HP LaserJet Enterprise MFP M636fh

This HP LaserJet MFP with JetIntelligence combines performance, energy efficiency, and security.¹

This HP LaserJet MFP with JetIntelligence combines exceptional performance and energy efficiency with professional-quality documents right when you need them—all while protecting your network from attacks with the industry's deepest security.¹





The world's most secure printing¹

- With HP Sure Start, operating code is automatically checked at startup and repairs itself if compromised.
- Run-time intrusion detection continually monitors to detect and stop attacks, then automatically reboots.
- Centralize control of your printing environment with HP Web Jetadmin—and help build business efficiency.²
 - Give workgroups what they need to succeed. Easily choose and deploy hundreds of HP and third-party solutions.

High-speed performance meets energy efficiency

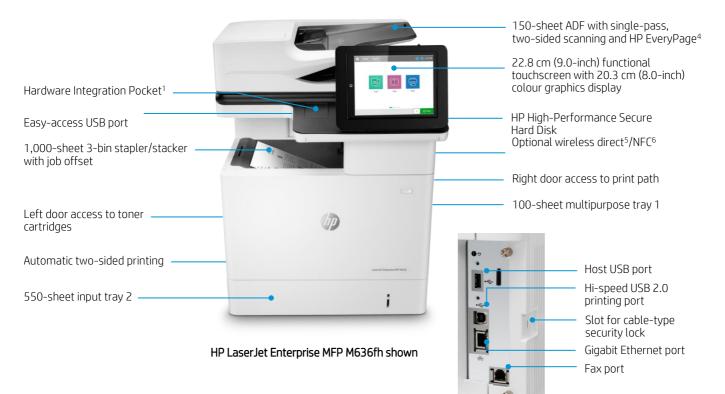
- Speed through tasks and save paper. Print two-sided documents nearly as fast as single-sided.
- This MFP wakes up and prints your first page fast—in as quickly as 8.1 seconds.⁴
- This MFP uses low amounts of energy thanks to its innovative design and toner technology.
- Paper handling options include a wheeled stand and 550-sheet input feeder for paper sizes 4 x 6" to legal.



Performance and protection you can count on

- Produce sharp text, bold blacks, and crisp graphics with precision black toner.
- Help retain the Original HP quality you paid for with anti-fraud and cartridge authentication technology.
- Spend less time replacing toner, and more on business. Choose high-yield toner cartridges.⁵

Product walkaround



Rear I/O panel close-up

Series at a glance

	MFP M636fh
Part number	7PT00A
Print speeds (A4) ²	Up to 71 ppm
HP High Performance Secure Hard Disk	\checkmark
Fax capabilities	\checkmark
100-sheet tray 1, 550-sheet tray 2	\checkmark
550-sheet paper feeder ³	Optional (up to four)
1x550-sheet paper feeder with stand and cabinet ³	Optional
3x550-sheet paper feeder and stand ³	Optional
1x550 and 2,000-sheet HCI feeder and stand ³	Optional
Envelope feeder	Optional (up to two)
3-bin stapler/stacker with job offset	Not available
Advanced workflow features, including pull-out keyboard ⁴	Not available
Direct mobile printing	Optional wireless direct ⁵ /NFC ⁶
Wireless networking	Optional ⁷

¹ Solutions deployed through the Hardware Integration Pocket (HIP) may require additional purchase. ² Measured using ISO/IEC 24734; excludes first set of test documents. For more information, see hp.com/go/printerclaims. Exact speed varies depending on the system configuration, software application, driver, and document complexity.

⁶ All models can add wireless direct printing with purchase of the optional HP Jetdirect 3000w NFC/Wireless Direct Accessory. Mobile device needs to be connected directly to the signal of a wireless direct supported MFP or printer prior to printing. Depending on mobile device, an app or driver may also be required. For details, see hp.com/go/mobileprinting. Wi-Fi Direct is a registered trademark of Wi-Fi Alliance.
 ⁶ Touch-to-print capability is optional for all models with purchase of the optional HP Jetdirect 3000w NFC/Wireless Direct Accessory. Mobile device must support Near Field Communication (NFC)-enabled printing. For more information, see hp.com/go/businessmobileprinting.

