Technical Regulation Laying Down Energy Labelling Requirements for Electronic Displays in Lebanon (November 2023)

Notes

This section shall be removed prior to the promulgation of this Technical Regulation!

The Regulation establishing a **framework** for the setting of Energy Labelling Requirements for Energy-related Products is presented in the **Overarching Policy** Document (Annex 2). It will be promulgated before or at the same time as this Technical Regulation, as it is a Regulatory Framework on which this Technical Regulation is based.

In order for this Technical Regulation to be effective, the competent authority shall complete or adapt or confirm or amend the following key information in the document:

- The proposed date of entry into force and enforcement schedule in Article 9;
- The EU Energy Labels provided in Annex III as examples only. (Lebanese Energy Labels could be designed considering similar design aspects.)
- The number of this Technical Regulation in Annex III, 1., X;
- The code colours of the National Flag of Lebanon in Annex III, 2., (f), 1;
- The number of this Technical Regulation in Annex IV, 2nd paragraph and section 2;
- The number/date of this Technical Regulation in Annex V, Table 4.
- The proposed energy efficiency index for the different classes in Annex II section A.

Background

This document is a technical regulation establishing energy labelling requirements for electronic displays (including televisions) in Lebanon. This technical regulation goes beyond televisions. It provides more energy and environmental benefits when also applied to other electronic displays. Considering the extensive experience with MEPS and labels implementation in the European Union, and its influence on the Lebanese market, this technical regulatory document is based on the Commission Delegated Regulation (EU) 2019/2013 of 11 March 2019.

Article 1 – Purpose and Scope

1.1 This Regulation establishes requirements for the labelling of, and the provision of supplementary product information on electronic displays, including televisions, monitors and digital signage displays.

1.2 This Regulation shall not apply to the following:
(a) any electronic display with a screen area smaller than or equal to 100 square centimetres;
(b) projectors;
(c) all-in-one video conference systems;
(d) medical displays;
(e) virtual reality headsets;
(f) displays integrated or to be integrated into products;
(g) electronic displays that are components or sub-assemblies as defined in Article 3 of Regulation establishing a framework for the setting of Minimum Energy Performance (Ecodesign) Requirements for Energy related Products (ErPs);
(h) broadcast displays;
(i) security displays;
(j) digital interactive whiteboards;
(k) digital photo frames;
(l) digital signage displays which meet any of the following characteristics:

(1) designed and constructed as a display module to be integrated as a partial image area of a larger display screen area and not intended for use as a standalone display device;
(2) distributed self-contained in an enclosure for permanent outdoor use;
(3) distributed self-contained in an enclosure with a screen area less than 30 dm^2 or greater than 130 dm^2;
(4) the display has a pixel density less than 230 pixels/cm^2 or more than 3,025 pixels/cm^2;
(5) a peak white luminance in standard dynamic range (SDR) operating mode of greater than or equal to 1 000 cd/m^2;
(6) no video signal input interface and display drive allowing the correct display of a standardised dynamic video test sequence for power measurement purposes;

(m) status displays;
(n) control panels.

Article 2 – Legal Basis

This Regulation is based on the Regulation establishing a framework for the setting of Energy Labelling requirements for Energy related Products (ErPs).

Article 3 – Definitions

For the purpose of this Technical Regulation the following definitions shall apply:

(3.1) '*electronic display*' means display screen and associated electronics that, as its primary function, displays visual information from wired or wireless sources;

(3.2) '*television*' means an electronic display designed primarily for the display and reception of audio-visual signals and which consists of an electronic display and one or more tuners/receivers;

(3.3) '*tuner/receiver*' means an electronic circuit that detects television broadcast signal, such as terrestrial digital or satellite, but not internet unicast, and facilitates the selection of a TV channel from a group of broadcast channels;

(3.4) '*monitor*' or 'computer monitor' or 'computer display' means an electronic display intended for one person for close viewing such as in a desk based environment;

(3.5) 'digital photo frame' means an electronic display that displays exclusively still visual information;

(3.6) '*projector*' means an optical device for processing analogue or digital video image information, in any format, to modulate a light source and project the resulting image onto an external surface;

(3.7) '*status display*' means a display used to show simple but changing information such as selected channel, time or power consumption. A simple light indicator is not considered a status display;

(3.8) '*control panel*' means an electronic display whose main function is to display images associated with product operational status; it may provide user interaction by touch or other means to control the product operation. It may be integrated into products or specifically designed and marketed to be used exclusively with the product;

(3.9) '*all-in-one video conference system*' means a dedicated system designed for video conferencing and collaboration, integrated within a single enclosure, whose specifications shall include all of the following features:
(a) support for specific videoconference protocol ITU-T H.323 or IETF SIP as delivered by the manufacturer;
(b) camera(s), display and processing capabilities for two-way real-time video including packet loss resilience;
(c) loudspeaker and audio processing capabilities for two-way real-time hands-free audio including echo cancellation;

(d) an encryption function;
(e) HiNA

(3.10) '*HiNA*' means High Network Availability, defined as one or more of the following functionalities, but no other, as the main function(s): router, network switch, wireless network access point, hub, modem, VoIP telephone, video phone;

(3.11) '*broadcast display*' means an electronic display designed and marketed for professional use by broadcasters and video production houses for video content creation. Its specifications shall include all of the following features:
(a) colour calibration function;
(b) input signal analysis function for input signal monitoring and error detection, such as wave-form monitor/vector scope, RGB cut off, facility to check the video signal status at actual pixel resolution, interlace mode and screen marker;
(c) Serial Digital Interface (SDI) or Video over internet Protocol (VoIP) integrated with the product;
(d) not intended for use in public areas;

(3.12) '*digital interactive whiteboard*' means an electronic display which allows direct user interaction with the displayed image. The digital interactive whiteboard is designed primarily to provide presentations, lessons or remote collaboration, including the transmission of audio and video signals. Its specification shall include all of the following features:
(a) primarily designed to be installed hanging, mounted on a ground stand, set on a shelf or desktop or fixed to a physical structure for viewing by multiple people;
(b) be necessarily used with computer software with specific functionalities to manage content and interaction;
(c) integrated or designed to be specifically used with a computer for running the software in point (b);
(d) a display screen area greater than 40 dm^2;
(e) user interaction by finger or pen touch or other means such as hand, arm gesture or voice;

