



ENERGY STAR®

Audio/Video Version 2.0

Specification Development

**Review of Stakeholder Comments
on Draft 1**

08 July 2009

Agenda



- V2.0 Audio/Video Spec Development Update
- Review of Stakeholder Comments on Draft 1
 - Definitions
 - Qualifying Products
 - Energy Efficiency Criteria
 - Test Procedure
- Product Testing Update
 - Summary of Data Received
 - Limitations
- Next Steps

Overview of Comments



1. Definitions

- Residential vs. Commercial
- Networking
- Power Modes

2. Qualifying Products

- AV Systems Approach
- Comparison with Set Top Box (STB)
- Component Vendors

3. Energy Efficiency Criteria

- Auto Power Down (APD)
- Modal Power Allowances
- Typical Energy Consumption (TEC)

4. Test Procedure

- Amplifiers
- Test Durations
- Test Setup
- Power Measurement
- Method of Procedure
- Video Devices

Definitions

Residential v. Commercial



- **COMMENTS:**
 - Consider using the term “Professional” instead of “Commercial”
 - Differentiation is necessary to avoid promoting inappropriate products for professional applications.
 - Suggest requiring manufacturers to declare a product category per UL/CSA/FCC, or differentiation based on user vs. professional installation.
- **RESPONSE:**
 - EPA is unaware of a concise definition for “professional” AV that is based on product features and not on marketing language. There has been only limited feedback unique product features that characterize Pro AV (e.g. RS-232).
 - UL/CSA/FCC declarations alone do not determine product usage.
- **OPEN ITEMS:**
 - What will prevent manufacturers of residential products from adding product features to obtain modal limit advantages?
 - What product features are exclusive to Pro AV, and what are the Sleep and On mode power consumption characteristics of each? When will test data be available?

Definitions

Network Connectivity



- **COMMENTS:**
 - *Define “Network Connectivity” to include more than IP-based networking. Consider “an interconnection between equipment which requires communication between units for normal operations.”*
- **RESPONSE:**
 - Consumer electronics products under the ENERGY STAR program have historically been provided power allowances for IP-based networking. The proposed definition would be too broad.
 - EPA will consider other specific types of network connectivity for inclusion in future revisions of the AV specification if data can be provided to define power consumption characteristics.
- **OPEN ITEMS:**
 - Stakeholders are encouraged to identify and provide power consumption characteristics for non-IP network connectivity to be considered for future specification revisions.

Definitions

Power Modes



- **COMMENTS:**
 - *A fourth power mode, Networked Standby Mode, needs to be defined. Sleep and On modes do not adequately account for the power usage of an interconnected system in a low power mode.*
 - *The Sleep Mode definition does not consider devices that are in a lower power state with video outputs off but still monitoring the front end (processing content) networking, PVR, etc.*
- **RESPONSE:**
 - A Sleep Mode power allowance will be defined for products that must maintain network connectivity. Networking is a function performed during Sleep Mode, not a power mode in and of itself.
- **OPEN ITEMS:**
 - Stakeholders are requested to submit data regarding appropriate power allowances for networking (Ethernet, RS-232, WiFi, etc.) and other functions that are active during Sleep Mode.

Qualifying Products

AV Systems Approach



- **COMMENTS:**
 - *The ENERGY STAR program needs to recognize that any comprehensive approach to energy savings will recognize commercial AV systems as well as products, and take advantage of the systems approach to maximize savings.*
 - *The industry is currently developing an ANSI standard on System Energy Management. Precedent has been established by the ENERGY STAR Homes program where building materials, lighting, heating, air conditioning, major appliances, controls and the builders work in concert to maximize efficiencies throughout the home.*
- **RESPONSE:**
 - EPA will track industry activities to define an appropriate systems approach for AV outside of the development of this specification.
- **OPEN ITEMS:**
 - None.

