Overview

HP ZBook 8 G1a 14 Mobile Workstation

Left

1	ACS & ALS Sensor	9	LED Indicator
2	Microphone (2)	10	USB Type-C® 20Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)
3	IR Camera (optional)		
4	Webcam		
5	Camera Shutter	11	USB Type-A 5Gbps signaling rate (Powered)
6	IR LEDS (optional)	12	RJ45 Ethernet port (standard)
7	Webcam LED	13	Security lock slot (Integrated)
8	Nano SIM card slot (Optional)	14	Fingerprint reader / Power button
		15	Touchpad

Overview

Right

1	HDMI 2.1	4	Power Indicator LED
2	Thunderbolt™ 4 with USB Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 2.1)	5	Headphone/mic combo jack
3	Thunderbolt™ 4 with USB Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 2.1)	6	Smart Card Reader (Optional)

Features

PRODUCT NAME

HP ZBook 8 G1ah 14 Mobile Workstation/ HP ZBook 8 G1ak 14 Mobile Workstation/ HP ZBook 8 G1as 14 Mobile Workstation

OPERATING SYSTEM

Preinstalled OS

FreeDOS
Windows 11 Home - HP recommends Windows 11 Pro for business [1]
Windows 11 Home Single Language - HP recommends Windows 11 Pro for business [1]
Windows 11 Pro (Windows 11 Enterprise available with a Volume Licensing Agreement) [1]
Windows 11 Pro [1]

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

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

Features

PROCESSOR

Name[1,2,4,5,7]	Cores	Threads	Smart Cache	Max Boost Frequency	Base Frequency	Pro	NPU	NPU TOPs
AMD Ryzen 5 PRO 230	6 cores	12	16 MB	4.90 GHz	3.5	Yes	Y	15
AMD Ryzen AI 5 PRO 340	6 cores	12	16 MB	4.80 GHz	2.0	Yes	Y	50
AMD Ryzen AI 7 PRO 350	8 cores	16	16 MB	5.00 GHz	2.0	Yes	Y	50
AMD Ryzen AI 9 HX PRO 370	12 cores	24	24 MB	5.10 GHz	2.0	Yes	Y	50

[1] 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.
[2] Intel Turbo Boost performance varies depending on hardware, software and overall system configuration. See http://www.intel.com/technology/turboboost for more information.
[4] 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.
[5] Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.
[7]Features and software that require a NPU may require software purchase, subscription or enablement by a software or platform provider, and third party software may have specific configuration or compatibility requirements. Performance varies by use, configuration, and other factors.

CHIPSET

Chipset is integrated with processor

GRAPHICS

Integrated
AMD Radeon™ Graphics with Pro Graphics driver
AMD Radeon™ 840M Graphics with Pro Graphics driver (1)
AMD Radeon™ 860M Graphics with Pro Graphics driver (2)

Support
Support HDMI 2.1

[1]Only available with the RyzenTM AI 5 PRO
[2]Only available with the RyzenTM AI 7 PRO

Features

DISPLAY

Non-Touch
35.6 cm (14") diagonal, WUXGA (1920 x 1200), LCD, UWVA, Anti-Glare, Low Blue Light, 800 nits, sRGB 100%, HP Sure View 5 [6]
35.6 cm (14") diagonal, WQXGA (2560 x 1600), Bent, LCD, 120Hz, UWVA, anti-glare, WLED, 500 nits, DCI-P3 100%, HP DreamColor
35.6 cm (14") diagonal, 2.5K (2560 x 1600), LCD, 120Hz (VRR), UWVA, Anti-Glare, WLED + Low Blue Light, 400 nits, Adobe 100% + DCI-P3 100%
35.6 cm (14") diagonal, WUXGA (1920 x 1200), LCD, UWVA, Anti-Glare, WLED + Low Blue Light, 400 nits, Low Power, sRGB 100%
35.6 cm (14") diagonal, WUXGA (1920 x 1200), LCD, UWVA, Anti-Glare, WLED, 300 nits, Low Power, sRGB 62.5%

Touch
35.6 cm (14") diagonal, WUXGA (1920 x 1200), LCD, Touch, UWVA, Anti-Glare, Low Blue Light, 800 nits, sRGB 100%, HP Sure View 5 [6]
35.6 cm (14") diagonal, WUXGA (1920 x 1200), LCD, Touch, UWVA, Anti-Glare, 300 nits, Low Power, sRGB 62.5%

DisplayPort™ 1.4
HDMI 2.0 Support resolution up to 4K @60 Hz

Displays support
Supports dual display through the dock

Display Size
14.0"
35.6 cm

Docking (Sold Separately)

Docking station model #1	HP USB-C™ Dock G5
Total number of supported displays (incl.the notebook) **display)**	3
Max.resolutions supported	Multi-Function Mode: (2) 5k @ 30Hz and (1) 4k UHD @ 30Hz on any port High-Resolution Mode: (2) 5k @ 60Hz on DisplayPort ports and (1) 4k UHD @ 60Hz on HDMI port
Dock Connectors	1x HDMI 2.0, 2x DisplayPort 1.4
Technicallimitations	Maximum resolution and display support is dependent on the maximum capability of the notebook. Highest resolution with dual displays is two 8K@ 60Hz host in High Resolution mode. Three maximum displays supported are two 5K@ 30 Hz on DP ports plus one 4K UHD@ 30 Hz on HDMI in Multi-function mode The highest resolution for a non-Thunderbolt host in Multi-function mode is a single 5K dual cable (using both DP ports) + (1) 4K on HDMI port.

Features

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

Features

STORAGE AND DRIVES

Primary M.2 Storage
2 TB PCIe® Gen4x4 NVMe™ SSD Three Layer Cell [6]
1 TB PCIe® Gen4x4 NVMe™ SSD Three Layer Cell [6]
1 TB PCIe® NVMe™ SSD Value [6]
512 GB PCIe® Gen4x4 NVMe™ SSD Three Layer Cell [6]
512 GB PCIe® Gen4x4 NVMe™ Self Encrypted OPAL2 SSD Three Layer Cell [6]
512 GB PCIe® NVMe™ SSD Value [6]
256 GB PCIe® NVMe™ Self Encrypted OPAL2 SSD Value [6]
256 GB PCIe® NVMe™ SSD Value [6]

MEMORY

Maximum Memory
64GB DDR5-5600 MT/s (2 x 32 GB) Memory

64GB DDR5-5600 MT/s (2 x 32 GB) Memory
32GB DDR5-5600 MT/s (1 x 32 GB) Memory
32GB DDR5-5600 MT/s (2 x 16 GB) Memory
16GB DDR5-5600 MT/s (1 x 16 GB) Memory
16GB DDR5-5600 MT/s (2 x 8 GB) Memory
24GB DDR5-5600 MT/s (2x12GB) Memory

Memory Slots
2 SODIMM
System runs at up to 5600 MT/s
Supports Dual Channel Memory(optional).
The memory is accessible/upgradeable by IT or self-maintainers only

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Features

NETWORKING /COMMUNICATIONS

WLAN
Mediatek RZ616 Wi-Fi 6E Bluetooth® 5.3 AIM-T WLAN
Mediatek MT7925 Wi-Fi 7 Bluetooth® 5.4 AIM-T WW WLAN
Qualcomm® Fast Connect 7800 Wi-Fi 7 Bluetooth® 5.4 AIM-T WW WLAN

WWAN
HP 5G Sub-6 CAT19
HP 4G CAT19

LPWAN
Qualcomm 9205 LTE-M (CAT-M1 fSVC) [12]

NFC
NFC Mirage WNC XRAV-1

Miracast
Native Miracast Support

Ethernet
Realtek RTL8111EPP 1GbE Ethernet Controller

AUDIO/MULTIMEDIA

Audio by Poly Studio
2 Integrated stereo speakers
Discrete Amplifiers
2 Integrated dual array microphone

Speaker Power
1W / 8 ohm per speaker

Camera
5MP + Infrared camera
5MP camera

Sensors
Ambient Light Sensor
Color Sensor with Ambient Light Sensing

Features

Fingerprint Sensor (optional)
Hall Effect Sensor
HP Sure Platform
HP Tamper Lock [14]
Thermal Sensor

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard
HP Premium NB Keyboard, spill-resistant, backlit, Durakey keyboard.
HP Premium NB Keyboard, spill-resistant, Privacy, backlit, Durakey, keyboard.

