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ANNEXES 1 to 5

**ANNEXES**

**to the**

**COMMISSION REGULATION (EU) .../...**

**laying down ecodesign requirements for electronic displays pursuant to  
Directive 2009/125/EC of the European Parliament and of the Council,  
amending Commission Regulation (EC) No 1275/2008**

**and repealing Commission Regulation (EC) 642/2009**

## ANNEX I

### Definitions applicable for the Annexes

The following definitions shall apply:

- (1) ‘*on mode*’ or ‘*active mode*’ means a condition in which the electronic display is connected to a power source, has been activated and is providing one or more of its display functions;
- (2) ‘*off mode*’ means a condition in which the electronic display is connected to the mains power source and is not providing any function; the following shall also be considered as off mode:
  - (1) conditions providing only an indication of off mode condition;
  - (2) conditions providing only functionalities intended to ensure electromagnetic compatibility pursuant to Directive 2014/30/EU<sup>1</sup>;
- (3) ‘*standby mode*’ means a condition where the electronic display is connected to a power source, depends on energy input from that source to work as intended and provides only the following functions, which may persist for an indefinite time:
  - reactivation function, or reactivation function and only an indication of enabled reactivation function; and/or
  - information or status display;
- (4) ‘*organic light emitting diode (OLED)*’ means a technology in which light is produced from a solid state device embodying a pn junction of organic material. A junction emits optical radiation when excited by electric current;
- (5) ‘*microLED display*’ means an electronic display where individual pixels are lit using microscopic GaN LED technology;
- (6) ‘*normal configuration*’ means a display setting which is recommended to the end-user by the manufacturer from the initial set up menu or the factory setting that the electronic display has for the intended product use. It must deliver the optimal quality for the end user in the intended environment and for the intended use. The normal configuration is the condition in which the values for off, standby, networked standby and on mode are measured;
- (7) ‘*External Power Supply (EPS)*’ means a device as defined in Commission Regulation (EU) 2019/XXX<sup>2</sup> [*OP, please insert the number of the Ecodesign Regulation laying down ecodesign requirements for external power supplies, repealing Regulation (EC) No 278/2009*];
- (8) ‘*USB*’ means Universal Serial Bus;

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<sup>1</sup> Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility. OJ L 96, 29.3.2014, p. 79.

<sup>2</sup> Commission Regulation (EU) [*OP please enter the number of the Ecodesign Regulation for external power supplies*] of [*OP please enter the date of adoption*] laying down ecodesign requirements for external power supplies pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EC) No 278/2009 (*OP please enter the references to the OJ*).

- (9) *'Automatic Brightness Control (ABC)'* means the automatic mechanism that, when enabled, controls the brightness of an electronic display as a function of the ambient light level illuminating the front of the display;
- (10) *'default'*, referring to a specific feature or setting, means the value of a specific feature as set at the factory and available when the customer uses the product for the first time and after performing a “reset to factory settings” action, if allowed by the product;
- (11) *'luminance'* means the photometric measure of the luminous intensity per unit area of light traveling in a given direction, expressed in units of candelas per square meter ( $\text{cd}/\text{m}^2$ ). The term brightness is often used to “subjectively” qualify the luminance of a display;
- (12) *'close viewing'* means a viewing distance comparable to that obtained when viewing an electronic display held in the hand or when sitting at the desk;
- (13) *'forced menu'* means a specific menu, appearing upon initial start-up of the display or upon a reset to factory settings, offering a set of alternative display settings, pre-defined by the manufacturer;
- (14) *'network'* means a communication infrastructure with a topology of links and an architecture that includes the physical components, organisational principles and communication procedures and formats (protocols);
- (15) *'network interface'* (or *'network port'*) means a wired or wireless physical interface, providing network connection, through which functions of the electronic display can be remotely activated and data received or sent. Interfaces to input data such as video and audio signals, but not originated from a network source and not using a network address, are not considered to be a network interface;
- (16) *'network availability'* means the capability of an electronic display to activate functions after a remotely initiated trigger has been detected by a network interface;
- (17) *'networked display'* means an electronic display that can connect to a network using one of its network interfaces, if enabled;
- (18) *'networked standby mode'* means a condition in which the electronic display is able to resume a function by way of a remotely initiated trigger from a network interface;
- (19) *'reactivation function'* means a function that via a remote switch, a remote control unit, an internal sensor, a timer or, for networked displays in networked standby mode, the network, provides a switch from standby mode or networked standby mode to a mode, other than off-mode, providing additional functions;
- (20) *'room presence sensor'* or *'gesture detection sensor'* or *'occupancy sensor'* means a sensor monitoring and reacting to the movements in the space around the product whose signal can trigger the switching to on mode. Lack of movement detection for a predetermined time can be used to switch into standby mode or networked standby mode;
- (21) *'pixel (picture element)'* means the area of the smallest element of a picture that can be distinguished from its neighbouring elements;
- (22) *'touch functionality'* means the possibility of inputting commands using, as input device, a touch-sensitive device, that generally is in the form of a transparent film layered on top of an electronic display panel;

