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ENERGY STAR Product Development
US Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
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Re: ENERGY STAR® Specification for Set-top Boxes Version 4.1, Draft 2

Dear Ms. Kaplan:

On behalf of the National Cable & Telecommunications Association ("NCTA"), I am responding to the Environmental Protection Agency's ("EPA") May 30, 2013 request for comment on the ENERGY STAR® Specification for Set-top Boxes Version 4.1, Draft 2 ("Draft 2").[1]

Our key recommendations for changes in the EPA's Draft 2 proposal are:

1. EPA should restore the HD and AVP allowances. These functionalities have not been adequately reflected in base allowances or in the allowances provided for basic non-DVR boxes and HD-DTAs, creating an incentive to deploy fully featured boxes that increase energy consumption.

2. EPA should provide a 50 kWh allowance sufficient for DOCSIS 3.0 modems, as has the Tier 2 European Voluntary Agreement.

3. EPA should provide a multi-room allowance for shared DVR functionality, because replacing multiple spinning disks in the home with a shared DVR is a net positive for energy efficiency, but does not come at zero cost.

4. EPA should provide an allowance for transcoding, which provides a backbone for delivering services not just through more efficient set-top boxes but through devices already owned by consumers.

5. EPA should correct the MoCA allowance provided.

[1] The comment date was extended to July 10, 2013 by EPA email of June 21, 2013.

6. EPA should adjust the allowances for thin clients to correct many errors and to account for their significantly greater functional requirements than the over-the-top boxes on which EPA has premised its analysis.

7. EPA should be less prescriptive in its requirements for deep sleep, in order to invite greater participation.

8. EPA should adjust the allowance for access point functionality.

9. EPA should clarify the allowances that may be claimed by a "server" set-top box for router and access point functionality.

10. EPA should follow the lead of the European and U.S. voluntary agreements, which allow for the introduction of new features that do not have allowances by providing that new features may either be deactivated for testing or afforded an additional allowance to account for usage by features that cannot be turned off.

11. EPA should not incorporate the draft test procedure proposed by the DOE in its recent Testing NOPR. As we have informed DOE, it would be unlawful for DOE to adopt the proposed test procedures instead of relying upon the CEA-2043 consensus technical standard for testing set-top boxes.

I. EPA SHOULD RESTORE THE HD AND AVP ALLOWANCES

Draft 1 proposed to reduce by one third – from 36 kWh to 24 kWh – the combined allowances provided for High Definition and Advanced Video Processing. Draft 2 proposes to reduce these allowances to zero because these features are not a "differentiator." Even features that have become standard features still consume power, but EPA has not added 24 kWh to all base allowances and has therefore not provided an adequate energy allowance for these features.

The loss of such allowances would be particularly acute for basic set-top boxes for which Draft 2 provides almost none of the allowances provided for fully featured DVRs and multi-room devices. By eliminating these adders, EPA would leave a basic allowance of only 55 kWh. Because this low allowance may often be unachievable with HD and AVP, it would create an incentive to shift deployment to more fully featured boxes instead of basic boxes, thereby increasing, rather than reducing energy consumption.

In addition, by eliminating the HD feature allowance, EPA would create a disincentive for the continued use of energy efficient HD DTAs. One HD DTA, the Motorola HD-DTA100u, is listed in the QPL at 35 kWh. EPA is apparently relying solely on that single device to justify its expectation that all HD DTAs can operate on the same 35 kWh energy allowance as a SD DTA. Relying on data from a single device from among a very small sample set creates a high probability of drawing erroneous conclusions. Some DTAs utilize a separate secure micro to support conditional access functionality, and also have a QPSK receiver to receive SCTE 55-2 (DAVIC) OOB messages. These features require additional power. DTAs are also continuing to evolve, offering faster channel change, and higher (1080p) resolution than is offered by the 100u.

Some DTAs support IR remotes, others IR and RF4CE. The energy allowance of 35 kWh is insufficient to support HD DTAs.

