



ENERGY STAR® Program Requirements for Small Network Equipment

Partner Commitments

1 Following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacture
2 and labeling of ENERGY STAR qualified products. The ENERGY STAR Partner must adhere to the
3 following partner commitments:
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5 **Qualifying Products**

- 6 1. **Comply with current ENERGY STAR Eligibility Criteria**, which define performance requirements
7 and test procedures for Small Network Equipment. A list of eligible products and their corresponding
8 Eligibility Criteria can be found at www.energystar.gov/specifications.
- 9 2. **Prior to associating the ENERGY STAR name or mark with any product**, obtain written
10 certification of ENERGY STAR qualification from a Certification Body recognized by EPA for Small
11 Network Equipment. As part of this certification process, products must be tested in a laboratory
12 recognized by EPA to perform Small Network Equipment testing. A list of EPA-recognized
13 laboratories and certification bodies can be found at www.energystar.gov/testingandverification.
- 14 3. **Ensure that all of Partner's products that bear the ENERGY STAR certification mark** meet the
15 following standard:
 - 16 • Product material requirements as defined in restriction of hazardous substances (RoHS)
17 regulations, as generally accepted. This includes exemptions in force at the date of product
18 manufacture: where the maximum concentration values tolerated by weight in homogeneous
19 materials are: lead (0.1%), mercury (0.1%), cadmium (0.01%), hexavalent chromium (0.1%),
20 polybrominated biphenyls (PBB) (0.1%), or polybrominated diphenyl ethers (PBDE) (0.1%).
21 Batteries are exempt.

22 *Notes:*

- 23 • The explicit intention is to harmonize with EU RoHS.
- 24 • For purposes of ENERGY STAR third-party certification, these requirements shall not be reviewed when products are initially
25 qualified nor during subsequent verification testing. Rather, EPA reserves the right to request supporting documentation at any
26 time.
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28 **Using the ENERGY STAR Name and Marks**

- 29 4. Comply with current ENERGY STAR Identity Guidelines, which define how the ENERGY STAR name
30 and marks may be used. Partner is responsible for adhering to these guidelines and ensuring that its
31 authorized representatives, such as advertising agencies, dealers, and distributors, are also in
32 compliance. The ENERGY STAR Identity Guidelines are available at www.energystar.gov/logouse.
- 33 5. Use the ENERGY STAR name and marks only in association with qualified products. Partner may not
34 refer to itself as an ENERGY STAR Partner unless at least one product is qualified and offered for
35 sale in the U.S and/or ENERGY STAR partner countries.
- 36 6. Provide clear and consistent labeling of ENERGY STAR qualified Small Network Equipment.
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 - 38 6.1. Partner must use the ENERGY STAR mark in all of the following ways:
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 - 40 6.1.1. On the top or front of the product. Labeling on the top or front of the product may be
41 permanent or temporary. All temporary labeling must be affixed to the top or front of the
42 product with an adhesive or cling-type application;

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44 6.1.2. In product literature (i.e. user manuals, spec sheets, etc.);
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46 6.1.3. On product packaging for products sold at retail; and
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48 6.1.4. On the Partner's Internet site where information about ENERGY STAR qualified models is
49 displayed:
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51 6.2. If additional information about the ENERGY STAR program(s) or other products provided by the
52 Partner on its Web site, Partner must comply with the *ENERGY STAR Web Linking Policy*,
53 which can be found at www.energystar.gov/partners.

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55 **Verifying Ongoing Product Qualification**

- 56 7. Participate in third-party verification testing through a Certification Body recognized by EPA for Small
57 Network Equipment, providing full cooperation and timely responses, EPA/DOE may also, at its
58 discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These
59 products may be obtained on the open market, or voluntarily supplied by Partner at the government's
60 request.

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62 **Providing Information to EPA**

- 63 8. Provide unit shipment data or other market indicators to EPA annually to assist with creation of
64 ENERGY STAR market penetration estimates, as follows:
- 65 8.1. Partner must submit the total number of ENERGY STAR qualified Small Network Equipment
66 shipped in the calendar year or an equivalent measurement as agreed to in advance by EPA
67 and Partner. Partner shall exclude shipments to organizations that rebrand and resell the
68 shipments (unaffiliated private labelers).
- 69 8.2. Partner must provide unit shipment data segmented by meaningful product characteristics (e.g.,
70 type, capacity, presence of additional functions) as prescribed by EPA.
- 71 8.3. Partner must submit unit shipment data for each calendar year to EPA or an EPA-authorized
72 third party, preferably in electronic format, no later than March 1 of the following year.
- 73 Submitted unit shipment data will be used by EPA only for program evaluation purposes and will be
74 closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the
75 data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of
76 the Partner;
- 77 9. Report to EPA any attempts by recognized laboratories or Certification Bodies (CBs) to influence
78 testing or certification results or to engage in discriminatory practices.
- 79 10. Notify EPA of a change in the designated responsible party or contacts within 30 days using the My
80 ENERGY STAR Account tool (MESA) available at www.energystar.gov/ mesa.

