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April 15, 2013

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Re: ENERGY STAR[®] Specification for Set-top Boxes Version 4.1

Dear Ms. Kaplan:

On behalf of the National Cable & Telecommunications Association (“NCTA”), I am responding to the Environmental Protection Agency’s (“EPA”) March 18, 2013 request for comment on the ENERGY STAR[®] Specification for Set-top Boxes Version 4.1 (“ESv4.1”).

Since the adoption of EPA’s Energy Star Version 3.0 and the publication of its 4.0 specifications for set-top boxes, fifteen industry-leading Pay TV providers and set-top box manufacturers launched an unprecedented Set-Top Box Energy Conservation Agreement that covers more than 90 million American households and 90% of Pay TV consumers. The first phase of these commitments includes making the Environmental Protection Agency’s ENERGY STAR 3.0 set-top box efficiency level the norm for at least 90% of their set-top boxes in 2014. This alone will result in annual residential electricity savings of \$1.5 billion or more as these commitments are fully realized, reducing carbon emissions by the equivalent of 4 power plants annually.¹ The Voluntary Agreement’s adoption of ENERGY STAR is a validation of EPA’s willingness to maintain a program with technologically and economically feasible standards and a realistic testing method.

¹ See Comments of the National Cable & Telecommunications Association, Docket No. EERE–2012–BT–TP–0046, April 8, 2013 (“NCTA Comments on DOE NOPR”), attached as Exhibit 1, at 2.

This initiative received strong bipartisan praise “for proactively developing a consensus agreement ... and not waiting for a federal mandate;” as an agreement “which will save consumers billions of dollars;” as a “strong industry-led efficiency agreement [that] can deliver meaningful near-term energy savings while laying a foundation for future innovation and efficiency improvements;” and as “a wonderful example of how we can capture the benefits of energy efficiency without relying on top-down government, where Congress chooses the winners and losers instead of the market.”²

We draw to your attention seven key recommendations for changes in the EPA’s proposal for Version 4.1 requirements, which can help maintain Energy Star as an effective incentive program that can attract participants:

1. EPA should not incorporate the draft test proposed by the DOE in its recent Testing NOPR. The draft test method in the NOPR is not a sufficiently stable or functional test method for utilization in the Energy Star program. EPA should point instead to CEA-2043, the standard developed under the formal, open standards-setting process of ANSI.
2. In order to move towards whole-home distribution techniques, EPA should provide more generous allowances to account for the higher functionality of Thin Client boxes, and should add allowances for routing and switching functions, and for more than one CableCARD in order to support more than six tuners.
3. EPA should adopt DOCSIS allowances that accommodate more advanced DOCSIS technologies like DOCSIS 3.0 channel bonding, as has the European voluntary agreement.

² Press Release, Sen. Dianne Feinstein, Feinstein Applauds Agreement on Energy Efficient Set-Top Boxes (Dec. 6, 2012) (“Last year, I asked the industry to utilize more efficient equipment, and I am very pleased they have taken the first step to accomplish that. I would like to congratulate the 15 companies that joined today’s agreement, which will save consumers billions of dollars in reduced electricity bills.”); Press Release, Sen. Lisa Murkowski, Murkowski Commends Cable Box Energy Efficiency Agreement (Dec. 6, 2012) (“I commend the industry for proactively developing a consensus agreement that will save their customers money, and not waiting for a federal mandate that forces them to act... This agreement is a wonderful example of how we can capture the benefits of energy efficiency without relying on top-down government, where Congress chooses the winners and losers instead of the market.”); Press Release, Rep. Ed Markey, Markey: End of Republican War on Energy Efficiency? (Feb. 26, 2013) (“In the rapidly changing telecommunications space, this strong industry-led efficiency agreement can deliver meaningful near-term energy savings while laying a foundation for future innovation and efficiency improvements.”); Press Release, Rep. John Dingell, Dingell Statement Regarding Energy & Power Hearing on Energy Efficient Technologies (Feb. 26, 2013) (“The cable industry is to be commended on this forward thinking to adopt practices that can take effect now and drastically improve efficiency moving forward.”).

4. 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 provided an allowance to account for usage by features that cannot be turned off. If Energy Star does not permit the introduction of new features in 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.
5. EPA should decline invitations to micromanage set-top box performance and user interfaces.
6. EPA should clarify its definitions so that a Displayless Video Gateway is defined to cover a device with the primary purpose of providing a compressed (headless) video output, and further clarify that a multi-service gateway having the primary purpose of serving as a network interface capable of joining multiple service provider protocols or provisioning video, voice, and broadband services from a service provider is neither a set-top box nor a Displayless Video Gateway.
7. EPA should not adopt its recyclability standard, which is inconsistent with the content protection and robustness requirements of cable distribution networks.

I. EPA SHOULD NOT RELY ON THE DRAFT TEST METHOD PROPOSED IN THE DOE TESTING NOPR.

EPA is proposing to incorporate a draft test proposed by the Department of Energy (“DOE”) in its recent Test Procedure NOPR.³ That draft method would introduce many problematic departures from past Energy Star practice and from effective testing of set-top boxes. A better option is to utilize the Consumer Electronics Association CEA-2043 test procedure.

EPA has previously followed a practice of classifying set-top boxes by family, which enables manufacturers to effectively participate in the Energy Star program and provides a path for the regular updates of set-top box hardware and software common in the industry without imposing an unreasonable test burden. By contrast, the NOPR proposes to classify as a separate “basic model” every unique combination of software loaded onto each model of set-top box by each MVPD. The proposed classification scheme would lead to the designation of thousands of “models” of set-top boxes that would have to be tested separately by MVPDs, if, as proposed by the NOPR, each were deemed a manufacturer.

³ *Energy Conservation Program: Test Procedure for Set-Top Boxes; Proposed Rule*, Notice of Proposed Rulemaking, 78 Fed. Reg. 5076 (Jan. 23, 2013) (“NOPR”).

This NOPR testing approach would create an unreasonable and unworkable test burden. Some NCTA members have more than 150 unique set-top box model numbers in their inventories. The number of models has grown significantly in recent years in part due to the increase in the number of vendors. Cable operators can have multiple combinations of software deployed in their set-top boxes at any given time. A typical set-top box today may have the firmware loaded by the manufacturer plus separate software each for the electronic programming guide, the video-on-demand client, and various Enhanced TV Binary Interchange Format (EBIF) applications, such as for caller ID display on a television, audience measurement, and shopping or other interactive applications. Operators are likely to deploy numerous different software combinations on a particular physical set-top box model at one time, varied depending upon (1) the types of services ordered by the customer, (2) the date the customer started or changed services, (3) the other third party devices and applications used by the customer, (4) the type of customer (residential, commercial, hospitality (i.e., hotel), video-only or bundled), (5) the location of the customer, (6) capabilities the operator is building into the network and devices as a foundation for new services, and (7) the configuration of network equipment at the headend serving that customer's location. A single manufacturer model number may have a dozen or more different software combinations just at one point in time, meaning that 150 manufacturer models could equate to well more than 1000 "basic models" to test right out of the gate. Software can be upgraded or changed multiple times a year, and each time a new "basic model" would have to be tested. A single physical set-top box deployed to a single customer's home could easily be re-classified as a new model more than 10 times during its useful life. And the diversity of software deployments is only likely to increase in the future, leading to even more required testing of additional "basic models." While software changes more frequently, hardware changes as well. Some changes are minor, such as a change in the supplier of resistors or memory chips; some are more significant, such as a transition to a faster processor. It would be one thing, after such changes, to require the manufacturer to test the revised model one time nationally, but quite another to effectively require each of hundreds of cable operators to test this "new" model not once but dozens of times with each of its software combinations.

Even aside from the extreme cost and impracticality of such testing, such a rule would delay, chill, and complicate the rollout of new software to consumers for any operator seeking to participate in the Energy Star program. If a cable operator had already performed energy testing on 100 "basic models" as defined by the NOPR, and then wanted to roll out a new EBIF application, it would apparently have to conduct 100 more tests because each of those previously tested models would become yet another one with the new application. The cable industry previously learned first-hand that such an approach is impractical and counterproductive. At one time, CableLabs required certification for each software update for cable modems and telephone adapters, but it abandoned this requirement as it became too onerous and was ultimately determined to be unnecessary. We expect that this problem would be far worse with set-top boxes, which have far more features and variation.

In addition, the NOPR's proposed construction of sleep mode testing would fail to give credit for reduced energy usage due to sleep performed at a pre-scheduled time. To qualify as sleep mode under the DOE test, sleep must be entered either because of user action (manual

sleep) or a period of inaction (resulting in “auto power down” or “APD”). A set-top box would not qualify as having auto power down if it did not enter sleep mode during testing within four hours. This approach could miss capturing sleep mode savings where a set-top box is programmed to automatically enter sleep mode at particular times of expected user inactivity, which may occur much sooner than 4 hours but not necessarily within the time period in which a test is conducted. For example, a service provider could program set-top boxes to sleep each day at 1 a.m. and awake with the first pre-scheduled recording event or user activity. This option could have comparable potential energy savings to APD triggered by four hours of inactivity, since pre-scheduled sleep could sometimes be triggered much sooner than APD for consumers who typically used the device shortly before going to sleep. A pre-determined sleep time may be more effective at reducing energy use, and manufacturers and cable operators should be given the flexibility to determine how best to reduce energy use without compromising the performance of set-top boxes. But the proposed test procedure does not include this or other more flexible options in its methods for measuring sleep performance.

The NOPR test method does not measure savings from sleep that requires more than 30 second wake time. As a consequence, it fails to account for savings from even deeper sleep states that do not meet DOE’s definition of sleep, but which EPA wishes to measure for the Energy Star program.

The NOPR has also included implausible duty cycles as part of the test method. The duty cycles are wrong at the outset; the cycles assume that three displays in use in a home would be viewed for a total of 21 hours a day, when Nielsen reports total household use at 9 hours, and typical usage on second and third sets is far below primary set usage. By incorporating duty cycles in a test method, rather than a standard used for computing AEC, the NOPR precludes EPA from effectively updating AEC calculations as viewing habits and standards evolve. The NOPR’s specific requirement to test a set-top box with three outputs engaged also fails to account for energy efficient output management.

The EPA proposes to correct such errors by grafting on additional tests to the NOPR. For example, EPA has already found it necessary to propose a test supplemental to the DOE’s proposal in order to test a device when some outputs are constrained. The better conclusion is that the draft test method in the NOPR is not a sufficiently stable or functional test method for utilization in the Energy Star program. It is also a vastly more complicated and burdensome approach than is required for an effective energy efficiency program, and should not be adopted by the EPA.

Rather than reference the proposed DOE test method, ESv4.1 should utilize the Consumer Electronics Association CEA-2043 test procedure. This comprehensive standard has been developed and vetted by experts under the formal, open standards-setting process of ANSI and incorporated as part of the Voluntary Agreement. As indicated in the attached side by side comparison, 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. DOE’s suggested changes to CEA

2043 have been processed through the ANSI comment resolution process, and several will be incorporated into CEA-2043.⁴

II. THE EPA SHOULD PROVIDE INCENTIVES FOR DEPLOYING DESIRABLE THIN CLIENT DEVICES AND WHOLE HOME SOLUTIONS.

The EPA has historically designed the Energy Star program to provide incentives to help move the market towards greater energy efficiency. In order to adhere to that helpful approach, the EPA should make adjustments in its proposed ESv4.1 allowance for client devices.

The proposed Thin Client allowances, which were pegged to allowances for over-the-top IP boxes, need to be more generous. Thin Client set-top boxes have different functionalities than over-the-top boxes. For example, as part of cable distribution networks, Thin Client set-top boxes offer a higher bit rate and resolution than over-the-top boxes that are designed for Internet distribution. They may support different home networking technologies, a variety of decode techniques, both MoCA and Wi-Fi, and additional outputs that are not commonly supported by over-the-top boxes. In addition, a more generous allowance for Thin Client set-top boxes will help provide incentives to move towards whole-home distribution techniques, which may offer overall energy savings superior to having multiple, fully featured set-top boxes in the home. At the EPA's March 29 public meeting, some advocates sought to ratchet down allowances for Thin Clients, which would have the perverse effect of creating disincentives for deploying devices that offer far more overall savings (compared to a fully featured set-top box) than the amount of the allowance under discussion. In fact, there is insufficient basis for reducing the Thin Client base allowance from 20 to 10. In addition, a Wi-Fi allowance should be provided for Thin Clients that support multiple networking protocols, such as both MoCA and Wi-Fi.

In order to move towards whole-home distribution techniques, primary set-top boxes will need to include routing and switching functions and may require more than one CableCARD in order to support more than six tuners. In order to accommodate such techniques, additional allowances should be included for multiple CableCARDS and for routing and switching functions.

III. ENERGY STAR SHOULD ADOPT DOCSIS ALLOWANCES THAT ACCOMMODATE MORE ADVANCED DOCSIS TECHNOLOGY.

Many cable operators are in transition to 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. DOCSIS 3.0 uses channel bonding capabilities that result in higher energy consumption than DOCSIS 2.0 (D2). The Tier 2 Annual Energy Allowances for the European Voluntary Agreement reflect this differential by assigning an allowance of 30 kWh/year for DOCSIS 2.0 and 50 kWh/year per every 4 bonded D3 downstream channels. The proposed specification does not distinguish among DOCSIS types and instead proposes to reduce the DOCSIS allowance to 15 kWh/year.

⁴ See NCTA Comments on DOE NOPR, Exhibit 2 at 2-6.

EPA should instead maintain the basic allowance at 20 and adopt the European allowances for D2 and D3.

IV. THE EPA SHOULD ENSURE THAT ITS ALLOWANCES ACCOMMODATE INNOVATIVE NEW FEATURES.

The EPA should also maintain its incentive structure by adjusting its proposed approach to allowances in order to accommodate innovative new features that lack allowances.

Service providers, who purchase their set-top boxes from their suppliers, must deploy equipment that is of reasonable cost but will not become instantly obsolete. This is a challenging balance when both the market and consumer expectations change rapidly outside of any individual service provider's environment. For example, there is growing interest in ultra-high resolution (4K) television, but the pace at which such programming might grow is unknown. Nevertheless, if a service provider installs set-top boxes into consumer homes and retains ownership and financial responsibility for them, the provider may want to add HEVC⁵ to the set-top boxes to anticipate and accommodate the greater network compression that will be required to accommodate 4K. That capability would not be used for some period until 4K is launched, but launch should not require a new Energy Star standard. Other features that an operator may wish to add may draw power, yet have no allowance. Examples include connectivity over power line or wireless connectivity for sensors that allow future home health care services, security, energy management and home automation controls. Or a user interface might include new inputs for gesture or facial-expression detection that take power but have no allowance. Set-top boxes that seek to provide "whole-home" energy efficiencies might include transcoding hardware to enable service to a customer-owned device connected to the home network, but the hardware may not be activated until a subscriber purchases a new video device at a future date. If cable operators cannot incorporate new platforms and features into their networks, including their set-top boxes, without waiting for the regulatory process to catch up, consumers would lose the benefits of new services or equipment from MVPDs. Innovative third-party application developers who could otherwise enhance the MVPD offering with new device features and services would turn instead toward developing new features and services for other devices and other means of video delivery not regulated by EPA. Being the "first mover" of a new feature or service is critical to success, and so innovators will not want to reveal the details of new designs to the public through an EPA standard revision, much less wait months or more for permission to proceed.

Energy Star could maintain a powerful incentive program that attracts new participants if it were to follow the lead of the European voluntary agreement, which allows for the introduction of new features that do not have allowances.⁶ The U.S. Voluntary Agreement follows that

⁵ High Efficiency Video Coding (HEVC) is a video compression standard developed as a successor to H.264/MPEG-4 AVC (Advanced Video Coding).

⁶ 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

approach by providing that new features may either be deactivated for testing or provided an allowance to account for usage by features that cannot feasibly be turned off.⁷ Energy Star could maintain an attractive incentive program if it were to adopt the same approach.

If Energy Star does not permit the introduction of new features in 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.

V. ENERGY STAR SHOULD NOT SEEK TO MICROMANAGE PERFORMANCE

At the EPA's March 29 public meeting, some advocates urged the EPA to micromanage set-top box performance, including by mandating the duration of button presses and the display of a particular provider's user interface. This is unnecessary and inappropriate. Cable operators engage in exhaustive consumer research for the design of their services and interfaces. Operators have hundreds of millions of ongoing customer interactions with millions of households each year, and continue to refine their services and interfaces rapidly in a dynamic market. The advocates have offered no consumer research to support their request to preclude certain user interfaces in ESv4 devices. Efforts to micromanage the user interface would only create a disincentive against participation in Energy Star.

VI. DEFINITIONS

The EPA's proposed definition of a Displayless Video Gateway is in need of revision to avoid locking in particular technologies like MoCA or DLNA, as discussed at the EPA's March 29 public meeting. We recommend revising the definition of Displayless Video Gateway to be, "A device combining hardware components with software programming designed for the

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 Ecodesign Scheme for Complex Set-Top Boxes (Nov. 22, 2012); February 27, 2013 Public Meeting on Notice of Proposed Rulemaking on Test Procedure for Set-Top Boxes, Court Reporter Transcript at 86 (Robert Turner of Pace (U.K.) explaining that under the EU agreement, "the test method specifically says, if you have a feature that doesn't have an allowance, you specifically exclude it, disabling it, so you're measuring what you intend to measure, not unintended extras.").

⁷ See 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.").

primary purpose of receiving television and related services from broadband, or local networks, providing video output without using a direct video connection.” By direct video connection, we are distinguishing between an uncompressed (headed) output for direct video connection and a compressed (headless) video output. For clarity, that intention should also be expressed in EPA adopting documents.

We further recommend that a multi-service gateway be explicitly excluded from the definitions of Set-Top Box and of Displayless Video Gateway. These devices are not widely deployed, but have the potential for consolidating multiple pieces of hardware into a single device whose primary purpose is to serve as a network interface, capable of joining multiple cable delivery protocols or provisioning video, voice, and broadband services from a cable operator. Their primary purpose is to serve as that network interface. EPA should clarify that such a multi-service gateway is neither a set-top box nor a Displayless Video Gateway.

VII. RECYCLABILITY

EPA has proposed to adopt a recyclability standard. Although NCTA is supportive of recycling, it does not support the proposal. EPA has borrowed from IEEE 1680 to propose that products be “designed for ease of disassembly and recyclability where external enclosures, subenclosures, chassis and electronic subassemblies are easily removable with commonly available tools, by hand, or by a recycler's automated processes.” IEEE 1680 was not developed for products that carry secured premium programming with specific robustness rules. A standard formulation in video technology license agreements provides that a typical consumer should not be able to use widely available tools, with or without instructions, to access and intercept such decrypted programming without risk of serious damage to the product or personal injury. Standard formulations also go on to provide that hardware must be designed such that attempts to remove, replace, or reprogram hardware elements in a way that would compromise the content protection requirements in the device would pose a serious risk of rendering the device unable to receive, decrypt, or decode secured programming, and that a component should be soldered rather than socketed.⁸ As a result, set-top boxes are designed to resist easy disassembly. EPA should not adopt recyclability rules.

⁸ Digital Transmission Protection License Agreement, Adopter Agreement -- October 2012, <http://www.dtcp.com/documents/licensing/dtla-adopter-agreement.pdf>.

VIII. RECOMMENDATIONS

For the reasons stated above and in the attached Comments to DOE, NCTA recommends that the ESv4.1 specification be adjusted as recommended above.

Respectfully submitted,

/s/ Neal M. Goldberg

Neal M. Goldberg

**Before the
DEPARTMENT OF ENERGY
Washington, DC**

In re

Energy Conservation Program: Test
Procedure for Set-Top Boxes;
Proposed Rule

Docket No. EERE-2012-BT-TP-0046
RIN Number 1904-AC52

**COMMENTS OF
THE NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION**

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DEPARTMENT OF ENERGY
Washington, DC**

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Energy Conservation Program: Test
Procedure for Set-Top Boxes;
Proposed Rule

Docket No. EERE-2012-BT-TP-0046
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**COMMENTS OF
THE NATIONAL CABLE & TELECOMMUNICATIONS ASSOCIATION**

The National Cable & Telecommunications Association (“NCTA”)¹ hereby submits its comments in response to the Notice of Proposed Rulemaking (“NOPR”) released by the Department of Energy (“DOE”) in the above-captioned proceeding.²

EXECUTIVE SUMMARY

NCTA opposes the NOPR’s proposal for a premature and unnecessary adoption of a DOE test procedure to supplant the ANSI consensus-based Consumer Electronics Association CEA-2043 test procedure.

NCTA appreciates that DOE has adjusted its set-top box approach somewhat, such as by recognizing that set-top boxes are not commodities and narrowing the scope of this proceeding to exclude gateway devices. But the NOPR still goes too far by pursuing the codification of a DOE-crafted set-top box test procedure – a continued regulatory approach that still threatens to undermine the energy efficiency and innovation that DOE is supposed to protect.

¹ NCTA is the principal trade association for the U.S. cable industry, representing cable operators serving more than 90 percent of the nation’s cable television households and more than 200 cable program networks. The cable industry is the nation’s largest provider of broadband service and provides competitive voice service to more than 25 million customers.

² *Energy Conservation Program: Test Procedure for Set-Top Boxes; Proposed Rule*, Notice of Proposed Rulemaking, 78 Fed. Reg. 5076 (Jan. 23, 2013) (“NOPR”).

One typical reason for a DOE test procedure is to provide standardized information for consumers to consider when purchasing appliances at retail. But set-top boxes are not consumer products covered by the Energy Policy and Conservation Act (“EPCA”); nearly all set-top boxes are purchased by a multichannel video programming distributor (“MVPD”), not by consumers; MVPDs already have sufficient information and incentives to evaluate the energy efficiency of the set-top boxes they purchase; and set-top boxes may be measured under uniform CEA-2043 test procedures that have already been developed under the formal, open standards-setting process of ANSI. Test procedures are therefore unnecessary for set-top boxes.

Instead, DOE’s obvious intended purpose for a test procedure is to enforce a forthcoming DOE-prescribed energy conservation standard for which it is laying the groundwork. But government efficiency standards for set-top boxes cannot be economically justified under the requirements of EPCA and DOE’s rules, which prohibit new conservation standards unless they would directly result in significantly better energy conservation than will be realized from market forces and non-regulatory approaches, including voluntary industry agreements.

Thus, DOE cannot continue to ignore the landmark December 2012 Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes (“Voluntary Agreement”) entered into by fifteen industry leaders representing all of the major MVPDs in the United States serving more than 90 million American households and 90% of Pay TV consumers.³ Just the first phase of its commitments when fully realized will result in annual residential electricity savings of at least \$1.5 billion, reducing carbon emissions by the equivalent of four power plants annually, years before any DOE rules could take effect. The Voluntary Agreement also includes much more: downloading “light sleep” energy efficiency capabilities to

³ The Voluntary Agreement is attached hereto as Exhibit 1.

existing set-top boxes in the field; providing “automatic power down;” making energy-efficient whole-home Digital Video Recorder (“DVR”) solutions available nationwide as an alternative to multiple in-home DVRs; and a commitment to field-test next-generation cable set-top boxes with an even more reduced power consumption mode and to deploy them if successful. To bolster accountability and transparency for consumers and regulators, the Voluntary Agreement provides for posting of product power consumption information for new set-top boxes by each company for its customers, testing against a uniform ANSI test method, verification of set-top box performance in the field, annual public reporting on energy efficiency improvements, compliance audits, and monitoring by an independent administrator.

The Voluntary Agreement will achieve these dramatic results years before any DOE rules could take effect in 2018 or later, and it can adapt quickly and flexibly to changes in technology and the market to seize new opportunities for energy efficiency while avoiding undermining the consumer benefits from rapid innovation. This initiative has received strong bipartisan praise from members of Congress as an exemplar of how to address complex energy efficiency challenges – exactly the type of consensus industry effort that Congress and the White House have repeatedly directed federal agencies to favor over government-engineered technology mandates. Governments in Europe and Australia have also elected to rely on voluntary agreements to pursue energy efficiency objectives for set-top boxes.

Moreover, the industry is already meeting regularly to keep updating energy-efficiency measures as the science advances, and will consult with government agencies, energy efficiency advocates, and others. This kind of voluntary, flexible development is critical if energy efficiency measures are to work with the highly varied, complex, and rapidly-changing nature of set-top boxes and the MVPD networks and services with which these set-top boxes are

integrated. It is essential that energy efficiency techniques do not impede the innovation and competition which have long characterized these industries and that they preserve or enhance the customer experience so that consumers do not reject them.

