

Proposed Performance Requirements for Game Consoles

Draft 1

The following are proposed performance and testing requirements for Game Consoles to be implemented per agreement between EPA ENERGY STAR and Game Console manufacturers.

1 DEFINITIONS

- 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) Game Console Sleep Mode: A low power state that the console is capable of entering automatically after a period of inactivity or by manual selection. The console may wake from sleep mode in one of two ways:
- a) *User-Initiated*: Game Consoles shall wake within 120 seconds of initiation of wake event, as defined above; or
 - b) *Automatic*: This ability to automatically wake is typically independent of user interaction and does not require concurrent user input.

The console is capable of automatically waking from sleep mode to perform "System Maintenance and Download," as defined below and/or perform other system-level functions. When a Game Console wakes from sleep mode without user input, it must automatically re-enter sleep after any maintenance activity or download is complete. Game Consoles shall spend no more than 10 minutes per day automatically checking into a central server and 1 hour per week of automatic System Maintenance and Download on average over the course of 1 year. These times assume a 100 kb/s data rate.

Additional functions available in this state are:

- a) Active Network Link; and
 - b) Active Wireless/IR connection to remotes.
- 2) Auto Power Down (APD): The ability of a Game Console to go into a low power state when left idle for a predetermined amount of time.

- 3) Game Console Active Mode: The state 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) *Home Menu Functions*:
 - (1) *Home Menu Play (aka 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.
 - (2) *Home Menu APD (or Home Menu Idle)*: Auto Power Down (or Home Menu Idle) from the root menu, or home menu.
 - b) *Game Functions*:
 - (1) *Game Play*: A game is actively being played and the console is receiving user input.
 - (2) *Game Play Pause*: An actively played game is paused and the console is receiving no user input.
 - (3) *Game Play Idle*: A game is loaded, from any source, while not actively being played and the console is receiving no user input.
 - (4) *Game Play APD*: A game is loaded, from any source, while not actively being played and the console is receiving no user input, and the Game Console automatically powers down.
 - c) *Removable Media Functions*:
 - (1) *Removable Media Video Play*: The Game Console is playing either a DVD or Blu-ray disc video.
 - (2) *Removable Media Video Play Pause*: The video player is paused during active playing of the video.
 - (3) *Removable Media Video Play Idle*: The console's media player is loaded while no media is actively being played. The video player idle includes title, or root menus, for movies.
 - (4) *Removable Media Video Play APD*: The console's media player is loaded while no media is actively being played. The video player idle includes title, or root menus, for movies. From the idle mode, the Game Console automatically powers down.
 - d) *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.
 - (3) *Video Stream Idle*: The console's media player is loaded while no media is actively being streamed. The video stream idle includes the streaming title, or root menus, for movies.
 - (4) *Video Stream APD*: The console's media player is loaded while no media is actively being streamed. The video stream idle includes the streaming title, or root menus, for movies. From the video stream idle, the Game Console automatically powers down.
 - e) *System Idle*: Applies to all non-game play menus (e.g., root menu) and periods of idle not covered by Game Play Idle or Media Play Idle.

f) *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 computer model number, product description, or other branding references.

3) Product Family: A high-level description referring to a group of computers 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.

2 SCOPE

2.1 Included Products

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

2.2 Excluded Products

- 2.2.1 Products that are covered under other ENERGY STAR product specifications are not eligible under this program. The list of specifications currently in effect can be found at www.energystar.gov/products.
- 2.2.2 The following products are not eligible for inclusion under this program:
 - i. Portable Game Consoles.

3 PERFORMANCE CRITERIA

3.1 Modal and Power Management Requirements

3.1.1 Auto Power Down

- i. A Game Console in any state other than *Game Play*, *Removable Media Video Play*, or *Video Stream Play* must auto-power down to a sleep mode within 1 hour of user inactivity (i.e., the console receives no user input for 1 hour or more). On resume, a Game Console shall return to the previous mode the console was in prior to sleep unless there was an interruption in power to the console during sleep.
- ii. After an automatic wake event, the console must power down immediately after performing required System Maintenance and Downloads.
- iii. A Game Console in *Game Play*, *Removable Media Video Play*, or *Video Stream Play* may not automatically power down.
- iv. The Game Consoles must be shipped with these settings enabled by default.
- v. When operating games published on or after the date of the Game Console efficiency agreement between EPA and Game Console manufacturers, the Game Console must automatically save a user's place in a game (as defined by that game's game play model) to allow auto-power down to a sleep mode and return the user to that place upon resuming from sleep. *Note: This requirement does not apply to operation of games published prior to the program requirements effective date, (i.e., "legacy" games developed for older consoles).*

3.1.2 Display Sleep Mode

- i. Display Sleep Mode shall be set to activate after no more than 15 minutes of user inactivity.