Pointing Device
Clickpad
Microsoft Precision Touchpad Default Gestures Support
Multi-touch gesture support

Function Keys
ESC - System information
F1 - Display Switching
F2 - Blank or Privacy
F3 - Brightness Down
F4 - Brightness Up
F5 - Blank or Keyboard Backlight
F6 - Audio Mute
F7 - Volume Down
F8 - Volume Up
F9 - Mic Mute
F10 - Play and Pause
F11 – Programmable Key
F12 - HOME
Power Button (with LED)
Insert
Delete
End
Page up
Page down
Microsoft Copilot [15]

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

Features

SOFTWARE AND SECURITY

Application Software
Buy Microsoft Office (Sold Separately)
HP Connection Optimizer
Edge Customization
HP Hotkey Support
HP Mac Address Manager
HP Notifications
HP PC Hardware Diagnostics UEFI
HP PC Hardware Diagnostics Windows
HP Privacy Settings
HP Services Scan [15]
HP Smart Support [16]
HP Support Assistant [17]
myHP
HSA Fusion for Commercial
HSA Telemetry for Commercial
Poly Lens [18]
Poly Camera Pro
Ubuntu Data Science Stack

Manageability Features
HP Client Catalog (download) [19]
HP Client Management Script Library (download) [20]
HP Cloud Recovery [21]
HP Connect for Microsoft Endpoint Manager
HP Driver Packs (download) [[22]
HP Image Assistant (download) [23]
HP Manageability Integration Kit (download) [24]
HP Power Manager with Battery Health Manager (download) [25]

Security Management
Secured-Core PC Enable [26]
Windows Hello Enhanced Sign-In Security (ESS)
HP Wolf Security for Business which includes: [27]
HP Tamper Lock
HP Sure Admin [28]
HP Sure Click [29]
HP Sure Recover [30]
HP Sure Run [31]
HP Sure Sense [32]

Features

HP Sure Start [33]

BIOS

Absolute Persistence Module [34]
Audio Permanent Disable
HP BIOS Recovery
HP Fingerprint Sensor [35]
BIOS Update via Network
HP BIOSphere Gen6 [36]
HP DriveLock & Automatic DriveLock
HP Secure Erase [37]
HP Wake on WLAN

15. HP Services Scan is preinstalled and/or provided thru Windows Update and checks for service entitlement on each hardware device and downloads the applicable software agent automatically. To disable this feature, please follow the instructions at http://www.hpdaas.com/requirements. The HP Insights agent is a telemetry and analytics platform that provides critical data around devices and applications and is not sold as a standalone service. HP follows stringent GDPR privacy regulations and is ISO27001, ISO27701, ISO27017 and SOC2 Type2 certified for Information Security. Internet access with connection to the HP Insights agent is required. For full system requirements, please visit http://www.hpdaas.com/requirements. Not available in China.
16. HP Smart Support requires the HP Insights agent to be installed. For more information about how to enable or to download HP Smart Support, please visit http://www.hp.com/smart-support. HP Services Scan is preinstalled and/or provided thru Windows Update and will check entitlement on each hardware device to determine if an HP Insights agent-enabled service has been purchased, and will download applicable software automatically. HP Insights agent is a telemetry and analytics platform that provides critical data around devices and applications and is not sold as a standalone service. HP follows stringent GDPR privacy regulations and is ISO27001, ISO27701, ISO27017 and SOC2 Type2 certified for Information Security. Internet access is required. For full system requirements or to disable this feature, please visit https://www.hpdaas.com/requirements.
17. HP Support Assistant is available on Windows. For more information, please visit https://support.hp.com/us-en/help/hp-support-assistant.
18. Poly Lens Desktop requires a Windows OS.
19. HP Client Catalog not preinstalled, however available for download at (https://www.hp.com/us-en/solutions/client-management-solutions.html)
20. HP Client Management Script Library (https://www.hp.com/us-en/solutions/client-management-solutions.html#tab=manageability-tools).
21. HP Cloud Recovery is available for Z by HP, HP Elite and Pro desktops and laptops PCs with Intel® or AMD processors and requires an open, network connection. **NOTE:** You must back up important files, data, photos, videos, etc. before use to avoid loss of data. Detail please refer to: https://support.hp.com/us-en/computer.
22. HP Driver Packs not preinstalled, however available for download at http://www.hp.com/go/clientmanagement.
23. HP Image Assistant not preinstalled, however available for download at (https://ftp.ext.hp.com/pub/caps-softpaq/cmit/HPIA.html),
24. HP Manageability Integration Kit not preinstalled, however available for downloaded from https://www.hp.com/us-en/solutions/client-management-solutions.html#tab=manageability-tools.
25. HP Power Manager with Battery Health can be downloaded by entering your system information here: https://support.hp.com/in-en/document/ish_4449597-3519507-16.
26. Secured-Core PC Enable requires an Intel® vPro®, AMD Ryzen™ Pro processor or Qualcomm® processor with SD850 or higher and requires 8 GB or more system memory. Secured-core PC is enabled from the factory.

Features

27. HP Wolf Security for Business requires Windows 10 or 11 Pro or higher, includes various HP security features and is available on HP Pro, Elite, RPOS and Workstation products. See product details for included security features.
28. HP Sure Admin requires HP G8 or newer platforms, Windows 10 or higher, HP BIOS, HP Manageability Kit or KMS Service from http://www.hp.com/go/clientmanagement and HP Sure Admin Local Access Authenticator smartphone app from the Android or Apple store.
29. HP Sure Click requires Windows 10 and higher. See https://bit.ly/2PrLT6A_SureClick for complete details.
30. HP Sure Recover is available on select HP PCs and requires Windows 10 or 11 and an open network connection. You must back up important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data. HP Sure Recover Gen6 with Embedded Reimaging is an optional feature on select HP PCs which requires Windows 10 or 11 must be configured at purchase. You must back up important files, data, photos, videos, etc. before use to avoid loss of data.
31. HP Sure Run is available on select HP PCs and requires Windows 10 and higher.
32. HP Sure Sense requires Windows 10 and higher. See product specifications for availability. On units with WWAN shipping to China, HP Sure Sense is only available via Softpaq download.
33. HP Sure Start is available on select HP PCs and requires Windows 10 and higher.
34. Absolute Persistence firmware module is shipped turned off and can only be activated with the purchase a license subscription and full activation of the software agent. License subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. Certain conditions apply. For full details visit: https://www.absolute.com/about/legal/agreements/absolute/.
35. HP Fingerprint Reader is an optional feature that requires Windows 10 or 11 and must be configured at purchase.
36. HP BIOSphere Gen6 features may vary depending on the platform and configuration.
37. HP Secure Erase implements the methods outlined in the National Institute of Standards and Technology Special Publication 800-88r "Clear" sanitation method. HP Secure Erase does not support platforms with Intel® Optane™.

POWER

HP 140W Slim USB Type-C® AC power adapter
HP 100W Slim USB Type-C® AC power adapter

Battery
HP Long Life 3 cell, 62Whr Polymer

Power Cord
3-wired plug- 1.0m

Battery life
TBD

WEIGHT & DIMENSIONS

Features

Weight

Product Weight- 62Whr

Starting at 1.44 kg (3.18 lb) with 62.00 Wh battery
Weight will vary by configuration. Does not include power adapter.
315.60 mm (W) x 222.00 mm (D) x 11.75 mm (front)/ 15.50 mm (rear) (12.43 in (W) x 8.74 in (D) x 0.46 in (front)/ 0.61 in (rear))
Maximum height 18.95 mm (0.75)

Front height measurement is near the front edge where the chassis bottom cover taper begins. Back height measurement is near the back edge where the chassis bottom cover taper ends.