Under the National Technology Transfer and Advancement Act (NTTAA) and executive branch orders, federal policy favors such voluntary, market solutions, which invite a diversity and flexibility of approach that drives innovation and helps to promote U.S. leadership and competitiveness. DOE is obligated under EPCA not to adopt standards that would not produce energy efficiency superior to what will be achieved in the absence of regulation. DOE should suspend this proceeding and afford a reasonable chance for the Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes to work.

Even if DOE moves forward to consider efficiency standards, NTTAA requires DOE to use the CEA-2043 test procedure, since that consensus standard is consistent with applicable law and would be practical to use. This comprehensive standard has been developed and vetted by experts under the formal, open standards-setting process of ANSI and incorporated as part of the Voluntary Agreement,⁴ 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.

By contrast, DOE's proposed test procedure, which treats every different combination of software and hardware as a new model of set-top box, would lead to the designation of thousands of "models" of set-top boxes each of which would have to be tested separately with each update, a crushing and time-wasting burden for every MVPD and for hundreds of small businesses that DOE appears not to even know would be affected by its proposal. The proposed test procedure assumes a static and narrow view of the current market and technology that would constrain both

⁴ See Exhibit 1, Voluntary Agreement at Annex 6.

innovation and energy efficiency efforts. For example, the NOPR would exclude energy-efficient network DVRs from the definition of a DVR because they do not have integrated storage, would not give credit for reduced energy usage due to sleep performed at a pre-scheduled time, and would not permit MVPDs to introduce new features that could not fit within energy caps crafted for devices without those features. Innovation, consumer choice and competition would be stifled as manufacturers and MVPDs would remain handcuffed to outdated rules that, by the nature of the regulatory process, cannot quickly be changed. As a result, the very MVPDs who have voluntarily committed to energy efficiency would face a severe competitive disadvantage compared with rapidly-growing over-the-top and other alternative video distribution service providers that DOE has exempted from regulation, even when tens of millions of such devices are far less energy-efficient than MVPD-supplied set-top boxes. The Voluntary Agreement and CEA-2043 offer a superior and more practical alternative.

Finally, the NOPR's proposed course would violate EPCA and DOE's own rules. DOE's explicit refusal to even consider the substantial savings and benefits arising from the Voluntary Agreement is completely inconsistent with its obligation not to impose a standard that would not directly result in significantly better energy conservation than non-regulatory approaches. DOE would adopt its own wrongly-amended version of the comprehensive CEA-2043 consensus standard, when NTTAA and the Administration require federal agencies wherever possible to use technical standards that are developed or adopted by voluntary consensus standards bodies unless such use "is inconsistent with applicable law or otherwise impractical." DOE's proposed test procedures would impose thousands of unnecessary, costly tests on even the smallest of MVPDs, when EPCA requires that any test procedures "shall not be unduly burdensome to conduct." The proposed test procedures would delay or even derail the introduction of new

features to consumers and upgrades to service provider networks when EPCA requires DOE to avoid “any lessening of the utility or the performance of the covered products likely to result from the imposition of the standard,” and when the Obama Administration has directed that federal agencies strive to “promote innovation.” DOE’s exclusive focus on MVPD set-top boxes would impose a significant innovation-throttling competitive disadvantage on MVPDs while leaving hundreds of millions of competing alternative devices free from regulation, lessening the competition that DOE is supposed to protect.

Last but certainly not least, the NOPR’s proposals cannot lawfully be adopted because set-top boxes are not “consumer products” in the first place. Most set-top boxes are not purchased by consumers, but are instead integrated parts of an overall MVPD network. Consumers may return them if they change services, switch devices, move, or cancel service. Set-top boxes are not long-term purchases by consumers in which they could weigh higher up-front purchase prices in exchange for decreases in residential electricity bills.

For all of these reasons, DOE should suspend this proceeding to give the Voluntary Agreement an opportunity to work, and should not adopt a new government-crafted test procedure as proposed by the NOPR.

I. FEDERAL LAW PRECLUDES THE IMPOSITION OF AN UNNECESSARY DOE TEST PROCEDURE TO REPLACE THE CONSENSUS CEA-2043 TEST PROCEDURE

A. The NOPR Appears to Be Premised on a Premature Plan to Adopt Energy Efficiency Standards

In general, a federal test procedure can have two purposes: (1) to assist consumers in choosing energy efficient appliances measured under a consistent framework; and (2) to establish

the measuring stick used to enforce a federal energy conservation standard.⁵ But in this case, the first purpose cannot, and need not, be realized from a test procedure mandate because consumers typically lease set-top boxes as part of MVPD service, and routinely return, upgrade, or exchange them. Among other reasons, this is because set-top boxes are not interchangeable commodity retail products, but are instead extensions of complex service provider networks and security systems, with only certain specific models compatible for use in each MVPD system.⁶ Consumers therefore do not make purchasing decisions from among many retail set-top box choices that could be informed by uniform national test procedures.⁷ Instead, the “consumers” of nearly all set-top boxes used to access MVPD services are MVPDs, which are sophisticated buyers that already have access to sufficient information to make educated decisions about the energy efficiency of the set-top boxes that they purchase. Thus, when the Federal Trade Commission implemented its obligations under EPCA to adopt energy labeling regulations for televisions and consumer electronics equipment, it elected not to extend requirements to set-top boxes because the purchasing decisions for these boxes are not made by end-user consumers.⁸

⁵ See NOPR at 8.

⁶ Set-top boxes are deeply integrated into distribution networks with differences in network architectures, transmission protocol, software stacks, conditional access systems, out-of-band communications channels used for command and control of the set-top box, operating system and processor instruction sets, network control architecture in support of interactivity, and electronic program guide applications and guide metadata formats, among other variables. See Response of the National Cable & Telecommunications Association, Docket No. EERE-2010-BT-DET-0040; RIN Number 1904-AC52, Mar. 15, 2012 at 5 (“NCTA RFI Response”). The complete NCTA RFI Response is incorporated as part of these comments by reference.

⁷ Set-top boxes are leased to consumers, who may return them if they change services, switch devices, move, or cancel service. Set-top boxes therefore are not “consumer products” that may legally be placed within the scope of DOE energy-efficiency standard setting. See NCTA RFI Response at A-5, A-6.

⁸ See Federal Trade Commission, *In re Rule Concerning Disclosures Regarding Energy Consumption and Water Use of Certain Home Appliances and Other Products Required Under the Energy Policy and Conservation Act*, Notice of Proposed Rulemaking and Public Meeting Announcement, 75 Fed. Reg. 11483 (Mar. 11, 2010) (citing comments of Motorola, among others, as basis for decision; Motorola had argued that “In light of the fact that cable set-top boxes are primarily leased, not sold, to customers, any labeling or other disclosure requirement would not assist consumers in making purchasing decisions.”).

Moreover, when MVPD customers want to learn more about the energy consumption of the set-top boxes they use, they will be able to do so without any new DOE rules. Under the Voluntary Agreement, service providers will post set-top box energy consumption statistics, measured under the same uniform test procedures already prescribed by CEA-2043.⁹ The adoption of the proposed test procedure thus would not have any benefit toward the first purpose of consumer education.

Therefore, the only apparent purpose of a test procedure mandate would be in furtherance of a future energy conservation standard. In fact, the test procedure proposed by the NOPR appears to be designed for that purpose: it includes duty cycles and set-top performance requirements that could only be needed, if at all, for the enforcement of standards and that have no place in a test procedure; and DOE has already published a Notice of Data Availability charting a course for standards.¹⁰ But it would be legally and logically premature for DOE to prescribe test procedures for that purpose now when it has not established the necessary basis to adopt a standard, or even found set-top boxes to be a “covered product.”

Whereas in other cases it may have made sense to adopt test procedures prior to determining whether conservation standards would also be imposed (because the test procedures would be used for uniformity in consumer education), such an approach makes no sense here, where enforcement of standards would be the only purpose of a test procedure. The NOPR should therefore be suspended unless and until such time that DOE determines that energy efficiency standards must be adopted.

⁹ See Exhibit 1, Voluntary Agreement at § 7.5.

¹⁰ Energy Conservation Standards for Set-Top Boxes: Availability of Initial Analysis, Notice of Data Availability (Feb. 28, 2013).

B. Prior to Considering the Adoption of Energy Efficiency Standards, DOE Should Afford the Voluntary Agreement an Opportunity to Work

No government-imposed efficiency standards are warranted at this time. The Voluntary Agreement has already established a consensus standard for energy efficiency that will result in more immediate, substantial savings than could be realized by DOE regulation. DOE has inappropriately suggested that it will not credit the energy savings derived from the Voluntary Agreement because not all “stakeholders” are participating in the agreement.¹¹ The tangible energy savings produced by a voluntary agreement do not become more or less real by the participation of particular policy advocates that do not purchase or manufacture set-top boxes. And under EPCA, DOE may only adopt regulatory standards that are technologically and economically feasible and that would directly produce savings superior to non-regulatory marketplace approaches.¹² DOE has committed by rule that prior to the adoption of any conservation standard it will “fully consider non-regulatory approaches” and “the effectiveness of market forces and non-regulatory approaches,” including “voluntary programs,”¹³ and will

¹¹ Energy Conservation Standards for Set-Top Boxes: Availability of Initial Analysis, Notice of Data Availability (Feb. 28, 2013) (“NODA”) at 6 (noting that DOE will only consider “any non-regulatory agreement reached between all stakeholders as an alternative to a regulatory standard”).

¹² 42 U.S.C. §§ 6295(o)(2)(B) (“In determining whether a standard is economically justified, the Secretary shall, after receiving views and comments furnished with respect to the proposed standard, determine whether the benefits of the standard exceed its burdens by, to the greatest extent practicable, considering ... the total projected amount of energy, or as applicable, water, savings likely to result directly from the imposition of the standard”), 6295(o)(3) (“The Secretary may not prescribe an amended or new standard under this section for a type (or class) of covered product if ... the establishment of such standard will not result in significant conservation of energy or ... is not technologically feasible or economically justified”).

¹³ 10 C.F.R. Ch. 11, Appendix A to Subpart C of Part 430—Procedures, Interpretations and Policies for Consideration of New or Revised Conservation Standards for Consumer Products, Objectives, Objective 1(e) (committing DOE to the following objective: “Fully consider non-regulatory approaches. The Department seeks to understand the effects of market forces and voluntary programs on encouraging the purchase of energy efficient products so that the incremental impacts of a new or revised standard can be accurately assessed and the Department can make informed decisions about where standards and voluntary “market pull” programs can be used most effectively. Under the guidelines in this appendix, DOE will solicit information on the effectiveness of market forces and non-regulatory approaches for encouraging the purchase of energy efficient products, and will carefully consider this information in

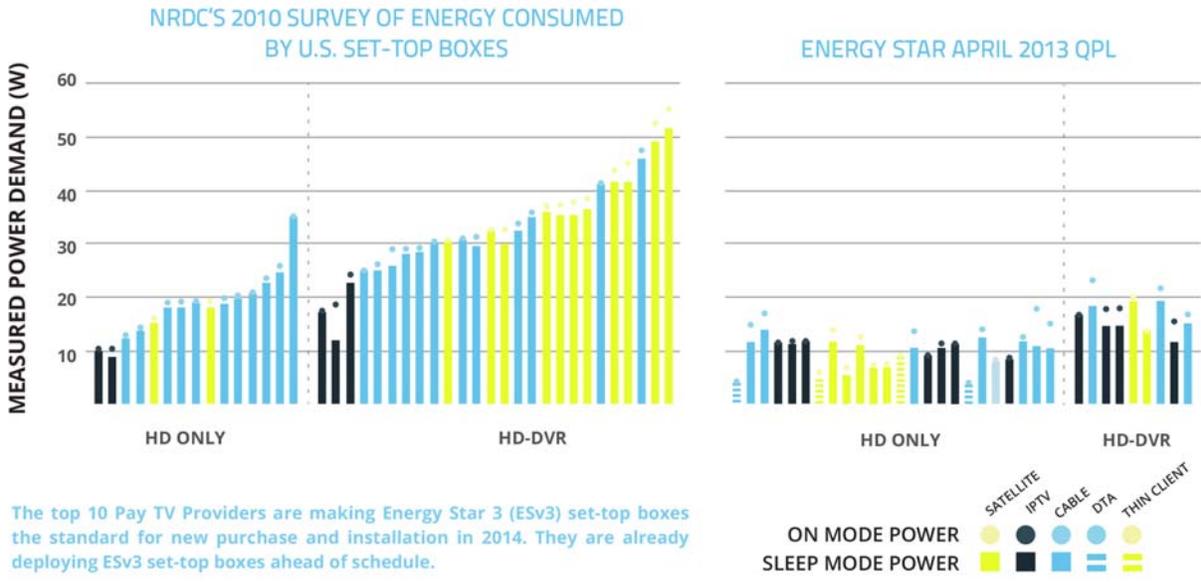
disfavor mandatory standards that “would not result in significant energy conservation relative to non-regulatory approaches.”¹⁴

It would be a tall order to conclude that mandatory standards are superior to market forces and non-regulatory approaches, given the substantial savings secured by the Voluntary Agreement. The Voluntary Agreement was announced on December 6, 2012, by fifteen industry leaders representing all of the major MVPDs in the United States, covering more than 90 million American households and 90% of Pay TV consumers, and the manufacturers that produce most of the set-top boxes used by those providers.¹⁵ The Voluntary Agreement includes specific energy performance standards, starting with a commitment that, beginning in 2014, 90% or more of new set-top boxes will meet Energy Star 3.0 standards (compared to only 25% needed to be classified as an Energy Star partner). Just the first phase of this commitment, when fully realized, will result in annual residential electricity savings of at least \$1.5 billion, reducing carbon emissions by the equivalent of four power plants annually.

The following chart illustrates the dramatic energy efficiency savings brought about by the Voluntary Agreement. Two years ago, NRDC presented its test results for set-top boxes, shown on the left hand side of the following graph. Under the Voluntary Agreement, set-top boxes operating at Energy Star 3.0 efficiency levels will be the national norm in 2014. The right hand side of the graph shows the effect: dramatic improvements in efficiency, with ESv3 DVRs operating at double the efficiency reported by NRDC.

assessing the benefits of standards.”). *See also id.* at 4, Process for Developing Efficiency Standards and Factors to be Considered, Factor (d)(7)(viii) (“analysis of energy savings and consumer impacts will incorporate an assessment of the impacts of market forces and existing voluntary programs in promoting product efficiency, usage and related characteristics in the absence of updated efficiency standards.”).

¹⁴*Id.* at 5(e)(3)(D) (if a “candidate standard level would not result in significant energy conservation relative to non-regulatory approaches, that standard level will be presumed not to be economically justified unless the Department determines that other specifically identified expected benefits of the standard would outweigh the expected adverse effects.”).



The Voluntary Agreement participants are already ahead of schedule. For example, the cable industry alone has deployed 13 million ENERGY STAR 3.0 set-top boxes, and over 70% of their newest purchases and installations are ENERGY STAR 3.0 compliant. Cable operators have downloaded “light sleep” energy efficiency capabilities to 12 million set-top boxes that are already in homes, saving \$50 million in residential power annually. Participating signatories are also providing “automatic power down” or similar efficiencies in millions of other set-top boxes, and are making energy efficient whole-home and network-based DVR solutions available nationwide as an alternative to multiple in-home DVRs.

Research and development for next-generation cable set-top boxes with even lower power consumption mode is well underway, with multiple experts and a dedicated cable industry Energy Lab established for these efforts. The cable industry is committed to field-test such units in 2014 and to deploy them if successful. Next generation set-top boxes will use new chips, new specifications, and new software, all of which need to be integrated into a wide variety of complex cable networks that were built at different times with different design, signaling,

software, security, program guides and other applications and services that must all work together.

To bolster accountability and transparency, the Voluntary Agreement adopted processes for verification of set-top box performance in the field;¹⁶ annual public reporting on energy efficiency improvements;¹⁷ and posting of product power consumption information for new set-top boxes by each company for its customers.¹⁸ Compliance will be monitored by an independent administrator and each participant is subject to audit.¹⁹

Finally, the industry is already meeting regularly to keep updating energy efficiency measures as the science advances, and will consult with government agencies, energy efficiency advocates, and others. This kind of voluntary, flexible development is critical if energy efficiency measures are to work with the highly varied, complex and rapidly evolving nature of set-top boxes and the networks and services with which these set-top boxes are integrated. It is also essential that energy efficiency techniques do not impede the innovation and competition which have long characterized these industries and that they preserve or enhance the customer experience, so that consumers do not reject them.

The Voluntary Agreement will achieve these dramatic results years before any DOE rules could take effect, and it can adapt quickly and flexibly to changes in technology and the market to seize new opportunities for energy efficiency while avoiding undermining the consumer benefits from rapid innovation. DOE should give the Voluntary Agreement a chance to work.

Under the National Technology Transfer and Advancement Act (NTTAA) and executive branch orders discussed below, federal policy favors such voluntary, market solutions, which

¹⁶ See Exhibit 1, Voluntary Agreement at § 8.2.

¹⁷ *Id.* at §§ 7.6, 10.1.1.2, Annex 8.

¹⁸ *Id.* at § 7.5.

¹⁹ *Id.* at §§ 7, 8.

invite a diversity and flexibility of approach that drives innovation and helps to promote U.S. leadership and competitiveness. Accordingly, as noted above, DOE’s rules require it to “fully consider” the incremental impact of a proposed conservation standards compared to the “effects of market forces and voluntary programs”²⁰ and will disfavor mandatory standards that “would not result in significant energy conservation relative to non-regulatory approaches.”²¹

Governments in Europe and Australia have also elected to rely on voluntary agreements to pursue energy efficiency objectives for set-top boxes.²² Those agreements served as models for the U.S. Voluntary Agreement. This initiative has received strong bipartisan praise “for proactively developing a consensus agreement ... and not waiting for a federal mandate;” as an agreement “which will save consumers billions of dollars;” as a “strong industry-led efficiency agreement [that] can deliver meaningful near-term energy savings while laying a foundation for future innovation and efficiency improvements;” and as “a wonderful example of how we can capture the benefits of energy efficiency without relying on top-down government, where Congress chooses the winners and losers instead of the market.”²³ The Voluntary Agreement is

²⁰ *See supra* n. 13.

²¹ *See supra* n. 14.

²² *See, e.g.*, Voluntary Industry Agreement to improve the energy consumption of Complex Set Top Boxes within the EU Proposal from the industry group, Version 3.0 (Sept. 2, 2011); European Council for an Energy Efficient Economy, Lot 18: Complex set top boxes (available at http://www.eceee.org/Eco_design/products/complex_set_top_boxes/); Subscription Television Industry, Voluntary Code for Improving the Energy Efficiency of Conditional-Access Set Top Boxes - An industry initiative supported by government under the National Framework for Energy Efficiency, Version 3, August 2012, available at <http://www.astra.org.au/Menu/Policy/STV-Set-Top-Boxes>.

²³ Press Release, Sen. Dianne Feinstein, Feinstein Applauds Agreement on Energy Efficient Set-Top Boxes (Dec. 6, 2012) (“Last year, I asked the industry to utilize more efficient equipment, and I am very pleased they have taken the first step to accomplish that. I would like to congratulate the 15 companies that joined today’s agreement, which will save consumers billions of dollars in reduced electricity bills.”); Press Release, Sen. Lisa Murkowski, Murkowski Commends Cable Box Energy Efficiency Agreement (Dec. 6, 2012) (“I commend the industry for proactively developing a consensus agreement that will save their customers money, and not waiting for a federal mandate that forces them to act... This agreement is a wonderful example of how we can capture the benefits of energy efficiency without relying on top-down government, where Congress chooses the winners and losers instead of the market.”); Press

an exemplar of how to address complex energy efficiency challenges, and is exactly the type of consensus industry effort that Congress and the White House have repeatedly directed federal agencies to favor over government-engineered technology mandates.

C. Government-Cable Cooperation with Private Standards Has a Proven History of Success

The cable industry has previously proven the efficacy of this federal policy to achieve government objectives through private standards. In the Communications Assistance for Law Enforcement Act (“CALEA”), Congress required telecommunications carriers to provide lawful intercept capability to law enforcement agencies to conduct electronic surveillance. Instead of mandating a particular standard, the government looked to standards bodies to create safe harbors. Through CableLabs, the cable industry’s research and development consortium, the industry worked with law enforcement to update the CableLabs PacketCable specifications in order to afford lawful intercept while preserving the privacy of cable subscribers not subject to warrants, in a manner compatible with the practical and technical aspects of cable systems. When CALEA was later determined to apply to broadband Internet access services, the cable industry collaborated again with law enforcement agencies to update the applicable broadband specifications as well. By coming to an industry consortium, the government was able to work with us directly to draw on our expertise; our institutional knowledge of the technology; our ability to shape specifications with appropriate regard to actual costs; our knowledge of the practical application of technology; our ability to address associated intellectual property issues

Release, Rep. Ed Markey, Markey: End of Republican War on Energy Efficiency? (Feb. 26, 2013) (“In the rapidly changing telecommunications space, this strong industry-led efficiency agreement can deliver meaningful near-term energy savings while laying a foundation for future innovation and efficiency improvements.”); Press Release, Rep. John Dingell, Dingell Statement Regarding Energy & Power Hearing on Energy Efficient Technologies (Feb. 26, 2013) (“The cable industry is to be commended on this forward thinking to adopt practices that can take effect now and drastically improve efficiency moving forward.”).

through commercial solutions; our familiarity with actual and possible implementations; our familiarity with multiple standards-setting options; our relationships with key companies and individuals; and our ability to build consensus and revise standards dynamically. FBI Assistant Director Kerry E. Haynes praised the specification produced through FBI-cable cooperation as “an extraordinary example of law enforcement and industry collaboration in the public interest. It stands as a model for future industry-law enforcement cooperative efforts.”²⁴ This specification is now an international standard. NCTA regards this experience as strong validation of current U.S. standards-setting policy to use commercially developed “voluntary consensus standards” where practical.

DOE can reasonably expect the Voluntary Agreement to succeed without the need for regulation. NCTA and others have demonstrated that cable operators and their equipment suppliers have incentives to be energy efficient, because more efficient set-top boxes generate less heat and operate at lower temperatures, which translates into lower component failure rates and fewer service calls from failed equipment.²⁵ The Voluntary Agreement has established an organized, flexible structure to implement industry-wide standards to conserve energy in the set-top boxes MVPDs deploy to consumers. Therefore, DOE should suspend this proceeding and give the Voluntary Agreement a chance to work.

²⁴ Press Release, Federal Bureau of Investigation, *Federal Bureau of Investigation Calls CableLabs®' Release of Its Packetcable™ Electronic Surveillance Technical Specification “A Positive Development” For Cable Industry Compliance With The Communications Assistance For Law Enforcement Act (CALEA) And The Lawful Access Needs Of Federal, State And Local Law Enforcement* (Sept. 7, 2004), available at <http://www.fbi.gov/news/pressrel/press-releases/federal-bureau-of-investigation-calls-cablelabsae-release-of-its-packetcabletm>.

²⁵ See NCTA RFI Response at 21 (noting that increased energy efficiency aligns with cable operator business objectives).

D. Even if DOE Later Adopts its Own Efficiency Standards, it Is Required to Utilize CEA-2043 Consensus Test Procedures Rather than Creating New Procedures

Even if DOE believed that it were necessary to scrap the Voluntary Agreement in favor of new DOE energy conservation standards, it would still 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 DOE to use private consensus standards “wherever possible, in lieu of creating proprietary, non-consensus standards.”²⁶ 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.”²⁷ This flexible approach enables rapid innovation, competition, and consumer choice.²⁸

CEA-2043 is in no way “inconsistent with law or otherwise impractical” to use as a test procedure for set-top boxes. At the public meeting, DOE staff stated that its objectives for a test procedure are that it be “repeatable, reproducible, representative, not overly burdensome, anticipates technology changes, discourages circumvention, unambiguous, harmonizes with

²⁶ <http://www.nist.gov/standardsgov/nttaa.cfm>, referencing NTTAA.

²⁷ 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.” NOPR at 20.

²⁸ See, e.g., Phil J. Weiser, *Making the World Safe for Standard Setting*, Univ. of Colorado Law Legal Studies Research Paper Series, Working Paper No. 08-06, at 7, 35 (July 27, 2007; revised October 13 2008) (quoting Clinton Administration praise for the model of private standard setting and conclusion that it was “unwise and unnecessary for governments to mandate standards for electronic commerce”), available at <http://ssrn.com/abstract=1003432>.

related test procedures, and consistent with legal authority.”²⁹ CEA-2043 meets all of these criteria, as demonstrated in Exhibit 3 hereto, which provides a point by point chart indicating why DOE’s proposed departures from CEA-2043 are unnecessary and/or inappropriate.³⁰ The standard has not yet been finalized because it was held open to consider revisions proposed by the NOPR, but it is expected to be adopted well before DOE could complete this rulemaking.