³ The HP Laser Jet Enterprise MFP M635fht and Flow M635z models can add up to one additional optional 550-sheet paper feeder. The M634dn, M635h, and M636fh can add up to four additional optional 550-sheet paper feeders; or, they can add one of the other optional accessories (1x550-sheet paper feeder with stand and cabinet, 3x550-sheet paper feeder and stand, or 1x550 and 2,000-sheet HCI feeder and stand) and up to one additional optional 550-sheet paper feeder. ⁴ The pull-out keyboard and HP EveryPage are only available on the HP Laser Jet Enterprise Flow MFP M635z model.

⁷ All models can add wireless networking with the purchase of the HP Jetdirect 2900nw Print Server. Wireless performance is dependent on physical environment and distance from access point, and may be limited during active VPN connections

Technical specifications

HP Laser Jet Enterprise MFP M636fh
HP LaserJet Enterprise MFP M636m 7PT00A
Print, copy, scan, fax
Automatic (standard)
Black (A4, normal) Up to 71 ppm; Black (A4, duplex): Up to 58 ipm; Black (letter, normal): Up to 75 ppm; Black (letter, duplex): Up to 62 ipm;
Black (A4, ready): As fast as 5.2 sec; Black (A4, sleep): As fast as 8.1 sec in mm Laser
Black (best): Up to 1200 x 1200 dpi; Black (normal): FastRes1200
Normal FastRes 1200; Fine Lines (1200 x 1200 dn), Juckeviw (300 x 300 dpi), Economode (600 x 600 dpi)
1 (black)
HP PCL 6, HP PCL 5, HP postscript level 3 emulation, native PDF printing (v 1.7), Apple AirPrint™
HP Printer Assistant, HP Device Toolbox, HP Web JetAdmin Software, HP JetAdvantage Security Manager, HP SNMP Proxy Agent, HP WS Pro Proxy Agent, Printer Administrator Resource Kit for HP Universal Print Driver (Driver Configuration Utility - Driver Deployment Utility - Managed Printing Administrator)
Normal (A4): Up to 69 ppm (b8w), up to 69 ppm (color); Duplex (A4): Up to 111 ipm (b8w), up to 111 ipm (color)
Scanner type Flatbed, ADF; Scan technology: Charge Coupled Device (CCD); Scan input modes: Front panel applications: Copy; E-mail; Save to Network Folder; Save to USB; Save to Device Memory; Save to SharePoint; Open Extensibility Platform (0XP) applications; HP Scan or user application via TWAIN; Duplex ADF scanning; Yes, single pass duplexing ADF; Scan size maximum
(ADF): 216 x 864 mm; Scan size maximum (flatbed): 216 x 356 mm; Optical scan resolution: Up to 600 dpi; Enhanced Scan Resolution: Up to 600 dpi; Hardware resolution: Up to 600 x 600 dpi Digital Send: PDF, JPEG, TIFF, MTIFF, XPS, PDF/A; Scan to easy access USB: PDF, JPEG, TIFF, MTIFF, XPS, PDF/A
Optimize text/picture; Image adjustments; Job build; Output quality setting; Selectable scan resolution 75 to 600 dpi; Auto detect color; Edge Erase; Job notification; Blank page suppression; HF
Quick Sets
Black (A4, normal): Up to 71 cpm; Black (letter, normal): Up to 75 cpm; Black (A4, duplex): Up to 58 cpm; Black (letter, duplex): Up to 62 cpm
Black (A4, ready): As fast as 4.9 sec; Black (A4, sleep): As fast as 11.2 sec; Black (letter, ready): As fast as 4.8 sec
Copier settings: Two-sided copying, scalability, image adjustments (darkness, contrast, background cleanup, sharpness), N-up, N or Z-ordering, content orientation, collation, booklet, job build, edge-to-edge, job storage, ID Copy, Book Copy, A-to-B Copy (different media sizes); Maximum number of copies: Up to 9999 copies
33.6 kbps / 6 sec per page
Fax memory: Up to 500 pages; Fax resolution: Up to 300 x 300 dpi (400 x 400 dpi for received faxes only); Auto fax reduction supported: Yes; Auto-redialing: Yes; Fax delayed sending: No; Distinctive ring detection supported: No; Fax forwarding supported: Yes; Junk barrier supported: Yes to 30 numbers may be blocked; Maximum speed dialing numbers: Up to 1000 numbers; PC interface supported: Yes; Software not included: Fax polling supported: Yes (Junk barrier supported: Yes) (Junk ba