PORTS/SLOTS

Left Side

2 x Thunderbolt™ 4 with USB Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 2.1) [40]
1 x HDMI 2.1
1 x headphone/mic combo jack
1 x Smart Card Reader (Optional)

Right Side

1 x USB Type-C® 20Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)
1 x USB Type-A 5Gbps signaling rate (Powered)
1 x RJ45 Ethernet port (Optional)
1 x Nano SIM card slot (Optional)
1 x Security lock slot (Integrated)

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.

Features

Certification and Compliance

CSA/UL 62368-1
ENERGY STAR®
FCC/ICES/CISPR/VCCI
CE MARKING
GS Mark
China CCC/SRRC
Taiwan BSMI/NCC
Korea KCC/KC/KES
Ukraine NSoC/TEC
EAEU Compliance
Saudi Arabian Compliance
TCO
EPEAT® Gold [1]
Low Blue Light

[1]EPEAT® registered where applicable. EPEAT ® registration varies by country. See www.epeat.net for registration status by country.

Technical Specifications – System Unit

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	
Nominal Operating Voltage	20.0V
Temperature	
Operating	0° to 35° C (32° to 95° F) System performance may be reduced above 32°C (89.6°F)
Non-operating	-20° to 60° C (-4° to 140° F) System performance may be reduced above 32°C (89.6°F)
Relative Humidity	
Operating	10% to 90 % (non-condensing)
Non-operating	5% to 95 %, 38.7° C (101.6° F) maximum wet bulb temperature
Shock	
Operating	40 G, 2 ms, half-sine
Non-operating	240 G, 2 ms, half-sine
Random Vibration	
Operating	1.043 grms
Non-operating	3.500 grms
Altitude (unpressurized)	
Operating	3048 m (10000 ft)
Non-operating	12192 m (40000 ft)
Planned Industry Standard Certifications	
Regulatory Model Number	HSN-I62C-4

Technical Specifications – Displays

DISPLAYS

Actual brightness will be lower with touchscreen or HP Sure View.
Availability may vary by country

14.0 in 2.5K (2560 x 1600)
Anti-Glare UWVA WLED+LBL
AD-100 400 eDP 1.4+PSR2
120Hz (VRR) bent LCD Panel

Outline Dimensions (W x H x D)	306.890 x 197.900 (max)
Active Area	301.594 x 188.496 (typ)
Weight	200 (max)
Diagonal Size	14
Thickness	2.0 / 3.8 (max)
Interface	eDP1.4
Surface Treatment	Anti-Glare
Touch Enabled	No
Contrast Ratio	2000:1 (typ)
Refresh Rate	120 (typ)
Brightness	400 (typ)
Pixel Resolution - Format	2560 x 1600 (2.5K)
Backlight	WLED
Pixel Resolution	RGB
Color Gamut Coverage	Adobe RGB 100% + DCI-P3 100%
Color Depth	8
Viewing Angle	UWVA 89/89/89/89
Low Blue Light	Yes
Power Consumption (W, EBL@ 150nits max/ 200nits max)	2.3 (max)/ 2.7 (max)

14.0 in WUXGA (1920 x 1200)
Anti-Glare UWVA LED sRGB
62.5 8bit 300 eDP 1.2 w/o PSR
Low-Power 60Hz bent LCD Panel

Outline Dimensions (W x H x D)	307.590 x 199.150 (max)
Active Area	301.59 X 188.50(typ)
Weight	300 (max)
Diagonal Size	14
Thickness	3.0/4.8 (max)
Interface	eDP1.2
Surface Treatment	Anti-Glare
Touch Enabled	No

Technical Specifications – Displays

Contrast Ratio	1000 : 1 (typ)
Refresh Rate	60 (typ)
Brightness	300 (typ)
Pixel Resolution - Format	1920 x 1200 (WUXGA)
Backlight	WLED
Pixel Resolution	RGB
Color Gamut Coverage	sRGB 62.5%
Color Depth	8
Viewing Angle	UWVA 89/89/89/89
Low Blue Light	No
Power Consumption (W, EBL@ 150nits max/ 200nits max)	1.70 (max)/2.10(max)

14.0 in WUXGA (1920 x 1200) Anti-Glare UWVA LED sRGB 62.5 8bit 300 TOP eDP 1.2 w/o PSR Low-Power 60Hz bent LCD Panel

Outline Dimensions (W x H x D)	307.59 x 199.15 (max)
Active Area	301.590 x 188.500 (typ)
Weight	300 (max)
Diagonal Size	14
Thickness	3.0/4.8 (max)
Interface	eDP 1.2
Surface Treatment	Anti-Glare
Touch Enabled	Yes
Contrast Ratio	1000:1(typ)
Refresh Rate	60 (typ)
Brightness	300 (typ)
Pixel Resolution - Format	1920 x 1200 (WUXGA)
Backlight	WLED
Pixel Resolution	RGB
Color Gamut Coverage	sRGB 62.5%
Color Depth	8
Viewing Angle	UWVA 89/89/89/89
Low Blue Light	No
Power Consumption (W, EBL@ 150nits max/ 200nits max)	1.75 (max) / 2.15 (max)

14.0 in WUXGA (1920 x 1200) Anti-Glare UWVA Low Blue Light sRGB 100 800 eDP

Technical Specifications – Displays

1.4+PSR+IOL Sure View 5 bent LCD Panel

Outline Dimensions (W x H x D)	306.890 x 197.900 (max)
Active Area	301.590 X 188.500 (typ)
Weight	260 (max)
Diagonal Size	14
Thickness	2.2/ 3.9 (max)
Interface	eDP 1.4
Surface Treatment	Anti-Glare
Touch Enabled	No
Contrast Ratio	1500 : 1 (typ)
Refresh Rate	60 (typ)
Brightness	800 (typ)
Pixel Resolution - Format	1920 x 1200 (WUXGA)
Backlight	WLED
Pixel Resolution	RGB
Color Gamut Coverage	sRGB 100%
Color Depth	8
Viewing Angle	UWVA 89/89/89/89
Low Blue Light	Yes
Power Consumption (W, EBL@ 150nits max/ 200nits max)	1.48 (max)/1.8(max)

14.0 in WUXGA (1920 x 1200) Anti-Glare UWVA Low Blue Light sRGB 100 800 TOP eDP 1.4+PSR+IOL Sure View 5 bent LCD Panel

Outline Dimensions (W x H x D)	306.890 x 197.900 (max)
Active Area	301.590 X 188.500 (typ)
Weight	260 (max)
Diagonal Size	14
Thickness	2.4 / 4.2 (max)
Interface	eDP 1.4
Surface Treatment	Anti-Glare
Touch Enabled	Yes
Contrast Ratio	1500 : 1 (typ)
Refresh Rate	60 (typ)
Brightness	800 (typ)
Pixel Resolution - Format	1920 x 1200 (WUXGA)
Backlight	WLED
Pixel Resolution	RGB
Color Gamut Coverage	sRGB 100%

Technical Specifications – Displays

Color Depth	8
Viewing Angle	UWVA 89/89/89/89
Low Blue Light	Yes
Power Consumption (W, EBL@ 150nits max/ 200nits max)	1.60 (max)/ 1.97 (max)

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

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

14.0 in WQXGA DRM (2560 x 1600) Anti-Glare UWVA LED DCI-P3 NB2X 500 eDP 1.4+PSR2 100 120Hz bent LCD Panel

Outline Dimensions (W x H x D)	307.594 x 199.546 (max)
Active Area	301.594 x 188.496 (typ)
Weight	230 (max)
Diagonal Size	14
Thickness	2.0 / 3.8 (max)
Interface	eDP 1.4
Surface Treatment	Anti-Glare

Technical Specifications – Displays

Touch Enabled	No
Contrast Ratio	1200:1(typ)
Refresh Rate	120 (typ)
Brightness	500 (typ)
Pixel Resolution - Format	2560 x1600 (WQXGA)
Backlight	WLED
Pixel Resolution	RGB
Color Gamut Coverage	DCI-P3 100%
Color Depth	8
Viewing Angle	UWVA 89/89/89/89
Low Blue Light	No
Power Consumption (W, EBL@ 150nits max/ 200nits max)	2.88 (max) / 3.44 (max)

Technical Specifications – Storage

STORAGE

SSD 2TB 2280 PCIe-4x4 NVMe Three Layer Cell

Form Factor	M.2 2280
Capacity	2TB
NAND Type	TLC
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Weight	0.02 lb (10 g)
Interface	PCIe NVMe Gen4X4
Maximum Sequential Read	6400 MB/s ±20%
Maximum Sequential Write	5000 MB/s ±20%
Logical Blocks	4000797360
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	Pyrite 2.0; TRIM; L1.2 Not all features are available in all versions.