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.”³¹ ANSI’s exacting guidelines ensure levels of equity, fair play, and openness in standards development that fit squarely under the strictures of NTTAA.³²

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.”³³ Pursuant to this mandate, DOE “must use” CEA-2043 to the extent that DOE requires a test procedure for set-top boxes. Last year, the Obama Administration

²⁹ See Department of Energy: Set-top Box Test Procedure Notice of Proposed Rulemaking Public Meeting, Presentation slides (“Public Meeting Slides”), at slide 12.

³⁰ Exhibit 3 provides a detailed technical analysis of DOE’s proposed changes to CEA-2043. As detailed in the technical analysis, while some of the proposals are appropriate and are being incorporated through the ANSI comment process, many others are not, and many more are out of scope for a test plan. For example, the DOE proposal specifies performance standards, standards for energy consumption and even duty cycles. A test method should identify the method for obtaining energy efficiency measurements, rather than to define consumption standards or performance requirements, which is a separate undertaking.

³¹ Introduction to ANSI, ANSI.org, *available at* http://www.ansi.org/about_ansi/introduction/introduction.aspx?menuid=1#.UVC0X1eprlQ.

³² 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>.

³³ 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).

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.”³⁴ If DOE 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.”³⁵

NTTAA directs DOE, where appropriate, to “consult with voluntary, private sector, consensus standards bodies and shall, when such participation is in the public interest and is compatible with agency and departmental missions, authorities, priorities, and budget resources, participate with such bodies in the development of technical standards.”³⁶ The NOPR recognizes that “DOE representatives have observed the development of CEA-2043, attended conference call meetings between STB manufacturers and energy advocates during draft revisions, and have been included on all notes and documentation from the CEA R04 WG13 STB Energy Consumption working group.”³⁷ Given that DOE and its consultants were participants in this process, it would have been constructive if its feedback could have been provided earlier in that forum, as NTTAA directs DOE to do, rather than later through the NOPR. Nonetheless, the final adoption of CEA-2043 was deferred so that the NOPR could be treated as a comment filed for consideration through the CEA-2043 standards process, and it is anticipated that some of the

³⁴ 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).

³⁵ OMB Circular A-119.

³⁶ NTTAA, § 12(d)(2).

³⁷ NOPR at 21.

ideas raised by the NOPR will be incorporated into the standard (as indicated in Exhibit 3 hereto). Going forward, NCTA welcomes DOE's participation in the ANSI process.

For these reasons, it would be unnecessary, and unlawful, for DOE to create its own new test procedure standard to replace CEA-2043. Moreover, as demonstrated in the next section below, the NOPR's specific proposals that deviate from CEA-2043 would be harmful to energy efficiency objectives, consumers, innovation, and the competitive market.

II. THE PROPOSED TEST PROCEDURE'S FLAWS ILLUSTRATE THE UNSUITABILITY OF A FEDERALLY-MANDATED TEST PROCEDURE LOCKED INTO CODIFIED REGULATION

To DOE's credit, the NOPR wisely found that its prior proposed scope may have been "too broad,"³⁸ and declines an attempt to craft test procedures or standards for network equipment or gateways.³⁹ We agree that gateways should be excluded. Gateways are in a very early stage of development, so the potential for regulation to unintentionally skew and undermine innovation in such devices is now at its greatest. A rule that discouraged gateways would be counterproductive for overall efficiency goals since gateways can enable whole-home and network-based solutions that use less total energy for the delivery of similar services. Few gateways have been deployed, so the inclusion of gateways would not meaningfully influence national energy consumption. The calculus for determining whether and how gateways can be placed into a sleep mode is considerably different than that for set-top boxes, particularly for gateways that are used to support telephone and alarm services. It is one thing to hypothesize (correctly or not) that consumers may accept a 30-second boot time from sleep for video services. It would be quite another thing for a consumer not to have immediate access to place

³⁸ NOPR at 27.

³⁹ Gateways are excluded by limiting "set-top boxes" to those with a direct video connection (such as HDMI) to a display device. *See* NOPR at 22.

an outgoing telephone call (such as to 911), to receive immediate incoming calls (including reverse 911 calls), or to send an alarm signal.⁴⁰

The NOPR also reflects recognition that, unlike appliances previously regulated by DOE, set-top boxes are not commodities purchased at the store by consumers amongst many choices, but instead are varied devices each matched only to specific MVPD systems.⁴¹

The NOPR also properly rejected calls from some commenters to require that testing only be performed in the field. Citing comments expressing concern about “the practicality of testing a STB on a live network,” the NOPR recognizes that set-top boxes should be able to be tested in a laboratory environment, such as that developed by CableLabs.⁴² CableLabs has built and maintained a laboratory with legacy and current hardware, the current software, code drops, and key applications (such as program guides) which cable operators change frequently. Closed network testing in this environment enables an accurate assessment of the various network configurations, including conditional access, channel lineup, control signal network (DAVIC, DC-II, or DSG), the guides in use, and set-top box operation. This realistic testing environment enables consistent, repeatable, and accurate measurement of energy consumption in various set-

⁴⁰ Reverse 911 enables law enforcement to pinpoint specific geographic areas to provide immediate warnings about local hazards such as tornadoes or life-threatening criminal activity. *See* <http://www.cassidiancommunications.com/notification-solutions/products/reverse-911.php>.

⁴¹ EPA recently concurred that the NOPR excludes gateways, because it announced that for Energy Star Version 4.1 it planned to use the NOPR’s definition for set-top boxes and then proceeded to explain that it would use CEA-2043 to measure gateways rather than any DOE procedure (presumably since it found that the DOE proposal would not include gateways). *See* ENERGY STAR Product Specification for Set-top Boxes Eligibility Criteria Draft 1 Version 4.1 (defining a set-top box as “providing video output using at least one direct video connection”); Environmental Protection Agency, Cover Letter for Draft 1 ENERGY STAR Version 4.1 specification for set-top boxes (March 18, 2013) (“EPA intends to harmonize with the proposed U.S. DOE set-top box test procedure released in January 2013...for testing STBs.”).

⁴² *See* NOPR at 56 (proposing that “[f]or testing the STB in a laboratory environment, DOE proposes to adopt the specification in the draft CEA-2043 standard, which states that the STB may be tested in a laboratory environment containing control equipment comparable to a live service provider system”).

top boxes and network configurations, and is accordingly being used in the implementation of the Voluntary Agreement.⁴³

But even while pulling back in some areas, the NOPR still reaches too far. As discussed in the examples below, the NOPR proposes a test procedure built on assumptions about the current market and technology that will quickly change. Innovation would be stifled as manufacturers and MVPDs would remain handcuffed to outdated rules that, by the nature of the regulatory process, cannot quickly be changed. This would delay – and in some cases derail – the development of newer models that are both more energy efficient and introduce new features.

DOE could try to address some of the immediate problems raised by the examples below, such as by broadening its definition of DVR and permitting new features to be turned off for testing. While that would remove some of the pitfalls that would otherwise lie ahead, moving forward with test procedure rules, even with those changes, would still miss a larger point. The fact is that the testing framework that DOE has developed for appliances does not fit, nor can it keep up with, the set-top box market. Technical standards for set-top boxes and similar advanced technology devices adopted by private standards bodies have been amended repeatedly year after year, through working groups that sometimes meet and discuss open issues weekly or more.⁴⁴ It is not realistic to expect that test procedures enshrined in federal regulations could be continuously refined with the necessary speed to keep up with innovation in this dynamic market. Therefore, DOE should not cement its own test procedure in federal rules. Instead, it

⁴³ Section 8.2 of the Voluntary Agreement also includes provisions for field verification, but not as the sole source of test results.

⁴⁴ For example, the OpenCable Host Device 2.1-CFR specification, which sets forth minimum capabilities to be supported by bi-directional digital cable set-top boxes, has been revised 15 times since released in 2007, with at least two revisions in each calendar year. CEA-861, which sets standards for digital output data requirements for set-top boxes, was established in January 2001, and was amended or clarified in December 2001, May 2002, November 2004, August 2005, July 2006, March 2008, April 2009, and July 2011, and is expected to be revised again in 2013.

should rely upon a standards-body consensus test procedures for set-top boxes as they change from time to time through the recognized standards forums, by adopting as its test procedure CEA-2043 and its successor amendments adopted through ANSI processes.⁴⁵

By applying preconceptions to a complex, rapidly evolving market, DOE would hamper the industry's ability to create flexible solutions to reduce energy use while still providing innovative and competitive services. EPCA requires DOE to avoid "any lessening of the utility or the performance of the covered products likely to result from the imposition of the standard."⁴⁶ The Obama Administration directs that federal agencies strive to "promote innovation."⁴⁷ EPCA requires that any test procedures "shall not be unduly burdensome to conduct." *DOE's proposed approach would violate all of these directives.*

A. The Proposed Test Procedure Would Create Disincentives for the Adoption of New Efficiencies

A test procedure with specific definitions based upon DOE's conceptions of current technology would quickly become outdated in ways that would constrain not only innovation, but also energy efficiency. For example, the NOPR proposes to define a DVR as a set-top box that records programming "on a hard disk drive (HDD) or other non-volatile storage device integrated into the STB."⁴⁸ This restrictive definition would frustrate and disincite efforts by manufacturers and cable operators who would otherwise work to develop new options for

⁴⁵ The NOPR recognizes that DOE may incorporate by reference an industry standard rather than setting forth the details of a standard in its regulations. *See* NOPR at 34 (proposing to incorporate by reference ANSI/SCTE 28 for the definition of POD and ISO/IEC 7816-12 for the definition of Smart Card).

⁴⁶ 42 U.S.C. § 6295(o)(2)(B)(i)(IV).

⁴⁷ Improving Regulation and Regulatory Review, Executive Order 13563, 76 Fed. Reg. 3821 (Jan. 21, 2011).

⁴⁸ NOPR at 30.

recording functionality, such as network-based DVRs.⁴⁹ Network-based DVRs can save consumers electricity and save energy overall because cable systems can manage energy load on a shared basis. If these devices are not deemed DVRs under a DOE test procedure, an MVPD would be prohibited by EPCA from representing a network-based DVR as a DVR with improved energy efficiency compared with integrated DVRs.⁵⁰ Thus, the devices could not qualify as a DVR for standards purposes, or perhaps even be marketed as a DVR at all, because of an outmoded definition that required an integrated storage device.

B. The NOPR's Proposals Would Result in Designation of an Unmanageable Number of Product Classes and Basic Models and Unduly Burdensome Testing Costs

DOE correctly understands that set-top boxes are not uniform commodities but instead are highly-varied essential components for use with cable networks whose energy usage will vary not only by physical model but depending on their local implementation as part of a particular cable network. At the same time, it is essential that DOE recognize the overwhelming complexity this variation poses for an attempt to codify an energy efficiency program into federal rules.

NCTA previously explained that because of the complexity and diversity of set-top boxes, DOE would have to create more than 2000 product classes just to account for the different allowance variables now part of the Energy Star program for set-top boxes.⁵¹ This number will only increase as set-top boxes continue to become more varied and elaborate. In today's rapidly changing environment, no one can predict the precise suites of new features and services that

⁴⁹ A network-based DVR allows cable subscribers to time-shift television programming by recording and storing content on the provider's network rather than on a set-top box in the subscriber's home. The recorded programming may then be accessed by the subscriber via set-top boxes or other connected devices.

⁵⁰ 42 U.S.C. § 6293(c)(2).

⁵¹ NCTA RFI Response at 40-43.

innovation may be able to deliver in 2018, or which of those features and services consumers may come to demand, or the amount of energy that those features and services will require. Therefore, it is impossible to accurately determine today all of the types of product classes that would be appropriate by 2018.

But under the NOPR, the product classifications are only the beginning of the complexity. The NOPR proposes to classify as a separate “basic model” every unique combination of software loaded onto each model of set-top box by each MVPD.⁵² We agree that software implementation can affect energy usage and it must be taken into account in any effective energy efficiency program. But the proposed classification scheme would lead to the designation of thousands of “models” of set-top boxes that would have to be tested separately by MVPDs, if, as proposed by the NOPR, each were deemed a manufacturer.

First, some NCTA members have more than 150 unique set-top box model numbers in their inventories. The number of models has grown significantly in recent years in part due to the increase in the number of vendors. Second, operators have multiple combinations of software deployed in their set-top boxes at any given time. A typical set-top box today may have the firmware loaded by the manufacturer plus separate software each for the electronic programming guide, the video-on-demand client, and various Enhanced TV Binary Interchange Format (EBIF) applications, such as for caller ID display on a television, audience measurement, and shopping or other interactive applications. Operators are likely to deploy numerous different software combinations on a particular physical set-top box model at one time, varied depending

⁵² See NOPR at 29 (“[I]n order for multiple STBs to be in the same basic model they must have essentially the same software downloads and hardware integration.”); NOPR at 23 (“DOE’s proposed definition refers to a device that is manufactured when both the hardware components and the software is loaded on the device such that its primary purpose is receiving and outputting video.”); NOPR at 103 (recognizing that because of its proposed definitions, some businesses in the category “Cable and Other Subscription Programming” would be classified as manufacturers).

upon (1) the types of services ordered by the customer, (2) the date the customer started or changed services, (3) the other third party devices and applications used by the customer, (4) the type of customer (residential, commercial, hospitality (i.e., hotel), video-only or bundled), (5) the location of the customer, (6) capabilities the operator is building into the network and devices as a foundation for new services, and (7) the configuration of network equipment at the headend serving that customer's location. *A single manufacturer model number may have a dozen or more different software combinations just at one point in time, meaning that 150 manufacturer models could equate to well more than 1000 "basic models" to test right out of the gate. Software can be upgraded or changed multiple times a year, and each time a new "basic model" would have to be tested. A single physical set-top box deployed to a single customer's home could easily be re-classified as a new model more than 10 times during its useful life. And the diversity of software deployments is only likely to increase in the future, leading to even more required testing of additional "basic models," a vastly more complicated and burdensome approach than is required for an effective energy efficiency program.*

While software changes more frequently, hardware changes as well. Some changes are minor, such as a change in the supplier of resistors or memory chips; some are more significant, such as a transition to a faster processor. It would be one thing, after such changes, to require the manufacturer to test the revised model one time nationally, but quite another to effectively require each of hundreds of cable operators to test this "new" model not once but dozens of times with each of its software combinations.

Even aside from the extreme cost and impracticality of such testing – which would violate DOE's own objective that a test procedure not be "overly burdensome"⁵³ – such a rule

⁵³ 42 U.S.C. § 6293(b)(3) ("Any test procedures prescribed or amended under this section...shall not be unduly burdensome to conduct"); NOPR at 9 ("EPCA provides in relevant part that any test procedure

would delay, chill, and complicate the rollout of new software to consumers. If a cable operator had already performed energy testing on 100 “basic models” as defined by the NOPR, and then wanted to roll out a new EBIF application, it would apparently have to conduct 100 more tests because each of those previously tested models would become yet another one with the new application. The cable industry previously learned first-hand that such an approach is impractical and counterproductive. At one time, CableLabs required certification for each software update for cable modems and telephone adapters, but it abandoned this requirement as it became too onerous and was ultimately determined to be unnecessary. We expect that this problem would be far worse with set-top boxes, which have far more features and variation.

DOE has also underestimated the cost of testing. Small and mid-sized operators would likely not have the appropriate resources to conduct in-house testing, and outside firms would likely be approximately \$150-200 per hour, well in excess of the \$40.98 estimated by the NOPR (using 2008 data), including separate lab charges. Operators that do conduct in-house testing would also incur much higher costs than the basic wage of the testing personnel, for overhead, employee benefits, training, development and maintenance of additional lab facilities (including calibration, certification, security, and audit of lab facilities), preparation of test reports, storage and security of data, addressing failures and issues that arise from testing, time for set-up and breakdown.

For these reasons, the NOPR fails to set forth an accurate initial regulatory flexibility analysis as required by 5 U.S.C. § 603. The Regulatory Flexibility Act also requires that the NOPR “contain a description of any significant alternatives to the proposed rule which

prescribed or amended under this section shall be reasonably designed to produce test results which measure energy efficiency...and shall not be unduly burdensome to conduct.”); Public Meeting Slides, at slide 12.

accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities.”⁵⁴ The use of CEA-2043 rather than a new DOE test procedure would be substantially less burdensome on small entities.

Therefore, the testing regime and definitions proposed by the NOPR are unreasonable, impractical, unduly costly, and would undermine innovation and the delivery of new services to consumers.

C. The NOPR Fails to Give Appropriate Credit for Energy-Saving Pre-Scheduled Sleep

Similarly, the NOPR’s proposed construction of sleep mode testing would fail to give credit for reduced energy usage due to sleep performed at a pre-scheduled time. To qualify as sleep mode under the DOE test, sleep must be entered either because of user action (manual sleep) or a period of inaction (resulting in “auto power down” or “APD”).⁵⁵ A set-top box would not qualify as having auto power down if it did not enter sleep mode during testing within four hours.⁵⁶ This approach could miss capturing sleep mode savings where a set-top box is programmed to automatically enter sleep mode at particular times of expected user inactivity, which may occur much sooner than 4 hours but not necessarily within the time period in which a test is conducted. For example, a service provider could program set-top boxes to sleep each day at 1 a.m. and awake with the first pre-scheduled recording event or user activity. This option could have comparable potential energy savings to APD triggered by four hours of inactivity, since pre-scheduled sleep could sometimes be triggered much sooner than APD for consumers who typically used the device shortly before going to sleep.⁵⁷ A pre-determined sleep time may

⁵⁴ 5 U.S.C. § 603(b).

⁵⁵ See NOPR at 74.

⁵⁶ See NOPR at 83.

⁵⁷ See NOPR at 83-86.

be more effective at reducing energy use, and manufacturers and cable operators should be given the flexibility to determine how best to reduce energy use without compromising the performance of set-top boxes. But the proposed test procedure does not include this or other more flexible options in its methods for measuring sleep performance.

D. The NOPR’s Prohibition on Deactivation of New Features Would Stifle Innovation and New Services

A major flaw of DOE’s proposed test method is that it would not allow for turning off new features or functionalities when testing set-top boxes against a standard. Such a rule would paralyze innovation and new services by effectively prohibiting their inclusion in new devices unless they could be squeezed in under the energy usage cap restriction that had been designed for set-top boxes lacking such features. Otherwise, manufacturers would have to delay the introduction of a new feature pending the completion of a slow-moving petition for waiver under Section 430.27 of DOE’s rules⁵⁸ or rulemaking change in an energy standard, or just forgo the new feature altogether. DOE has made it clear that the proposed test procedure is intended to be used in conjunction with an energy standard. As we illustrate below, a DOE energy standard enforced with a test procedure not flexible enough to permit the timely introduction of new features would pose a serious threat to innovation in this market.

1. The Video Services Market Demands Rapid Implementation of Innovation

The cable industry has invested more than \$200 billion in facilities and equipment since 1996 to build interactive broadband networks that enable operators to update set-top boxes, download new guides and software, and integrate new applications. That investment and innovation throughout the industry have unleashed rapid development of new services and

⁵⁸ 10 C.F.R. § 430.27.

options for consumers and dramatic changes in cable networks and equipment, including set-top boxes.

We have explained previously how set-top boxes must operate as part of complex, variable and dynamic networks that evolve rapidly as services evolve.⁵⁹ But set-top box design is even more complicated than that. Service providers, who purchase their set-top boxes from their suppliers, must deploy equipment that is of reasonable cost but will not become instantly obsolete. This is a challenging balance when both the market and consumer expectations change rapidly outside of any individual service provider's environment. For example, today, there is growing interest in ultra-high resolution (4K) television, but the pace at which such programming might grow is unknown. Nevertheless, if a service provider installs set-top boxes into consumer homes and retains ownership and financial responsibility for them, the provider may want to add HEVC⁶⁰ to the set-top boxes to anticipate and accommodate the greater network compression that will be required to accommodate 4K. That capability would not be used for some period until 4K is launched, but launch should not require a DOE rulemaking or waiver when all other video devices unregulated by DOE would be permitted to offer 4K. Set-top boxes and other MVPD video devices are deployed in the MVPD's network and environment, but content keeps changing. It is high-definition today, 3D tomorrow, 4K or 8K thereafter, with new advanced interactive advertising evolving rapidly. Meanwhile, other consumer devices with which set-top boxes interact, such as tablets, displays, sensors, home networks, also continue to innovate in ways that service providers must try to anticipate and address.

⁵⁹ See NCTA RFI Response at 26-27.

⁶⁰ High Efficiency Video Coding (HEVC) is a video compression standard being developed by MPEG and ITU as a successor to H.264/MPEG-4 AVC (Advanced Video Coding).

Service providers cannot anticipate every possible innovation in content or consumer devices, but they must have the ability to make judgments about what new features should be included in set-top boxes to anticipate and even help build new markets, such as markets for 4K. If they cannot, because DOE rules have intervened, consumer choice, innovation, and competition each will suffer, and much of the new set-top box fleet could end up in the stream of obsolete consumer electronics instead of continuing to provide service in homes as services evolve.

Other features that an operator may wish to add may draw power, yet have no allowance. Examples include connectivity over power line or wireless connectivity for sensors that allow future home health care services, security, energy management and home automation controls. Or a user interface might include new inputs for gesture or facial-expression detection that take power but have no allowance. Not all of these features will have individual consumer-facing “on-off” switches. In fact, some may even be included in system-on-a-chip silicon, because an integrated approach is more energy efficient than adding a separate chip. Including such new features in test results, and penalizing an otherwise compliant box, would erect a formidable barrier to developing new services.

Set-top boxes that seek to provide “whole-home” energy efficiencies provide other examples of features that would be hard hit by the DOE’s proposed testing approach. A living room set-top box might include transcoding hardware to enable service to a customer-owned device connected to the home network. That hardware may not be activated until a subscriber purchases a new video device at a future date. With no allowance for transcoding hardware, its inclusion in test results might take the living room set-top box out of compliance. But the whole-home footprint would be more energy efficient than two compliant set-top boxes. The problem

is still greater for multi-service gateways with a direct video connection: if they are treated as covered set-top boxes, yet have no allowance for eMTAs for telephone service or DOCSIS 3 and local networks for Internet service, service providers would be handicapped in deploying what would otherwise be a highly energy efficient solution for the whole home.

2. Testing of New Features Prior to their Widespread Adoption by Consumers Is Unnecessary, and Would Delay and Derail Innovation

These examples illustrate that it is critical for video service providers to be able to incorporate new platforms and features into their networks, including their set-top boxes, without waiting for the regulatory process to catch up. Consumers would lose if MVPDs had to wait months or even years for the completion of a federal DOE rulemaking or waiver proceeding before they receive the benefits of new services or equipment from MVPDs. Innovative third-party application developers who could otherwise enhance the MVPD offering with new device features and services would turn instead toward developing new features and services for over-the-top devices and other means of video delivery not regulated by DOE's proposed rules. Being the "first mover" of a new feature or service is critical to success, and so innovators will not want to reveal the details of new designs to the public through a DOE proceeding, much less wait months or more for permission to proceed. MVPDs customers would be denied the opportunity they now enjoy to discover new applications and services through their MVPD-supplied set-top boxes, and MVPD providers would increasingly suffer major competitive disadvantages in the rapidly-evolving video services market, where being early to offer a new service or feature is critical to success.

Moreover, requiring a DOE rulemaking or waiver before launching new consumer applications would stymie not only rapid innovation and the timely introduction of competitive features, but also the effective functioning of video networks altogether. Changes in service

provider network equipment and software often require changes to set-top box features, and cable operators need to be able to make timely implementations of those changes to effectively manage their networks.

For these reasons, following the lead of the European voluntary agreement,⁶¹ the Voluntary Agreement sets forth a much better approach than that proposed by DOE by allowing the introduction of new features without the constraint of ill-fitted pre-existing standards. Such features may either be deactivated for testing or an allowance can be provided to account for usage by features that cannot be turned off.⁶² The Voluntary Agreement also affords flexibility for participants to achieve energy efficiency in new ways, by providing credits for “alternative energy efficiency steps which provide energy efficiency gains superior to those required by the Voluntary Agreement.”⁶³

⁶¹ 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 Ecodesign Scheme for Complex Set-Top Boxes (Nov. 22, 2012); February 27, 2013 Public Meeting on Notice of Proposed Rulemaking on Test Procedure for Set-Top Boxes, Court Reporter Transcript at 86 (Robert Turner of Pace (U.K.) explaining that under the EU agreement, “the test method specifically says, if you have a feature that doesn’t have an allowance, you specifically exclude it, disabling it, so you’re measuring what you intend to measure, not unintended extras.”).

⁶² See 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.”).

⁶³ *Id.* at § 12.2.

