

Topic	Subtopic	Comment	EPA Responses
Definitions	Cable DTA	One stakeholder commented that the definition of Cable DTA (1.C.3) should be modified to read “Cable Digital Transport Adapter (DTA): A minimally-configured Cable STB that can receive television signals from a broadband, hybrid fiber/coaxial, or community cable distribution system.” This will ensure that this definition is understood to be applicable to Cable devices.	EPA has clarified the definition of Cable DTA by including "Cable".
Definitions	Deep Sleep State	One stakeholder commented that to clarify that Deep Sleep uses less energy than Sleep, the definition (1.H.3) could read “Deep Sleep State: A power state characterized by reduced power consumption that provides additional energy savings over Sleep Mode.”	When harmonizing with the Voluntary Agreement for Ongoing Improvement to the Energy Efficiency of Set-top Boxes (VA), EPA removed the requirements that Deep Sleep State use less energy than Sleep Mode. As in the VA, the Deep Sleep credit is proportional to the energy saved over Sleep Mode, and can be zero, so no change to the definition is appropriate.
Definitions	DVR	One stakeholder commented that the DVR definition include recording time to exclude integrated SD memory cards, which could otherwise receive an adder allowance.	EPA has clarified the definition of DVR by requiring that the TV signals be accessible for playback at an arbitrary time, which should exclude lower-capacity storage that only permits buffering or other functions.
Definitions	Multi-stream	One stakeholder commented that the Multi-Stream definition should use the word “receive” in place of “read” (“...A STB or DVG feature that allows the device to receive multiple independent streams of video content...”).	EPA has clarified the definition of Multi-stream by including "receive".
Definitions	Principal Function	One stakeholder commented that the Principal Function definition (1.F) should replace “selecting” with “selecting (via EPG)” (“...Principal Function: Functions necessary for selecting (via EPG), receiving, decoding, decompressing, or delivering live or recorded audio/video content to a Display Device, local/remote recording device, or Client.”). This change clarifies that a simple Channel Up/Down key press in testing is not acceptable, as noted in the sentence that follows (“Monitoring for user or network requests is not considered a Principal Function for STBs or DVGs.”)	EPA has clarified the definition of Principal Function by including "(via electronic program guide)".
Thin Client/Remote STB	UHD and HEVC	<p>Several stakeholders argued that Thin Client/Remote STBs supporting UHD resolution should be eligible for the HEVP and UltraHD Additional Functionality Allowances for the following reasons:</p> <ul style="list-style-type: none"> • HEVP and UltraHD should be applied consistently across all types of STBs/DVGs with these functionalities; • Client boxes with HEVP and UltraHD functionality require additional processing power not accounted for in the base allowance calculated based on only HD output; • Manufacturers are designing these Thin Clients to meet consumer demand; and • A UltraHD Thin Client would be allowed 67 kWh/yr -- still much less than the energy allowance of 132 kWh/yr for a UltraHD standalone STB, maintaining overall household savings <p>On the other hand, energy efficiency advocates noted that Thin Clients continue to have much higher Sleep Mode power levels than necessary, with little difference from On Mode power. With the Thin Client base allowance and HNI and MIMO Wi-Fi HNI allowance increases in prior drafts of the specification, these stakeholders urged EPA to resist efforts to further increase the total applicable allowances for Thin Clients and to continue to encourage industry to work to bring down the standby energy use of Thin Clients, which represent in many cases 50% to 75% and more of their annual energy use.</p>	<p>EPA has clarified that the UltraHD and HEVP allowances apply to all STBs, including Thin Clients, that either support UltraHD resolution or are using HEVP to decode content for display onto a connected UltraHD display, respectively. This clarification better matches up the allowances to additional energy consuming functions.</p> <p>However, EPA has decreased the HEVP allowance for thin clients to 5 kWh for a total combined allowance of 10 kWh. EPA expects this allowance to cover if not all of the eventual energy consumption of HEVP and UltraHD, then a sufficient enough proportion to permit UltraHD Thin Clients to continue qualifying to ENERGY STAR. However, it avoids much of the risk associated with an allowance that is too high: insufficient differentiation.</p> <p>This reflects the generally more efficient hardware implementations of Thin Clients compared to fully featured STBs, the continuing decreases in their energy consumption with time, and the current qualification rate for Thin Clients.</p>

