EUROPEAN
COMMISSION

Brussels, XXX
[…](2016) XXX draft

ANNEXES 1 to 8

ANNEXES

to the

COMMISSION REGULATION (EU) No …/..

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

and amending
Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment
and
Regulation (EU) No 617/2013 with regard to ecodesign requirements for computers and computer servers

ANNEX I

Acronyms, abbreviations, terms and definitions applicable for the purposes of the Annexes

(1) ‘ABC’ means Automatic Brightness Control (alternatively indicated as 'light sensor' or 'economy sensor') and refers to the self-acting mechanism that, when enabled, controls the brightness of a display as a function of the ambient light level illuminating the display in front.

(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) ‘*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 unrepresentative of the products' true characteristics that occur during normal use under comparable conditions.

(4) ‘*Electronic display audio system’* means the electronics of the sound processing and sound power - amplifier systems that are contained in the same unit casing as the display.

(5) ‘*Equivalent electronic display model*’ means a variant of a specific model of electronic display placed on the market by the same manufacturer but under a different commercial code number and having essentially identical, electrical, physical and functional characteristics that affect energy consumption, energy efficiency and recycling ecodesign criteria, as applicable.

(6) ‘*HiNA’* means High Network Availability.

(7) *‘HiNA functionality’* means the function of a network router, network switch, or wireless network access point (not being a terminal or node) or a combination of those functions.

(8) ‘*Home mode/standard mode*’ means a display screen setting which is recommended to the end-user by the manufacturer from the initial set up menu or the mode that the display product comes shipped in if no setting is recommended and must be a setting or mode that delivers the optimal quality for end-users in a typical domestic environment.

(9) ‘*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.

(10) ‘*Forced menu*’ means a set of display settings pre-defined by the manufacturer, of which the end-user of the display must select a particular setting upon initial start-up of the display.

(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 (cd/m^2). The term brightness is often used to subjectively qualify the luminance of a display.

(12) '*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 of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

(13) *'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).

(14) *'Networked Electronic Display'* means an electronic display that can connect to a network using one or more network ports.

(15) '*Network availability*' means the capability of an electronic display to resume functions after a remotely initiated trigger has been detected by a network port.

(16) '*Network port*' means a wired or wireless physical interface of the network connection located at the electronic display through which the electronic display can be remotely activated. For computer displays, the interfaces of the video and audio connection with the computer components are not considered to be network ports.

(17) *'Networked standby' m*eans a condition where an electronic display is connected to a power source and is able to resume a function through a remotely initiated trigger via a network connection. In the networked standby condition the product produces neither sound nor picture, but can be switched into another mode with the remote control unit or an internal signal or a data instruction through a network connection. The networked standby mode provides the following functions:

(a) networked standby reactivation function, or reactivation function and only an indication of enabled reactivation function, and/or,

(b) display of information or product status.

The networked standby mode may also provide the enhanced reactivation function(s).

(18) '*Networked standby reactivation function*' means a function facilitating the activation of other modes, including on-mode, by remotely initiated trigger to a condition providing additional functions, including the main function.

(19) '*Network access point*' means a device that, as its primary function, provides wired or wireless connectivity to a network linking multiple nodes (final devices).

(20) '*Network Router*' means a network device that, as its primary function, determines the optimal path along which network traffic should be forwarded.

(21) '*Network switch*' means a network device that, as its primary function, filters, forwards, and distributes frames based on the destination address of each frame. All switches operate at least at the data link layer (L2).

(22) '*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 principal display functions.

(23) '*Off mode*' means a condition in which the product, even if connected to the power source, produces no usable function and cannot be switched into any other mode using a remote control unit, an internal or an external signal. The product may only exit this mode by direct end-user actuation of a power switch or control on the product.

(24) '*PMMA'* means 'PolyMethyl MethAcrylate'.

(25) ‘*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.

(26) ‘*Product family’* means the set of equivalent electronic display models.

(27) ‘*Reactivation function*’ means a function facilitating the activation, by a remote switch a remote control unit, an internal sensor, or a timer, of other modes providing additional functions, including the main function.

(28) ‘*Enhanced reactivation function*’ means a reactivation function other than those traditionally supported by electronic displays (such as infrared remote control unit and internal timer) and using sensor systems for voice recognition, room presence and/or gesture detection.