SSD 1TB 2280 PCIe-4x4 NVMe Three Layer Cell

Form Factor	M.2 2280
Capacity	1TB
NAND Type	TLC
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Weight	0.02 lb (10 g)
Interface	PCIe NVMe Gen4X4
Maximum Sequential Read	6400 MB/s ±20%
Maximum Sequential Write	5000 MB/s ±20%
Logical Blocks	2000409264
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	Pyrite 2.0; TRIM; L1.2 Not all features are available in all versions.

SSD 512GB 2280 PCIe-4x4 NVMe Three Layer Cell

Form Factor	M.2 2280
Capacity	512GB
NAND Type	TLC
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Weight	0.02 lb (10 g)

Technical Specifications – Storage

	Interface	PCIe NVMe Gen4X4
	Maximum Sequential Read	6400 MB/s ±20%
	Maximum Sequential Write	3500 MB/s ±20%
	Logical Blocks	1000215215
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	Pyrite 2.0; TRIM; L1.2 Not all features are available in all versions.
512GB PCIe-4x4 2280 NVME Self Encrypted OPAL2 Three Layer Cell Solid State Drive		
	Form Factor	M.2 2280
	Capacity	512GB
	NAND Type	TLC
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Weight	0.02 lb (10 g)
	Interface	PCIe NVMe Gen4X4
	Maximum Sequential Read	6400 MB/s ±20%
	Maximum Sequential Write	3500 MB/s ±20%
	Logical Blocks	1000215215
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	TCG Opal 2.0; TRIM; L1.2 Not all features are available in all versions.
SSD 1TB 2280 PCIe NVMe Value	**Form Factor**	M.2 2280
	Capacity	1TB
	NAND Type	Value
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Weight	0.02 lb (10 g)
	Interface	PCIe NVMe Gen4X4
	Maximum Sequential Read	2200 MB/s ±20%
	Maximum Sequential Write	1600 MB/s ±20%
	Logical Blocks	2000409264
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	Pyrite 2.0; TRIM; L1.2 Not all features are available in all versions.
SSD 512GB 2280 PCIe NVMe Value		

Technical Specifications – Storage

Form Factor	M.2 2280
Capacity	512 GB
NAND Type	Value
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Weight	0.02 lb (10 g)
Interface	PCIe NVMe Gen4X4
Maximum Sequential Read	2200 MB/s ±20%
Maximum Sequential Write	1600 MB/s ±20%
Logical Blocks	1000215215
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	Pyrite 2.0; TRIM; L1.2 Not all features are available in all versions.

SSD 256GB 2280 PCIe NVMe Value

Form Factor	M.2 2280
Capacity	256 GB
NAND Type	Value
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Weight	0.02 lb (10 g)
Interface	PCIe NVMe Gen4X4
Maximum Sequential Read	2200 MB/s ±20%
Maximum Sequential Write	1600 MB/s ±20%
Logical Blocks	500118192
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	Pyrite 2.0; TRIM; L1.2 Not all features are available in all versions.

Technical Specifications – Networking

NETWORKING / COMMUNICATION

Mediatek RZ616 Wi-Fi 6E Bluetooth® 5.3 AIM-T WLAN [1]	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11ac IEEE 802.11ax IEEE 802.11b IEEE 802.11d IEEE 802.11e IEEE 802.11g IEEE 802.11h IEEE 802.11i IEEE 802.11j IEEE 802.11k IEEE 802.11mc IEEE 802.11n IEEE 802.11r IEEE 802.11v IEEE 802.11w
	Interoperability	Wi-Fi certified
	Frequency Band	802.11b/g/n/ax 2.402 – 2.482 GHz 802.11a/n/ac/ax 5.15 – 5.25 GHz 5.25 – 5.35 GHz 5.47 – 5.725 GHz 5.825 – 5.850 GHz 5.925 – 7.125 GHz
	Data Rates	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11ac: MSC0~MCS9, (20MHz, 40MHz, 80MHz, 160MHz) 802.11ax: MSC0~MCS11, (20MHz, 40MHz, 80MHz, 160MHz) 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MSC0~MCS15, (20MHz, 40MHz)
	Modulation	1024QAM, 16-QAM, 256-QAM, 64-QAM, BPSK, CCK, Direct Sequence Spread Spectrum, OFDM, QPSK
	Security	802.1x authentication AES-CCMP: 128 bit in hardware IEEE 802.11i IEEE and WiFi certified 64 / 128 bit WEP encryption for a/b/g mode only WAPI WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. WPA2 certification WPA3 (personal) certification

Technical Specifications – Networking

Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power	2.4GHz (MIMO, typical): • 802.11b : +18dBm • 802.11g : +16.5dBm • 802.11n/ac/ax (HT20/VHT20/HE20) : +16dBm • 802.11n/ac/ax (HT40/VHT40/HE40) : +12.5dBm 5GHz (MIMO, typical): • 802.11a : +13dBm • 802.11n/ac/ax (HT20/VHT20/HE20) : +13.5dBm • 802.11n/ac/ax (HT40/VHT40/HE40) : +12.5dBm • 802.11ac/ax (VHT80/HE80) : +11.5dBm • 802.11ax HE160 : +11.5dBm 6GHz LPI mode (MIMO, typical):: • 802.11a : 0dBm • 802.11ax HE20 : +1dBm • 802.11ax HE40 : +4dBm • 802.11ax HE80 : +7dBm • 802.11ax HE160 : +7.5dBm
Power Consumption	Transmit mode : 2.5 W Receive mode : 2.0 W Idle mode (PSP) : 180 mW (WLAN Associated) Idle mode: 50 mW (WLAN unassociated) Connected Standby/Modern Standby : 10 mW Radio disabled : 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[2]	2.4GHz (SISO): •802.11b, 11Mbps : -82dBm maximum • 802.11g, 54Mbps : -71dBm maximum • 802.11n, MCS7 : -64dBm maximum • 802.11ac, MCS9 : -52dBm maximum •802.11ax, MCS11(HT40): -49dBm maximum 5GHz (SISO): • 802.11a, 54Mbps : -71dBm maximum • 802.11n, MCS07 : -64dBm maximum • 802.11ac, MCS9 : -52dBm maximum •802.11ax, MCS11(HE80/HE160): -46dBm maximum 6GHz (SISO): • 802.11a, 54Mbps : -71dBm maximum • 802.11n, MCS7 : -64dBm maximum • 802.11ac, MCS9 : -52dBm maximum