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Thin Client/Remote STB	Access Point Allowance	<p>Several stakeholders requested the Access Point (AP) additional functionality allowance be applicable to Thin Client/Remote STBs pointing out that locating a 2nd access point within the Thin Client is the most efficient configuration for a MVPD to install where additional Wi-Fi coverage is needed for the following reasons:</p> <ul style="list-style-type: none"> • The MoCA backbone HNI is shared by both Thin Client and AP backhaul functionalities; • The power supply is shared by both Thin Client and AP functionalities; and • The enclosure (material resource) is shared by both Thin Client and AP. <p>Thus, some small percentage of Thin Clients will include Wi-Fi AP or Router functionality (EPA has already gone to great lengths to size these Allowances appropriately). IEEE, the developer of all 802.11 Standards, has already recognized the importance of this use case: supporting remote Wi-Fi APs on the MoCA backbone home network (see IEEE Standard 1905.1-2013). The stakeholders further argued that the Access Point allowance should be applied consistently across all STB/DVG base types if the functionality is present.</p> <p>On the other hand, energy efficiency advocates noted that Thin Clients continuing to have much higher Sleep Mode power levels than necessary, with little difference from On Mode power. With the Thin Client base allowance and HNI and MIMO Wi-Fi HNI allowance increases in prior drafts of the specification, these stakeholders urged EPA to resist efforts to further increase the total applicable allowances for Thin Clients and to continue to encourage industry to work to bring down the standby energy use of Thin Clients, which represent in many cases 50% to 75% and more of their annual energy use.</p>	<p>Providing Access Point functionality within a Thin Client was not previously discussed, and developing and vetting an appropriate allowance would delay the Final Specification. EPA has therefore not included an allowance in the Final Specification, but is open to discussing this in the next revision to the specification once these products are in the market.</p>
Base Allowances	OTT	<p>On stakeholder commented that OTT IP should be last on the Base Allowances list in Table 2 allowing a hybrid Terrestrial/OTT IP or hybrid Thin Client/OTT IP unit to use the correct base allowance.</p>	<p>EPA agrees that Terrestrial and OTT IP functionality can sometimes be implemented as additional functionalities on top of another base type, and has therefore demoted them in the base type hierarchy in Table 2.</p>
Base Allowances	MVPD IP	<p>One stakeholder commented that the base allowance for MVPD IP should be lower (approx. 45–50 kWh/year), since in contrast to cable and satellite, IP STBs utilize an external modem.</p>	<p>Although a lower allowance for MVPD IP STBs may appear reasonable based on their reliance on an external modem, this was not borne out by the data. A higher allowance was necessary to permit a sufficient number of devices to qualify to provide choice to consumers.</p>
Additional Functionality Allowance	AVP & HD	<p>One stakeholder commented that the removal of HD and AVP allowances disadvantages basic products in favor of ones that can claim additional allowances.</p>	<p>EPA increased the base allowances after the removal of the HD and AVP adders, so all products should again be treated consistently.</p>
Additional Functionality Allowance	DOCSIS	<p>Two stakeholders commented that the DOCSIS 3.0 Additional Functionality Allowance should not be sunset on December 1, 2015. One stakeholder noted that they are not aware of any empirical justification to support the assumption that all cable systems will have enabled 1x1 mode, and that 1x1 mode will completely offset any incremental power requirements by this date. The stakeholder is also uncertain how a device (or service partner) could be qualified and then lose its qualification if EPA's assumptions are not met in 2015. The stakeholders recommend that EPA harmonize with the industry Voluntary Agreement by not sunsetting the allowance and instead reconsidering it in a subsequent specification revision.</p>	<p>EPA wants to clarify that models will not lose their certifications once the DOCSIS 3.0 adder allowance expires; however, the intention of the adder is to permit the deployment of DOCSIS 3.0 STBs and DVGs before the implementation of 1x1 mode in headends, which based on discussions with stakeholders is expected to occur in 2015.</p> <p>Once this deployment occurs, DOCSIS 3.0 modems are expected to be in 1x1 mode during testing and should therefore not require additional power beyond that provided by a combination of the DOCSIS, Multi-room, Multi-stream, and Cable base type allowances.</p>
