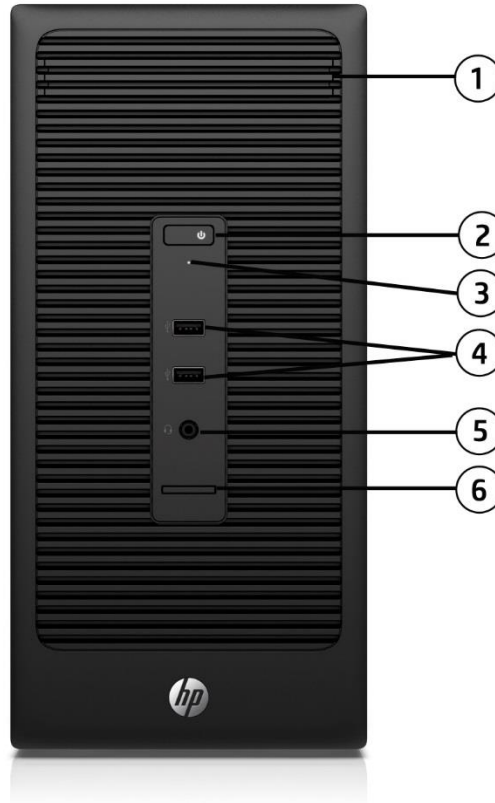


### Overview

### HP 285 G2 Microtower Business PC



#### **Front**

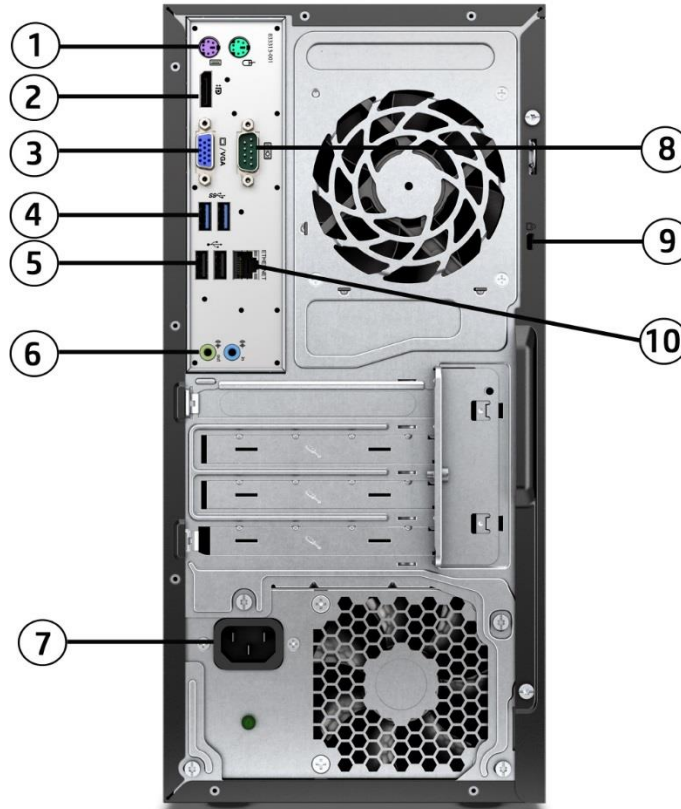
1. Slim-height Bay - supporting an optical disk drive (optional)
2. Power Button
3. PC Status LED
4. (2) USB 2.0 Ports
5. Microphone/Headphone Combo Jack
6. SD Media Card Reader (optional)

#### **Not Shown**

- Slots
- (1) PCI Express x16 Graphics Connector
  - (1) PCI Express x1 Accessory Connector
  - (1) PCI 2.1
- Bays
- (2) 3.5 in. internal storage drive bay

### Overview

### HP 285 G2 Microtower Business PC



#### **Back**

- |  |                                  |
|--|----------------------------------|
| 1. PS/2 Keyboard (purple) and Mouse (green) Connectors | 6. Audio Line Out; Audio Line In |
| 2. DisplayPort   | 7. Power Cord Connector          |
| 3. VGA Port  | 8. Serial Port                   |
| 4. (2) USB 3.0 Ports                                   | 9. Security Lock Slot            |
| 5. (2) USB 2.0 Ports                                   | 10. RJ-45 Network Connector      |

#### **Not Shown**

- Parallel Port (optional, select countries only)
- 2<sup>nd</sup> Serial Port (optional, select countries only)

### Overview

#### AT A GLANCE

- Windows 10 Pro , Windows 10 Home, Windows 7 Professional, NeoKylin Linux (selected countries only) or FreeDOS 2.0
- AMD® A78 FCH supporting AMD® HD Graphics
- Supports an optional discrete graphics card
- Integrated 10/100/1000 Ethernet Controller
- Up to 16 GB DDR3L Unbuffered Memory (UDIMM)
- Independent monitor support via VGA video interfaces
- TPM 1.2 support
- High definition audio
- 6 USB ports (including 2-USB 3.0 ports)
- Energy efficient internal power supply available (select models only)
- Security cable lock supported (sold separately)
- Protected by HP Services; terms and conditions vary by country; certain restrictions and exclusions apply