(29) ‘*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.

(30) *‘Room presence sensor’* or *‘gesture detection sensor’* means a sensor monitoring and reacting to the occupancy and movements, in the space around the product that can automatically trigger the activation of other modes, including on-mode.

(31) *‘Remotely initiated’* means coming from outside the electronic display, e.g. via a network.

(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 a power source, depends on energy input from that power source, produces neither sound nor picture, but can be switched into another mode with the remote control unit or another signal.

(34) ‘*Tuner*’ or ‘*Television tuner*’ means an electronic circuit in an analogue or digital TV that detects TV network transmission and facilitates the selection of a TV channel from a group of network channels.

(35) ‘*USB’* means Universal Serial Bus.

(36) ‘*Voice recognition sensor*’ means a sensor monitoring and reacting to voice commands of an end-user that can allow the activation of other modes, including on-mode.

ANNEX II

Energy efficiency requirements

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. ON-MODE POWER DEMAND LIMITS EXPRESSED AS AN EEI

The Energy Efficiency Index (EEI) of an electronic display shall be calculated using the following equation where *A* represents the screen area in decimetres squared (dm^2):

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

The declared EEI of an electronic display shall not exceed the maximum EEI (EEI_{max}) calculated using the following limits, in accordance with Article 3:

1.1. From 1 July 2018:

Displays with resolution up to HD (1980x1080 pixels)	Displays with resolution above HD
$\boldsymbol{EEI_{max} = 0.90}$	$\boldsymbol{EEI_{max} = 1.10}$

1.2. From 1 January 2020:

Displays with resolution up to HD (1980x1080 pixels)	Displays with resolution above HD
$\boldsymbol{EEI_{max} = 0.75}$	$\boldsymbol{EEI_{max} = 0.90}$

1.3. From 1 January 2022:

Displays with resolution up to HD (1980x1080 pixels)	Displays with resolution above HD
$\boldsymbol{EEI_{max} = 0.60}$	$\boldsymbol{EEI_{max} = 0.75}$

1.4. OLED displays and 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 in point 1.1 above, but shall comply with the EEI limits specified in points 1.2 and 1.3.

2. STANDBY, NETWORKED STANDBY AND OFF MODE POWER DEMAND AND AVAILABILITY OF MODES

2.1. Power demand in off mode and standby mode

From 1 July 2018:

2.1.1. The power demand of an electronic display in off-mode or in a standby mode providing only a reactivation function or providing a reactivation function and an indication of enabled reactivation function only, shall not exceed 0.3 W. If the electronic display offers a "fast start" or "quick start" reactivation function, it shall meet this power demand requirement with this function enabled.

2.1.2. The following power demand allowances may be added to those given in 2.1.1 for the following functions if enabled as delivered by the manufacturer;

– reactivation using only voice recognition and activation sensor: 0.5 W maximum;

– reactivation using only room presence/gesture detection and activation sensor: 0.5 W maximum;

– reactivation using both voice recognition and room presence / gesture recognition sensors; 1.0 W maximum;

– information/status display: 0.5W maximum.

2.2. Availability of off mode and/or standby mode

From 1 July 2018:

2.2.1. When an electronic display is placed on the market it shall have 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.

2.2.2. Automatic switch to off mode and/or standby mode, and/or another condition which does not exceed the applicable power demand requirements for off mode and/orstandby mode shall be set as default.

2.3. Activation and deactivation of network connection

From 1 July 2018:

2.3.1. The end-user shall be able to separately activate or deactivate the network availability of a networked electronic display in the use mode and in the standby mode.

2.3.2. A networked electronic display shall comply with the requirements stated in 2.1 "power demand in off-mode and in standby mode" when network availability is not activated.

2.4. Power demand in a condition providing networked standby

From 1 July 2018:

2.4.1. The power demand of electronic displays in a condition providing networked standby shall not exceed:

(a) 6.00 W if with HiNA functionality;

(b) 2.00 W if without HiNA functionality.

2.4.2. The additional power allowances specified in 2.1.2 above, for enhanced reactivation functions, are not included in the power limits specified in points 2.4.1, for a networked electronic display in a networked standby condition; these additional allowances shall add to those power limits when advanced reactivation functions are enabled as delivered by the manufacturer.