Technical Specifications – Networking

	•802.11ax, MCS11(HE160): -46dBm maximum
Antenna type	High efficiency antenna with spatial diversity Two embedded tri-band 2.4/5/6 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard
Dimensions	30.00 x 22.00 x 2.30 mm (1.18 x 0.87 x 0.09 inch)
Weight	1. Type 2230: 2.8 g
Operating Voltage	3.3 v +/- 9 %
Subtitle	Integrated Bluetooth® specifications
Bluetooth Specification	4.0/4.1/4.2/5.0/5.1/5.2/5.3 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
Data Rates and Throughput	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)
Transmit Power	The Bluetooth component shall operate as a Class 1.5 Bluetooth device with a maximum transmit power of + 14 dBm and 10 dBm for BR and EDR, respectively.
Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth Software Supported	Microsoft Windows Bluetooth Software
Link Topology	
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C/E, Section 15.247, 15.249, 15.407; ETSI 300 328, ETSI 301 893, ETSI 303 687
Bluetooth Profiles Supported	2Mbps LE Advanced Audio Distribution Profile (A2DP) Basic Imaging Profile (BIP) Bluetooth 4.1 -ESR 5/6/7 Compliance Bluetooth 4.2 ESR08 Compliance Bluetooth 5.2 Bluetooth 5.3 wireless card Channel Selection Algo Encryption key size control enhancements ESR9/10 Compliance FAX Profile (FAX) Hands Free Profile (HFP)

Technical Specifications – Networking

		Headset Profile (HSP) LE Advertisement Extensions LE Data Packet Length Extension LE Dual Mode LE L2CAP Connection Oriented Channels LE Link Layer LE Link Layer Ping LE Long Range LE Low Duty Cycle Directed Advertising LE Privacy 1.2 –Extended Scanner Filter Policies LE Privacy 1.2 –Link Layer Privacy LE Secure Connection- Basic/Full Limited High Duty Cycle Non-Connectable Advertising Periodic Advertisement interval Train Nudging & Interlaced Scan Windows Bluetooth profiles support [1] Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported. Wi-Fi 6E is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately. [2] Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

1. Wi-Fi 6E requires a Wi-Fi 6E router, sold separately, to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported.
Wi-Fi 6E is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately.
2. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

Mediatek MT7925 Wi-Fi 7 Bluetooth® 5.4 AIM-T WW WLAN [1]	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11ac IEEE 802.11ax IEEE 802.11b IEEE 802.11be IEEE 802.11d IEEE 802.11e IEEE 802.11g IEEE 802.11h

Technical Specifications – Networking

	IEEE 802.11i IEEE 802.11k IEEE 802.11n 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	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11ac: MSC0~MCS9, (20MHz, 40MHz, 80MHz, 160MHz) 802.11ax: MSC0~MCS11, (20MHz, 40MHz, 80MHz, 160MHz) 802.11b: 1, 2, 5.5, 11 Mbps 802.11be: MCS0~13, (20MHz, 40MHz, 80MHz, 160MHz) 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MSC0~MCS15, (20MHz, 40MHz)
Modulation	1024QAM, 16-QAM, 256-QAM, 4096-QAM, 64-QAM, BPSK, CCK, Direct Sequence Spread Spectrum, OFDM, QPSK
Security	802.1x authentication AES-CCMP: 128 bit in hardware IEEE 802.11i IEEE and WiFi certified 64 / 128 bit WEP encryption for a/b/g mode only WAPI WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. WPA2 certification WPA3 (personal) certification
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power	• 802.11b, 1Mbps : +17dBm minimum • 802.11g, 6Mpbs : +16dBm minimum • 802.11a, 6Mbps : +17dBm minimum • 802.11n, MCS7(HT20) : +14dBm minimum • 802.11n, MCS7(HT40) : +13.5dBm minimum

Technical Specifications – Networking

	• 802.11ac MCS9(VHT20) : 13.5dBm minimum • 802.11ac MCS9(VHT40) : +13.5dBm minimum • 802.11ac MCS9(VHT80) : +12.5dBm minimum • 802.11ac MCS9(VHT160) : +10.5dBm minimum • 802.11ax MCS11(HE20)(6GHz) : +11.5dBm minimum • 802.11ax MCS11(HE40)(6GHz) : +7.5dBm minimum • 802.11ax MCS11(HE80)(6GHz) : +7.5dBm minimum • 802.11ax MCS11(HE160)(6GHz) : +7.5dBm minimum • 802.11be MCS13(EHT20)(6GHz) : +11.5dBm • 802.11be MCS13(EHT40)(6GHz) : +7.5dBm • 802.11be MCS13(EHT80)(6GHz) : +7.5dBm • 802.11be MCS13(EHT160)(6GHz) : +6.5dBm
Power Consumption	Transmit mode : 2.7 W Receive mode : 1.8 W Idle mode (PSP) : 180 mW (WLAN Associated) Idle mode: 50 mW (WLAN unassociated) Connected Standby/Modern Standby : 10 mW Radio disabled : 8 mW
Power Management	ACPI and PCI Express compliant power management; 802.11 compliant power saving mode
Receiver Sensitivity[2]	•802.11b, 1Mbps : -93.5dBm maximum •802.11b, 11Mbps : -85dBm maximum • 802.11a/g, 6Mbps : -90.5dBm maximum • 802.11a/g, 54Mbps : -72.5dBm maximum • 802.11n, MCS0(HT20) : -90dBm maximum • 802.11n, MCS7(HT20) : -71.5dBm maximum • 802.11n, MCS0(HT40) : -88.5dBm maximum • 802.11n, MCS7(HT40) : -68.5dBm maximum • 802.11ac, MCS9(VHT20) : -88.5dBm maximum • 802.11ac, MCS9(VHT40) : -65.5dBm maximum • 802.11ac, MCS9(VHT80) : -60.5dBm maximum • 802.11ac, MCS9(VHT160) : -58.5dBm maximum • 802.11ax, MCS11(HE20)(6GHz) : -59.5dBm maximum • 802.11ax, MCS11(HE40)(6GHz) : -56.5dBm maximum • 802.11ax, MCS11(HE80)(6GHz) : -53.5dBm maximum • 802.11ax, MCS11(HE160)(6GHz) : -51.5dBm maximum • 802.11be, MCS13(EHT20)(6GHz) : -55.5dBm maximum • 802.11be, MCS13(EHT40)(6GHz) : -53.5dBm maximum • 802.11be, MCS13(EHT80)(6GHz) : -51.5dBm maximum • 802.11be, MCS13(EHT160)(6GHz) : -48.5dBm maximum
Antenna type	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

Technical Specifications – Networking

	communications
Form Factor	PCI-Express M.2 MiniCard
Dimensions	30.00 x 22.00 x 2.30 mm (1.18 x 0.87 x 0.09 inch)
Weight	1. Type 2230: 2.8 g
Operating Voltage	3.3 v +/- 9 %
Subtitle	Integrated Bluetooth® specifications
Bluetooth Specification	4.0/4.1/4.2/5.0/5.1/5.2/5.3/5.4 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
Data Rates and Throughput	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)
Transmit Power	The Bluetooth component shall operate as a Class I Bluetooth device with a maximum transmit power of +15.5 dBm for BR and +13dBm for EDR.
Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth Software Supported	Microsoft Windows Bluetooth Software
Link Topology	
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C/E, Section 15.247, 15.249, 15.407; ETSI 300 328, ETSI 301 893, ETSI 303 687
Bluetooth Profiles Supported	2Mbps LE Advanced Audio Distribution Profile (A2DP) Basic Imaging Profile (BIP) Channel Selection Algo Encryption key size control enhancements ESR9/10 Compliance FAX Profile (FAX) Hands Free Profile (HFP) Headset Profile (HSP) LE Advertisement Extensions LE Data Packet Length Extension LE Dual Mode LE L2CAP Connection Oriented Channels LE Link Layer LE Link Layer Ping LE Long Range

Technical Specifications – Networking

LE Low Duty Cycle Directed Advertising
LE Privacy 1.2 –Extended Scanner Filter Policies
LE Privacy 1.2 –Link Layer Privacy
LE Secure Connection- Basic/Full
Limited High Duty Cycle Non-Connectable Advertising
Train Nudging & Interlaced Scan

