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ANNEXES 1 to 6

## **ANNEXES**

**to the**

### **COMMISSION REGULATION**

**implementing Directive 2009/125/EC of the European Parliament and of the Council  
with regard to ecodesign requirements for electronic displays**

**repealing Regulation (EC) No 642/2009 with regard to ecodesign requirements for  
televisions**

## ANNEX I

### Definitions applicable for the Annexes

In addition to the definitions set out in Directive 2009/125/EC and in Article 2 of this Regulation, the following definitions shall apply:

- (1) *'Automatic Brightness Control' ('ABC')* means the automatic mechanism that, when enabled, controls the brightness of a display as a function of the ambient light level illuminating the front of the display;
- (2) *'Brightest on-mode condition'* (often termed *'shop mode'*) means the mode of the electronic display, pre-set by the manufacturer, which provides an acceptable picture with the highest measured luminance. This includes a pre-set mode incorporated 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 is detected;
- (3) *'By default'* means a specific feature or setting that is activated or set at the factory and available when the customer uses the product for the first time or after performing a "reset to factory settings" action, if allowed by the product. A change of a setting parameter by the user shall not automatically change any other parameter set as default without notifying the user;
- (4) *'Mercury Free'* means a product in which concentration values of mercury (Hg) by weight in homogeneous materials do not exceed 0,1% as defined in Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment;
- (5) *'Cadmium Free'* means a product in which concentration values of Cadmium (Cd) by weight in homogeneous materials do not exceed 0,01% as defined in Directive 2011/65/EU of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment;
- (6) *'Circumvention device'* or *'defeat device'* means any control device, software, component or part that alters the energy consumption on a product during any test procedure, resulting in measurements that are not representative of the products' true characteristics that occur during normal use under comparable conditions;
- (7) *'Component'* means a constituent part of a device that cannot be physically divided into smaller parts without losing its particular function;
- (8) *'Disassembling'* means reversible taking apart of an assembled product into constituent materials and/or components without functional damage that would preclude reassembling, reuse or refurbishment of the product;
- (9) *'Dismantling'* means possibly irreversible taking apart of an assembled product into constituent materials and/or components;
- (10) *'Electronic display audio system'* means the electronics of the audio processing and audio power - amplifier systems that are contained in the same unit casing as the display;
- (11) *'Flame retardant'* means a substance that markedly retards the propagation of a flame;
- (12) *'Halogenated flame retardant'* means a flame retardant that contains any halogen;

- (13) *'Grade 1 monitor'* means a monitor for high-level technical quality evaluation of images at key points in a production or broadcast workflow, such as image capture, post- production, transmission and storage;
- (14) *'Normal configuration'* (also known as *'Home configuration'*, *'Standard mode'*, or *'Home mode'*) means a display screen setting which is recommended to the end-user by the manufacturer from the initial set up menu or the factory setting that the display product has for the intended product use. The normal configuration is the condition in which the declared values for off mode, standby mode, networked standby mode and on mode are measured;
- (15) *'Homogeneous material'* means one material of uniform composition throughout or a material, consisting of a combination of materials, that cannot be separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes;
- (16) *'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.
- (17) *'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 ( $\text{cd/m}^2$ ). The term brightness is often used to subjectively qualify the luminance of a display;
- (18) *'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);
- (19) *'Networked standby'* 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;
- (20) *'Network availability'* means the capability of an electronic display to activate functions after a remotely initiated trigger has been detected by a network interface;
- (21) *'Network interface'* (or *'network port'*) means a wired or wireless physical interface through which functions of the electronic display can be remotely activated and data received. Interfaces to input video and audio signals, but not associated to a network address, are not considered to be a network interface;
- (22) *'Networked display'* means an electronic display that can connect to a network using one of its network interfaces, if activated;
- (23) *'On mode'* means a condition in which the product is connected to a power source, has been activated and is providing one or more of its display functions;
- (24) *'Off mode'* means a condition in which the equipment is connected to the mains power source and is not providing any function;
- (25) *'PMMA'* means PolyMethylMethAcrylate;
- (26) *'PCB'* means 'Printed Circuit Board' and is an assembly that uses a printed circuit board (or a printed wiring board) for component mounting and interconnection;
- (27) *'Product family'* means a set of models of electronic displays by the same supplier, sharing the same physical characteristics in respect to information related to

disassembling, dismantling, materials used, position of components and joining techniques used;