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82 **Performance for Special Distinction**

83 In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the
84 ENERGY STAR Partner may consider the following voluntary measures, and should keep EPA informed
85 on the progress of these efforts:

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- 87 ■ Provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase
88 availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and
89 its message.

- 90 ▪ Consider energy efficiency improvements in company facilities and pursue benchmarking buildings
91 through the ENERGY STAR Buildings program.
- 92 ▪ Purchase ENERGY STAR qualified products. Revise the company purchasing or procurement
93 specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA
94 for periodic updates and coordination. Circulate general ENERGY STAR qualified product information
95 to employees for use when purchasing products for their homes.
- 96 ▪ Feature the ENERGY STAR mark(s) on Partner website and other promotional materials. If
97 information concerning ENERGY STAR is provided on the Partner website as specified by the
98 ENERGY STAR Web Linking Policy (available in the Partner Resources section of the ENERGY
99 STAR website), EPA may provide links where appropriate to the Partner website.
- 100 ▪ Ensure the power management feature is enabled on all ENERGY STAR qualified displays and
101 computers in use in company facilities, particularly upon installation and after service is performed.
- 102 ▪ Provide general information about the ENERGY STAR program to employees whose jobs are
103 relevant to the development, marketing, sales, and service of current ENERGY STAR qualified
104 products.
- 105 ▪ Provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the
106 program requirements listed above. By doing so, EPA may be able to coordinate, and communicate
107 Partner's activities, provide an EPA representative, or include news about the event in the ENERGY
108 STAR newsletter, on the ENERGY STAR website, etc. The plan may be as simple as providing a list
109 of planned activities or milestones of which Partner would like EPA to be aware. For example,
110 activities may include: (1) increasing the availability of ENERGY STAR qualified products by
111 converting the entire product line within two years to meet ENERGY STAR guidelines; (2)
112 demonstrating the economic and environmental benefits of energy efficiency through special in-store
113 displays twice a year; (3) providing information to users (via the website and user's manual) about
114 energy-saving features and operating characteristics of ENERGY STAR qualified products; and (4)
115 building awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA
116 on one print advertorial and one live press event.
- 117 ▪ Join EPA's SmartWay Transport Partnership to improve the environmental performance of the
118 company's shipping operations. The SmartWay Transport Partnership works with freight carriers,
119 shippers, and other stakeholders in the goods movement industry to reduce fuel consumption,
120 greenhouse gases, and air pollution. For more information on SmartWay, visit
121 www.epa.gov/smartway.
- 122 ▪ Join EPA's Green Power Partnership. EPA's Green Power Partnership encourages organizations to
123 buy green power as a way to reduce the environmental impacts associated with traditional fossil fuel-
124 based electricity use. The partnership includes a diverse set of organizations including Fortune 500
125 companies, small and medium businesses, government institutions as well as a growing number of
126 colleges and universities. For more information on Green Power, visit www.epa.gov/greenpower.



ENERGY STAR[®] Product Specification for Small Network Equipment

Eligibility Criteria Draft 2 Version 1.0

127 Following is the ENERGY STAR product specification for Small Network Equipment. A product shall meet
128 all of the identified criteria if it is to earn the ENERGY STAR.

129 **1 DEFINITIONS**

130 A) Product Classifications:

- 131 1) Network Equipment: A device whose primary function is to pass Internet Protocol (IP) traffic
132 among various network interfaces / ports.
- 133 2) Small Network Equipment (SNE): Network Equipment that is intended to serve users in either
134 small networks or a subset of a large network. SNE includes a) all Network Equipment with
135 integral wireless capability and b) other Network Equipment meeting **all** of the following
136 criteria:
- 137 a) Designed for stationary operation;
 - 138 b) Contains no more than eleven (11) wired Physical Network Ports;
 - 139 c) Primary configuration for operation outside of standard equipment racks;
 - 140 d) Meets the definition of one or more of the Product Types defined below.
- 141 3) Large Network Equipment: Network Equipment that is rack-mounted, intended for use in
142 standard equipment racks, or contains more than eleven (11) ports for wired network.

