



ENERGY STAR® Set-top Boxes Draft 2 Specification Webinar

February 23, 2016

ENERGY STAR Products Labeling Program



Webinar Details

- Webinar slides and related materials will be available on the STB Product Development Web page:
 - https://www.energystar.gov/products/spec/set_top_box_specification_version_5_0_pd
- Audio provided via teleconference:
 - Call in:** +1 (877) 423-6338 (U.S.)
+1 (571) 281-2578 (International)
 - Code:** 198-920 #
 - Phone lines will remain open during discussion
 - Please mute line unless speaking
 - Press *6 to mute and *6 to un-mute your line



Webinar Agenda

- Introductions
- Stakeholder Comments on Draft 1
 - Updates to dataset requested
 - Concerns regarding base levels, particularly for Cable, and adder levels, as well as Thin Client sleep assumptions
 - All comments addressed on slides and in comment response document posted
- Summary of Key Changes in the Draft 2 Specification
 - Definition Updates (DVG, Scheduled Sleep, Deep Sleep, APD)
 - Revised Base and Adder Levels
- Proposed Changes to Purchase and Fleet Aspects of Partner Commitments
- Summary of Key Changes in Test Method
- Comments and Open Discussion



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Time	Topic:
12:00–12:15	Introductions
12:15–12:30	Definitions
12:30–1:15	Base and Adder Level Updates
1:15–1:30	Partner Commitments
1:30–1:45	Test Method
1:45–2:00	Next Steps and Open Comment



Introductions

Katharine Kaplan

U.S. Environmental Protection Agency

Matt Malinowski

ICF International

Dan Baldewicz

ICF International

Gregg Hardy

Ecos Research

Jeremy Dommu

U.S. Department of Energy

Allen Tsao

Navigant Consulting

Mansi Thakkar

Navigant Consulting



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STB Definition Update

- Redefining STB definition to harmonize with VA:
 - “A device with the primary purpose 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; decrypting or descrambling these signals; and decoding/decompressing for delivery to residential consumer displays and/or recording devices, and/or one or more other Set-Top Boxes, including Thin Clients, in a residential multi-room architecture. STBs which incorporate common LAN functionality as a secondary function are considered STBs for this specification.”
 - Categorizes a Displayless Video Gateway (DVG) as a type of Non-Thin Client STB.

Multiple stakeholders provided feedback to EPA on how to classify and define DVGs, and suggested that the STB definition should be expanded to incorporate DVGs. EPA harmonized the specification STB definition with the VA, and notes that it provides a method of incorporating DVGs.



Scheduled Sleep (Formerly Deep Sleep)

- Energy use less than Sleep Mode.
- Transition to On Mode greater than 30 seconds.
- Eligibility Criteria:
 1. Enabled by default.
 2. Means of activating on remote, user controllable timer, and/or custom method.
 3. Will not stop a user scheduled DVR recording.
 4. User scheduled DVR recording will not stop an STB from Scheduled Sleep, except during recording and ≤ 15 min before and after recording.
 5. End users may disable Scheduled Sleep, but they must be notified what Scheduled Sleep is, and that they can modify the schedule.
 6. Wake from scheduled sleep requires a transition time to On Mode greater than 30 seconds.



Deep Sleep (New Definition)

- Sleep mode with power draw less than or equal to 1 watt.
- Must meet all Sleep Mode requirements:
 - The STB may transition to On Mode due to user action, internal signal, or external signal.
 - If any Principal 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 Function.
 - Transition to On Mode within 30 seconds.
- Will be required for OTT IP STBs and Thin Clients on Jan 1, 2018.
- EPA envisions Thin Clients as the first step to bringing Deep Sleep to a broader mix of STBs in STBs Version 6.

Stakeholders provided feedback on Deep Sleep, and suggested that a valuable industry target is a reduced power draw on traditional Sleep Modes. EPA has revised the definition of Deep Sleep to incorporate this feedback.



