ENERGY STAR®

Audio/Video
Specification Development

CES Update Meeting

10 January 2009

Agenda

- **Introductions** 5 min.
- **ENERGY STAR Overview** 5 min.
  Kathleen Vokes, U.S. EPA
- **V 2.0 Audio/Video: Goals** 5 min.
  Steve Pantano, ICF International
- **Product Categories & Discussion** 20 min.
- **Open Discussion** 20 min.
- **Specification Timeline** 5 min.
  Kathleen Vokes, U.S. EPA

ENERGY STAR Overview

- What is ENERGY STAR?

- A voluntary public-private partnership program
- A strategic approach to energy management
- Recognized by over 70% of Americans
- An internationally recognized brand

ENERGY STAR Overview

- Guiding Principles of Specification Development
  - Cost-effective efficiency
  - Performance maintained or enhanced
  - Significant energy savings potential
  - Efficiency improvements are achievable with non-proprietary technology
  - Product differentiation and testing are feasible
  - Labeling can be effective in the market

V2.0 Audio/Video: Goals

- Recognize top 25% energy-efficient products
- Update product list
- Include On-mode power consumption
- Encourage auto power-down (APD)
- Adopt best-practices
  - Updated test procedures.
  - Updated mode definitions.
- Define boundaries with respect to other ENERGY STAR product categories

V2.0 Audio/Video: Home/Retail

- Home Market Considerations:
  - Limited usage data (hours/day) *(Source: TIAX, 2007; ECOS, 2006)*

	Active	Idle	Off
Mini-Systems	2	2	24
Home Theater-in-a-Box	4	2	18
DVD Players	1-5	0-2	19-24

V2.0 Audio/Video: Home/Retail

AV Receivers	
Features	• AM/FM, Satellite radio tuner • Pre-amp, Power amplifier (multiple) • Audio/Video decoding, processing, switching, distribution • Single-zone or Multi-zone • Network capability
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	1,450,000 ↔
ENERGY STAR Pros & Cons	• PRO: • CON:

- Standardize HDMI CEC (Consumer Electronics Control) protocols to facilitate auto power-down of peripherals.
- Ensure front-end units stop outputs when not in use to allow downstream components to power down.

V2.0 Audio/Video: Home/Retail

Digital Media Receivers	
Features	• Digital Audio and/or Video Content • Network capability • Integrated storage (HD / SSD)
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	?
ENERGY STAR Pros & Cons	• PRO: Video devices may be similar form & function to Set-Top Box. • CON:

- How do we properly segment this category? Audio and/or Video content, Streaming media, etc.

V2.0 Audio/Video: Home/Retail

Power Amplifiers	
Features	• Single-zone or Multi-zone • Single-channel or Multi-channel • Class A, AB, B, D
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	220,000 ↔
ENERGY STAR Pros & Cons	• PRO: • CON:

- Theoretical efficiency varies with amplifier class: Class A: 50%, Class AB: <78.5%, Class B: 78.5%, Class D: >90%.
- Encourage auto-power-down (APD) features in Class A & AB amplifiers.

Note: Amplifiers: Pure "Class B" is not used. List should be A, AB, D. Class D amplifier technology is non-proprietary.

V2.0 Audio/Video: Home/Retail

Other Audio Components	
Features	• Tuners • Pre-amps • Equalizers
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	285,000 ↑
ENERGY STAR Pros & Cons	• PRO: • CON:

V2.0 Audio/Video: Home/Retail

DVD & Blu-ray Disc (BD) Players	
Features	• DVD up-conversion • Recording capability
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	18,900,000 ↑
ENERGY STAR Pros & Cons	• PRO: Adoption of BD fueled by high-def transition. • CON:

- Standardize HDMI CEC (Consumer Electronics Control) protocols to facilitate auto power-down of peripherals.

V2.0 Audio/Video: Home/Retail

CD Players	
Features	• Single-disc • Multi-disc
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	190,000 ↓
ENERGY STAR Pros & Cons	• PRO: • CON:

V2.0 Audio/Video: Home/Retail

Home Theater in a Box (HTIB)	
Features	• Integrated DVD / Blu-ray Disc player • Self-powered subwoofer • Satellite surround speakers
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	4,100,000 ↑
ENERGY STAR Pros & Cons	• PRO: • CON:

- Standardize HDMI CEC (Consumer Electronics Control) protocols to facilitate auto power-down of peripherals.