(3.13) '*security display*' means an electronic display whose specification shall include all of the following features:
(a) self-monitoring function capable of communicating at least one of the following information to a remote server:
- power status;
- internal temperature from anti-overload thermal sensing;
- video source;
- audio source and audio status (volume/mute);
- model and firmware version;
(b) user-specified specialist form factor facilitating the installation of the display into professional housings or consoles;

(3.14) '*digital signage display*' means an electronic display that is designed primarily to be viewed by multiple people in non-desktop based and non-domestic environments. Its specifications shall include all of the following features:
(a) unique identifier to enable addressing a specific display screen;
(b) a function disabling unauthorised access to the display settings and displayed image;
(c) network connection (encompassing a hard-wired or wireless interface) for controlling, monitoring or receiving the information to display from remote unicast or multicast but not broadcast sources;
(d) designed to be installed hanging, mounted or fixed to a physical structure for viewing by multiple people and not placed on the market with a ground stand;
(e) does not integrate a tuner to display broadcast signals;

(3.15) '*integrated'*, referring to a display which is part of another product as a functional component, means electronic displays that are not able to be operated independently from the product and that depend on it for providing their functions, including power;

(3.16) '*medical display*' means an electronic display covered by the legislation applicable to devices defined and classified as medical devices;

(3.17) '*screen area*' means the viewable 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);

(3.18) 'virtual reality headset' means a head-wearable device that provides immersive virtual reality for the wearer by displaying stereoscopic images for each eye with head motion tracking functions;

(3.19) 'point of sale' means a location where electronic displays are displayed or offered for sale, hire or hire-purchase.

Article 4 – Obligations of Suppliers

4.1 Suppliers shall ensure that:

(a) each electronic display is supplied with a label in printed form in the format and containing the information set out in Annex III;
(b) the values of the parameters included in the product information sheet, as set out in Annex V, are entered into the public part of the product database;
(c) if specifically requested by the dealer, the product information sheet shall be made available in printed form;
(d) the content of the technical documentation, as set out in Annex VI, is entered into the product database;
(e) any visual advertisement for a specific model of electronic display, including on the internet, contains the energy efficiency class and the range of efficiency classes available on the label in accordance with Annex VII and Annex VIII;
(f) any technical promotional material concerning a specific model of electronic display, including on the internet, which describes its specific technical parameters, includes the energy efficiency class of that model and the range of efficiency classes available on the label, in accordance with Annex VII;
(g) an electronic label, in the format and containing the information as set out in Annex III, shall be made available to dealers for each electronic display model;
(h) an electronic product information sheet, as set out in Annex V, is made available to dealers for each electronic display model;
(i) in addition to point (a), the label shall be printed on the packaging or stuck on it.

4.2 The energy efficiency class shall be based on the energy efficiency index calculated in accordance with Annex II.

Article 5 – Obligations of Dealers

Dealers shall ensure that:

(a) each electronic display, at the point of sale, including at trade fairs, bears the label provided by suppliers in accordance with point 1(a) of Article 4 displayed on the front of the appliance or hung on it or placed in such a way as to be clearly visible and unequivocally associated to the specific model; provided that the electronic display is kept in on-mode when visible to customers for sale, the electronic label in accordance with point 1(g) of Article 4 displayed on the screen may replace the printed label;

(b) where an electronic display model is displayed in a point of sale without any unit displayed out of the box, the label printed on the box or stuck on it shall be visible;

(c) in the event of distance selling or telemarketing, the label and product information sheet are provided in accordance with Annexes VII and VIII;

(d) any visual advertisement for a specific model of electronic display, including on the internet, contains the energy efficiency class and the range of efficiency classes available on the label, in accordance with Annex VII;

(e) any technical promotional material concerning a specific model of electronic display, including technical promotional material on the internet, which describes its specific technical parameters, includes the energy efficiency class of that model and the range of efficiency classes available on the label, in accordance with Annex VII.

Article 6 – Obligations of Service Provider on Internet Hosting Platforms

Where a hosting service provider allows the selling of electronic displays through its internet website, the service provider shall enable the showing of the electronic label and electronic product information sheet provided by the dealer on the display mechanism in accordance with the provisions of Annex VIII and shall inform the dealer of the obligation to display them.

Article 7 – Measurement Methods

The information to be provided pursuant to Articles 4 and 5 shall be obtained by reliable, accurate and reproducible measurement and calculation methods, which take into account the recognised state-of-the-art measurement and calculation methods set out in Annex IV.

Article 8 – Verification Procedure for Market Surveillance Purposes

The market surveillance authority shall apply the verification procedure laid down in Annex IX when performing the market surveillance checks referred to in Regulation establishing a framework for the setting of Energy Labelling Requirements for Energy related Products (ErPs).

Article 9 – Entry Into Force and Application

This Regulation shall enter into force on, 2 January 2025 according to the following schedule:

- From 2 January 2025, only electronic displays with Energy Efficiency classes A to E shall be allowed to be placed on the market or put into service.
- From 2 January 2026, only electronic displays with Energy Efficiency classes A to D shall be allowed to be placed on the market or put into service.
- From 2 January 2027, only electronic displays with Energy Efficiency classes A to C shall be allowed to be placed on the market or put into service.

This Regulation shall be binding in its entirety and directly applicable.

ANNEX I: Definitions applicable for the Annexes

The following definitions shall apply:

(1) '*energy efficiency index (EEI)*' means an index number for the relative energy efficiency of an electronic display, as set out in point B of Annex II;

(2) '*High Dynamic Range (HDR)*' means a method to increase the contrast ratio of the image of an electronic display by using metadata generated during the creation of the video material and that the display management circuitry interprets to produce a contrast ratio and colour rendering perceived by the human eye as more realistic than that achieved by non HDR-compatible displays;

(3) '*contrast ratio*' means the difference between the peak brightness and black level in an image;

(4) '*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 an electronic display;

(5) '*Automatic Brightness Control (ABC)*' means the automatic mechanism that, when enabled, controls the brightness of an electronic display as a function of the ambient light level illuminating the front of the display;

(6) '*default*', referring to a specific feature or setting, means the value of a specific feature as set at the factory and available when the customer uses the product for the first time and after performing a 'reset to factory settings' action, if allowed by the product;

(7) '*pixel (picture element)*' means the area of the smallest element of a picture that can be distinguished from its neighbouring elements;

(8) '*on mode*' or '*active mode*' means a condition in which the electronic display is connected to a power source, has been activated and is providing one or more of its display functions;