Additional Functionality Allowance	MIMO	<p>One stakeholder recommended that EPA define the MIMO notation by adding the following text at Section I.D.4.i, titled, "Multi-Input Multi-Output (MIMO) Wireless NHI:"</p> <p>"When using the notation MIMO AxB: A is considered the number of spatial streams where B is the number of antennas supported. A spatial stream is an independent and separately encoded data signal."</p> <p>With this clarification, the stakeholder recommends deleting the parenthetical on lines 53-54 and footnote 3. The stakeholder also suggested that the Wi-Fi functionalities listed in Table 3 be modified to reflect the means by which the MIMO Wi-Fi HNI allowance would apply:</p> <p>"MIMO Wi-Fi HNI: 2.4 GHz Stream - MIMO Wi-Fi HNI: for each 2.4 GHz Spatial Stream MIMO Wi-Fi HNI: 5 GHz Stream - MIMO Wi-Fi HNI: per 5 GHz Spatial Stream"</p>	<p>EPA has clarified that the MIMO Wi-Fi definition and the adder allowance table to clarify that the allowances are applied per spatial stream.</p>

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Additional Functionality Allowance	Multi-stream	One stakeholder commented that Table 10 specifies that the client set-top boxes conduct the ON (Play) test, playing out recorded content from the server, instead of streaming live content, which the stakeholder understands to be required for the multi-stream allowance but suggested EPA should clarify its intent.	EPA has revised the Client-only Incentive in the Final Specification such that the power of the Multi-room STB is analyzed with the background clients in On (Play) Mode both times, thereby isolating the contribution of the Multi-room server STBs.
Additional Functionality Allowance	UHD	Section 4.5.1 3) suggests that the UltraHD allowance may not be claimed unless the UUT is tested with a UHD input stream. The stakeholder commented that the UltraHD allowance should apply to a product that outputs in UltraHD, even if it upscales content which is a likely feature as the market transitions to UHD displays with limited 4K content available. The product will require additional energy resources, whether the input is HD or UHD. The stakeholder recommended that the allowance apply based upon UltraHD output, and that the test procedure permit use of a HD stream. Another stakeholder similarly requested that EPA provide additional guidance as to whether UHD or MPEG 5 content be used and whether the upscaling feature on the product be enabled during testing.	EPA has clarified that STBs can receive the UltraHD allowance if tested while providing any type of UltraHD output, whether from an UltraHD stream or through upscaling.
Additional Functionality Allowance	Wi-Fi	One stakeholder suggested that EPA modify the rule for applying the MIMO Wi-Fi HNI allowance in 3.3.3.viii to read "...and only when the device is tested with Wi-Fi as the HOME NETWORK INTERFACE providing the primary video transport from the MULTI-ROOM STB or DVG to the device" to make it clear that this allowance is not intended to be applied to cases where the Wi-Fi capability is simply being used to connect to the household router to receive data.	EPA has clarified that the use of the MIMO Wi-Fi HNI allowance is limited to cases when the interface is used to transmit video content from a Multi-room STB or DVG.
Deep Sleep State	Enabled as Default	Several stakeholders suggested EPA redraft the requirement that STB deep sleep be "enabled by default" to explicitly include both manufacturers and service providers to ensure that it is enabled by default when it reaches the customer and delivering savings inline with the Annual Energy Use calculations of the specification.	EPA has added a requirement to the Final Specification that Deep Sleep functionality either be shipped enabled by the manufacturer or enabled by the default software download from the Service Provider, consistent with the requirements for APD.
