

Comments on

**Audio Amplification Proposal for the
ENERGY STAR FINAL DRAFT Version 2.0
Audio/Video Product**

Oct.28.2009

JEITA

Audio Networks Committee

AV Storage Networks Committee

Comments of JEITA members

There are many discrepant definitions in the final draft.

JEITA members will be able to cooperate to make consistent definitions.

We propose EPA to issue one more draft again.

This condition does not keep fairness for manufacturers.

The test procedure has change to final draft from Draft 1.

We have submitted the measurement data from Draft 1.

We study the limits for our products.

Some limits are not practical limits. (refer fig.1)

It means any products could not meet the limits depending on the category.

We would like to have responses to every comment.

It is necessary to solve some comments completely.

After EPA straightens out those problems, the efficiency of the amplifier can be measured with reasonable data. Then the limit should be decided.

Highlight Items (as of Final Draft)

	Comments	Proposal from JEITA
APD	Problems of LOS and Idle power consumption.	Idle power consumption should be excluded until Tier3.
LOS	Not clear	JEITA's members propose to decide the detecting condition by manufacturers themselves.
Idle state	Far from the limit. Discrepant definitions.	Idle power consumption should be excluded until Tier3.
On mode Optical disc player	Far from the limit. Discrepant definitions.	Audio optical player power consumption should be excluded until Tier3.
Audio amplifiers	Not clear. Discrepant definitions. The collection data look draft 1. (Does the data meet to final draft?)	The limits should be decided by each category. The calculation should be excluded to idle and optical disc player power consumption.



ENERGY STAR® Program Requirements for Audio/Video

FINAL DRAFT Version 2.0 Program Requirements

108 Below is the Version 2.0 product specification for ENERGY STAR qualified audio/video products. A
109 product must meet all of the identified criteria if it is to earn the ENERGY STAR.

110 1. Definitions

111 a) APD (Auto-Power Down): The capability to automatically switch a device from On mode to Sleep
112 mode when all of the following criteria have been met: (1) the device has ceased performance of all
113 primary functions, (2) the last user input has been received (e.g. remote control signal, volume
114 adjustment), and (3) a predetermined period of time (APD timing) has elapsed.

115 **Note:** EPA has modified the definition of APD for clarity.

116 b) Loss of Signal (LOS):

117 1) For audio signals, LOS is defined as:

- 118 i) RCA audio inputs: 1 dB or less above the measured noise floor for 60 seconds.
- 119 ii) HDMI: Receive <Inactive Source> or <Standby> signal over the CEC channel, or [Power
120 Status] of an upstream device goes to "Standby" or "In Transition to Standby" over the CEC
121 channel.

122 2) For video signals, LOS is defined as:

- 123 i) Composite inputs: 1 dB or less above the measured noise floor for 60 seconds.
- 124 ii) Analog VGA inputs: Loss of either the horizontal or vertical sync signal.
- 125 iii) HDMI: Receive <Inactive Source> or <Standby> signal over the CEC channel, or [Power
126 Status] of an upstream device goes to "Standby" or "In Transition to Standby" over the CEC
127 channel.
- 128 iv) DVI: Detection of a disabled TMDS link, a TMDS clock line signal below 22.5 MHz for more
129 than one second, or a TMDS link operating outside of the valid frequency range

130 **Note:** EPA has specified audio and video LOS based on stakeholder feedback. Additional suggestions
131 for further refinement of audio or video LOS definitions are welcome before the specification is finalized.
132 Specifically, is the proposed 1dB above the noise floor / 60 second requirement appropriate to capture
133 the majority of actual LOS situations without negatively affecting the end-user experience?

134 c) Primary Function: A primary function is any discrete, dynamic device function that can be perceived
135 by an end user. The delivery of active audio/video content to an end user is considered a primary
136 function.

- 137 1) Continuous device functions (e.g. clocks, status displays, indicator lamps) are not primary
138 functions.
- 139 2) Static device functions are not considered to be primary functions. Static functions include, but
140 are not limited to:
 - 141 i) No active audio or video processing or output
 - 142 ii) Playback paused or stopped

1) We hope the detection of LOS will be only audio signal or video signal depend on the product.

Some audio product can not detect the video signal. Because, the video input is only A/B selector switching function.

2) Some audio product can not detect the video signal. Because, the video input is only A/B selector switching function.

3a) Regarding Composite video signal, "Loss of either the horizontal or vertical sync " are preferable for us . Because detection of 1 dB or less signal are not stable way and not usual manner for us. Sync detection are more stable and familiar way. We think Manufacturer has more experience about this kind of signal detection.

From this point of view, we propose followings item 3b).

3b) Regarding the definition of LOS. JEITA's members propose to decide the detecting condition by manufacturers themselves. Manufacturers should guarantee the EPA's requirement of the APD timing. Because we have many way of detecting the signal. Manufacturers would like to select the detector depending on the circuit design.

- 143 iii) No optical disc media in disc drive
- 144 iv) System waiting in disc menu or other menu for user input

145 **Note:** Per stakeholder suggestions, the list of static device functions has been expanded to specify
146 additional device operations which do not constitute primary functions. A product which is performing a
147 static function would be expected to APD per the requirements specified in this document.

148 d) Operational Modes:¹

- 149 1) On Mode: Where the product is connected to a mains power source, has been activated and is
150 providing one or more primary functions. The common terms “active”, “in-use” and “normal
151 operation” also describe this mode.
 - 152 i) Active State: A state within On mode in which a product is performing a primary function.
 - 153 ii) Idle State: A state within On mode in which a product is not performing a primary function and
154 no content is actively being delivered to the end-user.
- 155 2) Sleep Mode: The common term “standby” may also describe this mode, where the product is
156 connected to a mains power source, is not providing a primary function, and offers one or more of
157 the following user oriented or protective functions which may persist for an indefinite time.
 - 158 i) To facilitate the activation of other modes (including activation or deactivation of On mode) by
159 remote switch (including remote control), internal sensor, timer;
 - 160 ii) Continuous function: information or status displays including clocks;
 - 161 iii) Continuous function: sensor-based functions.

162 For purposes of this specification, Sleep Mode is defined as the time when the product is
163 connected to a power source, produces neither sound nor picture, neither transmits nor receives
164 program information and/or data (excluding data transmitted to change the unit’s condition from
165 Sleep Mode to On Mode), and is waiting to be switched to On Mode by a direct or indirect signal
166 from the consumer, e.g., with the remote control.
- 167 3) Standby Mode: The mode in which the product is connected to the power source, is possibly
168 producing status information or time readout, is waiting to be switched to the active mode, and
169 produces/records no video or audio signal (either directly audible, or audible as reproduced by
170 headphones, loudspeakers, or other transducers). The product may exit the standby mode
171 through an automatic timer activation, direct activation by the user, or a remote control command
172 from the user. In standby mode, the product is substantially shut down but may continue to
173 perform some functions (e.g., remote control sensing and clock).

174 **Note:** The Standby mode definition is included for purposes of allowing Consumer AV Products additional
175 time to meet the new Version 2.0 “Tier 2” requirements. This definition is taken directly from the Version
176 1.0 Audio/DVD specification

- 177 4) Off Mode: Where the product is connected to a mains power source and is not providing any On
178 mode or Sleep mode functions, and where the mode may persist for an indefinite time. An
179 indicator that only shows the user that the product is in the off position is included within the
180 classification of an off mode.

181 **Note:** EPA has expanded Operational Mode definitions to include additional detail about Power states
182 within On Mode, and to align the Sleep Mode definition with the ENERGY STAR Televisions specification.
183 These definitions are referenced in subsequent product requirements

¹ Operational mode definitions are derived from IEC 62301

4) The definition of “Standby Mode” should be concretize. If there is not the note (174-176). We might be confused by the meaning between “Sleep mode” and “Standby mode”.

184 e) EPS (External Power Supply): Also referred to as External Power Adapter. A component contained
185 in a separate physical enclosure external to the AV product, designed to convert line voltage AC input
186 from the mains to lower DC voltage(s) in order to provide power to the AV product. An EPS must
187 connect to the AV product via a removable or hard-wired male/female electrical connection, cable,
188 cord or other wiring.

189 f) HDMI (High-Definition Multimedia Interface): A compact audio/video interface for transmitting
190 uncompressed digital data.

191 1) CEC (Consumer Electronics Control) Protocol: A single-conductor wire or bus technology that is
192 an optional feature in the HDMI specification. CEC is meant to carry IR/remote and/or control
193 commands between HDMI devices that are interconnected. CEC is not currently required for
194 HDMI compliance.

195 **Note:** In future specification revisions, EPA intends to require devices to have the ability to; (1) expose
196 power state across inter-device connections, (2) issue and receive power control commands across inter-
197 device connections, and (3) make power state changes based on available information. This requirement
198 would extend to other ENERGY STAR labeled products that connect to AV products (e.g. TV's, set top
199 boxes, etc). HDMI CEC is one of several technology options that will be evaluated. EPA intends to work
200 with industry to develop specific guidelines for implementation.

201 g) High Definition Resolution: Video output with resolution greater than 480i/p.

Question!! Very important !

Please take care of this definition on the “Multi-component System”.

If this is not a mistake, almost all of our audio products will be excluded from Version 2.