(9) '*forced menu*' means a specific menu, appearing upon initial start-up of the electronic display or upon a reset to factory settings, offering a set of display settings, pre-defined by the supplier;

(10) '*normal configuration*' means a display setting which is recommended to the end-user by the supplier from the initial set up menu or the factory setting that the electronic display has for the intended product use. It must deliver the optimal quality for the end user in the intended environment and for the intended use. The normal configuration is the condition in which the values for off, standby, networked standby and on mode are measured;

(11) '*brightest on mode configuration*' means the configuration of the electronic display, pre-set by the supplier, which provides an acceptable picture with the highest measured luminance;

(12) '*shop configuration*' means the configuration of the electronic display for use specifically in the context of demonstrating the electronic display, for example in high illumination (retail) conditions and not involving an auto power-off if no user action or presence is detected;

(13) '*room presence sensor*' or 'gesture detection sensor' or 'occupancy sensor' means a sensor monitoring and reacting to movements in the space around the product whose signal can trigger the switching to on mode. Lack of movement detection for a predetermined time can be used to switch into standby mode or networked standby mode;

(14) '*off mode*' means a condition in which the electronic display is connected to the mains power source and is not providing any function: the following shall also be considered as off mode:

- conditions providing only an indication of off mode condition;

- conditions providing only functionalities intended to ensure electromagnetic compatibility pursuant to relevant regulations adopted at national level;

(15) '*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;

(16) '*reactivation function*' means a function that via a remote switch, a remote control unit, an internal sensor, a timer or, for networked displays in networked standby mode, the network, provides a switch from standby mode or networked standby mode to a mode, other than off-mode, providing additional functions;

(17) '*display mechanism*' means any screen, including tactile screen or other visual technology used for displaying internet content to users;

(18) '*nested display*' means visual interface where an image or data set is accessed by a mouse click, mouse roll-over or tactile screen expansion of another image or data set;

(19) '*tactile screen*' means a screen responding to touch, such as that of a tablet computer, slate computer or a smartphone;

(20) '*alternative text*' means text provided as an alternative to a graphic allowing information to be presented in non-graphical form where display devices cannot render the graphic or as an aid to accessibility such as input to voice synthesis applications;

(21) '*External Power Supply (EPS)*' means a device which meets all of the following criteria:
(a) it is designed to convert alternating current (AC) power input from the mains power source input into one or more lower voltage direct current (DC) or AC outputs;
(b) it is used with one or more separate devices that constitute the primary load;
(c) it is contained in a physical enclosure separate from the device or devices that constitute the primary load;
(d) it is connected to the device or devices that constitute the primary load with removable or hard-wired male/ female electrical connections, cables, cords or other wirings;
(e) it has nameplate output power not exceeding 250 watts; and
(f) it is used with electrical and electronic household and office equipment;

(22) '*standardised EPS*' means an external power supply designed to provide power to various devices and that is complies with a standard issued by an international standardization organization;

(23) '*Quick Response (QR) code*' means a matrix barcode included on the energy label of a product model that links to that model's information in the public part of the product database;

(24) '*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);

(25) '*network interface*' (or '*network port*') means a wired or wireless physical interface, providing network connection, through which functions of the electronic display can be remotely activated and data received or sent. Interfaces to input data such as video and audio signals, but not originating from a network source and using a network address, are not considered to be a network interface;

(26) '*network availability*' means the capability of an electronic display to activate functions after a remotely initiated trigger has been detected by a network interface;

(27) '*networked display*' means an electronic display that can connect to a network using one of its network interfaces, if enabled;

(28) '*networked standby mode*' means a condition in which the electronic display is able to resume a function by way of a remotely initiated trigger from a network interface.

'(29) '*declared values*' means the values provided by the supplier for the stated, calculated or measured technical parameters, pursuant to Article 4(3) of Regulation establishing a framework for the setting of Energy Labelling Requirements for Energy related Products (ErPs) and in accordance with Article 4(1)(d) and Annex VI of this Technical Regulation, for the verification of compliance by the market surveillance authority;

(30) '*guarantee'* means any undertaking by the retailer or supplier to the consumer to:
(a) reimburse the price paid; or
(b) replace, repair or handle the electronic displays in any way if they do not meet the specifications set out in the guarantee statement or in the relevant advertising.

ANNEX II

A. Energy efficiency classes

The energy efficiency class of an electronic display shall be determined on the basis of its energy efficiency index for labelling (EEI_{label}) as set out in Table 1. The EEI_{label} of an electronic display shall be determined in accordance with part B of this Annex.

Table 1
Energy efficiency classes of electronic displays

Energy Efficiency Class	Energy Efficiency Index (EEI_{label})
A	$EEI_{label} < 0.30$
B	$0.30 \leq EEI_{label} < 0.40$
C	$0.40 \leq EEI_{label} < 0.50$
D	$0.50 \leq EEI_{label} < 0.60$
E	$0.60 \leq EEI_{label} < 0.75$
F	$0.75 \leq EEI_{label} < 0.90$
G	$0.90 \leq EEI_{label}$

B. Energy Efficiency Index (EEI_{label})

The Energy Efficiency Index (EEI_{label}) of the electronic display shall be calculated using the following equation:

$$EEIlabel = \frac{(Pmeasured + 1)}{\left(3\ x\ \left[90\ x\ tanh\left(0.025 + 0.0035\ x\ (A - 11)\right) + 4\right] + 3\right) + corrl}$$

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 set as indicated in Table 2;

$corr_l$ is a correction factor set as indicated in Table 3.

Table 2
Measurement of $P_{measured}$

Dynamic Range level	$P_{measured}$
Standard Dynamic Range (SDR): $Pmeasured_{SDR}$	Power demand in Watts (W) in on mode, measured when displaying standardised test sequences of moving picture from dynamic broadcast content. Where allowances are applicable according to part C of this Annex, they should be deducted from $P_{measured}$.
High Dynamic Range (HDR): $Pmeasured_{HDR}$	Power demand in Watts (W) in on mode, measured as for $Pmeasured_{SDR}$ but with the HDR functionality activated by metadata in the standardised HDR test sequences. Where allowances are applicable according to part C of this Annex, they should be deducted from $P_{measured}$.

Table 3
$corr_l$ value

Electronic Display type	$corr_l$ value
Television	0.0
Monitor	0.0
Digital signage	0.00062*(lum-500)*A

	where 'lum' is the peak white luminance, in cd/m^2, of the brightest on mode configuration of the electronic display and A is the screen area in dm^2

The declared values of the on mode power ($P_{measured}$) and viewing surface area (A) as listed in Table 5 of Annex VI shall be used for the EEI calculation.

