TEST REPORT

Ecodesign and Energy Label Requirements for Electronic Displays

Report Number.....:	NSL-291020001-2
Date of issue.....:	November 07, 2020
Total number of pages.....:	18
Tested by (name + signature).....:	Andy Lu
Approved by (name + signature)...:	David Liu
Applicant's name.....:	Changhzou Shincobroad Electronics Co., Ltd
Address.....:	No.8 West Taihu Road, Xinbei District, Changzhou, Jiangsu, China
Manufacture's name.....:	Changhzou Shincobroad Electronics Co., Ltd
Address.....:	No.8 West Taihu Road, Xinbei District, Changzhou, Jiangsu, China
Test specification:	
Standard.....:	**Directive 2009/125/EC** **(EU) 2019/2013** **(EU) 2019/2021**
Test Report form(s) Originator.....:	NSL
Non-standard test method.....:	N/A
Test specification:	
Testing location/Address.....:	Suzhou New-Standard Laboratory Co.,Ltd No.60 Chuangye Street, New District, Suzhou, China
Test item description.....:	LED TV
Trade Mark.....:	BOLVA
Model/Type reference.....:	LED-24DC
Ratings.....:	Input: 12VDC 3A 36W

General disclaimer:

The test results presented in this report relate only to the object tested.

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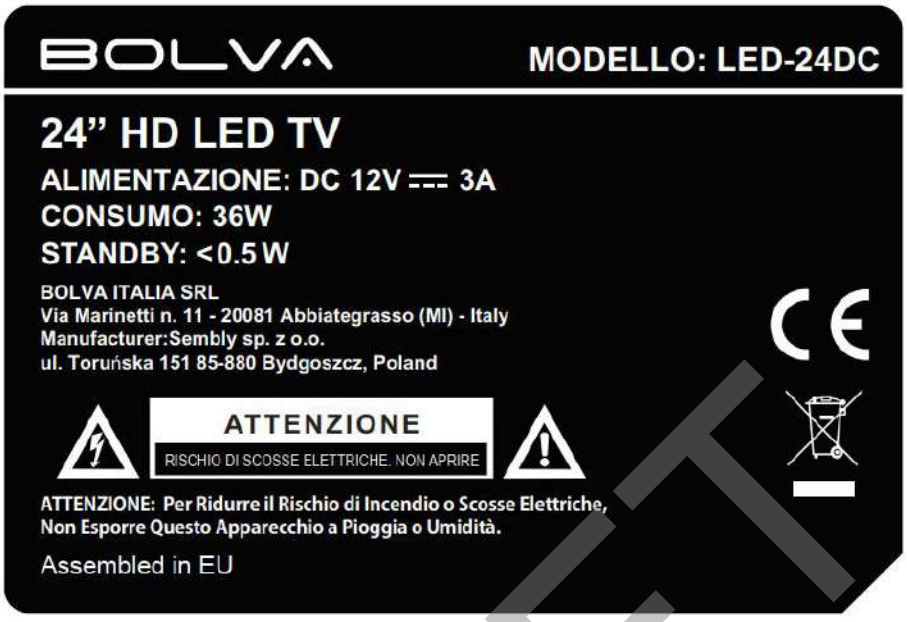
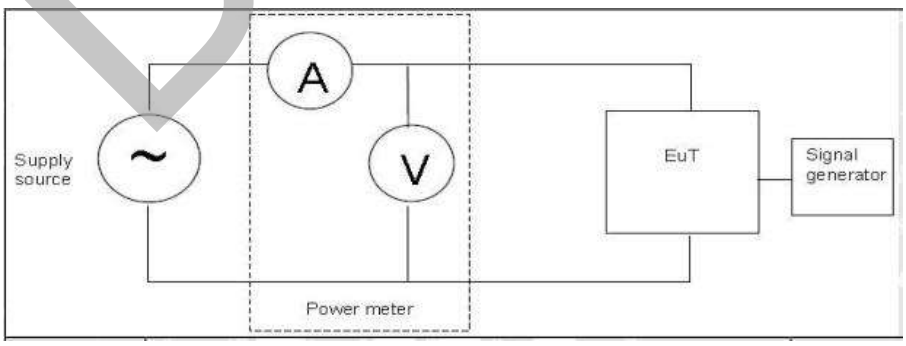
Summary of testing: Pass	
Tests performed: SDR On mode,Standby mode,and luminaires on SDR mode and brightness mode performed. **Model Difference:** Single model	**Testing location:** No.60 Chuangye Street, New District, Suzhou, China

Copy of marking plate:

The artwork below may be only a draft.



Test item particulars.....:	**LED TV**
Source of digital signal……..:	**HDMI**
Possible test case verdicts:	
- test case does not apply to the test object	**N/A**
- test object does meet the requirement	**P (Pass)**
- test object does not meet the requirement	**F (Fail)**
- test object does not meet the requirement	**--(Not verdict)**
Testing	
Date of receipt of test item	**October 27, 2020**
Date (s) of performance of tests	**November 03, 2020**
General remarks:	
Throughout this report a ☐ comma / ☒ point is used as the decimal separator.	
Name and address of factory (ies)..... :	Changzhou Shincobroad Electronics Co.,Ltd No.8,West Taihu Road,Xinbei District,Changzhou,Jiangsu,China
Test Circuit	