This approach does not undermine an energy standard. First, as NCTA has previously explained, the cable industry is strongly committed to energy conservation.⁶⁴ Second, many of these new features might never gain wide adoption or use, and therefore would not have a material impact on national energy consumption in any case. It would have been entirely unnecessary to have suppressed these new features for the purpose of conserving energy since these features may never be used in significant quantity. But consumers would suffer from the derailment even of commercially-unsuccessful features, because technology successes often build upon earlier unsuccessful innovation. Meanwhile, if and when a new feature does become prevalent, the Voluntary Agreement provides for a timely update in standards to assure that the new features are ultimately provided in an overall energy-efficient manner.⁶⁵

By applying its preconceptions to a complex, rapidly-evolving market, DOE's proposal to prohibit exclusion of new features from testing would (1) delay introduction of innovative features that may never become prevalent and (2) remove a major competitive driver in the MVPD market—the “first mover” introduction of competitive features that drive continuous innovation and consumer benefits in the entire MVPD industry. Therefore, any DOE test procedure should permit a test result to exclude new features.

E. The Proposed Rules Would Create Competitive Disparities that Would Conflict with Federal Policy and Distort the Market

DOE's proposal to impose test procedures on MVPD set-top boxes, but not other video devices, would create competitive disparities among platforms. Numerous other video platforms, such as gaming consoles from Microsoft, Sony, and Nintendo, Blu-ray players,

⁶⁴ Energy efficiency aligns with our business incentives by reducing total costs of ownership, reducing service calls, and improving our performance as competitors in a market with myriad video and communications service choices. *See* NCTA RFI Response at 21.

⁶⁵ *See* Exhibit 1, Voluntary Agreement at §§ 6.3, 10.1.

personal computers, over-the-top (OTT) set-top boxes such as Roku and Boxee, and other devices⁶⁶ provide access to video that competes with MVPD services, yet would be free to continue to innovate unfettered by DOE regulation. Even DOE’s own preliminary assessment recognized that these new platforms were likely to define the “future of TV.”⁶⁷ As we illustrate below, selecting some video device providers for regulation, and excusing all others, would lessen the utility or the performance of the regulated products; frustrate, rather than promote innovation; lessen competition; and, to put it mildly, be unduly burdensome—all in violation of express requirements of EPCA and directives of the Obama Administration.⁶⁸

For instance, Microsoft’s Xbox 360, Sony’s PlayStation 3, and Nintendo’s Wii are well-known as gaming consoles but also function as video platforms that provide access to subscription video streaming services (such as Netflix, Amazon Instant Video, or Microsoft’s Xbox LIVE Gold), Video on Demand (VOD), and advertiser-supported video streaming such as

⁶⁶ For example, smartphones equipped with Mobile High-Definition Link (MHL) technology can connect to an HDTV or another display via a simple cable or adapter and send high-definition video to the larger screen, mirroring video and other content streaming to the phone. *See* What is MHL?, available at <http://www.meetmhl.com/WhatIsMHL.aspx>. MHL technology is built into hundreds of unique products, including many Android smartphones and tablets, and features an installed base of more than 220 million products as of early 2013. News Release, *MHL Consortium Kicks Off 2013 With an Installed Base of More Than 220 Million Products and Close to 180 Global Adopters*, BusinessWire.com, Jan. 7, 2013, available at <http://www.businesswire.com/news/home/20130107005464/en/MHL-Consortium-Kicks-2013-Installed-Base-220>.

⁶⁷ Rulemaking Overview and Preliminary Market and Technology Assessment: Energy Efficiency Program for Consumer Products: Set-top Boxes and Network Equipment, Department of Energy (Dec.

11, 2011) (“Preliminary Assessment”), § 4.7.1.

⁶⁸ *See* 42 U.S.C. § 6295(o)(2)(B)(i)(IV) (requiring DOE to consider “any lessening of the utility or the performance of the covered products likely to result from the imposition of the standard”); Improving Regulation and Regulatory Review, Executive Order 13563, 76 Fed. Reg. 3821 (Jan. 21, 2011) (“In developing regulatory actions and identifying appropriate approaches, each agency shall ... seek to identify, as appropriate, means to achieve regulatory goals that are designed to promote innovation.”); 42 U.S.C. § 6295(o)(2)(B)(i)(V) (requiring DOE to consider “the impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from the imposition of the standard”); 42 U.S.C. § 6293(b)(3) (requiring that “[a]ny test procedures prescribed or amended under this section...shall not be unduly burdensome to conduct”).

YouTube.⁶⁹ Nielson recently reported that, “[f]or the third year in a row, Americans in 2012 spent more of their overall console time streaming video. ... [T]he use of video-on-demand (VOD) and streaming services accounted for 22 percent of users’ overall time on these systems last year, up from 19 percent in 2011 and 13 percent in 2010.”⁷⁰ CEO Reed Hastings of Netflix, (which had 27.1 million U.S. streaming video subscribers at the end of 2012⁷¹ – more than any MVPD) commented that Sony’s PlayStation 3 “is our largest TV-connected platform in terms of Netflix viewing, and this year, at times, even surpassed the PC in hours of Netflix enjoyment to become our number one platform overall.”⁷²

⁶⁹ See, e.g., More Entertainment on Xbox LIVE, Xbox.com, available at <http://www.xbox.com/en-US/Live/Partners>; PlayStation Network – Video and Music Services, PlayStation.com, available at <http://us.playstation.com/psn/psn-services>; Wii Channels, Nintendo.com, available at <http://www.nintendo.com/wii/built-in-entertainment>.

⁷⁰ *Play Vs. Stream: The Modern Gaming Console*, Nielson.com Newswire, Mar. 13, 2013, available at <http://nielsen.com/us/en/newswire/2013/play-vs--stream--the-modern-gaming-console.html>. Nielson’s summary of its recent research goes on to note that “PlayStation 3 users – who drove the trend in increased streaming activity – spent nearly 25 percent of their console time streaming content in 2012, up from 15 percent during the prior year. Wii users remained the most likely to spend their console time using VOD and streaming (32%), while Xbox 360 users spent about 13 percent of their usage time for VOD and streaming content, the same amount of time as last year.”

⁷¹ See George Winslow, *Netflix Beats Q4 Earnings Estimates*, Multichannel.com, Jan. 23, 2013, available at <http://www.multichannel.com/technology/netflix-beats-q4-earnings-estimates/141361>.

⁷² Phil Rosenberg, *PS3 is #1 for Netflix Streaming in the Living Room*, Sony PlayStation Blog, Dec. 4, 2012, available at <http://blog.us.playstation.com/2012/12/04/ps3-is-1-for-netflix-streaming-in-the-living-room>.



Image: Screenshot of Xbox 360 Apps Menu, displaying subscription video services such as Hulu Plus, Netflix, and HBO GO.⁷³

Similarly, Blu-ray players can do much more than play physical media. Many Blu-ray models feature network connectivity and built-in apps to stream online video from services like Netflix or Vudu.⁷⁴ For example, Netflix’s web site lists more than a dozen manufacturers whose Blu-ray players provide access to its OTT streaming service.⁷⁵ According to a recent report, more than 50 million U.S. households currently own Blu-ray compatible devices.⁷⁶

⁷³ Michael Gorman, *HBO Go Coming to Xbox 360 on April 1st*, Engadget.com, Feb. 28, 2012, available at <http://www.engadget.com/2012/02/28/hbo-go-coming-to-xbox-360-on-april-1st/>.

⁷⁴ See, e.g., *Blu-ray Player Buying Guide*, ConsumerReports.org, Nov. 2012, available at <http://www.consumerreports.org/cro/blu-ray-players/buying-guide.htm> (“Many new players can stream video from the Internet, providing instant access to movies and TV episodes from Amazon Instant Video, CinemaNow, Netflix, Vudu, and other online movie services.”); *The 10 Best Blu-Ray Players*, PCMag.com, July 10, 2012, available at <http://www.pcmag.com/article2/0,2817,2397234,00.asp> (“Not only do [Blu-ray players] play Blu-ray discs, which offer movies in full 1080p video, but they can support 3D video, stream content from the Web, and serve as a hub for entertainment in your home.”).

⁷⁵ See *Connect your TV to Netflix*, Netflix.com, available at https://signup.netflix.com/watch#bluray-players_link.

⁷⁶ See News Release, *DEG’s Year-End 2012 Home Entertainment Report*, Digital Entertainment Group, Jan. 8, 2013, available at http://degonline.org/pressreleases/2013/Year_End_2012%20cover%20note_FINAL_1.8.13.pdf (“Total household penetration of all Blu-ray compatible devices now stands at close to 51 million U.S. homes”).



Image: LG BP620 Blu-ray player, displaying web apps menu that includes online video services such as Netflix, Hulu Plus, Vudu and YouTube.⁷⁷

Meanwhile, Roku, Apple, and Boxee have introduced set-top boxes over the past year that provide users access to the most popular over-the-top (OTT) video streaming services, as well as dozens, if not hundreds, of additional “channels” or apps that feature added streaming content. Users of the Roku 3, Apple TV, and Boxee TV can connect the devices to their television and home network and watch television shows, movies, and sports content from online streaming services like Netflix, HuluPlus, and MLB.tv.⁷⁸

according to numbers compiled by the DEG with input from retail tracking sources.”) (“*DEG Year-End 2012 Report*”).

⁷⁷ LG BP620 Blu-ray Player, LG.com, available at <http://www.lg.com/us/blu-ray-players/lg-BP620-blu-ray-dvd-player>.

⁷⁸ See, e.g., Why It’s Cool, Roku.com, available at <http://www.roku.com/why-its-cool>; What’s on Apple TV, Apple.com, available at <http://www.apple.com/appletv/whats-on/>; Internet Apps, Boxee.tv, available at <http://www.boxee.tv/#/features/apps>.



Image: Roku 3, displaying My Channels menu that includes subscription video services such as Hulu Plus, Netflix, MLB.tv, Amazon Instant Video, and HBO GO.⁷⁹

As we previously demonstrated, the energy efficiency of MVPD set-top boxes already compares quite favorably to that of many other forms of video systems.⁸⁰ Indeed, taking into consideration all of the components with which OTT devices must be paired to stream video, many consume more energy than a typical cable set-top box.⁸¹ Meanwhile, as these set-top

⁷⁹ Why It's Cool, Roku.com, available at <http://www.roku.com/why-its-cool>.

⁸⁰ See NCTA RFI Response at 43-45.

⁸¹ See *id.* (discussing power consumption of alternative video systems and presenting chart showing energy consumption breakdown of various components). Although some OTT video boxes show low energy usage, they often delegate core functionality to other power-consuming devices within the home, such as broadband modems, wireless routers, computers, and external speakers. See *id.* at 43.

alternatives continue to offer more and more content,⁸² the number of alternative video platform devices is climbing dramatically, and they now exceed 200 million.⁸³

Under EPCA, DOE must “consider the impact of any lessening of competition, as determined in writing by the Attorney General” as it balances the benefits and burdens of a proposed standard.⁸⁴ The imposition of testing requirements and standards upon MVPD set-top boxes but not the rapidly-growing (and in some cases, less energy efficient) segment of alternatives would arbitrarily undermine this statutory mandate, and would chill and disadvantage MVPD innovation and skew competition in the video services market.

⁸² See NCTA RFI Response at 46-47 (explaining that OTT providers have reached agreements with “an ever-expanding list of major content providers, including professional sports leagues (MLB, NBA, NHL, MLS), networks (NBC, Disney/ABC, CBS, Fox, HBO, ESPN),⁹⁰ and studios (20th Century Fox, DreamWorks Animation SKG, Inc.)”).

⁸³ See NCTA RFI Response at 46 (“At year-end 2011, there were 19.88 million PS3s, 33.05 million Xbox 360s, and 40 million Blu-Ray players. As of 2010, there were 101 million Desktop PCs.”). One year later, the numbers of these and similar alternative video platform devices have grown as follows:

- PlayStation 3: 23.60 million. See USA Yearly Chart (2012), VGChartz.com, available at <http://www.vgchartz.com/yearly/2012/USA/> (ranking top-selling game consoles in 2012 and listing all-time sales totals for each in “USA Hardware by Platform” chart on sidebar) (“VGChartz.com List”).
- PlayStation 2: 23 million. The previous-generation PlayStation 2 console, which still enjoyed a 20% penetration rate among U.S. households as recently as one year ago, can play Internet video via third-party software. See Richard Lawler, *Qtv Launches Console IPTV Platform on the PlayStation...2*, Engadget.com, Apr. 21, 2009, available at <http://www.engadget.com/2009/04/21/qtv-launches-console-iptv-platform-on-the-playstation-2/>; U.S. Gaming: A 360° View, Nielson.com, Feb. 7, 2012, at 5, available at <http://www.nielson.com/content/dam/corporate/us/en/reports-downloads/2012-Webinars/US-Gaming-A-360-View.pdf> (listing PlayStation 2 with 20% penetration of U.S. households). Based on U.S. Census QuickFacts data that there are approximately 114.76 million U.S. households, Nielson’s 20% penetration rate works out to approximately 23 million active units.
- Xbox 360: 38.49 million. See VGChartz.com List.
- Nintendo Wii: 40.65 million. See VGChartz.com List.
- Blu-ray players: Approximately 51 million. See DEG Year-End 2012 Report.
- SmartTVs: 15.8 million. See Press Release, One Hundred Million Smart TVs Now In Use Worldwide, StrategyAnalytics.com, Jan. 3, 2013, available at <http://www.strategyanalytics.com/default.aspx?mod=pressreleaseviewer&a0=5311> (listing United States with 15.8 million units in chart titled, “Smart TV Installed Base Forecast: Selected Countries in 2012, based on December 2012 study by Strategy Analytics).
- Desktop computers: 100+ million. See NCTA RFI Response at 46 (noting that there were 101 million desktop PCs in the U.S. as of 2010).

⁸⁴ 42 U.S.C. § 6295(o)(2)(B)(i)(V).

Under a testing regime that includes only MVPD set-top boxes, alternative video systems would have more design flexibility, more freedom to launch new features or even new devices, and more opportunities to innovate in this fast-paced marketplace. Meanwhile, MVPDs set-top boxes would be relegated to a slow, regulated lane. While game consoles with video delivery would be free to add new capabilities, MVPD set-top boxes could not add such new features (or additional gaming capabilities) except through the constraints of the proposed regulations, which can take years to amend. While MVPDs waited to have every new model of their set-top boxes evaluated under the proposed testing procedures, and face potential liability from DOE, the FTC, and others if their innovation were alleged to have strayed outside the four corners of rigid DOE boundaries set in 2013, OTT providers and other unregulated competitors would be free to race ahead unburdened by testing obligations. This would be a peculiar way to provide energy efficiency incentives to the only market participants—MVPDs—that have stepped up proactively to energy efficiency commitments. Given that DOE can accomplish EPCA’s energy efficiency objectives by relying upon the commitments of the Voluntary Agreement, it should avoid skewing the market by adopting its proposed test procedures which would undermine the consumer benefits that are derived from vibrant competition.

F. The Proposed Test Procedure Should Not Include Performance Requirements

In its eagerness to jump the gun racing to adopt an efficiency standard, DOE has included performance requirements in the proposed test procedure, including duty cycles and usage assumptions. The NOPR seeks comment on two variations of the duty cycle method for calculating total energy consumption.⁸⁵ But a duty cycle is only relevant for the enforcement of an efficiency standard and should only be addressed within a standard, and not be included at all

⁸⁵ NOPR at 64.

in a test method. In the Energy Star program, such usage pattern assumptions are part of the standard, rather than the test method, so that standards and usage assumptions underlying the standard can be updated without revising a test procedure and the testing lab set up.

As was explained at the DOE Public Meeting, the particular usage assumptions made in the NOPR are also divorced from reality. DOE assumes that three displays in use in a home would be viewed for a total of 21 hours a day. But Nielsen reports total household use at 9 hours, because typical usage on second and third sets is far below primary set usage. At DOE's public meeting, the advocate for the Northwest Energy Efficiency Alliance, Mr. Stephens, agreed that such a DOE calculation is useless for energy load management purposes. The test procedure should produce reports of watts used in various modes, and others can do the math – indeed, they can do it better, because they would be able to use updated assumptions of always-evolving consumer usage patterns rather than be stuck with inevitably outdated assumptions baked into difficult-to-change DOE rules.⁸⁶ AEC total usage is not a requirement of testing procedures, and DOE should exclude duty cycles and other usage assumptions from any test procedure.

Similarly, DOE should not adopt the NOPR's proposal to include in the definition of sleep mode the requirement that a set-top box be able to wake from sleep to on mode within 30 seconds for it to qualify as having sleep mode. DOE has indicated that its basis for this proposal is a 2011 comment suggesting that consumers would resist any device that took more than a minute to transition from low power to on mode.⁸⁷ NCTA agrees that protecting the consumer experience is critical to the design of energy efficiency measures, or consumers will reject them. But such a performance metric has no place in a test method. The purpose of a test method is to

⁸⁶ This and the entire discussion of this critical point was inexplicably not included in the transcript released by DOE, and replaced by an "18 minute gap" indicating that it was "not recorded" by the reporter.

⁸⁷ NOPR at 38-39.

measure the energy use during sleep mode, not to set standards for how a set-top box must operate when entering or leaving sleep mode. *This type of standards setting is outside the scope of this proceeding.*

G. DOE Should Clarify its Intended Exclusion of Gateways

In addition, if DOE does move forward, it must clarify its proposed definition of “direct video connection.” The NOPR proposes to define that term as “any connection type that is one of the following: High-Definition Multimedia Interface (HDMI), Component Video, S-Video, Composite Video, or any other video interface that may be used to output video content.”⁸⁸ As discussed in Section I above, DOE’s apparent (and appropriate) purpose for this definition is to exclude from testing gateway devices that are not intended to provide a direct video connection in the manner of traditional set-top boxes today. To effect that purpose, which NCTA supports, DOE should delete the phrase “or any other video interface that may be used to output video content.” At best, this phrase introduces significant ambiguity, which DOE has stated it seeks to avoid.⁸⁹ It would be preferable to have greater certainty as to which devices are subject to any testing requirement. The phrase should also be removed because it could swallow the purpose of the definition and could be interpreted to include types of devices that were meant to be excluded.

H. The Proposed Test Procedure Would Undermine the Energy Star Program

The proposed DOE test procedure would supplant the EPA test methodology that has been used with Energy Star partners and products, yet would undermine many of the key Energy Star testing features that have been an integral part of the program’s ability to attract partners. For example, as discussed above, the DOE procedures would require each service provider to

⁸⁸ NOPR at 22.

⁸⁹ See Public Meeting Slides, at slide 12.

conduct testing, in some cases on thousands of “models” of software and hardware combinations, rather than following an Energy Star approach for a reasonable number of tests performed by the hardware manufacturer on a family of set-top boxes. As another example, DOE’s proposed limiting definitions of sleep and DVR would fail to accurately measure the benefits of pre-scheduled sleep and network-based DVRs. As a third example, DOE’s proposed test method would not even account for savings from even deeper sleep states that do not meet DOE’s definition of sleep, but which EPA wishes to measure for the Energy Star program. All of these factors would undermine the effectiveness of the Energy Star Version 4.1 program and its ability to attract new partners.

I. This Record Shows that DOE’s Usual Approach Does Not Fit the Set-Top Box Market

The examples above illustrate not only the difficulties in attempting to establish regulations five years in advance for any fast-moving technology product, but also the unsuitability of DOE’s consumer-products framework for the set-top boxes used with a service provider’s network. DOE would sacrifice the functionality, performance and innovation it is required to protect, and would not result in significantly better energy conservation than the non-regulatory Voluntary Agreement that is already in effect. DOE should therefore suspend the NOPR and rely on the CEA-2043 consensus standard, as required by NTTAA.

III. A RECAP OF THE LEGAL FAILINGS OF DOE’S APPROACH⁹⁰

Rather than mandating maximum energy efficiency, in EPCA, Congress required DOE to balance many competing interests in considering whether the benefits of any proposed efficiency

⁹⁰ NCTA incorporates Exhibit A of its March 15, 2012 RFI Response, which describes in greater detail the legal failings of DOE’s proposal to regulate MVPD set-top boxes as of the date of that filing – even before adoption and implementation of the Voluntary Agreement was a factor to be considered in such an analysis.

standard “exceed its burdens.”⁹¹ The course contemplated by the NOPR would fail this balance on many counts:

- DOE cannot adopt energy efficiency standards if they would not directly result in significantly better energy conservation than non-regulatory approaches,⁹² yet it has announced that it will only consider “any non-regulatory agreement reached between *all* stakeholders as an alternative to a regulatory standard”⁹³ and otherwise ignore the substantial and savings arising from the Voluntary Agreement.
- EPCA requires DOE to consider “any lessening of the utility or the performance of the covered products likely to result from the imposition of the standard,”⁹⁴ yet DOE has proposed to codify test procedures that would delay or even derail the introduction of new features to consumers and upgrades to service provider networks in violation of the Obama Administration directive that federal agencies seek to “promote innovation.”⁹⁵
- EPCA requires DOE to “consider the impact of any lessening of competition,”⁹⁶ yet DOE’s proposal would create a significant new competitive disparity by subjecting MVPD devices to potentially innovation-throttling regulations while leaving hundreds of millions of competing alternative devices free from regulation.

⁹¹ 42 U.S.C. § 6295(o)(2)(B).

⁹² See 42 U.S.C. § 6295(o) and *supra* notes 13-14 citing 10 C.F.R. Ch. 11, Appendix A to Subpart C of Part 430.

⁹³ NODA at 6 (emphasis added).

⁹⁴ 42 U.S.C. § 6295(o)(2)(B)(IV).

⁹⁵ Improving Regulation and Regulatory Review, Executive Order 13563, 76 Fed. Reg. 3821 (Jan. 21, 2011) (“In developing regulatory actions and identifying appropriate approaches, each agency shall ... seek to identify, as appropriate, means to achieve regulatory goals that are designed to promote innovation.”).

⁹⁶ 42 U.S.C. § 6295(o)(2)(B)(i)(V).

- EPCA requires that any test procedures “shall not be unduly burdensome to conduct,”⁹⁷ but the NOPR would impose thousands of unnecessary costly tests annually on even the smallest of MVPDs, an impact which it has utterly failed to assess as the Regulatory Flexibility Act requires. A requirement to conduct new testing of every combination of software would chill the release of new software options for consumers and undermine the ability of MVPDs to compete in the market.
- NTTAA and the Administration require federal agencies wherever possible to use technical standards that are developed or adopted by voluntary consensus standards bodies unless such use “is inconsistent with applicable law or otherwise impractical,”⁹⁸ yet DOE would discard the comprehensive CEA-2043 standard that is more practical and effective for securing energy efficiency than the new government-engineered standard proposed by the NOPR. DOE has not, and cannot, provide any justification for its abandonment of the Obama Administration’s “primary strategy for government engagement in standards development,” which is “reliance on private sector leadership, supplemented by Federal Government contributions to discrete standardization processes as outlined in OMB Circular A-119.”⁹⁹

One of the many reasons that EPCA’s standards and DOE’s tools do not fit this market is because set-top boxes are not “consumer products” in the first place.¹⁰⁰ Most set-top boxes are

⁹⁷ 42 U.S.C. § 6293(b)(3).

⁹⁸ NTTAA, § 12(d)(1), OMB Circular A-119.

⁹⁹ 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).

¹⁰⁰ NCTA incorporates as if set forth herein its September 30, 2011 comments on DOE’s proposal to classify set-top boxes as a covered consumer product. *See* Energy Conservation Program for Consumer Products and Certain Commercial and Industrial Equipment: Proposed Determination of Set-Top Boxes and Network Equipment as a Covered Consumer Product, Proposed Determination, Comments of NCTA (filed Sept. 30, 2011).

not purchased by consumers, and the market is driven by MVPDs who already have sufficient information (and incentives) to evaluate the energy efficiency of the set-top boxes they purchase. Set-top boxes are tailored to specific systems. They are often provided to consumers as part of pricing bundles that include network and programming costs. Consumers may return them if they change services, switch devices, move, or cancel service. This is not comparable to the sale to consumers of appliances priced for pay back through energy-efficiency and not what is contemplated under EPCA.

Set-top boxes are also integrated parts of the overall MVPD network, not individual commodities. They are deeply integrated into distribution networks with differences in network architectures, transmission protocol, software stacks, conditional access systems, out-of-band communications channels used for command and control of the set-top box, operating system and processor instruction sets, network control architectures in support of interactivity, and electronic program guide applications and guide metadata formats, among other variables. These different devices are not even the same product. Changes to set-top boxes entail changes in the network and network costs, which the NOPR simply ignores.

DOE's approach assumes that set-top boxes are commodities that consumers will purchase at a price premium to be recovered over time through decreases in residential electricity bills. It assumes that set-top boxes are like other appliances and have energy use that can be measured discretely. Because neither of these assumptions is correct, set-top boxes are not "consumer products" that may legally be placed within the scope of DOE energy efficiency standards setting.