C. Allowances and adjustments for the purpose of the EEI_{label} calculation

Electronic displays with automatic brightness control (ABC) shall qualify for a 10 % reduction in $P_{measured}$ if they meet all of the following requirements:

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

(b) the value of $P_{measured}$, in the normal configuration, is measured, with ABC disabled or if ABC cannot be disabled, in an ambient light condition of 100 lux measured at the ABC sensor;

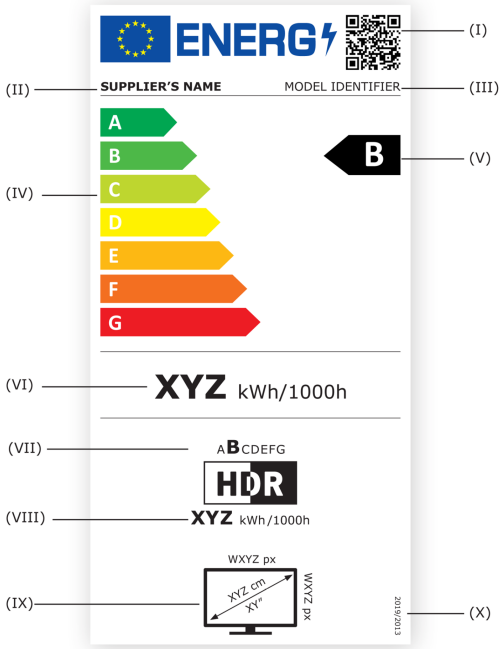
(c) if applicable, the value of $P_{measured}$ with ABC disabled shall be equal to or greater than the on mode power measured with ABC enabled in an ambient light condition of 100 lux measured at the ABC sensor;

(d) with ABC enabled, the measured value of the on mode power must decrease by 20 % or more when the ambient light condition, measured at the ABC sensor, is reduced from 100 lux to 12 lux;

(e) the ABC control of the display screen luminance meets all of the following characteristics when the ambient light condition measured at the ABC sensor changes:
- the measured screen luminance at 60 lux is between 65 % and 95 % of the screen luminance measured at 100 lux;
- the measured screen luminance at 35 lux is between 50 % and 80 % of the screen luminance measured at 100 lux;
- the measured screen luminance at 12 lux is between 35 % and 70 % of the screen luminance measured at 100 lux.

ANNEX III: Label for electronic displays

1. LABEL



The following information shall be included in the label for electronic displays:

I. QR code;

II. supplier's name or trade mark;

III. supplier's model identifier;

IV. scale of energy efficiency classes from A to G;

V. the energy efficiency class determined in accordance with point B of Annex II when using $Pmeasured_{SDR}$;

VI. on mode energy consumption in kWh per 1,000 h, when playing SDR content, rounded to the nearest integer;

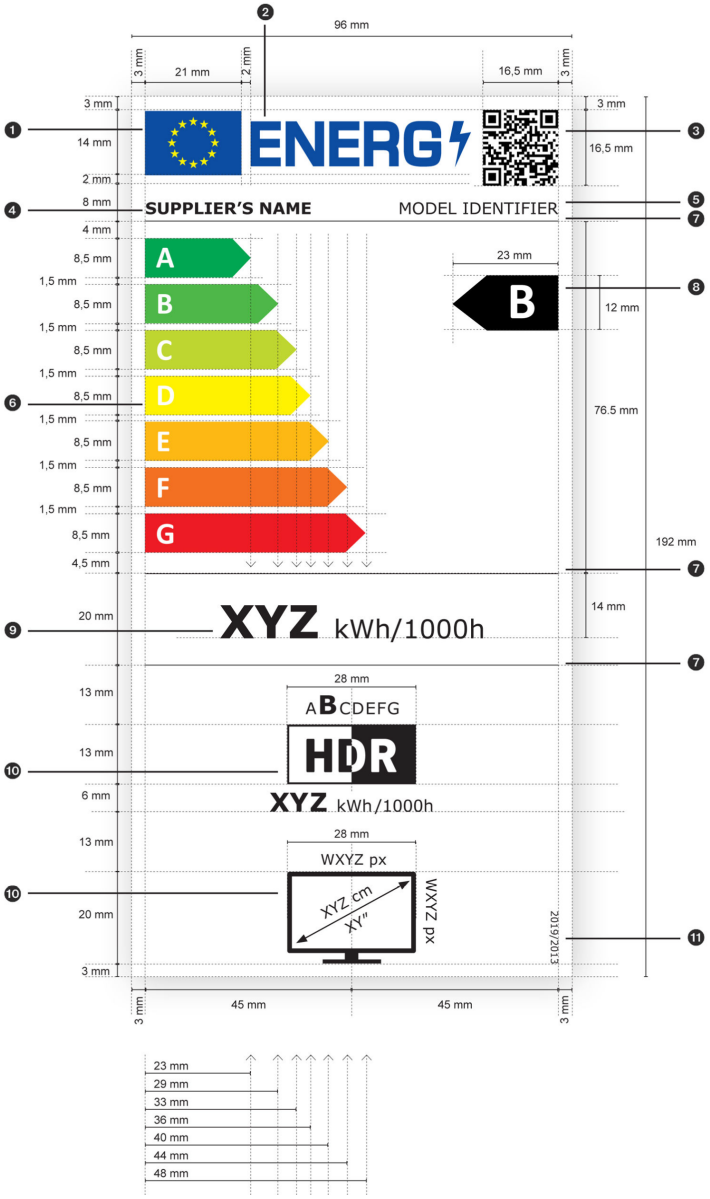
VII. the energy efficiency class determined in accordance with point B of Annex II when using $Pmeasured_{HDR}$;

VIII. the on mode energy consumption in kWh per 1,000 h, when playing HDR content, rounded to the nearest integer;

IX. visible screen diagonal in centimetres and inches and horizontal and vertical resolution in pixels;

X. the number of this Technical Regulation, that is ……

2. LABEL DESIGN



Whereby:

(a) The label shall be at least 96 mm wide and 192 mm high. Where the label is printed in a larger format, its content shall nevertheless remain proportionate to the specifications above. For electronic displays with a size of the diagonal of the visible area less than 127 cm (50 inches), the label can be printed scaled down, but not less than 60 % of its normal size; its content shall nevertheless be proportionate to the specifications above and the QR code still readable by a commonly available QR reader, such as those integrated in a smartphone.