[1]Wi-Fi 7 requires a Wi-Fi 7 router, sold separately, to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 7 is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 7 is supported. Wi-Fi 7 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels.
[2] Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

1.Wi-Fi 7 requires a Wi-Fi 7 router, sold separately, to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 7 is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 7 is supported. Wi-Fi 7 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels.
2. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

Qualcomm® Fast Connect 7800 Wi-Fi 7 Bluetooth® 5.4 AIM-T WW WLAN [1]	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11ac IEEE 802.11ax IEEE 802.11b IEEE 802.11be IEEE 802.11d IEEE 802.11e IEEE 802.11g IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11n 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

Technical Specifications – Networking

	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	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11ac : MCS0 ~ MCS9, (20MHz, 40MHz, 80MHz, 160MHz) 802.11ax : MCS0 ~ MCS11, (20MHz, 40MHz, 80MHz, 160MHz) 802.11b: 1, 2, 5.5, 11 Mbps 802.11be : MCS0~13, (20MHz, 40MHz, ,80MHz, 160MHz, 320MHz) 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 15, (20MHz, 40MHz)
Modulation	1024QAM, 16-QAM, 256-QAM, 4096QAM, 64-QAM, BPSK, CCK, Direct Sequence Spread Spectrum, OFDM, QPSK
Security	802.1x authentication AES-CCMP: 128 bit in hardware IEEE 802.11i IEEE and WiFi certified 64 / 128 bit WEP encryption for a/b/g mode only WAPI WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. WPA2 certification WPA3 (personal) certification
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power	• 802.11b, 1Mbps : +17dBm minimum • 802.11g, 6Mpbs : +16dBm minimum • 802.11a, 6Mbps : +17dBm minimum • 802.11n, MCS7(HT20) : +14dBm minimum • 802.11n, MCS7(HT40) : +13.5dBm minimum • 802.11ac MCS9(VHT20) : 13.5dBm minimum • 802.11ac MCS9(VHT40) : +13.5dBm minimum • 802.11ac MCS9(VHT80) : +12.5dBm minimum • 802.11ac MCS9(VHT160) : +10.5dBm minimum • 802.11ax MCS11(HE20)(6GHz) : +11.5dBm minimum • 802.11ax MCS11(HE40)(6GHz) : +7.5dBm minimum • 802.11ax MCS11(HE80)(6GHz) : +7.5dBm minimum • 802.11ax MCS11(HE160)(6GHz) : +7.5dBm minimum • 802.11be MCS13(EHT20)(6GHz) : 11.5dBm

Technical Specifications – Networking

	• 802.11be MCS13(EHT40)(6GHz) : 7.5dBm • 802.11be MCS13(EHT80)(6GHz) : 7.5dBm • 802.11be MCS13(EHT160)(6GHz) : 6.5dBm • 802.11be MCS13(EHT320)(6GHz) : 4.5dBm
Power Consumption	Transmit mode : 3.1 W Receive mode : 1.8 W Idle mode (PSP) : 180 mW (WLAN Associated) Idle mode: 50 mW (WLAN unassociated) Connected Standby/Modern Standby : 10 mW Radio disabled : 8 mW
Power Management	ACPI and PCI Express compliant power management; 802.11 compliant power saving mode
Receiver Sensitivity[2]	•802.11b, 1Mbps : -93.5dBm maximum •802.11b, 11Mbps : -85dBm maximum • 802.11a/g, 6Mbps : -90.5dBm maximum • 802.11a/g, 54Mbps : -72.5dBm maximum • 802.11n, MCS0(HT20) : -90dBm maximum • 802.11n, MCS7(HT20) : -71.5dBm maximum • 802.11n, MCS0(HT40) : -88.5dBm maximum • 802.11n, MCS7(HT40) : -68.5dBm maximum • 802.11ac, MCS9(VHT20) : -88.5dBm maximum • 802.11ac, MCS9(VHT40) : -65.5dBm maximum • 802.11ac, MCS9(VHT80) : -60.5dBm maximum • 802.11ac, MCS9(VHT160) : -58.5dBm maximum • 802.11ax, MCS11(HE20)(6GHz) : -59.5dBm maximum • 802.11ax, MCS11(HE40)(6GHz) : -56.5dBm maximum • 802.11ax, MCS11(HE80)(6GHz) : -53.5dBm maximum • 802.11ax, MCS11(HE160)(6GHz) : -51.5dBm maximum • 802.11be, MCS13(EHT20)(6GHz) : -55.5dBm maximum • 802.11be, MCS13(EHT40)(6GHz) : -53.5dBm maximum • 802.11be, MCS13(EHT80)(6GHz) : -51.5dBm maximum • 802.11be, MCS13(EHT160)(6GHz) : -48.5dBm maximum • 802.11be, MCS13(EHT320)(6GHz) : -45.5dBm maximum
Antenna type	High efficiency antenna with spatial diversity Two embedded tri-band 2.4/5/6 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard
Dimensions	30.00 x 22.00 x 2.35 mm (1.18 x 0.87 x 0.09 inch)
Weight	1. Type 2230: 3.1 g
Operating Voltage	3.3 v +/- 9 %
Subtitle	Integrated Bluetooth® specifications
Bluetooth Specification	4.0/4.1/4.2/5.0/5.1/5.2/5.3/5.4 Compliant
Frequency Band	2402 to 2480 MHz

Technical Specifications – Networking

Number of Available Channels	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
Data Rates and Throughput	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)
Transmit Power	The Bluetooth component shall operate as a Class I Bluetooth device with a maximum transmit power of +15.5 dBm for BR and +13dBm for EDR.
Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth Software Supported	Microsoft Windows Bluetooth Software
Link Topology	
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C/E, Section 15.247, 15.249, 15.407; ETSI 300 328, ETSI 301 893, ETSI 303 687
Bluetooth Profiles Supported	2Mbps LE Advanced Audio Distribution Profile (A2DP) Basic Imaging Profile (BIP) Bluetooth 4.1 -ESR 5/6/7 Compliance Bluetooth 4.2 ESR08 Compliance Bluetooth 5.2 Bluetooth 5.3 wireless card Channel Selection Algo Encryption key size control enhancements ESR9/10 Compliance FAX Profile (FAX) Hands Free Profile (HFP) Headset Profile (HSP) LE Advertisement Extensions LE Data Packet Length Extension LE Dual Mode LE L2CAP Connection Oriented Channels LE Link Layer LE Link Layer Ping LE Long Range LE Low Duty Cycle Directed Advertising LE Privacy 1.2 –Extended Scanner Filter Policies LE Privacy 1.2 –Link Layer Privacy LE Secure Connection- Basic/Full

		Limited High Duty Cycle Non-Connectable Advertising Periodic Advertisement interval Train Nudging & Interlaced Scan Windows Bluetooth profiles support [1]Wi-Fi 7 requires a Wi-Fi 7 router, sold separately, to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 7 is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 7 is supported. Wi-Fi 7 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels. [2] Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

1.Wi-Fi 7 requires a Wi-Fi 7 router, sold separately, to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 7 is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 7 is supported. Wi-Fi 7 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels.
2. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

HP 5G Sub-6 CAT19	**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)