Information, order and format of the product information sheet

	Information	Value and precision	Unit
1	Supplier's name or trade mark	BOLVA	
2	Supplier's model identifier	LED-24DC	
3	Energy efficiency class for standard Dynamic Range (SDR)	F	
4	On mode power demand for Standard Dynamic Range (SDR)	20.2	
5	Energy efficiency class (HDR)	No	
6	On mode power demand in High Dynamic Range (HDR) mode	No	
7	Off mode, power demand	N/A	
8	Standby mode power demand	0.19	W
9	Networked standby mode power demand	N/A	
10	Electronic display category	Television	
11	Size ratio	16:9	
12	Screen resolution (pixels)	Panel Model:CC240PV1D Pixels:1920X1080	
13	Screen diagonal	60.5	cm
14	Screen diagonal	23.8	inches
15	Visible screen area	1562.5	cm2
16	Panel technology used	LCD	
17	Automatic Brightness Control (ABC) available	No	
18	Voice recognition sensor available	No	
19	Room presence sensor available	No	
20	Image refresh frequency rate	50	
21	Minimum guaranteed availability of software and firmware updates (until):	03.12.2028	
22	Minimum guaranteed availability of spare parts (until):	03.12.2023	
23	Minimum guaranteed product support (until):	03.12.2025	

24	Power supply type:		External	
i	External standardised power supply (included in the product box)	Standard name	Switching Adaptor Model:SOY-1200300EU-056	
	Input voltage		100-240Vac	
	Output voltage		12Vdc,3A	
ii	External standardised suitable power supply (if not included in the product box)	Standard name	N/A	
	Required output voltage		N/A	
	Required delivered current		N/A	
	Required current frequency		N/A	

Measured technical parameters

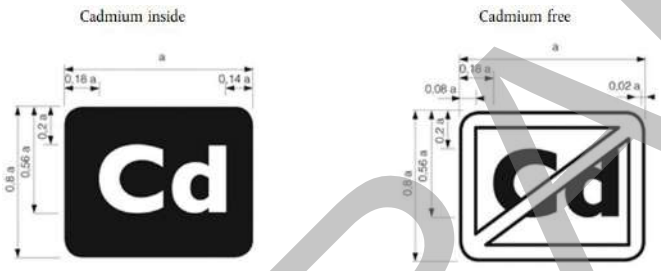
		Value and precision	Unit
	General		
1	Ambient temperature	23.5	ºC
2	Test voltage	230	V
3	Frequency	50	Hz
4	Total harmonic distortion (THD) of the electricity supply system		
	For On-mode		
5	Peak white luminance of the brightest on mode configuration	170	cd/m^2
6	Peak white luminance of the normal configuration	115	cd/m^2
7	Peak white luminance ratio (calculated)	67.6	%
	For APD		
8	Duration of the on mode condition, before the electronic display reaches automatically standby, or off mode, or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode.	See below	
	For televisions: the measured value of the time before the television automatically reaches standby, or offmode, or another condition which does not exceed the applicable power consumption requirements for offmode and/or standby-mode following the last user interaction;	4 hours	
	For televisions equipped with room presence sensor: the measured value of the time before the television automatically reaches standby, or off-mode, or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when no presence is detected;	No room presence sensor	
	Other electronic displays than televisions and broadcast displays: The measured value of the time before the electronic display automatically reaches	Equipment is a television	

	standby, or offmode, or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when no input is detected;		
	For ABC		N/A
9	Average on mode power demand of the electronic display at an ambient light intensity, measured at the ABC sensor of the electronic display, of 100 lux and 12 lux.	No ABC function	N/A
10	Percentage of power reduction due to ABC action between the 100 lux and 12 lux ambient light conditions.		N/A
11	Display peak white luminance at each of the following ambient light intensities measured at the ABC sensor of the electronic display, 100 lux, 60 lux, 35 lux, 12 lux.		N/A
	Measured on mode power at 100 lux ambient light at the ABC sensor		N/A
	Measured on mode power at 12 lux ambient light at the ABC sensor		N/A
	The measured screen luminance at 60 lux ambient light at the ABC sensor		N/A
	The measured screen luminance at 35 lux ambient at the ABC sensor		N/A
	The measured screen luminance at 12 lux ambient light at the ABC sensor		N/A

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
1	**ENERGY EFFICIENCY REQUIREMENTS**		**P**
	ENERGY EFFICIENCY INDEX LIMITS FOR ON-MODE		P
	The energy efficiency index (EEI) of an electronic display shall be calculated using the following equation: $EEI = \frac{(P_{measured} + 1)}{(3 \times [90 \times tanh(0,02 + 0,004 \times (A - 11)) + 4] + 3) + corr}$, A represents the screen area in dm^2; $P_{measured}$ is the measured power in Watts in on mode in the normal configuration, in standard dynamic range (SDR) corr is a correction factor of 10 for OLED electronic displays that do not apply the ABC allowance. This shall apply until 28 February 2023. corr shall be zero in all other cases.	0.835	P
	The EEI of an electronic display shall not exceed the maximum EEI (EEI_{max}) according to the limits in follow table from the dates indicated EEI limits for on-mode 1 March 2021: 0,90 / 1,10 / n.a. 1 March 2023: 0,75 / 0,90 / 0,90	Limits:0.90	P
2	**ALLOWANCES AND ADJUSTMENTS FOR THE PURPOSE OF THE EEI CALCULATION AND FUNCTIONAL REQUIREMENTS**		**N/A**
	Electronic displays with automatic brightness control (ABC)	No ABC function	N/A
	Electronic displays qualify for a 10 % reduction in Pmeasured, if they meet all of the following requirements:		N/A
	(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		N/A
	(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;		N/A

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
	(c) the value of $P_{measured}$ with ABC disabled, if applicable, 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;		N/A
	(d) with ABC enabled, the measured value of the on mode power must decrease by 20 % or more when the ambient light condition, measured at the ABC sensor, is reduced from 100 lux to 12 lux; and		N/A
	(e) the ABC control of the display screen luminance meets all of the following characteristics when the ambient light condition measured at the ABC sensor changes: — the measured screen luminance at 60 lux is between 65 % and 95 % of the screen luminance measured at 100 lux; — the measured screen luminance at 35 lux is between 50 % and 80 % of the screen luminance measured at 100 lux; and — the measured screen luminance at 12 lux is between 35 % and 70 % of the screen luminance measured at 100 lux.		N/A
3.	**Forced menu and set up menus**		**P**
	Electronic displays may be placed on the market with a forced menu on initial activation proposing alternative settings. Where a forced menu is provided, the normal configuration shall be set as default choice, otherwise the normal configuration shall be the out-of-the-box setting. If the user selects a configuration other than the normal configuration and this configuration results in a higher power demand than the normal configuration, a warning message about the likely increase in energy use shall appear and confirmation of the action shall be explicitly requested. If the user selects a setting other than those that are part of the normal configuration and this setting results in a higher energy consumption than the normal configuration, a warning message about the likely	Force menu provided. And warning message provided when changed setting and configuration other than normal configuration	P

