

Proposed Performance Requirements for EPA Game Console Recognition Program

Draft 3

The following are proposed performance and testing requirements for Game Consoles that seek EPA recognition through the EPA Game Console Recognition program.

1 DEFINITIONS

Note: A number of definitions have been changed to better align with industry standards, including changing “sleep” mode to “standby” mode, and changing “idle” mode to “navigation” mode. Idle functions have also been removed as they are covered in “navigation” mode.

- A) Game Console: A standalone computer-like device whose primary use is to play video games. Game Consoles use a hardware architecture based in part on typical computer components (e.g., processors, system memory, video architecture, optical and/or hard drives, etc.). The primary input for Game Consoles are special hand held controllers rather than the mouse and keyboard used by more conventional computer types. Game Consoles are also equipped with audio visual outputs for use with televisions as the primary display, rather than (or in addition to) an external or integrated display. These devices do not typically use a conventional personal computer (PC) operating system, but often perform a variety of multimedia functions such as: DVD/ Compact Disc (CD) playback, digital picture viewing, and digital music playback. Handheld gaming devices, typically battery powered and intended for use with an integral display as the primary display, are not included in this test plan.
- B) Product Category: A second-order classification or sub-type within a product type that is based on product features and installed components. Product categories are used in this specification to determine qualification and test requirements.
- C) Operational Modes:
- 1) Standby Mode: The mode where the console is plugged into a power source but is not providing any primary or secondary function and has no saved hardware state. The console has no active network link although may be capable of charging devices in this mode. Not all consoles may have this mode.
 - 2) Active Mode: The mode in which the Game Console is interactively manipulated by the user in response to prior or concurrent user input. Additional functions available in Active Mode are:
 - a) *Navigation Menu Function*:
 - (1) *Navigation Menu (aka Home Menu, System Menu, Cross Media Bar, or Dashboard)*: The Home Menu includes the screen(s) initially displayed for user navigation to selected game features for the selected game.
 - b) *Game Functions*:
 - (1) *Game Play*: A game is actively being played and the console is receiving user input.
 - (2) *Game Play Pause*: A game otherwise being played is paused after receiving user input.

c) *Streaming Media Functions:*

(1) *Video Stream Play:* The Game Console is playing a video stream through a network connection.

(2) *Video Stream Pause:* The video player is paused during active streaming of the video.

d) *System Maintenance and Download:* Applies to times when the console is actively engaged in system maintenance or download functionality after waking or in response to user input. System maintenance and download are defined below:

(1) *System Maintenance:* Game Console operating system patching, game updates, or other updates delivered and installed.

(2) *Download:* Files actively downloaded onto a local storage media for concurrent or future use.

D) Components:

1) External Power Supply (EPS): Also referred to as External Power Adapter. A component contained in a separate physical enclosure external to the Game Console casing, designed to convert line voltage ac input from the mains to lower dc voltage(s) in order to provide power to the Game Console. An external power supply shall connect to the computer via a removable or hard-wired male/female electrical connection, cable, cord or other wiring.

2) Internal Power Supply (IPS): A component internal to the Game Console casing and designed to convert ac voltage from the mains to dc voltage(s) for the purpose of powering the Game Console components. For the purposes of this specification, an internal power supply shall be contained within the Game Console casing but be separate from the main board. The power supply shall connect to the mains through a single cable with no intermediate circuitry between the power supply and the mains power. In addition, all power connections from the power supply to the Game Console components shall be internal to the Game Console casing (i.e., no external cables running from the power supply to the Game Console or individual components). Internal dc-to-dc converters used to convert a single dc voltage from an external power supply into multiple voltages for use by the Game Console are not considered internal power supplies.

E) Marketing or Shipment Terminology:

1) Model Number: A unique marketing name or identification reference that applies to a specific hardware and software configuration (e.g., operating system, processor type, memory, GPU), and is either pre-defined or selected by a customer.

2) Model Name: A marketing name that includes reference to the console model number, product description, or other branding references.

3) Product Family: A high-level description referring to a group of console typically sharing one chassis/motherboard combination that often contains hundreds of possible hardware and software configurations.

F) Additional Terms:

1) User Input: Activation of a button or active surface of a connected game controller, mouse, keyboard, remote or any other input device. The connected Game Console registers this activation via a wired or wireless connection.

2) Motion and Position Sensing Input: Motion and position sensing input is the use of spectrum sensors (reading a variety of spectrum wavelengths), which detect the motion and position of the player for game play, menu navigation and other purposes. Note: Accelerometer based controllers do not meet this definition.