Pc interface supported: yes, software not included, rax polling supported: yes (poll to receive only) Stored faxes; Fax archiving; Fax forwarding; Scale to fit; Fax address book; LAN/Internet fax; Fax number confirmation; Holiday fax schedule
Stored failes, the archiving, tak for warding, scale to right a datest doors, burg memory fails handler committeeing holdady fails schedule
1 Hi-Speed Device USB 2.0; 2 Host USB (1 walk-up and 1 external accessible); 1 Gigab Ethernet 10/100/1000T network; 1 Hardware Integration Pocket; 1 Fax HP ePrint; Apple AirPrint™; Mopria™ Certified; Gooqle Cloud Print™; Roam optional
Optional, enabled with purchase of a wireless hardware accessory. Single band Wireless Station and Wi-Fi Direct functionality available with HP Jetdirect 3000w NFC/Wireless Accessory J8030A Dual band Wireless Station and Wi-Fi Direct functionality available with HP Jetdirect 3100w BLE/NFC/Wireless Accessory 3JN69A, Dual band Wireless Station functionality available with HP Jetdirect 2900nw Print Server J8031A
Yes, via HP Jetdirect Ethernet embedded print server (standard) which supports: 10Base-T, 100Base-Tx, 1000Base-T; 802.3az (EEE) support on Fast Ethernet and Gig Links; IPsec (standard); 802.11a/b/g/n wireless networking (optional)
Standard: 1.5 GB (formatter); 512 MB (scanner); Maximum: Expandable to 4.0 GB
Standard, minimum 500 GB HP High-Performance Secure Hard Disk (AES 256 hardware encryption or greater)
1.2 GHz
Duty cycle (monthly, A4): Up to 300,000 pages; Recommended monthly page volume: 14,250 to 23,750
100-sheet multipurpose feeder, 550-sheet input feeder, 150-sheet automatic document feeder; Optional 1 x 550-sheet paper feeder, 1 x 550-sheet feeder with cabinet, 2000-sheet feeder
To sheet that and the sheet part feeder, so sheet part feeder, so sheet part feeder, plonal envelope feeder
500-sheet ouput feeder, two-sided printing
Standard: 2; Maximum: 6
Paper (plain, light, bond, recycled, heavy, extra heavy, cardstock, pre-printed, pre-punched, colored, rough, heavy rough), mono transparency, labels, letterhead, envelope, heavy envelope Automatic Duplexer: 60 to 120 a/m ²
Custom (metric): 100-sheet multipurpose Tray 1: 76 x 127 to 216 to 356 mm; 550-sheet input Tray 2: 99 x 148 to 216 x 297 mm; 550-sheet optional feeder: 99 x 148 to 216 x 356 mm; 75- sheet envelope feeder: 90 x 148 to 178 x 254 mm; Supported (metric): 100-sheet multipurpose Tray 1: A4, A5, A6, RA4, B5 (JIS), B6 (JIS), 10 x 15 cm, Oficio (216 x 340), 16K (195 x 270), 16K (184 x 260), 16K (197 x 273), Postcard (JIS), Dopstcard (JIS), Envelope: B5, C5, C6, DL; 550-sheet input Tray 2: A4, A5, A6, B5 (JIS), B6 (JIS), 10 x 15 cm, Oficio (216 x 340), 16K (195 x 270), 16K (194 x 260), 16K (197 x 273), Postcard (JIS), Dopstcard (JIS), Envelope: B5, C5, C6, DL; 550-sheet input Tray 2: A4, A5, A6, B5 (JIS), B6 (JIS), 10 x 15 cm, Oficio (216 x 340), 16K (194 x 260), 16K (197 x 273); 550-sheet optional feeder: A4, A5, A6, A4, B5 (JIS), B6 (JIS), 10 x 15 cm, Oficio (216 x 340), 16K (195 x 270), 16K (194 x 260), 16K
2000-sheet optional HCI: A4; 75-sheet optional envelope feeder: B5, C5, C6, DL; ADF : Letter; legal; officio; executive; statement; 16K; A4; RA4; A5; A6; B5; B6 (JIS); Postcard (JIS); DPostcard (JIS) 4 x 6 in; 5 x 7 in; 5 x 8 in; 68 x 147 mm to 215.9 x 863.6 mm; 2.68 x 5.79 in to 8.46 x 34 in
512 x 558 x 640 mm 33.2 kg
No software solutions are included in the Box, only on http://hp.com, http://123.hp.com
HP LaserJet Multifunction Printer; HP Black Original LaserJet Toner Cartridge (~10.5K yield); Documentation (Hardware Install Guide, Regulatory Flyer); Power cord.
One-year warranty. Warranty and support options vary by product, country and local legal requirements. Go to http://www.hp.com/support to learn about HP award winning service and support
options in your region.