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
	increase in energy consumption shall appear and confirmation of the action explicitly requested A change by the user in a single parameter in any setting shall not trigger any change in any other energy-relevant parameter, unless unavoidable. In such a case a warning message shall appear about the change of other parameters and the confirmation of the change shall be explicitly requested:		
4	**Peak white luminance ratio**		**P**
	In the normal configuration, the peak white luminance of the electronic display in a 100 lux ambient light viewing environment shall not be less than 220 cd/m2 or, if the electronic display is primarily intended for close viewing by a single user, not less than 150 cd/m2.		N/A
	If the electronic display's peak white luminance in the normal configuration is set to lower values, it shall not be less than 65 % of the peak white luminance of the display, in a 100 lux ambient light viewing environment in the brightest on mode configuration.	On SDR mode:115 cd/m^2 On brightest mode:170 cd/m^2 Ratio:120/124x100%=67.6%	P
5	**OFF MODE, STANDBY AND NETWORKED STANDBY MODE REQUIREMENTS**		**P**
	Power demand limits other than on-mode Electronic displays shall not exceed power demand limits in the different modes **power demand limits other than on-mode, in Watts** Off mode / Standby mode / Networked standby mode Maximum limits: 0,30 / 0,50 / 2,00 Allowances for additional functions when present and enabled: Status display: 0,0 / 0,20 / 0,20 Deactivation using room presence detection: 0,0 / 0,50 / 0,50 Touch functionality, if usable for activation: 0,0 / 1,00 / 1,00 HiNA function: 0,0 / 0,0 / 4,00 *Total maximum power demand with all additional functions when present and enabled*: 0,30 / 2,20 / 7,70	Only standby mode used	P
	Availability of off, standby and networked standby mode		P
	Automatic standby in televisions	Alert message provided in 4 hours	P
	Automatic standby in displays other than televisions	EUT is a television	N/A

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
6	**MATERIAL EFFICIENCY REQUIREMENT**		**--**
7	**Marking of plastic components**		**--**
8	**Cadmium logo**		**--**
	Electronic displays with a screen panel in which concentration values of Cadmium (Cd) by weight in homogeneous materials exceed 0,01 % as defined in Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment, shall be labelled with the 'Cadmium inside' logo. The logo shall be clearly visible durable, legible and indelible. The logo shall be in the form of the following graphic: Cadmium inside Cadmium free  	Over 0.01% by client information Cd marking provided	--
	The dimension of 'a' shall be greater than 9 mm and the typeface to be used is 'Gill Sans'. An additional 'Cadmium inside' logo shall be firmly attached internally on the display panel or molded in a Position clearly visible to workers once the external back cover bearing the external logo is removed. A 'Cadmium free' logo shall be used if concentration values of Cadmium (Cd) by weight in any homogeneous Material part of the display do not exceed 0,01 % as defined in Directive 2011/65/EU.		--
9	**Halogenated flame retardants**		**--**
10	**Design for repair and reuse**		**--**
11	**INFORMATION AVAILABILITY REQUIREMENTS**		**--**
12	**Measurement methods and calculations**		**P**
12.1	**General conditions**		**P**

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
	Measurements shall be made at an ambient temperature of 23 °C +/- 5 °C.		P
12.2	**Measurements of on mode power demand**		**P**
	(a) measurements of power demand ($P_{measured}$) shall be made in the normal configuration;		P
	(b) measurements shall be made using a dynamic broadcast-content video signal representing typical broadcast content for electronic displays in standard dynamic range (SDR). The measurement shall be the average power consumed over 10 consecutive minutes;	10 dynamic broadcast-content video signal used	P
	(c) measurements shall be made after the electronic display has been in the off mode or, if an off-mode is not available, in standby mode, for a minimum of 1 hour immediately followed by a minimum of 1 hour in the on mode and shall be completed before a maximum of 3 hours in on-mode. The relevant video signal shall be displayed during the entire on mode duration. For electronic displays that are known to stabilise within 1 hour, these durations may be reduced if the resulting measurement can be shown to be within 2 % of the results that would otherwise be achieved using the durations described here;		P
	(d) where ABC is available, measurements shall be made with it switched off. If ABC cannot be switched off, then the measurements shall be performed in an ambient light condition of 100 lux measured at the ABC sensor.	No ABC function	N/A
12.3	**Measurements of peak white luminance**		**P**
	(a) with a luminance meter, detecting that portion of the screen exhibiting a full (100 %) white image, which is part of a 'full screen test' pattern that does not exceed the average picture level (APL) point where any power limiting or other irregularity occurs in the electronic display luminance drive system affecting the electronic display luminance;	luminance meter used	P
	(b) without disturbing the luminance meter's detection		N/A

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
	point on the electronic display whilst switching between any of the conditions referred to in Annex II, point B.3.		

