NATURAL RESOURCES DEFENSE COUNCIL

NRDC Comments on

Final Draft Version 3.0-4.0 ENERGY STAR Set-top Box Program Requirements
November 30, 2010, and December 14, 2010 Addendum

Submitted by:

Pierre Delforge – Sr. Scientist
Noah Horowitz - Sr. Scientist
Natural Resources Defense Council (NRDC)

December 20, 2010

On behalf of the Natural Resources Defense Council (NRDC) and our more than 1.3 million members and online activists, we respectfully submit these comments on EPA's Final Draft Version 3.0-4.0 ENERGY STAR Set-top Box (STB) Program Requirements, Service Provider Partner Commitments and Test Method dated November 30 and December 14, 2010.

According to recent research conducted by NRDC, today's U.S. STB fleet consumes approximately 27 billion kilowatt-hours of electricity, the equivalent annual energy output of 9 average coal-fired power plants. This annual electricity consumption costs consumers 3 billion dollars per year and results in approximately 16 million metric tons of emitted carbon dioxide.[1,2] Most troubling, however, is how much energy STBs consume when they are not being used. A majority of STBs on the market today are drawing nearly as much power when in sleep as when actively displaying or recording content. We calculate the energy wasted just to power STBs when they are *not* displaying or recording video content to be the equivalent of 6 average coal-fired power plants in the US. The only way motivated consumers can currently significantly reduce the amount of power these devices consume when they are not using the box is to physically unplug them, an inconvenient and impractical solution.

[1] Based on average residential pricing of 11.26 cents per kWh; Source: Energy Information Administration, http://tonto.eia.doe.gov/energyexplained/index.cfm?page=electricity_home#tab2
[2] Based on 0.6 metric ton of CO2 per MWh; Source: Energy Information Administration. Table 1. 2008 Summary Statistics (US). http://www.eia.doe.gov/cneaf/electricity/st_profiles/us.html

NRDC's comments supplement our earlier comments which advocated for ENERGY STAR to specify requirements for new STBs to enter a very low power mode when not in use for an extended period of time. We commend EPA for attempting to address this issue by incorporating a credit for boxes that include a "Deep Sleep" power state that consumes much lower power levels than current offerings.

EPA's proposal encourages but does not currently require the box to be capable of entering a low power "Deep Sleep" state via manual user input or automatically after an extended period of user inactivity. We support EPA's plans to require these capabilities in the next version of its specification.

The key to long term success for STBs that require very low amounts of power during periods of extended user inactivity is a good user experience. While in the Deep Sleep power state, the STB must retain its ability to wake to record pre-scheduled content and then return to Deep Sleep after the show has been recorded. In addition, when the user returns to watch TV the time needed to change the channel and receive content should be minimal. While today's STBs may have unacceptably high wait periods, we encourage manufacturers and service providers to work together to develop implementations that have optimized low energy use and user experience. For example, some implementations may be timer-based whereby the box goes into a Deep Sleep between 11 pm and 8 am when the user is most likely asleep and not watching TV, and then shifts to a somewhat higher power level, or "light sleep" which would provide much quicker wake times. The EPA specification provides manufacturers with complete flexibility to achieve such solutions.

NRDC offers the following comments to ensure that the program requirements are as clear and effective as possible.

NRDC Comments on Program Requirements, November 30 2010

- Section 1.E.3, Deep Sleep State: The definition of Deep Sleep as a power state within Sleep Mode could lead to confusion for example with the test procedure, which instructs the tester to "use the remote control to place the system in a lower power state" in order to measure P_{SLEEP}. A manufacturer could conceivably put the STB into Deep Sleep (which is in fact a lower power state) for this test, thereby lowering $TEC_{PRIMARY}$ value calculated in Equation 1. We suggest EPA defines Deep Sleep and Light Sleep either as two separate modes, or as two states within an overarching Sleep mode and refers to these specific states throughout the specification.
- Section 1.E.3, Deep Sleep State: The explanatory note mixes a definition of the state and the mechanisms to get into it such as whether it is enabled by default. For clarity, we suggest defining only the state of Deep Sleep in section 1, and defining all requirements for how to get into Deep Sleep in section 3 as well as in the SPP Commitments as appropriate.