- (23) *'brightest on mode configuration'* means the configuration of the electronic display, set by the manufacturer, which provides an acceptable picture with the highest measured peak white luminance.
- (24) *'shop configuration'* means the configuration for use specifically in the context of demonstrating the electronic display, for example in high illumination (retail) conditions and not involving an auto power-off if no user action or presence is detected. This configuration may be not accessible through a displayed menu;
- (25) *'dismantling'* means possibly irreversible taking apart of an assembled product into its constituent materials and/or components;
- (26) *'disassembling'* means reversible taking apart of an assembled product into its constituent materials and/or components without functional damage that would preclude reassembling, reuse or refurbishment of the product;
- (27) *'step'* referring to *dismantling or disassembling*, means an operation that finishes with a change of tool or with the removal of a component or part;
- (28) *'Printed Circuit Board' ('PCB')* means an assembly that mechanically supports and electrically connects electronic or electrical components using conductive tracks, pads and other features etched from one or more sheet layers of conductive metal laminated onto or between sheet layers of a non-conductive substrate;
- (29) *'PMMA'* means PolyMethylMethAcrylate;
- (30) *'flame retardant'* or *'fire retardant'* means a substance that markedly retards the propagation of a flame;
- (31) *'halogenated flame retardant'* means a flame retardant that contains any halogen;
- (32) *'homogeneous material'* means one material of uniform composition throughout or a material, consisting of a combination of materials, that cannot be disjointed or separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes;
- (33) *'product database'* means a collection of data concerning products which is arranged in a systematic manner and consists of a consumer-oriented public part, where information concerning individual product parameters is accessible by electronic means, an online portal for accessibility and a compliance part, with clearly specified accessibility and security requirements, as laid down in Regulation (EU) 2017/1369;
- (34) *'equivalent model'* means a model which has the same technical characteristics relevant for the technical information to be provided, but which is placed on the market or put into service by the same manufacturer, importer or authorised representative as another model with a different model identifier;
- (35) *'model identifier'* means the code, usually alphanumeric, which distinguishes a specific product model from other models with the same trade mark of the same manufacturer's, importer's or authorised representative's name;
- (36) *'spare part'* means a separate part that can replace a part with the same function in a product;
- (37) *'professional repairer'* means an operator or undertaking which provides services of repair and professional maintenance of electronic displays.

*ANNEX II*  
**Ecodesign requirements**

**A. ENERGY EFFICIENCY REQUIREMENTS**

**1. ENERGY EFFICIENCY INDEX LIMITS FOR ON-MODE**

The energy efficiency index (EEI) of an electronic display shall be calculated using the following equation:

$$EEI = \frac{(P_{measured} + 1)}{(3 \times [90 \times \tanh(0,02 + 0,004 \times (A - 11)) + 4] + 3) + corr}$$

Where:

*A* represents the screen area in dm<sup>2</sup>;

*P<sub>measured</sub>* is the measured power in on mode in Watts in the normal configuration, in standard dynamic range (SDR);

*corr* is a correction factor of 10 for OLED electronic displays that do not apply the ABC allowance in point B (1). This shall apply until 28 February 2023. *corr* shall be zero in all other cases.

The EEI of an electronic display shall not exceed the maximum EEI (*EEI<sub>max</sub>*) according to the limits in Table 1 from the dates indicated.