Qualifying Products

Comparison with STB



- **COMMENTS:**

- *Where does a box that supports both Blu-ray playback and Netflix movie playback fit in the ENERGY STAR program? AV or STB?*
- *Section refers to Tuners but its our understanding there are no Video Tuners in these A/V devices.*

- **RESPONSE:**

- The STB program is currently limited to boxes that are 1) sold with service provider contracts or 2) non-IP tuners.
- The presence of a video tuner would not necessarily exclude a device from qualification under the AV specification, but EPA would like to consolidate products under the most appropriate product category. The Blu-ray / Netflix device described will ideally be addressed in the next revision (Tier 2) of the STB specification.

- **OPEN ITEMS:**

- Since many AV products may include IP video tuners, but may not easily be categorized as set top boxes, EPA is interested in stakeholder feedback regarding the development of concise rules for product categorization.

Qualifying Products

Component Vendors



- **COMMENTS:**

- *Will the EPA also consider component vendors under the ENERGY STAR Partnership agreement? If so, what would the criteria be?*

- **RESPONSE:**

- The ENERGY STAR label is intended for consumer products that offer superior energy performance. Components are not eligible to earn the ENERGY STAR in this context, with the exception of External Power Adapters, which are covered by a separate ENERGY STAR program.
- If a component enables improvements in end-item energy performance, vendors are encouraged to reach out to the OEMs in order to raise awareness of their offerings.

- **OPEN ITEMS:**

- None.

Energy Efficiency Criteria

Auto Power Down (APD)



- **COMMENTS:**

- *Some product uses may conflict with APD, such as life and safety emergency equipment. We recommend the APD “on by default” requirement be maintained, but products with direct life and safety emergency uses (i.e. PA systems) be exempted.*
- *An exception should be provided where functional standards prohibit APD, such as proposed UL 2572 and EN-54-16. Proposed addition to the definition: “unless standards governing the primary functionality of the equipment require it to remain in active mode such as for Mass Notification and Emergency Communications Systems (proposed ANSI/UL 2572).”*

- **RESPONSE:**

- Accept proposed modification to Mandatory APD requirements.

- **OPEN ITEMS:**

- None.

Energy Efficiency Criteria

Auto Power Down (APD)



- **COMMENTS:**

- *It is not clear what the definition of a component is, i.e. a CD player that is connected to a home theater system, or an internal CD player that may be incorporated into a home theater system.*
- *More specificity is required to define which functions are required to power down “without user input.”*

- **RESPONSE:**

- EPA will update the language in the specification such that mandatory system APD will be required, while APD at the component-level will be encouraged.

- **OPEN ITEMS:**

- Stakeholders are welcome to submit suggestions about how the ENERGY STAR program can identify and reward the implementation of component-level APD in future revisions of the AV specification.

Energy Efficiency Criteria

Auto Power Down (APD)



- **COMMENTS:**

- *APD should not be mandatory, but should be given additional allowances when incorporated into the equipment.*
- *If a product includes a “forced menu” the first time it is energized and one of the options is whether or not to enable APD, does this meet the default APD requirement?*

- **RESPONSE:**

- EPA intends to require APD in all products except those with emergency or life support requirements. Development of a modal allowance for APD would be difficult, given the complexity of products in the AV market.
- There is no intention of permitting a “forced menu” in the AV specification, considering that there is no way to standardize a menu for all AV product types. It is, however, permissible to allow APD to be disabled by the user by other means (menu option, switch, etc).

- **OPEN ITEMS:**

- None.

Energy Efficiency Criteria

Auto Power Down (APD)



- **COMMENTS:**

- *We expect customers will want to listen to music in their home for an entire day without user interaction, (i.e. button presses on the remote). The test procedure requires APD to be measured when active content is no longer playing. This definition should be updated to clearly indicate that APD is dependent on the completion of the active state and not user interaction.*

- **RESPONSE:**

- The definition, as written, does in fact de-couple APD from specific user interaction. APD is, “based on the amount of time the component has remained idle from last active use while not performing a primary function.” If a product is performing a primary function (e.g. playing a CD), it is not expected to APD.