Deep Sleep State	Wake to Record	Several stakeholders expressed support for EPA's decision to require that STBs be able to wake from deep sleep to record a pre-scheduled show and then return to a deep sleep state. This function is an essential requirement in order to achieve high consumer deep sleep retention and to realize the efficiency savings associated with this feature. Also while the VA permits the STB to postpone the Deep Sleep State if a recording event is scheduled rather than wake to record, the stakeholders believe it's entirely appropriate for EPA to include this requirement in its program as ENERGY STAR is meant to be a leadership specification and is voluntary, whereas the VA includes firm purchasing commitments by the service providers. Conversely a couple of stakeholders commented that the VA approach was adopted to promote wider adoption of more readily achievable techniques that will conserve energy. Either implementation can meet customer recording requirements, and would therefore not likely be disabled by consumers. Data indicate that the overwhelming majority of scheduled DVR recordings occur outside of the overnight hours with approximately 2% of recordings occur at 2 AM, and 1% at 3, 4, and 5 AM. Permitting a device to postpone scheduled sleep if a recording event is scheduled rather than wake to record would invite earlier adoption of sleep by a broader group of devices, with negligible reduction in sleep and full support of consumer expectations.	EPA has retained the Final Draft requirement in the Final Specification, requiring that STBs be able to enter Deep Sleep even when a recording is scheduled during the Deep Sleep period. Although EPA understands that not many recordings occur late at night when the default Deep Sleep period is expected to occur, users may change the Deep Sleep period to the daytime when more recordings are scheduled, and should continue to benefit from the savings due to the Deep Sleep feature.
Deep Sleep State	User Selectable Schedule	One stakeholder requested EPA require a user selectable scheduler as a requirement for applying the Deep Sleep State duty cycle. The user should be able select alternate times for enabling the Deep Sleep State to allow for additional savings beyond those during the 4-hour scheduled period.	EPA has clarified that STBs shall have both user-activated and timer-based means of entering Deep Sleep State.
Deep Sleep State	Manual Activation	Regarding the Final Draft not offering an incentive for products having a manual Deep Sleep State control (Paragraph 3.2.4.i, Webinar Slide 13), one stakeholder agreed with the consensus arrived at during the meeting that an incentive is not warranted since significant consumer use of the feature on a proactive basis would be rare.	EPA has clarified that STBs shall have both user-enabled and timer-based means of entering Deep Sleep State; however, the user-enabled mode shall not be factored into the TEC equation.

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Deep Sleep State	On Mode Transition Time	The Deep Sleep State definition is overly-narrow requiring that “after the end of the deep/scheduled sleep time, the STB must resume Sleep Mode functionality including the ability to transition to On Mode in 30 seconds or less.” The stakeholder recommended that the ability to transition to On Mode be set at 5 minutes, which reflects a more technically reasonable timeframe.	EPA has retained the Final Draft requirement in the Final Specification as it does not limit the wakeup time in Deep Sleep, but only after the end of the Deep Sleep period. If a STB takes 5 minutes to transition from Deep Sleep to On Mode, then the manufacturer should design their box so this “warm up” occurs 5 minutes prior to the end of the Deep Sleep period, so that by the end of the Deep Sleep period, the STB can transition to On Mode in 30 seconds or less.
Deep Sleep State	Measurement Wait Time	Two stakeholders suggested that a reasonable wait time for conducting the Deep Sleep State measurement is 5 minutes as 30 seconds may not be enough time to fully enter the state.	EPA has updated the Deep Sleep State wait time to 5 minutes in the Final Specification.
Displayless Video Gateway	Parameters	One stakeholder commented that Table 12 describes how to test a DVG with 3 clients, with the result being PMULTI_STREAM. Neither CEA 2043 nor the ENERGY STAR TEC calculation defines a PMULTI_STREAM parameter. The Final Draft should use the PWATCH TV parameter for testing in the multi-room environment.	EPA has updated the output parameter for DVGs to P_WATCH_TV in the Final Specification, consistent with that for STBs.