3) UUT: An acronym for "unit under test," which in this case refers to the Game Console being tested.

- 4) Auto Power Down (APD): The ability of a Game Console to go into a low power state when left without user input for a predetermined amount of time.
- 5) High Definition Multimedia Interface (HDMI): A type of audio/video connection.
- 6) Digital Visual Interface (DVI): A type of audio/video connection.

2 SCOPE

2.1 Included Products

- 2.1.1 Products that meet the definition of Game Console are eligible for EPA recognition, with the exception of products listed in Section 2.2.

2.2 Excluded Products

- 2.2.1 The following products are not eligible for EPA recognition under the EPA Game Console Recognition Program:
 - i. Portable Game Consoles.
 - ii. Game consoles brought to market prior to January 1, 2011.

Note: EPA received comments indicating a concern that many older models may not meet performance requirements under this program. In answer to this feedback and further analysis, EPA has excluded game consoles brought to market prior to January 1, 2011. Due to the uniqueness of this product, when is a product "brought to market"? When is a product manufactured?

2.3 Continuing Verification

- 2.3.1 This document describes the method by which a single unit may be tested for compliance with the recognition criteria. Manufacturers participating in the EPA Game Console Recognition Program are responsible for ensuring that products from different production runs meet program requirements.

3 PERFORMANCE CRITERIA

3.1 Modal and Power Management Requirements

3.1.1 Auto Power Down

- i. During initial setup for the game console, a setup screen that identifies Auto Power Down should not include an option to disable. The setup screen may include a link to a secondary Auto Power Down screen which includes an option to disable.
- ii. From the secondary APD screen, the user shall have the option to either disable Active Game Play mode APD only or disable APD for all modes. Consoles shall present the option of disabling APD for Active Game mode only first so as to encourage users to leave APD enabled for other modes.
- iii. In limited circumstances users may be prompted to cancel the APD timer temporarily to allow certain types of games or media content to run without user input (e.g. simulation games which run without user input for periods longer than 1 hour). Upon starting such games or media content the user will be prompted to temporarily suspend auto-power down if required. Autopower down will be re-enabled when the console is next powered on.
- iv. Choosing to disable Auto Power Down shall trigger a pop-up screen warning of increased energy consumption.
- v. A Game Console without user input, *Game Play or Media Play* are not without user input, by default, must auto-power down to a standby mode within 1 hour of user inactivity (i.e., the console receives no user input for 1 hour or more).
- vi. After an automatic wake event, the console must power down immediately after performing required System Maintenance and Downloads.
- vii. A Game Console in *Game Play or Media Play* need not automatically power down.
- viii. The Game Consoles must be shipped with these settings enabled by default.

Note: In response to stakeholder comment, In Draft 3, EPA has removed requirements associated with Auto-save and legacy games.

3.2 Energy Efficiency Requirements

Table 1: Game Console Requirements

Mode	Requirement
Standby	0.5 W
Active Navigation Menu	35.0 W
Active Streaming Media	45.0 W

3.3 User Information Requirements

- 3.3.1 Products shall be shipped with informational materials to notify customers of the following:

- i. A description of power management settings that have been enabled by default,
- ii. A description of the timing settings for various power management features, and
- iii. Instructions for properly waking the product from Auto Power Down.

3.3.2 Products shall be shipped with one or more of the following:

- i. A list of default power management settings.
- ii. A note relating that the manufacturer has been recognized by US EPA for this product's efficiency to include efficiency delivered to users through power management settings, which have been enabled at the factory for the user.

4 TESTING

4.1 Test Methods

4.1.1 Test methods identified in Table 2 shall be used to determine qualification:

Table 2: Test Methods for Qualification

Product Type	Test Method
All	Test Method for Game Consoles, Rev. Jul-2012

Proposed EPA Game Console Recognition Program

Draft 3 Test Method Rev. Jul-2012

1 OVERVIEW

The following test method shall be used for determining product compliance with requirements in the ENERGY STAR recognition criteria for Game Consoles.

2 APPLICABILITY

ENERGY STAR test requirements are dependent upon the feature set of the product under evaluation. The following guidelines shall be used to determine the applicability of each section of this document:

- Section 6 shall be conducted on all eligible Game Console Products. Testing in Section 6.2 shall only be conducted on Game Consoles that support a Standby Mode in their default configuration.

3 DEFINITIONS

Unless otherwise specified, all terms used in this document are consistent with the definitions in the ENERGY STAR recognition criteria for Game Consoles.

