

# Proposed Performance Requirements for Game Consoles

## Draft 2

1 The following are proposed performance and testing requirements for Game Consoles.

### 2 1 DEFINITIONS

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**Note:** A number of definitions have been changed to better align with industry standards, including the definition of “sleep mode,” and the use of “navigation menu.”

APD definition has been updated to specify a maximum time before APD.

- 4 A) Game Console: A standalone computer-like device whose primary use is to play video games.  
5 Game Consoles use a hardware architecture based in part on typical computer components (e.g.,  
6 processors, system memory, video architecture, optical and/or hard drives, etc.). The primary  
7 input for Game Consoles are special hand held controllers rather than the mouse and keyboard  
8 used by more conventional computer types. Game Consoles are also equipped with audio visual  
9 outputs for use with televisions as the primary display, rather than (or in addition to) an external or  
10 integrated display. These devices do not typically use a conventional personal computer (PC)  
11 operating system, but often perform a variety of multimedia functions such as: DVD/ Compact  
12 Disc (CD) playback, digital picture viewing, and digital music playback. Handheld gaming devices,  
13 typically battery powered and intended for use with an integral display as the primary display, are  
14 not included in this test plan.
- 15 B) Product Category: A second-order classification or sub-type within a product type that is based on  
16 product features and installed components. Product categories are used in this specification to  
17 determine qualification and test requirements.
- 18 C) Operational Modes:
- 19 1) Off Mode: The mode where the console is plugged into a power source but is not providing  
20 any primary or secondary function and has no saved hardware state. The console has no  
21 active network link and although may be capable of charging devices in this mode. Not all  
22 consoles may have this mode.

23 **Note:** A definition for Off Mode has been added in this Draft 2. Corresponding testing criteria are  
24 introduced in the Test Method.

- 25 2) Sleep Mode: The mode that the console is capable of entering automatically after a period of  
26 inactivity or by manual selection. The console is not engaging in game play or content  
27 delivery in this mode. The console may wake from sleep mode in one of two ways:
- 28 a) User-Initiated: Game Consoles shall wake within 120 seconds of initiation of wake event<sup>1</sup>;  
29 or

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<sup>1</sup> Wake Event: A user, scheduled, or external event or stimulus that causes the console to transition from Sleep Mode or Off Mode to an active state of operation.

30 b) *Automatic*: This ability to automatically wake is typically independent of user interaction  
31 and does not require concurrent user input.

32 The console is capable of automatically waking from sleep mode to perform “System  
33 Maintenance and Download,” as defined below and/or perform other system-level functions.  
34 When a Game Console wakes from sleep mode without user input, it must automatically re-  
35 enter sleep after any maintenance activity or download is complete. Game Consoles shall  
36 spend no more than 10 minutes per day automatically checking into a central server and 1  
37 hour per week of automatic System Maintenance and Download (not withstanding paid  
38 content) on average over the course of 1 year. These times assume a 100 kb/s data rate.  
39 Additional functions available in this state are:

40 a) Active Network Link; and

41 b) Active Wireless/IR connection to remotes.

42 3) Active Mode: The mode in which the Game Console is interactively manipulated by the user  
43 in response to prior or concurrent user input. Additional functions available in Active Mode  
44 are:

45 a) *Navigation Menu*:

46 (1) *Navigation Menu Idle (aka Home Menu, System Menu, Cross Media Bar, or*  
47 *Dashboard)*: The Home Menu includes the screen(s) initially displayed for user  
48 navigation to selected game features for the selected game.

49 b) *Game Functions*:

50 (1) *Game Play*: A game is actively being played and the console is receiving user input.

51 (2) *Game Play Pause*: A game otherwise being played is paused after receiving user  
52 input.

53 (3) *Game Play Idle*: A game is idled while awaiting user input. The game may have just  
54 loaded or game play has ended, but the game’s software is in control of the unit.

55 c) *Streaming Media Functions*:

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

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

60 (3) *Video Stream Idle*: The console’s media player is loaded while no media is actively  
61 being streamed. The video stream idle includes the streaming title, or root menus,  
62 for movies.

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

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

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

70 D) Components:

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

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

87 E) Marketing or Shipment Terminology:

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

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

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

96 F) Additional Terms:

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

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

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

106 4) Auto Power Down (APD): The ability of a Game Console to go into a low power state when  
107 left idle for a predetermined amount of time.

108 5) High Definition Multimedia Interface (HDMI): A type of audio/video connection.

109 6) Digital Visual Interface (DVI): A type of audio/video connection.