3. AUTOMATIC POWER DOWN

From 1 July 2018:

3.1. Electronic displays including networked electronic displays with network availability activated shall provide a function, set as default, that, within an interval of 4 hours in on mode following the last user interaction, should complete an automatic transition from on mode to:

- networked standby mode for networked electronic displays with network availability activated; or
- standby mode for electronic displays without network availability, for networked electronic displays with network availability deactivated or for networked electronic displays with network availability active but deactivated in non-use mode;
- another condition which does not exceed the applicable power demand requirements for off mode and/or standby mode.

3.2. If the display is equipped with a room presence sensor, and this is activated as delivered by the manufacturer, the automatic transition following the last user interaction as described in point 3.1 applies if no room presence is detected for no more than 1 hour, to automatically change the display mode from the room presence standby mode.

3.3. The menu of an electronic display shall provide a function allowing the user to shorten or extend the mode transition described in 3.1 and 3.2 above. A warning message about the increase in energy use and requiring confirmation of the action shall be prompted when extending the interval.

3.4. Electronic displays marketed as computer displays and electronic display products with various selectable input sources, shall recognise and prioritise the power management protocols of a host signal source (computers, set-top box or analogous) over those power management protocols and features described in point 3.1 when displaying the host signal source.

3.5. Networked electronic displays with the network availability activated shall allow the power management function and/or the user to switch the electronic display from 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.

4. HOME MODE/STANDARD MODE FOR ELECTRONIC DISPLAYS WHICH ARE DELIVERED WITH A FORCED MENU

From 1 July 2018:

Electronic displays shall be placed on the market with the home mode/standard mode set by default. Electronic displays may be placed on the market with a menu on initial activation proposing alternative modes, such as a shop mode. The home/standard mode shall be the default choice in the forced menu. If the user selects a mode other than home mode, a warning message about the likely increase in energy use, shall be prompted and confirmation of the action requested.

5. PEAK LUMINANCE RATIO

From 1 July 2018:

5.1. For an electronic display, the peak luminance of the on mode condition of the display as delivered by the manufacturer (or home mode/standard mode for electronic displays which are delivered with a forced menu) shall not be less than 65% of the peak luminance of the brightest on mode condition.

5.2. For an electronic display with an audio system special on mode condition the peak luminances measured to determine the peak luminance ratio shall not change when that special on mode condition is activated and deactivated.

6. ALLOWANCES AND ADJUSTMENTS FOR THE PURPOSES OF EEI CALCULATION

From 1 July 2018:

6.1. Audio System

An electronic display audio system may use a special on-mode condition that shall disable or minimise the power consumption of that audio system during the on-mode power measurement ($P_{measured}$) for the purposes of calculating the EEI. The special audio system on-mode condition must be achievable through, the display product remote control or through an externally accessible control or through a network port. Information describing the procedure to establish the special audio system on-mode condition must be provided as required in Annex IV.1. (b). If it is not provided then the on-mode power requirement must be measured for EEI calculation purposes with the audio system condition meeting the on-mode testing requirements of a supporting harmonised measurement standard.

6.2. Display products requiring an external AC to DC power supply (EPS)

For display products 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, $P_{measured}$ for the purposes of the EEI calculation shall be the DC input power.

For display products requiring an EPS providing a non-standardised DC power connection. $P_{measured}$ for the purposes of the EEI calculation shall be the AC input power to the EPS. If the EPS is not provided with the display product when placed on the market, $P_{measured}$ for the purposes of the EEI calculation shall be 115% of the measured DC input power to make a notional allowance for AC to DC conversion losses.

6.3. Display products with ABC enabled by default

For products supplied with ABC enabled by default, $P_{measured}$ may be reduced by 10% in the calculation of the EEI provided that:

- $P_{measured}$ is recorded with an ambient light illumination of 300 lux measured at the ABC sensor of the display product; and

- $P_{measured}$ reduces by at least 20% when the ambient light illumination measured at the ABC sensor of the display product is reduced to 12 lux.