- **OPEN ITEMS:**

- None.

Energy Efficiency Criteria

Auto Power Down (APD)



- **COMMENTS:**
 - *APD indicates a test time of 10 minutes. This would require the APD to function 5 minutes after active content stopped playing. If a user was watching a movie on a HTIB and stopped it to make popcorn and a drink and come back to start the movie again the equipment may power off during this time which would be a nuisance to the user.*
- **RESPONSE:**
 - The test is intended to measure power consumption both before and after the APD event, so the start of the test period should be 5 minutes before APD.
 - EPA will add language to the specification stating that the default period of inactivity before equipment automatically switches to Sleep Mode shall be 30 minutes or less.
- **OPEN ITEMS:**
 - None.

Energy Efficiency Criteria

Modal Power Allowances



- **COMMENTS:**
 - *"Bluetooth" should be added to the list of control mechanisms.*
 - *Consider the variation in power consumption for DVR recording and for recording to different types of storage media (Blu-ray, DVD, 1 layer, 2 layer).*
 - *Recommend an additional allowance for inputs like HDMI, component, pass through video processing, HDMI repeater.*
- **RESPONSE:**
 - Bluetooth will be added to the list of control mechanisms.
- **OPEN ITEMS:**
 - Additional allowances for various optical disc technologies and for HDMI will be considered only if sufficient data can be provided to demonstrate intrinsic differences in power consumption.

Energy Efficiency Criteria

Modal Power Allowances



- **COMMENTS:**
 - *Battery charging should be added to the list of product functions.*
- **RESPONSE:**
 - Consistent with other ENERGY STAR specifications, battery charging is not being considered for an additional power allowance. Rather, as per 4.5.c, all batteries are to be fully charged for the duration of testing.
- **OPEN ITEMS:**
 - None.

Energy Efficiency Criteria

Modal Power Allowances



- **COMMENTS:**
 - *Audio and video processing should not be combined as there are many products that only do audio processing.*
 - *Since AV signals often include audio and video content in the same stream, to combine into one requirement could result in a lost opportunity to drive down the energy consumption of devices which process just one of the signals, as the combined allowance is likely to be larger than the actual requirement.*
 - *Suggest that the video processing allowance is split further to distinguish between HD and SD video processing.*
- **RESPONSE:**
 - The specification will be updated to include Audio Processing, HD Video Processing, and SD Video Processing, as separate functions.
- **OPEN ITEMS:**
 - No data was submitted regarding the power consumption of dedicated signal processing devices.

Energy Efficiency Criteria

Modal Power Allowances



- **COMMENTS:**
 - *Sleep Mode only seems to have a single power allowance, with no regard to product functions that may be active during Sleep.*
- **RESPONSE:**
 - Sleep Mode will continue to be defined as the single low-power state for AV products. Specific product functions may merit additional Sleep mode power allowances, similar to the On Mode approach presented in Draft 1.
- **OPEN ITEMS:**
 - Stakeholders are requested to identify specific product functions to be considered for Sleep mode power allowances, along with steady-state power consumption data to support the allowance.

Energy Efficiency Criteria

Modal Power Allowances



- **COMMENTS:**

- *It is important to distinguish between devices which connect to a network occasionally (i.e. upon user request) and those which are permanently connected and capable of being activated remotely, either by the user or a service provider.*

- **RESPONSE:**

- The Networking product features identified in the draft specification are intended to apply only to those products which are permanently connected to the internet. The net increase in power consumption from infrequent, on-demand networking is expected to be negligible. The specification will be updated to clarify this point.

- **OPEN ITEMS:**

- None.

Energy Efficiency Criteria

Typical Energy Consumption (TEC)



- **COMMENTS:**

- *Recommend TEC approach for Connected AV devices like Connected Blu-ray devices that offer additional services like network movie services or internet like features.*
- *For such a broad specification, many products intended for one type of consumer could easily end up with another type and the estimated duty-cycles would have no connection to real-world use in many applications.*

- **RESPONSE:**

- EPA received no duty cycle data to support development of TEC criteria for AV products. At this time, only modal power limits will be developed.

