Topic	Subtopic	Comment	EPA Response
AC-DC Conversion	AC-DC Conversion	A stakeholder confirmed that the conversion factor of 85% proposed for dc powered devices is reasonable.	EPA appreciates this stakeholder feedback.
Adders	Access Point	A Stakeholder recommended the access point allowance remain at the current value of 8 kWh/yr.	EPA appreciates this feedback and following further review is proposing to restore the former allowance of 8 kWh. This allowance is approximately equal to 1 W continuous, which will continue to highlight top performers beyond those meeting the 2 W Idle Mode allowance in the recent U.S. Industry Voluntary Agreement on Small Network Equipment.
Adders	CableCARD	Two stakeholders commented that a vast majority of Cable Boxes have only 1 CableCARD, such that the allowance should be 25--30 kWh/ per CableCARD. In contrast, one stakeholder suggested that the CableCARD allowance could be adjusted to 20 (15 + 5 on 2nd) or even 15 for two cable cards. One stakeholder suggested that CableCARD was likely to remain on the market indefinitely.	Based on stakeholder feedback, EPA has increased the cable base allowance, while at the same time keeping the first and second CableCARD allowance at the proposed 15 kWh per card, to promote more efficient configurations.
Adders	DOCSIS	One stakeholder agreed with ENERGY STAR's intent to eliminate the DOCSIS 2 allowance, as it has become a standard feature. In contrast, two stakeholders requested an increase in the DOCSIS 2 allowances, commenting both that the regression analysis included an error and that the adder allowances were meant to address technology specific power needs, which were eliminated from the base allowances. Stakeholders also suggested that 11 kWh for DOCSIS 3 was too low, even for 1x1 mode, and inconsistent with other efficiency programs, and proposed significant increases to the allowance.	EPA has reviewed stakeholder information received on DOCSIS 2 and DOCSIS 3.X (3.0,3.1) power consumption. EPA began the analysis with the VA Tier 2 requirements of 20 kWh for D2 and 50 kWh for D3.0, then adjusted the adder level for D2 to 25 kWh and D3.X to 45 kWh. These levels maintain equitable pass rates between D2 and D3.0 STBs, and also compensate for lower Multi-room and Cable base levels compared to Version 4.1. A further reduction to the effective allowance comes from Version 5.0 requiring manufacturers to only claim either D3 OR D2, not both. This is due to the backwards compatibility of D3. EPA has received feedback that the tests of early products incorporating DOCSIS 3.1 indicate that the current allowance may be insufficient for the increased energy consumption of the updated protocol; however, EPA is proposing the current level and encourages manufacturers to identify innovative solutions to meeting it. Further discussions on this issue can be incorporated into a potential Version 5.1 minor specification revision.
Adders	DTA Exception to Adders	A stakeholder recommended EPA request industry feedback on whether DTAs will become available with HEVP, UHD, or HNI features. If so then these allowances may need to be made available to DTAs.	EPA appreciates this comment and seeks stakeholder feedback on the timeline for DTA Cable Boxes incorporating HEVP, UHD, HNI.
Adders	Routers	A stakeholder commented that the router allowance should be 15 kWh rather than 10 kWh.	EPA appreciates this feedback and is proposing to increase the allowance to 15 kWh. This allowance is approximately equal to 2 W continuous, which is consistent with the 2 W Idle Mode allowance in the recent U.S. Industry Voluntary Agreement on Small Network Equipment.

Topic	Subtopic	Comment	EPA Response
Adders	UHD/HEVP	Most new STBs introduced in 2016 (for availability in 2017) will likely support UHD, HEVP and also require larger DVRs (unless a network DVR service replaces the HDDs in Cable systems). There is a significant jump in processing power, memory, HDD size, HDMI performance, and UI graphics performance required for new UHD/HEVP STBs and thus additional power is required. A stakeholder expressed concern that the HEVP and HEVP-TC adder were at different levels, stating that in practice this expected difference in power consumption in Thin Clients was not the case.	These allowances were developed in Version 4.1 before the wide applicability of products supporting these features, with the expectation that the implementation of HEVP on Thin Clients would require less energy due to more efficient components used in the generally more efficient Thin Clients, the use of power management (Deep Sleep), and the lack of support for multiple streams. In response to stakeholder feedback, EPA is now proposing to provide parity between the HEVP and HEVP-TC allowances (both at 10 kWh/yr), and reflect the other differences in the base allowances or the Multi-stream allowance. The UHD adder remains at the previous level of 5 kWh, due to a lack of available data in the market place to revise this adder. EPA welcomes stakeholder feedback on energy use information for this feature.