143 B) Small Network Equipment Types:

144 1) Broadband Access Equipment

- 145 a) Broadband Modem: A device that transmits and receives digitally-modulated analog
146 signals over a wired or optical network as its primary function. The Broadband Modem
147 category does not include devices with integrated Router, Switch, or Access Point
148 functionality.
- 149 (1) Optical Network Termination Device (ONT): A type of Broadband Modem that
150 converts signals between copper (wired) or wireless connections and an optical fiber
151 connection. ONTs are available in either desktop or building-mounted versions with
152 different connectivity options.
- 153 b) Integrated Access Device (IAD): A network device with a modem and one or more of the
154 following functions: wired network routing, multi-port Ethernet switching and/or access
155 point functionality.

156 2) Local Network Equipment

- 157 a) Access Point: A device that provides wireless network connectivity to multiple clients as
158 its primary function. For the purposes of this specification, Access Points include devices
159 providing only IEEE 802.11 (Wi-Fi) connectivity.

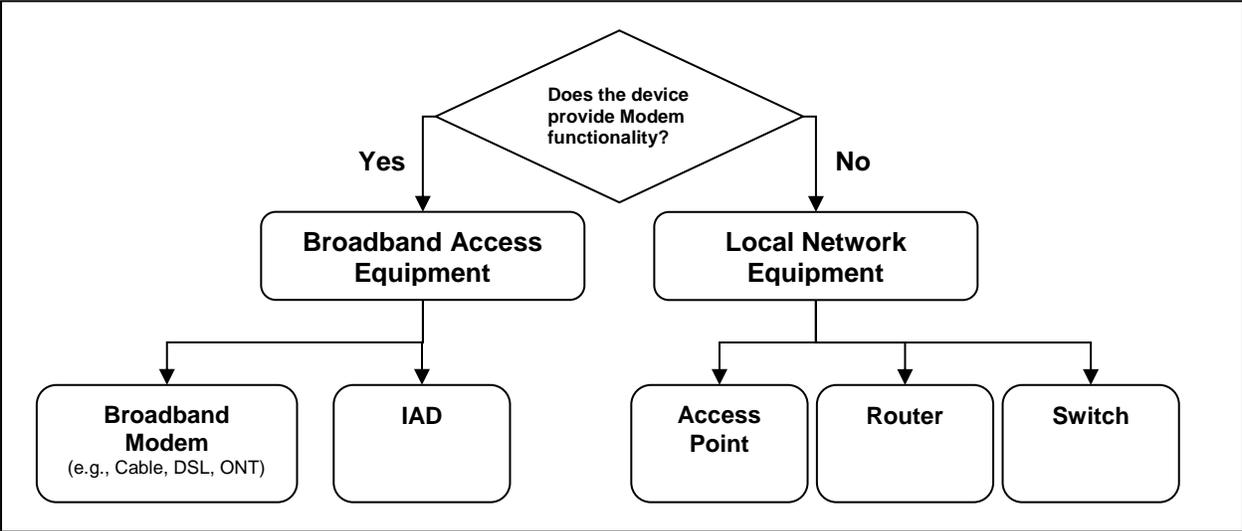
160 **Note:** EPA has revised the Access Point definition to provide additional clarity and welcomes stakeholder
161 feedback on this new definition.

- 162 b) Router: A network device that determines the optimal path along which network traffic

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should be forwarded as its primary function. Routers forward packets from one network to another based on network layer information. Devices fitting this definition may provide both Router functionality and wireless network capability.

- c) Switch: A network device that filters, forwards, and floods frames based on the destination address of each frame as its primary function. The switch operates at the data link layer of the OSI model.



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Figure 1: Product Type Assignment

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- C) Operational Modes and States:
 - 1) On Mode: The product is connected to a power source, is ready to use, and is providing one or more primary functions.
 - a) Idle State: The product is in On Mode and the data rate is 0 kb/s.
 - b) Low Data Rate: The product is in On Mode and traffic is passed across ports at 1.0 kb/s (0.5 kb/s in each direction) as defined in the test procedure.
 - c) High Data Rate: The product is in On Mode and traffic is passed across ports at a selected reference rate as defined in the test procedure.

