

## Report

# Competitive set selection and performance testing methodology: HP Color LaserJet Pro MFP M477 series



## HP LaserJet Fall 2015 New Product Claims

This document describes HP test methodology as well as definitions of the competitive sets for the HP Color LaserJet Pro MFP M477 series that was publically introduced on September 10, 2015

### Competitive Set Definition

Performance data shown is based on leading competitors as well as the HP predecessor product. Leading competitors for each category of products were defined based on the top unit shipment data for products currently in the market that started shipping WW on or after April 2012. The top 3 shipment vendors\* besides HP were selected: Samsung, Kyocera and Brother.

HP further refined the products within the top 3 shipment vendors: For each of the top 3 the highest volume product from the most recent quarter was selected. If there was a faster product from that vendor within 25% of the highest volume product it was selected instead. If there was a replacement product for the top selected product it was selected instead.

All product testing was completed in August, 2015.

\*Top 3 shipment vendors:

Quarter=2014Q2-2015Q1

Product Detail=Color Laser

Product Category=MFP

Format=A4

Letter Mono Speed=25-31ppm

Source: IDC WW Quarterly HCP Tracker 2015Q2 Final Historical Release

## Performance test methodology

The exact speed varies depending on the system configuration, software applications, driver and document complexity. Performance was tested on identical system configurations on dedicated network 1000Base-T EEE (energy efficient Ethernet) switches connected to a low traffic network uplink. Identical software applications and revisions were used with the driver installed on a clean system image, using the test files defined by the test standards to ensure consistent complexity across all devices. Testing was done using letter size paper (8.5"x11").

### The following defines the method used to test each performance metric

- **Ready mode FPOT (First Page Out Time)**

- Measured using ISO/IEC 17629-2014: “Method for measuring first page out time of a digital printing device”

- **Sleep mode FPOT (First Page Out Time)**

- Measured using pdf file from ISO/IEC 17629-2014: “Method for measuring first page out time of a digital printing device” at 60 minutes from entering sleep.

- **Ready mode FCOT (First Copy Out Time) & Copy ppm (pages per minute)**

- Measured using ISO/IEC 29183-2010: “Method for measuring digital copying productivity of a single one-sided original”

- **Sleep mode FCOT (First Copy Out Time)**

- Because there is no standard for measurement of FCOT from sleep mode, results are based on HP internal testing modeled after the ISO/IEC 17629 process for testing sleep FPOT.

- **Test Procedure**

1. Determine time required to enter sleep.
2. Place original on the flatbed.
3. Set the default color mode as Mono or Color.
4. Wait for the time required for the device to enter sleep plus 60 minutes.
5. Wake the device by touching the control panel or button.
6. If there is a start button on the home screen or physical key, press it as soon as it is enabled. Otherwise enter the copy app and start the job.
7. Measure time from waking device until page in bin.
8. Repeat the measurement a second time.
9. Check consistency to make sure it is within 5%. If not, run a third measurement and average all 3 results.
10. Average all measurements taken and report as Sleep FCOT.

- **Print PPM (Pages Per Minute) and Duplex IPM (Images Per Minute)**

- Measured using ISO/IEC 24734-2009: “Method for measuring digital printing productivity”

- **Copy Duplex IPM**

- Measured using ISO/IEC 24375-2009: “Method for measuring digital copying productivity”

- **Typical Electricity Consumption (TEC)**

- Based on HP testing using the ENERGY STAR® program’s Typical Electricity Consumption (TEC) method or as reported in energystar.gov as of July 2015. Actual results may vary. HP testing is based on using the default Sleep Timer setting for all products. Default Sleep Timer setting is 5 minutes for the LaserJet M477 series. Increasing the Sleep Timer setting longer than the default value can increase TEC.

• **TEC Watt hours per page**

- TEC W hrs/week divided by the number of pages per week printed in the TEC test. The number of pages printed is determined by the TEC test standard for the device speed.
- Formula:  $TEC\ W\ hrs/page = TEC(kWhrs) * 1000 / (pages\_per\_wk) - or - TEC(Whrs) / (pages\_per\_wk)$ .

• **Sound level (acoustics)**

- Based on HP testing and measured using ISO 9296 and ISO 7779 using a simplex (single-sided) print. Actual results may vary.

• **Volume (size)**

- The volume of the product is measured using a bounding rectangular cuboid in a typical operating condition.

**Test results based on competitive set selection and testing methodology described above:**

| Product comparisons                                | Black and White Print Performance<br>(First page out time, first page to print from sleep mode) |   |   |   | Color Print Performance<br>(First page out time, first page to print from sleep mode) |   |   |   |
|--|---|---|---|---|---|---|---|---|
|  | Ready FPOT<br>(First Page Out Time in seconds)  | FPOT improvement of new HP device vs. predecessor and leading competitors | Sleep FPOT<br>(First Page Out Time from sleep in seconds) | Sleep FPOT improvement of new HP device vs. predecessor and leading competitors | Ready FPOT<br>(First Page Out Time in seconds)  | FPOT improvement of new HP device vs. predecessor and leading competitors | Sleep FPOT<br>(First Page Out Time from sleep in seconds) | Sleep FPOT improvement of new HP device vs. predecessor and leading competitors |
| <b>HP Color LaserJet Pro MFP M477 series</b>       | <b>8.9</b>  |   | <b>11.3</b>   |   | <b>9.8</b>  |   | <b>11.5</b>   |   |
| Predecessor Device:<br>HP Color LaserJet MFP M476  | <b>16.5</b>   | 46%   | <b>17.5</b>   | 35%   | <b>16.5</b>   | 41%   | <b>17.5</b>   | 34%   |
| Leading competitors based on IDC market share data |   |   |   |   |   |   |   |   |
| Samsung ProXpress C2670FW                          | 12.87   | 31%   | 15.9  | 29%   | 15.13   | 35%   | 18.52   | 38%   |
| Kyocera ECOSYS M6526cidn                           | 9.74  | 9%  | 25.96   | 56%   | 10.59   | 7%  | 31.93   | 64%   |
| Brother MFC-L8600CDW                               | 10.42   | 15%   | 29.17   | 61%   | 11.68   | 16%   | 30.07   | 62%   |