EPA should restore the base allowances and the allowances for HD and AVP as proposed in Draft 1.

II. EPA SHOULD PROVIDE A GREATER ALLOWANCE FOR DOCSIS 3

In our prior comments, NCTA explained that many cable operators are adopting DOCSIS 3.0 (D3), a technique that can support higher IP data rates for potential use as IP video "tiers" if included in set-top boxes. D3 uses channel bonding capabilities that result in higher energy consumption than DOCSIS 2.0 (D2). Cisco has previously provided to the EPA detailed comments on the energy requirements for D3 modems, which net out to 50 kWh. The Tier 2 Annual Energy Allowances for the European Voluntary Agreement reflect this differential by assigning an allowance of 30 kWh/year for DOCSIS 2 and 50 kWh/year per every 4 bonded D3 downstream channels. Draft 2 offers no countervailing engineering analysis and yet proposes an inadequate allowance for D3. EPA should adopt a DOCSIS 2 allowance of 20 kWh and the European allowance of 50 kWh for D3 up to and including an 8x4 DOCSIS 3.0 cable modem. Configurations with greater than 8 downstream channels, as well as next generation DOCSIS 3.1 cable modems, are unknown at this time and should be treated as new features.

In addition, EPA noted at its webinar that its adders for DOCSIS are specific to set-top boxes, and not to multi-function gateways which may be required to support many more devices and services within the home. When adopting these allowances, the EPA must be explicit that these are video adders, not multi-function gateway adders. This will help to avoid misunderstandings if and when allowances and duty cycles are updated in the future.

III. EPA SHOULD PROVIDE A MULTI-ROOM FOR SHARED DVR FUNCTIONALITY

Draft 2 proposes to remove the multi-room allowance for a Multi-room DVR that can share its DVR resources with other set-top Boxes. EPA's apparent rationale is to create an incentive for gateway architectures in which client boxes have no communications back to the headend. While creating a 56 kWh incentive for gateways that support thin clients may be appropriate, it would be counterproductive to zero out the energy allowance for sharing DVR resources. Certain whole-home architectures may be more energy efficient where non-DVR STBs deployed in the home can stream live content directly from the MVPD without requiring interaction from a gateway (thereby allowing a gateway to be in standby mode), yet able to stream DVR content from a single shared DVR in the home. Replacing multiple spinning disks in the home with a shared DVR is a net positive for energy efficiency, but it requires more energy for the primary unit. A multi-room DVR requires more memory and buffer capacity, and typically a larger and more robust HDD than a single room DVR. Providing an additional allowance is far more efficient than incenting providers to install multiple fully featured DVRs throughout the home.

IV. EPA SHOULD PROVIDE A TRANSCODE ALLOWANCE

Draft 2 provides no allowance in base or features for transcoding, on the theory that transcoding is not tested. Transcoding can be in use to store video more efficiently to a HDD, transcode from various network formats to a common fixed format in the home, and transcode to an output used by customer-owned devices. This latter function should be of particular value to EPA, because it serves as a backbone for delivering services not just through more efficient set-top boxes, but through devices already owned by consumers. Transcoding can still consume energy even if it is not being specifically tested. Because it promotes the efficient use of customer-owned devices, it should be provided a multi-stream allowance. We recommend an allowance of 13 kWh for the presence of transcoding and 5 kWh for each active transcoding function during testing. The base allowance would account for the minimum additional base energy use of a System on a Chip which includes transcoding functions or of a dedicated transcoder. The additional adder reflects the best current estimate for maximum energy use for each incremental transcoder.

V. EPA SHOULD ADJUST THE MOCA ALLOWANCE

Draft 2 develops a MoCA allowance for a server, based on the assumption that the server is in ON mode only 5 hours while the client is in ON mode for 7 hours. EPA carried this incorrect formula over from the DOE draft test procedure. The server needs to act as network controller to manage the nodes for at least as long as the client is operating, so if EPA assumes that the client will be on for 7 hours then it needs to assume that the server also needs to be on for at least 7 hours per day. We note that this is another example of why duty cycles should not be included in the DOE test method.

