The U.S. Environmental Protection Agency (EPA) Recognition Program for Game Consoles

Performance Requirements
Version 1.0

The following are proposed performance and testing requirements for Game Consoles. Manufacturers that demonstrate that their product meets these criteria will be recognized by EPA.

1   DEFINITIONS

A) <u>Game Console</u>: 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) <u>Operational Modes</u>:

   1) <u>Standby Mode:</u> The mode where the Game Console is plugged into a power source but is not providing any primary or secondary function and has no saved hardware state. The Game Console has no active network link although may be capable of charging devices in this mode.

   2) <u>Active Mode</u>: 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 Game 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 Game 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.

C) Components:

1) External Power Supply (EPS): Also referred to as External Power Adapter. An external power supply circuit that is used to convert household electric current into dc current or lower-voltage ac current to operate a consumer product.

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.

D) 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.

7) Product Family: A group of product models that are (1) made by the same manufacturer, (2) subject to the same EPA performance requirements, and (3) of a common basic design. Product models within a family differ from each other according to one or more characteristics or features that either (1) have no impact on product performance with regard to EPA performance requirements, or (2) are specified herein as acceptable variations within a Product Family. For Game Consoles, acceptable variations within a Product Family include:

1) Color, and

2) Housing.

2 SCOPE

2.1 Included Products

2.1.1 Manufacturers of 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 Manufacturers are not eligible for EPA recognition specific to the following product types:

i. Portable Game Consoles.

ii. Game Consoles incapable of rendering HD video output (video output with a display resolution of 720 lines or greater) via HDMI.

2.3 Ensuring Products Across Production Runs Meet Performance Requirements

2.3.1 This document describes the method by which a single unit may be tested for compliance with these Performance Requirements. Manufacturers recognized by EPA for meeting these Game Console Performance Requirements are responsible for ensuring that products from different production runs meet these Program Requirements.

3 PERFORMANCE REQUIREMENTS

3.1 Significant Digits and Rounding

3.1.1 All calculations shall be carried out with directly measured (unrounded) values.

3.1.2 Unless otherwise specified, compliance with performance requirements limits shall be evaluated using directly measured or calculated values without any benefit from rounding.

3.1.3 Directly measured or calculated values that are submitted for reporting on the EPA website shall be rounded to the nearest significant digit as expressed in the corresponding performance requirement limit.

3.2 Modal and Power Management Requirements

3.2.1 Auto Power Down:

i. During initial setup for the Game Console, a setup screen that identifies Auto Power Down shall 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. Game Consoles shall present the option of disabling APD for Active Game mode only on initial setup so as to encourage users to leave APD enabled for other modes.

iii. In limited circumstances, users may be prompted to suspend APD for certain types of games, media content or other applications such that they run without user input and do not trigger APD (e.g. simulation games which run without user input for periods longer than 1 hour). Upon starting such games, media content or other applications, the temporary APD suspension may remain enabled for replay of such game, media content or other applications upon restart of the console. Auto Power Down for other titles shall not be disabled.

iv. If a user selects to disable Auto Power Down, a second selection process shall be prompted to confirm this selection.

v. A Game Console without user input, by default, must auto-power down to a Standby Mode within the period of user inactivity (i.e., the console receives no user input) specified in the Table 1 below.

Table 1: Auto Power Down Requirements by Mode

Operational Mode	Period of User Inactivity
Active Navigation Menu	1 hour
Active Game Play	1 hour
Active Game Play Pause	1 hour
Active Video Stream Play	4 hours
Active Video Stream Pause	1 hour

vi. Auto Power Down may be suspended temporarily to allow for the uninterrupted performance of System Maintenance and Downloads but shall not occur during the display of an error message in the event of a system error. After an automatic wake event, the Game Console shall auto-power down immediately after performing required System Maintenance and Downloads.

vii. The Game Consoles must be shipped with the APD settings enabled by default.