| Product comparisons                                | Black and White 2-sided (Duplex) printing efficiency           |   | Color 2-sided (Duplex) printing efficiency                     |   | Black and White Copy Performance<br>(First page to print from sleep mode) |   |
|--|--|---|--|---|---|---|
|  | Printing duplex efficiency measured by IPM (Images per minute) | Duplex improvement of new HP device vs. predecessor and leading competitors | Printing duplex efficiency measured by IPM (Images per minute) | Duplex improvement of new HP device vs. predecessor and leading competitors | Sleep FCOT (First Copy Out Time from sleep in seconds)                    | Sleep FCOT improvement of new HP device vs. predecessor and leading competitors |
| <b>HP Color LaserJet Pro MFP M477 series</b>       | <b>25</b>  |   | <b>25</b>  |   | <b>12.2</b>   |   |
| Predecessor Device:<br>HP Color LaserJet MFP M476  | <b>10</b>  | 150%  | <b>10</b>  | 150%  | <b>17.5</b>   | 30%   |
| Leading competitors based on IDC market share data |  |   |  |   |   |   |
| Samsung ProXpress C2670FW                          | 13.5   | 85%   | 13.5   | 85%   | 24.98   | 51%   |
| Kyocera ECOSYS M6526cidn                           | 13.9   | 80%   | 13.8   | 81%   | 25.22   | 52%   |
| Brother MFC-L8600CDW                               | 15.3   | 63%   | 15.3   | 63%   | 31.58   | 61%   |

| Product comparisons                                | Color Copy Performance<br>(first page to print from sleep mode) |   | Black and White 2-sided (Duplex)<br>copying efficiency        |   | Color 2-sided (Duplex) copying efficiency                     |   |
|--|---|---|---|---|---|---|
|  | Sleep FCOT (First Copy Out Time from sleep in seconds)          | Sleep FCOT improvement of new HP device vs. predecessor and leading competitors | Copying duplex efficiency measured by IPM (Images per minute) | Duplex improvement of new HP device vs. predecessor and leading competitors | Copying duplex efficiency measured by IPM (Images per minute) | Duplex improvement of new HP device vs. predecessor and leading competitors |
| <b>HP Color LaserJet Pro MFP M477 series</b>       | <b>16.1</b>   |   | <b>25</b>   |   | <b>25</b>   |   |
| Predecessor Device:<br>HP Color LaserJet MFP M476  | <b>23.5</b>   | 31%   | <b>10</b>   | 150%  | <b>10</b>   | 150%  |
| Leading competitors based on IDC market share data |   |   |   |   |   |   |
| Samsung ProXpress C2670FW                          | 27.34   | 41%   | 13.56   | 84%   | 13.56   | 84%   |
| Kyocera ECOSYS M6526cidn                           | 25.19   | 36%   | 13.9  | 80%   | 13.74   | 82%   |
| Brother MFC-L8600CDW                               | 31.59   | 49%   | 0   | n/a   | 0   | n/a   |

| Product comparisons                                | Acoustics (sound)           |   | Volume (Size) |  | TEC (Typical electricity Consumption) Energy Star metric |   | Energy consumption per page |   |
|--|-----------------------------|---|---------------|--|--|---|-----------------------------|---|
|  | Noise level (LWAd -Simplex) | Percentage quieter of new HP device vs. predecessor and leading competitors | Volume (Size) | Percentage smaller new HP device vs. predecessor and leading competitors | Energy Star TEC rating                                   | Percentage of energy saved of new HP device vs. predecessor and leading competitors | TEC Watt hours per page     | Percentage of energy saved of new HP device vs. predecessor and leading competitors |
| <b>HP Color LaserJet Pro MFP M477 series</b>       |                             |   | <b>78.5</b>   |  | <b>1.533</b>   |   | <b>0.782</b>                |   |
| Predecessor Device:<br>HP Color LaserJet MFP M476  |                             |   | <b>101.5</b>  | 23%  |  |   | <b>1.091</b>                | 28%   |
| Leading competitors based on IDC market share data |                             |   |               |  |  |   |                             |   |
| Samsung ProXpress C2670FW                          |                             |   | 106.94        | 27%  | 1.700  | 10%   | 0.969                       | 19%   |
| Kyocera ECOSYS M6526cidn                           |                             |   | 170.24        | 54%  | 2.600  | 41%   | 1.327                       | 41%   |
| Brother MFC-L8600CDW                               |                             |   | 101.34        | 23%  | 2.300  | 33%   | 1.022                       | 23%   |

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