201 g) High Definition Resolution: Video output with resolution greater than 480i/p

202 h) Multi-component System: A product consisting of several components with separate enclosures that
203 are sold as and intended for use as a single system. A “Home Theater in a Box” is an example of a
204 Multi-component System.

205 i) Audio Amplifier Type Classifications:

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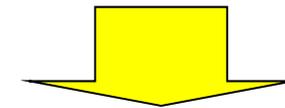
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227 iii) Does not provide audio amplification

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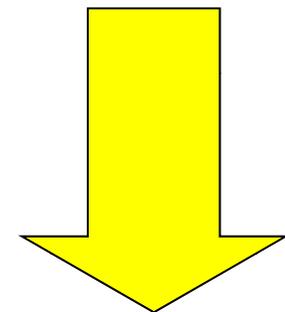
5) Very important question !

The EPA mentions the Multi-component System is HTIB, and it is a product of several components with separate enclosures.



6) The EPA mentions very clear. However I could not believe them.

ENERGY STAR label is intended for stand-alone products, not customized system installations. There is provision to qualify “products” that are made up of several sub-components in separate enclosures with independent power supplies (i.e. Home Theater in a Box).



Next page.

293 **Note:** The ENERGY STAR label is intended for stand-alone products, not customized system
294 installations. There is provision to qualify “products” that are made up of several sub-components in
295 separate enclosures with independent power supplies (i.e. Home Theater in a Box). Products that include
296 an IP video tuner and are sold or provided outside of a dedicated service contract will be considered for
297 inclusion in the next revision of the ENERGY STAR Set-top Box specification.

298 **3. Energy Efficiency Criteria**

299 Products must meet all of the requirements specified below to be eligible for ENERGY STAR qualification
300 under this specification. A summary of these requirements is in Table 1. Products previously eligible for
301 qualification under the Version 1.0 ENERGY STAR Audio/DVD specification are not subject to new
302 qualification requirements until Tier 2 takes effect.

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New definition of HTIB

V2.0 Audio/Video: Home/Retail



Power Amplifiers	
Features	<ul style="list-style-type: none"> • Single-zone or Multi-zone • Single-channel or Multi-channel • Class A, AB, B, D
Annual Sales & Trend*	220,000 ↔
ENERGY STAR Pros & Cons	<ul style="list-style-type: none"> • PRO: • CON:

or

V2.0 Audio/Video: Pro/Commercial



AV Receivers	
Features	<ul style="list-style-type: none"> • Tuner, Pre-amp, Power amplifier • Audio/Video decoding, processing, switching, distribution • Single-zone or Multi-zone
Annual Sales & Trend*	?
ENERGY STAR Pros & Cons	<ul style="list-style-type: none"> • PRO: • CON:

V2.0 Audio/Video: Home/Retail



CD Players	
Features	<ul style="list-style-type: none"> • Single-disc • Multi-disc
Annual Sales & Trend*	190,000 ↓
ENERGY STAR Pros & Cons	<ul style="list-style-type: none"> • PRO: • CON:

V2.0 Audio/Video: Home/Retail



DVD & Blu-ray Disc (BD) Players	
Features	<ul style="list-style-type: none"> • DVD up-conversion • Recording capability
Annual Sales & Trend*	18,900,000 ↑
ENERGY STAR Pros & Cons	<ul style="list-style-type: none"> • PRO: Adoption of BD fueled by high def transition. • CON:

V2.0 Audio/Video: Home/Retail



Other Audio Components	
Features	<ul style="list-style-type: none"> • Tuners • Pre-amps • Equalizers
Annual Sales & Trend*	285,000 ↑
ENERGY STAR Pros & Cons	<ul style="list-style-type: none"> • PRO: • CON:

If EPA's new definition is correct, many products are excluded from Version 2/Tier2.

Version2
Audio
Amplifier

Version2
Optical
Disc
Drive

Exclude from Version2

V2.0 Audio/Video: Home/Retail



Home Theater in a Box (HTIB)	
Features	<ul style="list-style-type: none"> • Integrated DVD / Blu-ray Disc player • Self-powered subwoofer • Satellite surround speakers
Annual Sales & Trend*	4,100,000 ↑
ENERGY STAR Pros & Cons	<ul style="list-style-type: none"> • PRO: • CON:

The EPA changed new definition to HTIB.

Amplifier with an integrated optical disc player is not the HTIB.

V2.0 Audio/Video: Home/Retail



Portable Audio Systems	
Features	<ul style="list-style-type: none"> • Clock Radios • Home Radio / CD / Tape Players • Boomboxes • Karaoke Machines
Annual Sales & Trend*	15,300,000 ↓
ENERGY STAR Pros & Cons	<ul style="list-style-type: none"> • PRO: • CON:

V2.0 Audio/Video: Home/Retail



Compact Audio Systems (Shelf Systems)	
Features	<ul style="list-style-type: none"> • CD / Tape Playback • MP3 Playback
Annual Sales & Trend*	3,500,000 ↓
ENERGY STAR Pros & Cons	<ul style="list-style-type: none"> • PRO: • CON:

Is this right ?

- 205 i) Audio Amplifier Type Classifications:
- 206 1) Full-spectrum Amplifier: An amplifier capable of full (20 Hz to 20 kHz) audible frequency range
- 207 output on all channels.
- 208 2) Limited-bandwidth Amplifier: An amplifier limited to less than full (20Hz to 20 kHz) audible
- 209 frequency range output on one or more channels.
- 210 j) Audio Amplifier Size Classifications:
- 211 1) Large Amplifier: Where $P_{IN} > 100$ W (P_{IN} = Input Power @ 1/8 MUP 1kHz Sine Wave)
- 212 2) Medium Amplifier: Where 20 W $\leq P_{IN} < 100$ W (P_{IN} = Input Power @ 1/8 MUP 1kHz Sine Wave)
- 213 3) Small Amplifier: Where $P_{IN} < 20$ W (P_{IN} = Input Power @ 1/8 MUP 1kHz Sine Wave)
- 214 k) Product Classifications:
- 215 1) AV Product: For purposes of this specification, all products that offer audio amplification and/or
- 216 optical disc drive functions and do not meet the definition of a Dedicated Audio DSP Device shall
- 217 be classified as AV Products and subject to the requirements specified in this document.
- 218 2) Consumer AV Product: Consumer AV Products are intended for sale to individual consumers and
- 219 include the following: cassette decks, CD players/changers, CD recorders/burners, clock radios,
- 220 DVD & Blu-ray Disc products, equalizers, laserdisc players, mini- and midi-systems, minidisc
- 221 players, powered speakers, rack systems, stereo amplifiers/pre-amplifiers, stereo receivers, table
- 222 radios, and tuners.
- 223 3) Dedicated Audio DSP Device: A device may be classified as a "Dedicated Audio DSP Device" if it
- 224 meets all of the following criteria:
- 225 i) Provides audio digital signal processing as its primary function.
- 226 ii) Provides support for RS232 or similar protocol for hard-wired remote control.
- 227 iii) Does not provide audio amplification

7) The definition of "Full-spectrum Amplifier" should be concretize.

We might be confused by the channel quantities.

Line207; out put on all channels.

Line487; one or two-channel

Line641; one or more full-spectrum

Line 488 mentions "d) Limited-bandwidth audio amplifier tests (Section 8) shall be performed on any product that offers surround sound multi-channel audio amplification. " The definition of multi-channel audio looks "Limited-bandwidth audio".

However, some multi-channel of AV receiver have the full-spectrum amplifier on all channel.

Please support these product.

228 **Note:** The "Consumer AV Product" definition is derived from the Version 1.0 Audio/DVD specification, and
229 is included in this document to allow additional time for products qualified to the Version 1.0 specification
230 to meet Tier 2 Version 2.0 requirements.

231 **Note:** Product Classifications have been updated to define product categories that will be subject to
232 unique requirements under this specification. The first definition, for "AV Product" is intended to be the
233 general purpose definition for the majority of products on the market today. A specific exception is noted
234 for Dedicated Audio DSP Devices, since these will be subject to unique requirements under this
235 specification.

236 l) Product Functions:

- 237 1) Audio Amplification: A function by which a device increases the amplitude of an audio signal for
238 purposes of sending the signal to a transducer for playback.
- 239 2) Audio Signal Processing: A function by which a device modifies an audio signal for a purpose
240 other than amplification.
- 241 3) High Resolution Display: A function by which a device converts a video signal into a visual output
242 (e.g. LCD panel, Plasma display panel).
- 243 4) Status Display: A function by which a product provides a visual display of less than 480x234 pixel
244 resolution or 5 inches diagonal screen size. A typical status display would be a back-lit
245 alphanumeric clock or channel indicator. Note that single indicator lamps are not included under
246 the definition of status displays and are not provided power allowances under this specification.

247 **Note:** EPA has revised the lower limit for high-resolution displays and added a definition for Status
248 Display per suggestions received from stakeholders.