(EU) 2019/2013			
Clause	Requirement + Test	Result - Remark	Verdict
1	**Energy efficiency classes**		**P**
	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 follow table **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: $0,90 \leq EEI_{label}$	SDR mode:F	P
	Energy Efficiency Index (EEI_{label}) The Energy Efficiency Index (EEI_{label}) of the electronic display shall be calculated using the following equation: $EEI_{label} = \frac{(P_{measured} + 1)}{(3 \times [90 \times tanh(0,025 + 0,0035 \times (A - 11)) + 4)] + 3) + corr_l}$ A represents the viewing surface area in dm2; $P_{measured}$ is the measured power in on mode in Watts in the normal configuration **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 $P_{measured}$. corrl is a correction factor set as indicated in follow table **$corr_l$ 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/m², of the brightest on mode configuration of the electronic display and A is the screen area in dm²*	SDR mode: EEI_{label}=0.812	P
	Allowances and adjustments for the purpose of the EEI_{label} calculation		P
	Electronic displays with automatic brightness control (ABC) shall qualify for a 10 % reduction in Pmeasured if they meet all of the following requirements:		N/A

(EU) 2019/2013			
Clause	Requirement + Test	Result - Remark	Verdict
	(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;	No ABC function	N/A
	(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;		P
	(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;		P
	(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;	No ABC function	N/A
	(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	No ABC function	N/A
2	**Label for electronic display**		**--**
3	**Measurement methods and calculations**		**P**
4	**Product information sheet**		**--**
5	**Technical documentation**		**--**
6	**Information to be provided in visual advertisements, in technical promotional material in distance selling and in telemarketing, except distance selling on the**		**--**

(EU) 2019/2013			
Clause	Requirement + Test	Result - Remark	Verdict
	internet		
7	**Information to be provided in the case of distance selling through the internet**		**--**

Photographs of EUT

No.1

☒ General ☐ Appearance ☐ Label ☐ Internal ☐ PCB board ☐ Transformer ☐ Motor ☐ Other:	

…….End of Report…….

II

(Non-legislative acts)

REGULATIONS

COMMISSION DELEGATED REGULATION (EU) 2019/2013

of 11 March 2019

supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of electronic displays and repealing Commission Delegated Regulation (EU) No 1062/2010

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) 2017/1369 of the European Parliament and of the Council of 28 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU ([1]), and in particular Article 11(5) and Article 16 thereof,

Whereas:

(1) Regulation (EU) 2017/1369 empowers the Commission to adopt delegated acts as regards the labelling or re-scaling of the labelling of product groups representing significant potential for saving energy and, where relevant, other resources.

(2) Provisions on the energy labelling of televisions were established by Commission Delegated Regulation (EU) No 1062/2010 ([2]).

(3) The Communication from the Commission COM(2016) 773 final ([3]) (ecodesign working plan), established by the Commission in application of Article 16(1) of Directive 2009/125/EC of the European Parliament and of the Council ([4]), sets out the working priorities under the ecodesign and energy labelling framework for the period 2016-2019. The ecodesign working plan identifies the energy-related product groups to be considered as priorities for the undertaking of preparatory studies and eventual adoption of implementing measure, as well as the review of Commission Regulation (EC) No 642/2009 ([5]) and of Delegated Regulation (EU) No 1062/2010.

(4) Measures from the ecodesign working plan have an estimated potential to deliver in total in excess of 260 TWh of annual final energy savings in 2030, which is equivalent to reducing greenhouse gas emissions by approximately 100 million tonnes per year in 2030. Electronic displays are one of the product groups listed in the working plan.

(5) Televisions are among the product groups mentioned in Article 11(5)(b) of Regulation (EU) 2017/1369 for which the Commission should adopt a delegated act introducing an A to G rescaled label.

(6) Delegated Regulation (EU) No 1062/2010 required the Commission to review the regulation in light of technological progress.

([1]) OJ L 198, 28.7.2017, p. 1.
([2]) Commission Delegated Regulation (EU) No 1062/2010 of 28 September 2010 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of televisions (OJ L 314, 30.11.2010, p. 64).
([3]) Communication from the Commission. Ecodesign working plan 2016-2019 COM(2016)773 final, 30.11.2016.
([4]) Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (OJ L 285, 31.10.2009, p. 10).
([5]) Commission Regulation (EC) No 642/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for televisions (OJ L 191, 23.7.2009, p. 42).

(7) The Commission has reviewed Regulation (EU) No 1062/2010 as required by its Article 7 and analysed technical, environmental and economic aspects of televisions and other electronic displays, including monitors and signage displays as well as the real-life user understanding and behaviour in respect to different labelling elements. The review was carried out in close cooperation with stakeholders and interested parties from the Union and third countries. The results of the review were made public and presented to the Consultation Forum established by Article 14 of Regulation (EU) 2017/1369.

(8) It appears from the review that the same requirements for televisions should also apply to monitors because of the rapidly increasing functionality overlap between displays and televisions. Moreover, digital signage displays are specifically listed in the Commission's 2016-2019 ecodesign working plan to be taken up in the revision of the existing regulations for televisions. The scope of this Regulation should thus comprise electronic displays including televisions, monitors and digital signage displays.

(9) The annual energy consumption in 2016 of televisions in the Union constituted more than 3 % of the Union's electricity consumption. The projected energy consumption of televisions, monitors and digital signage displays, in a business as usual scenario, is expected be close to 100 TWh/yr in 2030. This Regulation, together with the accompanying ecodesign regulation, is estimated to reduce the annual final energy consumption up to 39 TWh/yr by 2030.

(10) The high dynamic range (HDR) encoding function may lead to a different energy use, suggesting a separate energy efficiency indication for such a function.

(11) The information provided on the label for the electronic displays in the scope of this Regulation should be obtained through reliable, accurate and repeatable measurement procedures, which take into account the recognised state of the art measurement methods including, where available, harmonised standards adopted by the European standardisation organisations, as listed in Annex I to Regulation (EU) No 1025/2012 of the European Parliament and of the Council ([6]).

(12) Recognising the growth of sales of energy-related products through internet hosting platforms, rather than directly from suppliers' or dealers' websites, it should be clarified that internet sales platforms should be responsible for enabling the displaying of the label provided by the supplier in proximity to the price. They should inform the dealer of that obligation, but should not be responsible for the accuracy or content of the label and the product information sheet provided. However, in application of Article 14(1)(b) of Directive 2000/31/EC of the European Parliament and of the Council ([7]) on electronic commerce, such internet hosting platforms should act expeditiously to remove or to disable access to information about the product in question if they are aware of the non-compliance (e.g. missing, incomplete or incorrect label or product information sheet) for example if informed by the market surveillance authority. A supplier selling directly to end-users via its own website is covered by dealers' distance selling obligations referred to in Article 5 of Regulation (EU) 2017/1369.