3.3 Energy Efficiency Requirements

3.3.1 Average measured power shall be less than or equal to the Maximum Power Requirements as specified in Table 2.

Table 2: Game Console Maximum Power Requirements

Operational Mode	Requirement
Standby	0.5 W
Active Navigation Menu	40.0 W
Active Streaming Media	50.0 W

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 a list of default power management settings.

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	EPA Test Method for Game Consoles, Rev. Mar-2013

5 EFFECTIVE DATE

1.1.1 <u>Effective Date</u>: The Version 1.0 EPA Recognition Program for Game Consoles shall take effect on **March 5, 2013**. To be recognized, a product model shall meet the requirements in effect on the model's date of manufacture. The date of manufacture is specific to each unit and is the date on which a unit is considered to be completely assembled.

The U.S. Environmental Protection Agency (EPA) Recognition Program for Game Consoles

Test Method
Rev. Mar-2013

1   OVERVIEW

The following test method shall be used for determining product compliance with requirements in the EPA Recognition Program for Game Consoles.

2   APPLICABILITY

The EPA Recognition Program for Game Consoles 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 EPA Recognition Program for Game Consoles.

4   TEST SETUP

A) Test Setup and Instrumentation: Test setup and instrumentation for all sections of this test method shall be in accordance with the requirements of International Electrotechnical Commission (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 EPA Recognition Program for Game Consoles 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.

Table 1: 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) <u>Ambient Temperature</u>: Ambient temperature shall remain between 18 °C and 28 °C, inclusive, for the duration of the test.

D) <u>Relative Humidity</u>: Relative humidity shall remain between 10% and 80%, inclusive, for the duration of the test.

E) <u>Power Meter</u>: Power meters shall possess the following attributes:

   1) <u>Crest Factor</u>:

      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) <u>Minimum Frequency Response</u>: 3.0 kHz

   3) <u>Minimum Resolution</u>:

      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) <u>Measurement Accuracy</u>:

      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) <u>As Shipped Condition</u>: 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) <u>TV/Display Requirements</u>: 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) <u>Network Connection</u>: 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., Institute of Electrical and Electronic Engineers, Inc. (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) Streaming Media: Sections 6.4 and 6.5 require the use of streaming media. Any streaming service widely available to consumers 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.

E) 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, except for legacy game titles.

6 TEST PROCEDURES FOR ALL PRODUCTS

6.1   UUT Preparation

A) 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.

B) 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.

C) Connect the UUT to a suitable TV/display using the preferred connection type in accordance with the instructions given in Section 5.B).

D) Turn on the UUT and wait until the operating system has fully loaded.

E) 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.

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.

F) 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.

G) Ensure no disk (media or game) is in the UUT.

H) A network connection shall be made in accordance with the instructions given in Section 5.C).

I) 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 a minimum of five minutes and record the average (arithmetic mean) value.

6.3 Navigation

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

B) Cease user input to the UUT for five minutes.

C) 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 a minimum of five minutes and record the average (arithmetic mean) value.

6.4 Video Stream Play

A) Enter the UUT's online movie service, and access a test movie with the resolution and content requirements described in Section 5.D).

B) 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 a minimum of five minutes and record the average (arithmetic mean) value.

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

6.5 Video Stream Pause

A) Enter the UUT's online movie service, and access a test movie with the resolution and content requirements described in Section 5.D).

B) Five minutes after completing 6.5.A), 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 a minimum of five minutes and record the average (arithmetic mean) value as the "Video Stream Pause" power.

D) 65 minutes after pausing the video stream in 6.5.B), 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 a minimum of five minutes and record the average (arithmetic mean) value as the "Video Stream Pause APD" power.

6.6 Game Play APD

A) Load a game title with the requirements described in Section 5.E).

B) Advance through any title screens, menus, or videos and initiate Game Play.

C) Play the game for five minutes, advancing through the level, completing objectives, and/or increasing the user's score.

D) If the game can be paused, pause the game and cease user input. If the game cannot be paused, cease user input.

E) 65 minutes after ceasing user input, 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 a minimum of five minutes and record the average (arithmetic mean) value.