CONCLUSION

Voluntary consensus efforts are preferred under federal policy and around the world. The Voluntary Agreement would in any event result in more immediate and superior energy efficiency, and do so in a more flexible manner that will foster rather than stifle innovation. Nonetheless, even if DOE moves forward, it would be unnecessary, unlawful, and counterproductive for innovation and energy efficiency to supplant the CEA-2043 consensus testing standard with its own test standard. Because set-top boxes are not purchased directly by consumers (and therefore may not lawfully be classified as covered products in any event), a DOE test standard is not needed to create a uniform base for marketing appliances to consumers.

Even if a test standard becomes necessary to enforce federal energy efficiency standards, DOE is legally required by NTTAA instead to use the superior CEA-2043 consensus standard because it is consistent with law and practical. By contrast, because DOE's traditional regulatory tools do not practically or legally fit the fast-moving video services market, the test method proposed by the NOPR would create disincentives to roll out energy efficient products, such as network-based DVRs, and would harm innovation, by impeding the fast introduction of competitive features and by skewing the competitive market in favor of unregulated devices. DOE's proposed approach would therefore sacrifice the functionality, performance and innovation it is required to protect.

For all of these reasons, DOE should suspend this proceeding to give the Voluntary Agreement an opportunity to work, and should not adopt a new government-crafted test procedure as proposed by the NOPR.

Respectfully submitted,

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April 8, 2013

Exhibit 1

Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-Top Boxes

**VOLUNTARY AGREEMENT
FOR ONGOING IMPROVEMENT TO THE ENERGY EFFICIENCY OF SET-TOP BOXES**

December 6, 2012

This document sets out a Voluntary Agreement between the undersigned Signatories to continue improvements in the energy efficiency of Set-Top Boxes used in the distribution of digital video signals. The Annexes 1-9 attached hereto form part of the Voluntary Agreement.

1. Purpose

- 1.1. The purpose of this Voluntary Agreement is to continue improvements in the energy efficiency of Set-Top Boxes used in the delivery of services by Service Providers, thereby further reducing potential environmental impact and increasing benefits to consumers. Fostering device and service functionality while encouraging innovation and competition by Service Providers and Manufacturers are equally important objectives of this Voluntary Agreement.
- 1.2. Energy efficiency improvements will be pursued provided that such improvements do not jeopardize the intended uses and functionalities of Set-Top Boxes; that they preserve or enhance the customer experience; and that they are sufficiently flexible to adapt to technological options and market competition, to improve functionality, to offer service enhancements, and to foster rapid innovation.
- 1.3. The Voluntary Agreement is intended to be a complete and adequate substitute for all Federal and State legislative and regulatory solutions. The Signatories agree that voluntary measures including industry self-regulation are the preferred means for addressing the energy consumption of complex, networked, digital video service set-top boxes that are generally owned by the Service Provider and integrated with distribution networks, but deployed within the premises of customers.
- 1.4. The Signatories agree that energy efficiency measures should not create undue burdens or competitive disadvantages for Service Provider Signatories compared with other means of distributing video programming and other programming services.
- 1.5. Nothing in this Voluntary Agreement shall preclude any party from implementing energy efficiency measures that exceed the requirements of this Agreement.

2. Equipment Covered

- 2.1. This Voluntary Agreement initially covers only new Set-Top Boxes, as defined in Annex 1, ordered and placed into service in the United States by a Service Provider Signatory after the Effective Date. Except as specifically set forth in the Annexes 3-5 applicable to specific industry groups of Service Providers, there is no retroactive effect on equipment that is deployed or in inventory prior to the Effective Date, nor is there any requirement to retire or change existing equipment or to change existing equipment that is returned to the Service Provider and refurbished, repaired, and/or upgraded, and then redeployed.
- 2.2. Pursuant to the procedures of Section 11, during calendar year 2013 the Steering Committee will discuss amendments to this Voluntary Agreement that might be adopted to apply to future devices used by Service Providers for the delivery of commercial video services to consumers, such as residential modems and routers and Multi-Service Gateways.

3. Service Provider Signatory Commitments for Set-Top Boxes

- 3.1. From the Effective Date:
 - 3.1.1. Service Provider Signatories, through their purchasing, will support and encourage the development of new Set-Top Boxes designed to minimize energy consumption as

specified below while achieving the operational specifications, preserving their intended uses and functionalities, permitting ongoing innovation, preserving and enhancing the customer experience, and complying with existing applicable regulation.

3.1.2. Ninety percent (90%) of all new Set-Top Boxes that a Service Provider Signatory purchases and deploys after December 31, 2013 shall meet the efficiency standards established for ENERGY STAR Version 3.0 devices as of the Effective Date.

3.1.3. A Service Provider Signatory shall also comply with such specific energy efficiency provisions as are set forth in the Annex specifically accepted by the Service Provider when it becomes a Signatory.

3.2. Service Provider Signatories will support:

3.2.1. reasonable steps to monitor the effectiveness of this Voluntary Agreement through the procedure described in Section 10;

3.2.2. periodic review of the Voluntary Agreement to consider amendment to the Voluntary Agreement through the procedure described in Section 11; and

3.2.3. reasonable steps to inform consumers about the general energy consumption characteristics and performance of Set-Top Boxes, as described in Section 7.5.

4. Signatories to the Voluntary Agreement

4.1. Service Providers may become Signatories by signing Annex 7, Part A.

4.2. Equipment Manufacturers, Component Manufacturers, Software Providers, and Conditional Access Providers may become Vendor Signatories to the Voluntary Agreement by signing Annex 7, Part B. Each such Vendor Signatory endorses the purposes of the Voluntary Agreement and agrees to its commitments set out herein.

4.3. Each Signatory commits only to the areas which are under its individual control and responsibility.

4.4. After the Effective Date, qualified additional parties may become Signatories upon the approval of the Steering Committee, which shall not be unreasonably withheld.

5. Vendor Signatory Commitments for Set-top Boxes

5.1. Component Manufacturers will use reasonable efforts to design Set-Top Box components which improve functionality and enable component sub-systems to be controlled and operated in an energy efficient manner.

5.2. Conditional Access Providers will use reasonable efforts to design and develop conditional access systems which enable improved Set-Top Box energy efficiency while meeting the functional and operational specifications of Service Providers.

5.3. Equipment Manufacturers will use reasonable efforts to design and manufacture equipment to enable improved Set-Top Box energy efficiency while meeting the Service Providers' functional and operational specifications.

5.4. Software Providers will use reasonable efforts to develop software power management applications that are consistent with the commitments made by Service Providers for Set-Top Boxes and that enable Service Providers to utilize and integrate hardware power management features offered by Equipment Manufacturers and to do so without negatively impacting other Set-Top Box features and functionality or adversely affecting the End User customer experience.

6. Test Method

- 6.1. The applicable test methodologies and procedures are fully described within this document or incorporated by reference to external methodologies and/or procedures. Clarification of referenced methodologies or procedures may be provided in Annex 6 to avoid ambiguity. Compliance with the applicable energy consumption targets for Section 3.1.2 shall be demonstrated using tests defined in or reasonably consistent with the EPA ENERGY STAR Version 3.0 STB Testing Program.
- 6.2. The energy efficiency of Set-Top Boxes will be tested as normally installed for the End User as is specified in the ENERGY STAR Version 3.0 STB Program. Tests must be conducted using an EPA-Recognized Laboratory listed at the ENERGY STAR web site <http://www.energystar.gov/index.cfm?c=third_party_certification.tpc_index> or new test facilities which are pre-approved as test facilities for specific technologies as set forth in Annexes 3-5. Set-Top Boxes that have already been tested and appear on the ENERGY STAR Qualified Product List as meeting the efficiency standards for ENERGY STAR Version 3.0 devices need not be re-tested under this Voluntary Agreement, but shall be included in annual reports required by Section 7.1.
- 6.3. The Signatories agree that Equipment Manufacturers, Service Providers, Software Providers, Conditional Access Providers and Component Manufacturers are constantly innovating their products in response to developments in service concepts and technologies, competition, and consumer demand. 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.

7. Reporting

- 7.1. Each Service Provider Signatory shall prepare a confidential annual report by April 1 of each year commencing in 2014 containing the data set out in Annex 2 for the prior Reporting Period during which it was a Signatory and submit the report to the Independent Administrator or to an aggregating entity as set forth in Section 7.3 below.
- 7.2. A Reporting Period covers a single calendar year. When a Service Provider Signatory is making its first report, it may provide data either for the entire prior calendar year (effectively backdating its commitment to the January 1 preceding its signature) or provide a report covering only the period beginning with its signature.
- 7.3. Service Provider Signatories may elect to submit reports to a recognized industry consortium or industry association for aggregation and anonymization prior to forwarding to the Independent Administrator for final aggregation and reporting, provided that individual records are retained for purposes of audit.
- 7.4. All reporting arrangements shall protect the confidentiality of commercially sensitive information. The Independent Administrator must sign a confidentiality agreement in relation to any confidential information supplied by the Signatories.
- 7.5. Service Provider Signatories shall provide their subscribers and potential customers with reasonable access to energy efficiency information about the Set-Top Boxes subject to this

Voluntary Agreement no later than January 1, 2014 (or six months after signature, if later). This information may be reported in broad averaged categories, such as for DVRs, Non-DVRs, and Thin Clients offered by a Service Provider Signatory.

- 7.6. The Independent Administrator will aggregate and compile the confidential data submitted by Signatories and submit a report to the Steering Committee for each Reporting Period. To preserve confidentiality, any such official report produced by the Independent Administrator in connection with the information supplied by any individual Signatory shall not refer to the performance of individual Signatories.

8. Audit and Verification

- 8.1. On request of the Steering Committee, the Independent Administrator shall instruct an independent auditor approved by the Steering Committee to conduct an audit of the information and test results supplied by any Service Provider Signatory's Annex 2 annual report, provided that data which is also submitted to ENERGY STAR may not be subject to an audit other than one initiated by ENERGY STAR. Commercially sensitive information with respect to an individual Signatory, as designated by that Signatory, shall remain confidential both during and after the audit. Signatories agree to provide reasonable assistance to the auditor. The independent auditor must sign a confidentiality agreement in a form reasonably satisfactory to the Signatory. The Steering Committee shall bear the cost of such audit.
- 8.2. The Independent Administrator shall arrange for field verification of Set-Top Box energy consumption as follows.
 - 8.2.1. Verification will test only Set-Top Boxes on various Service Provider networks in no more than 100 homes annually. The Steering Committee shall determine the scope and sampling methodology (including limitations on the frequency with which any particular Service Provider Signatory is subject to field verification), verification protocols, verification dispute resolution procedures and reporting format, and the means for protecting the confidentiality of data collected during verification. The verification process shall not inconvenience customers.
 - 8.2.2. The cost of field verification shall be assessed equitably by the Steering Committee among the Signatories, separate from the dues established under Section 9. Costs of field verification shall not be imposed entirely upon the Vendor Signatories.
 - 8.2.3. Service Provider Signatories or their designees will identify candidate homes/customers utilizing the Set-Top Boxes subject to field verification. The field verification will not be identified as being sponsored or endorsed by the Service Provider Signatory without the consent of the Service Provider Signatory.
 - 8.2.4. Issues identified during field verification may be submitted for discussion with the relevant Service Provider Signatory and/or by the Steering Committee. Substantial non-compliance identified from field verification may be submitted as a claim for resolution under Section 12.3 through 12.5.
 - 8.2.5. The Steering Committee may utilize alternative methods of verification which may not necessitate in-home verification.
 - 8.2.6. Field verification shall take place either every other year of operation under this Voluntary Agreement or at other times as deemed appropriate by the Steering Committee.

9. Steering Committee

- 9.1. A Steering Committee is established as the coordinating and governing body of this Voluntary Agreement.
- 9.2. Each Service Provider Signatory with more than two million U.S. residential multichannel video subscribers as of its date of execution of this Voluntary Agreement, or which is one of the three largest telephone providers of U.S. residential multichannel video services, may nominate one person to represent it as a Member on the Steering Committee.
- 9.3. The Vendor Signatories in Annex 7, Part B together may nominate no more than three persons to serve as Members of the Steering Committee. A representative of the Consumer Electronics Association shall serve as one such Member. No Signatory may be represented twice.
- 9.4. A representative of the National Cable & Telecommunications Association shall serve as a Member.
- 9.5. Signatories entitled to nominate a Member may appoint an alternate representative that may attend meetings and vote in the absence of that Member. Signatories may replace a Member or alternative representative on notice.
- 9.6. The Steering Committee will elect a Chair from among its Members.
- 9.7. The Chair will be responsible for convening the Steering Committee meetings at least once each calendar year, and for running meetings of the Steering Committee.
- 9.8. At the request of any Signatory, the Chair may authorize any person to attend meetings of the Steering Committee as non-voting observers.
- 9.9. Attendees at Steering Committee meetings shall sign a confidentiality agreement as a condition of attendance.
- 9.10. The Steering Committee may adopt rules of procedure and administration. At a minimum, such rules will provide that all Members will be provided with at least fifteen (15) days' prior written notice of meetings of the Steering Committee or any sub-committee or any other groups acting in accordance with this Voluntary Agreement, that an agenda will be circulated sufficiently before the meeting to be reviewed by counsel, that no substantive vote will occur unless the subject of the vote was included in such prior notice, and that written minutes as to all topics of discussion be recorded, approved by all committee Members, and retained.
- 9.11. The Steering Committee may adopt rules for reporting, verification, and audit, which may be informed by existing ENERGY STAR procedures. These rules may include specific procedures for Service Providers to use in documenting deactivated functions or excluding the power consumed by functions not covered by the ENERGY STAR Version 3.0 STB Program, as set forth in Section 6.3.
- 9.12. The Steering Committee may delegate any of its powers under the Voluntary Agreement to specific individuals or to sub-committees established by the Steering Committee.
- 9.13. The Steering Committee shall designate an Independent Administrator to be responsible for the collection and processing of information supplied directly or indirectly by Signatories and determining a Signatory's compliance with the Voluntary Agreement.
- 9.14. The costs of attending Steering Committee meetings will be borne by each attendee.
- 9.15. The costs of operating the Steering Committee shall be allocated in cost-recovery only annual dues set by the Steering Committee and assessed equally on each Signatory. The initial amount shall not exceed \$10,000 per Signatory annually.

- 9.16. The Steering Committee will seek regular consultation and engagement with the official representatives of the Department of Energy, the Environmental Protection Agency, appropriate state regulatory authorities, and other stakeholders such as energy conservation advocates to provide updates regarding the implementation of this Agreement.

10. Review of the Voluntary Agreement

10.1. Annual Review

- 10.1.1. At least once each calendar year the Steering Committee will meet to review the Voluntary Agreement in order to:

- 10.1.1.1. evaluate the effectiveness of the Voluntary Agreement in achieving its purposes as identified in Section 1 above;
- 10.1.1.2. create an annual report consistent with Annex 8;
- 10.1.1.3. evaluate current and future developments that may influence energy consumption with a view to agreeing upon a course of action and/or revising the Voluntary Agreement; and
- 10.1.1.4. set future targets to increase energy efficiencies in accordance with the usual product development cycles.

- 10.1.2. Such discussions shall take place on a confidential basis.

10.2. Interim Consultations

- 10.2.1. During the first year of operation under this Voluntary Agreement, the Steering Committee shall meet at least quarterly at a mutually agreed upon time and place to review progress towards applicable targets and any significant issues discovered which are likely to affect meeting such targets.
- 10.2.2. During subsequent years of operation under this Voluntary Agreement, the Steering Committee may hold periodic meetings on a mutually agreeable timetable.

11. Amendment of the Voluntary Agreement

- 11.1. The Voluntary Agreement may be amended in accordance with Section 10 and in accordance with the procedure set out in this Section 11. The Steering Committee will consult on proposed amendments to the Voluntary Agreement prior to any vote on an amendment.
- 11.2. The Members of the Steering Committee will negotiate in good faith when considering amendments to the Voluntary Agreement.
- 11.3. The Chair of the Steering Committee will call for a vote to be made by a subsequent meeting of the Steering Committee. All Members will be notified of the details of the next meeting, the proposed amendment(s) and the calling of a vote in accordance with the notice provisions of Section 9.10.
- 11.4. At the next meeting of the Steering Committee, each proposed amendment will be adopted if there is at least agreement of two-thirds of the Service Provider Members, and the two thirds includes at least one Member of each of the three industry groups of Service Providers (cable, satellite, and telephone) covered by the Voluntary Agreement. The telephone companies that sign either Annex 4A or 4B are together deemed to be one industry group for purposes of voting requirements in this Section 11.4.
- 11.5. An industry-specific Annex may only be amended by agreement of two-thirds of the Service Provider Members covered by that specific Annex, after consultation with such Vendor

Member(s) as is appropriate for that industry-specific Annex. Service Provider Signatories not covered by a particular industry-specific Annex may not prevent amendment of that Annex.

- 11.6. Any Member may raise with the Steering Committee any concerns that an amendment to an industry-specific annex is inconsistent with the purpose of this Voluntary Agreement and may require further amendments to the Voluntary Agreement.
- 11.7. Once an amendment to the Voluntary Agreement has been adopted by the Steering Committee the Voluntary Agreement will be amended with the newly adopted amendment taking effect on the next anniversary of the Effective Date or such other date as may be adopted with the amendment.

12. Non-Compliance and Dispute Resolution

- 12.1. Substantial compliance with the Voluntary Agreement shall be assessed by the Independent Administrator based upon data for the most recently completed Reporting Period on the basis of the information provided by each Signatory.
- 12.2. In mitigation of any claims or concerns raised with respect to any Reporting Period and in evaluating substantial compliance with the Voluntary Agreement, a Service Provider shall be credited for alternative energy efficiency steps which provide energy efficiency gains superior to those required by the Voluntary Agreement. Such efforts may include but are not limited to: (a) using home networking and multi-room solutions to share the resources of a primary device with lower-functionality home-networked devices; (b) moving Set-Top Box recording, other functionality, or applications into the network or cloud; (c) delivering video services via Internet Protocol (IP) without the need for a Set-Top Box, using digital transport adapters, or using other adapters in lieu of Set-Top Boxes; (d) achievement of greater energy efficiency in Set-Top Boxes than is required by the Voluntary Agreement; (e) achievement of energy efficiency targets in Set-Top Boxes earlier than the required schedule. The Steering Committee may adopt procedures for evaluating such alternative energy efficiency steps.
- 12.3. The Steering Committee may raise a claim against a Signatory concerning compliance with the Voluntary Agreement.
- 12.4. The Steering Committee will establish dispute and compliance resolution procedures that provide notice of a claim to the Signatory, and shall endeavor in good faith to resolve the issue within three (3) months through consultation.
- 12.5. A Signatory that is found by the Independent Administrator not in substantial compliance with the Voluntary Agreement after being credited for alternative energy efficiency steps, if any, shall be provided a period of three (3) months from the date of its receipt of the notice described in Section 12.4 to or provide a satisfactory remedial plan to the Steering Committee. A Signatory that fails to do so and to fulfill its remedial plan may have its Signatory status terminated by the Steering Committee and its termination reported to such persons as the Chair may deem appropriate.
- 12.6. Involuntary termination pursuant to this Section constitutes the sole and complete remedy available to the Steering Committee, Signatories, Independent Administrator, auditor or any third party or other individuals or entities with respect to any alleged noncompliance with any term, provision or obligation of the Voluntary Agreement by a Signatory.

13. Termination

- 13.1. Any Signatory may elect to terminate its Signatory status by giving twenty-eight days' written notice to the Chair of the Steering Committee. Such termination shall immediately terminate all of that Signatory's rights and obligations under the Voluntary Agreement except that all

confidentiality obligations arising from this Voluntary Agreement shall survive such termination.

- 13.2. The Chair will notify all Members of the Steering Committee and such other persons as the Chair may deem appropriate of the termination.

14. Term

- 14.1. The term of this Voluntary Agreement shall begin on January 1, 2013 and shall continue for five (5) years.
- 14.2. The Voluntary Agreement may be renewed by mutual agreement.

15. Miscellaneous

- 15.1. Press. A Signatory may make public statements or issue press releases in relation to the Voluntary Agreement generally and its own compliance and/or engagement with the Voluntary Agreement. Except as expressly provided in this Voluntary Agreement, neither the Steering Committee nor any Signatory may make public statements or issue press releases making reference to another Signatory's compliance and/or engagement with the Voluntary Agreement (directly or by inference), except for: (1) statements made with prior approval of that other Signatory; and (2) comparative product information; provided that no statements may make use of or reveal confidential information.
- 15.2. Force Majeure. If a Signatory is prevented or delayed in performance of its commitments hereunder as a result of circumstances beyond such Signatory's reasonable control, including, without limitation, Acts of God, war, terrorism, acts of the government, or failure of suppliers, subcontractors, or carriers, such failure or delay will not be deemed to constitute substantial noncompliance with this Voluntary Agreement, but such commitments will remain in full force and effect, and will be performed or satisfied as soon as reasonably practicable after the termination of the relevant circumstances causing such failure or delay.
- 15.3. Counterparts. This Voluntary Agreement may be executed in one or more counterparts, each of which when so executed and delivered shall be an original and all of which together shall constitute one and the same instrument. Signatures to this Voluntary Agreement may be delivered by facsimile, which, upon delivery, shall be deemed to be originals.
- 15.4. Legal Effect. The Voluntary Agreement sets out a course of action for the Signatories to improve the energy efficiency of Set-Top Boxes. The Voluntary Agreement is not a commercial agreement and does not in itself create any contractual relationship, partnership, joint venture or other agency relationship among the Signatories. Nothing in this Voluntary Agreement shall be deemed to create a third-party beneficiary relationship.
- 15.5. Notice. All communications to Signatories in relation to the Voluntary Agreement should be addressed and sent to the relevant contact point specified in Annex 9.

SCHEDULE OF ANNEXES

ANNEX 1 – GENERAL DEFINITIONS

ANNEX 2 – REPORTING PRO-FORMA

ANNEX 3 – CABLE INDUSTRY PROVISIONS

ANNEX 4A – IPTV PLATFORM PROVISIONS (AT&T and CenturyLink)

ANNEX 4B – VERIZON PLATFORM PROVISIONS (Verizon)

ANNEX 5 – SATELLITE INDUSTRY PROVISIONS

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ANNEX 7, Part A – SERVICE PROVIDER SIGNING FORMS

ANNEX 7, Part B – EQUIPMENT MANUFACTURERS, SOFTWARE PROVIDERS,
CONDITIONAL ACCESS PROVIDERS, COMPONENT MANUFACTURERS
SIGNING FORMS

ANNEX 8 – ANNUAL REPORT

ANNEX 9 – CONTACT INFORMATION

ANNEX 1 – GENERAL DEFINITIONS

1. “Component Manufacturer” means a company or other legal entity that is responsible for designing and manufacturing components that will be used by a second company to build a product.
2. “Conditional Access” means the encryption, decryption, and authorization techniques employed to make access to content conditional upon authorization using a key that is dynamically allocated using a conditional access (CA) or Digital Rights Management (DRM) system.
3. “Conditional Access Provider” means a company that supplies the Conditional Access techniques employed to protect content from unauthorized viewing.
4. “Effective Date” means January 1, 2013, except that as applied to a Signatory that signs the Voluntary Agreement after that date, it shall mean the date on which that party signs the Voluntary Agreement.
5. “End User” means a subscriber to content services provided by a Service Provider who uses a Set-Top Box provided by the Service Provider as part of the subscription.
6. “Equipment Manufacturer” means the company or other legal entity that is responsible for designing, developing and/or manufacturing a Set-Top Box for purchase and deployment in the United States by a Service Provider.
7. “Equipment Under Test” or “EUT” means the equipment being tested.
8. “Federal” includes any part of the government of United States and any department, agency or instrument thereof.
9. “Independent Administrator” means the party designated by the Steering Committee who is tasked with, and responsible for, the collection and processing of information supplied directly or indirectly by Signatories pursuant to Section 7 and Annex 2, and determining a Signatory’s compliance with the Voluntary Agreement in accordance with Section 12. The Steering Committee shall engage the services of an Independent Administrator upon terms and conditions that shall require undertakings of confidentiality from the Independent Administrator, and which shall also set out any requirements or applicable mechanisms for a process of appeal, should this ever be necessary.
10. “Members” means the Members of the Steering Committee.
11. “Reporting Period” means the period within which the required information is to be submitted by a Signatory (which is generally a calendar year).
12. “Service Provider” means an entity that provides video (and possibly other) content to subscribers with whom it has an ongoing contractual relationship through a cable, satellite, or other managed distribution network provided by that entity. A Service Provider in the context of the Voluntary Agreement is one that supplies Set-Top Boxes to a residential End User.
13. “Set-Top Box” means a device which is capable of receiving digital television services from a coaxial, hybrid fiber coaxial, or fiber-to-the-home distribution system, from satellites, or encapsulated in IP packets from managed IP distribution networks; to decrypt or descramble these signals; and to decode/decompress for delivery to a single residential consumer display and/or recording device, and/or one or more other Set-Top Boxes or Thin Clients in a residential multi-room architecture, and that is purchased and placed into service in the United States by a Service Provider for the first time on or after the Effective Date. The Set-Top Boxes subject to this Voluntary Agreement are limited to the following Set-Top Boxes supplied by Service Providers to residential End Users:

- a. DVR. A Set-Top Box that has the capability of storing digital video signals received from the network to a rewritable disk drive or other non-volatile storage media local to the unit.
- b. Non-DVR. A Set-Top Box that does not have the capability of storing digital video signals received from the network.
- c. Thin Client. A Set-Top Box that is designed to interface between another Set-Top Box and a TV (or other display device) over a home network and relies solely on the other Set-Top Box for access to digital video signals received from the network. Any Set-Top Box that meets the definition of DVR or Non-DVR is not a Thin Client.