- 249 5) IP Networking: A function by which a device can connect to an IP-based network for transmission
250 and receipt of data. The connection may be wired or wireless (e.g. WiFi, Ethernet, Bluetooth).
- 251 6) Optical Disc Player/Recorder: A function by which a device can read and/or write data to
252 removable disk media (e.g. CD, DVD, Blu-ray Disc, and derivatives).
- 253 m) THD (Total Harmonic Distortion): The ratio of the sum of the powers of all harmonic components to
254 the power of the fundamental frequency of a signal.
- 255 n) MUP (Maximum Undistorted Power): A measure of amplifier output power at the point at which the
256 THD of the amplifier is 1% or greater.
- 257 o) UUT (Unit Under Test): The device being tested.

258 **2. Qualifying Products**

259 **2.1. Included Products:**

260 A product must meet the definitions provided in Section 1 of this document to be eligible for ENERGY
261 STAR qualification under this specification, with the exception of products identified in Section 2.2.

262 **Note:** Note that the term "Consumer AV" refers to those products primarily intended for use in a
263 residential environment, while "Commercial AV" refers to those products primarily intended for
264 commercial or professional applications. The distinction is included for purposes of expanding the breadth
265 of the ENERGY STAR Audio/Video product category in order to (1) allow commercial products that were
266 previously excluded from qualification to immediately qualify for ENERGY STAR, and (2) allow consumer
267 products currently covered under Version 1.0 Audio/DVD ample time to transition to the new efficiency
268 requirements.

269 Under Tier 1, Consumer AV products will continue to be subject to Version 1.0 Standby mode
270 requirements. Thus, these requirements as well as the testing protocol have been added to this
271 specification.

272 **Excluded Products:**

273 Products that are covered under existing ENERGY STAR product specifications are not eligible for
274 qualification under the Audio/Video specification. The list of specifications currently in effect can be found
275 at www.energystar.gov/products. For example, displays, monitors, lighting, computers, and game
276 consoles cannot qualify as Audio/Video products, since each is subject to qualification criteria under
277 another ENERGY STAR specification.

278 The following products are excluded from qualification under this specification.

- 279 a) Products which meet the definition of a Display, Television, Set-Top Box (STB), Computer, or Game
280 Console per the definitions in ENERGY STAR requirements for those product categories. Also
281 excluded are products that include an IP video tuner and are sold or provided outside of a dedicated
282 service contract.
- 283 b) Primarily battery-powered products (i.e. MP3 players, portable DVD players, portable gaming
284 systems, etc.)
- 285 c) Products for use in automotive applications
- 286 d) Video projectors
- 287 e) Home and building automation & control products
- 288 f) Whole-house and whole-building audio and/or video systems
- 289 g) Videoconferencing systems
- 290 h) Wireless microphone systems
- 291 i) A/B Selector Switching
- 292 j) Media Server

293 **Note:** The ENERGY STAR label is intended for stand-alone products, not customized system
294 installations. There is provision to qualify "products" that are made up of several sub-components in
295 separate enclosures with independent power supplies (i.e. Home Theater in a Box). Products that include
296 an IP video tuner and are sold or provided outside of a dedicated service contract will be considered for
297 inclusion in the next revision of the ENERGY STAR Set-top Box specification.

298 **3. Energy Efficiency Criteria**

299 Products must meet all of the requirements specified below to be eligible for ENERGY STAR qualification
300 under this specification. A summary of these requirements is in Table 1. Products previously eligible for
301 qualification under the Version 1.0 ENERGY STAR Audio/DVD specification are not subject to new
302 qualification requirements until Tier 2 takes effect.

Table 1: Summary of Energy Efficiency Requirements

Product	Requirements		
	Tier 1 Nov 2009	Tier 2 July 2010	Tier 3 March 2012
Consumer AV Products	<ul style="list-style-type: none"> Standby power consumption limit = 1W 	<ul style="list-style-type: none"> Sleep mode power consumption limits (base, IP networking) Auto Power Down requirements Product function power consumption limits (display, IP networking, optical disc player) Amplifier efficiency requirement (small, medium, and large) Idle power limits for all products if option to disable APD 	<ul style="list-style-type: none"> Sleep mode power consumption limits (base, IP networking) Auto Power Down requirements More stringent product function power consumption limits (display, IP networking, optical disc player) More stringent amplifier efficiency requirement (small, medium, and large) Idle power limits for all products if option to disable APD
Professional and Commercial AV Products	<ul style="list-style-type: none"> Sleep mode power consumption limits (base, IP networking) Auto Power Down requirements (for Digital Signal Processors, this is the only requirement) Product function power consumption limits (display, IP networking, optical disc player) Amplifier efficiency requirement (small, medium, and large) Idle power limits for all products if option to disable APD 		<ul style="list-style-type: none"> Idle power limits for all products if option to disable APD

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305 **3.1. General Qualification Criteria:**

- 306 a) **Mandatory Auto-Power Down:** To qualify for ENERGY STAR, all products must offer APD
 307 functionality that is enabled by default. APD timing begins after the last user input has been received
 308 (e.g. control signal, volume adjustment) and when the product ceases performance of all primary
 309 functions. For devices that process audio or video signals from external sources, the presence of a
 310 signal on any active AV input shall constitute performance of a primary function, and APD timing
 311 begins upon loss of signal (LOS) on all active AV inputs. APD must function on all available AV
 312 inputs. Manufacturers may offer users the option (via system menu, DIP-switch, or other means) to
 313 modify APD timing in 30 minute intervals or to disable APD entirely.
- 314 1) **APD ≤ 30 minutes:** This timing option is acceptable for use as a default setting. If APD timing is
 315 set to less than or equal to 30 minutes, products do not have to meet Idle state power
 316 consumption requirements.
- 317 2) **30 minutes > APD < 2 hours:** This timing option is acceptable for use as a default setting. If APD
 318 can be disabled, or if APD timing can be set to greater than 30 minutes, products must meet Idle
 319 state power consumption requirements.
- 320 3) **APD ≥ 2 hours:** This timing option may only be enabled by the end user and is not acceptable for
 321 use as a default setting. If APD can be disabled, or if APD timing can be set to greater than 2
 322 hours, products must meet Idle state power consumption requirements.

8) Regarding 3.1.a) line 305-313

Idle power limits is not necessary when APD timing is set to within 30minites.

However, JEITA members would like to exclude idle power limits from audio and video product until Tier3.

Because, audio and video product must come up against very tight limit of idle power.

Audio and video product limits should be assessed by more sample data.

9) Regarding 3.1.a) line 305-313

Idle power limits is not necessary when APD timing is set to within 30minites.

10) The definition of "APD" should be concretize.

There is a possibility of misreading this.

We can read "Idle power limits is not necessary when APD timing is set to within 30minites. "

Is it right ?

11) typo?

323 Exception to Mandatory APD Requirements: Products which are subject to 3rd party performance
 324 standards that prohibit APD, including those used for Mass Notification and Emergency
 325 Communications Systems and subject to proposed ANSI/UL 2572, are exempt from ENERGY STAR
 326 APD requirements.

327 **Note:** EPA has modified Section 3.1.a to clarify APD timing options and associated Idle power
 328 requirements. Note that APD must function on all available AV inputs, although only one input must be
 329 tested and verified for purposes of qualification for ENERGY STAR.

- 330 b) Products Sold with an External Power Supply: To qualify for ENERGY STAR, AV products that are
 331 sold with an External Power Supply must use either, (1) an EPS that is ENERGY STAR qualified, or
 332 (2) an EPS that meets the applicable no-load active mode efficiency levels and power factor
 333 requirements provided in the latest version of the ENERGY STAR Program Requirements for Single
 334 Voltage External AC-AC and AC-DC Power Supplies. The EPS specification and qualified product list
 335 can be found at www.energystar.gov/powersupplies.
- 336 c) Multi-component Systems: On and Sleep mode power consumption limits for each power-consuming
 337 component in a Multi-component System shall be assessed independently. To qualify for ENERGY
 338 STAR, each component must meet applicable ENERGY STAR criteria.

339 **3.2. Modal Qualification Criteria:**

- 340 a) Standby Mode Power Consumption Requirements: The limits specified in Table 2 are the only limits
 341 applicable to Consumer AV Products under Tier 1 of this specification. To qualify for ENERGY STAR,
 342 the calculated Standby mode power consumption for a product must not exceed the limits in Table 2.

343 **Table 2: Standby Mode Power Consumption Limits**

Product	Standby Mode Power Consumption Limit (W) Tier 1 Consumer AV Products ONLY
Consumer AV Products	1.0

344 **Note:** Standby mode requirements for Consumer AV products will remain in place under Tier 1 of this
 345 specification. Products currently qualified to Version 1.0 ENERGY STAR Audio/DVD will maintain their
 346 qualification without action by partners. To qualify new Consumer AV products to ENERGY STAR under
 347 Tier 1, manufacturers must test and submit data for Standby power consumption per Section 5.4 of the
 348 test procedure in Appendix B.

- 349 b) Sleep Mode Power Consumption Requirements: The limits specified in Table 3 are additive. To
 350 qualify for ENERGY STAR, the calculated Sleep mode power consumption for a product must not
 351 exceed the sum of the limits for each applicable product function listed in Table 3.

352 **Table 3: Sleep Mode Power Consumption Limits**

Product Function	Sleep Mode Power Consumption Limit (W)			
	Tier 1 Consumer AV Products	Tier 1 Commercial AV Products	Tier 2 All Products	Tier 3 All Products
Base Limit (All Products)	N/A	1.0	1.0	
IP Networking	N/A	1.0	1.0	

12) Could you change to “any available AV inputs” from “all”. Because we will control each function. However we would like to select audio or video depending on product situation.