Adders	Wi-Fi	Multiple stakeholders expressed concern regarding using the SNE allowances for MIMO Wi-Fi HNI, as the SNE Test Method requires idle state testing, in contrast to the STB test method. One stakeholder noted that the dataset misrepresented the number of MIMO antennas in their product such that an inappropriate allowance was applied. Three stakeholders suggested splitting the Wi-Fi allowances into a higher Server allowance and a lower Receiver Allowance. The ratio of the allowances should be 2x; for example, the allowances proposed for Draft 1 would be appropriate for Receivers, while Servers should retain the Version 4.1 allowances. One Stakeholder commented that the difference in power required for 2.4 GHz and 5 GHz is less than 1.5X, such that the Draft 1 power allowance for 2.4 GHz is too low, while the allowance for 5 GHz is too high.	EPA appreciates this feedback, and has proposed to harmonize the MIMO Wi-Fi adder allowances with those in the U.S. Industry Voluntary Agreement on Small Network Equipment. As such, EPA is proposing differentiated allowances based on protocol (802.11n versus 802.11ac) rather than frequency (2.4 GHz versus 5 GHz), as well as output power. EPA acknowledges that the SNE allowances in watts were based on Idle Mode power consumption; however tests of current network equipment reveal less than 0.5 W difference in power between Idle and On Mode (medium data rate) for most models. Furthermore, while the SNE VA is intended to reflect the performance achievable by all models, the ENERGY STAR is a leadership mark. Therefore, STB models meeting ENERGY STAR can be expected to feature innovative designs that incorporate cutting edge components that inherently perform better than those in SNE models meeting SNE VA requirements, and should be able to meet these requirements even while transmitting or receiving video streams.
Base Allowances	Cable/Sat/MVPD IP	Several stakeholders expressed concern that the base allowances were too low for a reasonable pass rate for the Draft 1 spec. These manufacturers also expressed concern with the timeline of the specification effective date, requesting more time to make product modifications. Multiple stakeholders expressed concern that the combined allowances are not able to account for technology differences in the STB front-ends, which would require different TEC allowances. One stakeholder suggested that the Cable base allowance was too low, and the MVPD IP allowance was higher than needed. One stakeholder suggested that using the adders to address technology differences is too complicated in practice, and that the spec requirements would be more consistent if the base allowances were set for each technologies' requirements. One stakeholder recommended that the Cable front end processing requirements were 20 kWh/year, which could improve to 15.5 kWh/year. This should be added to the Satellite/MVPD IP base. (delete?)	Based on additional information and data EPA has applied to its dataset since release of Draft 1 and the additional analysis the Agency has completed, EPA is proposing revised allowances for the Cable, CableDTA, Satellite, and MVPD IP STBs. The base allowances for Cable and Satellite STBs are equal to reflect the fundamental similarities between these two types of products, with any front-end differences (CableCARD, DOCSIS) addressed, in part, through adder allowances. The MVPD IP base allowance is less than the Cable and Satellite base allowances to reflect the absence of tuners in this type of STB.