Set-Top Boxes subject to this Voluntary Agreement do not include:

- d. Any Set-Top Box that is purchased for the first time before the Effective Date, including any such Set-Top Box that is returned to the Service Provider and refurbished, repaired, and/or upgraded, and then redeployed, or that is used in a “swap-for-failure” scenario after the Effective Date.
 - e. Any Multi-service Gateway, which for purposes of this Voluntary Agreement is a device that is capable of joining multiple Service Provider delivery protocols or provisioning at least two of video, voice, or broadband services from a Service Provider.
14. “Signatory” and “Signatories” mean those companies or organizations that sign this Voluntary Agreement as Service Providers or Vendor Signatories.
 15. “Software Provider” means a company or other legal entity that is responsible for producing the middleware and/or the operational software for the Set-Top Box.
 16. “State” includes the governments of the District of Columbia and any State, territory and insular possession of the United States and their political subdivisions; and any agency or instrument thereof.
 17. “Steering Committee” means the coordinating and governing body of this Voluntary Agreement.
 18. “Vendor Signatory” means the Equipment Manufacturers, Software Providers, Conditional Access Providers, Component Manufacturers that are Signatories pursuant to ANNEX 7, Part B – Equipment Manufacturers, Software Providers, Conditional Access Providers, Component Manufacturers Signing Forms.

ANNEX 2 – REPORTING PRO-FORMA

Information to be provided by Service Provider Signatories

Name of the Service Provider Signatory	
Reporting Period to which the information relates	
New Set-Top Box model type(s) procured by the Service Provider during the Reporting Period	
New Set-Top Box model type(s) procured by the Service Provider during the Reporting Period that meet the requirements of § 3	
ENERGY STAR Version 3.0 TEC figures in the Reporting Period per Set-Top Box model.	
List Features Deactivated for Testing Pursuant to § 6.3	
Reduction in TEC Reported Attributable to Features Excluded Pursuant to § 6.4 (documentation must be attached)	
Optional: information concerning alternative energy efficiency steps which the Service Provider wishes to be considered under § 12.2	

Category of Set-Top Box means, for the purposes of reporting under this Annex, a DVR, Non-DVR, and Thin Client.

Reporting format may be conformed to the format required by ENERGY STAR.

All Section (§) references above are to the Voluntary Agreement.

ANNEX 3 - CABLE INDUSTRY PROVISIONS

1. Signatories

- 1.1. The detailed commitments set forth in this Cable Industry Annex have been subscribed to by Comcast Cable Communications, LLC, Time Warner Cable, Inc., Cox Communications, Inc., Charter Communications, Inc., Cablevision Systems Corp., and Bright House Networks, LLC (“Cable Operators”). The Cable Operators are the largest Service Provider member companies of the National Cable & Telecommunications Association (NCTA) who serve approximately 85% of cable subscribers. Key vendors to the cable industry, identified in ANNEX 7, Part B, are also Signatories in support of the Voluntary Agreement.

2. Phase 1: Sleep

- 2.1. The Voluntary Agreement does not have any effect on previously deployed equipment. The Cable Operators nonetheless specifically commit to go beyond this general principle. The Cable Operators will continue the deployment which commenced in September 2012 of new Set-Top Boxes with “light sleep” capabilities while still preserving their functionality and of software updates enabling “light sleep” to certain models of deployed DVRs that have been placed in service prior to the Effective Date and are capable with commercially reasonable efforts of implementing “light sleep.”
- 2.2. “Light Sleep” means the capability of reducing energy consumption by the Set-Top Box during extended periods of inactivity or at specific times. Normative settings should put the Set-Top Box into sleep mode after no more than 4 hours of inactivity (i.e., no user input or programmed event in process), and to place the Set-Top Box back into sleep mode no more than 15 minutes after concluding an automatic function that does not require user input (e.g. download, programmed recording). The Cable Operators may vary these settings in order to provide a good customer experience. The Cable Operators may also provide customers with tools to vary or opt-out from these settings.

3. Phase 2: Procurement

- 3.1. Each Cable Operator will ensure that 90% of all new Set-Top Boxes it purchases and deploys after December 31, 2013 shall meet the efficiency standards for ENERGY STAR Version 3.0 devices, with “Light Sleep” enabled in capable DVR models.
- 3.2. The Cable Operators will provide reports of 2013 procurements pursuant to the Annual Report provided for in the Voluntary Agreement.

4. Phase 3: Power Scaling

- 4.1. Development. The Cable Operators will work with their suppliers to develop next generation semiconductors and specifications for new model Set-Top Boxes allowing parts of the device to operate in a reduced power consumption mode while still functioning with cable system architectures and meeting consumer expectations for quick start-up time and the ability for the Set-Top Box to wake for periodic updates or record pre-scheduled shows.
- 4.2. Field Testing. The Cable Operators will commence field tests of Set-Top Boxes that include next generation power management (herein referred to as Next Generation Set-Top Boxes) by December 31, 2014.
- 4.3. Deployment. If a Next Generation Set-Top Box has been field tested and it successfully performs on a Cable Operator’s network, the embedded next generation System-on-a-Chip supports all of a Cable Operator’s services, and utilization of that Next Generation Set-Top Box is economically feasible, then the Cable Operator will begin deployment of that Next Generation

Set-Top Box in its ordinary set-top box replacement cycle. The parties anticipate deployment of such successfully tested Next Generation Set-Top Boxes during 2016.

5. Testing

- 5.1. Testing methods to determine energy use and compliance beyond ENERGY STAR Version 3.0 shall be performed as provided in Annex 6.
- 5.2. Cable Television Laboratories, Inc. (CableLabs) and the Cable Operators' test facilities operating under CableLabs' guidance are specifically approved as test facilities for these purposes.
- 5.3. Cable Operators may utilize qualified vendor test facilities for testing purposes.

ANNEX 4A - IPTV PLATFORM PROVISIONS

1. Signatories

- 1.1. The detailed commitments set forth in this IPTV platform Annex have been subscribed to by AT&T Services, Inc., and CenturyTel Broadband Services, LLC d/b/a CenturyLink.

2. Accommodation of New Features Not Addressed by Energy Star Version 3

- 2.1. Because of the rapid pace of innovation, Energy Star Version 3 functionality allowances and/or testing methodology may not address all features present in Set-Top Boxes covered by the Voluntary Agreement. To the extent newly introduced features cannot be disabled for testing, as contemplated in paragraph 6.3 of the Voluntary Agreement, the Service Provider, after consultation with the appropriate manufacturer, will specify an energy consumption allowance to account for the new feature. The Service Provider will document and disclose the process used to quantify this allowance, subject to appropriate protections for proprietary and competitively sensitive information.
- 2.2. The Service Provider will use reasonable diligence to establish an energy consumption allowance for Set-Top Box features not addressed by Energy Star Version 3. However, consistent with this agreement's emphasis on rapid innovation and protecting the customer experience, the absence of such an allowance will not delay the deployment of devices carrying the new feature. Nor will a reasonable delay in establishing such an allowance count against a Service Provider in determining compliance with its deployment commitments under this Voluntary Agreement.

3. Light Sleep and Whole-Home Features in DVR Set-Top Boxes

- 3.1. When deploying DVR Set-Top Boxes, the Service Providers adopting this annex commit to provide units incorporating software instructions that automatically direct the disk drive to stop spinning during periods of disk inactivity, consistent with preserving the customer experience and disk life. The Service Providers covered by this annex agree to continue to provide this light sleep feature on all DVR Set-Top Boxes newly purchased and deployed after the date of adoption of this voluntary agreement.
- 3.2. To the extent DVR Set-Top Boxes are deployed, the Service Providers adopting this annex commit to deploying whole-home DVR Set-Top Boxes, rather than multiple in-home DVR Set-Top Boxes. Whole-home DVR Set-Top Boxes can effectively and efficiently serve content to multiple remote or client devices within a consumer's home. Having a single, whole-home DVR Set-Top Box serving video content in this manner typically consumes significantly less energy than do configurations involving multiple DVR Set-Top Boxes throughout the home.

4. Reduction of Inactive State Energy Consumption

- 4.1. The Service Providers adopting this annex are committed to pursuing innovative and commercially reasonable strategies (including deep sleep) to further reduce the energy consumption of their Set-Top Boxes, particularly when those boxes are not active. In pursuing these strategies, the Service Providers must weigh the potential for energy savings against the potential for adverse customer experience.
 - 4.1.1. The Service Providers covered by this annex commit to evaluate the options for further reducing inactive-state energy consumption while not degrading the customer experience.
 - 4.1.2. The Service Providers commit to providing periodic updates to government and energy-advocate stakeholders on: (1) the steps considered to further reduce their Set-Top Boxes' energy consumption and (2) the technological and customer-experience issues that must be addressed to enable achievement of this goal.

ANNEX 4B - VERIZON PLATFORM PROVISIONS

1. The detailed commitments set forth in this annex have been subscribed to by Verizon and relate to its FiOS TV service.
2. Verizon intends to achieve the commitments with respect to Set-Top Box purchases and deployment after December 31, 2013 consistent with Section 3 of the Voluntary Agreement. Consistent with Section 6.3 of the Voluntary Agreement, new features or functions which consume significant power and are not covered by Energy Star Version 3.0 will not to be counted against the initial efficiency targets.
3. Verizon will enable “light sleep” capabilities in certain models of Set-Top Boxes that are newly purchased and deployed after January 1, 2013, while not degrading the customer experience.
4. Verizon will set a default value of four hours of inactivity, although it may vary particular settings as needed to provide a good customer experience and/or to program sleep at a specific time.
5. Verizon commits to pursuing innovative and commercially reasonable strategies (including deep sleep) to continually reduce the energy consumption of its Set-Top Boxes, particularly when those boxes are not active. In pursuing these strategies, Verizon will weigh the potential for energy savings against the potential for adverse customer experience while not degrading the customer experience.
6. Verizon commits to offering and deploying Whole Home servers and clients, as appropriate, for its customers’ residential configurations, in 2013.

ANNEX 5 - SATELLITE INDUSTRY PROVISIONS

In addition to the energy efficiency commitments outlined in Section 3 (Service Provider Commitments for Set-Top Boxes), Satellite Service Provider signatories commit to:

1. Effective January 1, 2013, (the calendar year 2013 reporting period), at least 90% of new Set-Top Boxes purchased will include an “Automatic Power Down” (APD) feature with a default value of 4 hours or less.
2. Effective January 1, 2013 (the calendar year 2013 reporting period), energy efficient Whole-Home Servers and Clients will be available to all new and existing subscribers.
3. By the end of 2013 (for the calendar year 2014 reporting period), at least 90% of all new Set-Top Boxes purchased, including Whole-Home DVR Set-Top Boxes, will meet ENERGY STAR Version 3.0.

ANNEX 6 – TEST METHOD

The Signatories plan to follow test methodologies and procedures described in the 10/24/12 Draft *CEA-2043: Set-top Box (STB) Power Measurement* standard developed under the auspices of the Consumer Electronics Association (CEA) R4 Video Systems Committee.

The Steering Committee may amend and update this Annex under the procedures of Section 11.

ANNEX 7, Part A – SERVICE PROVIDER SIGNING FORMS

The undersigned Signatories agree to the Voluntary Agreement and ANNEX 3 – CABLE INDUSTRY PROVISIONS.

Bright House Networks, LLC

Signature: /s/ Jeff Chen
Name: Jeff Chen
Title: SVP, Advanced Technology
Date: November 30, 2012

Cablevision Systems Corp.

Signature: /s/ Yvette Kanouff
Name: Yvette Kanouff
Title: EVP – Corporate Engineering & Technology
Date: November 30, 2012

Charter Communications, Inc.

Signature: /s/ Jay Rolls
Name: Jay Rolls
Title: SVP & CTO
Date: November 29, 2012

Comcast Cable Communications, LLC

Signature: /s/ Tony Werner
Name: Tony Werner
Title: EVP & CTO
Date: November 30, 2012

Cox Communications, Inc.

Signature: /s/ Kevin T. Hart

Name: Kevin T. Hart

Title: Executive Vice President & Chief Technology Officer

Date: November 29, 2012

Time Warner Cable Inc.

Signature: /s/ Mike LaJoie

Name: Mike LaJoie

Title: Chief Technology Officer

Date: November 28, 2012

The undersigned Signatories agree to the Voluntary Agreement and ANNEX 4A – IPTV PLATFORM PROVISIONS.

AT&T Services, Inc.

Signature: /s/ Nolan Daines

Name: Nolan Daines

Title: SVP

Date: November 30, 2012

CenturyTel Broadband Services, LLC d/b/a CenturyLink

Signature: /s/ Matt Beal

Name: Matt Beal

Title: SVP Corporate Strategy/Product Development & CTO

Date: November 30, 2012

The undersigned Signatories agree to the Voluntary Agreement and ANNEX 4B – VERIZON PLATFORM PROVISIONS (Verizon).

Verizon Communications, Inc.

Signature: /s/ James J Gowen

Name: James J Gowen

Title: Vice President Supply Chain Operations / Chief Sustainability Officer

Date: 11/30/2012

The undersigned Signatories agree to the Voluntary Agreement and ANNEX 5 – SATELLITE INDUSTRY PROVISIONS.

DirectTV, LLC

Signature: /s/ Rômulo Pontual
Name: Rômulo Pontual
Title: EVP and CTO
Date: November 30, 2012

DISH Network LLC

Signature: /s/ Stanton Dodge
Name: Stanton Dodge
Title: EVP & General Counsel
Date: November 30, 2012

ANNEX 7, Part B – EQUIPMENT MANUFACTURERS, SOFTWARE PROVIDERS, CONDITIONAL ACCESS PROVIDERS, COMPONENT MANUFACTURERS SIGNING FORMS

The undersigned Signatories agree to the Voluntary Agreement.

Cisco Systems, Inc.

Signature: /s/ Joe Chow
Name: Joe Chow
Title: VP/GM, Connected Devices
Service Provider Video Technology Group
Date: November 29, 2012

Motorola Mobility LLC

Signature: /s/ Marwan Fawaz
Name: Marwan Fawaz
Title: Executive Vice President
Date: November 28, 2012

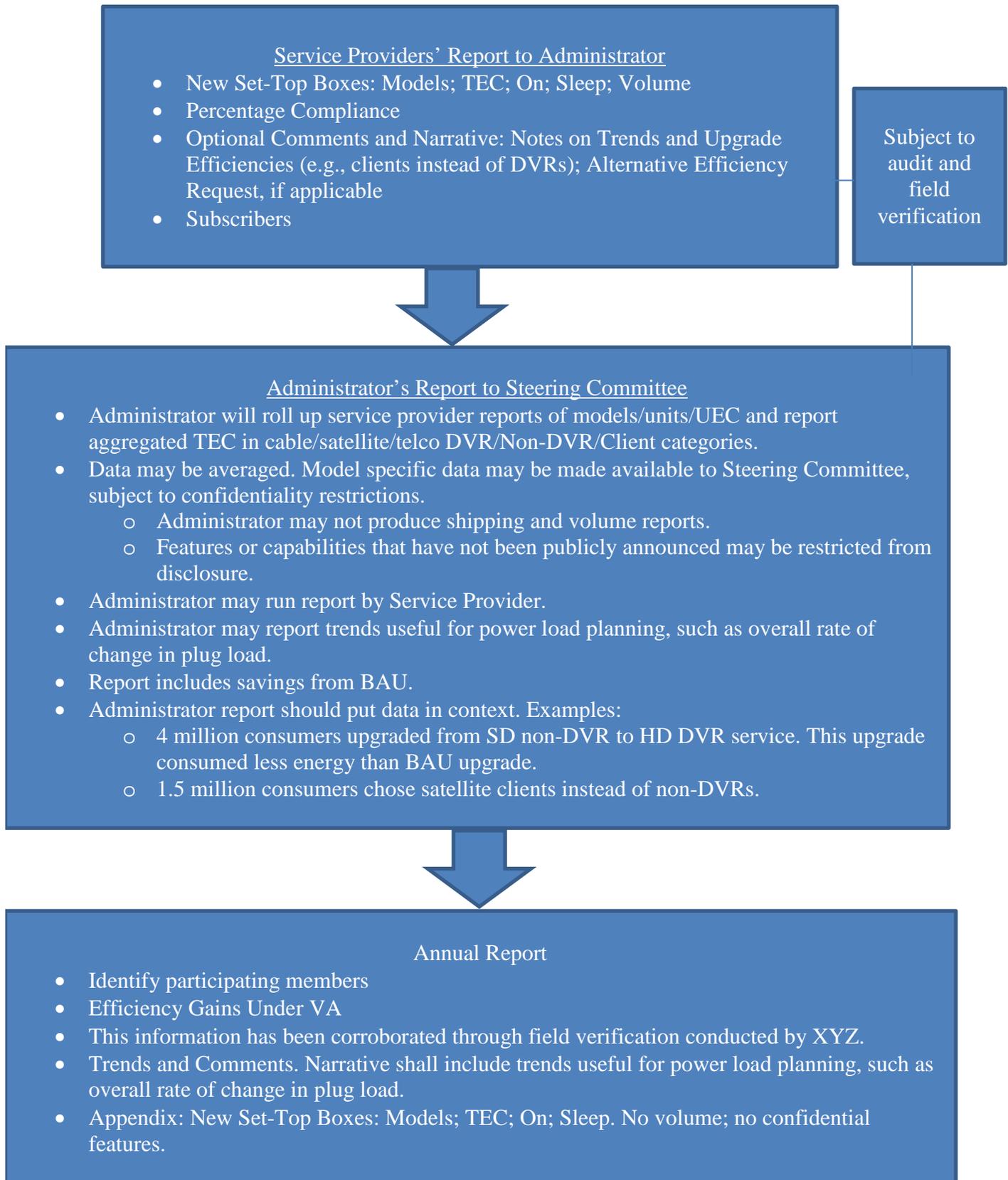
ARRIS Group, Inc.

Signature: /s/ Lawrence A. Margolis
Name: Lawrence A. Margolis
Title: EVP and Chief Counsel
Date: November 28, 2012

EchoStar Technologies LLC

Signature: /s/ Mark Jackson
Name: Mark Jackson
Title: President
Date: November 29, 2012

ANNEX 8 – ANNUAL REPORT



ANNEX 9 – CONTACT INFORMATION

REDACTED

Exhibit 2 – NCTA Responses to Specific NOPR Questions

Question 1: DOE requests comment on narrowing the scope of today’s rulemaking to STBs and excluding network equipment. See section III.B for further detail.

NCTA Response: NCTA agrees that network equipment should be excluded from the scope of this proceeding.

Question 2: DOE requests comment on using the draft CEA-2043 standard as the basis for today’s proposed test procedure for STBs. See section III.C for further detail.

NCTA Response: CEA-2043 should be used as the test procedure for set-top boxes. DOE should not construct a new, alternative test procedure that deviates from CEA-2043. Congress has required DOE to use standards adopted by voluntary consensus standards bodies unless such use “is inconsistent with applicable law or otherwise impractical.”

Question 3: DOE requests comment on the proposed definition of STBs. In particular, DOE requests comment about whether the proposed definition is specific enough to exclude non- STB devices such as gaming consoles and smartphones, yet broad enough to cover traditional STBs and newer boxes. DOE also requests comment on the proposed definitions for direct video connection, HDMI, Component Video, S-Video, and Composite Video. See section III.D.1 for further detail.

NCTA Response: The imposition of energy regulation on MVPD set-top boxes but not alternative video devices that include video functionality would impose a significant competitive disadvantage on MVPDs in a rapidly-changing market. *See* Section II.E. of Comments.

NCTA agrees with DOE’s proposed exclusion of gateway devices. Therefore, the proposed definition of “direct video connection” should be modified by the deletion of “or any other video interface that may be used to output video content” because, though ambiguous, it could be read to render the direct video connection definition empty and meaningless. *See* Section II.G. of Comments.

Question 4: DOE invites comment on the discussion of basic model as it pertains to the STB rulemaking. See section III.D.2 for further detail.

NCTA Response: A definition of basic model that differentiates between each combination of hardware and software would lead to an extraordinary and unduly burdensome number of basic models. *See* Section II.B. of Comments.

Question 5: DOE invites interested parties to comment on the proposed definitions for the STB test procedure NOPR including the definitions for content provider and multi-stream and clarifying information included for the definitions of DVR, display device, and HNI. For the definition of DVR, DOE requests comment on the proposed approach of not testing STBs with external storage as a DVR. If DOE does consider testing the STB with an external storage device as DVR in response to comments, DOE specifically requests comments on the proper external storage device to use. See section III.D.4 for further

detail.

NCTA Response: The definition of DVR should not require the presence of an integrated storage device, which would preclude DVR classification of energy-efficient network-based DVRs. See Section II.A. of Comments.

The term “content provider” is self-explanatory and does not require a definition.

DOE proposes to add to CEA-2043’s definition of “display device” “and displays it for viewing.” This should be changed to the more accurate phrase “and renders it for viewing,” which accounts for decompression.

Question 6: DOE invites interested parties to comment on the proposed definitions of on, sleep, and off modes of operation of a STB. In particular, DOE requests comment, and data, if available, on the proposed requirement to transition from sleep mode to on mode within 30 seconds, or whether a different maximum allowable transition time should be considered. See section III.D.5 for further detail.

NCTA Response: A specific time requirement should not be included in a test procedure. See Section II.F. of Comments.

Question 7: DOE requests comment on the proposed requirements for setting up the STB as installed in a consumer’s home for testing. See section III.E.1 for further detail.

NCTA Response: NCTA does not object to this proposal and understands that it will be incorporated into CEA-2043 through the ANSI comment resolution process.

Question 8: DOE requests comment on the proposed test room conditions for testing STBs, including air temperature, air speed, and thermally non-conductive test surface requirements. In particular, DOE invites interested parties to comment on the proposed air speed requirement of 0.5 m/s and whether this requirement should be relaxed to a higher value or removed altogether. See section III.E.2 for further detail.

NCTA Response: NCTA understands that these proposals will be incorporated into CEA-2043, except the proposal that tests be performed on a thermally non-conductive surface. Since all available surfaces are thermally conductive, that requirement should not be adopted.

Question 9: DOE invites interested parties to comment on the proposed input power requirements for testing STBs. See section III.F.1 for further detail.

NCTA Response: NCTA does not object to this proposal, which is consistent with CEA-2043.

Question 10: DOE requests comment on the proposed requirements for the accuracy of measuring the power consumption of STBs. See section III.F.2 for further detail.

NCTA Response: NCTA does not object to this proposal, which is consistent with CEA-2043.

Question 11: DOE invites interested parties to comment on the recommended test equipment to measure the AC line current, voltage, and frequency. See section III.F.3 for further detail.

NCTA Response: NCTA does not object to this proposal, which is consistent with CEA-2043.

Question 12: DOE requests comment on the proposed power meter instrumentation requirements such as, crest factor, bandwidth, frequency response, and sampling interval requirements. See section III.F.4 for further detail.

NCTA Response: NCTA does not object to this proposal, which is consistent with CEA-2043.

Question 13: DOE requests comment on the proposed calibration requirements for testing STBs. See section III.F.5 for further detail.

NCTA Response: NCTA does not object to this proposal, which is consistent with CEA-2043.

Question 14: DOE requests comment on the proposed requirements for testing STBs that require an HNI connection. Particularly, DOE requests comment on the proposed order in which HNI connections shall be used, that is, MoCA, followed by HPNA, followed by Wi-Fi, and finally any other connection. DOE also requests comment about whether there are any additional HNI connections that should be included and the order of preference in which they should be included. See section III.F.6.a for further detail.

NCTA Response: HNI technologies will change over time. A list of HNIs may be specified (and updated) outside of the test procedure.