(13) Electronic displays that are displayed at trade fairs should bear the energy label if the first unit of the model has already been placed on the market or is placed on the market at the trade fair.

(14) To improve the effectiveness of this Regulation, products that automatically alter their performance in test conditions to improve the declared parameters should be prohibited.

(15) The measures provided for in this Regulation were discussed by the Consultation Forum and the Member States' experts in accordance with Article 14 of Regulation (EU) 2017/1369.

(16) Delegated Regulation (EU) No 1062/2010 should be repealed,

([6]) Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council (OJ L 316, 14.11.2012, p. 12).

([7]) Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market (OJ L 178, 17.7.2000, p. 1).

HAS ADOPTED THIS REGULATION:

Article 1

Subject matter and scope

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.

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 listed in points 3(a) and 4 of Article 2 of Directive 2012/19/EU of the European Parliament and of the Council ([8]);

(g) electronic displays that are components or subassemblies of products covered by implementing measures adopted under Directive 2009/125/EC;

(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.

([8]) Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE), (OJ L 197, 24.7.2012, p. 38).

Article 2

Definitions

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

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

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

(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;

(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;

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

(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;

(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;

(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;

(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;

(10) '*HiNA*' means High Network Availability as defined in Article 1 of Commission Regulation (EC) No 1275/2008 ([9]);

(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;

([9]) Commission Regulation (EC) No 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment (OJ L 339, 18.12.2008, p. 45).

(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;

(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;

(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;

(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;

(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;

(16) *'medical display'* means an electronic display covered by the scope of:

(a) Council Directive 93/42/EEC ([10]) concerning medical devices; or

(b) Regulation (EU) 2017/745 of the European Parliament and of the Council ([11]) on medical devices; or

(c) Council Directive 90/385/EEC ([12]) on the approximation of the laws of the Member States relating to active implantable medical devices; or

(d) Directive 98/79/EC of the European Parliament and of the Council ([13]) on in vitro diagnostic medical devices; or

(e) Regulation (EU) 2017/746 of the European Parliament and of the Council ([14]) on in vitro diagnostic medical devices;

(17) *'grade 1 monitor'* means a monitor for high-level technical quality evaluation of images at key points in a production or broadcast workflow, such as image capture, post- production, transmission and storage;

(18) '*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);

(19) *'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;

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

Article 3

Obligations of suppliers

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 parameters of the product information sheet, as set out in Annex V, are entered into 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;

([10]) Council Directive 93/42/EEC of 14 June 1993 concerning medical devices (OJ L 169, 12.7.1993, p. 1).
([11]) Regulation (EU) 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC (OJ L 117, 5.5.2017, p. 1).
([12]) Council Directive 90/385/EEC of 20 June 1990 on the approximation of the laws of the Member States relating to active implantable medical devices (OJ L 189, 20.7.1990, p. 17).
([13]) Directive 98/79/EC of the European Parliament and of the Council of 27 October 1998 on in vitro diagnostic medical devices (OJ L 331, 7.12.1998, p. 1).
([14]) Regulation (EU) 2017/746 of the European Parliament and of the Council of 5 April 2017 on in vitro diagnostic medical devices and repealing Directive 98/79/EC and Commission Decision 2010/227/EU (OJ L 117, 5.5.2017, p. 176).

(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.

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

Article 4

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 3 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 3 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 5

Obligations of service provider on internet hosting platforms

Where a hosting service provider, as referred to in Article 14 of Directive 2000/31/EC, 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 6

Measurement methods

The information to be provided pursuant to Articles 3 and 4 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 7

Verification procedure for market surveillance purposes

Member States shall apply the verification procedure laid down in Annex IX when performing the market surveillance checks referred to in paragraph 3 of Article 8 of Regulation (EU) 2017/1369.

Article 8

Review

The Commission shall review this Regulation in the light of technological progress and present the results of this review, including, if appropriate, a draft revision proposal, to the Consultation Forum no later than 25 December 2022.

The review shall in particular assess the following:

(a) whether it is or is still appropriate to have separate energy categorisations for SDR and HDR;

(b) the verification tolerances set out in Annex IX;

(c) whether other electronic displays should be included in the scope;

(d) the appropriateness of the balance of stringency between larger and smaller products;

(e) whether it is feasible to develop appropriate notification methods for the energy consumption;

(f) the possibility to address circular economy aspects.

In addition, the Commission shall review the label to rescale it when the requirements of Article 11 of Regulation (EU) 2017/1369 are met.

Article 9

Repeal

Delegated Regulation (EU) No 1062/2010 is repealed as of 1 March 2021.

Article 10

Transitional measures

As from 25 December 2019 until 28 February 2021, the product fiche required under point 1(b) of Article 3 of Regulation (EU) No 1062/2010 may be made available through the product database instead of being provided in printed form with the product. In that case the supplier shall ensure that if, specifically requested by the dealer, the product fiche shall be made available in printed form.

Article 11

Entry into force and application

This Regulation shall enter into force on the twentieth day following its publication in the *Official Journal of the European Union*.

It shall apply from 1 March 2021. However, point 1(a) of Article 3 shall apply from 1 November 2020.

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

Done at Brussels, 11 March 2019.

For the Commission

The President

Jean-Claude JUNCKER

ANNEX I

Definitions for the purposes of 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:

(1) conditions providing only an indication of off mode condition;

(2) conditions providing only functionalities intended to ensure electromagnetic compatibility pursuant to Directive 2014/30/EU of the European Parliament and of the Council [1];

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

(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 as defined in Commission Regulation (EU) 2019/1782 ([2]);

(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.