- Section 1.E.3, Deep Sleep State: Deep Sleep will only be effective if it provides a good-enough experience to users, so that users do not disable it. For example if Deep Sleep causes DVR STBs to miss scheduled recordings, users will likely disable the functionality. NRDC recommends that EPA requires that to qualify for Deep Sleep, DVR STBs must be able to wake from Deep Sleep to perform user-requested recordings (eg. scheduled recording of a show) or downloads, or check for programming requests, and then automatically return to the low power state. The test method should also verify this.

NRDC Comments on Program Requirements, December 14 2010 Proposed Changes

- Section 3.2.4.iv - Deep Sleep Qualification Criteria: NRDC supports the ability for the end-user to disable Deep Sleep, however we recommend the requirements clearly state that the user should not be encouraged or prompted by the device to disable Deep Sleep functionality at any time. The effectiveness of power management depends on the majority of users keeping APD enabled. Disabling it should remain an exception for users with specific needs.
- Section 3.3 – TEC Requirements: In line with our previous comments, we find the use of T_{APD1}, P_{APD}, T_{APD2} and P_{DEEP_SLEEP} in the TEC equation confusing: we see APD as a mechanism to transition from one state to another, rather than a state. If the intent is to leave the flexibility for APD to be either Light Sleep, Deep Sleep or yet another state, we suggest explaining that intent for clarity, and clearly naming the variables to that effect, for example:

  $TEC_{PRIMARY} = 0.365 \times ((T_{TV} \times P_{TV}) + (T_{LIGHT\_SLEEP} \times P_{LIGHT\_SLEEP}) + (T_{APD\_SLEEP} \times P_{APD\_SLEEP}) + (T_{DEEP\_SLEEP} \times P_{DEEP\_SLEEP}))$

- Section 3.3 - TEC Requirements: Scenarios where both “APD to Sleep” and “APD to Deep Sleep” are enabled by default can be envisaged but are not intuitive. We suggest EPA gives examples of such scenarios in the interest of clarity and ease of understanding of the specification. We think EPA might have meant APD to light sleep and APD to deep sleep. One can imagine such a scenario if a the service provider deploys a time based solution whereby in the middle of the night the box APDs to a very low power state with slower resume times, and then shifts to a light sleep with higher APD value after 8 am or 5 pm to make sure the TV can power up quickly and change channels when the user returns.

NRDC Comments on the Test Method

- Line 72: What is meant by “non qualification” testing?
- Line 101: EPA could improve clarity by stating “Any features not identified…” vs. “Any features not tested in this test procedure should be tested…”

- Line 110: Does the term “preference” imply that the priority order is optional?
- Line 229, “place the system into a low power state”: by not specifying which low power state the console should be put into, this encourages testers to choose the lowest power state, which is Deep Sleep if available. So P_{SLEEP} and P_{DEEP_SLEEP} will have the same value while the power use of Light Sleep will not be represented in the TEC equation. Instead, we suggest that the test method measures clearly defined states (Light Sleep, Deep Sleep, APD Sleep) independently of how these states are reached. For example, do not specify that the remote control should be used to put the console in Sleep, just request that the console be put in Light Sleep mode per the definition of that mode. The test method would then also provide a means to verify that a product as deployed does indeed enter the Light and Deep Sleep states as reported.

NRDC Comments on Service Provider Partner Commitments

- Section 1.3.1.4 Purchases of STBs with Deep Sleep capability: The Service Provider (SP) incentive does not clearly require Deep Sleep to be enabled by default as deployed in users homes, just that “purchases of STBs with Deep Sleep capability receive a 50% premium”. We could envisage a scenario where manufacturers ship the box with Deep Sleep capability, but Service Providers disable that mode when installing the STB at customer premises. It seems that they would still both meet the incentive requirements as currently proposed. Instead we suggest that the manufacturer incentive requires that the STB is shipped with the capability enabled by default, and for the SP incentive it is deployed with the capability enabled by default.

Conclusion

NRDC thanks EPA for considering our comments during the development of this specification. We recognize that much more needs to be done before we reach the state where new STBs use very low levels of power whenever the user is neither watching nor recording a show.

We look forward to working with EPA on future revisions of this specification, and recommend that EPA also considers the following requirement in the next revision: Incent service providers to deploy STBs that have the capability to stream content directly to internet-enabled TVs. The objective is to eliminate the need for thin client STBs, thereby reducing total household energy consumption. While NRDC supports the shift from multiple full-featured STBs with DVR to multi-room configurations with thin-clients, direct streaming to internet-enabled TVs provides an even better energy saving where appropriate.