Auto Power Down (Revised)

- Eligibility Requirements:
 - 1. ~~Products shipped with software from the manufacturer shall ship with APD enabled by default,~~ STBs shall be deployed with APD enabled by default, with APD timing set to engage after a period of less than or equal to 4 hours from last user activity. User activity is defined as any activity in which the user interacted with the UUT. The Emergency Alert System (EAS) system can wake the box and should also be considered user activity for the purposes of this requirement.
 - ~~2. Otherwise, the default software download from the Service Provider or manufacturer shall set APD timing to engage after a period of inactivity less than or equal to 4 hours.~~
 - 2. ~~3.~~ All energy-related default settings shall persist until an end-user chooses to manually either (1) disable APD, or (2) modify the default settings.

Stakeholders commented on manufactured vs deployed state for an STB, noting that service provider software could change APD behavior. EPA revised the APD requirements to address this topic.



Interplay Between Sleep Modes, APD

Sleep Mode APD Enabled by Default*	Automatic Scheduled Sleep	T_{WATCH_TV}	T_{SLEEP}	T_{APD}	T_{SCHEM_SLEEP}
NO	NO	14	10	0	0
NO	YES	14	$10 - T_{SCHEM_SLEEP}$	0	Scheduled Sleep as deployed duration (requires APD to scheduled sleep)
YES	NO	$7 - \frac{4 - T_{APD\ ON\ to\ SLEEP}}{2}$	10	$7 + \frac{4 - T_{APD\ ON\ to\ SLEEP}}{2}$	0
YES	YES	$7 - \frac{4 - T_{APD\ ON\ to\ SLEEP}}{2}$	$10 - T_{SCHEM_SLEEP}$	$7 + \frac{4 - T_{APD\ ON\ to\ SLEEP}}{2}$	Scheduled Sleep as-deployed duration (requires APD to Scheduled Sleep)

* APD to include APD to Deep Sleep.



Updates to Dataset

- Removed models from analysis which are no longer in deployment:
 - D12-100, D12-700, H24-200, H24-700, H25-700, HR24-100, HR24-200, HR24-500, HR34-700, C31-700
- STBs given DOCSIS2 adder or DOCSIS3 (with DOCSIS2 support), no box can receive both.
- VA HNI MoCA and HNI Wi-Fi adders were added to dataset for better comparisons between VA and ENERGY STAR.
- MIMO Adders:
 - Obtained MIMO configuration for STBs from FCC.
 - Using version of MIMO Adders from Small Networking Equipment (SNE) VA.

Stakeholders commented on STB models which are currently being sold/deployed, older models that should be excluded, and requested EPA confirm the number of MIMO antennae in STB models. EPA has updated the analysis dataset models and pulled FCC data to reflect these comments.



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Revised Base Levels

- Cable and Satellite given equal allowances since Cable front end addressed in DOCSIS, CableCARD Adders. The MVPD IP base is lower due to lack of tuners.
- Thin Client base proposed with delayed requirement of Deep Sleep (≤ 1 W), effective Jan 1, 2018.
 - Until that time, EPA will retain STBs V. 4.1 base of 30 kWh/year.
 - EPA is proposing to allow Thin Clients to claim the Multi-stream allowance.

Stakeholders made technical component-level arguments that Cable and Satellite base levels should be higher than Draft 1 levels, and should be higher than MVPD IP STBs due to additional processing requirements. Stakeholders also expressed concerns in the time needed to implement Deep Sleep (≤ 1 W) in Thin Clients. EPA addressed these concerns in the revised base levels.



Base Allowance History

Base Type	Version 4.1 (kWh/year)	Draft 1 (kWh/year)	Draft 2 (kWh/year)
Cable DTA	40	40	37
Cable	60	40	50
Satellite	65	40	50
Multichannel Video Programming Distributor (MVPD) Internet Protocol (IP)	65	40	40
Thin-client / Remote	30	7	7 (Applicable after January 1, 2018)
Terrestrial	(18)	N/A	N/A
Over the top (OTT) Internet Protocol (IP)	10	7	7



Adder Levels: DOCSIS

- DOCSIS 2:
 - EPA is proposing to restore the DOCSIS 2 adder allowance as there are a number of STBs that continue to use this feature, and providing an allowance for it better reflects the distribution of energy consumption between the base and additional functionalities.
- DOCSIS 3.X:
 - Adder allowance is applicable to either DOCSIS 3.0 or DOCSIS 3.1.
 - EPA recognizes that allowance for DOCSIS 3.1 may need to be adjusted as technology information becomes available.
 - EPA encourages manufacturers to identify innovative solutions to maintaining the power requirements for DOCSIS 3.0 on DOCSIS 3.1 STBs.