([2]) Commission Regulation (EU) 2019/1782 of 1 October 2019 laying down ecodesign requirements for external power supplies pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EC) No 278/2009 (OJ L 272, 25.10.2019, p. 95).

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:

$$EEI_{label} = \frac{(P_{measured} + 1)}{(3 \times [90 \times tanh(0,025 + 0,0035 \times (A - 11) + 4)] + 3) + corr_l}$$

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/m², of the brightest* on mode *configuration of the electronic display and A is the screen area in dm²*

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;

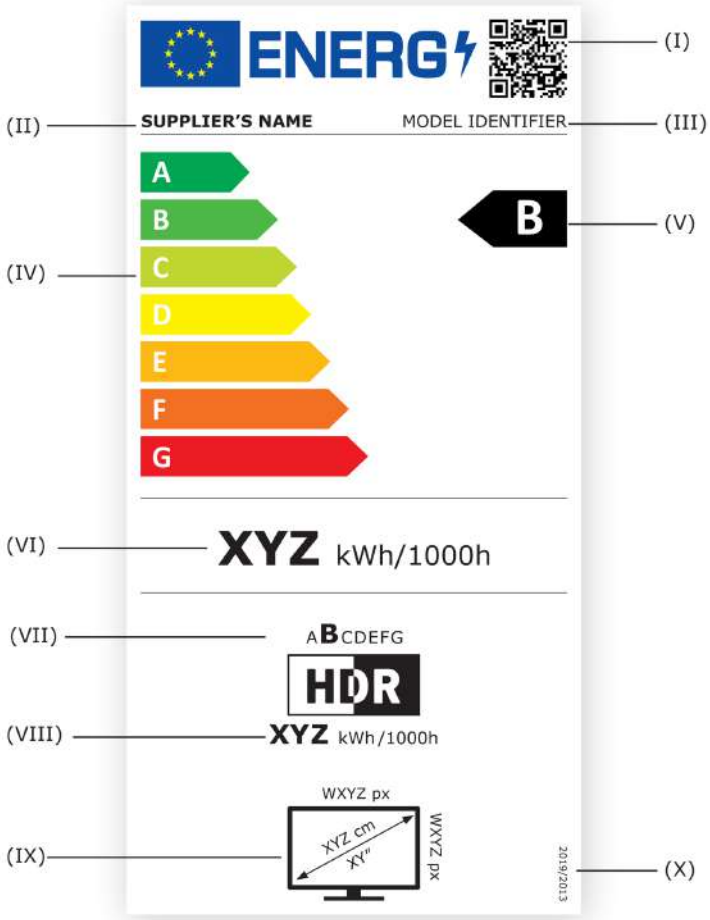
— the measured screen luminance at 35 lux is between 50 % and 80 % of the screen luminance measured at 100 lux;

— 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;

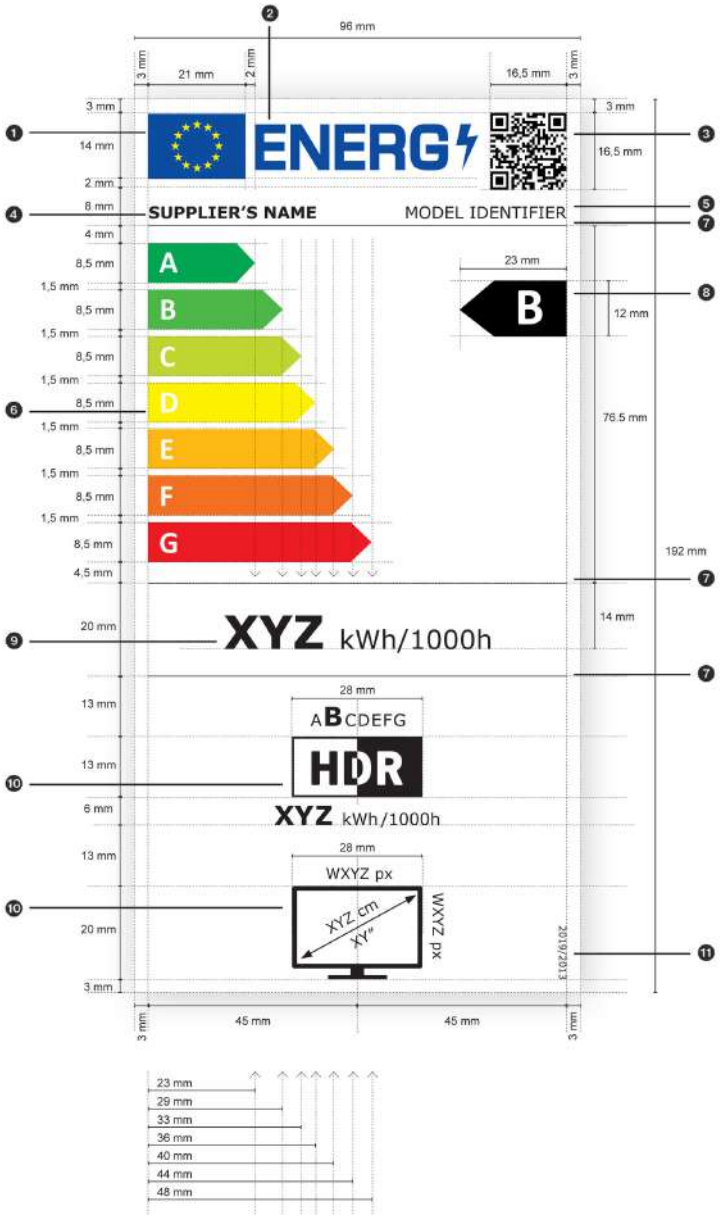
VII. the energy efficiency class determined in accordance with point B of Annex II when using $Pmeasured_{HDR}$;

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 Regulation, that is '2019/2013'.