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	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 34: 2010 to 2025 MHz (UL/DL) Band 38: 2570 to 2620 MHz (UL/DL) Band 39: 1880 to 1920 MHz (UL/DL) Band 40: 2300 to 2400 MHz (UL/DL) Band 41: 2496 to 2690 MHz (UL/DL) Band 42: 3400 to 3600 MHz (UL/DL) Band 43: 3400 to 3800 MHz (UL/DL) Band 46: 5150 to 5925 MHz (DL) Band 48: 3550 to 3700 MHz (UL/DL) Band 66: 1710 to 1800 MHz (UL), 2110 to 2200 MHz (DL) Band 71: 663 to 698 MHz (UL), 617 to 652 MHz (DL)
Wireless protocol standards	5GNR Air Interface 3GPP Rel15 5G NR sub-6 LTE Rel15 3GPP Release 8 UMTS Specification
GPS	Standalone/A-GPS (MS-A, MS-B)
GPS bands	GPS L1 (1575.42MHz), GLONASS L1 (1602MHz), Beidou B1 (1561.098MHz), Galileo E1 (1575.42MHz), QZSS (1575.42MHz)
Maximum data rates	SA 5G/NR sub-6 Peak: 4.67 Gbps(Download), 1.25 Gbps(Upload)
Maximum output power	HSPA+: 23.5 dBm LTE (all bands except B41): 23.0 dBm (Not support HPUE) NR (all band except n41, n77, n78, n79): 23.0 dBm (Not support HPUE) NR n41, n77, n78, n79 HPUE: 26.0 dBm (Support HPUE)
Maximum power consumption	5G Sub 6: 3,500 mA LTE: 2,500 mA (peak); mA (average)
Form Factor	M.2; 3052-S3 Key B
Weight	8.6 g (0.303 oz)
Dimensions (Length x Width x Thickness)	30.00 x 52.00 x 2.30 mm (1.18 x 2.05 x 0.09 inch)
embedded eSIM	Yes

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

Technical Specifications – Networking

planned to be available in select platforms and select countries, where carrier supported.

HP 4G CAT19	**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 34: 2010 to 2025 MHz (UL/DL) Band 38: 2570 to 2620 MHz (UL/DL) Band 39: 1880 to 1920 MHz (UL/DL) Band 40: 2300 to 2400 MHz (UL/DL) Band 41: 2496 to 2690 MHz (UL/DL) Band 42: 3400 to 3600 MHz (UL/DL) Band 43: 3400 to 3800 MHz (UL/DL) Band 46: 5150 to 5925 MHz (DL) Band 48: 3550 to 3700 MHz (UL/DL) Band 66: 1710 to 1800 MHz (UL), 2110 to 2200 MHz (DL) Band 71: 663 to 698 MHz (UL), 617 to 652 MHz (DL)
	Wireless protocol standards	LTE Rel15 3GPP Release 8 UMTS Specification
	GPS	Standalone/A-GPS (MS-A, MS-B)
	GPS bands	GPS L1 (1575.42MHz), GLONASS L1 (1602MHz), Beidou B1

Technical Specifications – Networking

		(1561.098MHz), Galileo E1 (1575.42MHz), QZSS (1575.42MHz)
	Maximum data rates	UE Category DL 19 (1.6 Gbps Download) , UE Category UL 18 (211 Mbps Upload)
	Maximum output power	LTE (all bands except B41): 23.0 dBm (Not support HPUE)
	Maximum power consumption	
		LTE: 2,500 mA (peak)
	Form Factor	M.2; 3052-S3 Key B
	Weight	8.4 g (0.296 oz)
	Dimensions (Length x Width x Thickness)	30.00 x 52.00 x 2.30 mm (1.18 x 2.05 x 0.09 inch)
	embedded eSIM	Yes

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.

Value

NFC Mirage WNC XRAV-1	**Dimensions (L x W x H)**	17.00 x 10.00 x 2.00 mm (0.67 x 0.39 x 0.08 inch)
	Chipset	NPC300
	System interface	I2C
	NFC RF standards	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
	NFC Forum Support	Type 1, Type 2, Type 3 / Type 4, NFCIP-1 / NFCIP-2
	Reader (PCD-VCD) Mode(1)	ISO/IEC 14443 A
		ISO/IEC 14443 B
		ISO/IEC 15693
		MIFARE 1K
		MIFARE 4K
		MIFARE DESFire
		FeliCa
		Jewel and Topaz
	Card Emulation (PICC-VICC) Mode(1)	ISO/IEC 14443 A
		ISO/IEC 14443 B and B’
		MIFARE
		FeliCa
	Frequency	13.56 MHz
	NFC Modes Supported	Reader/Writer, Peer-to-Peer
	Raw RF Data Rates	106 kbps, 212 kbps, 424 kbps, 848 kbps
	Operating temperature	Operating: 0 °C to 70 °C (32 °F to 158 °F)
		Storage: -20 °C to 125 °C (-4 °F to 257 °F)

Technical Specifications – Networking

	Storage temperature	Operating: 10% - 90% (non-condensing) Non-Operating: 5% - 95% (non-condensing)
	Humidity	Operating: 10% - 90% (non-condensing) Non-Operating: 5% - 95% (non-condensing)
	Supply Operating voltage	4.35 to 5.25 Volts
	I/O Voltage	1.8V or 3.3V
	Power Consumption (Booster enable, VBAT= 3.3V, VCC_BOOST = 5V)	Booster enable, VBAT= 3.3V, VCC_BOOST = 5V
	Mode	Power Consumption, Typical
	Polling	7.3 mA
	Detected Test Tag Type 1	Total 283.8 mA Net Module 236.8 mA
	Detected Test Tag Type 2	Total 288.8 mA Net Module 241.8 mA
	Detected Test Tag Type 3	Total 287.7 mA Net Module 240.7 mA
	Detected Test Tag Type 4	Total 282.3 mA Net Module 235.3 mA
	Antenna	Antenna connector, 0.5mm pitch, 7 connector FPC. Antenna matching is external to module.
Realtek RTL8111EPP 1GbE Ethernet Controller	**Connector**	RJ-45
	System Interface	PCI (Intel proprietary) + SMBus/ USB
	Data rates supported	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14), 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30), 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 802.3 clauses 40),
	IEEE Compliance	IEEE 802.1p QoS (Quality of Service) Support, IEEE 802.1q VLAN support, IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable), IEEE 802.3az EEE (Energy Efficient Ethernet),
	Performance	TCP/IP/UDP Checksum Offload (configurable); Protocol Offload (ARP & NS); Large send offload and Giant send offload; Jumbo Frame 9K; Receiving Side Scaling;
	Power consumption	Cable Disconnetion: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000mW WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW
	Power Management	ACPI compliant – multiple power modes; Situation-sensitive features reduce power consumption; Advanced link down power saving for reducing link down power consumption;

Technical Specifications – Networking

	Management Interface	Auto MDI/MDIX Crossover cable detection
	IT Manageability	Wake-on-LAN from modern standby or sleep state (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only); PXE 2.1 Remote Boot; Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30));
	Security & Manageability	Support DASH 1.1 compliant/Software KVM ASF 2.0
Qualcomm 9205 LTE-M (CAT-M1 fSVC) [1]	**Technology/Operating bands**	FDD LTE: 1700/2100 (Band 4), 1700/2100 (Band 66), 1800 (Band 3), 1900 (Band 2), 1900 (Band 25), 2100 (Band 1), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 14 upper), 700 (Band 28), 700 (band 85), 800 (Band 20), 800 (Band 27), 850 (Band 18 lower), 850 (Band 19 upper), 850 (Band 26), 850 (Band 5), 900 (Band 8) MHz GSM/GPRS/EGPRS: 1800, 1900, 850, 900 MHz
	Wireless protocol standards	3GPP TS 21.111 V10.0.0: USIM and IC card requirements 3GPP TS 27.005 V10.0.1: Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS) 3GPP TS 27.007 V10.0.8: AT command set for User Equipment (UE) 3GPP TS 31.102 V10.11.0: Characteristics of the Universal Subscriber Identity Module (USIM) application 3GPP TS 31.11 V10.16.0: Universal Subscriber Identity Module (USIM) Application Toolkit (USAT) 3GPP TS 36.124 V10.3.0: Electro Magnetic Compatibility (EMC) requirements for mobile terminals and ancillary equipment 3GPP TS 36.521-1 V14.3.0: User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing 3GPP TS 51.010-1 V10.5.0: Mobile Station (MS) conformance specification; Part 1: Conformance specification 3GPP TS 51.011 V4.15.0: Specification of the Subscriber Identity Module -Mobile Equipment (SIM-ME) interface
	GPS	Standalone GPS/Beidou/GLONASS/A-GPS (XTRA)
	GPS bands	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz
	Maximum data rates	LTE FDD: 375.00 Kbps(Download), 1119.00 Kbps(Upload) GPRS: 107.00 Kbps(Download), 85.60 Kbps(Upload) EGPRS: 296.00 Kbps(Download), 236.80 Kbps(Upload)
	Maximum output power	LTE (all bands except B41): 21.5 dBm GSM: 34.0 dBm
	Maximum power consumption	LTE: 151 mA(peak), 16 mA(average)
	Form Factor	M.2

Technical Specifications – Networking

Weight	4.0 g (0.141 oz)
Dimensions (Length x Width x Thickness)	22.00 x 42.00 x 2.30 mm (0.87 x 1.65 x 0.09 inch)
embedded eSIM	Support

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

Technical Specifications – Power

POWER

Power supply availability may vary by country.