Stakeholders expressed concern with eliminating the DOCSIS 2 adder, as many STBs still use this protocol. Stakeholders also noted the distinction between DOCSIS 3.0 and 3.1, and recommended that the power needs for 3.1 were higher than 3.0, but still under active development.



Adder Levels: DOCSIS (cont'd)

- DOCSIS Backwards Compatibility:
 - EPA understands that DOCSIS 3.X is backwards-compatible with DOCSIS 2
 - Proposing that STB may claim either DOCSIS 2 or DOCSIS 3.X.
- DOCSIS 2, DOCSIS 3.X:
 - Evaluated impacts of VA levels (D2 at 20 kWh, D3 at 50 kWh).
 - Analysis suggested D2 level was too low, and D3 was too high.
 - Proposing revised levels:
 - DOCSIS 2: 25 kWh/year
 - DOCSIS 3.X: 45 kWh/year

Stakeholders provided feedback on power levels for DOCSIS, providing recommendations for DOCSIS adder levels and information on backwards compatibility. EPA has incorporated this feedback into the Draft 2 Analysis. EPA will consider a different adder for 3.1 if need is demonstrated later.



Adder Levels: CableCARD

- CableCARD:
 - Stakeholders commented that most CableCARD STBs only have 1 Card.
 - Analysis suggested 26 kWh/year. EPA proposes to retain the 15 kWh/year allowance, providing an incentive for manufacturers to move to more efficient alternatives.

Stakeholders provided feedback on power levels for CableCARD, noting that most Cable STBs have 1 CableCARD. EPA has incorporated this feedback into the Draft 2 Analysis.



Adder Levels: HEVP and HEVP-TC

- HEVP-TC adder developed when Thin Clients were in early stages, stakeholders anticipated additional efficiency in implementation.
 - Stakeholder feedback on models in deployment recommend parity between HEVP and HEVP-TC.
- New HEVP Adder Level:
 - HEVP: 10 kWh/year
 - HEVP-TC: 10 kWh/year

A Stakeholder expressed concerns with the HEVP adder difference between traditional STBs and Thin Clients, noting that the power requirements are the same. EPA has revised this adder.