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):

❶ the colours of the EU logo shall be as follows:

— the background: 100,80,0,0;

— the stars: 0,0,100,0;

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

❸ the QR code shall be 100 % black;

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

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

❻ 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;

❼ the internal dividers shall have a weight of 0,5 pt and the colour shall be 100 % black;

❽ 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;

❾ 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;

❿ 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;

⓫ 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 Regulation, measurements and calculations shall be made using harmonised standards, the reference numbers of which have been published in the *Official Journal of the European Union* 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.

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.

ANNEX V

Product information sheet

Pursuant to point 1(b) of Article 3, 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	TEXT		
2.	Supplier's model identifier	TEXT		
3.	Energy efficiency class for standard Dynamic Range (SDR)	[A/B/C/D/E/F/G]		If the product database automatically generates the definitive content of this cell, the supplier shall not enter this data.
4.	On mode power demand for 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 from 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) mode	X,X	W	Rounded to the first decimal place for power values below 100 W, and rounded to the first integer for power values from 100 W (value set to 0 (zero) if 'not applicable').
7.	Off mode, power demand	X,X	W	
8.	Standby mode power demand	X,X	W	

	Information	Value and precision			Unit	Notes
9.	Networked standby mode power demand	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 (pixels)	X	x	Y	pixels	Horizontal and vertical pixels
13.	Screen diagonal	X,X			cm	In cm according to the International System of Units (SI), rounded to the nearest decimal place.
14.	Screen diagonal	X			inches	Optional, in inches rounded to the nearest integer place.
15.	Visible screen area	X,X			cm^2	Rounded to the 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	X			Hz	
21.	Minimum guaranteed availability of software and firmware updates (until):	GG MM AAAA			date	As from Annex II E, point 1 of Commission Regulation (EU) 2019/2021 ([1]).
22.	Minimum guaranteed availability of spare parts (until):	GG MM AAAA			date	As from Annex II D, point 5 of Regulation (EU) 2019/2021.
23.	Minimum guaranteed product support (until):	GG MM AAAA			date	

([1]) Commission Regulation (EU) 2019/2021 of 1 October 2019 laying down ecodesign requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Commission Regulation (EC) No 1275/2008 and repealing Commission Regulation (EC) No 642/2009 (See page 241 of this Official Journal).

	Information		Value and precision	Unit	Notes
24.	Power supply type:		Internal/External/ Standardised external		Select one.
i	External standardised power supply (included in the product box)	Standard name	TEXT		
		Input voltage	X	V	
		Output voltage	X	V	
ii	External standardised suitable power supply (if not included in the product box)	Standard name	TEXT		Mandatory only if EPS not included in the box, non-mandatory otherwise.
		Required output voltage	X,X	V	Mandatory only if EPS not included in the box, non-mandatory otherwise.
		Required delivered current	X,X	A	Mandatory only if EPS not included in the box, non-mandatory otherwise.
		Required current frequency	X	Hz	Mandatory only if EPS not included in the box, non-mandatory otherwise.

ANNEX VI

Technical documentation

The technical documentation referred to in point 1(d) of Article 3 shall include:

(1) identification data (general description of the model):

(a) trademark and model identifier;

(b) supplier's name, address, registered trade name;

(2) references to the harmonised standards applied, other measurement standards and specifications used in measuring the technical parameters and calculations performed;

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

(4) a list of all equivalent models, including model identifiers;

(5) measured technical parameters of the model and calculations performed with the measured parameters as listed in Table 5;

Table 5

Measured technical parameters

		Value and precision	Unit	Notes
	General			
1.	Ambient temperature	XX,XX	°C	
2.	Test voltage	X	V	
3.	Frequency	X,X	Hz	
4.	Total harmonic distortion (THD) of the electricity supply system	X	%	
	For On-mode			
5.	Peak white luminance of the brightest on mode configuration	X	cd/m²	
6.	Peak white luminance of the normal configuration	X	cd/m²	
7.	Peak white luminance ratio (calculated)	X,X	%	Value row 6 above divided by value row 5 above times 100
	For APD			
8.	Duration of the on mode condition, before the electronic display reaches automatically standby, or off mode, or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode.	mm:ss		

		Value and precision	Unit	Notes
	For televisions: the measured value of the time before the television automatically reaches standby, or off-mode, or another condition which does not exceed the applicable power consumption requirements for off-mode and/or standby-mode following the last user interaction;	mm:ss		
	For televisions equipped with room presence sensor: the measured value of the time before the television automatically reaches standby, or off-mode, or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when no presence is detected;	mm:ss		
	Other electronic displays than televisions and broadcast displays: The measured value of the time before the electronic display automatically reaches standby, or off-mode, or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when no input is detected;	mm:ss		
	For ABC			If available and activated by default (as from Annex V, Table 4)
9.	Average on mode power demand of the electronic display at an ambient light intensity, measured at the ABC sensor of the electronic display, of 100 lux and 12 lux.	X,X	W	
10.	Percentage of power reduction due to ABC action between the 100 lux and 12 lux ambient light conditions.	X,X	%	
11.	Display peak white luminance at each of the following ambient light intensities measured at the ABC sensor of the electronic display, 100 lux, 60 lux, 35 lux, 12 lux.	x	cd/m^2	
	Measured on mode power at 100 lux ambient light at the ABC sensor	X,X	W	
	Measured on mode power at 12 lux ambient light at the ABC sensor	X,X	W	
	The measured screen luminance at 60 lux ambient light at the ABC sensor	X	cd/m^2	

		Value and precision	Unit	Notes
	The measured screen luminance at 35 lux ambient at the ABC sensor	X	cd/m²	
	The measured screen luminance at 12 lux ambient light at the ABC sensor	X	cd/m²	

(6) 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

(iii) 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:

(i) 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 set out in point 6.2.3 of Annex II of Commission Regulation (EU) No 617/2013 [1]. 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;

[1] Commission Regulation (EU) No 617/2013 of 26 June 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for computers and computer servers (OJ L 175, 27.6.2013, p. 13).

(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.

(7) 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

(8) 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 market surveillance authorities or to the Commission for carrying out their tasks under this Regulation.