**Table 1: EEI limits for on-mode**

	<i>EEI<sub>max</sub></i> for electronic displays with resolution up to 2 138 400 pixels (HD)	<i>EEI<sub>max</sub></i> for electronic displays with resolution above 2 138 400 pixels (HD) and up to 8 294 400 pixels (UHD-4k)	<i>EEI<sub>max</sub></i> for electronic displays with resolution above 8 294 400 pixels (UHD-4k) and for MicroLED displays
1 March 2021	0,90	1,10	n.a
1 March 2023	0,75	0,90	0,90

**B. ALLOWANCES AND ADJUSTMENTS FOR THE PURPOSE OF THE EEI CALCULATION AND FUNCTIONAL REQUIREMENTS**

From 1 March 2021, electronic displays shall meet the requirements listed below.

**1. Electronic displays with automatic brightness control (ABC)**

Electronic displays qualify for a 10 % reduction in *P<sub>measured</sub>*, if they meet all of the following requirements:

- (a) ABC is enabled in the normal configuration of the electronic display and persists in any other standard dynamic range configuration available to the end-user;

- (b) the value of  $P_{measured}$ , in the normal configuration, is measured, with ABC disabled or if ABC cannot be disabled, in an ambient light condition of 100 lux measured at the ABC sensor;
- (c) if applicable, the value of  $P_{measured}$  with ABC disabled shall be equal to or greater than the on mode power measured with ABC enabled in an ambient light condition of 100 lux measured at the ABC sensor;
- (d) with ABC enabled, the measured value of the on mode power must decrease by 20 % or more when the ambient light condition, measured at the ABC sensor, is reduced from 100 lux to 12 lux and
- (e) the ABC control of the display screen luminance meets all of the following characteristics when the ambient light condition measured at the ABC sensor changes:
  - the measured screen luminance at 60 lux is between 65 % and 95 % of the screen luminance measured at 100 lux;
  - the measured screen luminance at 35 lux is between 50 % and 80 % of the screen luminance measured at 100 lux and
  - the measured screen luminance at 12 lux is between 35 % and 70 % of the screen luminance measured at 100 lux.

## **2. Forced menu and set up menus**

Electronic displays may be placed on the market with a forced menu on initial activation proposing alternative settings. Where a forced menu is provided, the normal configuration shall be set as default choice, otherwise the normal configuration shall be the out-of-the-box setting.

If the user selects a configuration other than the normal configuration and this configuration results in a higher power demand than the normal configuration, a warning message about the likely increase in energy use shall appear and confirmation of the action shall be explicitly requested.

If the user selects a setting other than those that are part of the normal configuration and this setting results in a higher energy consumption than the normal configuration, a warning message about the likely increase in energy consumption shall appear and confirmation of the action explicitly requested.

A change by the user in a single parameter in any setting shall not trigger any change in any other energy-relevant parameter, unless unavoidable. In such a case a warning message shall appear about the change of other parameters and the confirmation of the change shall be explicitly requested.

## **3. Peak white luminance ratio**

In the normal configuration, the peak white luminance of the electronic display in a 100 lux ambient light viewing environment shall not be less than 220 cd/m<sup>2</sup> or, if the electronic display is primarily intended for close viewing by a single user, not less than 150 cd/m<sup>2</sup>.

If the electronic display's peak white luminance in the normal configuration is set to lower values, it shall not be less than 65 % of the peak white luminance of the display, in a 100 lux ambient light viewing environment in the brightest on mode configuration.

## **C. OFF MODE, STANDBY AND NETWORKED STANDBY MODE REQUIREMENTS**

From 1 March 2021, electronic displays shall meet the requirements listed below.

## 1. Power demand limits other than on-mode

Electronic displays shall not exceed power demand limits in the different modes and conditions listed in Table 2, indicated in Watts:

**Table 2: power demand limits other than on-mode**

	Off mode	Standby mode	Networked standby mode
Maximum limits	0,30	0,50	2,00
Allowances for additional functions when present and enabled			
Status display	0,0	0,20	0,20
Deactivation using room presence detection	0,0	0,50	0,50
Touch functionality, if usable for activation	0,0	1,00	1,00
HiNA function	0,0	0,0	4,00
<i>Total maximum power demand with all additional functions when present and enabled</i>	<i>0,30</i>	<i>2,20</i>	<i>7,70</i>

## 2. Availability of off, standby and networked standby modes

Electronic displays shall provide off mode or standby mode or a networked standby mode or other modes which do not exceed the applicable power demand requirements for standby-mode.

The configuration menu, instruction manuals and other documentation, if any, shall refer to off mode, standby mode or networked standby mode using those terms.

Automatic switch to off mode and/or standby mode and/or another mode which does not exceed the applicable power demand requirements for standby mode shall be set as default, including for networked displays where the network interface is enabled when in on mode.