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

### Standard Features and Configurable Modules

#### CHIPSET

AMD® A78 FCH

#### PROCESSOR\*

- AMD A4-5300B APU with Radeon™ HD 7480D Graphics (3.4 GHz, 1 MB cache, 2 cores, 65W APU)
- AMD A4-6300B APU with Radeon™ HD 8370D Graphics (3.7 GHz, 1 MB cache, 2 cores, 65W APU)
- AMD A4 PRO -7300B APU with Radeon™ HD 8470D Graphics (3.8 GHz, 1 MB cache, 2 cores, 65W APU)
- AMD A6-5400B APU with Radeon™ HD 7540D Graphics (3.6 GHz, 1 MB cache, 2 cores, 65W APU)
- AMD A6-6400B APU with Radeon™ HD 8470D Graphics (3.9 GHz, 1 MB cache, 2 cores)
- AMD A6-6420B APU with Radeon™ HD 8470D Graphics (4.0 GHz, 1 MB cache, 2 cores)
- AMD Pro A6-8550B APU with Radeon™ R5 Series Graphics (3.7 GHz, 1 MB cache, 2 cores)
- AMD A8 PRO-7600B APU with Radeon™ R7 Series Graphics (3.1 GHz, 4M cache, 4 cores)
- AMD Pro A8-8650B APU with Radeon™ R7 Series Graphics (3.2 GHz, 2 x 2 MB shared caches, 4 cores)
- AMD A10 PRO -7800B APU with Radeon™ R7 Series Graphics (3.5 GHz, 4M cache, 4 cores)
- AMD Pro A10-8750B APU with Radeon™ R7 Series Graphics (3.6 GHz, 2 x 2 MB shared caches, 4 cores)

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 is not a measurement of higher performance.

#### GRAPHICS

##### Integrated

AMD Integrated HD Graphics Varies by Processor

##### Discrete

AMD Radeon™ R5 320 1GB GDDR5 PCIe x8 (optional, selected countries only)

NVIDIA® GeForce® GT 720 2GB PCIe x8 (optional, selected countries only)

NOTE: HD content required to view HD images.

#### MEMORY\*

Both slots are customer accessible / upgradeable, Supports Dual Channel Memory

Form Factor	Type	Maximum	# of Slots
Microtower	DDR3L-1600 (Transfer rates up to 1600 MT/s)	16 GB capacity	2 DIMM
	2 MB DDR3L-1600 DIMM (1x2 GB)		
	4 MB DDR3L-1600 DIMM (1x4 GB)		
	8 MB DDR3L-1600 DIMM (1x8 GB)		
	8 MB DDR3L-1600 DIMM (2x4 GB) (Dual Channel)		

\*NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system. Memory modules support data transfer rates up to 1600 MT/s; actual data rate is determined by the system's configured processor. See processor specifications for supported memory data rate.

### Standard Features and Configurable Modules

#### STORAGE\*

**Supports SATA 3.5" 6Gb/s HDDs\***

**SATA 3.5" 6Gb/s HDDs\***

500GB 7200 RPM SATA Hard Disk Drive

1TB 7200 RPM SATA Hard Disk Drive

2TB 7200 RPM SATA Hard Disk Drive

**SD Card Reader (optional)\*\***

HP SD Media Card Reader (optional)

\*NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.

\*\*Card sold separately

#### OPTICAL DISC DRIVES\*

HP 9.5mm Desktop G2 Slim DVD-ROM Drive

HP 9.5mm Desktop G2 Slim DVD Writer Drive

\*Optical drives are optional or add on features. Duplication of copyrighted material is strictly prohibited. Actual speeds may vary. Double Layer media compatibility will widely vary with some home DVD players and DVD-ROM drives.

#### AUDIO/MULTIMEDIA

HD audio with Realtek ALC221

Microphone/Headphone Combo Jack

Standard internal speaker

#### NETWORKING

**Ethernet (RJ-45)**

Realtek RTL8111G-CG - Integrated 10/100/1000M Gigabit Ethernet Controller Supports Wake-on-LAN (WOL)

**Wireless\***

Broadcom BCM943228Z 802.11n No Bluetooth® NIC

\* Wireless cards are optional or add-on features and requires separately purchased wireless access point and internet service. Availability of public wireless access points limited.

