ENERGY STAR® Notes on Small Network Equipment Dataset

This document provides a description of steps EPA has taken in analysis of the Small Network Equipment Dataset. The dataset, with manufacturer names masked, is available on the ENERGY STAR website.

I. Analysis Overview

Draft 1 presents an Average Power Consumption (P_{AVG}) structure as the primary energy efficiency metric in the Small Network Equipment specification. In this approach, an average power value for a product is derived from all applicable data points out of the following:

- P_{WAN_TEST}: Measured power consumption in Wired Network – WAN test, at 1.0 kb/s (W);
- P_{LAN_TEST}: Measured power consumption in Wired Network – LAN test, half of available wired LAN ports populated, at 1.0 kb/s (W); and
- $P_{WIRELESS\_TEST}$ = Measured power consumption in Wireless Network – LAN test, at 1.0 kb/s (W).

A limited list of functional power adders were considered in order to allow proposed levels to account for scaling by Ethernet Port and the presence of Wi-Fi in categories where it was present in some, but not all, devices.

II. Dataset Overview:

A. EPA review

EPA reviewed data acquired using both the Rev 2 and Rev 4 Test methods. A summary of the changes between the two versions is provided below as a reference.

Table 1: Comparison of Rev 2 and Rev 4 Test Methods

	V2	V4
WAN Testing	• Measurements taken with traffic at 7 speeds, as applicable to the UUT	• Measurements taken with traffic at 2 speeds, 1 kb/s and a high traffic rate as specified in Table 8
Wired LAN	• Three scenarios: minimum-, half-, and full-ports connected • For each scenario, measurements taken with traffic at 4 speeds, as applicable to the UUT	• One scenario: half-ports connected • For the half-port scenario, measurements taken with traffic at 2 speeds, 1 kb/s and a high traffic rate as specified in Table 8
Wireless LAN	• Measurements taken with traffic at 4 speeds, as applicable to the UUT • Tests repeated for each available wireless protocol	• Measurements taken with traffic at 2 speeds, 1 kb/s and a high traffic rate as specified in Table 8 • Tests repeated for each available wireless protocol

EPA focused on power consumption at low data rates. To account for differences in the test method revisions, idle power was analyzed in instances where data was not taken for the 1 kb/s condition. **P_{AVG}** was calculated by averaging all non-zero values of P_{WAN_TEST}, P_{LAN_TEST}, and $P_{WIRELESS\_TEST}$. To allow for an appropriate evaluation of base consumption, adder values were subtracted from this average. This adjusted value was used to set the base product type requirements.

EPA completed the initial data review with an evaluation of the product types listed for each data point. To account for instances where ambiguities in the initial set of ENERGY STAR definitions were present, EPA recategorized as appropriate for a subset of products. Both original manufacturer disclosures (column L) and EPA's revisions (column N) remain listed in the public dataset file should further review be required.

B. Functional Adder Values

The following table summarizes functional adders assigned in Draft 1. These values were set after review of multiple sources that included program data and out-year tiers in the European Commission's *Broadband Code of Conduct Version 4*.

Table 2: Functional Adder Values

Feature	Power Allowance (P_{ADD}) in watts	Notes
Fast Ethernet (100Base-T)	0.1	Allowance applied once per port present in the UUT.
Gigabit Ethernet (1000Base-T)	0.3	Allowance applied once per port present in the UUT.
Wi-Fi (802.11a/b/g/n)	0.7	Applied once for the UUT for availability of Wi-Fi connectivity.

C. Dataset

The charts in this section present data received in each product area, excluding categories in which data was insufficient to support development of a proposed level. The vertical axis in each chart is the adjusted P_{AVG} (calculated P_{AVG} minus appropriate adder values); the horizontal axis corresponds to index number as available in the ENERGY STAR dataset file.

In data on switches, a set of five products from one manufacturer (index 56-60) were excluded from analysis. These products were measured to have a P_{AVG} falling well below all other products in the dataset. Though the presence of products with such low power demands is encouraging, EPA believes that these products are not representative of the bulk of the market given their isolation from the rest of the product data available. Accordingly, EPA decided to calculate the proposed Switch base level without these five products factored in.