Windows Client OS (32/64 bit)-, Win10, Win8.1, Win7 Ultimate, Mobile OS-, iOS, Android, Mac-, Apple® macOS Sierra v10.13, Apple® macOS High Sierra v10.14, Apple® macOS Mojave v10.15, Discrete PCL6 Printer Driver-, For more information on the supported operating systems go to http://support.hp.com, Enter your product name and search, Click on User Guides and enter your product name and search for User Guide, Search for your (Product Name) - User Guide, Search for the Supported Operating Systems section, UPD PCL6 / PS Printer Drivers-, For more information on the supported operating systems go to http://support.hp.com, Enter your product name and search, Click on User Guide, Search for User Guide, Search
supported operating systems see www.hp.com/go/upd; Windows: 2 GB available hard disk space, Internet connection, or USB port, Internet browser. For additional OS hardware requirements see microsoft.com; Mac: 2 GB available hard drive space,
Internet connection, or USB port, Internet browser. For additional OS hardware requirements see apple.com Identity management: Kerberos authentication; LDAP authentication; 1000 user PIN codes; optional HP and 3rd party advanced authentication solutions (e.g.; badge readers); Network:
IPsec/firewall with Certificate; Pre-Shared Key, and Kerberos authentication; Supports WJA-10 IPsec configuration Plug-in; 802.1X authentication (EAP-PEAP; EAP-TLS); SNMPv3; HTTPS; Certificates; Access Control List; Data: Storage Encryption; Encrypted PDF & Email (Less FIPS 140 validated cryptographic librargies from Microsoft); Secure Erase; SSL/TLS, (INTTPS); Encrypted Credentials; Device: Security lock slot; USB port disablement; hardware integration pocket for security solutions; Intrusion Detection with Red Balloon Security Technology - Constant in-device monitoring for attacks; SureStart Secure Boot - BIOS Integrity Checking with self-healing capability, Whitelisting - loads only known good code (DLLs, EXEs,); Security management: Compatib with HP JetAdvantage Security Manager, Device Security Syslog Messages processed and accessable in Arcsight and Splunk SIEMs
105 internal TrueType fonts scalable in HP PCL, 92 internal scalable fonts in HP postscript level 3 emulation (Euro symbol built-in); 1 internal Unicode Fonts (Andale Mono WorldType); 2 Interna Windows Vista 8 Fonts (Calibri, Cambria); Additional font solutions available via third-party flash memory cards; HP LaserJet Fonts and IPDS Emulation available at http://www.hp.com/go/laserietfonts
8.0-in (20.3 cm) Color Graphics Display (CGD) with touchscreen; rotating (adjustable angle) display; illuminated Home button (for quick return to the Home menu)
8.0-in (20.3 cm) Color Graphics Display (CGD) with touchscreen; rotating (adjustable angle) display; illuminated Home button (for quick return to the Home menu)
Requirements: Input voltage: 100 V to 127 V nominal (+/-10%), 50 - 60Hz nominal (+/- 3Hz), 12 A; Input voltage: 220 V to 240 V nominal, (+/-10%), 50 - 60Hz nominal (+/- 3Hz), 6 A;
Consumption: 740 watts (printing/copying), 29.0 watts (ready), 3.3 watts (sleep), <0.1 watts (Auto Off/Manual On), <0.1 watts (Manual Off); Typical Electricity Consumption (TEQ) ¹¹ : ES: 1.079 kWh/week; BA: 3.183 kWh/week; Power supply type: Built in 115V or 220 V Power Supply
Consumption: 740 watts (printing/copying), 29.0 watts (ready), 3.3 watts (sleep), <0.1 watts (Auto Off/Manual On), <0.1 watts (Manual Off); Typical Electricity Consumption (TEC) ¹¹ : ES: 1.079
Consumption: 740 watts (printing/copying), 29.0 watts (ready), 3.3 watts (sleep), <0.1 watts (Auto Off/Manual On), <0.1 watts (Manual Off); Typical Electricity Consumption (TEC) ¹¹ : ES: 1.079 kWh/week; BA: 3.183 kWh/week; Power supply type: Built in 115V or 220 V Power Supply Operating temperature range: 10 to 32.5°C; Recommended operating temperature range: 15 to 27°C Operating humidity range: 10 to 80% RH; Recommended operating humidity range: 30 to 70% RH