Topic	Subtopic	Comment	EPA Response
Base Allowances	Thin Clients	Several stakeholders expressed concern that the base allowances were too low for a reasonable pass rate in the Draft 1 specification. There was also some confusion as to how deep sleep/low power sleep states would allow manufacturers to meet the stringent requirements. A stakeholder commented that even with MoCA 2, their basic product (few adders) would be unlikely to meet TEC requirements. A stakeholder commented that the sleep mode power used in the calculation of the TEC for thin clients should be placed at or less than 1 watt, and provided an example of a current product meeting this sleep power draw. A stakeholder commented that the circuitry required to use deep sleep on Thin Clients would add 0.5 watts to the power draw of the box, which should be accounted for by a small increase in the TEC requirement, while another noted that such functionality would be costly. A stakeholder commented that the VA Tier 2 requirements for a Thin-Client using MoCA are easier than those in the ENERGY STAR Version 4.1 specification, so the current specification already reflects leadership. This stakeholder also commented that the industry is targeting standby network power levels of 6W (2015) / 3W (2017) / 2W (2019), and recommends that the STB specification harmonize with these current targets. This stakeholder is concerned about the ability to meet the Thin Client TEC levels, referencing a lack of TEC savings using deep sleep and increased cost in hardware in order to use that approach.	EPA appreciates stakeholder feedback regarding the TEC levels for Thin Clients. Due to concerns with usability and savings offered by the previously defined Deep Sleep State, EPA is redefining this term to be a state within Sleep Mode (i.e., latency less than 30 seconds, no required schedule) that offers significant savings. EPA has also revised the TEC requirements for Thin Clients such that Deep Sleep State, or another mechanism that achieves similar reductions, would need to be deployed by 2018. The previous Deep Sleep State has been renamed Scheduled Sleep Mode and is incentivized through TEC weightings, as before. Seeing Thin Clients achieve Deep Sleep is the priority for this product type for Version 5.0. As such, EPA has proposed a level based on a low-latency Deep Sleep State, in which STBs without a MVPD connection can draw 1 W or less when not in use, consistent with other consumer products and some OTT STBs. EPA recognizes that this capability is not available in current STBs and has, therefore, proposed to delay the effective date of Version 5.0 for Thin Clients until January 1, 2018. Until that time, EPA will retain the Version 4.1 specification (including a base level of 30kWh/year) for Thin Clients. In doing so, EPA intends to reduce partners' certification responsibilities.
Dataset	Errors	A stakeholder recommended the following corrections to the dataset: - One listing on the ENERGY STAR V4.1 QPL, H44-500 Single Room non-DVR operating mode, is missing from this analysis. - The "VA Adder Allowances" (Column BJ) and "Meets VA?" (Column BK) are not generally correct. It appears that not all of the adders applicable to many STBs for the VA case are included. For example: all 22 ENERGY STAR Version 4.1 compliant DIRECTV STBs and Thin Clients also meet Tier 2 currently, however the spreadsheet incorrectly shows 12 of these not meeting Tier 2. This incorrectly suggests the Tier 2 limits are tougher than they really are. - Listings for ten out-of-production DIRECTV models (D12, H24, H25-700, HR24, HR34 and C31) are included in the analysis, probably drawn from the 2013 STB VA Annual Report data. - There may be duplicate entries in this analysis from models that appear both on Energy Star and VA lists, and in the case of some Energy Star models they appear multiple times as they were qualified in several operating modes (e.g. single room / multi-room, non-DVR / DVR).	EPA appreciates stakeholder feedback on the dataset used in the analysis. EPA understands that service providers are not reporting all adders in the Industry Voluntary Agreement, Tier 2 levels, which can make drawing comparisons between the 2 programs difficult. EPA welcomes additional information on this topic. EPA removed several STBs based on stakeholder feedback that these boxes were no longer in deployment, and added several recently qualified STBs. EPA used information reported by the Federal Communications Commission to obtain exact STB MIMO configuration. STBs with multiple configurations on the QPL were included in the analysis to obtain a more complete picture of the market. Removing these boxes would move the calculated adders away from the features in those boxes.