7. SOFTWARE AND FIRMARE UPDATES

From 1 July 2018:

Each single software or firmware update, unless intended exclusively for the purpose of correcting malfunctions and errors and not possibly increasing the energy use of the electronic display in any of the different modes, shall only be explicitly authorised by the user once the TV is switched on, even if the download and installation can be scheduled at a later moment. The user shall be notified of a possible increase of energy use and in which circumstance or functionality that increase will occur before starting the download. The user has the right to refuse an update. A notification has to be shown to the user on the display and kept visible until the user confirms acceptance of any completed software or firmware update.

ANNEX III

Resource efficiency requirements

From 1 January 2020:

1. Requirements on design for dismantling, re-use, recycling and recovery

Manufacturers shall ensure that welding or gluing other than through the use of double-sided adhesive tape are not used as joining or sealing techniques for the following components[1], when present:

- batteries;
- PCB assemblies larger than 0.1 dm^2;
- display panels larger than 1 dm^2;
- mercury containing components;
- capacitors; and in addition;
- PMMA boards;
- internal power supplies.

Accessing components shall be ensured by documenting the sequence of dismantling operations needed to access the targeted components, including for each of these operations, the type and number of fastening technique(s) to be unlocked, and tool(s) required.

2. Marking of plastic parts

Plastic parts heavier than 50g:

2.1. Shall be marked by specifying the type of polymer using the appropriate standard symbols and abbreviated terms as specified in available standards. The marking shall be legible.

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

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 part;

iii. marking is technically not possible because of the molding method.

For the following plastic parts no marking is required:

(1) packaging, tape, labels and stretch wraps;

(2) wiring, cables and connectors;

(3) PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;

(4) transparent parts where the marking would obstruct the function of the part in question;

(5) If there is not enough available appropriate surface area for the marking to be of a legible size to be identified by a recycling operator.

2.2. If flame retardants are present, they shall be marked according to available standards and using the following notation:

[1] Listed in point 1 of Annex VII of Directive 2012/19/EU

'x-FR-y'

where:

x= abbreviated term for the polymer used

FR = abbreviation meaning 'flame retardant'

y= standard code number of the flame retardant used.

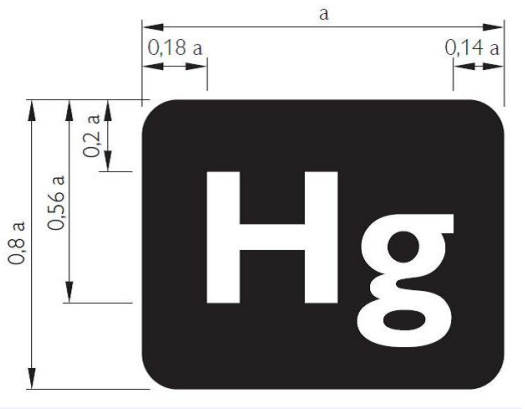
From 1 July 2018:

3. Mercury logo

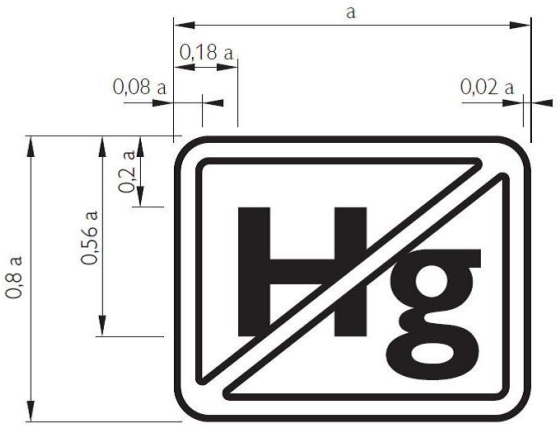
Electronic displays shall be labelled with the "Mercury inside" logo. The logo shall be visible without the removal of a cover, durable, legible and indelible. The logo shall be in the form of the following graphic.

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

Mercury inside



Mercury free



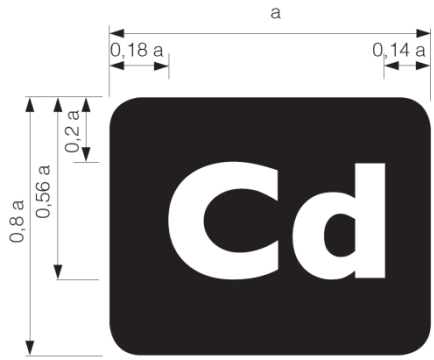
The dimension of “a” shall be greater than 9 mm and the typeface to be used is ‘Gill Sans serif’.