Figure 1: Adjusted P_{AVG} - ONTs

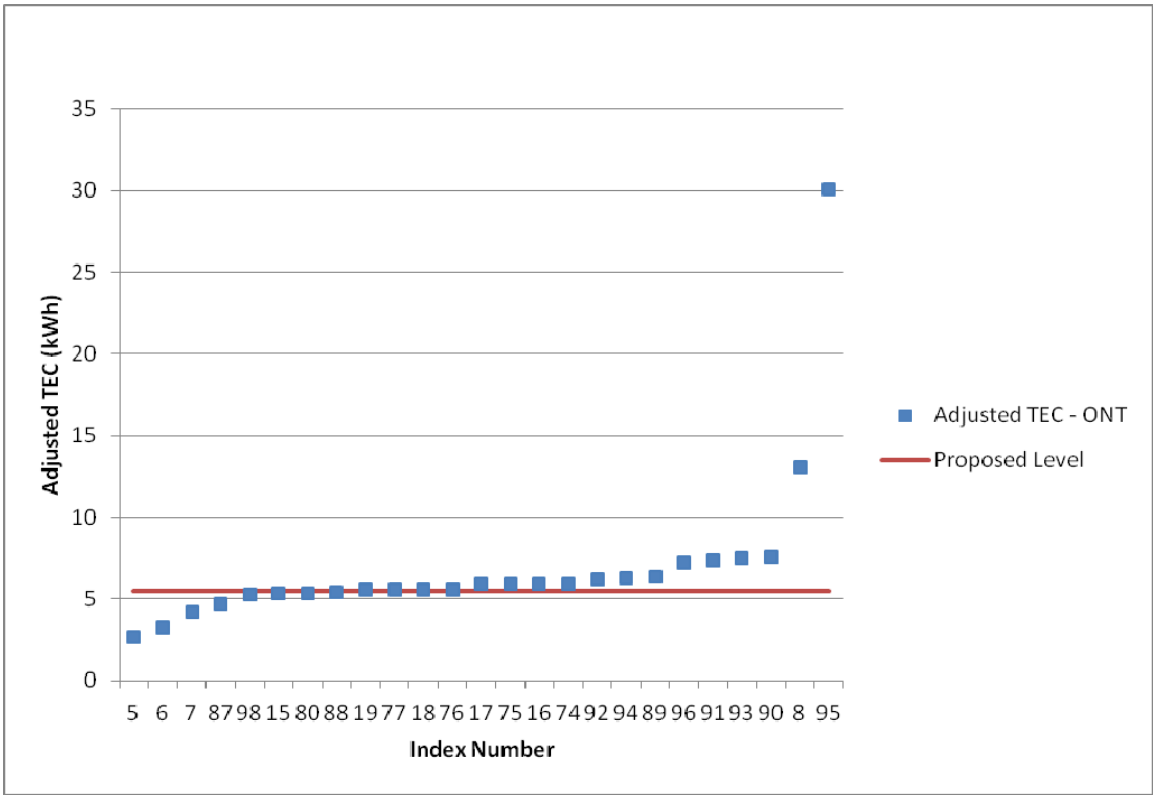

Figure 2: Adjusted P_{AVG} - IADs

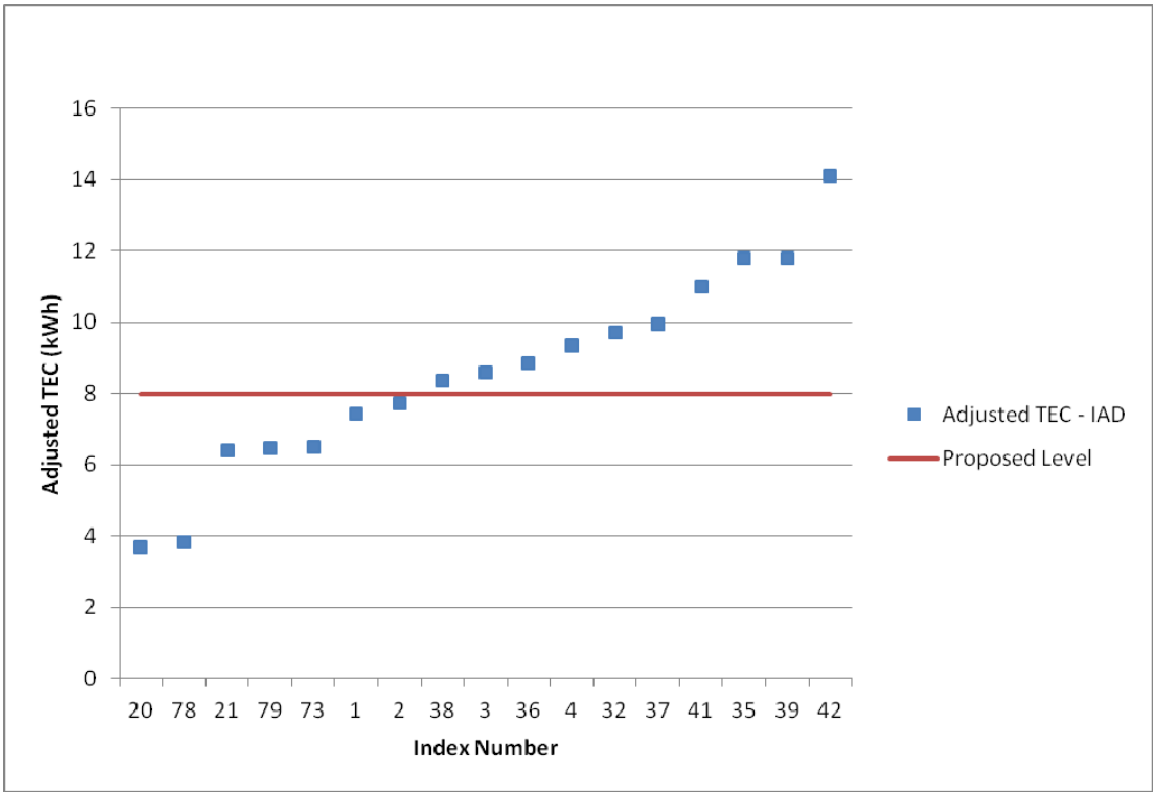