Ordering information

Accessories

Number	Description
3JN69A	HP Jetdirect 3100w BLE/NFC/Wireless Accessory
4QL32A	HP Legic Secure USB Reader
B5L28A	HP Internal USB Ports
B5L31A	HP Foreign Interface Harness
E5K49A	HP 2 GB x32 144-pin (800 MHz) DDR3 SODIMM
J8031A	HP Jetdirect 2900nw Print Server
J8J89A	HP LaserJet 550-sheet Feeder Tray
J8J90A	HP LaserJet Envelope Feeder
J8J91A	HP LaserJet 1x550 Paper Feeder and Cabinet
J8J92A	HP LaserJet 1x550-sheet and 2000-sheet HCI Feeder and Stand
J8J93A	HP LaserJet 3x550-sheet Paper Feeder with Cabinet
X3D03A	HP Universal USB Proximity Card Reader
Y7C05A	HP HIP2 Keystroke Reader

HP Care Packs

Number Description

number	Description
U9NK0E	HP 3 Year Next Business Day HW Support W/Defective Media Retention
U9NK1E	HP 4 Year Next Business Day HW Support W/Defective Media Retention
U9NK2E	HP 5 Year Next Business Day HW Support W/Defective Media Retention
U9NK3E	HP 3 Year 4 Hour 9x5 HW Support W/Defective Media Retention
U9NK4E	HP 4 Year 4 Hour 9x5 HW Support W/Defective Media Retention
U9NK5E	HP 5 Year 4 Hour 9x5 HW Support W/Defective Media Retention
U9NL2E	HP 3 year Next Business Day Parts Exchange Service
U9NL3E	HP 4 year Next Business Day Parts Exchange Service
U9NL4E	HP 5 year Next Business Day Parts Exchange Service
U9NL8PE	HP 1 Year Post Warranty NBD HW Support w/Defective Media Retention
U9NL9PE	HP 2 Year Post Warranty NBD HW Support w/Defective Media Retention
U9NM0PE	HP 1 Year Post Warranty 4 Hour 9x5 Hardware Support W/DMR
U9NM1PE	HP 2 Year Post Warranty 4 Hour 9x5 Hardware Support W/DMR
U9NM6PE	HP 1 Year Post Warranty NBD Parts Exchange Service

Protect your investment with HP Care Pack. Let HP certified engineers resolve your technical issues. For more details on HP Care Pack, go to hp.com/go/cpc

Supported paper

Contact HP via phone: Asia: 65 6253 8500











Original HP ink cartridges and maintenance supplies

Number Description

- J8J95A HP 300 ADF Roller Replacement Kit (150,000 pages)
- J8J96A HP Staple Catridge Refill (5,000 staples)
- J8J87A HP Laser Jet 110v Maintenance Kit (225,000 pages) J8J88A HP Laser Jet 220v Maintenance Kit (225,000 pages)
- W1470A HP 147A Black Original LaserJet Toner Cartridge (10,500 pages)
- W1470X HP 147X High Yield Black Original Laser Jet Toner Cartridge (10,300 pages)
- W1470Y HP 147Y Extra High Yield Black Original Laser Jet Toner Cartridge (42,000 pages)

HP Inc. offices

Australia	(613) 8833 5000	hp.com.au
China	(010) 6564 3888	hp.com.cn
Hong Kong	(852) 3077 2688	hp.com.hk
India	(80) 2612 9000	hp.com/in
Indonesia	(62-21) 5799 1088	hp.com/id
Korea	(02) 2199 0114	hp.co.kr
Malaysia	(603) 2332 3333	hp.com.my
New Zealand	(09) 918 9555	hp.co.nz
Philippines	(632) 888 5900	hp.com/ph
Singapore	(65) 6275 3888	hp.com.sg
Taiwan	(02) 3789 9900	hp.com.tw
Thailand	(662) 353 9500	hp.com/th
Vietnam	(848) 3823 4151	hp.com/vn

For the following countries, please fax your queries to (65) 6275 6707 Bangladesh, Bhutan, Brunei, Cambodia, Maldives, Nepal, Pakistan, Sri Lanka