4. Cadmium logo

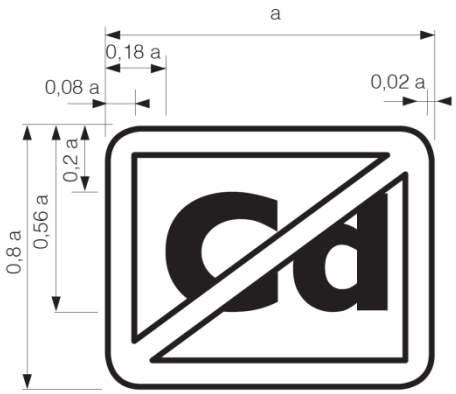
Electronic displays shall be labelled with the "Cadmium inside" logo. The logo shall be visible without the removal of a cover, durable, legible and indelible. The logo shall be in the form of the following graphic. The "Cadmium inside" logo shall be attached also internally, on the back of the LCD panel, in a position easily visible by a worker dismounting or manipulating it.

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

Cadmium inside



Cadmium free



ANNEX IV

Information requirements

From 1 July 2018, the following information shall be kept available for at least 15 years from the day the last model of a product family was placed on the market and free of charge:

1. General information: available as printed documentation with the product or in free access websites or in a common database of manufacturers, their authorised representatives or importers.
2. Technical information: available in free access websites or in a common database of manufacturers, their authorised representatives or importers.
3. Repair and end of life documentation and information: available to third parties dealing with maintenance, repair, reuse and upgrading of displays upon registration and provided in a websites or in a common database of manufacturers, their authorised representatives or importers.

1. General information

i. manufacturer's name registered trade name or registered trade mark, and the address at which it can be contacted;

ii. manufacturer's model identifier or code, which unequivocally distinguishes a specific electronic display model from other models with the same trade mark or manufacturer’s name;

iii. year of manufacture;

iv. the screen diagonal in centimetres and, optionally, in inches;

v. the screen resolution in physical horizontal and vertical pixel count;

vi. the on-mode power demand in Watt rounded to the first decimal place for power values up to 100 W, and rounded to the first integer for power values above 100 W. This should be measured with the audio system special on mode disabled (if applicable);

vii. the standby, off-mode and networked standby power demand in Watt rounded to the first decimal place;

viii. whether an Automatic Brightness Control and a room presence sensor are available and activated by default.

2. Technical information

(a) Test parameters for measurements:

i. ambient temperature;

ii. test voltage in V and for AC, frequency in Hz;

iii. total harmonic distortion (THD) of the electricity supply system;

iv. the input terminal for the audio and video test signals;

v. information and documentation on achieving the special on-mode condition for the display audio system;

vi. information and documentation on the instrumentation, set-up and circuits used for electrical testing;

vii. where appropriate, the references of the harmonised standards applied;

viii. where appropriate, the other technical standards and specifications used.

(b) For On-mode:

i. the power demand data in Watts rounded to the first decimal place for power measurements up to 100 Watts, and rounded to the first integer for power measurements above 100 Watt with and without any factory pre-set home mode energy saving feature that may be disabled by the end user. These measurements should be repeated with the special display sound system mode enabled and disabled;

ii. the characteristics of:

- the dynamic broadcast-content video signal representing typical broadcast TV content (in the case of UHD displays, the HD broadcast content standard video test signal shall be used with up conversion to the native resolution of the display provided by the display electronics and not an external device);
- the test pattern for the video signal used for the measurement of peak luminance required for 2 (b) iv. and 2(b) v. below.

iii. the sequence of steps for achieving a stable condition with respect to power demand;

iv. picture settings for the brightest on mode condition;

v. the peak luminance of the brightest on mode condition and the on–mode power requirement during this peak luminance measurement This measurement shall be made with the special display sound system mode enabled where applicable;

vi. the peak luminance of the home mode/standard mode and the on-mode power requirement during this peak luminance measurement. This measurement shall be made with the special display sound system mode enabled where applicable;

vii. the ratio of the peak luminance of the on mode condition as delivered by the manufacturer, or home mode/standard mode for electronic displays which are delivered with a forced menu, and the peak luminance of the brightest on mode condition as a percentage rounded to the nearest integer.