#### PORTS

**Front I/O Ports**

Two (2) USB 2.0 ports

One (1) Microphone/Headphone Combo Jack

**Rear I/O Ports**

Two (2) USB 2.0 ports

Two (2) USB 3.0 ports

One (1) RJ45 network connection

One (1) Audio Line out

### Standard Features and Configurable Modules

- One (1) Audio Line in
- One (1) VGA
- One (1) DisplayPort
- Two (2) PS/2 ports (Keyboard and Mouse)
- One (1) Serial Port
- One (1) 2nd Serial Port (optional, select countries only)

#### Internal I/O Ports

- One (1) PCIe x 16
- One (1) PCIe x 1
- One (1) PCI 2.1

### BAYS

- Two (2) 3.5 in. Hard Disc Drive Bay
- One (1) 5.25 in. Optical Disc Drive Bay

### KEYBOARDS AND POINTING DEVICES\*

#### Keyboards

- HP PS/2 Business Slim Keyboard
- HP PS/2 Keyboard
- HP USB Antimicrobial Keyboard (China only)
- HP USB Business Slim Keyboard
- HP USB Keyboard
- Universal USB Wired Windows 8 Keyboard

#### Mice

- HP PS/2 Mouse
- HP USB Antimicrobial Mouse (China only)
- HP USB Hardened Mouse
- HP USB Mouse
- Universal USB Wired Optical Mouse

\*Keyboards and mouse are optional or add-on features.

### SERVICE AND SUPPORT

**On-site Warranty:** One-year (1-1-1) limited warranty delivers, next business day service for parts and labor and includes free support 24 x 7. One-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing an optional HP Care Pack. To choose the right level of service for your HP product, visit HP Care Pack Central: [www.hp.com/go/cpc](http://www.hp.com/go/cpc)

**NOTE 1:** Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

**NOTE 2:** On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

**NOTE 3:** Technical support applies only to HP-configured and third-party HP qualified hardware and software. 24 x 7 support may not be available in some countries.

## Standard Features and Configurable Modules

### Technical Specifications

#### **OPERATING SYSTEMS**

##### **Preinstalled (Windows)**

Windows 10 Pro 64\*

Windows 10 Home 64\*

Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro)\*\*

Windows 7 Professional 32 (available through downgrade rights from Windows 10 Pro)

Windows 7 Professional 32\*\*\*

Windows 7 Professional 64\*\*\*

##### **Pre-installed (Other)**

FreeDOS 2.0

NeoKylin Linux 32

##### **Web-supported**

Windows 10 Pro 64

Windows 10 Home 64

Windows 7 Professional 64

Windows 7 Professional 32

\*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.microsoft.com>.

\*\*This system is preinstalled with Windows 7 Pro software and also comes with a license and media for Windows 10 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

\*\*\*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. See <http://www.microsoft.com>.



### Technical Specifications

#### SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

Preinstalled (varies by country)

##### BIOS

Power On Authentication

##### Multimedia

Cyberlink Power DVD, BD

Cyberlink Power2Go (Secure Burn)

##### HP Value Add Software

HP ePrint Driver<sup>1</sup>

HP Recovery Manager

HP Support Assistant

Windows 10 Welcome App

##### 3rd Party

Foxit PhantomPDF Express for HP (optional, US only)

##### Microsoft Products

Buy Office

Bing Search

Skype

##### Manageability

HP BIOS Config Utility (BCU)<sup>2</sup>

Discover HP Touchpoint Manager<sup>3</sup>

##### Client Security Software

Microsoft Security Essentials<sup>4</sup>

Microsoft Defender

TPM 1.2

NOTE 1: TPM feature will not be supported on machines pre-configured with FreeDOS/Linux

NOTE 2: In selected countries, machines pre-configured with Windows OS will be shipped with TPM disabled.

1. Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see <http://www.hp.com/go/businessmobileprinting>).
2. Not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>.
3. Subscription required.
4. Opt in and internet connection required for updates.

### Technical Specifications

#### UNIT ENVIRONMENT AND OPERATING CONDITIONS

##### General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 10.2 cm (4 in.) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

Temperature Range	Operating: 50° to 95° F (10° to 35° C)* Non-operating: -22° to 140° F (-30° to 60° C)
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m)

\* Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.

#### POWER SUPPLY

180 W standard efficiency, active PFC; 180 W, up to 85% efficient, active PFC; 180 W standard efficiency

#### DIMENSIONS AND WEIGHT (configured with 1 HDD and 1 ODD)

Chassis (H x W x D)	14.13 x 6.69 x 13.98 in 35.88 x 17 x 35.5 cm
System Weight	13.47 lbs / 6.11 kg

#### PACKAGING DIMENSIONS AND WEIGHT

Dimensions	18.82 x 11.77 x 20.35 in 47.8 x 29.9 x 51.7 cm
Weight	18.98 lbs / 8.61 kg