Note: EPA has expanded the mode and state definition section to reflect the modes and states tested via the Final Draft ENERGY STAR SNE Test Method. EPA welcomes stakeholder feedback on these definitions.

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- D) Components:
 - 1) External Power Supply (EPS): A component contained in a separate physical enclosure from the SNE product designed to convert line voltage ac input into lower voltage ac or dc output(s) for the purpose of powering the SNE product. An EPS must connect to the SNE product via a removable or hard-wired male/female electrical connection, cable, cord or other wiring.
- E) Marketing or Shipment Terminology:
 - 1) Cable, Satellite, and Telecom Service Provider (“Service Provider”): An entity that provides Internet connectivity to subscribers with whom it has an ongoing contractual relationship.

193 2) Manufacturing Partner: An entity that manufactures, or markets OEM-manufactured SNE for
194 sale to either end customers or Service Providers.

195 3) SOHO: Small Office / Home Office.

196 F) Additional Terms:

197 1) End Point Device: A device that functions as either an originator or destination for network
198 traffic passed through Network Equipment. Examples of end point devices include
199 computers, servers, set-top boxes, IP-capable televisions, IP phones, etc. For the purposes
200 of this specification, an end point device is not considered network equipment.

201 2) Energy Efficient Ethernet (EEE): A technology which enables reduced power consumption of
202 Ethernet interfaces during times of low data throughput. Specified by IEEE 802.3az.

203 3) Link Rate: The maximum PHY bit rate possible on a particular link (e.g., 1000BASE-T
204 Ethernet supports 1 Gb/s in each direction [2 Gb/s total]; IEEE 802.11g supports 54 Mb/s
205 total).

206 **Note:** EPA received a request to change “maximum raw bit rate” to “maximum PHY bit rate” in the Link
207 Rate definition because it is the common terminology used by industry. EPA welcomes stakeholder
208 feedback on the change to this definition.

209 4) Physical Data Port: An integrated physical connection point primarily intended to accept non-
210 IP data. For the purposes of this specification, a port must support one of the following media
211 types to fit this definition:

212 a) Universal Serial Bus (USB);

213 b) Firewire;

214 c) Thunderbolt;

215 d) SATA;

216 e) SCSI; or

217 f) RS-232.

218 5) Physical Network Port: An integrated physical connection point primarily intended to accept
219 IP or similar traffic via a cable. For the purposes of this specification, a port must support one
220 of the following media types to fit this definition:

221 a) Ethernet;

222 b) Coaxial Cable;

223 c) Twisted Pair Copper; or

224 d) Fiber Optic.

225 6) Power over Ethernet (PoE): A technology which enables transfer of electrical power, along
226 with data, to network end point devices through an Ethernet cable. Currently specified by
227 IEEE 802.3af and IEEE 802.3at.

228 7) Standard Equipment Rack: An equipment enclosure commonly seen in data centers or
229 managed facilities and intended to house a variety of information technology equipment.
230 Front panel width is typically 19 inches (482.6 mm) in width. Standard Equipment Racks are
231 defined by EIA-310, IEC 60297, or DIN 41494.

232 8) Unit Under Test (UUT): The network equipment device being tested.

233 9) Wireless Local Area Network (WLAN) Test Client: A device that is capable of establishing an
234 802.11x link with an Access Point (AP) and transmitting data to and receiving from the AP.

235 10) Full Network Connectivity: The ability of an End Point Device to maintain network presence

236 while in Sleep Mode or another low power mode (LPM) of equal or lower power consumption
237 and intelligently wake when further processing is required (including occasional processing
238 required to maintain network presence). Presence of the End Point Device, its network
239 services and applications is maintained even though the End Point Device is in a LPM. From
240 the vantage point of the network, an End Point Device with full network connectivity that is in
241 LPM is functionally equivalent to an idle End Point Device with respect to common
242 applications and usage models. Full network connectivity in LPM is not limited to a specific
243 set of protocols but can cover applications installed after initial installation. Also referred to as
244 “network proxy” functionality and as described in the Ecma-393 standard.