(c) For standby and off mode:

i. the power demand data in Watts rounded to the second decimal place;

ii. the measurement method used;

iii. description of how the mode was selected or programmed including any enhanced reactivation functions;

iv. sequence of events to reach the mode where the electronic display automatically changes modes.

(d) For automatic power down:

i. the duration of on mode condition before the electronic display reaches automatically standby, or off mode, or another condition which does not exceed the applicable power demand requirements for off mode and/or standby mode.

(e) For networked electronic displays:

i. the number and type of network ports and, except for wireless network ports, where these ports are located at the electronic display; in particular it shall be noted if the same physical network port accommodates several types of network ports;

ii. whether the electronic display qualifies as electronic display with HiNA functionality; if no information is provided the electronic display is considered not to be a display with HiNA functionality;

iii. information as to whether a networked electronic display provides functionality allowing the power management function and/or the end-user to switch the electronic display 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 including enhanced reactivation function power allowance where applicable.

(f) For displays with a designated computer signal interface:

i. confirmation that the display product recognises and prioritises the computer display power management protocols set out in Point 6.2.3 of Annex II of Regulation 617/2013. Any deviation from the protocols should be reported.

(g) For networked electronic display, for each type of network port:

i. the default time after which the power management function switches the display into a condition providing networked standby;

ii. the trigger that is used to reactivate the electronic display;

iii. the (maximum) performance specifications;

iv. the (maximum) power demand of the electronic display in a condition providing networked standby into which the power management function will switch the electronic display, if only this port is used for remote activation.

(h) For Automatic Brightness Control (ABC), if applicable:

i. the manufacturer shall provide data confirming the power reduction due to ABC by measuring and declaring the reduction in the average on-mode power demand of the electronic display when the ambient light intensity, measured at the ABC sensor of the display product, is reduced from 300 lux to 12 lux.

Where the information included in the technical documentation file for a particular electronic display model has been obtained by calculation on the basis of another electronic display model, the technical documentation shall include details of such calculations and of tests undertaken by the manufacturer to verify the accuracy of the calculations undertaken. In the case of digital signage displays with integrated computer, this calculation may be made from measurements made on a technically identical equivalent digital signage display without an integrated computer.

The technical information shall include the list of all equivalent electronic display models.

The information contained in this technical documentation may be merged with the technical documentation provided in accordance with the measure on electronic displays adopted under the Directive 2010/30/EU.

3. Repair and end of life documentation and information

For each product family, suppliers shall provide information relevant for repair purposes including the information relevant for non-destructive disassembly and replacement of defective components.

For each product family, suppliers shall provide information relevant for dismantling, re-use, recycling and recovery at end-of-life including at least the following:

(a) a diagram of the product showing the location of the components indicated in section 1 of Annex III, when present, and showing the location of plastic parts containing flame retardants, when present, using references of parts as given in the Table IV.2;

(b) instructions on the sequence of operations needed to remove these components, including type and number of fastening techniques to be unlocked and tool(s) required;

(c) the reason why certain, if any, plastic parts are not marked as per the exemption set out in section 2.1 of Annex III;

(d) for the following toxic, ecotoxic or rare and precious substances: cadmium, lead, arsenic, mercury or their compounds and indium: the indication of the specific substance(s), the location of all component(s) containing each, its quantity (as X,X mg), and the advised recycling techniques, if any, to be applied;

(e) if plastic parts (excluding the PCB assemblies) containing flame retardants are used, documentation in the format of Table I.

Table I - 'Flame retardant in plastic parts' index calculation table.

(All masses shall be expressed in grams)

Brand name and Product family:			
Part reference	**Polymer ***	**Flame retardant****	**Total mass (g)**
Reference *(1)*	…	…	…
Reference *(2)*	…	…	…
…	…	…	…
Reference *(j)*	…	…	…
A) Overall mass of plastic parts*** incorporated in the display that contain flame retardants ***(g)***			
B) Overall mass of plastic parts***incorporated in the display ***(g)***			
Total mass of the display ***(g)***			
			Index (%)
Ratio of plastic containing flame retardants on the total mass of plastic (A/B)			
Ratio of plastic containing flame retardants on the total mass of display (A/C)			

* standard abbreviated term for the polymer(s)

** standard code number of the flame retardant(s)

*** PCB assemblies are excluded

ANNEX V

Measurements

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

They 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.