Networked standby mode shall be disabled in ‘normal configuration’ of a networked television. The end user shall be prompted to confirm the activation of networked standby, if it is needed for a chosen remotely activated function, and must be able to disable it.

Networked electronic displays shall comply with the requirements for standby mode when networked standby mode is disabled.

## 3. Automatic standby in televisions

- (a) Televisions shall provide a power management function, enabled as delivered by the manufacturer that, within 4 hours following the last user interaction, shall switch the television from on mode into standby mode or networked standby mode or another mode which does not exceed the applicable power demand requirements respectively for standby or networked standby mode. Before such automatic switch, televisions shall show, for at least 20 seconds, an alert message warning the user of the impending switch, with possibility of delaying or temporarily cancelling it.
- (b) If the television provides a function allowing the user to shorten, extend or disable the 4-hour period for automatic mode transitions detailed in (a), a warning message shall

appear about a potential increase in energy use and a confirmation of the new setting must be requested when an extension beyond the 4-hour period or disabling is selected.

- (c) If the television is equipped with a room presence sensor, the automatic transition from on mode into any mode as detailed in (a) applies if no presence is detected for no more than 1 hour.
- (d) Televisions with various selectable input sources shall prioritise the power management protocols of the signal source selected and displayed over those default power management mechanisms described in the paragraphs (a) to (c) above.

#### **4. Automatic standby in displays other than televisions**

Electronic displays other than televisions, with various selectable input sources shall switch, as configured in the normal configuration, into standby mode, networked standby mode or another mode which does not exceed the applicable power demand requirements respectively for standby or networked standby mode when no input is detected by any input source for over 10 seconds and, for digital interactive whiteboards and for broadcast displays, for over 60 minutes.

Before triggering such a switch, a warning message shall be displayed and the switch completed within 10 minutes.

### **D. MATERIAL EFFICIENCY REQUIREMENTS**

From 1 March 2021, electronic displays shall meet the requirements indicated below.

#### **1. Design for dismantling, recycling and recovery**

Manufacturers, importers or their authorised representatives shall ensure that joining, fastening or sealing techniques do not prevent the removal, using commonly available tools, of the components indicated in point 1 of Annex VII of Directive 2012/19/EU on WEEE or in Article 11 of Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators, when present.

Manufacturers, importers or their authorised representatives shall, without prejudice to point 1 Article 15 of Directive 2012/19/EU, make available the dismantling information needed to access, any of the products components referred to in point 1 of Annex VII of Directive 2012/19/EU on a free-access website.

This dismantling information shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.

The end of life information shall be available until at least 15 years after the placing on the market of the last unit of a product model.

#### **2. Marking of plastic components**

Plastic components heavier than 50 g:

- (a) Shall be marked by specifying the type of polymer with the appropriate standard symbols or abbreviated terms set between the punctuation marks “>” and “<” as specified in available standards. The marking shall be legible.

Plastic components are exempt from marking requirements in the following circumstances:



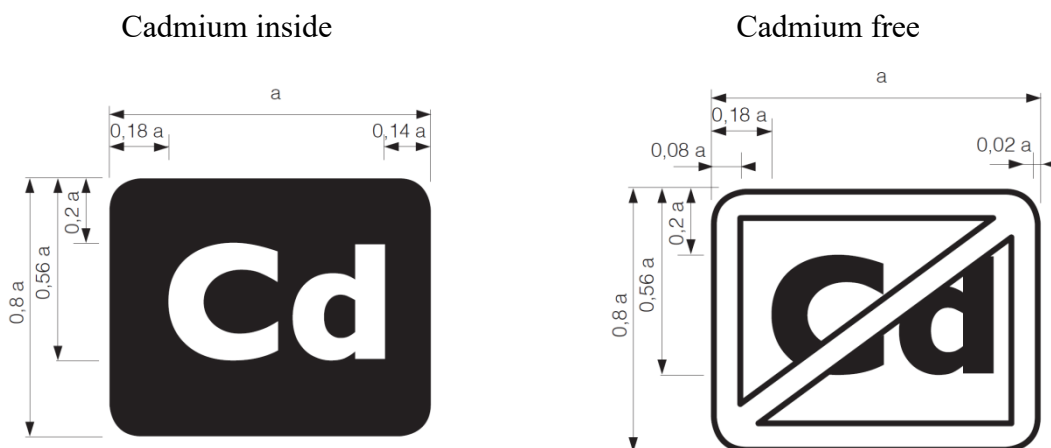
- (i) the marking is not possible because of the shape or size;
- (ii) the marking would impact on the performance or functionality of the plastic component; and
- (iii) marking is technically not possible because of the molding method.