- 245 a) Network Proxy - Base Capability: To maintain addresses and presence on the network
246 while in LPM, the system handles IPv4 ARP and IPv6 NS/ND.
- 247 b) Network Proxy - Full Capability: While in LPM, the system supports Base Capability,
248 Remote Wake, and Service Discovery/Name Services.
- 249 c) Network Proxy - Remote Wake: While in LPM, the system is capable of remotely waking
250 upon request from outside the local network. Includes Base Capability.
- 251 d) Network Proxy - Service Discovery/Name Services: While in LPM, the system allows for
252 advertising host services and network name. Includes Base Capability.
- 253 11) External Proxy Capability: The ability of an SNE device to maintain Full Network Connectivity
254 on behalf of an End Point Device. Must include an implementation of a standard protocol for
255 communicating between the host and the SNE device. Note: A known such protocol is
256 mDNS. Waking the sleeping host is typically accomplished by Wake-On-LAN or a wireless
257 equivalent.

258 **Note:** EPA has proposed new definitions for Full Network Connectivity and External Proxy Capability in
259 order to define the requirements for applying the proposed External Proxy Incentive in Section 3.3.3. The
260 Full Network Connectivity definition is a revised version of the definition found in Version 6.0 Draft 2
261 Computers specification for internal proxy functionality. EPA welcomes stakeholder feedback on these
262 definitions.

263 G) Product Family: A group of product models that are (1) made by the same manufacturer, (2)
264 subject to the same ENERGY STAR qualification criteria, and (3) of a common basic design.
265 Product models within a family differ from each other according to one or more characteristics or
266 features that either (1) have no impact on product performance with regard to ENERGY STAR
267 qualification criteria, or (2) are specified herein as acceptable variations within a product family.
268 For Small Network Equipment, acceptable variations within a product family include:

- 269 1) Color,
270 2) Housing, or
271 3) Any of the functional adders specified in Table 2.

272 **Note:** EPA has proposed a Product Family structure above for purposes of qualifying Small Network
273 Equipment. The goal of such provisions is to reduce testing burden while ensuring that all “members” of
274 the Product Family being represented by the tested unit deliver the same energy savings to the end user.
275 EPA seeks feedback from stakeholders on this structure and additional recommendations.

276 2 SCOPE

277 2.1 Included Products

278 2.1.1 Products that meet the definition for Small Network Equipment as specified herein are eligible for
279 ENERGY STAR qualification, with the exception of products listed in Section 2.2. In addition,
280 SNE shall meet one of the following equipment type definitions:

- 281 i. Broadband Modems (ONT, Cable, DSL);
- 282 ii. Integrated Access Device (IAD);
- 283 iii. Router;
- 284 iv. Switch; or
- 285 v. Access Point.

286 2.2 Excluded Products

287 2.2.1 Products that are covered under other ENERGY STAR product specifications are not eligible for
288 qualification under this specification. The list of specifications currently in effect can be found at
289 www.energystar.gov/products.

290 2.2.2 The following products are not eligible for qualification under this specification:

- 291 i. Network Equipment with one or more Small Form-factor Pluggable (SFP) network ports;
292 and
- 293 ii. Large Network Equipment.

294 **Note:** EPA received a request to exclude Network Equipment that contains hardware circuits that support
295 Internet or Ethernet security or data security functions (e.g., Firewall, VPN, SSL, Encryption/decryption,
296 etc.). EPA has not received any data to support this suggestion. EPA believes the non-rack mounted
297 requirement in the small network equipment (SNE) definition provides sufficient separation between SNE
298 and Large Network Equipment.

299 Additionally, EPA would like to inform stakeholders that the Version 1.0 Large Network Equipment
300 specification development effort recently launched. Details about this new specification can be found at
301 <https://www.energystar.gov/products/specs/node/413>.

302 3 QUALIFICATION CRITERIA

303 3.1 Significant Digits and Rounding

304 3.1.1 All calculations shall be carried out with directly measured (unrounded) values.

305 3.1.2 Unless otherwise specified, compliance with specification limits shall be evaluated using directly
306 measured or calculated values without any benefit from rounding.

307 3.1.3 Directly measured or calculated values that are submitted for reporting on the ENERGY STAR
308 website shall be rounded to the nearest significant digit as expressed in the corresponding
309 specification limit.

310 3.2 Power Supply Requirements

311 3.2.1 External Power Supplies (EPSs): EPSs (single- and multiple-voltage) shall meet the level V
312 performance requirements under the International Efficiency Marking Protocol and include the
313 level V marking. Additional information on the Marking Protocol is available
314 at www.energystar.gov/powersupplies.