(b) The background of the label shall be 100 % white.

(c) The typefaces shall be Verdana and Calibri.

(d) The dimensions and specifications of the elements constituting the label shall be as indicated in the label design.

(e) Colours shall be CMYK — cyan, magenta, yellow and black, following this example: 0,70,100,0: 0 % cyan, 70 % magenta, 100 % yellow, 0 % black.

(f) The label shall fulfil all the following requirements (numbers refer to the figure above):

1. the colours of the National Flag of Lebanon shall be as follows:
   - the background: …,…,…,…;
   - the Cedar tree: …,…,…,…;

2. the colour of the energy logo shall be: 100,80,0,0;

3. the QR code shall be 100 % black;

4. the supplier's name shall be 100 % black and in Verdana Bold 9 pt;

5. the model identifier shall be 100 % black and in Verdana Regular 9 pt;

6. the A to G scale shall be as follows:
   - the letters of the energy efficiency scale shall be 100 % white and in Calibri Bold 19 pt; the letters shall be centred on an axis at 4.5 mm from the left side of the arrows;
   - the colours of the A to G scale arrows shall be as follows:
     - A-class: 100,0,100,0;
     - B-class: 70,0,100,0;
     - C-class: 30,0,100,0;
     - D-class: 0,0,100,0;
     - E-class: 0,30,100,0;
     - F-class: 0,70,100,0;
     - G-class: 0,100,100,0;

7. the internal dividers shall have a weight of 0.5 pt and the colour shall be 100 % black;

8. the letter of the energy efficiency class shall be 100 % white and in Calibri Bold 33 pt. The energy efficiency class arrow and the corresponding arrow in the A to G scale shall be positioned in such a way that their tips are aligned. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow which shall be 100 % black;

9. the energy consumption value in SDR shall be in Verdana Bold 28 pt; 'kWh/1 000h' shall be in Verdana Regular 16 pt. The text shall be centred and in 100 % black;

10. the HDR and the screen pictograms shall be 100 % black and as shown as in the label design; the texts (numbers and units) shall be 100 % black, and as follows:
    - above the HDR pictogram, the letters of energy efficiency classes (A to G) shall be centred, with the letter of the applicable energy efficiency class in Verdana Bold 16 pt and the other letters in Verdana Regular 10 pt; under the HDR pictogram, the energy consumption value in HDR shall be centred, in Verdana Bold 16 pt with 'kWh/1 000h' in Verdana Regular 10 pt;
    - the texts of the screen pictogram shall be in Verdana Regular 9 pt and placed as in the label design;
    - If the electronic display does not support HDR, the HDR pictogram and the letters of energy efficiency classes are not displayed. The screen pictogram, indicating screen size and resolution, shall be vertically centred in the area below the indication of the energy consumption.

11. the number of the regulation shall be 100 % black and in Verdana Regular 6 pt.

ANNEX IV: Measurement methods and calculations

For the purposes of compliance and verification of compliance with the requirements of this Technical Regulation, measurements and calculations shall be made using referenced standards if available or using other reliable, accurate and reproducible methods which take into account the generally recognised state-of-the-art. They shall be in line with the provisions set out in this Annex.

In the absence of existing relevant standards, the transitional testing methods set out in Annex IIIa to Technical Regulation …… laying down Minimum Energy Performance (Ecodesign) Requirements for Electronic Displays, or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art, shall be used.

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

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

1. MEASUREMENTS OF ON MODE POWER DEMAND

Measurements of the on-mode power demand shall fulfil all of the following general conditions:

(a) electronic displays shall be measured in the normal configuration;

(b) measurements shall be made at an ambient temperature of 23 °C +/- 5 °C;

(c) measurements shall be made using a dynamic broadcast video signal test loops representing typical broadcast content for electronic displays in standard dynamic range (SDR). For the HDR measurement the electronic display must automatically and correctly respond to the HDR metadata in the test loop. The measurement shall be the average power consumed over 10 consecutive minutes;

(d) measurements shall be made after the electronic display has been in the off-mode or, if an off-mode is not available, in standby mode for a minimum of 1 hour immediately followed by a minimum of 1 hour in the on mode and shall be completed before a maximum of 3 hours in on-mode. The relevant video signal shall be displayed during the entire on mode duration. For electronic displays that are known to stabilise within 1 hour, these durations may be reduced if the resulting measurement can be shown to be within 2 % of the results that would otherwise be achieved using the durations described here;

(e) where ABC is available, measurements shall be made with it switched off. If ABC cannot be switched off, then the measurements shall be performed in an ambient light condition of 100 lux measured at the ABC sensor.

2. MEASUREMENTS OF PEAK WHITE LUMINANCE

Measurements of the peak white luminance shall be made:

(a) with a luminance meter, detecting that portion of the screen exhibiting a full (100 %) white image, which is part of a ‘full screen test’ pattern not exceeding the average picture level (APL) point where any power limiting or other irregularity occurs;

(b) without disturbing the luminance meter’s detection point on the electronic display whilst switching between the normal configuration and the brightest on mode configuration.

Measurements of Standard Dynamic Range, High Dynamic Range, screen luminance for Automatic Brightness Control, Peak White luminance ratio and other luminance measurements shall be made as detailed in Annex III, Table 3a of Technical Regulation …… laying down Minimum Energy Performance (Ecodesign) Requirements for Electronic Displays.

ANNEX V: Product information sheet

Pursuant to point 3.1(b) of Article 4, the supplier shall enter into the product database the information as set out in Table 4.

The product manual or other literature provided with the product shall clearly indicate the link to the model in the product database as a human-readable Uniform Resource Locator (URL) or as QR-code or provide the product registration number.