353 **Note:** Based on a recent stakeholder comment, EPA revisited the test data set to review whether an
 354 additional 1W Sleep mode power allowance was appropriate for Status Display functionality. The data
 355 set does not support an additional 1W, as most products in the data set provide Status Displays and are
 356 able to achieve Sleep mode power consumption of less than 1W.

357 c) **On Mode Power Consumption Requirements:** The limits specified in Table 4 are additive, with the
 358 exception of the optical disc player limit. Only one optical disc player limit may be added to the On
 359 mode power consumption limit calculation for a product. To qualify for ENERGY STAR, power
 360 consumption in On mode must not exceed the sum of the limits for each applicable product function
 361 listed in Table 4. In the case where multiple On mode tests can be performed on a single product
 362 (e.g. both playback and record tests can be performed on a DVD Recorder), the product must meet
 363 the On mode requirements specified in Table 4 in each test that is performed. See the requirements
 364 flow chart in Appendix A to determine appropriate test and qualification requirements for a particular
 365 product.

366 **Note:** EPA has included additional guidance regarding how to meet On mode requirements for products
 367 that are subject to several On mode tests for a single function. For example, a DVD player will have to
 368 perform various playback and recording tests for optical disc players per Section 6 of this document – the
 369 device must meet the On mode power consumption requirements specified in Table 4 in each test that is
 370 performed.

371 *Exception to On Mode Power Consumption Requirements: Dedicated Audio DSP Devices that meet*
 372 *the definition in Section 1 are exempt from ENERGY STAR On mode power consumption*
 373 *requirements. In order to qualify for ENERGY STAR, these products must meet the Sleep mode*
 374 *power consumption limits in Table 3, must have APD enabled by default, and must meet all other*
 375 *requirements specified in this document. Furthermore, manufacturers must test and report On mode*
 376 *power consumption for all qualifying products. EPA may consider this On mode power consumption*
 377 *data in future evaluations of Audio/Video ENERGY STAR requirements.*

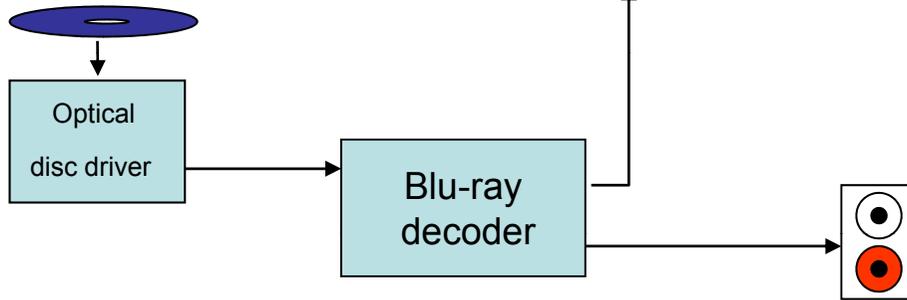
378 **Table 4: On Mode Power Consumption Limits**

Product Function	On Mode Power Consumption Limit (W)			
	Tier 1 Consumer AV Products	Tier 1 Commercial AV Products	Tier 2 All Products	Tier 3 All Products
High Resolution Display (> 480x234 resolution and 5 inches diagonal)	N/A	$P = 6*(R) + 0.05*(A) + 3$ Where: $R = \text{Display Resolution (x * y)}$ $A = \text{Screen Area}$		
IP Networking	N/A	1.5 W		TBD
Standard Definition (SD) Video and Audio Source Optical Disc Player/Recorder	N/A	6.0 W (Player Only) 16 W (Player/Recorder)		TBD
SD Source to HD Output "Upconversion" Optical Disc Player	N/A	10 W (Player Only) 20 W (Player/Recorder)		TBD
High Definition (HD) Video Source Optical Disc Player/Recorder	N/A	15 W (Player Only) 25 W (Player/Recorder)		TBD

13a) IP Networking;
 Our understanding of some example of IP Networking are WiFi, Ethernet, Bluetooth, etc. If some products have such function (For example, BD player with Ethernet function), how to understand the limits of 1.5w. Is the meaning of additional allowance of power consumption for such products? How about USB. Is it included USB interface in IP Networking?
 We think some additional description are necessary.

13b) On mode power consumption for HTIB is very tight.
 Most HTIB products could not clear the limit. Optical disk player's power consumption should be excluded until Tier3 of the audio product. Audio products need bigger power consumption by extra feature function. They need extra power without power amplifier. So, JEITA members would like to exclude this power limits from audio product until Tier3. Because, audio product must come up against very tight limit of this power. Audio product limits should be assessed by more sample data. The amplifier addition value of Draft2 has disappeared. Why did it disappear?

Blu-ray Player



Example of

“Blu-ray disc Player” vs. “HTIB”

Why HTIB need more power for the optical disc player power consumption?

@ It is different from circuit size and extra feature functions.

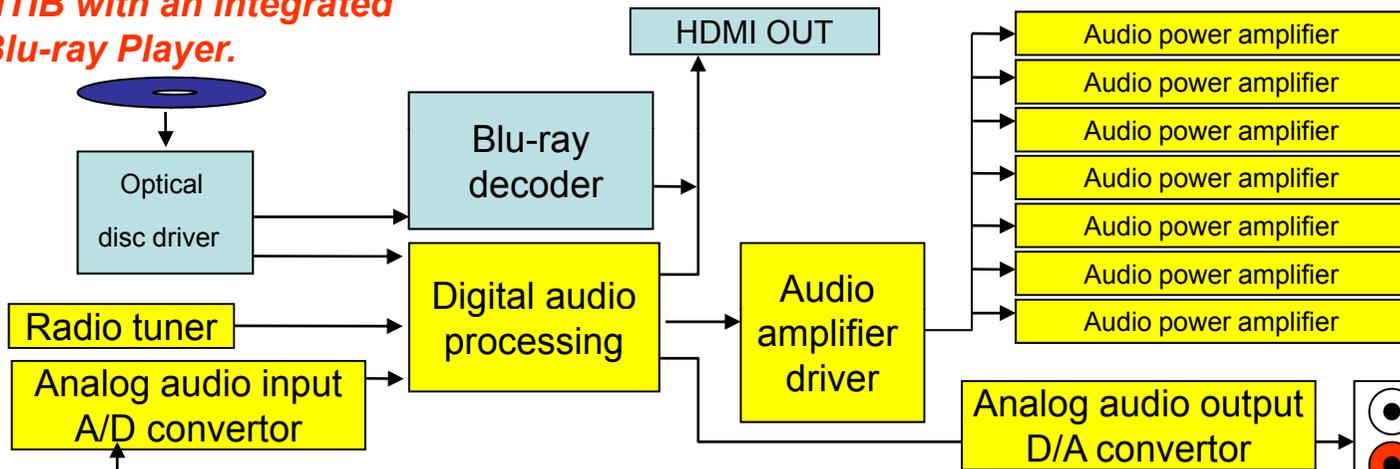
Standby power consumption=1W



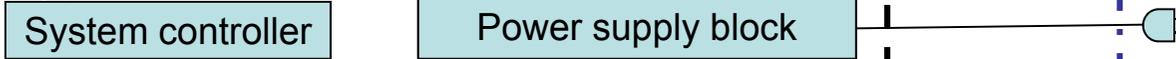
On mode

Optical disc player's power consumption=15W

HTIB with an integrated Blu-ray Player.



Standby power consumption=1W



On mode

HTIB and audio products is not same as the Optical disc player's power consumption.

379 **Note:** EPA has added a third category to Table 4 for “upconversion” disc players, which process a SD
 380 source for output to a HD device. The On mode limits for all optical disc players have also been relaxed
 381 from the previous draft based on stakeholder feedback. Because there was limited data on which to
 382 based Tier 1 levels, EPA plans to revisit Tier 2 levels to ensure appropriate levels are set.

383 d) **On Mode Audio Amplifier Efficiency Requirements:** To qualify for ENERGY STAR, all products that
 384 offer Audio Amplification must meet or exceed the On mode amplifier efficiency requirements
 385 specified in Table 5.

386 If no AV inputs are available and the optical disc player is used for audio signal input (per test
 387 procedure Section 4.3.a), the power consumption from the optical disc player, as measured in
 388 Section 6.3 of the test procedure, may be subtracted from the total measured power consumption of
 389 the device for all audio amplifier efficiency calculations.

390 **Note:** EPA has added additional clarification for devices that must meet On mode amplifier efficiency
 391 requirements but do not offer external signal input terminals for purposes of testing.