Question 15: DOE invites interested parties to comment on the proposed setup requirements for STBs requiring broadband service. Particularly, DOE requests comment on the clarification that a service provider network connection should take precedence over a broadband connection for STBs that are designed to operate on either connection. See section III.F.6.b for further detail.

NCTA Response: NCTA agrees with this proposal in concept, and understands that Section 8.1.5 of CEA-2043 will be revised through the ANSI comment resolution process to read:

“STBs requiring additional data connections

All data connections required for normal operation of Principal Functions must be connected.

Data connection performance criteria (i.e. download speed, upload speed, latency, etc.) must meet the specified requirements of the UUT to fulfill the principal functions.”

Question 16: DOE requests comment on the proposed exclusion of external equipment power consumption from the power consumption of the STB itself. Further, if stakeholders suggest that the power consumption of external equipment be tested and measured, DOE requests comment on the test method and standard configuration that

should be used to test the external equipment. See section III.F.6.c for further detail.

NCTA Response: NCTA does not object to this proposal, which is consistent with CEA-2043.

Question 17: DOE requests comment on the proposed exclusion of power consumption of the input signal equipment from the power consumption of the STB. Further, DOE requests comment on the clarification that such equipment should not supply any power to the STB. DOE also requests feedback on the potential use of a DC block to prevent power transfer to and from any input signal equipment. Finally, if stakeholders indicate that this equipment should be tested and the power consumption be measured, DOE requests comment on the test method and standard configuration that should be used to test this equipment. See section III.F.6.d for further detail.

NCTA Response: NCTA does not object to this proposal and understands that it will be incorporated into CEA-2043 through the ANSI comment resolution process.

Question 18: DOE invites interested parties to comment on the proposed requirements for service provider network connection. In particular, DOE requests comment and data, if available, about whether the power consumption of a STB is similar on a live network versus a closed network. See section III.F.6.e for further detail.

NCTA Response: NCTA does not object to this proposal, which is consistent with CEA-2043.

Question 19: DOE requests comment on the proposed warm-up time for stabilizing the STB. See section III.G.1 for further detail.

NCTA Response: NCTA does not object to this proposal, which is consistent with CEA-2043.

Question 20: DOE invites interested parties to comment on all aspects of the proposed configuration for testing STBs in the on, sleep, and off modes of operation. DOE is especially interested in receiving comments on the proposed connections for the test configuration. DOE also invites comments on the proposed order of preference for connecting a display device to the STB. See section III.G.2 for further information.

NCTA Response: NCTA opposes DOE's proposal to establish this inflexible, uniform test configuration. The reason that CEA-2043 defers these configurations to the "entity specifying the use of the CEA standard" is not to await a single standard from some other authority but instead to allow for appropriate divergent configurations for display devices and HNI as determined by the party on whose behalf the test is performed.

Question 21: DOE requests comment on the proposed requirements for streaming an appropriate SD or HD stream to a display device. DOE also invites comment on the proposed requirement to record content on a DVR integrated into the STB. Finally, DOE requests comment on the proposed requirements to stream content to a connected client. Specifically, DOE requests comment on the proposed hierarchy of content to stream to a

connected client, which is a recorded stream followed by a channel. See section III.G.3 for further detail.

NCTA Response: DOE's proposal can be effected more clearly by changes set forth in Exhibit 3, page 7.

Question 22: DOE requests comment on the proposed methods to determine the average power consumption of the STB in each mode of operation. See section III.G.4 for further detail.

NCTA Response: NCTA does not object to this proposal and understands that it will be incorporated into CEA-2043 through the ANSI comment resolution process.

Question 23: DOE invites comment on all aspects of the proposed approach for testing the STB in the on mode including the proposed time period of 2 minutes for all tests in the on mode. The on mode measurement test includes the on (watch TV) test and multi-stream test. See section III.G.5 for further detail.

NCTA Response: Some of DOE's proposed changes are being incorporated into CEA-2043 through the ANSI comment resolution process as indicated in Exhibit 3, page 9. Otherwise, no text changes are required. A test method should identify the method for obtaining energy efficiency measurements, rather than to define a standard for energy consumption or time periods utilized for calculating compliance with a standard.

Question 24: DOE requests comment on the proposed method for the on (watch TV) test. In particular, DOE requests comment on the approach of using both, an SD and HD stream for testing HD STBs. DOE also requests interested parties to comment, and provide data if available, on the percentage of streams that are available in SD and HD for HD STBs, and whether the proposed equation for calculating PWATCH should be changed. See section III.G.5.a for further detail.

NCTA Response: NCTA disagrees with this proposed change to CEA-2043. The standard, as written, will support testing of devices with this P (watch) time measurement. No text changes are required. A test method should identify the method for obtaining energy efficiency measurements, rather than define a standard for energy consumption or time periods utilized for calculating compliance with a standard. See Section II.F. of Comments (The Proposed Test Procedure Should Not Include Performance Requirements).

Question 25: DOE requests comment on the approach of using a single multi-stream test as well as the test procedure to test STBs with multi-streaming capability. DOE is especially interested in receiving comments on the proposed priority list for enabling streams for testing STBs with multi-streaming capability. DOE also seeks feedback on whether the number of additional streams that should be enabled should be other than three and the reasons for enabling a different number of streams. DOE requests comment on the possibility of including a maximum power test, which would test the STB such that the maximum number of streams is enabled. If included, DOE requests comment on the

weighting that should be applied for the maximum streaming test in the calculation of the AEC. See section III.G.5.b for further detail.

NCTA Response: The tests are already accommodated by CEA-2043. By constraining how outputs would be tested, DOE would make the tests so inflexible that EPA has already found it necessary to propose a test supplemental to the DOE's proposal in order to test a device when some outputs are constrained. By keeping the standard flexible, the test method can be more useful.

Question 26: DOE requests comment on all aspects of the proposed specification for setting up STBs for testing in sleep mode. In particular, DOE invites comment on the proposed duration (4 to 8 hours unless network activities prompt a longer time period) over which the power consumption of the STB shall be measured and averaged, and whether this duration should be increased or decreased to better represent the STB power consumption in sleep mode. See section III.G.6 for further detail.

NCTA Response: A test method should identify the method for obtaining energy efficiency measurements, rather than to define consumption standards or performance requirements, which is a separate undertaking. See Section II.F. of Comments (The Proposed Test Procedure Should Not Include Performance Requirements).

Question 27: DOE also requests comment on the proposed scheduled recording requirement prior to placing the STB in sleep mode to measure its power consumption. DOE requests interested parties to provide data, if available, on the variation in power consumption of a STB when a recording is scheduled versus when it is not scheduled. See section III.G.6 for further detail.

NCTA Response: NCTA understands that DOE's proposal will be incorporated into CEA-2043 through the ANSI comment resolution process to assure that no scheduled recordings will occur during the test, and to require that a recording be scheduled at least 24 hours into the future.

Question 28: DOE invites interested parties to comment on all aspects of the proposed method to address network initiated actions. DOE requests comment and data, if available, on the approach proposed in today's NOPR, the approaches that were considered but have not been proposed, as well as any other approach that stakeholders believe would best capture the transition of the STB from sleep mode to on mode due to network initiated activities. See section III.G.6 for further detail.

NCTA Response: It would be easier to assure that no service provider initiated activity interrupts the test, and/or to re-run the test if so interrupted, rather than implementing the NOPR's approach.

Question 29: DOE invites comments on the proposed requirements for testing STBs in manual sleep mode. See section III.G.6.a for further detail.

NCTA Response: This test is unnecessary for a test procedure because it would only be relevant

to the calculation of an AEC. There is no need to compute AEC as part of a test procedure. AEC calculations should be deferred in the absence of energy conservation standards. *See* Section II.F of Comments.

Question 30: DOE requests comment on the proposed test for determining the STB power consumption in APD. In particular, DOE requests comment and data, if available, on the time required to transition to sleep mode from on mode and whether this time period should be set at a default value of 4 hours or adjusted during testing. DOE also requests comment on potential methods to scale APD and the advantages and disadvantages of scaling the power consumption in APD. Finally, DOE requests comment on potential methods to account for a scaling APD value in the AEC metric. See section III.G.6.b for further detail.

NCTA Response: A test procedure should measure power consumption of a device that has entered sleep mode, but does not need a separate APD test, which would be used to calculate AEC. There is no need to compute AEC as part of a test procedure. AEC calculations should be deferred in the absence of energy conservation standards. *See* Section II.F of Comments.

Question 31: DOE invites interested parties to comment on the proposed requirements for testing STBs in off mode. See section III.G.7 for further detail.

NCTA Response: Testing in off mode is not necessary for a test procedure and should not be required.

Question 32: DOE requests comment on the proposed sleep to on mode transition time measurement test. See section III.G.8 for further detail.

NCTA Response: DOE should not adopt the NOPR's proposal to include in the definition of sleep mode the requirement that a set-top box be able to wake from sleep to on mode within 30 seconds for it to qualify as having sleep mode. Such a performance metric has no place in a test method. The purpose of a test method is to measure the energy use during sleep mode, not to set standards for how a set-top box must operate when entering or leaving sleep mode. *See* Section II.F. of Comments.

Question 33: DOE requests comment on the proposed sampling plan and rounding requirements for making representations of the STB power consumption in each mode of operation. DOE also requests comment on proposed rounding requirements for AEC, which is calculated from the rated power consumption values. See section III.H for further detail.

NCTA Response: There is no need to compute AEC as part of a test procedure. AEC calculations should be deferred in the absence of energy conservation standards. *See* Section II.F of Comments.

Question 34: DOE requests comment on the proposed calculation of the AEC metric for determining the annual energy consumption of the STB. DOE requests comment on the

proposed hour weightings that were developed based on the ENERGY STAR specification or whether the alternate hour weightings should be considered instead. DOE also invites comment and data, if available, on the time coefficients for each mode of operation to calculate the AEC. See section III.I for further detail.

NCTA Response: There is no need to compute AEC as part of a test procedure. AEC calculations should be deferred in the absence of energy conservation standards, and DOE should exclude duty cycles and other usage assumptions from any test procedure. *See* Section II.F of Comments.

Question 35: DOE requests comment on the analysis of the burden to small businesses for testing STBs according to the proposed test procedure. DOE also requests comment on the expected number of small business manufacturers of STBs. See section IV.B for further detail.

NCTA Response: DOE has vastly underestimated the number of small cable operators that would be forced to conduct unduly burdensome and expensive testing as a result of DOE's proposed classification of MVPDs as manufacturers when they load software to a set-top box. *See* Section II.B of Comments.

Question 36: DOE requests additional information and comment for the development of a test procedure for LNBS, ONTs, ODU, or other infrastructure devices and the standard configuration in which these devices should be tested, if stakeholders support developing a test procedure for them. See section III.B for further detail.

NCTA Response: The Voluntary Agreement provides a superior method for gaining energy efficiency while accounting for the wide variety of distribution networks.

Exhibit 3

CEA Technical Comments on Differences Between CEA-2043 and DOE's Proposal

CLASS* NOPR Quest- ion No.	<u>Accept/ Disagree</u>	<u>Existing Text</u>	<u>DOE Comment/Modification/Addition</u>	<u>CEA-2043 Work Group Consensus</u>
OS Q3	Disagree	4.16 Set-top Box (STB) — a device whose primary purpose or function is to receive video content which is then delivered to a Display Device, recording device, or Client.	Definitions: <u>Set-top box means a device combining hardware components with software programming designed for the primary purpose of receiving television and related services from terrestrial, cable, satellite, broadband, or local networks, providing video output using at least one direct video connection.</u>	The current Set-top Box definition covers the expanded details proposed by the DOE comment. For instance: 1.) "...hardware components with software programming..." is covered by the general term of "...a device...". 2.) "...and related services from terrestrial, cable, satellite, broadband, or local networks" is covered by the general term "...video content..." which covers all of DOE proposed sources plus any other possible delivery technology. 3.) "...providing video output using at least one direct video connection.." would exclude "headless devices" (e.g. an STB that delivers video using Wi-Fi, MoCA, 802.11, etc.) The standard, as written, will support testing of devices without "direct video connections".
OS	Disagree	none	Definitions: <u>Direct Video Connection - any connection type that is one of the following: High-Definition Multimedia Interface (HDMI), Component Video, S-Video, Composite Video, or any other video interface that may be used to output video content.</u>	Only required if new DOE proposed definition was accepted.
OS Q5	Disagree	none	Definitions: <u>Content provider means an entity that provides video programming content.</u>	The term "content provider" is considered self-explanatory and does not require a definition.

* Classification:

- TI - Tester Instructions – outside the scope of a test standard
- OS - Over Specification – covered by current CEA-2043 language
- R - Regulatory parameter - outside the scope of a test standard

OS Q5	Disagree	4.4 Digital Video Recorder (DVR) — a STB feature that records television signals on a HDD or other non-volatile storage device. A DVR often includes features such as: Play, Record, Pause, Fast Forward (FF), and Fast Rewind (FR). STBs that support a Service Provider delivery network based “DVR” service are not considered DVR STBs for purposes of this standard. The presence of DVR functionality does not mean the device is defined to be an STB.	Definitions: <i>Digital video recorder (DVR)</i> means a STB feature that records television signals on a HDD or other non-volatile storage device <u>integrated into the STB</u> . A DVR often includes features such as: Play, Record, Pause, Fast Forward (FF), and Fast Rewind (FR). STBs that support a service provider delivery network-based “DVR” service are not considered DVR STBs for purposes of this test procedure. The presence of DVR functionality does not mean the device is defined to be a STB.	Adding "...integrated into the STB" would exclude a device that is designed to always use an external HDD as supplied by the manufacturer. Section 8.1.8 indicates the correct treatment for essential peripheral devices.
-	Accept - but simplify DOE text	4.5 Display Device (DD) — a Display Device (e.g. TV, Computer Monitor, Portable TV, etc.) receives its content directly from an STB through a video interface (e.g. HDMI, Component, Composite, S-Video, etc.) and not through a Home Network Interface.	Definitions: <i>Display device</i> means a device (example: TV, Computer Monitor, or Portable TV) that receives its content directly from a STB through a video interface (example: HDMI2, Component Video, Composite Video, or S-Video), not through an HNI, and <u>displays it for viewing</u> .	Add - "...and renders it for viewing"
OS Q5	Disagree	4.8 Home Network Interface (HNI) — the interface with external devices over a local area network (e.g. IEEE 802.11(Wi-Fi), MoCA, HPNA, IEEE 802.3, HomePlug AV).	Definitions: Home network interface (HNI) means an interface with external devices over a local area network (example: IEEE3 802.11 (Wi-Fi), MoCA, HPNA, IEEE 802.3, HomePlug AV) <u>that is capable of transmitting video content</u> .	The addition of "...that is capable of transmitting video content." is not sufficient to distinguish a class of HNIs. All HNIs are capable of transmitting video at some level. The standard, as written, will support testing of devices with all HNI types so the definition of HNI should not be restricted. A list of HNIs may be specified (and updated) outside of the standard.
OS Q5	Open	none	Definitions: <i>Multi-stream</i> means a STB feature that <u>may provide independent video content to one or more clients, one or more directly connected TVs, or a DVR</u> .	Not required since current text allows the entity using CEA-2043 to specify various configurations for testing.

-	Accept	none	<p>Acronyms: <u>ANSI means American National Standards Institute.</u> <u>IEC means International Electrotechnical Commission.</u> <u>ISO means International Organization for Standardization.</u> <u>SCTE means The Society of Cable Telecommunications Engineers. Inc.</u></p>	Add acronyms with meanings to standard.
R Q6	Disagree - but clarifying text added	<p>6.2 SLEEP A range of reduced power states where the STB is connected to a mains power source and is not providing any Principal STB Function. The STB may transition to ON or OFF mode due to user action, internal signal, or external signal. The power consumed in this mode may vary based on specific use or configuration. If any Principal STB Function is activated while operating in this mode, the STB is assumed to transition to ON mode. Monitoring for user or network requests is not considered a Principal STB Function.</p>	<p>Definitions: Sleep mode – a range of reduced power states where the STB is connected to a mains power source and is not providing any principal STB function. The STB may transition to on or off mode due to user action, internal signal, or external signal. The power consumed in this mode may vary based on specific use or configuration. If any principal STB function is activated while operating in this mode, the STB is assumed to transition to on mode. Monitoring for user or network requests is not considered a principal STB function. <u>The STB shall be able to transition from this mode to on mode within 30 seconds to be considered in sleep mode.</u></p>	The standard should not contain performance limitations in a definition. However the following text will be appended to the definition in lieu of the DOE proposed text - "An STB may be expected to transition from Sleep mode to On mode within a specified time interval however such considerations are outside the scope of this standard"

<p>- Q7</p>	<p>Accept - but simplify DOE text</p>	<p>none</p>	<p>Test Conditions: <u>1. For STBs that require subscription to a service, select the simplest available video subscription that supports all functionality specified in this test procedure (example: HD streaming, multi-stream, DVR, etc.). That is, select a subscription with TV services only; services with non-video capability, such as telephony, shall not be selected.</u> <u>2. If the STB can be installed by the consumer per the manufacturer’s instructions without the service of a technician, then install and setup the STB according to the instructions provided in the user manual shipped with the unit. Setup the STB using only those instructions in the user manual. Setup is considered complete once these instructions are followed.</u> <u>3. If the STB must be installed by a technician per the manufacturer’s instructions, then it shall be setup as installed by the technician using this test procedure. All steps that a technician would follow when installing a STB for use in a consumer residence should be followed. Information about each of the steps that were performed to setup the STB by a technician shall be recorded and maintained by the manufacturer pursuant to 10 CFR Part 429.71.</u></p>	<p>Information will be added to Section 8.1 Test Procedures - General</p>
<p>OS/TI Q14</p>	<p>Disagree</p>	<p>8.1.4 STB configurations that require a home network STB configurations that require the use of a home network shall use the Home Network Interface option (HNI) as provided by the entity specifying the use of CEA-2043. The HNI option used for the testing must be recorded by the tester.</p>	<p><i>Home Network Connection.</i> STB configurations that require the use of a home network shall use the HNI option <u>according to the following order of preference. The first available connection that the STB supports shall be used:</u> <u>1. MoCA;</u> <u>2. HPNA;</u> <u>3. Wi-Fi (802.11); or</u> <u>4. Other HNI connection.</u></p>	<p>HNI Technologies will change over time so it is best to specify the list of types and preferred order of use outside of the standard.</p>

<p>- Q15</p>	<p>Accept</p>	<p>8.1.5 STBs requiring broadband service If the UUT includes a HNI, and the HNI must be connected to broadband service for operation of a principal function of the UUT, it shall be tested while connected to a broadband network. Broadband performance criteria (i.e. download speed, upload speed, latency, etc.) must meet the specified requirements of the UUT to fulfill the principal functions.</p>	<p><i>Broadband Service.</i> If the STB includes an HNI, and the HNI shall be connected to broadband service for operation of a principal STB function, it shall be tested while connected to a broadband network. Broadband performance criteria (that is, download speed, upload speed, latency, etc.) shall meet the specified requirements of the STB to fulfill the principal STB functions. <u>For STBs designed to operate both with a broadband connection and a service provider network connection, the service provider connection takes precedence, and the broadband connection shall only be made if the STB requires it for operating a principal STB function.</u></p>	<p>Section 8.1.5 will be rewritten to accommodate the DOE comment and clarify the requirement. New text: 8.1.5 STBs requiring additional data connections All data connections required for normal operation of Principal Functions must be connected. Data connection performance criteria (i.e. download speed, upload speed, latency, etc.) must meet the specified requirements of the UUT to fulfill the principal functions.</p>
<p>- Q17</p>	<p>Accept</p>	<p>8.1.7 Input Signal Equipment When an ODU, OTA antenna amplifier, CATV distribution amplifier, or similar signal equipment is required and the power for that equipment is supplied from the UUT, then the measurement must not include the power consumption of that equipment. Accordingly, the signal equipment shall be powered from a source other than the UUT.</p>	<p><i>Input Signal Equipment</i> When an ODU, OTA antenna amplifier, CATV distribution amplifier, or similar signal equipment is required and the power for that equipment is supplied from the STB, then the measurement shall not include the power consumption of that equipment, <u>unless the equipment cannot be powered from a source other than the STB. If the signal equipment cannot be powered from a source other than the STB, then the power for this equipment shall be included in the STB power consumption measurement. However, if the signal equipment can be powered from a source other than the STB, then it shall be powered from another source, and such equipment shall not deliver any power to the connected STB.</u></p>	<p>Section 8.1.7 will adopt the DOE proposed comment.</p>

<p>TI Q7</p>	<p>Disagree</p>	<p>8.1.11 Test Configuration Information A STB is configured with one or more devices (e.g. display devices, network devices, service delivery devices, etc.) and, if applicable, configured with the network technology most commonly used in subscriber installations. Identically featured STBs often have different performance capabilities. Additionally, not all CEA-2043 tests apply to all STB types or configurations.</p> <p>Therefore the entity specifying the use of CEA-2043 is expected to provide the following information: (a) Test Configurations – a configuration diagram of the STBs, Clients, Display Devices, and any other devices required for each requested CEA-2043 test</p>	<p>Test Configuration Information <i>Test Configuration</i> The display device and client setup is described in Table 1 (of the NOPR). Based on the capability of the STB, the appropriate number of display devices and clients shall be connected.</p> <p>Table 1: Display Device and Client Connection Setup.</p> <table border="1" data-bbox="905 443 1457 683"> <thead> <tr> <th>Supports Multiple Display Devices?</th> <th>Supports DVR?</th> <th>Supports Clients?</th> <th>Number of Connected Display Devices</th> <th>Number of Connected Clients</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>X</td> <td>X</td> <td>1</td> <td>1</td> </tr> <tr> <td>X</td> <td>X</td> <td></td> <td>2</td> <td>0</td> </tr> <tr> <td>X</td> <td></td> <td>X</td> <td>2</td> <td>1</td> </tr> <tr> <td></td> <td>X</td> <td>X</td> <td>1</td> <td>1</td> </tr> <tr> <td>X</td> <td></td> <td></td> <td>2 or 3*</td> <td>0</td> </tr> <tr> <td></td> <td>X</td> <td></td> <td>1</td> <td>0</td> </tr> <tr> <td></td> <td></td> <td>X</td> <td>1</td> <td>1 or 2*</td> </tr> <tr> <td></td> <td></td> <td></td> <td>1</td> <td>0</td> </tr> </tbody> </table> <p>* The highest number of connections supported by the STB shall be used.</p>	Supports Multiple Display Devices?	Supports DVR?	Supports Clients?	Number of Connected Display Devices	Number of Connected Clients	X	X	X	1	1	X	X		2	0	X		X	2	1		X	X	1	1	X			2 or 3*	0		X		1	0			X	1	1 or 2*				1	0	<p>Since 2043 supports user specified configurations for testing a STB it is better to keep the standard flexible to accommodate other possible configuration test requests. For example, EPA has already found it necessary to propose a test supplemental to the DOE’s proposal in order to test a device when some outputs are constrained. By keeping the standard flexible, the test method can be more useful.</p>
Supports Multiple Display Devices?	Supports DVR?	Supports Clients?	Number of Connected Display Devices	Number of Connected Clients																																													
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<p>OS/TI Q20</p>	<p>Disagree - but clarifying text added</p>	<p>(b) The specific network technology to be used for each test, if applicable (c) The maximum number of connected Display Devices for each test, if applicable (d) The maximum number of Clients for each test, if applicable (e) Devices in the network configuration that cannot to be tested (e.g. PCs, Tablets, etc) (f) Required tests to be run on each device</p>	<p>Test Configuration Information <i>Connecting to a Display Device.</i> The STB shall be connected to the number of display devices required based on the setup requirements specified in Table 1 (of the NOPR). <u>The following order of preference shall be used to connect each display device to the STB. The first available connection that the STB supports shall be used:</u> <u>1. HDMI</u> <u>2. Component Video</u> <u>3. S-Video</u> <u>4. Composite Video</u> <u>5. Other video interface</u></p>	<p>Add the following clarifying text to item C - "...and by priority specified, if desired."</p>																																													
<p>OS</p>	<p>Disagree</p>	<p>(g) Test parameters for each required test (e.g. TON, TSLEEP)</p> <p>Annex D (section D.2) includes recommended CEA-2043 test procedures for common STB types.</p>	<p>Test Configuration Information <i>Connecting to a Client.</i> The STB shall be connected to the number of clients required based on the setup requirements specified in Table 1 (of the NOPR). <u>An HNI connection shall be used to connect the client to the STB. The order of preference in which an HNI connection shall be selected is specified in section 4.6.1. (Of the NOPR).</u></p>	<p>Keeps original text as it accommodates an entity specifying the HNI interface requirements.</p>																																													