HP 100W Slim USB-C Straight AC Power Adapter Mario II	**Dimensions**	5.354 x 2.362 x 0.866 in (13.6x6.0x2.2cm)
	Weight	340g ± 10g (Not including power cord. Power cord varies by country.)
	Input	100-240Vac
	Input Efficiency	81.50% min at 115 Vac/ 230 Vac @5.00V 86.70% min at 115 Vac/ 230 Vac @9.00V 88.00% min at 115 Vac/ 230 Vac @12.00V 89.00% min at 115 Vac/ 230 Vac @15.00V 89.00% min at 115 Vac/ 230 Vac @20.00V
	Input frequency range	47-63Hz
	Input AC current	Max. 1.6 A at 90 Vac
	Output	
	Output power	5V/15W 9V/27W 12V/60W 15V/75W 20V/100W
	DC output	5V/9V/12V/15V/20V
	Hold-up time	100% load 5ms at 115 Vac input/80% load 10ms at 115 Vac input
	Output current limit	5V/9V/12V/15V<125% max current, 20V<135% max current
	Connector	
	Connector	C6
	Environmental Design	
	Operating temperature	0° to 35° C (32° to 95° F)
	Non-operating (storage) temperature	-20° to 85° C (-4° to 185° F)
	Altitude	0 to 5,000 m (0 to 16,400 ft)
	Humidity	20% to 95%
	Storage Humidity	10% to 95%
	EMI and Safety Certifications	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950-1, IEC 62368-1:2014 and IEC62368-1 : 2018, EN62368-1:2020+A11, UL 62368-1 Agency approvals - C-UL-US, TUV/GS, TUV/PSE, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC, CU(EAC), KCC(Safety+EMC), NOM-001 NYCE, NRcan, NRCS, ISC, SEC, PSB, Argentina S-mark, Australia RCM, BIS, BSMI, UAE, UKCA DoC, Ukraine(CoC+DoC+RoHS+ECO)
HP 140W Slim USB-C Straight AC Power Adapter Daisy II	**Dimensions**	5.433 x 2.578 x 1.122 in (13.8x6.55x2.85cm)

Technical Specifications – Power

	Weight	415g(+/-10g) (Not including power cord. Power cord varies by country.)
	Input	100-240Vac
	Input Efficiency	81.50% min at 115 Vac/ 230 Vac @5.00V 86.70% min at 115 Vac/ 230 Vac @9.00V 88.00% min at 115 Vac/ 230 Vac @12.00V 89.00% min at 115 Vac/ 230 Vac @15.00V 89.00% min at 115 Vac/ 230 Vac @20.00V 89.00% min at 115 Vac/ 230 Vac @28.00V
	Input frequency range	47-63Hz
	Input AC current	Max. 2.5 A at 90 Vac
	Output	
	Output power	5V/15W 9V/27W 12V/60W 15V/75W 20V/100W 28V/140W
	DC output	5V/9V/12V/15V/20V/28V
	Hold-up time	100% load 5ms at 115 Vac input/80% load 10ms at 115 Vac input
	Output current limit	5V/9V/12V/15V/20V<125% max current, 28V<135% max current
	Connector	
	Connector	C6
	Environmental Design	
	Operating temperature	0° to 35° C (32° to 95° F)
	Non-operating (storage) temperature	-20° to 85° C (-4° to 185° F)
	Altitude	0 to 5,000 m (0 to 16,400 ft)
	Humidity	20% to 95%
	Storage Humidity	10% to 95%
	EMI and Safety Certifications	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950-1, IEC 62368-1:2014 and IEC62368-1 : 2018, EN62368-1:2020+A11, UL 62368-1 Agency approvals - C-UL-US, TUV/GS, TUV/PSE, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC, CU(EAC), KCC(Safety+EMC), NOM-001 NYCE, NRcan, NRCS, ISC, SEC, PSB, Argentina S-mark, Australia RCM, BIS, BSMI, UAE, UKCA DoC, Ukraine(CoC+DoC+RoHS+ECO)
MC 62Whr Long Life Polymer Fast charge 3 cell Battery	**Dimensions (H x W x L)**	L 255.8 mm* W 67.8mm* T 7.4mm
	Weight	Max 236.0g
	Cells/Type	3cell Lithium-Ion Polymer cell
	Energy	

Technical Specifications – Power

Voltage	11.58V
Amp-hour capacity	5355mAh / 5086mAh
Watt-hour capacity	62Whr
Temperature	
Operating (Charging)	0° C ~ 40° C
Operating (Discharging)	-10° C ~ 40° C
Fuel Gauge LED	
Warranty	
Optional Travel Battery Available	No

Technical Specifications – Audio

AUDIO

HD Stereo Codec	Realtek ALC3315
Audio I/O Ports	3.5mm Headset: CTIA only;Headphone-out
Internal Speaker Amplifier	Cirrus Logic High-Efficiency Boosted Class D Amplifier
Multi-streaming Capable	Playback multi-streaming can be enabled in the audio control panel to allow independent audio streams to be sent to/from the front jacks or integrated speaker., Following MSFT Behavior
Sampling	DAC: Supports resolutions from 16-bit to 24-bit;48.0 kHZ to 48.0 kHz ADC: Supports resolutions from 16-bit to 24-bit;44.1 kHZ to 48.0 kHz
Internal Speaker	Yes

Technical Specifications – Fingerprint Reader

FINGERPRINT READER

Sensor vendor	SYNAPTICS
Sensor type	Capacitive
DPI resolution	363 DPI
Scan area	104 x 86 pixels
False Rejection Rate	< 3%
False Acceptance Rate	< 0.001%
Mobile Voltage Operation	2.7 V ~ 3.6 V
Operating Temperature	5°C ~ 60°C (41°F ~ 140°F)
Current Consumption Image	100 mA max
Low Latency Wait For Finger	260 uA
Capture Rate	50 frames/sec
ESD Resistance	IEC 61000-4-2 4B (+15KV)
Detection Matrix	363 dpi / 7.4 x 6.0 mm sensor area

Fingerprint Reader	**Second Source**
Sensor vendor	ELAN
Sensor type	Capacitive
DPI resolution	363 DPI
Scan area	56 x 56 pixels
False Rejection Rate	< 3%
False Acceptance Rate	< 0.001%
Mobile Voltage Operation	2.8 V ~ 3.6 V
Operating Temperature	-20°C ~ 80°C (-4°F ~ 176°F)
Current Consumption Image	100 mA max
Low Latency Wait For Finger	300 uA
Capture Rate	50 frames/sec
ESD Resistance	IEC 61000-4-2 4B (+15KV)
Detection Matrix	363 dpi / 4.0 x 4.0 mm sensor area

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

OPTIONS

Category	Description	Part Number
Audio/Video	TBD	TBD
Cases	TBD	TBD
Docking	TBD	TBD
Hub	TBD	TBD
Adapter	TBD	TBD
Keyboard/Combo	TBD	TBD
Mouse	TBD	TBD
Power	TBD	TBD
Commodity	TBD	TBD

Date of change	Version History		Description of change
	From v1 to v2		