- (28) ‘*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 supplier as another model with a different model identifier;
- (29) ‘*Reactivation function*’ means a function facilitating the activation of other modes, including active mode, by remote switch, including remote control, internal sensor, timer, or, for networked displays, the network, to a condition providing additional functions, including the main function;
- (30) ‘*Fast start*’ or ‘*quick start*’ means an enhanced reactivation function capable of completing the transition into "on mode" in a shorter time than that of the normal reactivation function;
- (31) ‘*Room presence 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;
- (32) ‘*Screen area*’ means the viewable screen area of the electronic display calculated by multiplying the maximum viewable image width by the maximum viewable image height along the surface of the panel (both flat or curved);
- (33) ‘*Standby mode*’ means a condition where the electronic display is connected to the mains or DC 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;
- (34) ‘*Television*’ means a product designed primarily for the display and reception of audiovisual signals and which consists of an electronic display and one or more tuner(s)/receiver(s);
- (35) ‘*Tuner*’ or ‘*Television tuner*’ means an electronic circuit in digital TV that detects TV broadcast signal, such as terrestrial digital or satellite but not unicast, and facilitates the selection of a TV channel from a group of network channels;
- (36) ‘*USB*’ means Universal Serial Bus;

ANNEX II  
Ecodesign requirements

**A: ENERGY EFFICIENCY REQUIREMENTS**

**1. ON-MODE POWER DEMAND LIMITS**

The Energy Efficiency Index (EEI) of an electronic display shall be calculated using the following equation:

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

where  $A$  represents the viewing surface area in  $dm^2$ ,  $P_{measured}$  is the measured power in on-mode in Watts in the normal configuration and  $corr_{lum}$  is a correction factor set to zero.

The declared EEI of an electronic display shall not exceed the maximum EEI ( $EEI_{max}$ ) according to the limits in **Table 1**:

**Table 1**

	$EEI_{max}$ for displays with resolution up to HD (1980x1080 pixels)	$EEI_{max}$ for displays with resolution above HD
Tier 1: from [1 April 2020]	0.90	1.10
Tier 2: from [1 April 2022]	0.75	0.90
Tier 3: from [1 April 2024]	0.60	0.75

Displays with a resolution above UHD-4k or with a number of pixels greater than 8 294 400 are exempted from the maximum  $EEI$  limit specified from the date of application of **Tier 1**, but shall comply with the  $EEI$  limits specified from the date of application of **Tier 2** and the date of application from **Tier 3**.

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

From [the date of application of **Tier 1**], electronic displays shall meet the following requirements:

**1. Audio System**

An electronic display may use an on-mode test condition for the audio system that disables or minimises the power demand of the audio system during the on-mode power measurement (to obtain  $P_{measured}$ ) for the purposes of calculating the EEI. This test condition (*audio-set*) must be achievable through the display product remote control or through an externally accessible control or through a network interface. The technical documentation shall clearly identify the operations required to activate the *audio-set* condition..

**2. Electronic displays requiring an external AC to DC power supply (EPS)**

For electronic displays supplied with a standardised DC power connection (such as those standardised for USB) and that are placed on the market without an external AC to DC power supply in the packaging,  $P_{measured}$  for the purposes of the EEI calculation shall be the DC input power.

### **3. Display products with ABC enabled by default**

Electronic displays shall qualify for a 15% reduction in  $P_{measured}$ , in the calculation of the EEI if they meet all of the following requirements:

- (a) ABC is enabled by default in the normal configuration of the display product and persists in any other configuration unless switched off by the user;
- (b) The value of  $P_{measured}$ , in the normal configuration, is measured, with ABC off or if ABC cannot be switched off, in an ambient light condition of 100lux measured at the ABC sensor;
- (c) The value of  $P_{measured}$  with ABC switched off shall be equal to or greater than the on-mode power measured with ABC switched on in an ambient light condition of 100lux measured at the ABC sensor;
- (d) With ABC switched on, 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 12lux;
- (e) The ABC control of display screen luminance with changes in the ambient light condition measured at the ABC sensor must meet all of the following characteristics,
  - 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.
- (f) Digital signage displays with a peak white brightness capability of 1500 cd/m<sup>2</sup> or more must have an ABC function enabled by default by the supplier.