392 **Table 5: On Mode Audio Amplifier Efficiency Requirements**

Product Function	On Mode Amplifier Efficiency			
	Tier 1 Consumer AV Products	Tier 1 Commercial AV Products	Tier 2 All Products	Tier 3 All Products
Audio Amplification Small Amplifiers ($P_{IN} < 20\text{ W}$)	N/A	No Efficiency Requirement		No Efficiency Requirement
Audio Amplification Medium Amplifiers ($20\text{ W} \leq P_{IN} < 100\text{ W}$)	N/A	Efficiency > 55% Where: $Efficiency = P_{OUT} / (P_{IN} * 0.80)$		TBD
Audio Amplification Large Amplifiers ($P_{IN} \geq 100\text{ W}$)	N/A	Efficiency > 55% Where: $Efficiency = P_{OUT} / P_{IN}$		TBD

393 P_{IN} = Input Power @ 1/8 MUP 1kHz Sine Wave
 394 P_{OUT} = Output Power @ 1/8 MUP 1kHz Sine Wave
 395

396 **Note:** Because there is a wide range of usage patterns for products with an amplification function, EPA
 397 believes that there are significant benefits to be derived from both on-mode efficiency and APD
 398 requirements. The requirements above are the same as those presented in the audio amplification
 399 proposal.

400 e) **Idle State Power Consumption Requirements:** The limits specified in Table 6 are additive. To qualify
 401 for ENERGY STAR, power consumption in Idle state must not exceed the sum of the limits for each
 402 applicable product function listed in Table 6.

14) This is not fair to all kind of products.
 The power consumption from optical disc player and or idle power consumption, as measured in Section 4.3.a) should be subtracted from the total power consumption of the device for all audio amplifier efficiency calculations.
 JEITA members propose “Idle power consumption” or “All optical player power consumption with audio input and without audio input” may be subtracted from total power consumption.
 “Because, Section 4.3.a)” is included idle power consumption.

[$20\text{W} \leq P_{in} < 100\text{W}$]

Efficiency= $P_{out} / (P_{in} * 0.8 - \text{Idle})$

or

Efficiency= $P_{out} / (P_{in} * 0.8 - \text{Section 4.3.a})$

[$P_{in} \leq 100\text{W}$]

Efficiency= $P_{out} / (P_{in} - \text{Idle})$

or

Efficiency= $P_{out} / (P_{in} - \text{Idle} - \text{Section 4.3.a})$

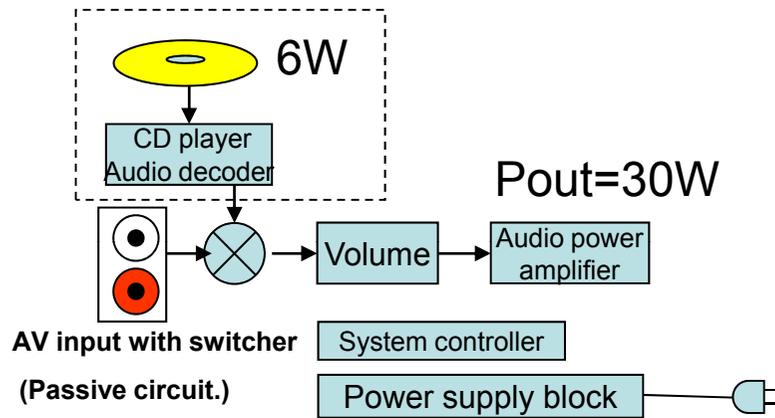


Next page

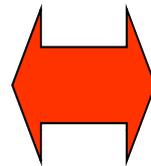
Example for explanation.

Example for explanation.

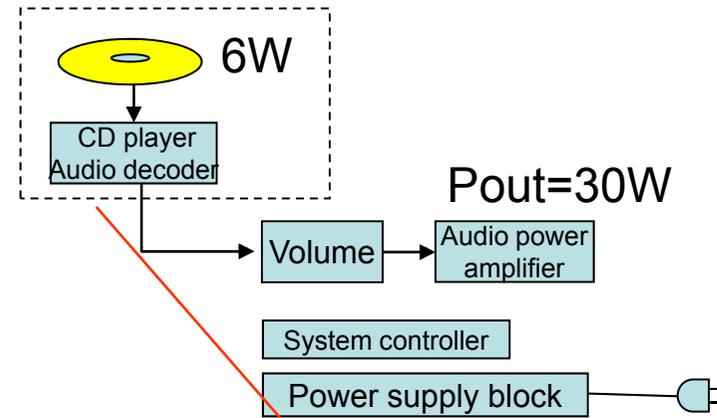
Compact audio system with AV input.



Pin=70W
 P_{out}=30W
 Efficiency=30/70*0.8=54%=NG
 Idle power consumption=5W
 Efficiency=30/70*0.8-5W=59%=OK



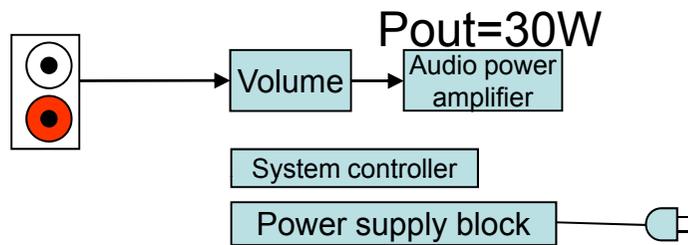
Compact audio system without AV input.



Pin=70W
 P_{out}=30W
 Efficiency=30/(70*0.8-6W)=60%=OK

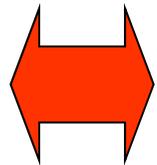
← Proposal

Compact audio system with AV input.



Pin=70W
 P_{out}=30W
 Efficiency=30/70*0.8=54%=NG

The power consumption from optical disc player and or idle power consumption, as measured in Section 2.3.a) should be subtracted from the total power consumption of the device for all audio amplifier efficiency calculations.



Pin=70W
 P_{out}=30W
 Idle power consumption=5W
 Efficiency=30/70*0.8-5W=59%=OK

← Proposal

JEITA members propose exclude idle power consumption for fair comparison.

Table 6: Idle State Power Consumption Limits

Product Function	Idle State Power Consumption Limit (W)			
	Tier 1 Consumer AV Products	Tier 1 Commercial AV Products	Tier 2 All Products	Tier 3 All Products
Base Limit (All Products)	N/A	5.0 W		
Audio Amplification	N/A	$P = (0.10 * P_{OUT})$ or 5 W, whichever is greater Where: P_{OUT} = Output Power @ 1/8 MUP 1kHz Sine Wave		

404 **Note:** Based on test data received to date, EPA assumes that the overhead required to operate a product
 405 with amplifier circuitry turned off is approximately 10% of the power required to operate with a 1/8 MUP
 406 sine wave input signal. The defined limits for amplifier Idle power have been updated to be based on
 407 amplifier output power, rather than mains input power, to avoid penalizing higher-efficiency amplifiers.

408 4. Testing

409 Partners are required to perform tests and self-certify those products that meet the ENERGY STAR
 410 guidelines. The test results must be reported to the EPA using the Audio/Video Qualifying Product
 411 Information (QPI) Form or Online Product Submission (OPS) Tool. Test results must be included with the
 412 product submission. All testing shall be performed per the ENERGY STAR Audio/Video test procedure
 413 included as Appendix B of this document.

414 5. User Interface

415 Although not mandatory, manufacturers are strongly recommended to design products in accordance with
 416 IEEE 1621 "Standard for User Interface Elements in Power Control of Electronic Devices Employed in
 417 Office/Consumer Environments." Compliance with IEEE 1621 will make power controls more consistent
 418 and intuitive across all electronic devices. For more information on the standard, visit
 419 <http://eetd.lbl.gov/controls>.

420 6. Effective Date

421 The date that products must meet the requirements specified under the Version 2.0 Audio/Video
 422 specification will be defined as the effective date of the agreement. Any previously executed agreement
 423 on the subject of ENERGY STAR qualified Audio/DVD products shall be terminated effective November
 424 16, 2009 for products eligible under the Version 1.0 Program Requirements for Audio/DVD Products.

425 a) **Qualifying and Marking products under the Tier 1 Version 2.0 specification:** Effective dates for Tier 1
 426 Version 2.0 ENERGY STAR Program Requirements for Audio/Video are listed in Table 7. Note that
 427 the requirements for Consumer AV Products originally eligible for qualification under the Version 1.0
 428 ENERGY STAR Audio/DVD specification have been transferred into this specification for the Tier 1
 429 timeframe. Commercial AV products must meet the new applicable Tier 1 requirements specified in
 430 the main body of this document in order to qualify for ENERGY STAR.

431 All products with a date of manufacture on or after the applicable Tier 1 Version 2.0 effective date
 432 must meet Tier 1 Version 2.0 requirements in order to qualify for ENERGY STAR (including additional
 433 shipments of products originally qualified under Version 1.0). The date of manufacture is specific to
 434 each unit and is the date (e.g., month and year) on which a unit is considered to be completely
 435 assembled.

15a) 5W limit is very tight. We want to know which kind of product clears this limit.

Most AV receivers and HTIV systems can not clear this limit. It will be far from EPA's top 25% target

It should be excluded from amplifier product.

Because , it can not be decided typical power consumption by all product categories.

So, JEITA members would like to exclude idle power limits from audio product until Tier3.

Because, audio product must come up against very tight limit of idle power.

Audio product limits should be assessed by more sample data.

We found important discrepant limit.

Idle limit of audio amplification = $5w + 5W$ (or $P_{out} * 0.1$) vs.

On mode of optical player = 6W

Why on mode is smaller than idle mode ?

15b) Additional comment for Video products;

Idle state power consumption are specified by Final draft for all products including consumer video products.