In addition, Draft 2 figures have not been scaled for converter efficiency to get to the input power at the wall socket, so they are insufficient for their intended use.

We recommend an allowance of 20 kWh. This could be accommodated by adding a 10kWh allowance specific for a MoCA interface in addition to the 10 kWh HNI or the allowance taken for Multi-room.

VI. EPA SHOULD ADJUST THE ALLOWANCES FOR THIN CLIENTS

Draft 2 has limited the thin client base allowance to 15 kWh plus an HNI of 10 kWh. These allowances would not allow thin clients to meet their functional requirements. To meet Service Provider performance requirements, thin clients must perform at the highest rate of resolution (19-20 Mbps), not with the compressed, lower resolution video characteristic of over-the-top boxes. They also must often support more outputs to handle the many TV inputs that subscribers utilize. The silicon in a thin client may be identical to the silicon on a set-top box. By dramatically reducing thin client allowances and by limiting multi-room allowances to gateways that serve thin clients, Draft 2 has created significant disincentives for the whole home architectures it wishes to promote.

The proposed Draft 2 would exclude the only cable thin client on the QPL. The supposed justification for this allowance is the perception that three devices on other platforms can meet it. This is another instance in which working with a very small set and little information about the performance of the low energy users can lead to mistakes. EPA has assumed that all thin clients can operate at 6 W ON for 7 hours + 1.5 W for 17 hours. The on mode is mistaken. The on mode for MoCA requires 3.8 W, leaving less than 2 W for all remaining functions. External components like DRAM, LEDs, flash memory and RF4CE alone consume close to 2 W at the wall socket. Cable thin clients are expected to include HDMI repeaters, Channel 3-4 video outputs, Ethernet ports and other features that stripped-down clients lack. The video and application processing SoC component can bring all other functions to 10 W after accounting for power efficiency to the wall socket.

The low power mode is also mistaken. As Entropic has informed EPA, MoCA 2 is expected to consume 1.2 W in low power at the socket, rather than 0.5 W, and just because MoCA is in sleep does not mean that the box is in sleep. It will still have components like DRAM running. In mixed MoCA 1 and 2 households, a MoCA 2 client could not remotely wake a MoCA 1 gateway. At the client level, EPA offers no basis for capping client MoCA at 10 kWh when EPA's own numbers say the minimum required is 12 kWh. EPA needs to increase the allowances available to thin clients to meet their energy requirements.

We suggest that a Thin Client Base of 15 kWh, as proposed in Draft 2, is workable if the client may also use an HD allowance of 16 kWh, AVP of 8 kWh, HNI base of 10 kWh and MoCA adder of 10 kWh.

VII. EPA SHOULD BE LESS PRESCRIPTIVE ON DEEP SLEEP

As EPA has recognized, deep sleep is still in development.

One of the major issues with deep sleep is a proposed definition set at 15% of on power, and less than 95% of sleep power. This minimum requirement may be a disincentive to manufacturers to attempt any lower power modes if they cannot achieve the 15% target. Energy reductions to levels below current sleep power still present the potential for significant energy savings and should be encouraged. Likewise, requiring recovery in less than 30 seconds from this mode is too restrictive, and similarly could disincentivize the development of devices with longer recovery times that would be more energy efficient than devices deployed in their place.

Establishing the proper consumer experiences will involve considerably more experience with consumers and consumer feedback to know whether response to a remote press must occur within 2 seconds, or whether any of the other proposed qualifiers for sleep are the correct design. As we noted in our previous comments, cable operators engage in exhaustive consumer research for the design of their services and interfaces. They have hundreds of millions of ongoing customer interactions with millions of households each year, and we expect to continue to refine services, interfaces and consumer experiences as we learn more about sleep experiences. The EPA should minimize the number of design constraints it places on service provider in such a dynamic market.