- 315 i. External Power Supplies shall meet level V requirements when tested using the *Test*
 316 *Method for Calculating the Energy Efficiency of Single-Voltage External Ac-Dc and Ac-Ac*
 317 *Power Supplies, Aug. 11, 2004.*

318 **Note:** A comment was received noting that provisions were not included to accommodate multi-voltage
 319 output power supplies. EPA assumes that all products that fall within the scope of this Version 1.0 of the
 320 SNE program will utilize only single-voltage EPS. Stakeholder feedback on the likelihood of multi-voltage
 321 output EPS is welcomed.

322 **3.3 Efficiency Criteria**

323 3.3.1 Average Power Consumption (P_{AVG}): Calculated Average Power Consumption (P_{AVG}) per
 324 Equation 1 shall be less than or equal to the maximum requirement for Average Power
 325 Consumption (P_{AVG_MAX}), as calculated per Equation 2.

326 **Equation 1: Average Power Calculation (P_{AVG}) for Small Network Equipment**

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$$P_{AVG} = Average[P_{WAN_TEST}, P_{LAN_TEST}, P_{WIRELESS_TEST}]$$

328 *Where:*

- 329 ▪ *Average[x_i] = Average of terms (x_i) applicable to the UUT;*
- 330 ▪ *P_{WAN_TEST} = Measured power consumption in Wired Network –*
 331 *WAN test, at 1.0 kb/s (W);*
- 332 ▪ *P_{LAN_TEST} = Measured power consumption in Wired Network –*
 333 *LAN test, half of available wired LAN ports populated, at 1.0 kb/s*
 334 *(W);*
- 335 ▪ *$P_{WIRELESS_TEST}$ = Measured power consumption in Wireless*
 336 *Network – LAN test, at 1.0 kb/s (W).*

337 **Equation 2: Maximum Average Power (P_{AVG_MAX}) Calculation for Small Network Equipment**

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$$P_{AVG_MAX} = P_{BASE} + \sum_{i=1}^n P_{ADD_i}$$

339 *Where:*

- 340 ▪ *P_{BASE} = Base power allowance (W) from Table 1;*
- 341 ▪ *P_{ADD_i} = The power allowance as specified in Table 2 for each*
 342 *feature present in the device, for a total of n such allowances.*

343 **Table 1: Base Power Allowances**

Product Type	P_{BASE} (watts) Version 1.0
Broadband Modem – Cable	5.9
Broadband Modem – ADSL	4.0
Broadband Modem - VDSL	6.9
Broadband Modem – ONT	5.5
IAD - Cable	6.0
IAD - ADSL	5.5
IAD - VDSL	8.4
Router	3.2
Switch	0.6
Access Point	2.0

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Note: EPA has received additional stakeholder test data on several of the above product categories and has revised the base power allowances based on the combined test data. With the additional data, EPA was able to split the IAD category from Draft 1 into separate Cable and DSL IAD categories. EPA analyzed the combined test data and found that products that support only VDSL technology could not meet the DSL Modem or DSL IAD proposed base power requirements, and further split the DSL categories into ADSL and VDSL functionality as a result. Using the enhanced data set, EPA proposes new base power allowances for Cable and DSL Broadband Modems, and Access Points, as well as revised levels for IADs, Routers, and Switches. The additional test data increased the EPA dataset from 104 products to 154 products and included manufacturers not previously represented. The data was collected using the ENERGY STAR SNE Test Method and reflects off the shelf units comparable to units in the original EPA dataset. The additional data set included test data from in home tests which was not included in the EPA analysis.

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Table 2: Additional Functional Adders

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.

Note: EPA has proposed the following changes based on stakeholder feedback and recommendations:

- Adders: EPA has received a number of recommendations for additional adders such as MoCA, HPNA among others. EPA provides adders, as needed, to ensure that ENERGY STAR products deliver the features and functionalities that consumers seek. In doing so, EPA also intends to recognize the most energy efficient delivery of those features. EPA considers recommendations for additional adders that are accompanied by power data. Manufacturers with data that supports inclusion of additional adders are encouraged to submit this data for EPA consideration.
- Wide Area Network (WAN) Links: EPA received recommendations for handling other WAN-side interface technologies, including requests for adders. The revised Test Method is written to allow for devices having WAN options in addition to those specified for testing. Such interfaces are not connected during the test. Because only limited data is available at this time to identify the power required for the additional WAN technologies, no adder has been created for secondary WAN interfaces not connected during ENERGY STAR testing.
- Wi-Fi: One stakeholder comment suggests that products offering more than one Wi-Fi interface to allow transporting of data and video simultaneously should be recognized by allowing manufacturers to multiply the Wi-Fi adder in Table 2 by the number of interfaces. An additional comment suggested that the adder would be sufficient only for “short-reach” interfaces. EPA has not received any product data that supports these suggestions.
- Storage: EPA received a request to have an adder for integrated storage. EPA has not received any product data that supports an adder for this function.
- Voice over Internet Protocol (VoIP): EPA received requests to have an adder for VoIP technology. EPA has not received any product data that supports developing an adder for this technology.