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

Electronic displays may be placed on the market with a forced menu on initial activation proposing alternative modes. Where a forced menu is provided, the normal configuration shall be set as default choice. If the user selects a mode other than the normal configuration, a warning message about the likely increase in energy use shall appear and confirmation of the action explicitly requested.

A change in a single parameter in any setting shall not trigger any change in other energy-relevant parameters, unless advisable or unavoidable. In such a case the end user shall be explicitly notified, via an alert window, of the change of other parameters and the confirmation of the change explicitly requested.

### **5. Peak luminance ratio**

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

If the display peak white luminance is factory pre-set to less than these luminance values, it shall not be less than 65% of the highest peak white luminance of the display, in a 100 lux ambient light viewing environment in a factory pre-set viewing mode.

**C: OFF MODE AND STANDBY REQUIREMENTS**

From [the date of application of tier1], electronic displays shall meet the following requirements listed below.

**1. Power demand limits**

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

**Table 2**

	Off mode	Standby mode	Networked standby mode	Networked standby mode with HiNA function enabled
Maximum limits	0,30	0,50	2,00	6,00
Allowances for functions when activated				
Status display	0	0,20	0,20	0,00
Deactivation using room presence detection	0	0,50	0,50	0,00
<i>Total maximum power demand</i>	<i>0,30</i>	<i>1,20</i>	<i>2,70</i>	<i>6,00</i>

No allowance shall be provided for "fast start" function or for the "indication of enabled reactivation function".

Signage displays may exceed the total maximum power demand limits listed in Table 2 by 1.00 Watt when touch functionality is enabled.

**2. Availability of off, standby and network standby mode**

When an electronic display is placed on the market it shall provide off mode and/or standby mode. It may also provide other conditions which do not exceed the applicable power demand requirements for standby-mode. The configuration menu and instructions, if any, shall refer to off mode, standby mode, networked standby mode using those terms.

Automatic switch to off mode and/or standby mode and/or another condition 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 shall be disabled as delivered by the manufacturer. The end user shall be prompted to confirm the activation of networked standby if it is needed for a chosen unattended function.

**3. Automatic power down in televisions**

Televisions shall provide a power management function, activated as delivered by the manufacturer that, within 4 hours following the last user interaction, shall switch the display into standby mode or off mode or networked standby mode or another condition which does not exceed the applicable power demand requirements respectively for off mode and/or

standby mode or to network standby. If the display is equipped with a room presence sensor, the automatic transition following the last user interaction applies if no presence is detected for no more than 1 hour. The menu of an electronic display may provide a function allowing the user to shorten, extend or disable the mode transition described above.

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 paragraph above.

#### **4. Automatic power down in displays other than televisions**

Electronic displays other than televisions with various selectable input sources shall switch into standby mode or off mode or network standby mode or another condition which does not exceed the applicable power demand requirements respectively for off mode and/or standby mode or to network standby when no video input signal is detected by any input source.

#### **D: MATERIAL EFFICIENCY REQUIREMENTS**

From [date of application of Tier 2], electronic displays shall meet the requirements indicated below.

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

Manufacturers shall ensure that joining, fastening or sealing techniques do not prevent the safe and readily achievable removal of the components indicated in Article 8(2) of Directive 2012/19/EU, when present.

The sequence of dismantling operations, tools or technologies needed to access the targeted components shall be documented as foreseen in point E including, for each necessary operation, the type of joining, fastening or sealing techniques to be unlocked and the tools required. The sequence of operations suggested shall assure the safety of workers, if to be performed manually.

Exemptions apply to products listed in article 2 point 2 of Directive 2006/66/EC. Exceptions shall be documented as foreseen in point E.

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

Plastic components heavier than 50g:

1. 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:

- (a) the marking is not possible because of the shape or size;
- (b) the marking would impact on the performance or functionality of the plastic component;
- (c) marking is technically not possible because of the molding method.