However we think this limit are also very tight target for video product. Because recently DVD or BD player use

one chip solution integrated system control and disc drive control. In this case , it is not possible to power down for

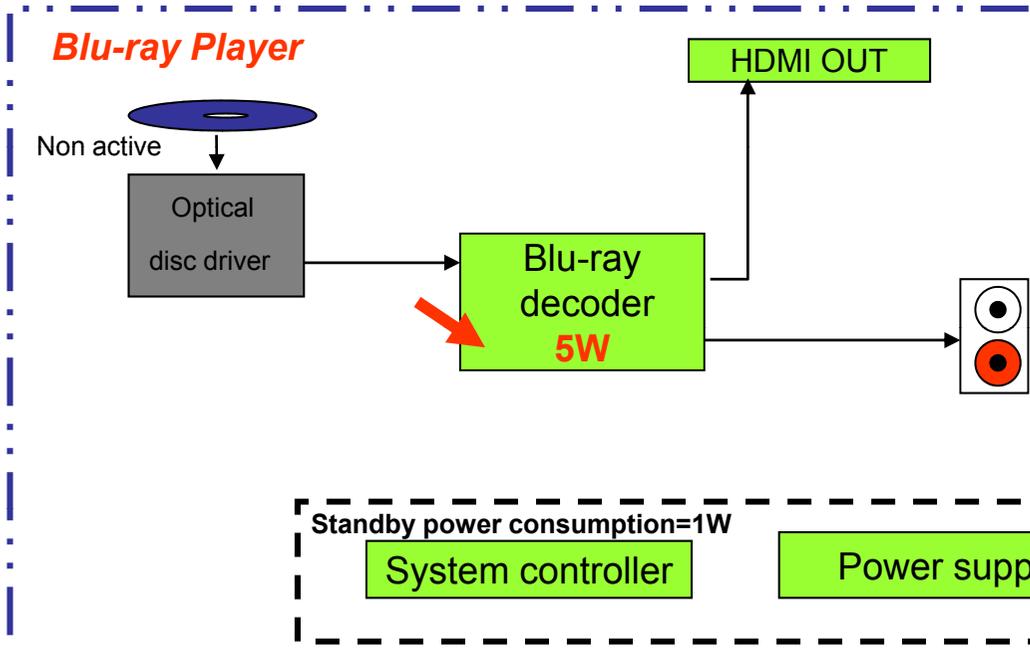
such controller even Idle mode, similar power

consumption are needed between ON mode and idle

mode. Because system controller are operating . To have separate twin controller might be one solution to decrease

idle mode power consumption, but this is costly. In this sense ,we propose to have additional investigation with

evaluation of more sample data until Tier 3 before fixing limit.



Example of

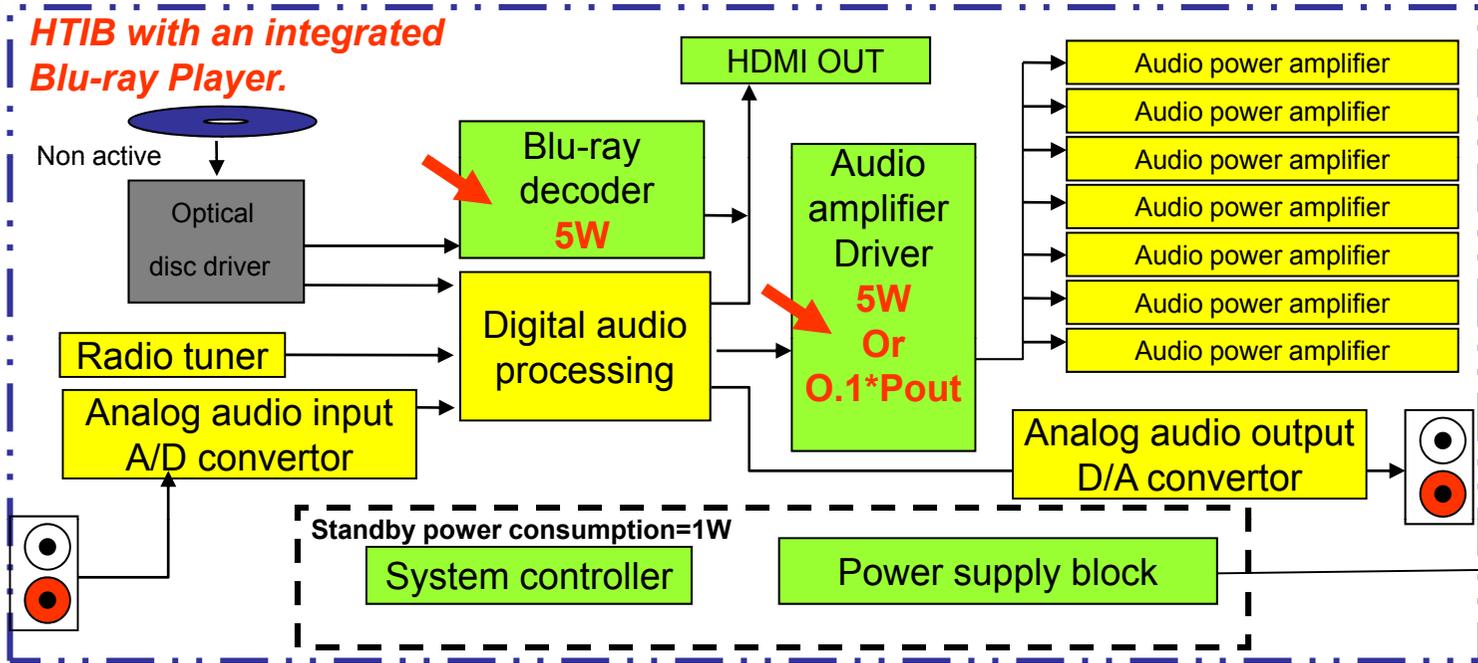
“Blu-ray disc Player” vs. “HTIB”

Why HTIB need more power for the optical disc player power consumption?

@ It is different from circuit size and extra feature functions.

Idle mode

Optical disc player's Idle consumption=5W



Idle mode

HTIB and audio products is not same as the Optical disc player's power consumption.

5W+5W(or 0.1*Pout) Is too small.

436 b) Qualifying and Marking products under the Tier 2 Version 2.0 specification: Effective dates for Tier 2
 437 Version 2.0 ENERGY STAR Program Requirements for Audio/Video are listed in Table 7. All
 438 products with a date of manufacture on or after the applicable Tier 2 Version 2.0 effective date must
 439 meet the Tier 2 Version 2.0 requirements in order to qualify for ENERGY STAR. The date of
 440 manufacture is specific to each unit and is the date (e.g., month and year) on which a unit is
 441 considered to be completely assembled.

442 c) Qualifying and Marking products under the Tier 3 Version 2.0 specification: Effective dates for Tier 3
 443 Version 2.0 ENERGY STAR Program Requirements for Audio/Video are listed in Table 7. All
 444 products with a date of manufacture on or after the applicable Tier 3 Version 2.0 effective date must
 445 meet the Tier 3 Version 2.0 requirements in order to qualify for ENERGY STAR. The date of
 446 manufacture is specific to each unit and is the date (e.g., month and year) on which a unit is
 447 considered to be completely assembled.

448 **Table 7: Version 2.0 Specification Effective Dates**

Audio/Video Product	Tier 1 Version 2.0 Effective Date	Tier 2 Version 2.0 Effective Date	Tier 3 Version 2.0 Effective Date
All Products	November 16, 2009	July 30, 2010	March 30, 2012

449

450 **Note:** EPA has incorporated the Audio/DVD Version 1.0 requirements into this document under the tier 1
 451 requirements for consumer AV products. This is to ensure the 9-month transition period for product types
 452 previously eligible under the Version 1.0 Audio/DVD specification.

453 d) Elimination of Grandfathering: EPA will not allow grandfathering under this Version 2.0 ENERGY
 454 STAR specification. ENERGY STAR qualification under Version 1.0 is not automatically granted for
 455 the life of the product model. Therefore, any product sold, marketed, or identified by the
 456 manufacturing Partner as ENERGY STAR must meet the specification in effect at the time of
 457 manufacture of the product.

458 7. Future Specification Revisions

459 EPA reserves the right to revise the specification should technological and/or market changes affect its
 460 usefulness to consumers or industry or its impact on the environment. In keeping with current policy,
 461 revisions to the specification will be discussed with stakeholders. In the event of a specification revision,
 462 please note that ENERGY STAR qualification is not automatically granted for the life of a product model.
 463 Any product sold, marketed, or identified by the manufacturing Partner as ENERGY STAR must meet the
 464 program requirements in effect on the date of manufacture of the product.