#### SECURITY FEATURES

Trusted Platform Module (TPM) 1.2  
Security cable slot

#### CERTIFICATIONS

CECP  
SEPA

### Technical Specifications

ENERGY STAR® 6.0

CEL

FCC

UL

RoHS

CCC

### Technical Specifications - Graphics

<b>GRAPHICS</b>		
<b>Integrated AMD HD Graphics</b>		
<b>VGA Controller</b>	<b>Integrated</b>	
<b>DisplayPort</b>	<ul style="list-style-type: none"> <li>• DP++</li> <li>• DisplayPort audio:               <ul style="list-style-type: none"> <li>○ Linear PCM, Dolby Digital (AC-3), Dolby® TrueHD, DTS Studio Sound™</li> <li>○ LPCM at sample rates: 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, and 192 kHz, Bits per sample: 16, 20, and 24</li> <li>○ Supports up to 8 channels</li> </ul> </li> <li>• 4, 2, or 1-lane transmission</li> <li>• 5.4 Gbps (HBR2), 2.7 Gbps, and 1.62 Gbps link bit rates</li> <li>• DisplayPort Multi-Stream Transport (MST) for up to four independent video and audio streams on one connector</li> <li>• Maximum resolution of 4096 x 2160 at 30 Hz and 24 bpp (single stream)               <ul style="list-style-type: none"> <li>○ Supports 2560 x 1600 at 60 Hz (single stream)</li> <li>○ Support for tiled displays with resolution of up to 4096 x 2160 at 60 Hz DisplayPort 1.2 MST</li> </ul> </li> </ul> <p>Supports stereoscopic 3D gaming, Blu-ray 3D, and stereoscopic 3D video for 120-Hz frame sequential monitors</p>	
<b>Memory</b>	Allocated at system startup and configurable using F10 setup with values of 128MB, 256MB, and 512MB. Additional memory that is not in use by the host will be dynamically allocated and will vary depending on the total installed system memory.	
<b>Maximum Graphics Memory</b>	Microsoft Windows 7	Windows 8.1
	Variable*	Variable*
* Actual amount of maximum graphics memory can vary depending on the amount of installed system memory		
<b>Maximum Color Depth</b>	32 bits/pixel, 8-bits per color component	
<b>Graphics/Video API Support</b>	<ul style="list-style-type: none"> <li>• Discrete-level graphics processor embedded alongside the x86 CPU complex</li> <li>• Dedicated graphics memory controller</li> </ul> <p><b>AMD Eyefinity</b> AMD Eyefinity support for up to four displays when at least two displays are operating with DisplayPort 1.2 multi-streaming.</p> <p><b>Power Management</b></p> <ul style="list-style-type: none"> <li>• AMD PowerPlay™ power management technology               <ul style="list-style-type: none"> <li>○ Dynamic power gating for GPU, UVD, VCE, GFX, DCE, and Graphics Memory Controller (GMC)</li> </ul> </li> <li>• Dynamic refresh rate supported with digital panels that support this feature</li> <li>• Dynamic refresh rate</li> <li>• Frame Buffer Compression</li> <li>• Panel Self-Refresh</li> </ul> <p><b>3D Acceleration Features</b> DirectX® 11.1 compliant, including full speed 32-bit floating point per component operations:</p> <ul style="list-style-type: none"> <li>• Shader Model 5 geometry and pixel support in a unified shader architecture               <ul style="list-style-type: none"> <li>○ Graphics Core Next (GCN) architecture</li> <li>○ Advanced shader instructions, including flexible flow control with CPU-level flexibility on branching</li> <li>○ Read/Write caching system, replacing texture cache with a unified read-write two-level cache</li> <li>○ Vertex, pixel, geometry, compute, domain, and hull shaders</li> </ul> </li> </ul>	

### Technical Specifications - Graphics

- 32-bit and 64-bit floating point processing per component
- High performance dynamic branching and flow control
- Shader instruction store, using an advanced caching system
- Advanced shader design, with ultra-threading sequencer for high efficiency operations
- Advanced, high performance branching support, including static and dynamic branching
- High dynamic range rendering with floating point blending, texture filtering, and anti-aliasing support
- 16-bit and 32-bit floating point components for high dynamic range computations
- Full anti-aliasing on render surfaces up to and including 128-bit floating point formats
- Support for OpenCL™ 1.2, DirectCompute 11 and Microsoft C++ AMP
- Support for OpenGL 4.1/4.1+

#### Motion Video Acceleration Features

- Supports DVD, Blu-ray, and SDTV/HDTV content playback with low CPU usage
- Supports stereoscopic 3D Blu-ray
- Video compression engine:
  - Dedicated hardware (VCE 2.0) assisted encoding of HD video streams to H.264 (main profile)
  - Support H.264 SVC temporal scalability
  - Real-time transcoding by encoding the output from UVD with reduction of CPU utilization and power consumption
- Motion video decode acceleration technology:
  - Dedicated hardware (UVD) for H.264, MPEG4, VC-1, MVC, and MPEG2 decode:
    - H.264 implementation based on the ISO/IEC 14496-10 specification
    - MPEG6 implementation based on the ISO/IEC 14496-2 specification
    - VC-1 implementation based on the SMPTE 421M specification
    - MPEG2 implementation based on the ISO 13818-2 specification
    - Multi View Coding (MVC) for Blu-ray 3D content
    - WMV-9 implementation
  - Real time high-definition and standard definition stream decode
  - Real time dual high-definition stream decode