DOCSIS	Reference	One stakeholder recommended EPA update its reference to the CableLabs DOCSIS specifications to http://www.cablelabs.com/specs/ .	EPA has updated the reference in the Final Specification.
MVPD Software		<p>Several stakeholders suggested tying certification of STB models to the MVPD networks to accurately reflect actual energy use and enable a better structure for utility rebates:</p> <ul style="list-style-type: none"> • Require test results for each of the MVPD systems. If there is technical justification to conclude that there will be no difference between the energy reported for each system, the same testing report may be provided specifying the systems it represents. MVPDs are already testing each of the boxes they deploy within their network as a condition of the industry Voluntary Agreement, so it does not present any additional testing burden. • Develop a model numbering scheme to distinguish models with the same construction but different energy use numbers depending on the system, i.e. after the base model number XYZ, add “-TWC” for a STB tested on Time Warner Cable and “-CH” for a STB on Charter Communications. • Address the labeling issue whereby a MVPD creates a model number such as the X-1 and sources their products from multiple original equipment manufacturers whose products vary in energy use. <p>Two other stakeholders noted the burden and complexity of the above proposal and requested that EPA maintain the current certification processes and reevaluate whether any changes are necessary in 2015. The first stakeholder argued that it is premature to redesign EPA’s requirements based on the prospect of Voluntary Agreement test results. Further, particular combinations of hardware and software are the result of integration from multiple vendors and may change over time, although the testing information need not be updated for software and/or configuration changes unless changes significantly affect energy use (Sections 7.6.3-7.6.4). The second stakeholder commented that the burdens are not worth minor differences in energy consumption that might be uncovered.</p> <p>Following a supplemental EPA proposal proposing to address software variations through a Product Family approach where manufacturers report the most energy consumptive configuration, two stakeholders commented in favor and one in opposition. The ones in favor noted that this would give consumers assurance of energy consumption, while providing manufacturers flexibility to sell the same STB for use on more energy consumptive networks under a different model number. The one stakeholder in opposition commented that multiple service providers and user override of settings make it impossible for a manufacturer to report the STB energy consumption without great difficulty and with confidence.</p>	<p>EPA has refined the certification requirements for STBs such that ENERGY STAR STBs must be tested under worst case in terms of configurations and service provider networks. Partners may certify STBs that cannot meet the ENERGY STAR requirements in some configurations or on some networks if they assign a unique identifier to the STBs that do comply with requirements on specific networks.</p> <p>EPA recognizes that this requirement calls on manufacturers to either communicate with their MVPD customers to obtain test results or estimate the maximum possible energy consumption based on STB features. EPA believes this is not a significant step from the current requirement for STBs sold to non-ENERGY STAR MVPD partners and also aligns with the reporting requirements of the Voluntary Agreement in that MVPDs are collecting this information. With this approach, EPA worked to balance the interests of stakeholders and reflect the reality of the market while protecting the interests of consumers.</p>
Test Procedures	CEA-2043	One stakeholder commented that the Final Draft provides detailed instructions for testing some parameters, but leaves others vague. Section 4.6.2 states “The devices in the configuration shall concurrently run all of the applicable CEA-2043 tests specified in CEA-2043 section listed in Table 10, with the Thin Client/Remote STBs serving as a background condition for the testing of the Multi-room STB (UUT).” It goes on to describe how to conduct the testing for the Client Only Incentive. But the Final Draft is vague on how to test PWATCH TV for a set-top box in a multi-room configuration. EPA should clarify what is meant by “background condition.” EPA should clarify whether the clients are streaming live video during the test, recorded content, or inactive.	EPA has clarified the Multi-room testing instructions in the Final Specification.

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Document Formatting		Stakeholders noted there were formatting errors with the equations in the Final Draft specification.	EPA has corrected the typographical errors in the Final Specification.