For the following plastic components no marking is required:

- (i) packaging, tape, labels and stretch wraps;
  - (ii) wiring, cables and connectors, rubber parts and anywhere not enough appropriate surface area is available for the marking to be of a legible size;
  - (iii) PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;
  - (iv) transparent parts where the marking would obstruct the function of the part in question.
- (b) Components containing flame retardants shall additionally be marked with the abbreviated term of the polymer followed by hyphen, then the symbol “FR” followed by the code number of the flame retardant in parentheses. The marking on the enclosure and stand components shall be clearly visible and readable.

### 3. Cadmium logo

Electronic displays with a screen panel in which concentration values of Cadmium (Cd) by weight in homogeneous materials exceed 0,01 % as defined in Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment, shall be labelled with the “Cadmium inside” logo. The logo shall be clearly visible durable, legible and indelible. The logo shall be in the form of the following graphic:



The dimension of “a” shall be greater than 9 mm and the typeface to be used is ‘Gill Sans’.

An additional “Cadmium inside” logo shall be firmly attached internally on the display panel or molded in a position clearly visible to workers once the external back cover bearing the external logo is removed.

A “Cadmium free” logo shall be used if concentration values of Cadmium (Cd) by weight in any homogeneous material part of the display do not exceed 0,01 % as defined in Directive 2011/65/EU.

#### **4. Halogenated flame retardants**

The use of halogenated flame retardants is not allowed in the enclosure and stand of electronic displays.

#### **5. Design for repair and reuse**

##### **(a) Availability of spare parts:**

- (1) manufacturers, importers or authorised representatives of electronic displays shall make available to professional repairers at least the following spare parts: internal power supply, connectors to connect external equipment (cable, antenna, USB, DVD and Blue-Ray), capacitors, batteries and accumulators, DVD/Blue-Ray module if applicable and HD/SSD module if applicable for a minimum period of seven years after placing the last unit of the model on the market;
- (2) manufacturers, importers or authorised representatives of electronic displays shall make available to professional repairers and end-users at least the following spare parts: external power supply and remote control for a minimum period of seven years after placing the last unit of the model on the market;
- (3) manufacturers shall ensure that these spare parts can be replaced with the use of commonly available tools and without permanent damage to the appliance;
- (4) the list of spare parts concerned by point 1 and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, at the latest two years after the placing on the market of the first unit of a model and until the end of the period of availability of these spare parts; and
- (5) the list of spare parts concerned by point 2 and the procedure for ordering them and the repair instructions shall be publicly available on the manufacturer's, the importer's or authorised representative's free access website, at the moment of the placing on the market of the first unit of a model and until the end of the period of availability of these spare parts.

##### **(b) Access to repair and maintenance information**

After a period of two years after the placing on the market of the first unit of a model or of an equivalent model, and until the end of the period mentioned under (a), the manufacturer, importer or authorised representative shall provide access to the appliance repair and maintenance information to professional repairers in the following conditions:

- (1) the manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information; to accept such a request, manufacturers, importers or authorised representative may require the professional repairer to demonstrate that:
  - (i) the professional repairer has the technical competence to repair electronic displays and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to

an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;

- (ii) the professional repairer is covered by insurance covering liabilities resulting from its activity, regardless of whether this is required by the Member State;
- (2) the manufacturers, importers or authorised representatives shall accept or refuse the registration within 5 working days from the date of request by the professional repairer;
- (3) manufacturers, importers or authorised representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for receiving regular updates. A fee is reasonable if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information;

Once registered, a professional repairer shall have access, within one working day after requesting it, to the requested repair and maintenance information. The available repair and maintenance information shall include:

- the unequivocal appliance identification;
- a disassembly map or exploded view;
- list of necessary repair and test equipment;
- component and diagnosis information (such as minimum and maximum theoretical values for measurements);
- wiring and connection diagrams;
- diagnostic fault and error codes (including manufacturer-specific codes, where applicable); and
- data records of reported failure incidents stored on the electronic display (where applicable).