For the following plastic components no marking is required:

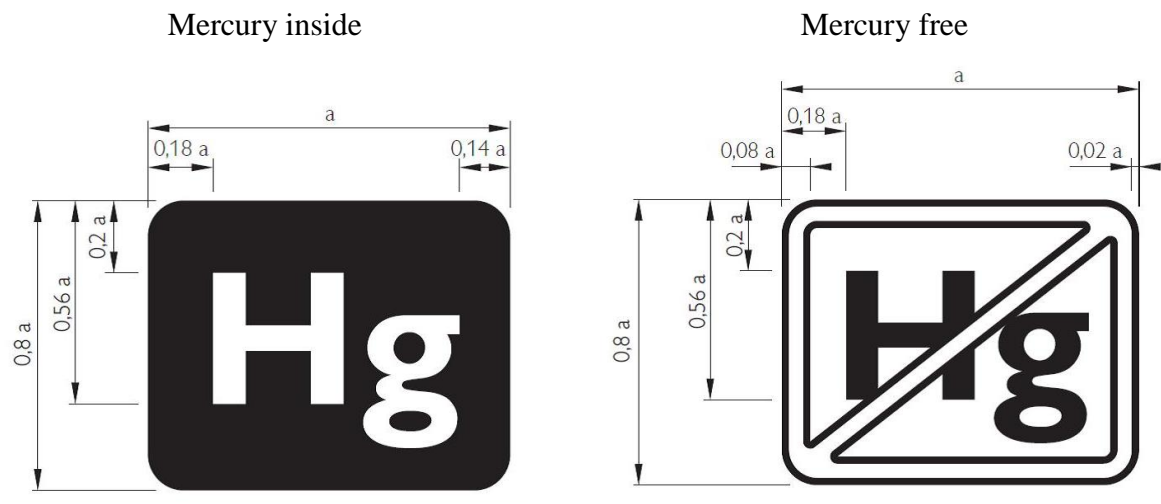
- (a) packaging, tape, labels and stretch wraps;
- (b) wiring, cables and connectors, rubber parts;
- (c) PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;



- (d) transparent parts where the marking would obstruct the function of the part in question;
  - (e) not enough appropriate surface area is available for the marking to be of a legible size.
2. Components containing flame retardants shall be marked according to available standards 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.

### 3. Mercury logo

Electronic displays that are not mercury free shall be labelled with the "Mercury inside" logo. The logo shall be visible without the removal of a cover, durable, legible and indelible. The logo shall be in the form of the following graphic:



The "Mercury inside" logo shall be firmly attached also internally on the display panel in a position clearly visible by workers once the external cover bearing the external logo is removed.

A "Mercury free" logo may be used if no mercury is used in the backlighting system or in other component.

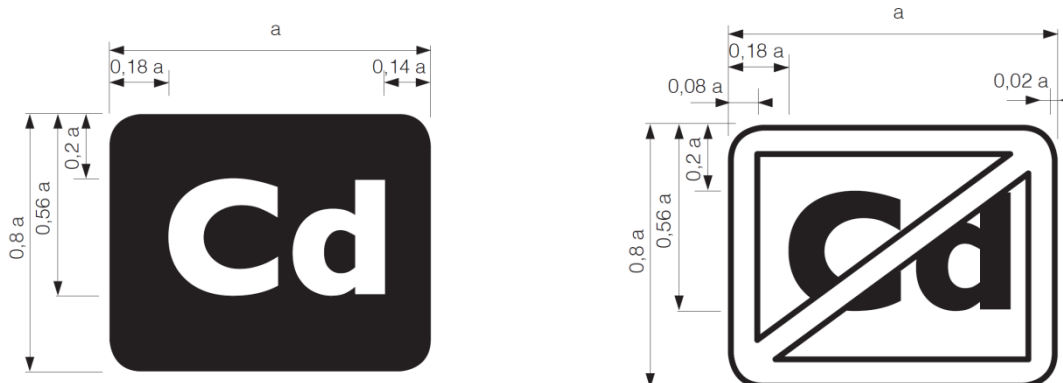
The dimension of "a" shall be greater than 9 mm and the typeface to be used is 'Gill Sans'.