Topic	Subtopic	Comment	EPA Response
Dataset	Example STBs	**One Stakeholder commented that limited products meet the Draft 1 proposed levels and shared other issues:** **"Thin Client 1" (DIRECTV C41-100) and "Thin Client 2" (DIRECTV C41-500): the Draft 1 TEC requirement for these is 44 kWh/year, not 49 as shown in the spreadsheet. The measured TEC for these devices is 53 and 54, which significantly exceed 44 kWh/yr. Deep sleep and lower power modes are not possible, even with a software upgrade, due to limitations in these devices' hardware designs.** **- "Cable Basic STB" (LG STB-2000): the STB is designed for hospitality (e.g. hotel) applications and relies on a hotel's commercial hotel head-end server system to operate.** **- "Satellite Basic STB" (DIRECTV L14): this is a standard definition, MPEG2 only STB and therefore not a relevant example. The best example in the dataset, DIRECTV H25-100, is a true satellite HD basic STB having a measured TEC of 78 which comes nowhere close to passing the Draft 1 target TEC of 57.**	**EPA appreciates this feedback and has re-run the regression analysis with revisions to the dataset and more information on the exact Wi-Fi antenna count of the STBs in the dataset.**
Definitions	**Deep Sleep**	**One stakeholder suggested that Deep Sleep is not necessary for Thin Clients, which should use low-power sleep, with quick wake. Deep Sleep has potential issues, since users and service providers can alter/opt out of Deep Sleep.** **A stakeholder recommended setting a power threshold on what qualifies for Deep Sleep.**	**EPA appreciates this feedback and proposes to rename Deep Sleep to Scheduled Sleep, to help differentiate it from traditional Sleep Mode. In contrast, EPA proposes to reserve Deep Sleep for quick-wake Sleep Mode with a power requirement of 1 W. This Deep Sleep mode will continue to be incentivized through the Service Provider partner commitments. EPA will also rename Sleep with a longer wake, Scheduled Sleep, which is also incentivized through the Service Provider partner commitments.**
Definitions	**DVGs**	**One stakeholder commented that a Conditional Access System (CAS) is a good distinguishing feature between a DVG and a IP Gateway. There may be additional systems that could be used to differentiate as well, but these would have to be agreed upon by the industry.** **Another stakeholder expressed the need to expand the current STBs specification to capture Triple Play Boxes, where the receiver is used for Internet, TV Programming, and Phone. This stakeholder recommended holding an industry call to determine additional relevant details.**	**EPA appreciates these comments has modified the current STB definition with language from the VA definition for STBs, which includes a thorough treatment of DVGs. EPA anticipates discussing inclusion of Triple Play Boxes at a future time in the interest of completing this specification such that its effective date is in January 2017, aligned with Tier 2 of the VA.**
Definitions	**Multi-Room**	**One stakeholder suggested that the definition for Multi-room be restructured to prevent 2 tuner DVRs from acquiring the allowance. This stakeholder recommended that true Multi-Room devices support 3 or more streams. This stakeholder also mentioned that the VA has a Shared DVR allowance specific to these 2 tuner DVR devices.** **Another stakeholder appreciated the clarification in the Multi-Room definition.** **One stakeholder recommended that MR could be reduced to 35 kWh/yr if DOCSIS3 is given 50 kWh/yr. This stakeholder suggested that the Multi-room allowance should apply whenever 1 client is able to attach to the main box.**	**EPA appreciates this stakeholder feedback. The multi-room adder encourages the use of a fully featured main STB with Thin Clients, which is an energy efficient configuration. In contrast, the two-tuner DVRs allowance would instead encourage higher power consumption boxes in more locations.**
General Certification Criteria	**Testing Margin**	**A stakeholder commented that the verification testing requirements for the VA allow margins, whereas ENERGY STAR does not. This stakeholder mentioned that due to this, manufacturers must over-engineer their boxes in order to feel comfortable that Verification Testing will be passed by a box after accounting for component variation.**	**EPA ENERGY STAR programs all follow the same Verification Testing requirements, where no testing margin is given on the requirements. EPA acknowledges that this is different from the VA Verification Testing procedure.**

Topic	Subtopic	Comment	EPA Response
Specification	Effective Date	A stakeholder commented that the effective date for the specification is too soon, and that they would be unlikely to be able to manufacturer STBs meeting the proposed requirements in time. Instead, EPA should consider 18 months to 2 years for effective date.	The 9 month effective date is not intended to allow for the redesign of products, but rather to permit changes to labeling and marketing to reflect products' new status. At the same time EPA will ensure that the Version 5.0 requirements recognize a representative section of current products to permit product choice.