Figure 3: Adjusted P_{AVG} - Routers

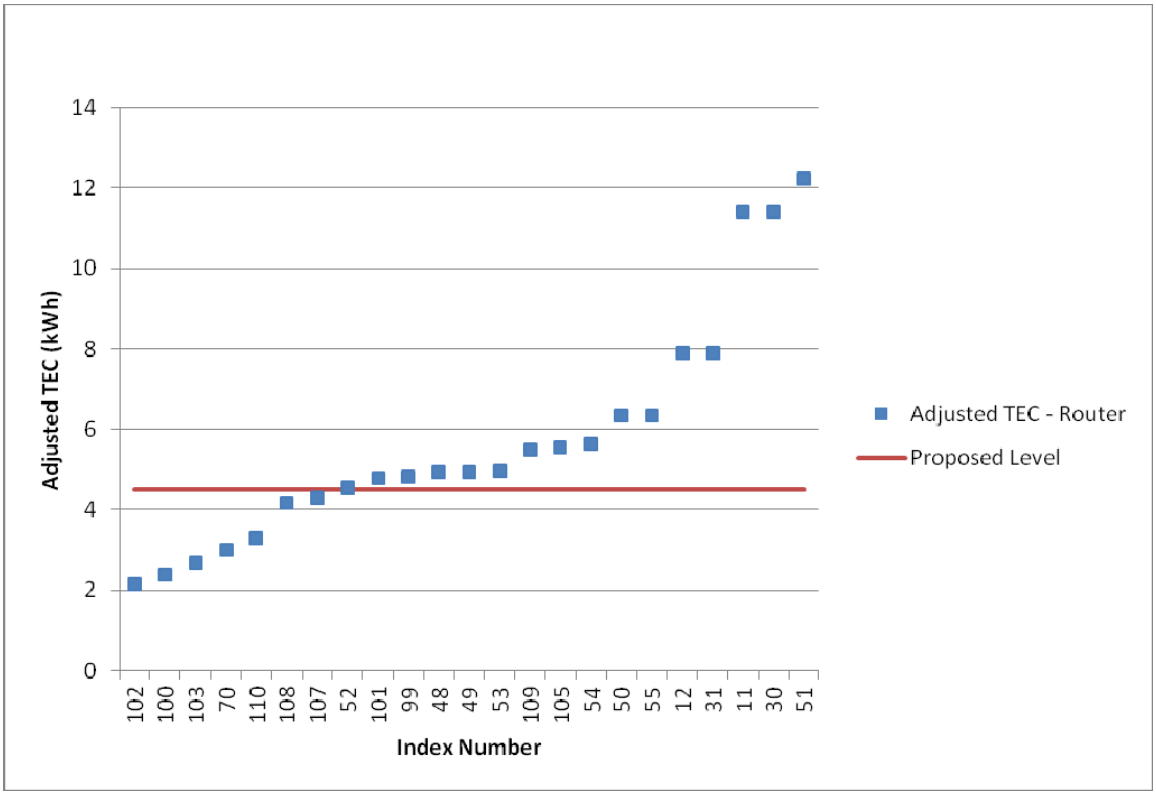

Figure 4: Adjusted P_{AVG} - Switches