### 4. Cadmium logo

Electronic displays that are not cadmium free shall be labelled with the "Cadmium inside" logo. The logo shall be clearly visible without the removal of a cover, durable, legible and indelible. The logo shall be in the form of the following graphic:

Cadmium inside

Cadmium free



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

The "Cadmium inside" logo shall be firmly attached also internally on the screen panel in a position clearly visible by workers once the external back cover bearing the external logo is removed.

A "Cadmium free" logo may be used if no cadmium is used.

## 5. Halogenated flame retardants

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

### E: INFORMATION REQUIREMENTS

From [date, Tier 1], instruction manuals or installation manuals, and websites of manufacturers, their authorised representatives and importers or their associations shall include the information set out below.

#### 1. Repair and re-use documentation and information

Suppliers shall provide to third parties upon request information relevant for repair purposes including the information relevant for disassembly and replacement of defective components and location where repair information and spare parts can be found.

The same information can be provided for any model of the same family.

#### 2. End of life documentation and information

Suppliers shall provide to third parties upon request information relevant for dismantling, recycling and recovery at end-of-life of the electronic displays including at least the following:

- (a) a diagram of the product showing the location of the plastic components containing flame retardants and the location of components containing substances listed in point (b) hereafter;

for the toxic or ecotoxic substances or their compounds listed in Table 3, the indication of their respective quantities (as X,X mg):

**Table 3: Toxic or ecotoxic substances or compounds**

<i>Substance</i>	<i>quantity (X,X mg)</i>
Arsenic	
Cadmium	

Lead	
Mercury	
Compounds of above substances	

- (b) for each type of joining, fastening or sealing technique to be unlocked, the instructions on the sequence of operations needed to remove these components and tools required;
- (c) for substances listed in point (b), the advised recycling techniques, if any, to be applied;
- (d) the reason why certain, if any, plastic parts are not marked as per the exemption set out in point D (2);
- (e) if plastic components larger than 50 grams containing flame retardants are used, documentation in the format of Table 4.

**Table 4: Flame retardant in plastic components larger than 50 grams index calculation table**

<b>Brand name and Product family:</b>			
<b>Component reference</b> (with flame retardant)	<b>Polymer *</b>	<b>Flame retardant**</b>	<b>Mass (g)</b>
Reference (1)	...	...	...
Reference (2)	...	...	...
...	...	...	...
Reference (j)	...	...	...
<b>Component reference</b> (without flame retardant)	<b>Polymer *</b>		<b>Mass (g)</b>
Reference (1)	...		
Reference (2)	...		
...	...		
Reference (j)	...		
A) Total mass of plastic components*** incorporated in the display containing flame retardants			
B) Total mass of plastic components*** incorporated in the display not containing flame retardants			
C) Total mass of the electronic display (g)			

\* standard abbreviated term for the polymer(s) in the plastic component, according to EN ISO 1043 series

\*\* standard code number of the flame retardant(s) in the plastic component, according to EN ISO 1043 series

All masses shall be expressed in grams (g).

for the critical raw materials listed in Table 35, the indication of their respective quantities (as X,X mg):

**Table 5: Critical raw materials**

<b>Substance</b>	<b>quantity (X,X mg)</b>
Indium	

**F: TECHNICAL DOCUMENTATION**

The technical documentation for the purposes of conformity assessment pursuant to Article 4 shall include the information in the order and as set out in Table 4 of Annex VI to Regulation [*Please insert here references of the specific energy labelling regulation*]. For market surveillance purposes, manufacturers may refer to the technical documentation uploaded to the product database, which contains the same information as per Regulation [*Please insert here references of the specific energy labelling regulation*].

### ANNEX III

#### Measurements 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 takes 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, according to the on-mode power demand test methodology established for electronic displays with 2D mode only.

An electronic display which is placed on the market split into two or more physically separate units shall, for checking the conformity with the requirements of this Annex, be treated as a single electronic display regardless of the functions and powering arrangements of each unit.

The screen area  $A$  of an electronic display is calculated by multiplying the viewable image width by the viewable image height. For curved displays, the width and height should be measured along the arc of the display.