- **OPEN ITEMS:**

- Stakeholders are welcome to submit duty cycle data for any AV products for consideration in future specification revisions.

Test Procedure

Amplifiers



- **COMMENTS:**
 - *There is no test procedure for measuring On Mode power consumption of multi-channel amplifiers.*
 - *Typical surround sound systems adjust the output levels of each channel to match a real life system. For testing, all settings should be made on the base channel (generally the highest power consuming channel) and power measurements taken on all channels. The output power would then be the sum of all the output channels.*
- **RESPONSE:**
 - The test procedure will be updated to include multi-channel amplifiers, per these stakeholder suggestions.
- **OPEN ITEMS:**
 - Stakeholders are requested to re-test multi-channel amplifiers per the proposed modification and resubmit power consumption data to EPA for review.

Test Procedure

Amplifiers



- **COMMENTS:**

- *Most technicians would prefer to use a resistor on the outputs to avoid noise, but testing with speakers should be allowed.*
- *Testing of home theater systems should be done with the supplied speakers since it is representative of the energy used.*
- *Consider measuring “Sound Pressure Levels” (SPL) for audio equipment provided with speakers. There can be significant energy losses in converting electrical signals to sound. A consumer is not concerned with the output power of the amplifier, but rather the intensity of the sound that is reproduced.*

- **RESPONSE:**

- In order to minimize the number of variables in the test process and to best ensure the fairness, repeatability, and reproducibility of test results EPA prefers (1) to measure power output as opposed to SPL, and (2) to conduct testing with a resistor instead of detachable speakers.
- Clarification will be added to the test procedure to note that products with hard-wired speakers shall be tested with the supplied speakers.

- **OPEN ITEMS:**

- None.

Test Procedure

Amplifiers



- **COMMENTS:**
 - *The test procedure should be updated to indicate “the rated load impedance or lowest impedance of the rated impedance range. (e.g. 6 ohm if rated 6-8 ohm).*
 - *The specification should reference the band pass filter for wide band noise measurements, (6.1 of IEC 60268-1), as referenced in the UL/IEC 60065 standard.*
- **RESPONSE:**
 - The test procedure will be updated per these suggestions.
- **OPEN ITEMS:**
 - None.

Test Procedure

Amplifiers



- **COMMENTS:**

- *The procedure requires pink noise to be played at 1/3 the maximum unclipped output power. At 1/3rd power pink noise will be severely clipped or compressed. Power measurements in this condition would not be representative because of the clipping and compression.*

- **RESPONSE:**

- The test procedure currently only requires the sine wave signal to be played at 1/3 of maximum undistorted output. The pink noise signal is only played at 1/8 MUP.
- EPA intends to remove the 1/3 MUP sine wave test in the next draft of the test procedure. All amplifier testing will be performed at 1/8 MUP.

- **OPEN ITEMS:**

- None.

Test Procedure

Test Durations



- **COMMENTS:**

- *There are no time frames defined for measuring the amplifier power. Because pink noise is random, power will vary and should be averaged over a set amount of time. Two minutes should be enough time based on the band pass filtered pink noise signal identified in UL 60065.*

- **RESPONSE:**

- The test procedure will be updated per this comment. Amplifier power measurements shall be averaged over a 2 minute time period.

- **OPEN ITEMS:**

- None.

Test Procedure

Test Durations



- **COMMENTS:**
 - *The language in the test procedure conflicts with IEC 62301 Ed. 1.0. Either the language should be replaced with verbatim text from IEC 62301, or if the intent is otherwise, the entire clause should be reworded so that it does not appear that these are quotes from IEC 62301.*
 - *The average energy approach requires a user selected period of no less than 10 min. The test procedures indicate measurements of 2, 5, and 10 min.*
- **RESPONSE:**
 - The reduced durations of 2 and 5 minutes were intended to reduce the burden on testers during preliminary product testing. Test durations will be increased to 10 minutes to harmonize with the requirements in IEC 62301.
- **OPEN ITEMS:**
 - None.