Electronic displays with an audio system shall be tested for on-mode power demand with the special audio system on mode condition enabled and disabled.

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 of the electronic display shall be those set by the manufacturer for the end-user;

   (b) electronic displays with forced menu shall be measured in the home-mode/standard mode 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. Measurements shall be made with the ABC function, if such a function exists, made inactive. If the ABC function exists but cannot be made inactive or disabled, then the measurements shall be performed with the light entering directly into the ambient light sensor at a level of 300 lux. Where the ABC function can be disabled by switching off there should be no difference in $P_{measured}$ with the ABC on or off in the 300 lux ambient light condition.

v. Measurement shall be made with the electronic display audio system special on mode condition enabled and disabled.

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 and on-mode power for the peak luminance test pattern

Measurements of the peak luminance referred to in Annex II, point 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 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 the conditions referred to in Annex II, point 5.

5. Measurements of marking of plastic parts of electronic displays

Measurements of marking of plastic referred to in Annex III, point 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 logos

Measurements of presence of mercury in components of electronic displays referred to in Annex III, point 3 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 VI

Product compliance verification by market surveillance authorities

1. Verification procedure

In the context of verifying compliance of a product model with the requirements laid down in this Regulation referred to in Article 3(2) of Directive 2009/125/EC, the authorities of the Member States shall apply the following procedure for the purposes of the requirements referred to in this Annex:

(1) The Member State authorities shall verify one single unit of the model.

(2) The model shall be considered to comply with the applicable requirements:

(a) if the values in the technical documentation according to Annex IV point 2 of Directive 2009/125/EC, and where appropriate the values used to establish those values that are calculated, are not more favourable for the manufacturer or importer than the respective results of the measurements according to paragraph (g) thereof; and

(b) if the values used to determine the compliance of the model and those provided in the product information as required by this Regulation, and where appropriate, the values used to establish those values that are calculated are not more favourable for the manufacturer or importer than the values in the technical documentation file, including in the test reports; and

(c) if, when Member State authorities test the unit of the model, all measured parameters and the values calculated from these measurement(s) are within the respective verification tolerances according to Table 1.

(3) 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.

(4) 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.

(5) The model shall be considered to comply with the applicable requirements if for these three units, the arithmetical mean of the measured values of the relevant parameters and the values calculated from these measurement(s) are within the respective verification tolerances according to Table 1.

(6) If the result referred to in point 5 is not achieved, the model shall be considered not to comply with this Regulation.

(7) 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.

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

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

Table 1 – Verification tolerances	
Parameter	*Verification tolerances*
On-mode power consumption excluding allowances and adjustments for the purposes of EEI calculation ($P_{measured}$) set out in Annex II, point 1. EEI calculation equation and for the purposes of allowances and adjustments in Annex II. Point 6.	The determined value shall not exceed the declared value by more than 7%
Off-mode/standby conditions, as applicable, limit values set out in Annex II, points 2.1. and 2.4.	The determined value shall not exceed the declared value by more than 0.10 Watt
Peak luminance ratio set out in Annex II, Part 5.	The determined value shall not be lower than 60% of the peak luminance of the brightest on-mode condition provided by the television
Timed functions as set out in Annex II point 3.	The determined value shall be within 5 seconds of the declared value.
Weight of plastic parts as qualified in Annex III 2.	The determined value shall not be different from the declared value by more than 5 grammes

2. Verification procedure for requirements established in points 2.2.1. and 2.2.2. of Annex II

Member States authorities shall test one single unit.

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

- 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
- 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.

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. Otherwise, the model and all equivalent electronic displays shall be considered not to comply with the requirements.

3. Verification procedure for requirements established in point 2.3.1. and 2.3.2. of Annex II

Member States authorities shall test one single unit.

