



July 26, 2013

Ms. Katharine Kaplan
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ENERGY STAR[®] Product Development
U.S. Environmental Protection Agency
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Re: ENERGY STAR Specification for Set-top Boxes Version 4.1 Draft 2

Dear Ms. Kaplan:

Thank you for the opportunity to provide comments on the ENERGY STAR specification for Set-top boxes, Draft 2 version 4.1. Cisco has long been engaged in the ENERGY STAR program and appreciates the efforts that you and those who support you make to develop specifications that not only increase the energy efficiency of covered products, but also promote innovation and value customer satisfaction.

Cisco continues its strong support and involvement with 14 other companies in the Pay TV industry in the Set-Top Box Energy Conservation Agreement. The Signatories have agreed to undertake a number of substantive, measurable actions to improve STB energy efficiency, including a commitment that at least 90 percent of all new STBs purchased and deployed after 2013 will meet the ENERGY STAR 3.0 rating. The Voluntary Agreement will result in increased STB energy efficiency by an average of 45 percent and will generate residential electricity savings of \$1.5 billion annually. In addition, improvements regarding “light sleep” functionality already have been implemented.¹

While we recognize that the Department of Energy (DOE) has issued a Notice of Proposed Rulemaking (NOPR) for a federal test procedure to measure energy efficiency of set-top boxes, we are disappointed to see that draft 2 continues to incorporate its elements. As stressed in comments on draft 1, Cisco urges EPA to disentangle the ENERGY STAR specification from the NOPR, which Cisco and the vast majority of ENERGY STAR Partners strongly oppose. EPA risks Partners abandoning ENERGY STAR for set-top boxes by continuing down this path.

¹ The Voluntary Agreement also includes commitments to immediately download “light sleep” capability to currently deployed cable STBs, to provide energy efficient whole-home DVR solutions, and to field-test “deep sleep” functionality. See Voluntary Agreement at Annex 3 § 2, Annex 4A § 3, Annex 4B § 3; *infra* at [citation forthcoming].

Assuming the NOPR would be disentangled from the EPA v4.1 proposal, Cisco would like to suggest the following specific changes to the proposed Draft 2 of Version 4.1 specification:

Proposal for Base Type Allowances

1. Cisco would support EPA’s “Cable DTA” Base Type Allowance of 35 kWh/y (Draft 2 Version 4.1 line 281); however Cisco proposes EPA remove the limitation for taking Additional Functionality Allowances (Draft 2 Version 4.1 line 310) and revise the values for Additional Feature Allowances (Draft 2 Version 4.1 line 341) as proposed in the body of these comments. Please refer to detailed comments regarding proposed values for Additional Functionality Allowances.

An Energy Star strategy for taking Additional Functionality Allowances when applicable appears to best reflect a robust energy use target for the program and continues to allow feature innovation in this product category.

2. Cisco would support EPA’s “Cable” Base Type Allowance of 55 kWh/y (Draft 2 Version 4.1 line 281); however Cisco proposes EPA revise the values for Additional Feature Allowances (Draft 2 Version 4.1 line 341) as proposed in the body of these comments.

Elimination of some Additional Feature Allowances, while not increasing the Base Type Allowance by a similar value, does not model the energy used by typical or even the best set-top boxes. Please refer to detailed comments regarding proposed values for Additional Functionality Allowances.

3. Cisco would support EPA’s “Service Provider Internet Protocol (IP)” Base Type Allowance of 45 kWh/y (Draft 2 Version 4.1 line 281); however Cisco proposes EPA revise the values for Additional Feature Allowances (Draft 2 Version 4.1 line 341) as proposed in the body of these comments.

Elimination of some Additional Feature Allowances, while not increasing the Base Type Allowance by a similar value, does not model the energy used by typical or even the best set-top boxes. Please refer to detailed comments regarding proposed values for Additional Functionality Allowances within the body of these comments.

4. Cisco would support EPA’s “Thin-client / Remote” Base Type Allowance of 15 kWh/y (Draft 2 Version 4.1 line 281); however Cisco proposes EPA remove the limitation for taking Additional Functionality Allowances (Draft 2 Version 4.1 line 312) and revise the values for Additional Feature Allowances (Draft 2 Version 4.1 line 341) as proposed in the body of these comments.

Elimination of some Additional Feature Allowances, while not increasing the Base Type Allowance by a similar value, and limiting which allowances may be added, does not model the energy used by typical or even the best set-top boxes. Please refer to detailed comments regarding proposed values for Additional Functionality Allowances.