Test Procedure

Test Durations



- **COMMENTS:**
 - *Both the playback and record tests measure the power to load the media as part of the 5 minute test. This implies that the user may be loading media every 5 minutes whereas users of DVD or BD players are more likely to load media once every hour or 2 hours. Remove the media loading power from the test if the loading power overhead is generally small.*
- **RESPONSE:**
 - EPA had previously removed one of the two media load/unload cycles from the test procedure per stakeholder request. The final version of the test procedure will require test durations of at least 10 minutes, further mitigating this concern.
- **OPEN ITEMS:**
 - None.

Test Procedure

Test Setup



- **COMMENTS:**

- *Specifying the product be tested in the “most basic configuration” may be insufficient to ensure similar products are tested on an even playing field. For example, the power consumption for a DVD Recorder can be reduced by as much as 10% if video out is via Video (instead of active HDMI) and RF input is cable (instead of ATSC or equivalent.) It may be helpful to add an appendix to specify the set up of products with known issues.*

- **RESPONSE:**

- EPA will include additional UUT setup details in the next draft specification. The intent is to set qualification criteria for products in the configuration most often employed by end users.

- **OPEN ITEMS:**

- Stakeholders are requested to submit details regarding appropriate and representative test configurations for various products in the AV market, along with test data regarding differences in power consumption for various product configurations.

Test Procedure

Test Setup



- **COMMENTS:**

- *All measurements would typically be performed with a single power meter instead of the test equipment listed. Suggest replacing text in clause 4.1 with text from the Version 3.0 ENERGY STAR TV specification.*

- **RESPONSE:**

- Language to clarify acceptable use of a power meter will be derived from the Version 3.0 ENERGY STAR Televisions specification and the latest committee draft of IEC 62301 for inclusion in the next draft of the test procedure.

- **OPEN ITEMS:**

- None.

Test Procedure

Method of Procedure



- **COMMENTS:**
 - *It is stated that “Partners must measure a representative sample.” and that, “tests...should be performed on every product”. Request clarification of this requirement with regard to which standards should be used as a reference to determine what constitutes a representative sample, e.g. MIL-105 or similar, or indeed a fixed number of products.*
- **RESPONSE:**
 - EPA will remove the requirement for lot sample testing from the specification. Every product (SKU) subject to qualification will be required to be tested once to confirm whether it meets ENERGY STAR qualification criteria.
- **OPEN ITEMS:**
 - None.

Test Procedure

Method of Procedure



- **COMMENTS:**

- *If a manufacturer is testing 20 (or only 2) SD DVR devices, they are all similar designs, and the manufacturer can demonstrate that there is no difference in power consumption when playing or recording Ref Channel A, B, or C; it should be sufficient to use Channel A only.*
- *For products with multiple tuners, setting each tuner to a different channel that meets the definition of Reference Channel A where specified in the test procedure is sufficient. Alternatively, reference Channel B or C may be used.*

- **RESPONSE:**

- EPA agrees with this suggestion and will provide further clarification to this point in the next draft of the specification.

- **OPEN ITEMS:**

- None.

Test Procedure

Method of Procedure



- **COMMENTS:**

- *The APD measurement does not appear to yield any useful data and should be deleted.*
 - *5.1.1 – 5.1.3 measures “a typical Active mode operational state.” This is too generic to be of any use and Active mode states are measured elsewhere in the test procedure.*
 - *5.1.4 – 5.1.6 measures power consumption after Automatic Power Down. By the APD definition in this draft, that state is “Sleep Mode” which is measured elsewhere.*

- **RESPONSE:**

- EPA agrees that the power level in APD and Sleep Mode should be the same, by definition. The purpose of testing is to confirm the completion of APD.
- The test procedure will be clarified to remove duplicate steps, but it will still be necessary to verify APD.