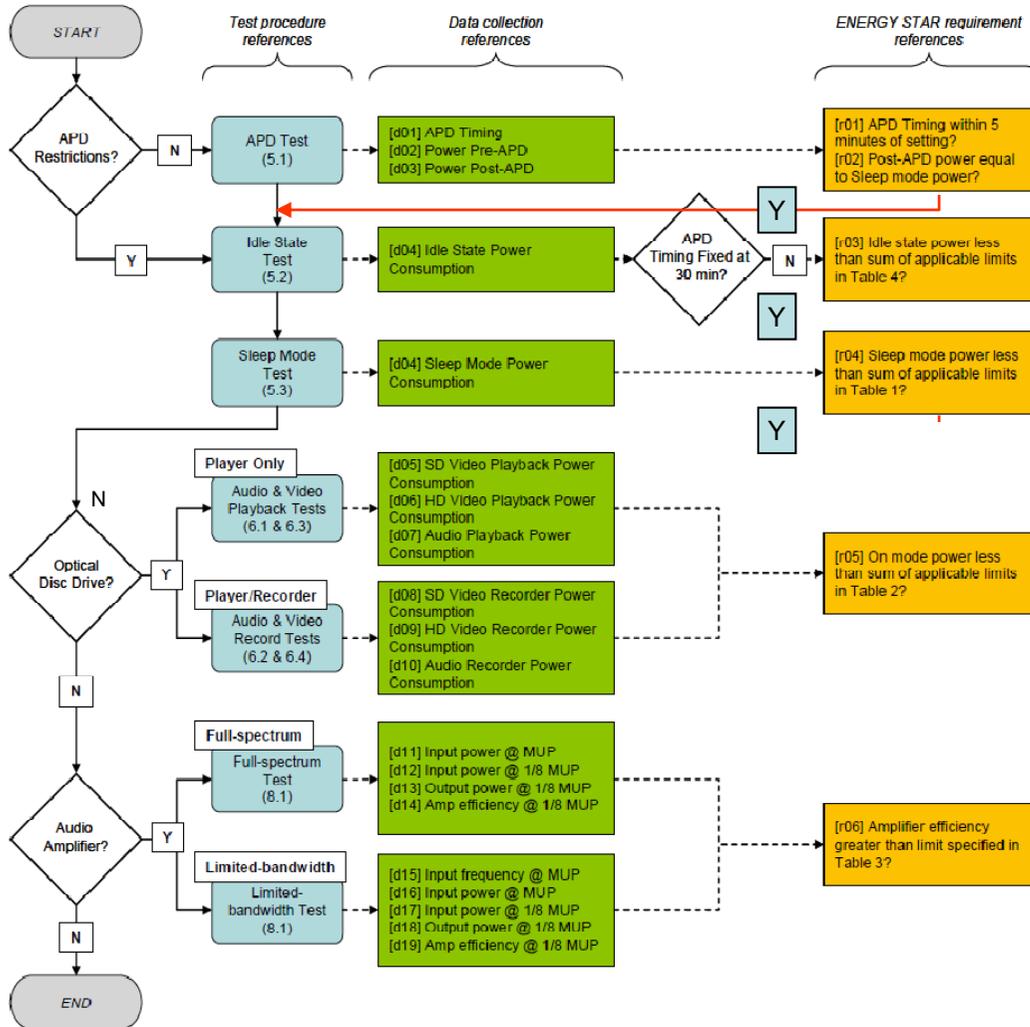
A) We understand HDD feature will be continue to be considered for future specification revisions. However Some Video equipment has multiple functions, which are integrated several storage media drive (e.g. DVD with HDD ,DVD with VCR,BD with HDD etc). If possible, we would like to know future plan to investigate such multiple function including HDD feature.

B) Measurement of Power consumption
 We understand that measurement of power consumption must follow Test procedure of Appendix B. On the other hand test procedure for safety regulation (e.g. UL60065) show different manner for measurement condition . As you know, power consumption are indicated on rating label for each products ,which are measured by safety Regulation. In this case, this indicated power consumption are not matching to measured data by Appendix B. For example, indication of rating label are 17w , and Energy star's measured data show 14w are happen. We think this is not problem but we would like to confirm for our better understanding . Our understanding are correct or not.

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APPENDIX A: Audio/Video Version 2.0 Requirements Flow Chart (Not Applicable to Tier 1 Consumer AV Products)

Note: This flow chart is provided as a visual aid only and should not be used in place of the full requirements specification. In the event of a discrepancy between this flow chart and the primary document, the requirements specified in the primary document shall prevail.



16) This flow chart can not reach "END".

These additional red lines are necessary.

472
473

APPENDIX B: ENERGY STAR Test Procedure for Audio/Video Products

474 1. Overview

475 The following protocol should be followed when measuring power consumption levels of audio/video
476 products for compliance with the levels provided in the ENERGY STAR Version 2.0 Audio/Video
477 Specification.

478 2. Applicability

479 Partners must test products in their "as-shipped" configuration. For products that offer a choice of user-
480 configurable options, all options shall be set to their default condition. EPA has prepared the following
481 guidelines for testing of Audio/Video products:

- 482 a) Power mode tests described in Section 5 shall be performed on every product.
- 483 b) Optical media player tests (Section 6) shall be performed on any product capable of playback
484 or recording of audio and/or video stored on optical media (e.g. CD, SACD, DVD, Blu-ray Disc),
485 and
- 486 c) Full-spectrum audio amplifier tests (Section 7) shall be performed on any product that offers
487 one- or two-channel audio amplification.
- 488 d) Limited-bandwidth audio amplifier tests (Section 8) shall be performed on any product that
489 offers surround sound multi-channel audio amplification. Products that offer surround sound
490 processing shall be tested in the default surround sound mode.

491 Under these guidelines, a HTIB system with an integrated DVD player/recorder and audio amplifiers
492 would likely be subject to the power mode tests in Section 5, several of the optical disc player tests in
493 Section 6, and the full-spectrum audio amplifier tests in Section 8. In contrast, a stand-alone rack-mount
494 audio amplifier would likely only be subject to the power mode tests in Section 5 and the full-spectrum
495 audio amplifier tests in Section 7. See the requirements flow chart in Appendix A to determine
496 appropriate test and qualification requirements for a particular product.

497 Note that Partners who wish to qualify Consumer AV products to Tier 1 requirements need only perform
498 the Standby mode tests in Section 5.4 of this test procedure. After the Tier 2 Version 2.0 specification
499 becomes effective, all products must be tested to

500 3. Definitions

501 Unless otherwise specified, all terms used in this document are consistent with the definitions contained
502 in the Version 2.0 ENERGY STAR Eligibility Criteria for Audio/Video Products.

503 4. Test Setup

504 Test setup and instrumentation shall be in accordance with the requirements of IEC 62301, Ed. 1.0,
505 "Measurement of Household Appliance Standby Power", Section 4, "General Conditions for
506 Measurements", unless otherwise noted in this document. In the event of conflicting requirements, this
507 test procedure shall take precedence. The setup and instrumentation requirements from IEC 62301, Ed.
508 1.0, Section 4 are applicable to both On and Sleep mode testing for ENERGY STAR.

509 4.1. Calibration

510 All test equipment shall be annually calibrated by a laboratory accredited to ISO/IEC 17025:2005 by an
511 ILAC recognized accreditation body.

512 4.2. Power Measurement Test Conditions

- 513 a) Measurement Location: All power measurements shall be taken at a point between the AC
514 mains power source and the UUT.

17) JEITA members propose the amplifier system with an integrated optical disc player to be excluded from the optical disc player test in Section 6.

515 b) Component-level Measurement: For multi-component systems (e.g. a home theater system
516 may include a receiver, powered subwoofer, and wireless speakers); all components shall be
517 connected together in a typical end-use configuration. Components may be tested
518 simultaneously, but each power-consuming device must be metered separately – power
519 consumption must be measured at each plug connection to mains power.

520 4.3. Source Signals

- 521 a) Signal Input Location: If the UUT does not have accessible signal input terminals, test signal
522 input may be through the device antenna, optical disc player, or other accessible means typical
523 of customer use.
- 524 b) Audio Sources: A 1 kHz sine wave input signal shall be used as the audio source for all
525 amplifier tests in Sections 7 and 8. For stereo testing, sine wave signals shall be in-phase, with
526 identical frequency.
- 527 c) Video Sources: SD and HD video content from IEC-62087 shall be used as the video source for
528 optical disc player tests in Section 6.
- 529 d) Option to Test with Only HD Video Sources: The video test procedures in Section 6 are to be
530 performed with both SD and HD video sources for devices capable of processing both SD and
531 HD content. The reported power consumption for the UUT is the average of the power
532 consumption measurements from the SD and HD video source tests. This average is intended
533 to reward devices that can scale back power consumption when processing SD video signals.
- 534 If the UUT is found to have negligible differences in power consumption when processing SD
535 versus HD sources, the manufacturer may choose to perform and report results from only HD
536 tests, in order to expedite testing.

537 4.4. UUT Operation

- 538 a) UUT Control: The UUT shall be controlled with the factory-supplied remote control (I/R or RF)
539 to the extent possible. For units that do not ship with a remote control, or for functions that
540 cannot be accessed from the supplied remote control, control interfaces on the face or body of
541 the UUT may be used.
- 542 b) Output Volume: The UUT output volume should be set to minimum for the duration of all tests
543 except as noted in the audio amplifier test procedures in Sections 7 & 8.
- 544 c) Battery Powered Devices: If the UUT contains rechargeable batteries, or can be integrated with
545 another device that contains rechargeable batteries, all batteries should be in a fully charged
546 state for the duration of testing.

547 4.5. UUT Pre-test Configuration

548 Prior to the start of testing, the UUT shall be configured as follows:

- 549 1) Set up the UUT per the instructions in the supplied operating manual. If several audio and video
550 interconnections are available, select and configure the system with one of the following
551 interconnections, in order of preference: HDMI, component, S-video, and composite.