Adder Levels: MIMO Wi-Fi

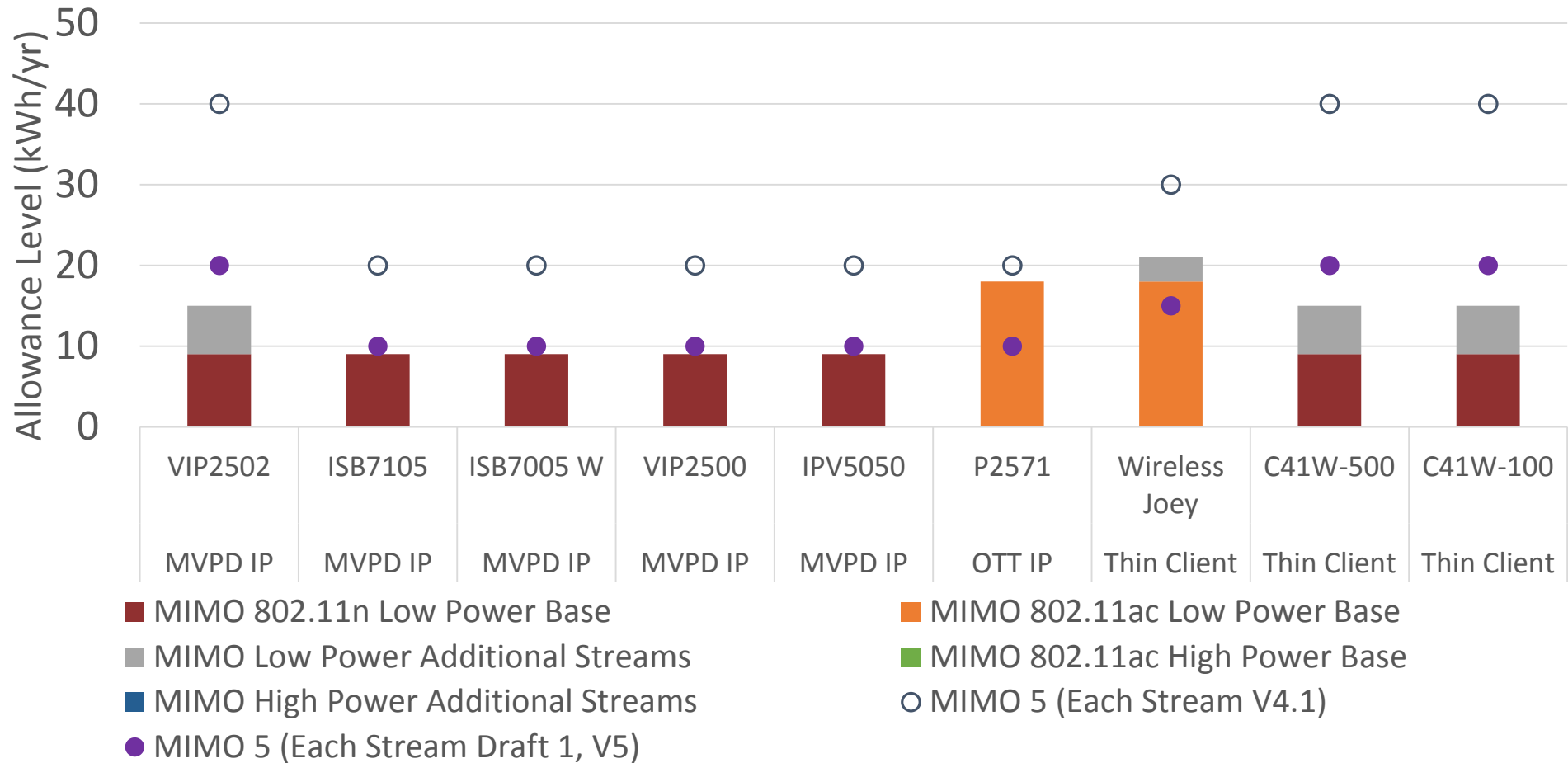
- Stakeholders commented on industry trends of High vs Low Power antennae appearing in MIMO products.
 - [Low Power < 200 mW]
- EPA is proposing the following adder levels, based on the Small Networking Equipment VA.
- EPA acknowledges that the SNE allowances are based on Idle Mode power consumption, and notes that our tests indicate there is 0.5 W or less difference between Idle Mode and On Mode (medium data rate).
- EPA believes that these levels are achievable, yet encourage innovation in the marketplace.

MIMO Adder	TEC kWh/Year
802.11n Low Power Base (2x2)	9
802.11ac Low Power Base (2x2)	18
Low Power Additional Transmitter Streams:	3
802.11n High Power Base (2x2)	11
802.11ac High Power Base (2x2)	22
High Power Additional Transmitter Streams:	4

Stakeholders provided feedback on MIMO Wi-Fi adders, recommending that previous adders gave too much allowance per 5 GHz Stream. Some Stakeholders recommended differentiating between 802.11n vs 802.11ac, and Low vs High Power antennae.



Wi-Fi Adders: Draft 2 vs Draft 1 and Version 4.1





Adder Levels: DVR, Multi-Room, Multi-Stream

- DVR
 - Based on regression analysis, EPA is proposing 35 kWh/year.
- Multi-Room
 - Regression analysis suggested 21 kWh/year.
- Multi-Stream
 - EPA is proposing to return the Multi-Stream adder.
 - The regression analysis suggested 18 kWh/year.

Stakeholders provided feedback on DVR, Multi-Room, and Multi-Stream adders. Many requested the return of the Multi-Stream adder due to STB features present that use Multi-Stream functionality. EPA has recalculated the adders based on the Draft 2 dataset, and has returned the Multi-Stream adder.