Proposal for Additional Functionality Allowances

5. Cisco proposes that EPA restore the “High Definition” Additional Functionality Allowance and set its value to 16 kWh/y (Draft 2 Version 4.1 line 56 and Draft 2 Version 4.1 line 341).

Elimination of this allowance with less than an equal allowance in the Base Types does not account for actual models on the Qualified Products List and other typical products on the market that include High Definition functionality.

6. Cisco proposes that EPA restore the Advanced Video Processing (AVP) Additional Functionality Allowance and set its value to 8 kWh/y (Draft 2 Version 4.1 line 56 and Draft 2 Version 4.1 line 341).

Elimination of this allowance with less than an equal allowance in the Base Types does not account for actual models on the Qualified Products List and other typical products on the market that include Advanced Video Processing functionality.

7. Cisco proposes that EPA create a “DOCSIS 3.0” Additional Functionality Allowance, to support the inclusion of Video Gateway and Displayless Video Gateways within the STB specification, and set its value to 50 kWh/y. When applicable, a STB would select either the DOCSIS 2 at 20 kWh/y or DOCSIS 3 at 50 kWh/y Allowance, not both.

The DOCSIS 3 allowance of 50 kWh/y is derived from 8.5W in full bandwidth on-modes and 4.5W in low bandwidth 1-downstream and 1-upstream sleep/APD modes. This level assumes the adoption of the recently added DOCSIS 3 low power 1x1 mode in sleep/APD modes and its adoption in subsequent DOCSIS industry specifications.

DOCSIS 3 allowance is necessary to support STB feature innovation and home energy saving innovations such as IP delivered Cloud DVR solutions and total home energy management solutions. It is insufficient for EPA to lump an approximate adder into an Additional Functionality Allowance for Multi-room and suppose those STBs are typically where DOCSIS 3 will reside (Draft 2 Version 4.1 line 346). Not every innovative solution using DOCSIS 3 will be provided in a Multi-room STB. DOCSIS 3 will produce new features which consumers demand and offer potential additional energy savings by leveraging Cloud based video and other applications.

8. Cisco proposes that EPA create a “MoCA” Additional Functionality Allowance and set its value to 12 kWh/y. A STB would select this allowance when applicable and add it to the HNI allowance for a total of 22 kWh/y.

MoCA 1.1 typically consumes power at 2.5W continuously (TEC = 22 kWh/y). MoCA 2.0 does provide a lower standby opportunity, but its on power is an estimated 3.75 W and its standby power is an estimated 1.9 W. Cisco is updating prior comments which recommended a total allowance for HNI + MoCA of 17 kWh/y. Those comments mistakenly did not include the STB power supply efficiency factor.

9. Cisco proposes that EPA restore the allowance for “Multi-Room” to be applicable for STBs which serve DVR recorded content to any Base Type STB or other connected device in the home, not only those which stream live content to a Thin Client Base Type (Draft 2 Version 4.1 line 321 and Draft 2 Version 4.1 line 321).

EPA’s elimination of DVRs from taking the Multi-room allowance discourages STBs which can provide DVR functionality to multiple devices within the home. Such a strategy would increase the total energy used within the home, if Service Providers were forced to return to a DVR per room strategy.

Alternatively, EPA could create a “Shared DVR” Additional Functionality Allowance and set its value to 20 kWh/y. Shared DVR would apply to STBs which can share recorded content, but not also live content. This allowance would allow for the additional power for extra Hard Disc Drive (HDD) Capacity, typically larger HDD disc dimensions (3.5” vs. 2.5”), and streaming bandwidth processing power required to serve DVR content to multiple devices. A STB would select the Shared DVR or Multi-room Allowance, not both. The Shared DVR allowance could be taken in parallel to HNI, MoCA, and WiFi Allowances if present.

This strategy would continue to provide the Multi-room Additional Functionality Allowance to incentivize devices which serve both recorded and live content to devices, which was EPA’s intent. Cisco agrees that such a device would provide an even greater savings across the home and therefore a greater allowance is helpful.

10. Cisco proposes that EPA revise its WiFi Additional Functionality Allowance to anticipate a Service Provider client set-top box adding to its base type (and other applicable allowances) 37 kWh/y for WiFi using two 5 GHz transmit chains, 41 kWh/y for WiFi using three 5 GHz transmit chains, and 46 kWh/y for WiFi using four 5 GHz transmit chains.