#### 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 1 shall fulfil all of the following conditions:

- i. measurements of power demand ( $P_{measured}$ ):
  - (a) electronic displays without forced menu shall be measured in the on-mode condition of the electronic display as delivered by the manufacturer, that is, the settings affecting the brightness (peak white luminance) of the electronic display shall be those set by the manufacturer for the end-user;
  - (b) electronic displays with a forced menu shall be measured in the normal configuration condition.
- ii. measurements shall be made using a dynamic broadcast-content video signal representing typical broadcast content for electronic displays. The measurement shall be the average power consumed over 10 consecutive minutes.
- iii. measurements shall be made after the electronic display has been in the off-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.
- iv. where the ABC function exists, measurements shall be made with it switched off. If the ABC function cannot be switched off, then the measurements shall be performed in an ambient light condition of 100 lux measured at the ABC sensor.

3. Measurements of standby/off mode, enhanced reactivation functions and networked standby power demand

Measurements of the standby/off mode, additional power demand of enhanced reactivation functions and networked standby power demand shall be made using a reliable, accurate and reproducible measurement procedure, which takes into account the generally recognised state of the art measurement methods. If the electronic display offers a “fast start” or “quick start” function, measurement of the standby mode shall be made with this function enabled and disabled.

4. Measurements of peak luminance

Measurements of the peak luminance referred to in point B (5) shall be made:

- i. 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;
- ii. without disturbing the luminance meter’s detection point on the electronic display whilst switching between any of the conditions referred to in point B (5).

5. Measurements of marking of plastic components of electronic displays

Measurements of marking of plastic referred to in point D (2) shall be made using a reliable, accurate and reproducible measurement procedure, which takes into account the generally recognised state of the art measurement methods.

6. Mercury and Cadmium logos

Measurements of the presence of mercury or cadmium in components of electronic displays referred to in point D, shall be made using available standards, as those already used to check the compliance of product with the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances.

## ANNEX IV

### 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 or importer 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.

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. They shall apply the steps set out in points 2(a), 2(b) and 3 below also during the verification procedure set out in points 2 to 9 of this Annex.

#### 1. Verification procedure for requirements established in Annex II

- (1) The Member States authorities shall verify one single unit of the model.
- (2) 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 or importer than the results of the corresponding measurements carried out pursuant to paragraph (g) thereof; and
  - (b) the declared values meet any requirements laid down in this Regulation, and any required product information published by the manufacturer or importer does not contain values that are more favourable for the manufacturer or importer than the declared values; and
  - (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 1 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.

If the results referred to in points 2(a) and 2(b) are not achieved, the model shall be considered not to comply with this Regulation.

- (3) If the result referred to in point 2(c) is not achieved, the Member State authorities shall select three additional units of the same model for testing.
- (4) 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 1.
- (5) If the result referred to in point 5 is not achieved, the model shall be considered not to comply with this Regulation.
- (6) The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission within one month of the decision being taken on the non-compliance of the model according to points 3 and 6.

The Member State authorities shall use the calculation methods set out in Annex I and the measurement conditions set out in V.

The Member State authorities shall only apply the verification tolerances that are set out in Table 1 and shall only use the procedure described in points 1 to 7 for the requirements referred to in this Annex. No other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

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

Member State authorities shall test one single unit.

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

- (a) the ABC of the product is enabled by default and persists in all modes unless switched off;
- (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 100lux to 12 lux;
- (c) the ABC control of display luminance meets the requirements of point B(3)e of Annex II.

If these test results are not achieved, three additional units of the same model shall be tested.

After three additional units of the same model have been tested, the model shall be considered to comply with the requirements, if:

- (a) the results for the additional three units achieves the requirement of (a) above;
- (b) the average of the results for the additional three units meets the requirement of (b) above.

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

Member State authorities shall test one single unit.

The model with forced menu on initial activation shall be considered to comply with the applicable requirement, if:

- (a) the home mode/standard mode 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 home mode/standard mode.

If these test results are not achieved the model and all equivalent electronic displays shall be considered not to comply with the applicable requirements.

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

Member States authorities shall test one single unit.