Table 4
Information, order and format of the product information sheet

	Information	Value and precision	Unit	Notes
1	Supplier's name or trade mark ([2]) ([3]).		TEXT	
	Supplier's address ([2]) ([3]) ([4]).			Information as from the supplier registration in the product database.
2	Model identifier ([2])		TEXT	
3	Energy efficiency class for standard Dynamic Range (SDR)	[A/B/C/D/E/F/G]		
4	On mode power demand in Standard Dynamic Range (SDR)	X,X	W	Rounded to the first decimal place for power values below 100 W and rounded to the first integer for power values equal or above 100 W.
5	Energy efficiency class (HDR)	[A/B/C/D/E/F/G] or n.a.		If the product database automatically generates the definitive content of this cell, the supplier shall not enter this data. Value set to "n.a." (not applicable) if HDR not implemented.
6	On mode power demand in High Dynamic Range (HDR), if implemented	X,X	W	Rounded to the first decimal place for power values below 100 W, and rounded to the integer for power values from 100 W (value set to 0 (zero) if "not applicable").
7	Off mode, power demand, if applicable	X,X	W	
8	Standby mode power demand, if applicable	X,X	W	
9	Networked standby mode power demand, if applicable	X,X	W	
10	Electronic display category	[television/monitor/signage/ other]		Select one
11	Size ratio	X : Y	Integer	E.g. 16:9, 21:9, etc.
12	Screen resolution	X x Y	pixels	Horizontal and vertical pixels
13	Screen diagonal	X,X	cm	Rounded to one decimal place.

14	Screen diagonal		X	inches	Optional, in inches rounded to the nearest integer.
15	Visible screen area		X,X	dm^2	Rounded to one decimal place
16	Panel technology used		TEXT		E.g. LCD/LED LCD/QLED LCD/ OLED/MicroLED/QDLED/SED/ FED/EPD, etc.
17	Automatic Brightness Control (ABC) available		[YES/NO]		Must be activated as default (if YES)
18	Voice recognition sensor available		[YES/NO]		
19	Room presence sensor available		[YES/NO]		Must be activated as default (if YES).
20	Image refresh frequency rate (default)		X	Hz	
21	Minimum guaranteed availability of software and firmware updates (from the date of end of the placement on the market) ([2]) ([3])		X	Years	As set out in Annex II E, point 1 of Technical Regulation ……. laying down Minimum Energy Performance (Ecodesign) Requirements for Electronic Displays ([1])
22	Minimum guaranteed availability of spare parts (from the date of end of the placement on the market) ([2]) ([3])		X	Years	As set out in Annex II E, point 1 of Technical Regulation ……. laying down Minimum Energy Performance (Ecodesign) Requirements for Electronic Displays
23	Minimum guaranteed product support ([2]) ([3])		X	Years	As set out in Annex II E, point 1 of Technical Regulation ……. laying down Minimum Energy Performance (Ecodesign) Requirements for Electronic Displays
	Minimum duration of the general guarantee offered by the supplier ([2]) ([3])		X	Years	
24	Power supply type		Internal/External/Standardised external		Select one.
25	External power supply (non-standardised and included in the product box)				
	i			TEXT	Description
	ii	Input voltage	X	V	
	iii	Output voltage	X,X	V	
26	External standardised power supply (or suitable one if not included in the product box)				
	i	Supported standard name or list		TEXT	
	ii	Required output voltage	X,X	V	

	iii	Required delivered current (minimum)	X,X	A	
	iv	Required current frequency	XX	Hz	

(1) Technical Regulation ……. of …… laying down Minimum Energy Performance (Ecodesign) Requirements for Electronic Displays pursuant to Regulation establishing a framework for the setting of Minimum Energy Performance (Ecodesign) Requirements for Energy related Products.

(2) This item shall not be considered relevant for the purposes of Article 3(6) of Regulation establishing a framework for the setting of Energy Labelling Requirements for Energy related Products.

(3) Changes to this item shall not be considered relevant for the purposes of paragraph 2 of Article 5 of Regulation establishing a framework for the setting of Energy Labelling Requirements for Energy related Products.

(4) The supplier shall not enter these data for each model if automatically provided by the database.

ANNEX VI: Technical documentation

The technical documentation referred to in point 1(d) of Article 4 shall include:

(1) a general description of the model allowing it to be unequivocally and easily identified;

(2) references to the national standards applied or other measurement standards used;

(3) specific precautions to be taken when the model is assembled, installed, maintained or tested;

(4) the values for the technical parameters set out in Table 5; these values are considered as the declared values for the purpose of the verification procedure in Annex IX;

(5) the details and the results of calculations performed in accordance with Annex IV;

(6) testing conditions if not described sufficiently in point (2);

(7) equivalent models, if any, including model identifiers.

These elements shall also constitute the mandatory specific parts of the technical documentation that the supplier shall enter into the database, pursuant to point 9.5 of Article 9 of Regulation establishing a framework for the setting of Energy Labelling Requirements for Energy related Products.

(8) Additional information requirements:

(a) input terminal for the audio and video test signals used for testing;

(b) information and documentation on the instrumentation, set-up and circuits used for electrical testing;

(c) any other testing condition not described or determined in point (b);

(d) for on mode:

(i) the characteristics of the dynamic broadcast-content video signal representing typical broadcast TV content; for the HDR dynamic broadcast content video signal the electronic display must be automatically switched to HDR mode by the HDR metadata of that signal;
(ii) the sequence of steps for achieving a stable condition with respect to power demand level; and
(ii) the picture settings used for the brightest peak white luminance measurement and the test pattern for the video signal used for the measurement.

(e) For standby and off mode:

(iii) the measurement method used;
(ii) description of how the mode was selected or programmed including any enhanced reactivation functions; and
(iii) sequence of events to reach the condition where the electronic display automatically changes mode.

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

(i) confirmation that the electronic display prioritises the computer display power management protocols. Any deviation from the protocols should be reported;

(g) For the networked electronic displays only:

(i) number and type of network interfaces and, except for wireless network interfaces, their position in the electronic display;
(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 HiNA display or display with HiNA functionality; and
(iii) information whether networked electronic display provides functionality allowing the power management function and/or the end-user to 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 including enhanced reactivation function power allowance where applicable.

(h) For each type of network port:

(i) the default time (mm:ss) after which the power management function, switches the display into a condition providing networked standby; and
(ii) the trigger to be used to reactivate the electronic display.

(9) where the information included in the technical documentation file for a particular electronic display model has been obtained:

(a) from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer or

(b) by calculation on the basis of design or by extrapolation from another model of the same or of a different supplier, or both;

the technical documentation shall include, as appropriate, the details of such calculation, the assessment undertaken by suppliers to verify the accuracy of the calculation and, where appropriate, the declaration of identity between the models of different suppliers; and

(10) the contact details of the person empowered to bind the supplier if not included in the technical information uploaded into the database, shall be made available, on request, to the market surveillance authority for carrying out their tasks under this Technical Regulation.