4 TEST SETUP

- A) Test Setup and Instrumentation: Test setup and instrumentation for all sections of this method shall be in accordance with the requirements of IEC 62301, Ed. 2.0, "Household Electrical Appliances – Measurement of Standby Power," Section 4, "General Conditions for Measurements," unless otherwise noted in this document. In the event of conflicting requirements, the ENERGY STAR test method shall take precedence.
- B) Input Power: Products intended to be powered from ac mains shall be connected to a voltage source appropriate for the intended market, as specified in Table 3.

Table 3: Input Power Requirements

Market	Voltage	Voltage Tolerance	Maximum Total Harmonic Distortion	Frequency	Frequency Tolerance
North America, Taiwan	115 V ac	+/- 1.0 %	2.0 %	60 Hz	+/- 1.0 %
Europe, Australia, New Zealand	230 V ac	+/- 1.0 %	2.0 %	50 Hz	+/- 1.0 %
Japan	100 V ac	+/- 1.0 %	2.0 %	50 Hz/60 Hz	+/- 1.0 %

- C) Ambient Temperature: Ambient temperature shall remain between 18 °C and 28 °C, inclusive, for the duration of the test.
- D) Relative Humidity: Relative humidity shall remain between 10% and 80%, inclusive, for the duration of the test.
- E) Power Meter: Power meters shall possess the following attributes:
- 1) Crest Factor:
 - i) An available current crest factor of 3 or more at its rated range value; and
 - ii) Lower bound on the current range of 10 mA or less.
 - 2) Minimum Frequency Response: 3.0 kHz
 - 3) Minimum Resolution:
 - i) 0.01 W for measurement values less than 10 W;
 - ii) 0.1 W for measurement values from 10 W to 100 W; and
 - iii) 1.0 W for measurement values greater than 100 W.
 - 4) Measurement Accuracy:
 - i) Power measurements with a value greater than or equal to 0.5 W shall be made with an uncertainty of less than or equal to 2% at the 95% confidence level.
 - ii) Power measurements with a value less than 0.5 W shall be made with an uncertainty of less than or equal to 0.01 W at the 95% confidence level.

5 TEST CONDUCT

- A) As Shipped Condition: Game Consoles shall be tested with configuration and settings in their default, "as shipped" condition, unless otherwise specified in this document. During initial system setup, if prompted for user input for configuration options, the default settings shall be chosen when applicable. If prompted, the system firmware shall be updated.
- B) TV/Display Requirements: Game Consoles shall be tested while connected to a TV or display that supports the highest resolution supported by the UUT. Furthermore, the UUT shall be connected to the TV/display using the preferred connection type. The list below ranks connection types from most preferred to least preferred (e.g., if the UUT supports both HDMI and Component Video outputs, HDMI shall be used for testing).
- 1) HDMI
 - 2) DVI

- 3) Other Digital Interface
 - 4) Analog Component
 - 5) Analog Composite
 - 6) Other Analog Interface
- C) Network Connection: Game Console energy consumption shall be measured with network connectivity according to the instructions below. Only one network connection shall be active during testing.
- 1) For UUTs with wireless capability (e.g., IEEE 802.11), a live connection to a wireless router or network access point, which supports the highest and lowest data speeds of the client radio, shall be maintained for the duration of testing.
 - 2) For UUTs without wireless capability but with Ethernet support, a connection to an active network switch (the switch does not need to be connected to a live network), which supports the highest and lowest data speeds supported by the UUT, shall be maintained for the duration of testing.
- D) Auto Power Down (APD) Verification: Game Consoles are expected to perform APDs in certain instances after an hour of user inactivity. Sections 6.5 and 6.6 verify APD and measure the console's power consumption afterwards. If, after an hour, no APD occurs, its absence must be noted on the test report form and a power measurement shall be taken.
- E) Streaming Media: Sections 6.4 and 6.5 require the use of streaming media. Any streaming service widely available to consumers (e.g., Netflix) may be utilized so long as it provides content at the highest resolution available among streaming services. Video titles shall contain motion/action typical of a modern, live-action movie. The streaming media shall be viewed in the highest resolution available from the streaming service. This resolution shall be maintained for the duration of testing.
- F) Game Title: To test game play APD, a game title must be loaded into the UUT. Any game title may be selected for this test.