VIII. EPA SHOULD ADJUST THE ALLOWANCE FOR ACCESS POINTS

EPA's SNE specification for an access point calculates 17.5 kWh, yielding an allowance of 18 kWh. In addition, no standard tells us how to power down a Host access point. Under these circumstances, the proposed allowance of 8 should be reset to 18.

IX. EPA SHOULD CLARIFY THE ALLOWANCES AVAILABLE FOR A "SERVER" SET-TOP BOX

Draft 2 includes confusing definitions that do not align with our understanding of set-top boxes that support downstream devices. In its definition of Access Point and Router, Draft 2 claims that "Router Functionality includes Access Point Functionality." During EPA's webinar, there was considerable confusion over whether router functionality can only be taken when a wireless access point is present. The note following the new definitions of Access Point, Router, and Telephony connect these definitions to support for Displayless Video Gateways. But this adds to the confusion, because these functions are not necessarily a part of a displayless video gateway. In addition, it appears that a "server" cannot claim HNI if it is claiming multi-room, and the router and AP can only be claimed if taking HNI.

In our experience, a server could contain both router and access point, but that is not the only configuration. A device that streams to MoCA clients is forwarding packets from one network (the video broadcast network) to the MoCA network without any wireless access point.

EPA should clarify its intent and separate the router and access point allowances.

X. EPA SHOULD PROVIDE A BETTER PATHWAY FOR THE INTRODUCTION OF NEW FEATURES

EPA identifies certain features (Ultra HD, HEVC, 3D) as likely to be included in some set-top boxes, but assigns no allowance, citing lack of data. This makes it problematic for an Energy Star partner to add such features. Lack of data should not be a reason to handicap the introduction of innovative features.

In other cases, EPA assigns a value even when it has no data. For example, for eMTA functionality included in a set-top box, it assigned an allowance of 4 kWh. EPA has no data on the impact of including an eMTA in a set-top box and the potential effect it has on other systems or components, such as the ability to scale power in an embedded modem and still maintain 911 service.

We recommend that EPA accept our prior recommendation, and follow the lead of the European and US voluntary agreements, both of which allow for the introduction of new features that do not have allowances.[2] If Energy Star does not permit the introduction of new features in

[2] *See* Voluntary Industry Agreement to Improve the Energy Consumption of Complex Set Top Boxes Within the EU Proposal from the Industry Group, Version 3.0, Annex C (Sept. 2, 2011) (stating that energy consumption should be measured using base functionalities and that additional features should be disabled unless they have been provided an allowance); Report from the Commission to the European Parliament and the Council on the Voluntary

this way, then EPA must set generous base allowances sufficiently high to fit new features, like Ultra HD, HEVC, transcoding, and sensors. It can then fine tune allowances as we gain collective experience with new features and technologies in wider market deployment.

XI. EPA SHOULD NOT INCLUDE THE TESTING METHODS FROM THE DOE'S NOPR

We appreciate that EPA has departed from some of the problematic aspects the DOE's proposed test procedure, by restoring the "family" approach to testing and including tests for sleep states that DOE's proposal fails to measure. But as we detailed in our prior comments, there remain far too many problems with DOE's proposed test method for EPA to continue to point in that direction. The problems with DOE's proposals continued to manifest themselves during EPA's recent webinar, such as including a duty cycle in a test procedure that assumed a gateway was inactive when the dependent client device was active. Attempting to incorporate the DOE's draft has led to exceptionally vague test requirements, such as: "All other testing conditions shall be taken from the DOE test procedure as needed and if something is not specified there, from draft CEA-2043."