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

- (a) the unit provides off mode and/or standby mode, and/or another condition 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 off mode and/or standby mode, and/or another condition which does not exceed the applicable power demand requirements for off mode and/or standby mode, is set as default; and



- (c) the unit provides networked standby mode with HiNA functionality, the unit does not exceed the applicable power demand requirements for HiNA functionality when the electronic display is connected to the power source; and
- (d) the unit provides networked standby mode without HiNA functionality, the unit does not exceed the applicable power demand requirements without HiNA functionality when the electronic display is connected to the power source.

If any of these test results are not achieved, three additional units of the same electronic display shall be tested.

After three additional units have been tested, the model shall be considered to comply with the requirements if all three of the additional units meet all the conditions with the applicable power demand limits averaged for the three units. Otherwise, the model and all equivalent electronic displays shall be considered not to comply with the requirements.

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

Member State authorities shall test one single unit.

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

- (a) the activation of the network availability requires the end-user's intervention; and
- (b) the network availability can be deactivated by the end-user; and
- (c) it complies with the requirements for standby mode when networked standby condition is not activated.

If any of these test results are not achieved the model and all equivalent electronic displays shall be considered not to comply with the applicable requirements.

#### **6. Verification procedure for requirements established in point C(3) of Annex II for electronic displays.**

Member State authorities shall test one single unit.

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

- (a) within 4 hours in on mode following the last user interaction or within 1 hour if a room presence sensor is activated, the electronic display automatically switches from on mode, to standby mode, or off mode, or, networked standby mode if activated, or another condition which does not exceed the applicable power demand requirements for off mode and/or standby mode. Member State authorities shall use the applicable procedure to measure the power demand after the automatic power down functionality switches the electronic display into the applicable power mode; and
- (b) the function is set as default; and
- (c) in on mode the unit displays an alert message before automatically switching from on mode to the applicable mode/condition; and
- (d) the unit provides a function allowing the user to shorten, extend or disable the 4-hour period for automatic mode transitions detailed in (a). If an extension beyond the 4-hour period or disabling is selected, a warning message must be prompted about a potential increase in energy use and a confirmation of the new user setting requested.

If the test results under subpoint (a) is not achieved, three additional units of the same model shall be tested.

After three additional units have been tested, the model shall be considered to comply with the requirements if all three of the additional units meet the test result specified under subpoint (a). Otherwise, the model and all equivalent electronic displays shall be considered not to comply with the requirement.

If any of the test results under subpoints (b) to (d) are not achieved, the model and all equivalent electronic displays shall be considered not to comply with the applicable requirements.

#### **7. Verification procedure for requirements established in point C(3) of Annex II for networked displays**

Member State authorities shall test one single unit.

The networked display with the network availability activated shall be considered to comply with the applicable requirement, if after no more than 4 hours in on mode following the last user interaction, or after 1 hour with no movement detected for displays with room presence sensor activated:

- (a) the electronic display automatically switches from on mode to a condition of networked standby mode or any other condition which does not exceed the applicable power demand requirements for conditions providing networked standby. Member State authorities shall use the applicable procedure to measure the power demand after the automatic power down functionality switches the electronic display into the applicable power mode; and
- (b) the unit provides a function allowing the user to shorten or extend the time period or disable the auto power down function; and
- (c) extending the time period triggers a warning message about the increase in energy use requiring a confirmation; and
- (d) as stated in the technical documentation, the power management function and/or the user can switch the electronic display being in a condition providing networked standby into standby mode, or off mode or another condition which does not exceed the applicable power demand requirements for off mode and/or standby mode.

If the test results under subpoints (a) to (d) are not achieved, three additional units of the same model shall be tested.

After three additional units have been tested, the model shall be considered to comply with the applicable requirements if all three of the additional units meet the test results under subpoints (a) to (d). Otherwise, the model and all equivalent electronic displays shall be considered not to comply with the applicable requirements.

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

Member State authorities shall test one single unit.

The model shall be considered to comply with the applicable requirement, if each end user selectable signal input interface type specified to carry power management control signals /data other than a radio frequency signal connector shall recognise the power management protocols of the host signal source and prioritise those protocols over the power management requirements of point C(3) and (4) of Annex II. 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.

If any of the test results show that the host signal source power management protocols are not recognised and prioritised, the model and all equivalent electronic displays shall be considered not to comply with the applicable requirement.