#### Supported Display Resolutions and Refresh Rates

**Note:** other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

SUPPORTED DVI-D (DIGITAL) AND DISPLAYPORT DISPLAY MODES Resolution	Depth (BPP)	Refresh Rate (Hz)
320x200	8, 16, 32	60
320x240	8, 16, 32	60
400x300	8, 16, 32	60
480x360	8, 16, 32	60
512x384	8, 16, 32	60
640x350	8, 16, 32	60
640x400	8, 16, 32	60
640x480	8, 16, 32	60
720x480	8, 16, 32	60
720x576	8, 16, 32	60
800x600	8, 16, 32	60
1024x768	8, 16, 32	60
1152x864	8, 16, 32	60
1280x720	8, 16, 32	60
0.98M9 (1280x768)	8, 16, 32	60
1280x960	8, 16, 32	60
1280x1024	8, 16, 32	60
1.30MA (1440x900)	8, 16, 32	60, 75

### Technical Specifications - Graphics

1600x900	8, 16, 32	60
1.64MA (1600x1024)	8, 16, 32	60
1600x1200	8, 16, 32	60
1.76MA (1680x1050)	8, 16, 32	60
1.76MA-R (1680x1050)	8, 16, 32	75-R
2.07M9-R (1920x1080)	8, 16, 32	60-R
2.30MA-R (1920x1200)	8, 16, 32	60-R
2560x1440	8, 16, 32	60
2560x1600	8, 16, 32	60

### VGA AND DVI-A (ANALOG) DISPLAY MODES

Resolution	Depth (bpp)	CRT Refresh Rate (Hz)
320x200	8, 16, 32	60, 75, 85
320x240	8, 16, 32	60, 75, 85
400x300	8, 16, 32	60, 75, 85
480x360	8, 16, 32	60, 75, 85
512x384	8, 16, 32	60, 75, 85
640x350	8, 16, 32	60, 75, 85
640x400	8, 16, 32	60, 75, 85
640x480	8, 16, 32	60, 75, 85
720x480	8, 16, 32	60, 75, 85
720x576	8, 16, 32	50, 60, 75, 85
800x600	8, 16, 32	60, 75, 85
1024x768	8, 16, 32	60, 75, 85
1152x864	8, 16, 32	60, 75, 85
1280x720	8, 16, 32	60, 75, 85
0.98M9 (1280x768)	8, 16, 32	60, 75, 85
1280x960	8, 16, 32	60, 75, 85
1280x1024	8, 16, 32	60, 75, 85
1.30MA (1440x900)	8, 16, 32	60, 75
1600x900	8, 16, 32	60, 75, 85
1.64MA (1600x1024)	8, 16, 32	60, 75, 85
1600x1200	8, 16, 32	60, 75, 85
1.76MA (1680x1050)	8, 16, 32	60, 75
1920x1080	8, 16, 32	60, 75, 85
2.30MA (1920x1200)	8, 16, 32	60, 75, 85
1920x1440	8, 16, 32	60, 75, 85
2048x1536	8, 16, 32	60, 75

<b>AMD® Radeon™ R5 320 1GB DH PCIe x8 Graphics Card</b>	
<b>Engine Clock</b>	775MHz
<b>Memory Clock</b>	800 MHz
<b>Memory Size(width)</b>	1GB (64-bit)
<b>Memory Type</b>	128 M x 32 GDDR5 @ 2
<b>Max. Resolution(Analog VGA)</b>	2048x1536x32bpp@75Hz
<b>Max. Resolution(HDMI)</b>	1920x1080 @60Hz(HDMI1.4)
<b>Max. Resolution(DP)</b>	3840x2160x30bpp@30Hz(DP1.2)

### Technical Specifications - Graphics

<b>Multi Display Support</b>	DP+HDMI+VGA
<b>HDCP Compliance</b>	Yes
<b>Rear I/O connectors(bracket)</b>	DP+HDMI+VGA (Fly cable)
<b>Cooling(active/passive)</b>	Active fan-sink(Active cooling with dynamic speed)
<b>Total power consumption(W)</b>	<35Wmax
<b>PCB form-factor with bracket</b>	PCIex16LP(half height)PCB with FH bracket

### NVIDIA® GeForce® GT 720 2GB PCIe x8 Graphics Card

<b>Engine Clock</b>	797MHz
<b>Memory Clock</b>	900 MHz
<b>Memory Size(width)</b>	2GB (64-bit)
<b>Memory Type</b>	256Mx16 DDR3(Micron) @4pcs
<b>Max. Resolution(Analog VGA)</b>	2048x1536x32bpp @75Hz
<b>Max. Resolution(HDMI)</b>	1920x1080 @60Hz (HDMI1.4)
<b>Max. Resolution(DP)</b>	3840x2160x30bpp @30Hz (DP1.2)
<b>Multi Display Support</b>	DP+HDMI+VGA
<b>HDCP Compliance</b>	Yes
<b>Rear I/O connectors(bracket)</b>	DP+HDMI+VGA (Fly cable)
<b>Cooling(active/passive)</b>	Active fan-sink(Active cooling with dynamic speed)
<b>Total power consumption(W)</b>	<25W max
<b>PCB form-factor with bracket</b>	PCIex8LP(half height) PCB with FH bracket