V2.0 Audio/Video: Home/Retail

Home Theater Speaker Systems	
Features	• Self-powered subwoofer • Satellite surround speakers
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	1,900,000 ↔
ENERGY STAR Pros & Cons	• PRO: • CON:

V2.0 Audio/Video: Home/Retail

Stereo Speakers	
Features	• Floor/Shelf, Ceiling, Outdoor • Wired / Wireless
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	4,900,000 ↑
ENERGY STAR Pros & Cons	• PRO: • CON:

- What portion of this category is self-powered (wireless, etc.)?

V2.0 Audio/Video: Home/Retail

Compact Audio Systems (Shelf Systems)	
Features	• CD / Tape Playback • MP3 Playback
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	3,500,000 ↓
ENERGY STAR Pros & Cons	• PRO: • CON:

V2.0 Audio/Video: Home/Retail

Portable Audio Systems	
Features	• Clock Radios • Home Radio / CD / Tape Players • Boomboxes • Karaoke Machines
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	15,300,000 ↓
ENERGY STAR Pros & Cons	• PRO: • CON:

V2.0 Audio/Video: Home/Retail

Intercom Systems	
Features	• Audio Monitor / Transmit • Video Monitor
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	?
ENERGY STAR Pros & Cons	• PRO: • CON:

Note: Intercom systems are almost universally near-zero energy consumption. Not a good candidate product category for ENERGY STAR.

V2.0 Audio/Video: Pro/Commercial

- Professional Market Considerations:
  - Typical usage varies by application, from 12 hours/day, 5 days/week, to 24 hours/day, 7 days/week.
  - There is little consistency among manufacturers in amplifier power ratings, so a uniform test method will be required.

NOTES:

1. ***Many pro products are left on 24/7 because of a belief from years back that power cycling would degrade the reliability of components. This may have been true in the past but is no longer. Could be opportunity for an educational campaign.***
2. ***Many pro audio components do not have hard power switches, to prevent accidental power-down in critical applications.***
3. ***Need to define a way to differentiate consumer products from professional or consumer products for purposes of the spec since use patterns are so different.***
4. ***Tom B noted that even if behavior can be changed, it is ENERGY STAR's model to back up the behavior change with a technology change - enabling APD, for example.***

V2.0 Audio/Video: Pro/Commercial

AV Receivers	
Features	• Tuner, Pre-amp, Power amplifier • Audio/Video decoding, processing, switching, distribution • Single-zone or Multi-zone
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	?
ENERGY STAR Pros & Cons	• PRO: • CON:

- In the pro market, should Receivers be evaluated independently or grouped with "Other Audio Components"?
- Ensure front-end units stop outputs when not in use to allow downstream components to power down.

V2.0 Audio/Video: Pro/Commercial

Power Amplifiers	
Features	• Single-zone or Multi-zone • Single-channel or Multi-channel • Class A, AB, B, D
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	?
ENERGY STAR Pros & Cons	• PRO: • CON:

- Theoretical efficiency varies with amplifier class: Class A: 50%, Class AB: <78.5%, Class B: 78.5%, Class D: >90%.
- Segment into “Performance” and “Public Address” subcategories to align with typical end-use of various amplifier types.
- Encourage auto-power-down (APD) features in Class A & AB amplifiers.
- Encourage implementation of efficient Class D amplifiers in always-on applications such as PA systems where hi-fi is not essential.

V2.0 Audio/Video: Pro/Commercial

Distribution & Switching Systems	
Features	• Audio and/or Video switching • Multiple I/O formats – Video-over-CAT-5
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	?
ENERGY STAR Pros & Cons	• PRO: • CON:

V2.0 Audio/Video: Pro/Commercial

Other Audio Components	
Features	• Tuner • Equalizer • Mixer
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	?
ENERGY STAR Pros & Cons	• PRO: • CON:

V2.0 Audio/Video: Pro/Commercial

Speaker Systems	
Features	• Self-powered Subwoofers
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	?
ENERGY STAR Pros & Cons	• PRO: • CON:

- Are self-powered speakers more prevalent in commercial applications since speakers may be distributed throughout a facility and located far from the signal source?