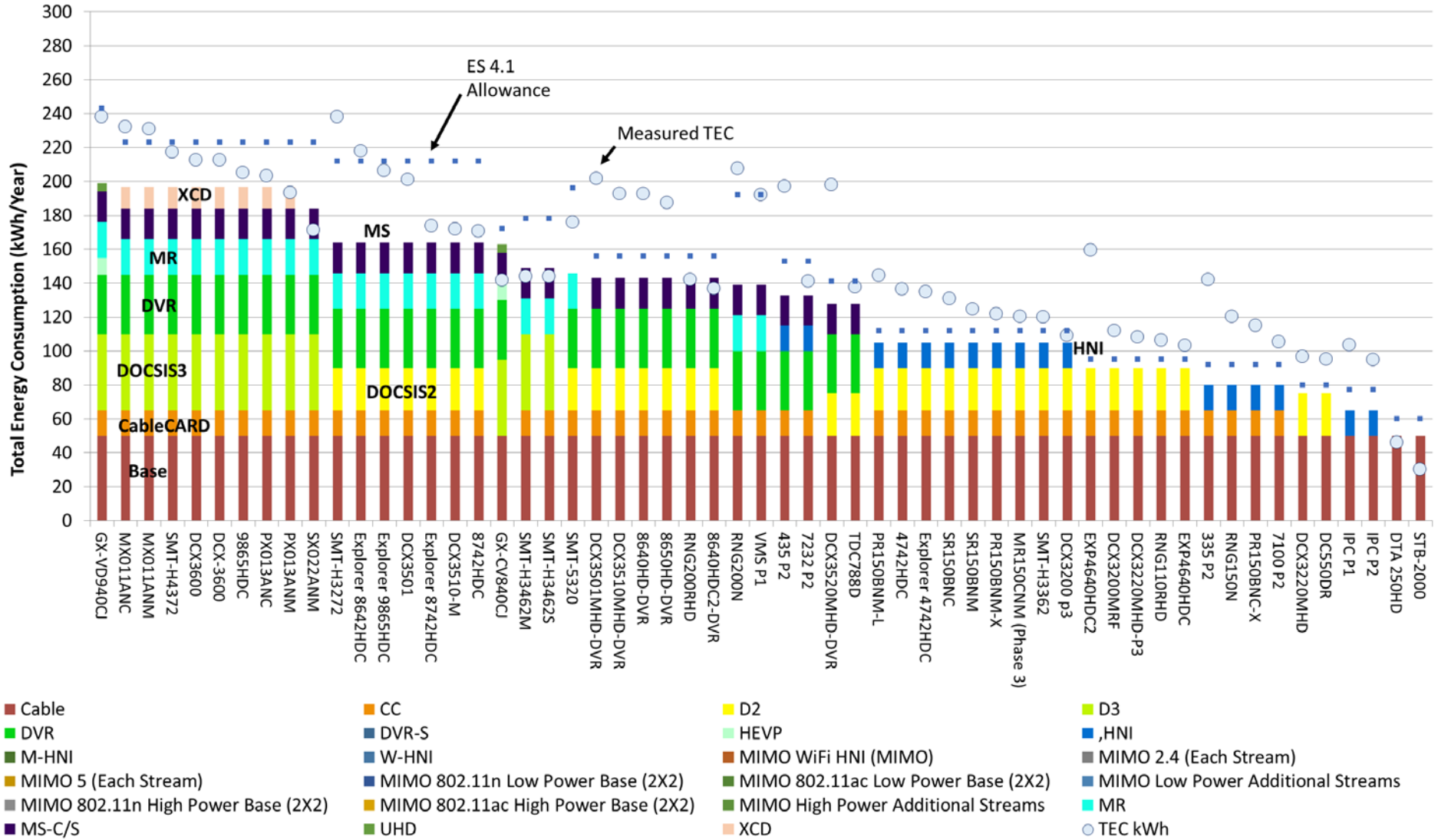
Adder Levels: Access Point, Routers, Telephony

- Not enough STBs in the market with these features to analyze data.
 - EPA was able to refer to power consumption levels on SNE test data.
- Based on stakeholder feedback and calculations based on similar products, including Small Networking Equipment, EPA is proposing the following levels:
 - Access Point: 8 kWh/year
 - Routers: 15 kWh/year
 - Telephony 4 kWh/year

A Stakeholder provided information and recommended adjusting the Router adder to 15 kWh/year. This was consistent with EPA SNE power consumption results, therefore the Router adder was adjusted.