### Technical Specifications – Hard Disk and Solid State Storage

<b>2TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive</b>		
<b>Unformatted Capacity</b>	2 TB	
<b>Rotational Speed</b>	7,200 rpm	
<b>Interface</b>	SATA 6 Gb/s	
<b>Cache, Multi-segmented (MB)</b>	64 MB	
<b>Seek Time</b> (average)	Read	<8.5 ms
	Write	<9.5 ms
<b>Height</b>	1.028 in/26.11 mm	
<b>Width</b>	4.0 in/101.6 mm	
<b>Depth</b>	5.787 in/146.99 mm	
<b>Weight</b>	1.38 lb/626 g	
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	

<b>1TB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive</b>		
<b>Capacity</b>	1,000,204,886,016 bytes	
<b>Rotational Speed</b>	7,200 rpm	
<b>Interface</b>	Serial ATA 3.0 (6.0 Gb/s)	
<b>Buffer Size</b>	32 MB	
<b>Logical Blocks</b>	1,953,525,168	
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	11 ms
	Full-Stroke:	21 ms
<b>Height</b> (nominal)	1 in/2.54 cm	
<b>Width</b> (nominal)	Media diameter: 3.5 in/8.89 cm	



### Technical Specifications – Hard Disk and Solid State Storage

	Physical size: 4 in/10.2 cm
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

<b>500GB 7.2K rpm SATA 6.0Gb/s 3.5” Hard Disk Drive</b>	
<b>Capacity</b>	500,107,862,016 bytes
<b>Rotational Speed</b>	7,200 rpm
<b>Interface</b>	Serial ATA 3.0 (6.0 Gb/s)
<b>Buffer Size</b>	16 MB
<b>Logical Blocks</b>	976,773,168
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track:</b> 2.0 ms
	<b>Average:</b> 11 ms
	<b>Full-Stroke:</b> 21 ms
<b>Height</b> (nominal)	1 in/2.54 cm
<b>Width</b> (nominal)	Media diameter: 3.5 in/8.89 cm
	Physical size: 4 in/10.2 cm
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

### Technical Specifications - Removable Storage

<b>HP 9.5mm Desktop G2 Slim DVD Writer Drive</b>		
<b>Height</b>	9.5 mm height	
<b>Orientation</b>	Either horizontal or vertical	
<b>Interface type</b>	SATA/ATAPI	
<b>Disc recording capacity</b>	Up to 8.5 GB DL or 4.7 GB standard	
<b>Dimensions (W x H x D)</b>	5.04 x 0.37 x 5.0 in (128 x 9.5 x 127 mm) without bezel	
<b>Weight (max)</b>	0.31 lb (140 g)	
	DVD-R DL	Up to 6X
	DVD+R	Up to 8X
	DVD+RW	Up to 8X
	DVD+R DL	Up to 6X
	DVD-R	Up to 8X
	DVD-RW	Up to 6X
	CD-R	Up to 24X
	CD-RW	Up to 10X
	DVD-RW, DVD+RW	Up to 8X
	DVD-R DL, DVD+R DL	Up to 8X
	DVD+R, DVD-R	Up to 8X
	DVD-ROM DL, DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X
<b>Access time</b> (typical reads, including settling)	Random	DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical)
	Full Stroke	DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical)
	Stop Time	6 seconds (typical)
<b>Power</b>	Source	Slimline SATA DC power receptacle
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum)
	Temperature	41° to 122° F (5° to 50° C)

### Technical Specifications - Removable Storage

<b>Environmental conditions</b> (operating - non-condensing)	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature	84° F (29° C)

**Environmental Data**

**Eco-Label Certifications & declarations**

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- IT ECO declaration
- US ENERGY STAR®
- EPEAT<sup>®</sup> Silver registered in the United States. See <http://www.epeat.net> for registration status in your country.