(c) Maximum delivery time of spare parts

- (1) during the period mentioned under point 5(a)(1) and point 5(a)(2), the manufacturer, importer or authorised representatives shall ensure the delivery of the spare parts for electronic displays within 15 working days after having received the order;
- (2) in the case of spare parts available only to professional repairers, this availability may be limited to professional repairers registered in accordance with point (b).

**E. INFORMATION AVAILABILITY REQUIREMENTS**

From 1 March 2021, the product manufacturer, importer or authorised representative shall make available the information set out below when placing on the market the first unit of a model or of an equivalent model.

The information shall be provided free of charge to third parties dealing with professional repair and reuse of electronic displays (including third party maintenance actors, brokers and spare parts providers).

## 1. Availability of software and firmware updates

- (a) The latest available version of the firmware shall be made available for a minimum period of eight years after the placing on the market of the last unit of a certain product model, free of charge or at a fair, transparent and non-discriminatory cost. The latest available security update to the firmware shall be made available until at least eight years after the placing on the market of the last product of a certain product model, free of charge.
- (b) Information on the minimum guaranteed availability of software and firmware updates, availability of spare parts and product support shall be indicated in the product information sheet as from Annex V of Commission Delegated Regulation (EU) 2019/XXX<sup>3</sup> *[OP - please insert here the number of the accompanying Energy Labelling Regulation on electronic displays]*.

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<sup>3</sup> Commission Delegated Regulation (EU) *[OP please enter the number of the Energy Labelling Regulation on electronic displays]* of *[OP please enter the date of adoption]* supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council as regards energy labelling of electronic displays and repealing Commission Delegated Regulation (EU) No 1062/2010 (*[OP please enter the references to the OJ]*).

### ANNEX III

#### Measurement methods and calculations

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published for this purpose in the *Official Journal of the European Union*, or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art, and in line with the following provisions.

Measurements and calculations shall meet the technical definitions, conditions, equations and parameters set out in this Annex. Electronic displays which can operate in both 2D and 3D modes shall be tested when they operate in 2D mode.

An electronic display which is split into two or more physically separate units, but placed on the market in a single package, shall, for checking the conformity with the requirements of this Annex, be treated as a single electronic display. Where multiple electronic displays that can be placed on the market separately are combined in a single system, the individual electronic displays shall be treated as single displays.

#### 1. General conditions

Measurements shall be made at an ambient temperature of 23 °C +/- 5 °C.

#### 2. Measurements of on mode power demand

Measurements of the power demand referred to in Annex II, point A (1) shall fulfil all of the following conditions:

- (a) measurements of power demand ( $P_{measured}$ ) shall be made in the normal configuration;
- (b) measurements shall be made using a dynamic broadcast-content video signal representing typical broadcast content for electronic displays in standard dynamic range (SDR). The measurement shall be the average power consumed over 10 consecutive minutes;
- (c) measurements shall be made after the electronic display has been in the off mode or, if an off-mode is not available, in standby mode, for a minimum of 1 hour immediately followed by a minimum of 1 hour in the on mode and shall be completed before a maximum of 3 hours in on-mode. The relevant video signal shall be displayed during the entire on mode duration. For electronic displays that are known to stabilise within 1 hour, these durations may be reduced if the resulting measurement can be shown to be within 2 % of the results that would otherwise be achieved using the durations described here;
- (d) where ABC is available, measurements shall be made with it switched off. If ABC cannot be switched off, then the measurements shall be performed in an ambient light condition of 100 lux measured at the ABC sensor.

#### Measurements of peak white luminance

Measurements of the peak white luminance referred to in point B (3) of Annex II shall be made:

- (a) with a luminance meter, detecting that portion of the screen exhibiting a full (100 %) white image, which is part of a 'full screen test' pattern that does not exceed the average picture level (APL) point where any power limiting or other irregularity occurs in the electronic display luminance drive system affecting electronic display luminance;

- (b) without disturbing the luminance meter's detection point on the electronic display whilst switching between any of the conditions referred to in point B(3) of Annex II.

## Verification procedure for market surveillance purposes

The verification tolerances defined in this Annex relate only to the verification of the measured parameters by Member State authorities and shall not be used by the manufacturer, importer or authorised representative as an allowed tolerance to establish the values in the technical documentation or in interpreting these values with a view to achieving compliance or to communicate better performance by any means.