### 9. Verification procedure for requirements established in point D of Annex II

Member State authorities shall test one single unit of the model.

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

- (a) the documentation provided as per point E(2) of Annex II provides sufficient information on the sequence of dismantling operations leading to the extraction of the targeted components, as set out in point D(1) of Annex II and no joining, fastening or sealing technique necessarily determines breakage of the listed components;
- (b) all plastic components of the display heavier than 50 g, other than those exempted as defined in point D(2) of Annex II, are marked with the proper symbols set out in point D(2)1 of Annex II and consist of one single polymer or polymer blend. Models with plastic components heavier than 50 g (other than PMMA board and display optical plastics) containing flame retardants shall be considered to comply with the requirements if marked with the proper symbols for flame retardant, as set out in point D(2)2 of Annex II. For exempted plastic components, the market surveillance authority shall check that a justification is provided in the end-of-life documentation, as set out in point E(2)e of Annex II; and
- (c) the mercury logo and/or cadmium logo, as detailed in point D(3) and (4) of Annex II, are present for products containing these toxic metals; and
- (d) the end-of-life documentation for the product family containing all information set out in point E(2) of Annex II, as applicable, is made available on a website.

If the test results and requirements under subpoints (a) to (d) are not achieved, the model is considered not compliant.

If the test results and requirements under subpoints (i), (ii), (iii) or (iv) are not achieved, the model is considered not compliant.

### 10. Verification tolerances

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 1 – Verification tolerances</b>	
<i>Parameter</i>	<i>Verification tolerances</i>
On-mode power demand excluding allowances and adjustments for the purposes of EEI calculation ( $P_{measured}$ ) set out in Annex II.A and, for the purposes of allowances and adjustments, in point B of Annex II.	The determined value shall not exceed the declared value by more than 7%
Off-mode, standby and network standby	The determined value shall not exceed the

conditions, as applicable, limit values set out in point C(1) of Annex II	declared value by more than 0.10 Watt
Peak luminance ratio set out in point B of Annex II	The determined value shall not be lower than 60% of the peak luminance of the brightest on-mode condition provided by the electronic display
Peak luminance (cd/m <sup>2</sup> ) requirements as set out in points B(3) and (5) of Annex II	The determined value shall not deviate from the required value by more than 4%
Timed functions as set out in points C(3) and (4) of Annex II	The determined value shall be within 5 seconds of the declared value
Weight of plastic components as qualified in point E(2) of Annex II	The determined value shall not be different from the declared value by more than 5 grams

## 11. Circumvention devices

Where the operation of a circumvention device is suspected during testing, Market Surveillance authorities should perform complementary tests or other appropriate actions in an attempt to detect the presence and operation of any such devices. Details of any such action and their effect, in any of the verification points from 1 to 12, shall be included in the test report.

Where the presence of a circumvention device is confirmed, the electronic display shall be considered not compliant.

*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 (December 2017) for electronic displays on the market.

Diagonal of viewing area		HD	UHD
(cm)	(inches)	Watt	Watt
55.9	22	15	
81.3	32	25	
108.0	42.5	36	51
123.2	48.5	43	57
152.4	60	62	67
165.1	65	69	73
Other functioning modes:			
Off mode (hard switch):		0.0 W	
Off mode (no hard switch):		0.1 W	
Standby		0.2 W	
Networked standby (non-Hina):		0.9 W	

*ANNEX VI*  
**Amendments to Regulation (EC) No 1275/2008**

**List of energy-using products covered by Annex I, point 2 and final paragraph of point 3  
to Regulation (EC) No 1275/2008**

2. Information technology equipment intended primarily for use in the domestic environment, but excluding desktop computers, integrated desktop computers and notebook computers as defined in Commission Regulation (EU) No 617/2013 as well as electronic displays covered by Commission Regulation (EU) [Numbering of the Regulation to be added before publication in the OJ].

3. Consumer equipment

[...]

And other equipment for the purpose of recording or reproducing sound or images, including signals or other technologies for the distribution of sound and image other than by telecommunications, but excluding electronic displays covered by Commission Regulation (EU) [Numbering of the Regulation to be added before publication in the OJ]’.