## 110 2 SCOPE

### 111 2.1 Included Products

112 2.1.1 Products that meet the definition of Game Console are eligible for coverage, with the  
113 exception of products listed in Section 2.2.

### 114 2.2 Excluded Products

115 2.2.1 Products that are covered under ENERGY STAR product specifications are not eligible under  
116 this program. The list of specifications currently in effect can be found at  
117 [www.energystar.gov/products](http://www.energystar.gov/products).

118 2.2.2 The following products are not eligible for inclusion under this program:

119 i. Portable Game Consoles.

## 120 2.3 Continuing Verification

121 2.3.1 This document describes the method by which a single unit may be tested for compliance. An  
122 ongoing testing process is highly recommended to ensure that products from different  
123 production runs meet testing requirements.

# 124 3 PERFORMANCE CRITERIA

## 125 3.1 Modal and Power Management Requirements

### 126 3.1.1 Auto Power Down

- 127 i. An idle Game Console, *Game Play* or *Media Play* are not idle by default, must auto-power  
128 down to a sleep mode within 1 hour of user inactivity (i.e., the console receives no user input  
129 for 1 hour or more). On resume, a Game Console shall return to the previous mode the  
130 console was in prior to sleep unless there was an interruption in power to the console during  
131 sleep.
- 132 ii. After an automatic wake event, the console must power down immediately after performing  
133 required System Maintenance and Downloads.
- 134 iii. A Game Console in *Game Play*, or *Media Play* need not automatically power down.
- 135 iv. The Game Consoles must be shipped with these settings enabled by default.
- 136 v. When operating games published on or after the date of the Game Console efficiency  
137 agreement between EPA and Game Console manufacturers, the Game Console must either  
138 automatically save a user's place in a game (as defined by that game's game play model) to  
139 allow auto-power down to a sleep mode and return the user to that place upon resuming from  
140 sleep, or function in such a way as to make a console that idles, powers down, then resumes  
141 behave no differently to the user's perspective than a console that remains idle for the same  
142 time period. *Note: This requirement, as well as auto power down in general, does not apply to*  
143 *operation of games published prior to the program requirements effective date, (i.e., "legacy"*  
144 *games developed for older consoles).*

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**Note:** EPA has added language to allow an exception to the requirements to auto power down for legacy games.

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## 147 3.2 Power Supply Requirements

148 3.2.1 Internal Power Supplies (IPSs): Internal Power Supplies used in Game Consoles must meet  
149 the following requirements when tested using the *EPRI Generalized Internal Power Supply*  
150 *Efficiency Test Protocol, Rev. 6.5* (available at [www.efficientpowersupplies.org](http://www.efficientpowersupplies.org)).

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**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

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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](http://www.energystar.gov/powersupplies).

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- 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*.

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- 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. 6.5*.

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**Note:** The cited revision of the *Generalized Internal Power Supply Efficiency Test Protocol* is updated to the most recent version available.

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### 3.3 Energy Efficiency Requirements

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**Table 2: Game Console Requirements**

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

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### 3.4 User Information Requirements

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

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i. A description of power management settings that have been enabled by default;

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ii. A description of the timing settings for various power management features; and

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iii. Instructions for properly waking the product from Auto Power Down.

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

- 171 i. A list of default power management settings; and/or  
172 ii. A note stating that default power management settings have been selected for compliance  
173 with ENERGY STAR requirements.

174 **4 TESTING**

175 **4.1 Test Methods**

176 4.1.1 Test methods identified in Table 3 shall be used to determine qualification:

177 **Table 3: Test Methods for Qualification**

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

# Game Console Draft Test Method

## Rev. Feb-2012

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**Note:** All Scope, Definitions, and Performance Criteria information have been removed from the Test Method and placed in the Performance Criteria document as relevant.

## 1 OVERVIEW

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

## 2 APPLICABILITY

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 an Off Mode in its default configuration.
  - Testing in Section 6.3 shall only be conducted on Game Consoles that support a Sleep Mode in its default configuration.

## 3 DEFINITIONS

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

## 4 TEST SETUP

- A) Test Setup and Instrumentation: Test setup and instrumentation for all portions 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 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.

**Note:** The table detailing input power requirements for products rated at over 1500 W has been removed as it was not relevant to Game Consoles.

**Table 4: 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.

**Note:** Sections 5 and 6 have been reorganized from the previous draft to provide a clearer, more coherent test method. Much of the content in the current Test Conduct section was previously included in the Test Procedure section.