Solutions

For more solutions information, please visit hp.com/go/gsc

Footnotes

¹ HP's most advanced embedded security features are available on HP Enterprise and HP Managed devices with HP FutureSmart firmware 4.5 or above. Claim based on HP review of 2019 published features of competitive in-class printers. Only HP offers a combination of security features to automatically detect, stop, and recover from attacks with a self-healing reboot, in alignment with NIST SP 800-193 guidelines for device cyber resiliency. For a list of compatible products, visit: http://www.hp.com/go/PrintersThatProtect. For more information, visit: http://www.hp.com/go/PrinterSecurityClaims
² HP Web Jetadmin is available for download at no additional charge at http://www.hp.com/go/webjetadmin

³ Neasured using ISO/IEC 24734, excludes first set of test documents. For more information, see http://www.hp.com/go/printerclaims. Exact speed varies depending on the system configuration, software application, driver, and document complexity.

Measured after 15 min in sleep. Exact speed varies depending on the system configuration, software application, driver, document complexity and time in sleep.

⁶ IPI 147X High Yield Black Original LaserJet Toner Cartridges not included; please purchase separately.
⁶ Scan speed measured from ADF at default 300 dpi (black-and-white, grayscale, and color). Actual processing speeds may vary depending on scan resolution, network conditions, computer performance, and application software ⁷ An FCC Class A emissions compliant device meets the less stringent (higher) levels of emissions allowed by the FCC for a product operation in a commercial environment. An FCC class A device cannot be marketed for use in a residential environment and an FCC class A device should not be purchased for use in a residential environment due to the increased risk of interference to radio communications.

Technical specifications disclaimers

¹ Power requirements are based on the country/region where the printer is sold. Do not convert operating voltages. This will damage the printer and void the product warranty.
² Average black declared yields based on ISO/IEC 19752 and continuous printing. Actual yields vary considerably based on images printed and other factors. For details see http://www.hp.com/go/learnaboutsupplies.
³ EPEAT® registered where applicable. EPEAT registration varies by country. See http://www.epeat.net for registration status by country.

⁴ To enable HP Roam, some devices may require firmware to be upgraded and an optional accessory to add Bluetooth® Low Energy (BLE) beaconing capabilities. Subscription may be required. For more information, visit http://hp.com/go/roam

⁵ Acoustic values are subject to change. For current information see http://www.hp.com/support. Noise measured during printing mono simplex A4 at 71 ppm and ADF scan mono simplex A4 at 95 ipm.
⁶ Based on standard ITU-T test image #1 at standard resolution. More complicated pages or higher resolution will take longer and use more memory.

⁷ Measured using ISO 24734 Feature Test, A5 Landscape Feed, Speed may vary based on content, PC, media orientation, and media type

⁸ First Copy Out from Ready and Simplex Copy Speed measured using (SO/IEC 24735, excludes first set of test documents. For more information see http://www.hp.com/go/printerclaims. Exact speed varies depending on the system configuration, software application and document complexity.

⁹ Measured using ISO/IEC 17629. For more information see http://www.hp.com/go/printerclaims. Exact speed varies depending on the system configuration, software application, driver, and document complexity.
¹⁰ HP recommends that the number of printed pages per month be within the stated range for optimum device performance, based on factors including supplies replacement intervals and device life over an extended warranty period.

¹¹ BA TEC is equal to Best TEC. Power requirements are based on the country/region where the printer is sold. Do not cover operating upgets of the printer is sold and the printer is sold. Do not cover operating upgets of the printer is sold and the printer is sold. Do not cover operating upgets of the printer is sold and the printer is sold. Do not cover operating upgets of the printer is sold. Do not cover operating upg

¹³ HP recommends that the number of scanned pages per month be within the stated range for optimum device performance ¹⁴ Scan software not included in box. HP Scan and TWAIN driver available for download at http://hp.com/support

¹⁵ With print cartridges

¹⁶ An FCC Class A emissions compliant device meets the less stringent (higher) levels of emissions allowed by the FCC for a product operation in a commercial environment. An FCC class A device cannot be marketed for use in a residential environment and an FCC class A device should not be purchased for use in a residential environment due to the increased risk of interference to radio communications

To learn more, visit hp.com

© Copyright 2020 HP Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein. ENERGY STAR logo are registered U.S. marks. Microsoft and Windows are registered trademarks of Microsoft Corporation. AirPrint and the AirPrint logo are trademarks of Apple Inc., registered in the U.S. and other countries. Linux is a U.S. registered trademark of Linus Torvalds. UNIX is a registered trademark of The Open Group. Published in APJ 4AA7-6737EEP, June 2020