Moreover, as we have informed DOE, it would be unlawful for DOE to adopt the proposed test procedures instead of relying upon the CEA-2043 consensus technical standard for testing set-top boxes. Congress has directed federal agencies to use private consensus standards "wherever possible, in lieu of creating proprietary, non-consensus standards."[3] Under Section 12(d) of NTTAA, Congress required that federal agencies must "use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives," unless such use "is inconsistent with applicable law or otherwise impractical."[4] CEA-2043 is in no way "inconsistent with law or otherwise impractical" to use as a test procedure for set-top boxes. ANSI standards unquestionably qualify under NTTAA. To receive ANSI accreditation, a standards developing organization must meet ANSI's "essential requirements for openness, balance, consensus and due process."[5] ANSI's exacting guidelines ensure levels of equity, fair play, and openness in standards development that

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Ecodesign Scheme for Complex Set-Top Boxes (Nov. 22, 2012). NCTA Comments on DOE NOPR, Exhibit 1, Voluntary Agreement at § 6.3 ("In order to foster the benefits of such innovative and competitive markets, new features/functions which consume significant power and functions not covered by the ENERGY STAR Version 3.0 STB Program should be deactivated (if possible) during the testing process and are not to be counted against reported efficiency targets. The test results will explicitly list any functions that were deactivated during testing. If it is not possible to deactivate such function for testing, the Signatory may provide written documentation indicating the incremental power consumption of the function to be excluded from the reported test result. Such deactivated/excluded functions may be accounted for in updated applicable energy consumption targets.").

[3] http://www.nist.gov/standardsgov/nttaa.cfm, referencing NTTAA.

[4] National Technology Transfer and Advancement Act of 1995, Pub. L. No. 104-113, §12, 110 Stat. 775, 782-783 (1996). CEA-2043 has been developed through the American National Standards Institute (ANSI) process by such a standards body. DOE also found that "CEA is a leading organization that connects consumer electronics manufacturers, retailers, and other interested parties to develop industry accepted electronics test procedures." DOE NOPR at 20.

[5] Introduction to ANSI, ANSI.org, *available at* http://www.ansi.org/about_ansi/introduction/introduction.aspx?menuid=1#.UVC0X1eprlQ.

fit squarely under the strictures of NTTAA.[6] Moreover, OMB Circular A-119, which implements NTTAA, states unambiguously that "[a]ll federal agencies *must use* voluntary consensus standards in lieu of government-unique standards in their procurement and regulatory activities, except where inconsistent with law or otherwise impractical."[7] Pursuant to this mandate, DOE and EPA "must use" CEA-2043 to the extent that they require a test procedure for set-top boxes. Last year, the Obama Administration reaffirmed that "reliance on private sector leadership, supplemented by Federal Government contributions to discrete standardization processes as outlined in OMB Circular A-119 … remains the primary strategy for government engagement in standards development."[8] If a federal agency instead adopts its own test procedure rather than relying on CEA-2043, it must "transmit to the Office of Management and Budget (OMB), through the National Institute of Standards and Technology (NIST), an explanation of the reason(s) for using government-unique standards in lieu of voluntary consensus standards."[9]

CEA-2043 accommodates all of the testing called for by DOE and EPA, and can be changed far more often and quickly than a codified federal test procedure, to meet the ongoing and inevitable future changes that will come to the market. EPA should decouple from DOE test method until this issue has been completely resolved.

XII. RECOMMENDATIONS

For the reasons stated above, NCTA recommends that the ESv4.1 specification be adjusted as recommended above.

Respectfully submitted,

/s/ Neal M. Goldberg

Neal M. Goldberg

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[6] ANSI Essential Requirements: Due Process Requirements for American National Standards, ANSI.org, *available at* http://publicaa.ansi.org/sites/apdl/Documents/Standards%20Activities/American%20National%20Standards/Procedures,%20Guides,%20and%20Forms/2010%20ANSI%20Essential%20Requirements%20and%20Related/2010%20ANSI%20Essential%20Requirements.pdf.

[7] Office of Management and Budget Circular A-119 "Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities" ("OMB Circular A-119") (emphasis added).

[8] Memorandum for the Heads of Executive Departments and Agencies, Office of Science and Technology Policy, United States Trade Representative, Office of Information and Regulatory Affairs (Jan. 17, 2012).

[9] OMB Circular A-119.