr 53 Long Life -PL Fast Charge</b>	<b>Dimensions (L x W x H)</b>	7.3 x 52.9 x 267.11 mm ( 0.287 x 2.082 x 10.516 inch)
	<b>Weight</b>	0.205g (0.45 lb)
	<b>Cells/Type</b>	3cell Lithium-Ion Polymer cell / 645180
	<b>Energy</b>	<b>Voltage</b> 11.55V
		<b>Amp-hour capacity</b> 4.59Ah
		<b>Watt-hour capacity</b> 53Wh
	<b>Temperature</b>	<b>Operating (Charging)</b> 32° to 113° F (0° to 45° C)
		<b>Operating (Discharging)</b> 32° to 122° F (0° to 50° C)
	<b>Warranty</b>	Depends on system offering
	<b>Optional Travel Battery Available</b>	No

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### COUNTRY OF ORIGIN

China

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

Type	Description	Part Number
<b>Cases</b>	HP Recycled Series 15.6-inch Backpack	5KN28AA
	HP Recycled Series 15.6-inch Top Load	5KN29AA
	HP 15.6 Business Top Load	2SC66AA
	HP 14.1 Business Sleeve	2UW01AA
<b>Input/Output</b>	HP Wireless (Link-5) Keyboard	T6U20AA
	HP USB Collaboration Keyboard	Z9N38AA
	HP Wireless Collaboration Keyboard	Z9N39AA
	HP USB Essential Keyboard and Mouse	H6L29AA
	HP Slim Wireless Keyboard and Mouse	T6L04AA
	HP Comfort Grip Wireless Mouse	H2L63AA
	HP X4000b Bluetooth Mouse	H3T50AA
	HP 3-button USB Laser Mouse	H4B81AA
	HP Ultra Mobile Wireless Mouse	H6F25AA
	HP USB Travel Mouse	G1K28AA
	HP Wireless Premium Mouse	1JR31AA
	HP USB Premium Mouse	1JR32AA
	HP Essential USB Mouse	2TX37AA
	HP Elite Presenter Mouse	2CE30AA
	HP Bluetooth Travel Mouse	6SP30AA
	HP HDMI to DVI Adapter	F5A28AA
	HP HDMI to VGA Adapter	H4F02AA
	HP USB-C to USB 3.0	N2Z63AA
	HP USB-C to RJ-45 Adapter	V7W66AA
	HP USB-C to DisplayPort Adapter	N9K78AA
HP USB-C to HDMI 2.0 Adapter	1WC36AA	
HP USB-C to VGA Adapter	H4F02AA	
HP USB-C to USB-A Hub	Z6A00AA	
<b>Power</b>	HP 45W Smart AC Adapter	H6Y88AA
	HP 65W Smart AC Adapter	H6Y89AA
	HP 45W 2-prong 4.5 mm DC jack AC Adapter	L6F60AA
	HP 45W USB-C Power Adapter	1HE07AA
	HP 65W USB-C Power Adapter	1HE08AA
<b>Storage</b>	HP USB External DVDRW Drive	F2B56AA

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

#### Security

HP Sure Key Cable Lock	6UW42AA
HP Nano Keyed Cable Lock	1AJ39AA
HP Nano Keyed Dual Head Cable Locks	1AJ41AA

<sup>1</sup>Not compatible on HP ThinPro or HP Smart Zero OS.

<sup>2</sup>Final testing on HP ThinPro Pending

<sup>3</sup>Single external display. Cannot use HDMI and VGA simultaneously. Not compatible on HP ThinPro or HP Smart Zero OS.

### Summary of Changes

<b>Date of change:</b>	<b>Version History:</b>	<b>Type of change</b>	<b>Description of change:</b>
October 22, 2020	From v1 to v2	Changed	Battery Life and changed format page 3
January 14, 2021	From v2 to v3	Removed	Docking information
		Changed	SOFTWARE AND SECURITY section
March 2, 2021	From v3 to v4	Changed	NETWORKING/COMMUNICATIONS section

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