3.3.2 Energy Efficiency Ethernet (EEE) Incentive: Small Network Equipment products that ship with IEEE 802.3az compliant Gigabit Ethernet ports may claim a 0.2 watt additional adder for each Gigabit port when calculating P_{ADD}.

383 **Note:** EPA is proposing an EEE incentive to encourage the adoption of EEE in Small Network Equipment
 384 products. EPA believes there is a savings potential in reducing the power consumption of Ethernet ports
 385 between the Small Network Equipment product and End Point Devices with EEE functionality. If all the 4
 386 port Gigabit Ethernet switches sold in 2012 had EEE functionality, EPA estimates savings of close to \$3M
 387 annually. EPA welcomes stakeholder feedback on the proposed incentive.

388 3.3.3 External Proxy Incentive: Small Network Equipment products that ship with External Proxy
 389 Capability may claim **one** of the following adders in Table 3 when calculating P_{ADD} based on the
 390 level of Proxy functionality in the product, as defined in Section 1)F)10.

391 **Table 3: External Proxy Incentives**

Capability	Incentive Value in watts
Base Capability	0.2
Remote Wake	0.5
Service Discovery/ Name Services	0.8
Full Capability	1.0

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 393 **Note:** EPA is proposing an External Proxy incentive to encourage the adoption of External Proxy
 394 Capability in Small Network Equipment products. EPA believes there is savings potential in providing the
 395 ability for End Point Devices to maintain Full Network Connectivity while entering a sleep state. If all the
 396 desktop computers that are left on could enter low power mode because of proxying, EPA estimates
 397 savings of over \$180M annually. EPA welcomes stakeholder feedback on the proposed incentive.

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 399 Note: Products intended for sale in the US market are subject to minimum toxicity requirements. Please
 400 see ENERGY STAR Program Requirements for Small Network Equipment: Partner Commitments, for
 401 details.
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403 **Note:** To ensure that product designers are aware of Partner Commitments specific to toxicity, EPA has
 404 inserted the above note.

405 EPA remains committed to including attributes related to other aspects of product performance in
 406 ENERGY STAR specifications to ensure that overall product performance is maintained relative to a non-
 407 qualifying product. By including additional attributes, the ENERGY STAR program seeks to avoid
 408 associating the label with models of poor quality or models with features that are not compatible with
 409 broadly held consumer or societal interests, thereby preserving the influence of the label in the market. In
 410 response to significant stakeholder concern that placement of toxicity requirements in the product
 411 eligibility criteria would hinder international harmonization, EPA is proposing that these criteria reside
 412 instead in the ENERGY STAR Small Network Equipment Partner Commitment document, which is unique
 413 to the US market. As such, EPA has removed Section 3.5, Toxicity and Recyclability requirements from
 414 the eligibility criteria. Further, in response to feedback, EPA notes in the Partner Commitment document
 415 that it is the Agency's intention to harmonize with EU RoHS and that the toxicity requirements are not
 416 subject to third-party certification.

417 **3.4 Efficiency Techniques and Power Management**

418 **Note:** EPA received stakeholder feedback stating that the Power over Ethernet (PoE) Supply
 419 Management requirement (Section 3.4.1 in Draft 1) is unnecessary because it does not provide any
 420 significant benefit to the energy efficiency performance of the product. EPA has removed this requirement
 421 from Draft 2 and welcomes stakeholder feedback on this revision.

422 **4 TESTING**

423 **4.1 Test Methods**

424 4.1.1 When testing SNE, the test methods identified in Table 4 shall be used to determine qualification
 425 for ENERGY STAR.

426 **Table 4: Test Methods for ENERGY STAR Qualification**

Product Type	Test Method
All	ENERGY STAR Test Method for Small Network Equipment, Rev. November 2012

427 4.1.2 Products that have both ADSL and VDSL functionality shall be tested using their ADSL
 428 functionality.