**System Configuration**

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Ultra-slim Desktop model is based on a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

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

Normal Operation (Short idle)  
Normal Operation (Long idle)  
Sleep  
Off

**115VAC, 60Hz**

**230VAC, 50Hz**

**100VAC, 60Hz**

22.35 W

23.09 W

22.54 W

20.77 W

20.94 W

20.96 W

1.12 W

1.18 W

1.12 W

0.35 W

0.47 W

0.34 W

**Note:**

Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

**Heat Dissipation\***

**Normal Operation (Short idle)**

**Normal Operation (Long idle)**

**115VAC, 60Hz**

**230VAC, 50Hz**

**100VAC, 60Hz**

76 BTU/hr

79 BTU/hr

77 BTU/hr

71 BTU/hr

71 BTU/hr

72 BTU/hr

### Technical Specifications - Removable Storage

<b>Sleep</b>	4 BTU/hr	4 BTU/hr	4 BTU/hr
<b>Off</b>	1 BTU/hr	2 BTU/hr	1 BTU/hr

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

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

Typically Configured – Idle Fixed Disk – Random writes

Sound Power (L<sub>WAd</sub>, bels)

Sound Pressure (L<sub>pAm</sub>, decibels)

3.6

26

3.8

26

**Longevity and Upgrading**

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

- 6 USB ports
- 2 memory slots
- 1 Mini PCIe half-length slot
- 1 MXM 3.0 Type A - 35W slot
- 1 mSATA slot
- 1 2.5" internal bay supporting up to Two 2.5" hard drives (HDD/SSD/SED/SSHD)
- 1 5.25" external supporting optical drive

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

**Batteries**

This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:  
Mercury greater the 1ppm by weight  
Cadmium greater than 20ppm by weight

Battery size: CR2032 (coin cell)

Battery type: Lithium

### Technical Specifications - Removable Storage

#### Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT<sup>®</sup>) standard at the < Silver > level, see [www.epeat.net](http://www.epeat.net)
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product contains 10.5% post-consumer recycled plastic (by wt.)
- This product is 92.9% recycle-able when properly disposed of at end of life.

#### Packaging Materials

**External:** PAPER/Corrugated 1254 g

**Internal:** PLASTIC/EPE (Expanded Polyethylene) 273 g

The Plastic packaging material is made from 10.5% recycled content.

The corrugated paper packaging materials contains at least 43.8% recycled content.

#### Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at <http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf>):

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

### Technical Specifications - Removable Storage

#### **Packaging Usage**

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

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

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

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

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/recyclers>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

#### **Hewlett-Packard Corporate Environmental Information**

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

Global Citizenship Report

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

Eco-label certifications

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

ISO 14001 certificates:

[http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC\\_GBU\\_Product\\_Design\\_ISO\\_14K\\_Certificate.pdf](http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf)

and

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

### Technical Specifications - Removable Storage

<b>HP 9.5mm Desktop G2 Slim DVD-ROM Drive</b>		
<b>Height</b>	9.5mm	
<b>Orientation</b>	Either horizontal or vertical	
<b>Interface type</b>	SATA/ATAPI	
<b>Dimensions (W x H x D)</b>	5.04 x 0.37 x 5.0 in (128 x 9.5 x 127 mm) without bezel	
<b>Weight (max)</b>	Up to 0.31 lb (140g) without bezel	
<b>Read speeds</b>	DVD+R/-R/+RW/ -RW/+R DL /-R DL	Up to 8X
	DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X
<b>Access time</b> (typical reads, including settling)	Random	DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical)
	Full Stroke	DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical)
<b>Power</b>	Source	Slimline SATA DC power receptacle
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum
<b>Environmental</b> (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature (operating)	84° F (29° C)

### Technical Specifications - Audio

<b>High Definition Audio</b>	
<b>Type</b>	Integrated
<b>HD Stereo Codec</b>	Realtek 2-channel ALC221 codec
<b>Audio I/O Ports</b>	Front microphone-In (150-K ohm Input Impedance)
	Rear Line-In/Microphone input (150-K ohm Input Impedance, function is configurable by audio driver)
	Rear Line-Out* (190 ohms Output Impedance, expects at least a 10-K ohm load)
	Front Headphone-Out (0.5 Ohm Output Impedance, expects at least a 32 ohm load) Front Microphone/Headphone jack is re-task able to provide Microphone input, line-in or Headphone output to support connecting two headphones to the front of the system. When configured as a second front headphone output, both front headphone outputs are always driven with the same signal.
	All ports are 3.5mm
<b>Internal Speaker Amplifier</b>	1.5W amplifier for the internal speaker only. External speakers must be powered externally. Rear Line-in audio port is re-taskable as either Line-in or Microphone-In.
<b>Multi-streaming Capable</b>	Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks.
<b>Sampling</b>	8 kHz - 192 kHz
<b>Wavetable Syntheses</b>	Yes – Uses OS soft wavetable
<b>Analog Audio</b>	Yes
<b># of Channels on Line-Out</b>	Stereo (Left & Right channels)
<b>Internal Speaker</b>	Yes
<b>External Speaker Jack</b>	Yes