Table 5
Technical parameters of the model and declared values

	Parameter	Parameter value and precision	Unit	Declared value
General				
1	Supplier's name or trade mark	TEXT		
2	Model identifier	TEXT		
3	Energy efficiency class for Standard Dynamic Range (SDR)	[A/B/C/D/E/F/G]	A – G	
4	On mode power demand in Standard Dynamic Range (SDR)	XXX,X	W	
5	Energy efficiency class for High Dynamic Range (HDR), if implemented	[A/B/C/D/E/F/G] or n.a.	A – G	
6	On mode power demand in High Dynamic Range (HDR)	XXX,X	W	
7	Off mode, power demand	X,X	W	
8	Standby mode power demand	X,X	W	
9	Networked standby mode power demand	X,X	W	

10	Electronic display category	[television/monitor/signage/ other]			TEXT	
11	Size ratio	XX	:	XX		
12	Screen resolution (pixels)	X	×	X		
13	Screen diagonal	XXX,X			cm	
14	Screen diagonal	XX			inches	
15	Visible screen area	XXX,X			dm^2	
16	Panel technology used	TEXT				
17	Automatic Brightness Control (ABC) available	[YES/NO]				
18	Voice recognition sensor available	[YES/NO]				
19	Room presence sensor available	[YES/NO]				
20	Image refresh frequency rate (normal configuration)	XXX			Hz	
21	Minimum guaranteed availability of software and firmware updates (from the date of end of the placement on the market (as set out in Annex II E, point 1 of Technical Regulation laying down Minimum Energy Performance (Ecodesign) Requirements for Electronic Displays.	XX			Years	
22	Minimum guaranteed availability of spare parts (from the date of end of the placement on the market, as set out in Annex II E, point 1 of Technical Regulation laying down Minimum Energy Performance (Ecodesign) Requirements for Electronic Displays.	XX			Years	
23	Minimum guaranteed product support (from the date of end of the placement on the market, as set out Annex II E, point 1 of Technical Regulation laying down Minimum Energy Performance (Ecodesign) Requirements for Electronic Displays:	XX			Years	
	Minimum duration of the general guarantee offered by the supplier	XX			Years	
For On-mode						
24	Peak white luminance of the brightest on mode configuration.	XXXX			cd/m^2	
25	Peak white luminance of the normal configuration.	XXXX			cd/m^2	
26	Peak white luminance ratio (calculated as value of "Peak white luminance of the normal configuration" divided by value of "Peak white luminance of the brightest on mode configuration" multiplied by 100).	XX,X			%	
For Auto Power Down (APD)						
27	Length of time in on mode before the electronic display automatically switches to standby, off mode, or	XX:XX			mm:ss	

	another condition which does not exceed the applicable power demand requirements for off mode or standby mode.			
28	For televisions: the length of time, following the last user interaction, before the television automatically switches to standby, off-mode, or another condition which does not exceed the applicable power consumption requirements for off-mode or standby-mode;	XX:XX	mm:ss	
29	For televisions equipped with room presence sensor: the length of time, when no presence is detected, before the television automatically switches to standby, off-mode, or another condition which does not exceed the applicable power demand requirements for off mode or standby mode;	XX:XX	mm:ss	
30	For electronic displays other than televisions and broadcast displays: the length of time, when no input is detected, before the electronic display automatically switches to standby, off-mode, or another condition which does not exceed the applicable power consumption requirements for off mode or standby mode;	XX:XX	mm:ss	
For ABC If available and activated by default				
31	Percentage of power reduction due to ABC action between the 100 lux and 12 lux ambient light conditions.	XX,X	%	
32	On mode power at 100 lux ambient light at the ABC sensor	XXX,X	W	
33	On mode power at 12 lux ambient light at the ABC sensor	XXX,X	W	
34	Screen luminance at 100 lux ambient light at the ABC sensor (*)	XXX	cd/m^2	
35	Screen luminance at 60 lux ambient light at the ABC sensor (*)	XXX	cd/m^2	
36	Screen luminance at 35 lux ambient light at the ABC sensor (*)	XXX	cd/m^2	
37	Screen luminance at 12 lux ambient light at the ABC sensor (*)	XXX	cd/m^2	
For Power Supply				
38	Power supply type	Internal/External		
39	Standard references (if relevant)		TEXT	
40	Input voltage	XXX,X	V	
41	Output voltage	XXX,X	V	
42	Input current (max)	XXX,X	A	
43	Output current (min)	XXX,X	A	

(*) the values of ABC luminance-related parameters are indicative, and the verification is against the applicable ABC-related requirements.

ANNEX VII: Information to be provided in visual advertisements, in technical promotional material in distance selling and in telemarketing, except distance selling on the internet

1. In visual advertisements, for the purposes of ensuring conformity with the requirements laid down in point 3.1(e) of Article 4 and point (d) of Article 5, the energy efficiency class and the range of efficiency classes available on the label shall be shown as set out in point 4 of this Annex.

2. In technical promotional material, for the purposes of ensuring conformity with the requirements laid down in point 3.1(f) of Article 4 and point (e) of Article 5 the energy class and the range of efficiency classes available on the label shall be shown as set out in point 4 of this Annex.

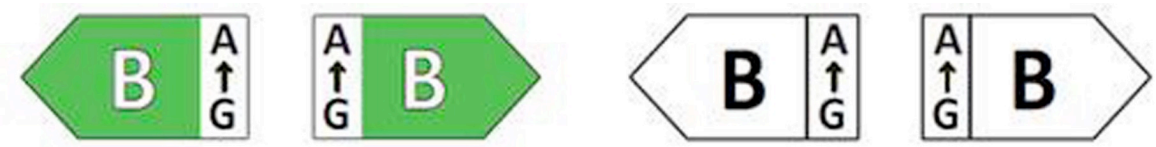
3. Any paper-based distance selling must show the energy class and the range of efficiency classes available on the label as set out in point 4 of this Annex.

4. The energy efficiency class and the range of energy efficiency classes shall be shown, as indicated in Figure 1, with:

   (a) an arrow, containing the letter of the energy efficiency class in 100 % white, Calibri Bold and in a font size at least equivalent to that of the price, when the price is shown;
   (b) the colour of the arrow matching the colour of the energy efficiency class;
   (c) the range of available energy efficiency classes in 100 % black; and,
   (d) the size shall be such that the arrow is clearly visible and legible. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow, with a border of 0.5 pt in 100 % black placed around the arrow and the letter of the energy efficiency class.