This allowance could be a single adder or the sum of allowances for HNI, WiFi, and/or multiplied WiFi stream count. EPA’s Draft 2 allowances in Table 2 (row 341) do not provide sufficient allowance to permit innovative WiFi video delivery for consumers and the necessary connection for service provider device management and subscription control.

The following video WiFi client solutions are provided as examples, with estimated power values over a 7h/17h STB usage profile.

WiFi in Video <i>Client</i> STB	P _{TV}	P _{SLEEP/APD}	TEC 7/17 (estimated)	Proposed Revised Allowance	EPA Draft 2 Allowance
2x2 at 5 GHz	4.54 W	4.00 W	36.4 kWh/y	37 kWh/y	24 kWh/y
3x3 at 5 GHz	5.24 W	4.44 W	40.9 kWh/y	41 kWh/y	31 kWh/y
4x4 at 5 GHz	5.95 W	4.88 W	45.5 kWh/y	46 kWh/y	38 kWh/y

11. Cisco proposes that EPA revise its Access Point Additional Functionality Allowance to anticipate a Service Provider server set-top box adding to its base type (and other applicable allowances) 49 kWh/y for WiFi using two 5 GHz transmit chains, 57 kWh/y for WiFi using three 5 GHz transmit chains, and 65 kWh/y for WiFi using four 5 GHz transmit chains.

This allowance could be a single adder or a combination of allowances for HNI, WiFi, multiplied WiFi stream count, and Access Point. EPA’s Draft 2 allowances in Table 2 (row 341) do not provide sufficient allowance to permit innovative WiFi video delivery for consumers and the necessary connection for service provider device management and subscription control.

The following video WiFi server solutions are provided as examples, based on an expected 60% transmit duty cycle while on, with power values over a 7h/17h STB duty cycle.

WiFi in Video <i>Server</i> STB	P _{TV}	P _{SLEEP/APD}	TEC 7/17 (estimated)	Proposed Revised Allowance	EPA Draft 2 Allowance
2x2 at 5 GHz	7.85 W	4.63 W	48.8 kWh/y	49 kWh/y	32 kWh/y
3x3 at 5 GHz	9.90 W	5.06 W	56.7 kWh/y	57 kWh/y	39 kWh/y
4x4 at 5 GHz	11.95 W	5.50 W	64.7 kWh/y	65 kWh/y	46 kWh/y

12. Cisco proposes that EPA revise its formula for Deep Sleep Incentive as follows.

- STBs:
 $P_{SLEEP_SP} \leq \max [\max (0.15 \times P_{WATCH}, 3 \text{ W}), 0.95 \times P_{SLEEP_APD}, 0.95 \times P_{SLEEP_MANUAL}]$
 (Draft 2 Version 4.1 line 419)
- Displayless Video Gateways:
 $P_{SLEEP_SP} \leq \max [\max (0.15 \times P_{WATCH}, 3 \text{ W}), 0.95 \times P_{SLEEP}]$ (Draft 2 Version 4.1 line 430).

This proposed change has the goal to bring the formula within the specification into agreement with the expressed intent of the EPA’s cover letter which accompanied Draft 2 specification. The cover letter stated, “EPA has revised the definition of Deep Sleep State so that it covers any state that provides additional energy savings over that which is measured by the Sleep Mode test in Section 5.6 of the DOE NOPR. 78 FR 5076.” The formula as written in EPA’s Draft 2 appears to assume all P_{SLEEP_APD}, P_{SLEEP_MANUAL}, or P_{SLEEP} would already be less than 0.15 x P_{WATCH}, 3 W. If that were the case, it seems no incentive for Deep Sleep would be necessary or even applicable.

Revising the formula to agree with the intent expressed in the Draft 2 cover letter provides an invitation for manufacturers to pursue sleep modes that reduce power and not abandon pursuit of those technologies merely because they do not fully go below max (0.15 x P_{WATCH}, 3 W). Such an incentive sets deep sleep level based on being less than P_{SLEEP}, thereby inviting products of all functional allowances to pursue the deep sleep incentive.

13. Cisco proposes that EPA returns to TEC product family and test methodology, instead of AEC, unless and until such time DOE has formally advanced its test procedure.

Thank you for your consideration of these comments. We look forward to working with you and other stakeholders to craft the next generation ENERGY STAR STB specification that not only advances energy efficiency, but also promotes innovation and consumer experience.

Sincerely,
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Cisco Systems, Inc.