<p>- Q20 Q21</p>	<p>Accept - but simplify DOE text</p>	<p>8.2.2.1 ON (Watch TV) The ON (Watch TV) mode power level shall be determined as follows: (a) Configure the UUT as specified in 8.1.11 (b) <u>Select a channel* and view on a connected Display Device, if supported or, if not supported, view on a Client</u> (c) Begin ON mode power consumption measurement and record the power consumption as PWATCH TV_n ,where n is the total number of Display Devices and Clients (d) Repeat steps (b) and (c) up to the maximums specified in 8.1.11. * For STBs using a content provider that does not support channels, select content that meets section 8.1.2 requirements and view the content as indicated.</p>	<p><i>Test Conduct.</i> <u>The following section is provided as guidance when conducting the various on, sleep, and off mode tests. When multiple streams are enabled, different content shall be selected to output to a display device, record on a DVR integrated into the STB, and stream to a connected client.</u> <i>Output to a Display Device.</i> For tests requiring output to a display device, a channel shall be selected and viewed on the connected display device(s) as required by the test configuration. For STBs using a service provider that does not support channels, <u>an appropriate SD or HD test stream shall be selected and the content shall be viewed as indicated. If more than one display device is connected to the STB based on the test configuration from Table 1 (of the NOPR), then the content outputted on each display device shall be different.</u> <i>Streaming to a Connected Client.</i> The content streamed to a client shall be selected in the order of preference proposed in the NOPR depending on the number of streams enabled. The first available stream that is supported by each connected client shall be enabled and the content on each stream shall be different. <i>Stream with recorded content.</i> That is, previously recorded content shall be viewed on a display device connected to a client. <i>Stream with channel content.</i> That is, a channel (SD stream for an SD client and HD stream for an HD client) shall be viewed on the connected display device. For clients that do not support channels, select an appropriate SD or HD test stream and view the content as indicated. <i>Other streaming option.</i> If the streams from sections 5.3.3.1. and 5.3.3.2. (of the NOPR) are not supported, use another stream that is available.</p>	<p>Change step (d) to: “Repeat steps (b) and (c), using different content, up to the maximums specified in 8.1.11. Add text to 8.1.2: indicate if entity wants to specify additional stream parameters that can be done but is outside the scope of the test procedure. Review 8.1.11: allows for specification of content stream sources. "A configuration diagram should include the sources for test streams..."</p>
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<p>- Q22</p>	<p>Accept</p>	<p>8.2.2.3 ON (Record) - DVR STB The ON (Record) power level shall be determined as follows: (a) Configure the UUT as specified in 8.1.11 (b) Select a channel using a connected Display Device or a Client, and record the program (c) Begin ON mode power consumption measurement and record the power consumption as PRECORD_n , where n is the total number of recordings (d) Repeat steps (b) and (c) up to the maximums specified in 8.1.11</p>	<p><i>Recording for a STB with DVR capability.</i> For tests that require recording on a DVR, a channel shall be selected using a connected display device or a client and the program shall be recorded. <u>If more than one recording is enabled on a DVR that is integrated into the STB, the content for each recording shall be different.</u></p>	<p>Change step (d) to: “Repeat steps (b) and (c), using different content, up to the maximums specified in 8.1.11.</p>
<p>OS</p>	<p>Disagree</p>	<p>8.2.2.2 ON (Play) - DVR STB The ON (Play) power level shall be determined as follows: (a) Configure the UUT as specified in 8.1.11 (b) Select a previously recorded program and view on a connected Display Device or Client (c) Begin ON mode power consumption measurement and record the power consumption as PPLAY_n, where n is the total number of Display Devices and Clients (d) Repeat steps (b) and (c) up to the maximums specified in 8.1.11.</p>	<p><i>Stream with recorded content.</i> That is, previously recorded content shall be viewed on a display device connected to a client.</p>	<p>Current text accommodates request.</p>

<p>- Q23</p>	<p>Accept</p>	<p>8.2.1 ON Mode Power Consumption Measurement ON mode power consumption measurements must use the following procedure. Specific power consumption parameter names are identified in each test. (a) Use the time period for ON mode power consumption measurement from 8.1.11 (TON) (b) Record the energy consumed over the predetermined time period (c) Record the average power consumption as the energy divided by the time period</p>	<p>Calculation of Average and Rated Power Consumption For all tests in the on, sleep, and off modes (sections 5.5, 5.6, and 5.7), the average power shall be calculated using <u>one of the following two methods</u>: 1. Record the accumulated energy (Ei) in kilo-watt hours (kWh) consumed over the time period specified for each test (Ti). The average power consumption is calculated as $P_i = E_i/T_i$. 2. <u>Record the average power consumption (Pi) by sampling the power at a rate of at least 1 sample per second and computing the arithmetic mean of all samples over the time period specified for each test (Ti).</u></p>	<p>Accept as proposed by DOE</p>
<p>TI Q23</p>	<p>Disagree</p>	<p>8.2.1 ON Mode Power Consumption Measurement ON mode power consumption measurements must use the following procedure. Specific power consumption parameter names are identified in each test. <u>(a) Use the time period for ON mode power consumption measurement from 8.1.11 (TON)</u> (b) Record the energy consumed over the predetermined time period (c) Record the average power consumption as the energy divided by the time period</p>	<p>On Mode Power Measurement <u>The time period for each test in the on mode, TON, is 2 minutes.</u></p>	<p>The standard, as written, will support testing of devices with this ON mode time measurement. No text changes are required.</p>

<p>R Q24</p>	<p>Disagree</p>	<p>8.2.2.1 ON (Watch TV) The ON (Watch TV) mode power level shall be determined as follows: (a) Configure the UUT as specified in 8.1.11 (b) Select a channel* and view on a connected Display Device, if supported or, if not supported, view on a Client (c) Begin ON mode power consumption measurement and record the power consumption as $P_{WATCH\ TV_n}$, where n is the total number of Display Devices and Clients (d) Repeat steps (b) and (c) up to the maximums specified in 8.1.11.</p> <p>* For STBs using a content provider that does not support channels, select content that meets section 8.1.2 requirements and view the content as indicated.</p>	<p><u>On (Watch TV SD) and On (Watch TV HD)</u> <u>1. If supported, select an SD channel and view on the connected display device. For STBs using a content provider that does not support channels, select an appropriate SD test stream and view the content as indicated.</u> <u>2. If the STB supports HD streaming, repeat the test section 5.5.2. (of the NOPR) using HD content instead of SD content and record this value as $P_{WATCH\ HD}$.</u></p> <p>5.5.2.3. <i>Calculation of P_{WATCH}.</i> Compute P_{WATCH} according to the following equation:</p> $P_{WATCH} = \begin{cases} \frac{P_{WATCH_SD} + P_{WATCH_HD}}{2}, & \text{STB supports HD} \\ P_{WATCH_SD}, & \text{STB doesn't support HD} \end{cases}$	<p>Previously accepted changes will accommodate DOE requirement for both SD and HD streams. The standard, as written, will support testing with both SD and HD test streams. No text changes are required.</p>
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<p>TI Q25</p>	<p>Disagree</p>	<p>8.2.2 ON Mode Test Procedures 8.2.2.1 ON (Watch TV) The ON (Watch TV) mode power level shall be determined as follows: (a) Configure the UUT as specified in 8.1.11 (b) Select a channel* and view on a connected Display Device, if supported or, if not supported, view on a Client (c) Begin ON mode power consumption measurement and record the power consumption as PWATCH TV_n ,where n is the total number of Display Devices and Clients (d) Repeat steps (b) and (c) up to the maximums specified in 8.1.11. * For STBs using a content provider that does not support channels, select content that meets section 8.1.2 requirements and view the content as indicated. 8.2.2.2 ON (Play) - DVR STB The ON (Play) power level shall be determined as follows: (a) Configure the UUT as specified in 8.1.11 (b) Select a previously recorded program and view on a connected Display Device or Client (c) Begin ON mode power consumption measurement and record the power consumption as PPLAY_n , where n is the total number of Display Devices and Clients (d) Repeat steps (b) and (c) up to the maximums specified in 8.1.11. 8.2.2.3 ON (Record) - DVR STB The ON (Record) power level shall be determined as follows: (a) Configure the UUT as specified in</p>	<p>Multi-stream The multi-stream test proposed by DOE is one scenario test as specified in section 8.1.11 of the draft CEA-2043 standard. Configure the STB as specified in section 5.2 of this appendix. Table 2 of this appendix describes how to setup the multi-stream test. Choose the highest priority (smallest number option) that the STB supports.</p> <p>Table 2: Priority List for the Multi-stream Test.</p> <table border="1"> <thead> <tr> <th rowspan="2">Priority for Enabling Multi-streaming - 1 is highest priority - 9 is lowest priority</th> <th colspan="3">Number of Streams Enabled:</th> </tr> <tr> <th>To Display Devices</th> <th>To Record on DVR</th> <th>To Connect to Clients</th> </tr> </thead> <tbody> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>2</td><td>2</td><td>1</td><td>-</td></tr> <tr><td>3</td><td>2</td><td>-</td><td>1</td></tr> <tr><td>4</td><td>1</td><td>2</td><td>-</td></tr> <tr><td>5</td><td>1</td><td>-</td><td>2</td></tr> <tr><td>6</td><td>3</td><td>-</td><td>-</td></tr> <tr><td>7</td><td>1</td><td>1</td><td>-</td></tr> <tr><td>8</td><td>1</td><td>-</td><td>1</td></tr> <tr><td>9</td><td>2</td><td>-</td><td>-</td></tr> </tbody> </table>	Priority for Enabling Multi-streaming - 1 is highest priority - 9 is lowest priority	Number of Streams Enabled:			To Display Devices	To Record on DVR	To Connect to Clients	1	1	1	1	2	2	1	-	3	2	-	1	4	1	2	-	5	1	-	2	6	3	-	-	7	1	1	-	8	1	-	1	9	2	-	-	<p>Already accommodated by standard - multi-stream configurations must be specified outside of standard.</p>
Priority for Enabling Multi-streaming - 1 is highest priority - 9 is lowest priority	Number of Streams Enabled:																																														
	To Display Devices	To Record on DVR	To Connect to Clients																																												
1	1	1	1																																												
2	2	1	-																																												
3	2	-	1																																												
4	1	2	-																																												
5	1	-	2																																												
6	3	-	-																																												
7	1	1	-																																												
8	1	-	1																																												
9	2	-	-																																												

<p>R/TI Q26 Q27 Q28</p>	<p>Disagree</p>	<p>8.3.1 SLEEP Mode Power Consumption Measurement SLEEP mode power consumption measurements must use the following procedure. Specific power consumption parameter names are identified in each test. (a) Use the time period for SLEEP mode power consumption measurement from 8.1.11 (TSLEEP) <u>(b) Assure no recording events are scheduled during this time period</u> (c) Assure no Service Provider network initiated actions requiring a transition to ON mode are scheduled during this time period (e.g. content downloads, software updates) (d) Assure no local area network initiated actions requiring a transition to ON mode are scheduled during this time period (e.g. mobile applications, other network devices requesting service) (e) Record the energy consumed over the predetermined time period (f) Record the average power consumption as the energy divided by the time period</p>	<p>Sleep Mode Power Measurement <u>Only run the test for each mode if the STB supports this functionality</u>, as defined in section 2.25.2. (of the NOPR). If the STB cannot be placed in sleep mode as defined in section 2.25.2. (of the NOPR) using a remote control, then this test shall be skipped. NOPR 2.25.2. Sleep mode means a range of reduced power states where the STB is connected to a mains power source and is not providing any principal STB function. The STB may transition to on or off mode due to user action, internal signal, or external signal. The power consumed in this mode may vary based on specific use or configuration. If any principal STB function is activated while operating in this mode, the STB is assumed to transition to on mode. Monitoring for user or network requests is not considered a principal STB function. <u>The STB shall be able to transition from this mode to on mode within 30 seconds to be considered in sleep mode.</u></p>	<p>DOE requested changes are already accommodated by the current text. The standard, as written, will support testing of devices with a variety of sleep modes. No text changes are required. A test method should identify the method for obtaining energy efficiency measurements, rather than to define performance standards, which is a separate undertaking.</p>
<p>TI</p>	<p>Disagree</p>		<p>Sleep Mode Power Measurement <u>The time period for each test in the sleep mode, TSLEEP, shall be between 4 to 8 hours. The time period shall be extended beyond 8 hours only if required as described in section 5.6.4. (of the NOPR).</u></p>	<p>DOE requested changes are already accommodated by the current text. The standard, as written, will support testing of devices with a variety of sleep mode measurement time periods.</p>

-	Accept		<p>Sleep Mode Power Measurement Assure no recording events are scheduled <u>over the entire duration of the test, including the time prior to transitioning to sleep mode. If the STB is capable of scheduling a recording, schedule a recording 24 or more hours into the future.</u></p>	This will be added to the Sleep mode test
OS Q26	Disagree - but add clarifying text	<p>8.3.1 SLEEP Mode Power Consumption Measurement SLEEP mode power consumption measurements must use the following procedure. Specific power consumption parameter names are identified in each test. (a) Use the time period for SLEEP mode power consumption measurement from 8.1.11 (TSLEEP) (b) Assure no recording events are scheduled during this time period <u>(c) Assure no Service Provider network initiated actions requiring a transition to ON mode are scheduled during this time period (e.g. content downloads, software updates)</u> (d) Assure no local area network initiated actions requiring a transition to ON mode are scheduled during this time period (e.g. mobile applications, other network devices requesting service) (e) Record the energy consumed over the predetermined time period (f) Record the average power consumption as the energy divided by the time period</p>	<p>Sleep Mode Power Measurement Assure no service provider network initiated actions requiring a transition to on mode occur during the 4 to 8 hour time period that the STB is in sleep mode (example: content downloads or software updates). If a service provider network initiated activity cannot be disabled, then this shall be monitored as follows: 1. The power consumption shall be sampled at a rate of at least 1 sample per second. 2. For input powers less than or equal to 1 W, a linear regression through all power readings shall have a slope of less than 10 milli-watts per hour (mW/h). If the slope of the linear regression is equal to or greater than 10 mW/h, the test shall either be restarted or extended until a slope of less than 10 mW/h is achieved. 3. For input powers greater than 1 W, a linear regression through all power readings shall have a slope of less than 1 percent of the measured input power per hour. If the slope of the linear regression is equal to or greater than 1 percent the test shall either be restarted or extended until a slope of less than 1 percent is achieved. 4. If the test is extended beyond 8 hours to achieve the desired condition, the average power consumption over the entire test duration shall be reported for PSLEEP_MANUAL and PSLEEP_APD and these values shall be used to determine the AEC.</p>	<p>Append to (c) If the tester cannot guarantee that a SP initiated action will be prevented during the test period then they must notify the entity requesting the test to determine if additional action must be taken. Note: If a “service provider initiated activity” occurs during a Sleep mode test the tester can just rerun the test instead of adding this time consuming analysis to determine if it impacted the test results.</p>

<p>R Q29</p>	<p>Disagree</p>	<p>none</p>	<p>Manual Sleep Test If the STB does not support sleep mode, then set PSLEEP_MANUAL equal to PWATCH.</p>	<p>This DOE request is related to the DOE proposed AEC calculation and is considered out of scope of a test standard. A test method should identify the method for obtaining energy efficiency measurements, rather than to define consumption standards, which is a separate undertaking.</p>
<p>OS Q29</p>	<p>Disagree</p>	<p>8.3.4 SLEEP Mode Test Procedure (a) Select a channel and view on a connected Display Device, if supported or, if not supported, view on a Client (b) Momentarily (< 1 sec) press the “Power” button on the remote for each locally connected Display Device and Client (c) Do not use (or move) the UUT remote control after step (b) (d) Wait until the UUT enters SLEEP (or Special SLEEP) mode using 8.3.2 (e) Begin SLEEP mode power consumption measurement and record PSLEEP (or PSLEEP_SP_n)</p>	<p>Manual Sleep Test For STBs that are capable of transitioning to sleep mode, <u>operate the STB in the multi-stream test configuration for at least 5 minutes</u> if the STB supports multi-streaming. If the STB does not support multi-streaming, <u>operate the STB in the on (watch TV) configuration for at least 5 minutes immediately before beginning the test</u></p>	<p>Section 8.1.1e of the standard indicates the UUT be run in ON mode for 15 minutes to achieve stability before any tests are started. This is sufficient to address the DOE request.</p>

<p>TI Q29</p>	<p>Disagree</p>	<p>8.3.2 Determining when a UUT has entered SLEEP mode A UUT must be in an ON (Watch TV) mode when each SLEEP procedure begins. Using the UUT remote control the tester should momentarily (< 1 sec) press the “Power” button. In practice, a UUT may require a short period of time before it actually enters a lower power consumption mode, if at all. Before the SLEEP mode power consumption measurement can begin it must be verified that the UUT has actually entered SLEEP mode. This can be done using any of the following methods: (a) No channel viewing or recording is supported on a UUT or Client (b) Observation of a SLEEP mode indicator on the UUT (consult the UUT user manual) (c) A predetermined wait time (TSLEEP_WAIT) provided by the entity specifying the use of CEA-2043 The tester must record the method used when performing a SLEEP mode test .</p>	<p>Manual Sleep Test Ensure that the STB and each locally connected client has entered sleep mode by verifying no channel viewing or recording is supported on the STB and client(s). <u>That is, there shall be no video output on the connected display device(s) from the STB and any locally connected clients.</u></p>	<p>The standard supports three methods to determine if an STB has entered Sleep mode. DOE is specifying the use of a particular method and this should be specified outside the standard.</p>
<p>TI Q30</p>	<p>Disagree but clarifying text will be added</p>	<p>8.5.1 Power Mode Transition – “ON to APD” Transition (a) Select a channel and view on a connected Display Device, if supported or, if not supported, view on a Client (b) Do not use (or move) the UUT remote control after step (a) (c) Begin the elapsed time measurement (d) Wait until the UUT exits ON mode (no channel viewing or recording supported) (e) Record the power consumption as</p>	<p>Auto Power Down (APD) Test <u>Perform this test only if the STB supports auto power down as defined in section 2.2 of the NOPR.</u> 2.2. Auto power down (APD) means a STB feature that monitors parameters correlated with user activity or viewing. If the parameters collectively indicate that no user activity or viewing is occurring, the APD feature enables the STB to transition to sleep or off mode.</p>	<p>DOE comment should be handled outside the standard. The standard will be modified to improve the name of the tests to be more descriptive. This transition test will be renamed "APD initiated ON to SLEEP" Transition instead of "ON to APD" since APD is not a power mode. Section 8.5.2 will also be renamed to "Manual initiated ON to Sleep" Transition.</p>

<p>TI Q30</p>	<p>Disagree</p>	<p>PON_to_APD over a sufficient period of time to assure that the UUT has entered APD, and record the elapsed time as TON_to_APD</p>	<p>Auto Power Down (APD) Test If the STB supports multi-streaming, <u>operate the STB in the multi-stream configuration for at least 5 minutes.</u> If the STB does not support multi-streaming, <u>operate the STB in the on (watch TV) configuration for at least 5 minutes.</u></p>	<p>Current text accommodates a warm up time.</p>
<p>-</p>	<p>Accepted</p>		<p>Auto Power Down (APD) Test <u>Momentarily (< 1 second) press the “Power” button on the remote only for any locally connected clients to place the clients into sleep mode as defined in section 2.25.2. (of the NOPR). Some clients may require a short period of time before they actually enter a lower power consumption mode. If more than one display device is locally connected to the STB, press the “Power” button for the additional locally connected display devices and stream content to one display device only.</u></p>	<p>CEA 2043 text will be modified to make it clear to place all clients and directly connected displays, except a single display, into Sleep mode. Text will also be added to clarify that devices are to be placed into Sleep Mode without indicating it must be done with a remote control button since any means of placing a device in Sleep mode is acceptable.</p>
<p>R Q30</p>	<p>Disagree but add clarifying text</p>		<p>Auto Power Down (APD) Test <u>Allow the STB to operate until the STB enters sleep mode or until 4 hours have elapsed, whichever occurs first.</u></p>	<p>Add text to indicate the tester should verify with entity requesting test what the max test time is for the Auto APD test.</p>

R Q30	OPEN		<p>Auto Power Down (APD) Test <u>If 4 hours have elapsed and the STB is not in sleep mode, then the unit is not considered to support APD and PSLEEP APD shall be set equal to PWATCH.</u></p>	<p>Outside of a test standard since this is specific instructions related to regulatory AEC calculations. A maximum test time parameter will be added to CEA-2043 to inform a tester when the APD initiated ON to SLEEP test may be stopped.</p>
- Q32	Accepted	<p>8.5.2 Power Mode Transition – “ON to SLEEP” Transition (a) Select a channel and view on a connected Display Device, if supported or, if not supported, view on a Client <u>(b) Momentarily (< 1 sec) press the “Power” button on the remote for each locally connected Display Device and Client</u> (c) Do not use (or move) the UUT remote control after step (b) (d) Begin the elapsed time measurement (e) Wait until the UUT power consumption equals PSLEEP (8.3.4) (+ 0.5W, - 0.0W) (f) Record the power consumption as PON_to_SLEEP over a sufficient period of time to assure that the UUT has entered SLEEP, and record the elapsed time as TON_to_SLEEP</p>	<p>Auto Power Down (APD) Test <u>Momentarily (< 1 second) press the “Power” button on the remote only for any locally connected clients to place the clients into sleep mode as defined in section 2.25.2. (of the NOPR). Some clients may require a short period of time before they actually enter a lower power consumption mode. If more than one display device is locally connected to the STB, press the “Power” button for the additional locally connected display devices and stream content to one display device only.</u></p>	<p>CEA 2043 text will be modified to make it clear to place all clients and directly connected displays, except a single display, into Sleep mode. Text will also be added to clarify that devices are to be placed into Sleep Mode without indicating it must be done with a remote control button since any means of placing a device in Sleep mode is acceptable.</p>
TI Q31	Disagree	<p>8.4.1 OFF (a) Place the UUT in OFF mode (b) Wait until the UUT enters OFF mode (c) Record POFF</p>	<p>Off Mode Power Measurement Place the STB in off mode. <u>If the STB cannot be placed off mode as defined in section 2.25.3. (of the NOPR), then this test shall be skipped.</u></p>	<p>Tester instructions – outside the scope of a test standard</p>
TI Q31	OPEN		<p>Off Mode Power Measurement Record the average power for <u>2 minutes as POFF.</u></p>	<p>Covered by existing text.</p>

<p>- Q32</p>	<p>Accept</p>	<p>8.5.5 Power Mode Transition – “SLEEP to ON” Transition (a) Select a channel and view on a connected Display Device, if supported or, if not supported, view on a Client (b) Momentarily (< 1 sec) press the “Power” button on the remote control of each Display Device and Client (c) Wait until the UUT power consumption reaches PSLEEP (or PSLEEP_SP_n) (8.3.4) (+ 0.5W, - 0.0W) (d) Remain in SLEEP (or Special SLEEP) mode for the predetermined stabilization time from 8.1.11 (TSLEEP_to_ON_WAIT) (e) Momentarily (< 1 sec) press the “Power” button on the remote or front panel of the UUT</p>	<p>Sleep to On Mode Transition Time Measurement For the manual sleep test, place the STB in sleep mode according to the steps specified in sections 5.6.7.2 through 5.6.7.5 (of the NOPR). For the APD test, place the STB in sleep mode according to the steps specified in sections 5.6.8.2 through 5.6.8.6 (of the NOPR).</p>	<p>Action: modify text to support both APD and manual entered SLEEP mode. Also address "momentarily press..."</p>
<p>TI Q32</p>	<p>Disagree</p>	<p>(f) Begin the elapsed time measurement (g) Wait until the UUT enters ON mode (channel viewing supported) (h) Record the power consumption as PSLEEP_to_ON (or PSLEEP_SP_n_to_ON) over a sufficient period of time to assure that the UUT has entered ON mode, and record the elapsed time as TSLEEP_to_ON (or TSLEEP_SP_n_to_ON)</p>	<p>Sleep to On Mode Transition Time Measurement After the STB power consumption reaches the desired value as specified in section 5.8.2. of the NOPR, remain in sleep mode for at least 5 minutes.</p>	<p>Addressed in current text - TSLEEP_to_ON_WAIT is to be specified by entity requesting the test.</p>
<p>- Q8</p>	<p>Accept</p>	<p>7.3 Test room Tests shall be carried out in a room where the air speed surrounding the unit under test (UUT) is <= 0.5 m/s, and the ambient temperature is maintained at 23 ± 5 °C throughout the test. <u>The UUT shall be tested on a thermally non-conductive surface.</u></p>	<p>States that the test shall be done on thermally non-conductive surface”. This statement is vague and has no meaning, every surface including air is thermally conductive, therefore it needs to be re-written to spell out what your intention.</p>	<p>The last sentence “The UUT shall be tested on a thermally non-conductive surface.” will be removed.</p>