   By way of derogation, if the visual advertisement, technical promotional material or paper-based distance selling is printed in monochrome, the arrow can be in monochrome in that visual advertisement, technical promotional material or paper-based distance selling.

Figure 1
Coloured/monochrome left/right arrow, with range of energy efficiency classes indicated.



5. Telemarketing-based distance selling must specifically inform the customer of the energy efficiency class of the product and of the range of energy efficiency classes available on the label, and that the customer can access the label and the product information sheet through the product database website, or by requesting a printed copy.

6. For all the situations mentioned in points 1 to 3 and 5, it must be possible for the customer to obtain, on request, a printed copy of the label and the product information sheet.

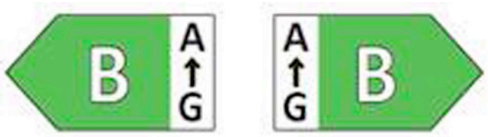
ANNEX VIII: Information to be provided in the case of distance selling through the internet

1. The appropriate label made available by suppliers in accordance with point 3.1(g) of Article 3 shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the label is clearly visible and legible and shall be proportionate to the size specified in point 2(a) of Annex III. The label may be displayed using a nested display, in which case the image used for accessing the label shall comply with the specifications laid down in point 3 of this Annex. If a nested display is applied, the label shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the image.

2. The image used for accessing the label in the case of nested display, as indicated in Figure 2, shall:

   (a) be an arrow in the colour corresponding to the energy efficiency class of the product on the label;
   (b) indicate the energy efficiency class of the product on the arrow in 100 % white, Calibri Bold and in a font size equivalent to that of the price;
   (c) have the range of available energy efficiency classes in 100 % black; and,
   (d) have one of the following two formats, and its size shall be such that the arrow is clearly visible and legible. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow, with a visible border in 100 % black placed around the arrow and the letter of the energy efficiency class:

Figure 2
Coloured left/right arrow, with range of energy efficiency classes indicated.



3. In the case of nested display, the sequence of display of the label shall be as follows:

   (a) the image referred to in point 2 of this Annex shall be shown on the display mechanism in proximity to the price of the product;
   (b) the image shall link to the label set out in Annex III;
   (c) the label shall be displayed after a mouse click, mouse roll-over or tactile screen expansion on the image;
   (d) the label shall be displayed by pop up, new tab, new page or inset screen display;
   (e) for magnification of the label on tactile screens, the device conventions for tactile magnification shall apply;
   (f) the label shall cease to be displayed by means of a close option or other standard closing mechanism; and
   (g) the alternative text for the graphic, to be displayed on failure to display the label, shall be the energy efficiency class of the product in a font size equivalent to that of the price.

4. The appropriate product information sheet made available by suppliers in accordance with point 3.1(h) of Article 4 shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the product information sheet is clearly visible and legible. The product information sheet may be displayed using a nested display or by referring to the product database in which case the link used for accessing the product information sheet shall clearly and legibly indicate 'Product information sheet'. If a nested display is used, the product information sheet shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the link.

ANNEX IX: Verification procedure for market surveillance purposes

The verification tolerances defined in this Annex relate only to the verification by the market surveillance authority of the declared values and shall not be used by the supplier 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. The values and classes published on the label or in the product information sheet shall not be more favourable for the supplier than the values declared in the technical documentation.

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

As part of verifying the compliance of a product model with the requirements laid down in this Technical Regulation, the market surveillance authority shall apply the following procedure:

(1) The market surveillance authority 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 4.3 of Article 4 of Regulation establishing a framework for the setting of Energy Labelling Requirements for Energy related Products and, where applicable, the values used to calculate these values are not more favourable for the supplier than the corresponding values given in the test reports;

(b) the values published on the label and in the product information sheet are not more favourable for the supplier than the declared values and the indicated energy efficiency class is not more favourable for the supplier than the class determined by the declared values; and

(c) when the market surveillance authority tests 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 6.

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

(4) If the result referred to in point 2(c) is not achieved, the market surveillance authority shall select three additional units of the same model for testing. As an alternative, the three additional units selected may be one or more equivalent models.

(5) 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 tolerances given in Table 6.

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

The market surveillance authority shall use the measurement and calculation methods set out in Annex IV.

The market surveillance authority shall only apply the verification tolerances that are set out in Table 6 and shall only use the procedure described in points 1 to 7 for the requirements referred to in this Annex. No other tolerances shall be applied.

Table 6
Verification tolerances.

Parameter	Verification tolerances
On mode power demand ($P_{measured}$, Watts).	The determined value (**) shall not exceed the declared value by more than 7 %.
Off mode, standby, and networked standby mode power demand in Watts, as applicable.	The determined value (**) shall not exceed the declared value by more than 0.10 Watt if the declared value is 1.00 Watt or less, or by more than 10 % if the declared value is more than 1.00 Watt.
Visible screen area.	The determined value (*) shall not be lower than the declared value by more than 1 % or 0.1 dm^2, whichever is smaller.
Visible screen diagonal in centimetres.	The determined value (*) shall not be different from the declared value by more than 1 cm.
The screen resolution in horizontal and vertical pixels.	The determined value (*) shall not deviate from the declared value.
Peak white luminance.	The determined value (**) shall not be lower than the declared value by more than 8 %.
Length of time in on mode before the electronic display automatically switches to standby, off mode, or another condition which does not exceed the applicable power demand requirements for off mode or standby mode.	The determined value (*) shall not exceed the declared value by more than 5 seconds.
For televisions: the length of time, following the last user interaction, before the television automatically switches to standby, off-mode, or another condition which does not exceed the applicable power consumption requirements for off-mode or standby-mode.	The determined value (*) shall not exceed the declared value by more than 5 seconds.
For televisions equipped with room presence sensor: the length of time, when no presence is detected, before the television automatically switches to standby, off-mode, or another condition which does not exceed the applicable power demand requirements for off mode or standby mode.	The determined value (*) shall not exceed the declared value by more than 5 seconds.
For electronic displays other than televisions and broadcast displays: the length of time, when no input is detected, before the electronic display automatically switches to standby, off-mode, or another condition which does not exceed the applicable power consumption requirements for off mode or standby mode.	The determined value (*) shall not exceed the declared value by more than 5 seconds.

(*) In the case that the determined value for a single unit does not comply, the model and all equivalent models shall be considered not to comply with this Technical Regulation.

(**) In the case of three additional units tested as prescribed in point 4, the determined value means the arithmetic mean of the values determined for these three additional units.