Where a model has been designed to be able to detect it is being tested (e.g. by recognizing the test conditions or test cycle), and to react specifically by automatically altering its performance during the test with the objective of reaching a more favourable level for any of the parameters specified in this Regulation or included in the technical documentation or included in any of the documentation provided, the model and all equivalent models shall be considered not compliant.

When verifying the compliance of a product model with the requirements laid down in this Regulation pursuant to Article 3(2) of Directive 2009/125/EC, for the requirements referred to in this Annex, the authorities of the Member States shall apply the procedure indicated below for the requirements referred to in Annex II.

### 1. General procedure

The Member States authorities shall verify one single unit of the model.

The model shall be considered to comply with the applicable requirements if:

- (a) the values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC (declared values), and, where applicable, the values used to calculate these values, are not more favourable for the manufacturer, importer or authorised representative than the results of the corresponding measurements carried out pursuant to paragraph (g) thereof;
- (b) the declared values meet any requirements laid down in this Regulation, and any product information published by the manufacturer, importer or authorised representative does not contain values that are more favourable for the manufacturer, importer or authorised representative than the declared values;
- (c) when the Member State authorities test the unit of the model, the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) comply with the respective verification tolerances as given in Table 5; and
- (d) when the Member State authorities check the unit of the model, it complies with the functional requirements and the requirements on repair and end-of-life aspects.

#### 1.1. Verification procedure for requirements established in point B(1) of Annex II

The model shall be considered to comply with the applicable requirements if:

- (a) the ABC of the product is enabled by default and persists in all SDR modes, except in the shop configuration;
- (b) the measured on mode power of the product decreases by 20 % or more when the ambient light condition measured at the ABC sensor is reduced from 100 lux to 12 lux;
- (c) the ABC control of display luminance meets the requirements of point B(1)e of Annex II.

**1.2. Verification procedure for requirements established in point B(2) of Annex II**

The model shall be considered to comply with the applicable requirements if:

- (a) the normal configuration is provided as the default choice on initial activation of the electronic display; and
- (b) a second selection process is prompted to confirm the choice, if the user selects a mode other than normal configuration.

**1.3. Verification procedure for requirements established in point B(3) of Annex II**

The model shall be considered to comply with the applicable requirements if the determined value of the peak white luminance or, if applicable, the peak white luminance ratio, meets the value required in point B(3).

**1.4. Verification procedure for requirements established in point C(1) of Annex II**

The model shall be considered to comply with the applicable requirements if, when connected to the power source:

- (a) the off mode and/or standby mode, and/or another mode which does not exceed the applicable power demand requirements for off mode and/or standby mode, is set as default;
- (b) the unit provides networked standby mode with HiNA, the unit does not exceed the applicable power demand requirements for HiNA when networked standby is enabled; and
- (c) the unit provides networked standby mode without HiNA, the unit does not exceed the applicable power demand requirements without HiNA when networked standby is enabled.

**1.5. Verification procedure for requirements established in point C(2) of Annex II**

The model shall be considered to comply with the applicable requirements if:

- (a) the unit provides off mode and/or standby mode, and/or another mode which does not exceed the applicable power demand requirements for off mode and/or standby mode, when the electronic display is connected to the power source; and
- (b) the activation of the network availability requires the end-user's intervention; and
- (c) the network availability can be disabled by the end-user; and
- (d) it complies with the requirements for standby mode when networked standby mode is not enabled.

**1.6. Verification procedure for requirements established in point C(3) of Annex II**

The model shall be considered to comply with the applicable requirements if:

- (a) within 4 hours in on mode following the last user interaction or within 1 hour if a room presence sensor is enabled and no movement is detected, the television automatically switches from on mode to standby mode or off mode or networked standby mode, if enabled, or another mode which does not exceed the applicable power demand requirements for ~~or~~ standby mode. Member State authorities shall use the applicable procedure to measure the power demand after the automatic power down functionality switches the television into the applicable power mode; and
- (b) the function is set as default; and



- (c) in on mode, the television shows an alert message before automatically switching from on mode to the applicable mode; and
- (d) if the television provides a function allowing the user to modify the 4-hour period for automatic mode transitions detailed in (a), a warning message must be prompted about a potential increase in energy use and a confirmation of the new setting must be requested when an extension beyond the 4-hour period or disabling is selected; and
- (e) if the television is equipped with a room presence sensor, the automatic transition from on mode into any mode as detailed in (a) applies if no presence is detected for no more than 1 hour; and
- (f) televisions with various selectable input sources shall prioritise the power management protocols of the signal source selected and displayed over those default power management mechanisms described in (a) above.