552 **Note:** Per conversations with stakeholders, EPA has included further detail about UUT setup
553 requirements for systems that offer several options for audio/video interconnection. Note that the test
554 procedure for APD requires APD to be verified using the interconnection option selected in 4.5.1, though
555 APD is required to function on all available AV inputs.

- 556 2) If the UUT includes speaker outputs, connect a resistive load across each pair of output terminals
557 equivalent to the nominal rated load impedance or lowest impedance of the rated impedance range.
558 (e.g. 6 ohm if rated 6-8 ohm). The same resistive load must be used for all amplifier tests.
- 559 a) For self-powered or internal speakers with no accessible output terminals, output power shall
560 be measured across the speaker input leads, using the attached speaker as a resistive load.

18) Could you change to “any available AV inputs” from “all”. Because we will control each function. However we would like to select audio or video depending on product situation.

- 561 3) Connect the UUT to the power source.
- 562 4) Power on the UUT and perform initial system configuration, as applicable.
- 563 a) Disable any wireless networking functionality (WiFi), unless wireless networking is the UUT's
564 primary means of accessing a network.
- 565 b) Ensure that all audio tone controls are set to mid-level.
- 566 c) Ensure that UUT components (display brightness, etc.) are in their as-shipped configuration.
- 567 5) Connect the UUT to the signal source. The input signal shall comply with the requirements in
568 Section 4.4, above.
- 569 6) Let the UUT sit for at least 15 minutes, or until the unit has completed initialization and is ready for
570 use.
- 571 7) Measure & record the AC mains input voltage and frequency.
- 572 8) Measure & record the test room ambient temperature.

573 5. Test Procedures for All Products

574 The following tests shall be performed on all Audio/Video products².

575 5.1. Auto Power-down (APD) Function

- 576 1) Configure the UUT in a typical On mode operational state, with APD timing set to the default value,
577 or 30 minutes.
- 578 2) Stop the UUT from performing any primary functions and turn off any input signal applied to the
579 active AV input.
- 580 3) Measure & record the average power consumption before APD over a 2-minute period.
- 581 4) Allow the UUT to automatically power-down. Record the time elapsed before the APD event.
582 Verify that the elapsed time is within 5 minutes of the default APD timing value.
- 583 5) Verify that the device is in the expected APD low-power state.
- 584 6) Measure & record the average power consumption after APD over a 2-minute period.

585 **Note:** The APD test procedure has been revised to reflect recent changes to APD timing options, and to
586 include verification of APD timing.

587 5.2. Idle State

- 588 1) Configure the UUT in a typical Sleep or Off mode operational state.
- 589 2) Press the Power button to bring the unit into an On mode operational state, such that no active
590 content is playing.
- 591 3) Wait 60 seconds.
- 592 4) Measure & record the average power consumption over a 2-minute period.

593 **Note:** The Idle state test procedure has been revised to include a 60-second delay before performing
594 power measurements, to allow time for the product to manage power consumption of internal high-power
595 devices.

² NOTE: The APD test (5.1) is not required for products that are not required to offer an APD function. The Sleep Mode test (5.3) is not required for products that do not offer a Sleep mode.

596 **5.3. Sleep Mode**

- 597 1) Configure the UUT in a typical On mode operational state.
598 2) Press the Power button to bring the unit into a Sleep mode low-power operational state.
599 3) Measure & record the average power consumption over a 2-minute period.

600 **5.4 Standby Mode**

601 **** ONLY APPLICABLE TO CONSUMER AV PRODUCTS FOR TIER 1 ****

- 602 1) Power on all test equipment and properly adjust operation range
603 2) Connect the test equipment and unit under test.
604 3) Check for normal operation of the test unit and leave all customer adjustment to factory default
605 settings.
606 4) Bring the test unit into Standby mode (not Off mode) either by using the remote control device or
607 by using the ON/OFF switch on the test unit cabinet.
608 5) Either verify that the wall outlet power is within specifications or adjust the AC power source
609 output to Voltage: $115 \text{ Vrms} \pm 3 \text{ Vrms}$, Frequency: $60\text{Hz} \pm 3\text{Hz}$.
610 6) Set the power meter current range. The full-scale value selected multiplied by the crest factor
611 rating ($I_{\text{peak}}/I_{\text{rms}}$) of the meter must be greater than the peak current reading from the oscilloscope.
612 7) After the unit under test reaches operating temperature and the readings on the power meter
613 stabilize (approximately 90 minutes), take the true power reading in watts from the power meter.
614 8) Record the test conditions and test data. The measurement time shall be sufficiently long to
615 measure the correct average value to within a +10% - 0% error. If the device has different
616 standby modes that can be manually selected, the measurement should be taken with the device
617 in the most energy consumptive mode. If the modes are cycled through automatically, the
618 measurement time should be long enough to obtain a true average that includes all modes.

619 **Note:** The Standby mode test procedure is equivalent to the test procedure in the Version 1.0 ENERGY
620 STAR Audio/DVD specification.

621 **6. Test Procedures for Optical Disc Players**

622 The following tests shall be performed on any product capable of playback or recording of audio and/or
623 video stored on optical disc media (e.g. CD, DVD, Blu-ray Disc).

624 **6.1. Video Playback Test**

- 625 1) Insert / install the removable media and begin playback of IEC-62087 SD video content.
626 2) Measure & record the average power consumption over a 2-minute period.
627 3) If the UUT is capable of playing HD content, repeat the test with IEC-62087 HD video content and
628 record the average power consumption from each test.

629 **6.2. Video Recording Test**

- 630 1) Insert / install the removable media and begin recording of IEC-62087 SD video content.
631 2) Measure & record the average power consumption over a 2-minute period.
632 3) If the UUT is capable of recording HD content, repeat the test with IEC-62087 HD video content
633 and record the average power consumption from each test.

634 **6.3. Audio Playback Test**

- 635 1) Insert / install the optical disc media and begin playback of a pink noise signal per section 4.3.b.

19) Pink noise should be changed to 1kHz sine wave.

636 2) Measure & record the average power consumption over a 2-minute period.

637 **6.4. Audio Recording Test**

638 1) Insert / install the optical disc media and begin recording of a pink noise signal per section 4.3 b.

639 2) Measure & record the average power consumption over a 2-minute period.

640 **7. Test Procedures for Full-spectrum Audio Amplifiers**

641 The following tests shall be performed on any product that contains one or more full-spectrum audio
642 power amplifiers.

643 **7.1. Active State Test**

644 1) Connect the UUT to the output of the signal generator. For devices with multiple independent audio
645 amplifiers, all amplifiers should be connected and tested simultaneously.

646 2) Generate a 1 kHz sine wave input signal per Section 4.3.b. For devices that accept only digital
647 input signals, generate an appropriate representation of a 1 kHz sine wave.

648 3) Monitor each channel, one at a time, with a distortion analyzer and power meter.

649 4) Set the volume of the UUT to 100% and adjust the amplitude of the input signal until the THD of
650 any single channel is 1% or greater. This shall be considered the maximum undistorted power
651 (MUP)³ of the channel, and this channel shall be considered the reference channel for testing.

652 5) Measure & record the mains input power.

653 6) Reduce the sine wave input signal amplitude until the output power of the reference channel is at
654 1/8th MUP.

655 7) Measure & record the mains input power.

656 8) With the reference channel at 1/8th MUP, measure and record the output power for all channels,
657 averaged over a 2-minute period. Record the sum of all the output power measurements.

658 **8. Test Procedures for Limited-bandwidth Audio Amplifiers**

659 The following tests shall be performed on any product that contains a limited-bandwidth audio power
660 amplifier, including surround sound amplifiers.

661 **8.1. Active State Test**

662 1) Connect the UUT to the output of the signal generator.

663 2) Generate a 1 kHz sine wave input signal per Section 4.3.b. For devices that accept only digital
664 input signals, generate an appropriate representation of a 1 kHz sine wave. If 1 kHz is outside the
665 range of any bandwidth-limited channel in the UUT, sweep the input signal frequency between the
666 upper and lower -3 dB response points of the channel. Record the input signal frequency when the
667 UUT input power is at its maximum.

668 3) Using the input signal frequency determined for each channel in 8.1.2, monitor each channel, one
669 at a time, with a distortion analyzer and power meter.

670 4) Set the volume of the UUT to 100% and adjust the amplitude of the input signal until the THD of the
671 output is 1% or greater. Record the output power measured on each channel at 1% THD. This shall
672 be considered the maximum undistorted power (MUP) of the selected channel.

673 5) Measure & record the mains input power.

³ If the UUT performs signal processing such that the amplifier output does not clip at 1% THD, maximum undistorted power shall be obtained by monitoring input signal amplitude and output power simultaneously to identify the point at which input signal amplitude is increased and output power remains constant.

20) Same test," 5)" will be no need.

- 674 6) Determine which channel created the highest power draw in 8.1.3. This channel shall be
675 considered the reference channel for testing.
- 676 7) Reduce the sine wave input signal amplitude until the output power of the reference channel is at
677 1/8th MUP.
- 678 8) Measure & record the mains input power.
- 679 9) With the reference channel at 1/8th MUP, measure and record the output power for all channels,
680 averaged over a 2-minute period. Record the sum of all the output power measurements.