### Technical Specifications - Networking/Communication

<b>Broadcom BCM943228Z 802.11n 2x2 DualBand No Bluetooth NIC PCIe x1 Card</b>	
<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n
<b>Interoperability</b>	Wi-Fi certified
<b>Frequency Band</b>	802.11b/g/n <ul style="list-style-type: none"> <li>2.402 – 2.482 GHz</li> </ul> Note: The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.
	802.11a/n <ul style="list-style-type: none"> <li>4.9 - 4.95 GHz (Japan)</li> <li>5.15 - 5.25 GHz</li> <li>5.25 - 5.35 GHz</li> <li>5.47 - 5.725 GHz</li> </ul> 5.825 - 5.850 GHz Note: Indonesia no support this band)
<b>Antenna Structure</b>	2 transmit; 2 receive (2x2)
<b>Data Rates</b>	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)
<b>Modulation</b>	Direct Sequence Spread Spectrum CCK, BPSK, QPSK, 16-QAM, 64-QAM
<b>Security<sup>1</sup></b>	<ul style="list-style-type: none"> <li>IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only</li> <li>AES-CCMP: 128 bit in hardware</li> <li>802.1x authentication</li> <li>WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>WPA2 certification</li> <li>IEEE 802.11i</li> <li>Cisco Certified Extensions, all versions through CCX4 and CCX Lite</li> <li>WAPI</li> </ul>
<b>Sub-channels</b>	Multinational support with frequency bands and channels compliant to local regulations.
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between band Access Points
<b>Output Power<sup>2</sup></b>	<ul style="list-style-type: none"> <li>802.11b : +16dBm minimum</li> <li>802.11g : +14dBm minimum</li> <li>802.11a : +14dBm minimum</li> <li>802.11n HT20(2.4GHz) : +13dBm minimum</li> <li>802.11n HT40(2.4GHz) : +13dBm minimum</li> <li>802.11n HT20(5GHz) : +12dBm minimum</li> <li>802.11n HT40(5GHz) : +12dBm minimum</li> </ul>

### Technical Specifications - Networking/Communication

	<b>Power Consumption</b>	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 60 mW (WLAN unassociated) Radio disabled: 30 mW	
	<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 : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11a, 6Mbps : -86dBm maximum 802.11a, 54Mbps : -72dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm 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 and Bluetooth® communications	
	<b>Form Factor</b>	PCI-Express M.2 MiniCard	
	<b>Dimensions</b>	Type 2230 : 2.3 x 22.0 x 30.0 mm Or Type 1630 : 2.3 x 16.0 x 30.0 mm	
	<b>Weight</b>	Type 2230 : 2.8g Or Type 1630 : 2g	
	<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	0 to 10,000 ft (3,048 m)
		Non-operating	0 to 50,000 ft (15,240 m)
	<b>LED Activity</b>	LED Amber - Radio OFF; LED White - Radio ON	
	1. Check latest software/driver release for updates on supported security features. 2. Maximum output power may vary by country according to local regulations. 3. In Power Save Polling mode and on battery power. 4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation). 5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.		

### Options and Accessories

Type	Description	Part #
<b>Memory</b>	HP 4GB DDR3L-1600 DIMM	N1M46AA
	HP 8GB DDR3L-1600 DIMM	N1M47AA
<b>Storage</b>	HP 500GB SATA 6.0Gb/s Hard Drive	QK554AA
<b>Graphics</b>	NVIDIA GeForce GT 720 2GB PCIe x8 Card	T4E57AA
	AMD Radeon R5 320 1GB GDDR5 PCIe x16 Card	T9F48AA
<b>Security</b>	HP UltraSlim Cable Lock Kit	H4D73AA
	HP Business PC Security Lock Kit	PV606AA
<b>Adapters</b>	HP Serial Port Adapter	PA716A
	HP USB to Serial Adapter	J7B60AA
	HP Parallel Port Adapter	KD061AA
<b>Networking</b>	Intel Ethernet I210-T1 GbE NIC Card	E0X95AA
<b>Multimedia</b>	HP Business Headset	QK550AA
	HP USB Business Speakers	D9J19AA
	HP USB HD 720P v2 Business Webcam	D8Z08AA
<b>Input</b>	HP USB Keyboard	QY776AA
	HP Conferencing Keyboard	K8P74AA
	HP USB Conferencing Keyboard	N8N57AA
	HP USB Business Slim Keyboard	N3R87AA
	HP USB Business Slim Keyboard and Mouse and Mousepad	T4E63AA
	HP PS/2 Business Slim Keyboard and Mouse and Mousepad	T4E66AA
	HP USB Antimicrobial Keyboard and Mouse (China Only)	K7X25AA
	HP USB Grey Mouse	K7W54AA
	HP PS/2 Mouse	QY775AA
HP USB Hardened Mouse	P1N77AA	

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### Change Log

<b>Date of change:</b>	<b>Version History:</b>		<b>Description of change:</b>
February 08, 2016	From v1 to v2	Added	Environmental specs
February 24, 2016	From v2 to v3	Added	Environmental Specs
May 25, 2016	From v3 to v4	Update	Updated Memory type part numbers
July 19, 2016	From v4 to v5	Update	Updated EPEAT gold to silver
December 6, 2016	From v5 to v6	Update	SuperMulti references deleted
March 8, 2018	From v6 to v7	Update	Couple of notes added to (TPM) 2.0 (firmware) in Security Features section