- **OPEN ITEMS:**

- None.

Test Procedure

Power Measurements



- **COMMENTS:**

- *It should not be required to meter each powered component separately unless this benefits the manufacturer. This may require a manufacturer to purchase additional power meters.*
- *By requiring component level measurements to be summed for overall power allowance, manufacturers who have equipment that is sold together as a system are penalized. This promotes the use of multiple component systems, with each component getting its own power allocation.*

- **RESPONSE:**

- The sub-metering requirement was included in Draft 1 to obtain additional data from preliminary testing. This requirement will be removed in future drafts.
- Modal power allowances are based solely on product functions, so it is immaterial to ENERGY STAR whether those functions are contained in one or many enclosures.

- **OPEN ITEMS:**

- None.

Test Procedure

Video Devices



- **COMMENTS:**

- *Recommend that standard video content be developed for these tests, because (1) if the product is manufactured overseas, the live signal may not exist in that territory as AV broadcast systems vary across the globe, and (2) live signals vary enormously – this could lead to poor repeatability of test measurements, or worse, selective content could be used to generate optimum results.*
- *The broadcast content from IEC-62087 2nd Edition could be used as the standard signal.*

- **RESPONSE:**

- EPA will consider requiring the use of equivalent IEC-62087 content instead of Reference Channels A, B, and C.

- **OPEN ITEMS:**

- For purposes of setting specification levels, stakeholders are encouraged to test products using both IEC-62087 content and Reference Channel content to identify differences in power consumption.

Test Procedure

Video Devices



- **COMMENTS:**

- *Power consumption of optical disc players depends on the area of the disc being read during testing. Normally playback at outer regions of a disc results in greater power consumption. The Japanese “Top Runner” program requires playback from a region of the disc at 24mm-27.5mm from the disc center.*

- **RESPONSE:**

- The test procedure will be updated to require optical disc read/write activity to occur in a region located 24 to 27.5 mm radially from the center of the disc.

- **OPEN ITEMS:**

- The updated requirement may increase the power consumption of products for which data has already been submitted. Stakeholders are welcome to re-submit test data for optical disc players under the revised requirement for use in setting ENERGY STAR qualification levels.

Product Testing Update



- Test data received on 119 unique products
 - 53 Audio Amplifiers (40 to 7000 W/channel Output)
 - 32 digital, 19 analog
 - 72% with APD, 87% with network connectivity
 - 30 Optical Disc Players
 - 19 BD, 11 DVD
 - 11% with APD, 47% with network connectivity
 - 18 Home Theater Receivers
 - 11% with APD, 6% with network connectivity
 - 10 Shelf Audio Systems
 - 4 with digital amplifiers, 6 with analog
 - 30% with APD, zero with network connectivity
 - 4 iPod Docking Stations
 - 3 Speaker Systems
 - 1 Wireless Microphone Receiver

Product Testing Update



- EPA will continue to evaluate data over the next several weeks.
- Stakeholders are encouraged to continue data submissions across all product types until July 24th. Product data must be received by July 24 in order for product functions to be considered for inclusion in Version 2.0.
- Initial assessments:
 - Little or no data was submitted on which to evaluate wireless networking, other removable media drives (USB, etc.), remote control, integrated high-resolution displays, video recording functionality, or integrated HDD storage.
 - Opportunities exist to implement APD to full Sleep Mode across most products. On and Idle power consumption is much greater than Sleep Mode for most products in the dataset.

Next Steps



- Stakeholders are requested to resubmit select test data per the following changes by July 24.
 - New test procedure for multi-channel amplifiers
 - Testing of video devices with IEC 62087 content
 - Optical disc option to resubmit
- EPA will distribute a Draft 2 AV specification for review in early August
- Review this presentation and send questions and comments to AudioVideo@energystar.gov.
- EPA intends to continue development of the AV specification on a regular schedule. Approximately 1 year after Version 2.0 becomes effective, additional data will be collected to refine qualification levels and evaluate new product features for inclusion.

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