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

- the network availability of the electronic display can be activated and deactivated by the end user, with the possibility of disabling the network stand-by if the network availability is activated in on-mode.

If this test result is 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.

4. Verification procedure for requirements established in 2.3. of Annex II

Member States authorities shall test one single unit.

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

- the activation of the network availability requires the end-user's intervention; and
- the network availability can be deactivated by the end-user;
- 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.

5. Verification procedure for requirements established in point 3.1., 3.2., and 3.3. of Annex II

Member States authorities shall test one single unit.

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

i. 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 States' 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

ii. the function is set as default; and

iii. in on mode the unit displays an alert message before automatically switching from on mode to the applicable mode/condition; and

iv. the unit provides a function allowing the user to shorten, extend or disable the 4 hour period for automatic mode transitions detailed in (i). 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 any of the test results under subpoints (ii) to (iv) are not achieved, the model and all equivalent electronic displays shall be considered not to comply with the applicable requirements.

If the test results under subpoint (i) 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 (i). Otherwise, the model and all equivalent electronic displays shall be considered not to comply with the requirement.

6. Verification procedure for requirements established in point 3.5. of Annex II

Member States' 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 3.1 of Annex II. Where there are two or more identical signal interfaces unqualified by a 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.

7. Verification procedure for requirements established in point 3.5 of Annex II

Member States' authorities shall test one single unit.

The networked electronic 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:

i. 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 States' 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

ii. the unit provides a function allowing the user to shorten or extend the time period or disable the auto power down function; and

iii. extending the time period triggers a warning message about the increase in energy use requiring a confirmation; and

iv. 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 (i) to (iv) 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 (i) to (iv). 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 4. of Annex II

Member States' authorities shall test one single unit.

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

- the home mode/standard mode is provided as the default choice on initial activation of the electronic display; and
- 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.

9. Verification procedure for requirements established in point 6.4 of Annex II

Member States' 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;

(b) the measured on-mode power of the product "$P_{measured}$" reduces by 20% or more but no less than 15% when the ambient light illumination measured at the ABC sensor is reduced from 300lux or more to 12 lux.

If these tests 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:

(c) the results for the additional three units achieves the requirements of (a) above;

(d) the average of the results for the additional three units meets the requirements of (b) above.

10. Verification procedure for requirements established in Annex III

For the requirement set out in Annex III, market surveillance authority/member States' authorities shall test one single display unit.

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

i. No fastening technique using welding or gluing, other than through the use of adhesive tape, is encountered in the sequence of dismantling operations leading to the extraction of the targeted components, as set out in Annex III point 1;

ii. All plastic parts of the display larger than 50 g, other than those exempted as defined in Annex III point 2, are marked with the proper symbols set out in Annex III point 2.1. Models with plastic parts larger 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 Annex III point 2.2. For exempted plastic parts, the market surveillance authority shall check that a justification is provided in the end-of-life documentation, as in Annex IV point 3;

iii. The mercury logo and/or cadmium logo, as detailed in Annex IV point 3, are present for products containing these toxic metals; and

iv. The end-of-life documentation for the product family containing all information set out in Annex III point 3, as applicable, is made available on a website.

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

11. Verification procedure for requirements established in Annex IV

For the requirement set out in Annex IV, the Member States' authorities shall verify the information requirements for one single display unit.

The model shall be considered to comply with the requirements set out in Annex IV.1, if all the required information is present in the format and order listed in Annex IV.1, printed on paper or as PDF document provided on a suitable support, such as CD, DVD, SD card, USB memory stick of similar supports for which a reader is commonly available on the market.

The model shall be considered to comply with the requirements set out in Annex IV.2 and Annex IV.3, if all the required information is present in the format and order listed in Annex IV.2 and Annex IV.3, accessible and correctly viewable using the last major release of at least two web browsers among the more common five web browsers available.

12. The verification tolerances

The verification tolerances defined in this Annex relate only to the verification of the measured parameters by the Member States' 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.

13. Circumvention device

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

ANNEX VII

Indicative benchmarks

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 (July 2016) 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

ANNEX VIII

Correlation table

Regulation 642/2009	This Regulation
Article 1	
Article 2	
Article 3	
Article 4	
Article 5	
Article 6	
Article 7	
Article 8	
Annexes I to IV	