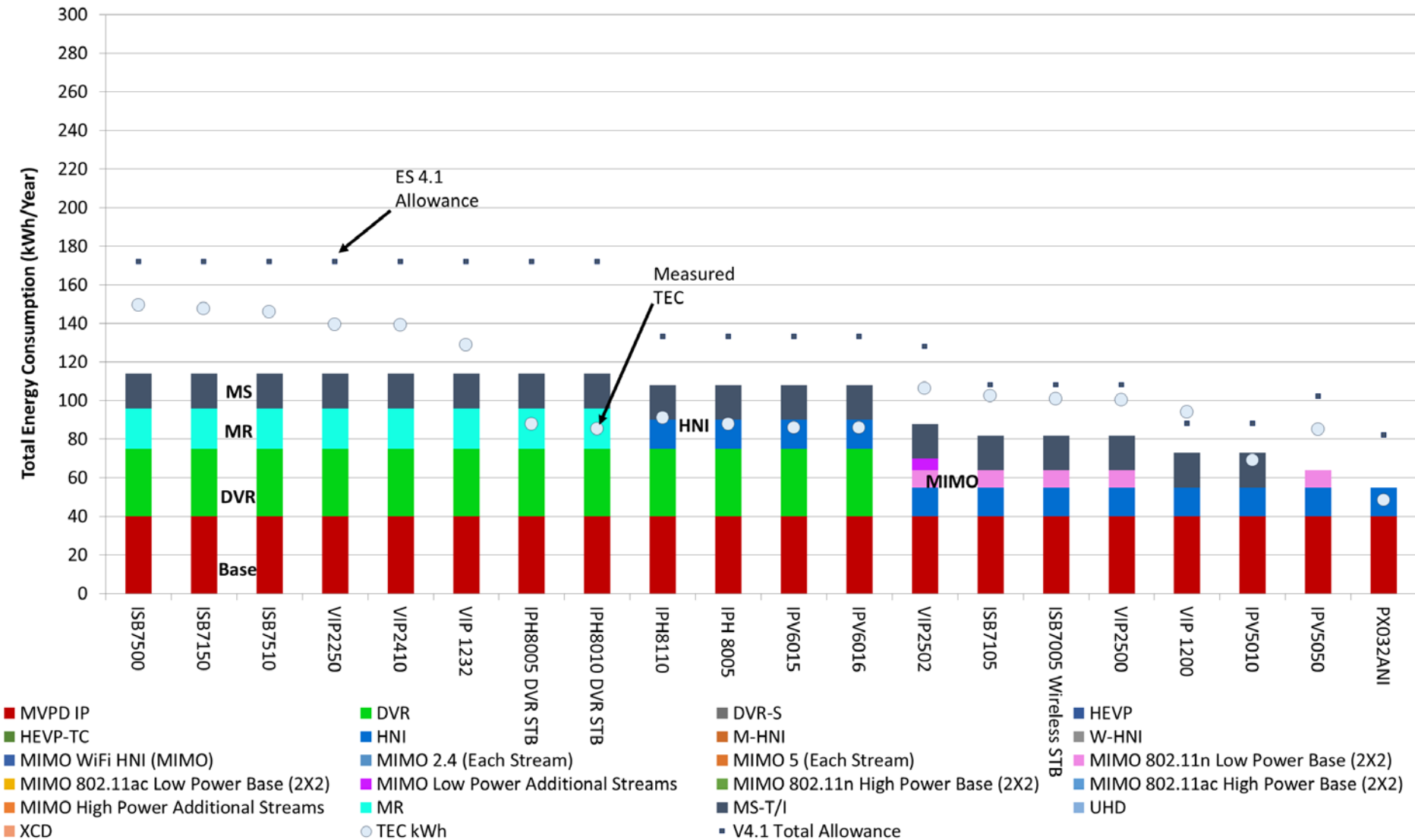
Cable Set-top Boxes

Stacked Bars Represent Proposed Draft 2 ENERGY STAR V5.0 Allowances



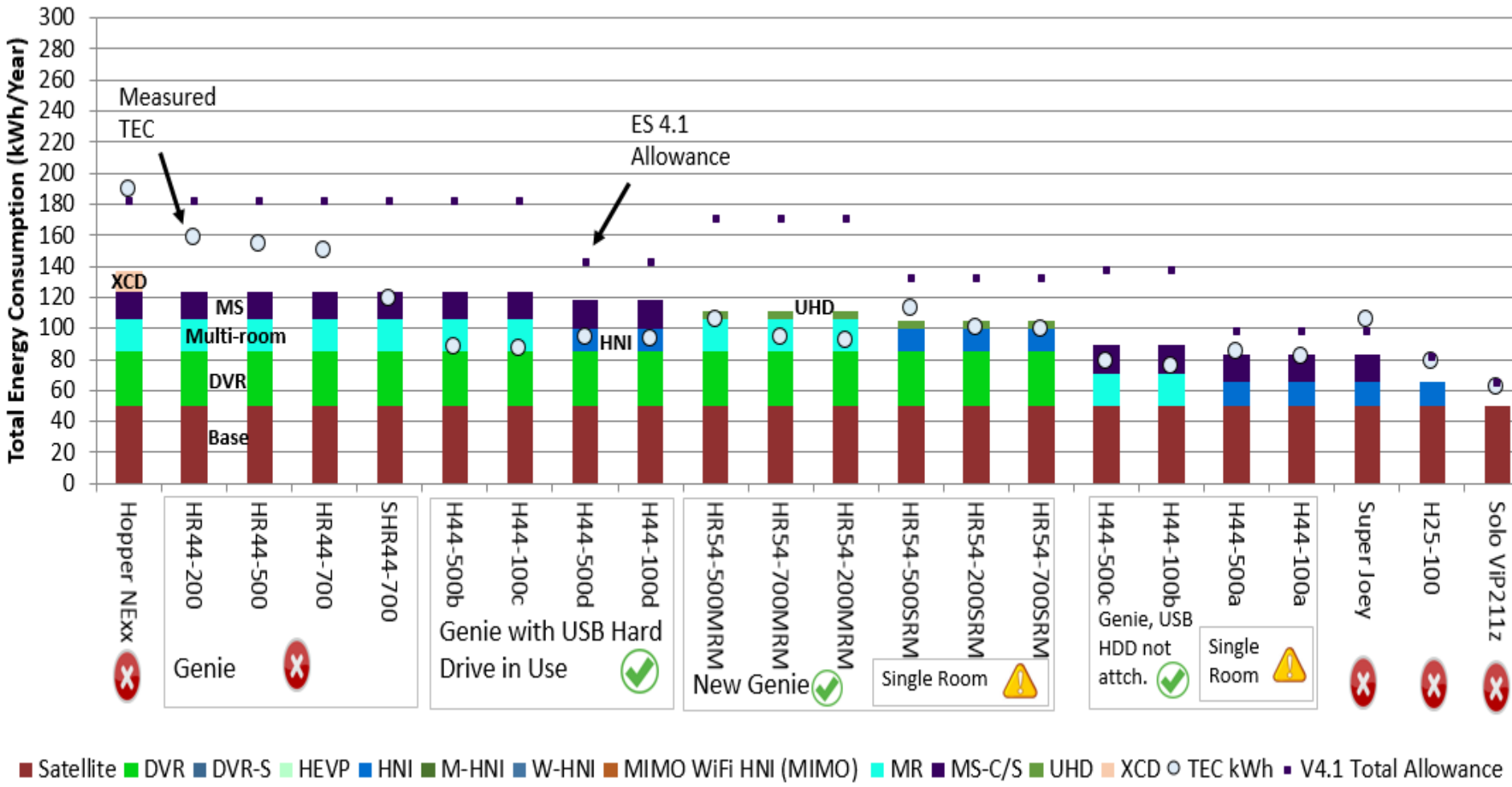
MVPD IP Set-top Boxes

Stacked Bars Represent Proposed Draft 2 ENERGY STAR V5.0 Allowances



Satellite Set-top Boxes

Stacked Bars Represent Proposed Draft 2 ENERGY STAR V5.0 Allowances





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Partner Commitments

- In accordance with program design, EPA reviews Purchase and Fleet requirements as new hardware levels are being set. Review indicated less demanding requirements are appropriate in light of stringency of eligibility criteria.
- Purchase Requirement adjusted to 25% STBs per Year.
 - Added new incentive: STBs with Deep Sleep (≤ 1 W Sleep) are given 100% purchase incentive (Counts as 2 STBs).
 - Thin clients eligible until Jan 1, 2018, when Deep Sleep becomes a requirement for these STBs.
 - Scheduled sleep remains at 50% purchase incentive but is available for non-thin clients only.
 - Thin Client Multi-Room incentive remains unchanged at 50%.
- Fleet Requirement adjusted to 15% deployed STBs.