3.2 Power Supply Requirements

- 3.2.1 Internal Power Supplies (IPSs): Internal Power Supplies used in Game Consoles must meet the following requirements when tested using the *EPRI Generalized Internal Power Supply Efficiency Test Protocol, Rev. 6.4.2* (available at www.efficientpowersupplies.org).

Table 1: Requirements for Internal Power Supplies and External Power Supplies with Integral Cooling

Loading Condition (Percentage of Nameplate Output Current)	Minimum Efficiency	Minimum Power Factor
20%	0.82	-
50%	0.85	-
100%	0.82	0.90

3.2.2 EPS without integral cooling fans shall meet the level V performance requirements under the International Efficiency Marking Protocol and include the level V marking. Additional information on the Marking Protocol is available at www.energystar.gov/powersupplies.

- Single-output EPS without integral cooling fans shall meet level V requirements when tested using the *Test Method for Calculating the Energy Efficiency of Single-Voltage External Ac-Dc and Ac-Ac Power Supplies, Aug. 11, 2004*.
- Multi-output EPS without integral cooling fans shall meet the level V requirements when tested using the *EPRI Generalized Internal Power Supply Efficiency Test Protocol, Rev. 6.4.2*.

3.3 Energy Efficiency Requirements

Note: EPA is currently re-evaluating previous proposed ES levels for Game Consoles. EPA is assembling data on the draw of “connected” devices (i.e. PlayStation Move, XBOX Kinect, Nintendo Wiimote) when in sleep, idle, off, and active modes. EPA will consider all data received **by August 26, 2011** when releasing a revised version of these proposed performance and testing requirement in October.

EPA encourages Game Console manufacturers and stakeholders to send any data available on the power draw of “connected” devices.

Table 2: Game Console Requirements

Mode	Requirement
Sleep	TBD
System Idle (no game loaded)	TBD
Media Functions	TBD

3.4 User Information Requirements

3.4.1 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.

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

- i. A list of default power management settings.
- ii. A note stating that default power management settings have been selected for compliance with ENERGY STAR requirements.

4 TESTING

4.1 Test Methods

4.1.1 Test methods identified in Table 3 shall be used to determine qualification:

Table 3: Test Methods for Qualification

Product Type	Test Method
All	ENERGY STAR Test Method for Game Consoles, Rev. [TBD]

Proposed Test Method for Game Consoles

Draft 1

1 OVERVIEW

The following test method shall be used for determining product compliance with requirements in the Performance Requirements and Test Method 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:

Note: Requirements TBD.

3 DEFINITIONS

Unless otherwise specified, all terms used in this document are consistent with the definitions in the Performance Requirements and Test Method for Game Consoles.

4 TEST SETUP

- A) Test Setup and Instrumentation: Test setup and instrumentation for all portions of this procedure 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 4 and Table 5.

Table 4: Input Power Requirements for Products with Nameplate Rated Power Less Than or Equal to 1500 W

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

Table 5: Input Power Requirements for Products with Nameplate Rated Power Greater Than 1500 W

Market	Voltage	Voltage Tolerance	Maximum Total Harmonic Distortion	Frequency	Frequency Tolerance
North America, Taiwan	115 Vac	+/- 4.0 %	5.0 %	60 Hz	+/- 1.0 %
Europe, Australia, New Zealand	230 Vac	+/- 4.0 %	5.0 %	50 Hz	+/- 1.0 %
Japan	100 Vac	+/- 4.0 %	5.0 %	50 Hz/60 Hz	+/- 1.0 %

- C) Ambient Temperature: Ambient temperature shall remain between 18 °C to 28 °C, inclusive, for the duration of the test.
- D) Relative Humidity: Relative humidity shall be from 10% to 80%.
- 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 10mA 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: Measurement uncertainty as introduced by the instrument that measures the input power to the product under test, including any external shunts.

- 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

Note: Requirements TBD.