429 **Note:** EPA is proposing that products with both ADSL and VDSL functionality be tested using ADSL
 430 connections, as the dataset supports that these products show base power consumption which is similar
 431 to ADSL-only products.

432 **4.2 Number of Units Required for Testing**

433 4.2.1 Representative Models shall be selected for testing per the following requirements:

- 434 i. For qualification of an individual product model, a product configuration equivalent to that
 435 which is intended to be marketed and labeled as ENERGY STAR is considered the
 436 Representative Model;
- 437 ii. For qualification of a product family, the configuration that consumes the most energy
 438 within the family shall be considered the Representative Model. If models in a product
 439 family span multiple categories, product configurations that represent the worst-case
 440 power consumption for each product category within the family are considered
 441 Representative Models. When submitting product families, manufacturers continue to be
 442 held accountable for any efficiency claims made about their products, including those not
 443 tested or for which data was not reported.

444 4.2.2 A single unit of each Representative Model shall be selected for testing.

445 **4.3 International Market Qualification**

446 4.3.1 Products shall be tested for qualification at the relevant input voltage/frequency combination for
 447 each market in which they will be sold and promoted as ENERGY STAR.

448 **4.4 Optional Performance Reporting**

449 4.4.1 At the Partner's option, data on the following performance considerations may be reported along
 450 with product evaluation data:

- 451 i. Ethernet Throughput – The maximum data rate supported by the UUT for which there is
 452 no packet loss.

- 453 ii. Maximum Number of Wireless Clients - The maximum number of clients supported by the
454 UUT.
- 455 iii. Maximum Number of NAT Clients
- 456 iv. Maximum number of IEEE Gigabit Ethernet ports – The maximum number of IEEE
457 802.3az compliant Gigabit Ethernet ports supported by the UUT. This reporting
458 requirement shall be mandatory for any products that claim the IEEE Incentive in Section
459 3.3.2.
- 460 v. Maximum External Proxy Capability – The highest level of External Proxy Capability
461 provided by the UUT as listed in Table 3. This reporting requirement shall be mandatory
462 for any products that claim the External Proxy Incentive in Section 3.3.3.

Note: Section 4.4 is added as optional reporting criteria, replacing the optional provisions previously provided as part of the Test Method. Stakeholders have suggested that users may find the additional information in Section 4.4 to be useful in evaluating which products meet their needs and better interpret power efficiency data. EPA anticipates posting this information in the qualified product lists. If the data is not reported, this will be noted in the qualified product list.

EPA is proposing that reporting items iv and v shall be mandatory, rather than optional, for products that claim their respective incentives in Version 1.0.

5 USER INTERFACE

- 470 5.1.1 Manufacturers are encouraged to design products in accordance with the user interface standard
471 IEEE P1621: Standard for User Interface Elements in Power Control of Electronic Devices
472 Employed in Office/Consumer Environments. For details, see <http://eetd.LBL.gov/Controls>.
473

6 EFFECTIVE DATE

- 474 6.1.1 Effective Date: The Version 1.0 ENERGY STAR Small Network Equipment specification shall
475 take effect on the dates specified in Table 5. To qualify for ENERGY STAR, a product model shall
476 meet the ENERGY STAR specification in effect on its date of manufacture. The date of
477 manufacture is specific to each unit and is the date on which a unit is considered to be completely
478 assembled.
479
- 480 6.1.2 Future Specification Revisions: EPA reserves the right to change this specification should
481 technological and/or market changes affect its usefulness to consumers, industry, or the
482 environment. In keeping with current policy, revisions to the specification are arrived at through
483 stakeholder discussions. In the event of a specification revision, please note that the ENERGY
484 STAR qualification is not automatically granted for the life of a product model.

Table 5: Specification Effective Date

Effective Date
March, 2013

486 **7 CONSIDERATIONS FOR FUTURE REVISIONS**

487 **7.1 Product Scope**

488 TBD

489 **7.2 Energy Efficiency Criteria**

490 TBD

491 **7.3 Energy Efficient Ethernet**

492 7.3.1 All ports for PHYs addressed by IEEE 802.3az shall be compliant with IEEE 802.3az.

493 **7.4 Network Proxy**

494 7.4.1 EPA will continue to monitor the implementation of proxying capability in small network
495 equipment hardware and consider the development of a test method to determine the
496 functionality of a network proxy (e.g. one compliant with ECMA-393 ProxZzy for Sleeping
497 Hosts).