Partner Commitments: Purchase Incentive Summary

Purchase Incentive Type	Date Available	Base Types	
		Thin Clients	Cable, CableDTA, Satellite, MVPD IP
Thin Client (Without Deep Sleep)		50% (1.5 STBs)	N/A
Scheduled Sleep		N/A	50% (1.5 STBs)
Deep Sleep	Prior to Jan 1, 2018	100% (2.0 STBs)	100% (2.0 STBs)
	Beginning Jan 1, 2018	0%	100% (2.0 STBs)



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Test Method Discussion

1. Combined Requirements for STBs and DVGs.
2. Testing with Multiple Streams over HNI
3. Instructions for Wireless Connection
4. Test Streams



Combined STB and DVG Test Requirements

- EPA updated the definition of STBs such that it also includes DVGs.
- DOE removed the separate section regarding Test Conduct for DVGs and combined the requirements with Multi-Room STB Testing.
- DVG testing requirements are the same as before.



Testing with Multiple Streams

- In the Draft 1 Test Method DOE proposed: “STBs offering concurrent operation of integrated HNIs must be tested with the HNIs providing video content when multiple streams are needed.”
 - This requirement was included to align with the VA.
 - DOE interpreted this as different HNI connections must be used to stream to the two (or more) connected Clients.
- During the Draft 1 Webinar, stakeholders said that the VA intended to specify that the HNI used must support video streaming rather than different HNI connections for streaming.
- DOE has updated this requirement in Draft 2 to be exactly the same as the VA.



Instructions for Wireless Connection

- During the Draft 1 Webinar, stakeholders asked regarding setup of wirelessly connected devices.
- DOE proposes the following requirement to ensure test repeatability:
 - STBs and Clients connected wirelessly shall be placed within 10 feet of each other and there shall be no walls or other obstructions between the devices.



Test Streams

- In the Draft 1 Test Method DOE requested feedback regarding prevalence of UltraHD Test Streams and any changes required to test with UltraHD.
- DOE received some feedback during the webinar and in written comments.
- DOE is not making it mandatory to test UltraHD STBs with an UltraHD Test Stream in this version.
 - UltraHD Test Stream should be used only if claiming the adder and the output and input resolutions must be same for this test.



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Effective Dates

- Thin Client Base proposed with requirement of Deep Sleep (≤ 1 W), with delayed effective date of January 1, 2018.
 - Until that time, EPA will retain the Version 4.1 requirements for Thin Clients, including base level of 30 kWh/year.
- STBs Version 5 effective date for all other products January 1, 2017.

Base Type	Effective Date
Cable, CableDTA, Satellite, MVPD IP, OTT IP	January 1, 2017
Thin Client	January 1, 2018

Stakeholders expressed concerns with implementing Deep Sleep (≤ 1 W) in the anticipated Jan 1, 2017 Timeframe. EPA has structured the Draft 2 Specification to allow additional time prior to the effective date for these products to improve the Sleep Mode for these STBs.



Next Steps

Event	Date
<i>Draft 2 Released</i>	<i>February 3, 2016</i>
Draft 2 Webinar	February 23, 2016
Comments on Draft 2 Due	March 2, 2016
Version 5.0 specification finalized	April 2016
Version 5.0 specification effective	January 2017



Thank you!

Once again, please email comments by March 2, 2016 to:

STBs@energystar.gov

Katharine Kaplan

EPA ENERGY STAR Program

Kaplan.Katharine@epa.gov

Matt Malinowski

ICF International

Matt.Malinowski@icfi.com

Jeremy Dommu

DOE ENERGY STAR Program

Jeremy.Dommu@ee.doe.gov

Mansi Thakkar

Navigant Consulting, Inc.

Mansi.Thakkar@navigant.com

Thank you for participating!

