

ENERGY STAR Program Requirements for Imaging Equipment

Explanation of Ready Mode Power Requirements for Type 1 and Type 2 Digital Front Ends

Purpose:

EPA would like to provide further explanation of Ready Mode power requirements for Digital Front Ends (DFEs) in Imaging Equipment, being proposed for inclusion in the Version 2.0 Specification. EPA is proposing to create Ready Mode maximum power requirements for both Type 1 and Type 2 DFEs, based on ENERGY STAR requirements for small-scale servers.

Background:

- 1) Digital Front-end (DFE): A functionally-integrated server that hosts other computers and applications and acts as an interface to Imaging Equipment. A DFE provides greater functionality to the Imaging Equipment.
 - a) A DFE offers three or more of the following advanced features:
 - i. Network connectivity in various environments;
 - ii. Mailbox functionality;
 - iii. Job queue management;
 - iv. Machine management (e.g., waking the imaging equipment from a reduced power state);
 - v. Advanced graphic user-interface (UI);
 - vi. Ability to initiate communication with other host servers and client computers (e.g., scanning to email, polling remote mailboxes for jobs); or
 - vii. Ability to post-process pages (e.g., reformatting pages prior to printing).
 - b) Type 1 DFE: A DFE that draws its dc power from its own ac power supply (internal or external), which is separate from the power supply that powers the Imaging Equipment. This DFE may draw its ac power directly from a wall outlet, or it may draw it from the ac power associated with the Imaging product's internal power supply
 - c) Type 2 DFE: A DFE that draws its dc power from the same power supply as the Imaging Equipment with which it operates. Type 2 DFEs must have a board or assembly with a separate processing unit that is capable of initiating activity over the network and can be physically removed, isolated, or disabled using common engineering practices to allow power measurements to be made.
 - d) Type 3 DFE: A DFE that is not shipped with the Imaging Equipment it supports. This DFE draws its dc power from its own external ac power supply, which is separate from the power supply that powers the Imaging Equipment. No requirements shall apply to Type 3 DFEs.

DFE-related changes in the Test Method:

- 1) The Version 1.2 test method (current) requires a five-minute energy measurement of the DFE input power (whether ac or dc) while the Imaging Equipment is in Ready Mode.
- 2) The Version 2.0 test method (under development) will additionally require a measurement of the DFE input power (whether ac or dc) while the Imaging Equipment is in Sleep Mode, if the manufacturer has reported a Sleep Mode that is enabled as shipped. If no Sleep Mode is reported, the measured Ready Mode power will be used as the Sleep Mode power for the DFE.

Previously proposed methods for reducing DFE energy consumption:

EPA presented the following methods in the Discussion Document published on March 11, 2011:

- 1) Promote DFE qualification as a server or small-scale server, as defined in the ENERGY STAR Servers and Computers specifications, respectively;
- 2) Treat DFEs as functional adders;
- 3) Incentivize or require a Sleep Mode for DFEs (with a power limit and maintenance of full network connectivity) when Imaging Equipment is in Sleep Mode; and/or

- 4) Consider the DFE an integral component of the Imaging Equipment and record the DFE power measured through the test method.

Draft 1 Ready Mode Power Requirements Proposal

EPA is proposing to combine options 1) and 3), above, by creating Ready Mode maximum power requirements for both Type 1 and Type 2 DFEs, based on ENERGY STAR requirements for small-scale servers. This requirement will be achievable by many existing DFEs, and will recognize the highest performing products. It will require minimal changes to the test method and program requirements. EPA would also like to collect stakeholder input on of the prevalence of network-capable Sleep Modes in DFEs for inclusion in Draft 2 of the specification.

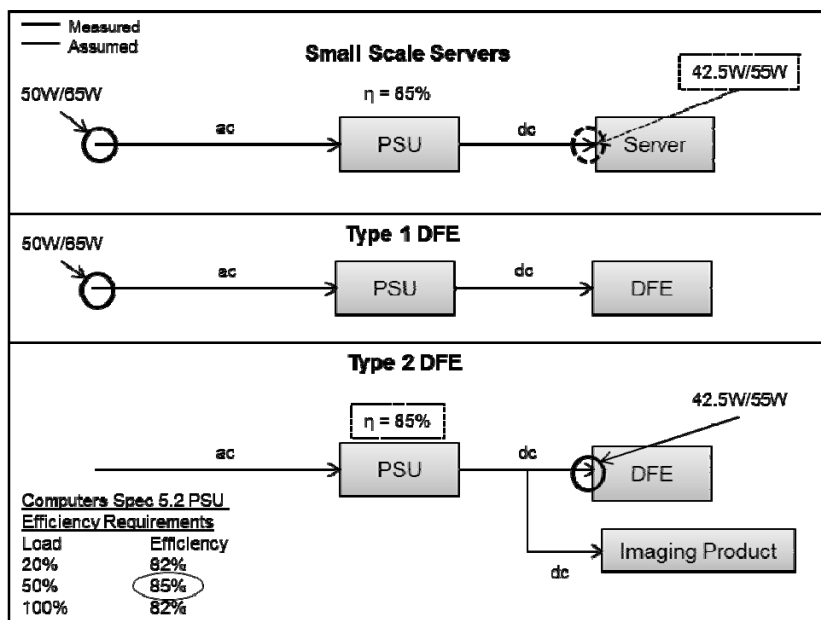
Type 1 DFEs: EPA is proposing to use small-scale server power consumption requirements from the Version 5.2 ENERGY STAR Specification for Computers:

- Small-scale server max idle power requirement is 50 W for a single processing core and 65 W for multiple processing cores.
- DFE Ready Mode assumes that the product is fully on, waiting to receive work. This definition closely aligns with max idle power in small-scale servers
- DFEs and small-scale servers share similar hardware and software functionality.
- EPA is proposing to eliminate DFE power supply efficiency requirements, allowing more flexibility in how manufacturers meet the Ready Mode maximum power requirement.

Type 2 DFEs: EPA is proposing to use 85% of the Ready Mode maximum power requirement for Type 1 DFEs as the Ready Mode maximum power requirement for Type 2 DFEs.

- Since the Type 2 DFE power measurement does not take into account the power supply efficiency (assumed to be 85%), EPA is proposing to decrease the Ready Mode maximum power requirement, thereby treating Type 1 and Type 2 DFEs consistently. This is shown in Figure 1 below.
- Again, there will be no specific power supply efficiency requirements for Type 2 DFEs.

Figure 1: Comparison of Small Scale Servers with Type 1 and Type 2 DFEs



Note: EPA welcomes input from stakeholders on the technical feasibility of and market prevalence of DFEs that maintain network capability in sleep mode, as well as any other comments relating to DFE energy efficiency.