6 TEST PROCEDURES FOR ALL PRODUCTS

6.1 UUT Preparation

- A) Record the UUT's manufacturer, model name, operating system name and version, processor type and speed, total and available physical memory, etc. in the test report template provided.
- B) Connect an approved meter capable of measuring true power to an ac line voltage source set to the appropriate voltage/frequency combination for the test.
- C) Plug the UUT into the measurement power outlet on the meter. No power strips or uninterruptible power supplies shall be connected between the meter and the UUT. For a valid test, the meter shall remain in place until all power data are recorded.
- D) Connect the UUT to a suitable TV/display using the preferred connection type in accordance with the instructions given in Section 5B).
- E) Turn on the UUT and wait until the operating system has fully loaded.
- F) Configure the UUT to peripherals connections (e.g., infrared, Bluetooth), as shipped. Ensure the following provisions are also met:
 - 1) All accessories shipped with the console that are required for operation, must be connected for the entirety of the test. For example, Motion and Position Sensing Input devices that are not required for operation need not be connected for testing.
 - 2) If the controller has wireless capabilities, configure and utilize the wireless connection to the console during testing. Otherwise, plug the controller into the UUT.

- 3) Only one standard controller shall be used unless otherwise required for the UUT to operate properly.
- 4) For wireless controllers and peripherals requiring integral batteries, ensure the batteries are fully charged prior to testing.
- G) If prompted, run the initial system setup (including firmware update, if prompted) and allow all preliminary tasks and other one-time/periodic processes to complete. If prompted for configuration input, default settings should be used.
- H) Ensure no disk (media or game) is in the UUT.
- I) A network connection shall be made in accordance with the instructions given in Section 5C).
- J) Ensure that the UUT is configured as shipped including, but not limited to, default Wake on LAN (WoL), power management, and software settings. Record the ac voltage and frequency.

6.2 Standby Mode (if applicable)

- A) Place the UUT in its Standby Mode.
- B) Five minutes after completing 6.2.A), set the meter to begin accumulating true power values at an interval greater than or equal to one reading per second. Accumulate power values for five minutes and record the average (arithmetic mean) value.

6.3 Navigation

- A) Navigate to the game console's home menu.

Cease user input to the UUT for five minutes.

- G) Set the meter to begin accumulating true power values at an interval greater than or equal to one reading per second. Accumulate power values for five minutes and record the average (arithmetic mean) value.

Note: Based on stakeholder feedback, Navigation test language has been updated to remove the term "idle" and replacing it with "cease user input".

6.4 Video Stream Play

- A) Enter the UUT's online movie service (e.g. Netflix), and access a test movie with the resolution and content requirements described in Section 5E).

Five minutes after completing 6.4.A), set the meter to begin accumulating true power values at an interval greater than or equal to one reading per second. Accumulate power values for five minutes and record the average (arithmetic mean) value.

- H) If the video rebuffers or loses video quality any time during the testing, repeat 6.4.A) and 6.4.0 until a test is completed without video rebuffering or loss of video quality.

6.5 Video Stream Pause

Enter the UUT's online movie service (e.g. Netflix), and access a test movie with the resolution and content requirements described in Section 5E).

- I) Five minutes after completing 6.5.0, pause the video stream.
- J) Set the meter to begin accumulating true power values at an interval of greater than or equal to 1 reading per second. Accumulate power values for five minutes and record the average (arithmetic mean) value.
- K) Cease user input to the UUT. Wait one hour and verify that the UUT goes into a low power state.
- L) Set the meter to begin accumulating true power values at an interval greater than or equal to one reading per second. Accumulate power values for five minutes and record the average (arithmetic mean) value.

Note: Based on discussions regarding APD resume, verification of the resume point has been removed from the test method, as it is no longer required that a console resume video as soon as it is powered back on.

6.6 Game Play APD

Load a game title with the requirements described in Section 5.F.

- M) Advance through any title screens, menus, or videos and initiate Game Play.
- N) Play the game for five minutes, advancing through the level, completing objectives, and/or increasing the user's score.
- O) If the game is able to be paused, pause the game. If the game cannot be paused, continue to 6.6.P).
- P) Cease user input (for game titles that cannot be paused, APD will be initiated 1 hour after ceasing user inputs).
- Q) Wait one hour and verify that the UUT goes into a low power state.
- R) Set the meter to begin accumulating true power values at an interval greater than or equal to one reading per second. Accumulate power values for five minutes and record the average (arithmetic mean) value.

Note: Game play APD has been expanded so it does not restrict game titles that cannot be paused. If a title cannot be paused, then APD will be tested by ceasing user input.

Additionally, based on discussions regarding APD resume, verification of the game position before and after the APD has been removed as it is no longer required that a console resume its previous game play location when it is powered back on.