#### **1.7. Verification procedure for requirements established in point C(4) of Annex II**

The model shall be tested for each end user selectable signal input interface type which has specified that it can carry power management control signals or data. Where there are two or more identical signal interfaces not labelled for a specific host product type (e.g. HDMI-1, HDMI-2, etc.) it is sufficient to test one of these signal interfaces selected at random. Where there are labelled or menu designated signal interfaces (e.g. computer, set top box or analogous) the appropriate host signal source device should be connected to the designated signal interface for the test. The model shall be considered to comply with the applicable requirement if no signal by any input source is detected and the model switches into standby mode, off mode or networked standby mode.

#### **1.8. Verification procedure for requirements established in point D and E of Annex II**

The model shall be considered to comply with the applicable requirements if, when the Member State authorities check the unit of the model, it complies with the requirements on resource efficiency in Annex II D.

### **2. Procedure if requirements are not achieved**

If the results referred to in point 1(c) and 1(d) related to requirements not involving measured values are not achieved, the model and all equivalent models shall be considered not to comply.

If the results referred to in point 1(c) and 1(d) related to requirements involving measured values are not achieved, the Member State authorities shall select three additional units of the same model or equivalent models for testing. The model shall be considered to comply with the applicable requirements if, for these three units, the arithmetical mean of the determined values complies with the respective verification tolerances given in Table 5. Otherwise the model and all equivalent models shall be considered not to comply.

The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission without delay after the decision is taken on the non-compliance of the model.

The Member State authorities shall use the measurement and calculation methods set out in Annex III and only use the procedure described in points 1 and 2 for the requirements referred to in this Annex.

### 3. Verification tolerances

The Member State authorities shall only apply the verification tolerances that are set out in Table 5. No other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

The verification tolerances defined in this Annex relate only to the verification of the measured parameters by the Member State authorities and shall not be used by the manufacturer as an allowed tolerance on the values in the technical documentation to achieve compliance with the requirements. Declared values shall not be more favourable for the manufacturer than the values reported in the technical documentation.

<b>Table 5: Verification tolerances</b>	
<i>Parameter</i>	<i>Verification tolerances</i>
On mode power demand, ( $P_{measured}$ , Watts) excluding allowances and adjustments in point B of Annex II, for the purposes of EEI calculation set out in Annex II.A.	The determined value* shall not exceed the declared value by more than 7 %
Off mode, standby mode and networked standby mode power demand (Watts), as applicable	The determined value* shall not exceed the declared value by more than 0,10 Watt if the declared value is 1,00 W or less, or by more than 10 % if the declared value is more than 1,00 W
Peak white luminance ratio	Where applicable, the determined value shall not be lower than 60 % of the peak white luminance of the brightest on mode configuration provided by the electronic display
Peak white luminance ( $cd/m^2$ )	The determined value* shall not be lower than the declared value by more than 8 %
Visible screen diagonal in centimetres (and inches, if declared)	The determined value* shall not be lower than the declared value by more than 1 cm (or 0,4 inches).
Screen area in $dm^2$	The determined value* shall not be lower than the declared value by more than 0,1 $dm^2$
Timed functions as set out in points C(3) and C(4) of Annex II	The switch shall be completed within 5 seconds of the set out values
Weight of plastic components as qualified in point D(2) of Annex II	The determined value* shall not be different from the declared value by more than 5 grams

\* In the case of three additional units tested as prescribed in Annex IV point 2(a), the determined value means the arithmetic mean of the values determined for these three additional units.

*ANNEX V*  
**Benchmarks**

The best available technology on the market, at the time of entry into force of this Regulation, for the environmental aspects that were considered significant and are quantifiable is indicated below.

The following indicative benchmarks are identified for the purpose of part 3, point 2 of Annex I to Directive 2009/125/EC. They refer to the best available technology at the time of drafting this Regulation for electronic displays on the market.

Diagonal of screen area		HD	UHD
(cm)	(inches)	Watt	Watt
55.9	22	15	
81.3	32	25	
108.0	43	33	47
123.2	49	43	57
152.4	60	62	67
165.1	65	56	71
Other functioning modes:			
Off mode (physical switch):			0,0 W
Off mode (no physical switch):			0,1 W
Standby			0,2 W
Networked standby (non-HiNA):			0,9 W