6 TEST PROCEDURES FOR ALL PRODUCTS

6.1 UUT Preparation

1. Record the manufacturer and model name of the UUT.
2. Record basic information about the computer's configuration – computer type, operating system name and version, processor type and speed, total and available physical memory, etc.
3. Ensure that the UUT is connected to a TV(s) which support one or more of the output types supported by the UUT.
 - a. For each output that supports APD, repeat step 16 of this procedure.
 - b. Connect the first A/V connection available in the UUT that appears in the following preferential order (e.g., if HDMI and Composite Video are both present, use HDMI for testing).
 - I. *HDMI*
 - II. *Component Video*
 - III. *Composite Video*
 - IV. *RF*
 - V. *Other*
4. Peripherals: Configure all UUT to peripherals connections (e.g., Infra Red, Bluetooth) as shipped. Ensure the following provisions are also met:
 - a. All accessories shipped with the console must be connected for the entirety of the test.
 - b. If the controller has wireless capabilities, configure and utilize the wireless connection to the console during testing. Otherwise, plug the controller into the UUT.
 - c. Only one controller shall be used unless otherwise required for the UUT to operate properly.
 - d. For wireless controllers and peripherals requiring integral batteries, ensure the batteries are fully charged prior to testing.
5. Motion and Position Sensing Input:
 - a. When testing with the motion and position sensing input controller, the controller shall be plugged in, configured and operational, even when a particular game or menu system is not capable of utilizing the feature.
 - b. When performing the testing with standard controllers only, the motion and position sensing input controller shall be removed from the UUT and disabled.
6. Network connection: For consoles with wireless capability, power to a wireless LAN radio (e.g. IEEE 802.11) shall remain on during testing and shall maintain a live wireless connection to a wireless router or network access point, which supports the highest and lowest data speeds of the client radio, for the duration of testing. For consoles without wireless capability but with Ethernet, the Ethernet connection shall be enabled during testing.
7. Remove any disk (media or game) from UUT.
8. Streaming media chosen for testing shall be at the maximum resolution supported by the UUT or available for streaming to consumers.

9. Ensure that the UUT is configured as shipped, including but not limited to: active connection(s) to all accessories and motion sensor apparatus shipped with the UUT, enabled Wake-on-LAN (WOL), power management and software settings as shipped by default.
10. 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.
11. Plug the UUT into the measurement power outlet on the meter. No power strips or UPS units shall be connected between the meter and the UUT. For a valid test to take place the meter shall remain in place until all power data is recorded.
12. Record the ac voltage and frequency.

6.2 Active Mode Testing

13. From the Off state, turn on the UUT and wait until the operating system has fully loaded.
14. If necessary, run the initial system setup and allow all preliminary tasks and other one-time/periodic processes to complete.
15. Ensure that the UUT is configured as shipped including all accessories, power management settings and software shipped by default.
16. For each applicable video output, wait for 15 minutes and ensure the output goes blank after the prescribed time.
17. System Idle:
 - a. Place the system in a state without a game or any media loaded.
 - b. 5 minutes after completing 17a, 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 5 additional minutes and record the average (arithmetic mean) value observed during that 5 minute period.
18. Wait one hour and verify that the UUT goes into a low power state.
19. Bring the UUT back into its OS-loaded state.
20. Game Play Pause:
 - a. Start active game play with a game offered with the UUT and pause the game.
 - b. 5 minutes after completing 20a, 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 5 additional minutes and record the average (arithmetic mean) value observed during that 5 minute period.
 - c. Repeat steps 18 and 19.
21. Game Play Idle:
 - a. Load a game and start game play. Ensure no subsequent user input to the UUT.
 - b. 5 minutes after completing 21a, 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 5 additional minutes and record the average (arithmetic mean) value observed during that 5 minute period.
 - c. Repeat steps 18 and 19.
22. Video Stream Play:
 - a. Enter the console's online movie service (e.g. Netflix), and access the test movie, "The Lord of the Rings: The Return of the King" (2003).
 - b. 5 minutes after completing 22a, 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 5 additional minutes and record the average (arithmetic mean) value observed during that 5 minute period.
 - c. If at any time during the testing the video rebuffers or loses video quality, repeat test 22b. Repeat this step until a test is completed without video rebuffering or loss of video quality.
 - d. Repeat steps 18 and 19.
23. Video Stream Pause:
 - a. Enter the console's online movie service (e.g. Netflix), and access the test movie, "The Lord of the Rings: The Return of the King" (2003).
 - b. 5 minutes after completing 23a, pause the video stream.

- c. 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 5 additional minutes and record the average (arithmetic mean) value observed during that 5 minute period.
 - d. Repeat steps 18 and 19.
24. Video Stream Idle:
- a. Open the UUT's media player and load a movie or song. Ensure no subsequent user input to the UUT.
 - b. 5 minutes after completing 24a, 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 5 additional minutes and record the average (arithmetic mean) value observed during that 5 minute period.
 - c. Repeat steps 18 and 19.

6.3 Sleep/APD Mode Testing

25. After completing the Active Mode measurements, place the computer in its Sleep/APD mode. Reset the meter (if necessary) and begin accumulating true power values at an interval of greater than or equal to 1 reading per second. Accumulate power values for 5 additional minutes and record the average (arithmetic mean) value observed during that 5 minute period.

6.4 Continuing Verification

This testing procedure describes the method by which a single unit may be tested for compliance. An ongoing testing process is highly recommended to ensure that products from different production runs meet testing requirements.