Note: Self-powered speakers are not used often for long-distance speaker-amp connections.

V2.0 Audio/Video: Pro/Commercial

Microphone & Recording Systems	
Features	•
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	?
ENERGY STAR Pros & Cons	• PRO: • CON:

V2.0 Audio/Video: Pro/Commercial

Videoconferencing & Telepresence Systems	
Features	•
Annual Sales & Trend* ** Source: CEA 2012 Industry Forecast*	?
ENERGY STAR Pros & Cons	• PRO: • CON:

Discussion Topics

- Auto-Power-Down for all product types
- Standby Power Consumption limits for all product types.
- Benefits of a function-based specification, versus a product-based specification.
  - Assign a power budget for each product function or feature, then combine features to determine the total power consumption budget.
  - Does modular = future-proof? Easier to add functions an features to the menu versus trying to predict new variations on AV products.
- Identify existing test procedures for all products under consideration.
  - Leverage Set-top Box test procedure for all media-playback devices (DVD, BD, MP3 players, etc.)
- Identify sources for market data.

Discussion Topics – Meeting Notes

- Re: Auto-Power-Down (APD) via HDMI CEC protocol
  - Communications protocol via HDCP Handshaking
  - Manufacturers today are having trouble with this even among their own devices, not to mention other manufacturers' products.
- How do you separate power consumption of features/functions in a combo device if there is a shared power supply?
- Function- or Feature-based spec
  - Many attendees thought it sounds like a good idea.
  - Some features to consider: motors (to spin a CD), drives, amplifiers, displays
- The "speed step" model used in PC's may be good to encourage in AV - design components that are capable of operating at various power levels appropriate to the demand.
- A "staged" approach to APD might be appropriate. For example, when a CD stops playing, you can shut down the amplifiers immediately at the end of playback and leave the display on for a while so the APD is transparent to the user. Then after 30 minutes or so, when it can be assumed that the user is not going to start another playback, you can power down the display and remaining components.

Discussion Topics – Meeting Notes cont…

- Participants questioned the amount of energy savings that would be available from APD of amplifiers other than Class A. Suggested that Class D amplifiers use no power unless there is an input signal.
- Amplifier power consumption is tied to the signal/content being amplified, as with TV's.
  - UL tests amplifiers at 1/8 of total power to simulate voice & music content
  - Biamp Systems tests with a 1000 Hz sine wave
- Loudness measurement may be per CEA 490, FTC spec, or IHF spec
- New NFPA code effective in 2010 requires redundant amplifiers for critical PA systems such as hospitals and airports. Now may be a good time to catch this market.
- Suggest that APD not be mandated as an energy-saving feature, to allow similar energy savings to be achieved by other technological approaches.

Discussion Topics – Meeting Notes cont…

- Consider the increased speed offered by newer networking technologies as a factor in improving energy efficiency. Faster speeds mean that products do not have to operate at full power for as long as they do at slower speeds.
- As per HTIB conversation, there may be other systems to consider as whole systems for ENERGY STAR qualification.
- CEA Tech Home division
  - Members wondered if there was opportunity for recognition of home automation and control devices in the future. Kathleen agreed to bring this back to EPA for discussion.
  - Consider the idea of "certified providers" to install ENERGY STAR AV and other systems to ensure the implementation of the most energy efficient solutions.
- Installers note that the first question most customers are asking these days is "how do I save energy?"

Preliminary Timeline

- 23 January 2009
  - **Comments and feedback due to EPA via AudioVideo@energystar.gov**
- Early February 2009
  - **EPA to host web meeting to discuss Draft 1**
- Mid February 2009
  - Publish Draft 1 specification
- Mid March 2009
  - Comments due on Draft 1 specification

NOTE: The purpose of Draft 1 is to lay out proposed definitions and specification framework for use in subsequent drafts. EPA anticipates several draft/comment cycles will be required to develop a final specification.

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