## 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).

**Note:** The following list has been revised to include additional output formats. It is consistent with the ENERGY STAR Displays v6.0 Test Method Draft 3.

Additionally, TVs and displays are no longer required to support bi-directional power management (i.e., automated TV shutdown). This requirement has been removed in Draft 2 of the Proposed Performance Requirements for Game Consoles.

- 1) HDMI
- 2) DVI
- 3) Other Digital Interface
- 4) Analog Component
- 5) Analog Composite
- 6) Other Analog Interface

**Note:** Section C) below has been moved to the Test Conduct Section from the Test Procedure Section. It clarifies the requirements of Game Console network connectivity during testing as requested by stakeholders.

- 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.

**Note:** The method for verifying Auto Power Down (APD) has been updated to include a power measurement following an APD occurrence. Recent discussions concerning possible implementations of APD (especially Game Play Pause APD) have introduced the possibility of memory remaining active and powered during the low power APD mode, which could result in higher power consumption than the unit's traditional Off and/or Sleep Mode. Stakeholder also requested this update.

- D) Auto Power Down (APD) Verification: Game Consoles are expected to perform APDs in certain instances after an hour of user inactivity. Sections 6.6 through 6.7 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 6.5 and 6.6 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 APD from a paused game, a game title must be loaded. Any game may be used so long as it is capable of being paused.

## 6 TEST PROCEDURES FOR ALL PRODUCTS

### 6.1 UUT Preparation

1. 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.
2. 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.
3. 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.
4. Connect the UUT to a suitable TV/display using the preferred connection type in accordance with the instructions given in Section 5.B).
5. Turn on the UUT and wait until the operating system has fully loaded.
6. Configure the UUT to peripherals connections (e.g., infrared, 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 standard controller shall be used unless otherwise required for the UUT to operate properly.
  - d. In addition to the standard controller, if the UUT comes packaged with a motion and position sensing input controller, it shall be plugged in, configured, and operational, even when a particular game or menu system is not capable of utilizing the feature.
  - e. For wireless controllers and peripherals requiring integral batteries, ensure the batteries are fully charged prior to testing.
7. 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.
8. Ensure no disk (media or game) is in the UUT.
9. A network connection shall be made in accordance with the instructions given in Section 5.C).
10. 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.

**Note:** A new Off Mode test has been added to coincide with the Off Mode definition included in Draft 2 of the Proposed Performance Requirements for Game Consoles. Off Mode is similar to Sleep Mode except that it does not permit a network connection to be active (it cannot download updates or turn on remotely). Typically, a console will implement either Off Mode or Sleep Mode, rarely both.

### 6.2 Off Mode (if applicable)

1. Place the UUT in its Off Mode.
2. Five minutes after completing 6.2.1, 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 Sleep Mode (if applicable)

1. Place the UUT in its Sleep Mode.
2. Five minutes after completing 6.3.1, 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.

## 6.4 Idle Mode

1. Place the UUT in its Idle Mode.
2. Five minutes after completing 6.4.1, 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.

## 6.5 Video Stream Play

1. Enter the UUT's online movie service (e.g. Netflix), and access a test movie with the resolution and content requirements described in Section 5.E).
2. Five minutes after completing 6.5.1, 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.
3. If the video rebuffers or loses video quality any time during the testing, repeat 6.5.1 and 6.5.2 until a test is completed without video rebuffering or loss of video quality.

## 6.6 Video Stream Pause

1. Enter the UUT's online movie service (e.g. Netflix), and access a test movie with the resolution and content requirements described in Section 5.E).
2. Five minutes after completing 6.6.1, pause the video stream.
3. 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.
4. Cease user input to the UUT. Wait one hour and verify that the UUT goes into a low power state.
5. 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. Power the UUT back on and note whether the UUT returns to the point at which the video stream was paused prior to the APD.

**Note:** A Game Play Pause test has been added due to updated performance criteria in Draft 2 of the Proposed Performance Requirements for Game Consoles. This test verifies the proper implementation of a Game Play Pause APD. It does NOT include Game Play power measurements.

## 6.7 Game Play Pause

1. Load a game title with the requirements described in Section 5.F).
2. Advance through any title screens, menus, or videos and initiate Game Play.
3. Play the game for five minutes, advancing through the level, completing objectives, and/or increasing the user's score.
4. Pause the game and cease user input. Record the game state (score, level, player orientation, health, etc.).
5. Wait one hour and verify that the UUT goes into a low power state.
6. 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.
7. Power the UUT back on and note whether the console returns to its location prior to the APD. Make note of the game state (score, level, player orientation, health, etc.).