Test Method	CEA	One stakeholder noted that a newer CEA-2043 version, August-2013, is available.	DOE and EPA appreciate the stakeholder feedback and will incorporate this version of the CEA-2043 into the test method.
Test Method	UltraHD	A stakeholder commented that a standard test mechanism should be defined when taking UltraHD and HEVP allowances. This standard would likely need to establish resolution, bitrates, etc.	EPA and DOE appreciate this feedback, and note that it is not mandatory to test on an UltraHD Test Stream for this Version of the Test Method.
Test Method	MoCA/Wi-Fi	One stakeholder noted that consumers may use both MoCA and Wi-Fi in the field. For example a STB that is usually wired using coax in a bedroom may be moved to a deck/patio and connected via Wi-Fi during certain times.	DOE had included this requirement in the Draft 1 Test Method to align with the requirements in the VA. During the webinar, stakeholders explained the intent of the requirement in the VA. Accordingly, DOE has updated the requirement in the Draft 2 Test Method to be the same as that in the VA. DOE further requests feedback on whether it is common to use different HNI connections to stream video content. That is, is it more common for a Multi-Room STB to stream content to different Clients over the same HNI connection or use two different connections if both of them support video streaming?
General Certification Criteria		Several stakeholders expressed concern with the potential issues that can arise in the current STB Manufacturer certification approach, including changes to software, differences between service provider software, duty cycle, difficulties testing worst case performance, difficulties addressing service provider background updates, and testing procedures. A stakeholder recommended that EPA address potential energy consumption differences on the same box, operating on different Service Provider software. A stakeholder recommended harmonizing with the Industry Voluntary Agreement, where service providers are responsible for certification.	In response to stakeholder comment, EPA evaluated fully shifting the focus of this program to service providers, assigning them responsibility for certifying and maintaining responsibility for verification of all ENERGY STAR STBs. As the program is currently structured, service providers are already permitted to play this role, and one service provider partner does so, partnering with EPA as a manufacturer and service provider. EPA has concluded that a full shift to a service provider focus has negative implications at present, as it would significantly reduce the incentive manufacturers have to design and make available the most efficient of STBs for a prospective service provider customer or one that has not yet become and ENERGY STAR partner. Further, taking this approach now may also negatively impact small service provider partners that may not be testing STBs on their own networks at present under the VA. EPA believes that taking this approach may be viable in the future when a greater percentage of service providers become partners and smaller providers have access to more testing infrastructure.

Topic	Subtopic	Comment	EPA Response
Adders	Multi-Stream	Several stakeholders expressed concern that elimination of the Multi-stream allowance would eliminate Picture-in-picture (PIP) and other user-interface innovations. These features require additional decryption and decompression functions, and therefore more power. Another stakeholder suggested that a small Multi-Stream adder, 3 kWh, should be allowed on non HNI, MR, or DVR products. A stakeholder commented that although multi-stream is a requirement for PIP, there are additional decoding and decompression requirements (double), in order to provide this feature, and this should potentially be accounted for by a PIP adder.	EPA appreciates this stakeholder feedback, and has retained the multi-stream adder at an updated level, 18 kWh. EPA's regression analysis returned 18 kWh as a significant result for Cable and Satellite STBs, which was further extended to MVPD IP STBs as the energy use of this feature should be similar.
Adders	New-Mesh Node	A stakeholder recommended adding a new allowance for devices capable of acting as a Mesh Node. This property allows a Thin Client to act as an access point, during this time, the STB is not able to enter most sleep states, so it will increase the TEC by 10 kWh/yr.	EPA appreciates stakeholder feedback, but did not have enough information on the power consumption of the feature in the market to propose an adder in Draft 2.