ANNEX VII

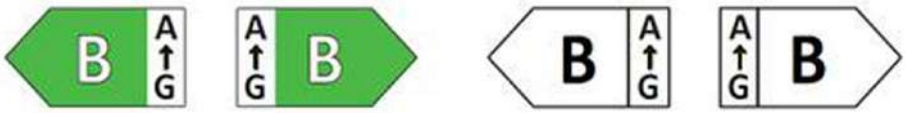
Information to be provided in visual advertisements, in technical promotional material in distance selling and in telemarketing, except distance selling on the internet

1. In visual advertisements, for the purposes of ensuring conformity with the requirements laid down in point 1(e) of Article 3 and point (d) of Article 4, 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 1(f) of Article 3 and point (e) Article 4 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.

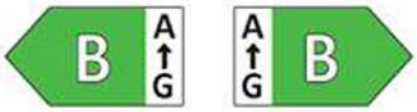
ANNEX VIII

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 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 1(h) 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 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 set out in this Annex relate only to the verification of the measured parameters by Member State authorities and shall not be used by the supplier as an allowed tolerance to establish the values in the technical documentation. The values and classes on the label or in the product information sheet shall not be more favourable for the supplier than the values reported 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 Regulation or included in the technical documentation or included in any of the documentation provided, the model and all equivalent models shall be considered not compliant.

When verifying the compliance of a product model with the requirements laid down in this Regulation, the authorities of the Member States shall apply the following procedure:

(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 if:

(a) the values given in the technical documentation pursuant to point 3 of Article 3 of Regulation (EU) 2017/1369 (declared values) 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 Member State authorities test the unit of the model, the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) comply with the respective verification tolerances as given in Table 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 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. 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 Regulation.

(7) The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission without delay after a decision being taken on the non-compliance of the model according to points 3 and 6.

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

The Member State authorities 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, such as those set out in harmonised standards or in any other measurement method 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 diagonal in centimetres (and inches if declared)	The determined value (*) shall not be lower than the declared value by more than 1 cm or 0,4 inches.
Visible screen area in dm^2	The determined value (*) shall not be lower than the declared value by more than 0,1 dm^2.
The screen resolution in horizontal and vertical pixels	The determined value (*) shall not deviate from the declared value.

(*) 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.

COMMISSION REGULATION (EU) 2019/2021

of 1 October 2019

laying down ecodesign requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Commission Regulation (EC) No 1275/2008 and repealing Commission Regulation (EC) No 642/2009

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to Article 114 of the Treaty on the Functioning of the European Union,

Having regard to Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products ([1]), and in particular Article 15(1) thereof,

Whereas:

(1) Pursuant to Directive 2009/125/EC the Commission should set ecodesign requirements for energy-related products which account for significant volumes of sales and trade, in the Union and which have a significant environmental impact and presenting significant potential for improvement through design in terms of their environmental impact, without entailing excessive costs.

(2) The Commission established ecodesign requirements for televisions in Commission Regulation (EC) No 642/2009 ([2]) and pursuant to that Regulation, the Commission should review the Regulation in the light of technological progress.

(3) The Communication from the Commission COM(2016) 773 ([3]) (ecodesign working plan), established by the Commission in application of Article 16(1) of Directive 2009/125/EC, sets out the working priorities under the ecodesign and energy labelling framework for the period 2016-2019. The ecodesign working plan identifies the energy-related product groups to be considered as priorities for the undertaking of preparatory studies and eventual adoption of implementing measures, as well as the review of Regulation (EC) No 642/2009.

(4) Measures from the Ecodesign Working Plan have an estimated potential to deliver a total in excess of 260 TWh of annual primary energy savings in 2030, which is equivalent to reducing greenhouse gas emissions by approximately 100 million tonnes per year in 2030. Electronic displays are one of the product groups listed in the working plan.

(5) Pursuant to Article 6 of Regulation (EC) No 642/2009, the Commission has reviewed the Regulation in light of technological progress and analysed the technical, environmental and economic aspects of televisions and other electronic displays. The review was carried out in close cooperation with stakeholders and interested parties from the Union and third countries. The results of the review were made public and presented to the Consultation Forum established by Article 18 of Directive 2009/125/EC.

(6) The review concluded that there was a need for the introduction of new ecodesign energy-related requirements for televisions and that the same requirements should also apply to other displays, such as computer monitors, because of the rapidly increasing functionality overlap between different display types. Projectors use very different technologies and consequently should be out of scope of this Regulation.

(7) Digital signage displays are used in public spaces such as airports, metro and train stations, retail stores, shop windows, restaurants, museums, hotels, conference centres or in prominent positions outside buildings and represent a relevant emerging market. Their energy needs are different and generally higher than those of other electronic displays because they are often used in luminous places and continuously on. Minimum requirements for digital signage displays in on-mode should be evaluated once additional data will be available, however they should at least have minimum requirements on off, standby and networked standby modes and on material efficiency.

([1]) OJ L 285, 31.10.2009, p. 10.
([2]) Commission Regulation (EC) No 642/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for televisions (OJ L 191, 23.7.2009, p. 42).
([3]) Communication from the Commission. Ecodesign working plan 2016-2019, COM(2016) 773 final, 30.11.2016.

(8) The annual energy consumption in 2016 of televisions in the Union constituted more than 3 % of the European Union's electricity consumption. The projected energy consumption of televisions, monitors and digital signage displays would be expected be close to 100 TWh/yr in 2030. This Regulation, together with the accompanying energy labelling regulation, is estimated to reduce the overall consumption by 39 TWh/yr by 2030.

(9) Specific requirements should be laid down for standby, networked standby and off mode electric power demand of electronic displays. Therefore, the requirements of Commission Regulation (EC) No 1275/2008 ([4]) that does not apply to televisions, should no longer apply to the additional electronic displays types covered by the scope of this Regulation. Regulation (EC) No 1275/2008 should be amended accordingly.

(10) Electronic displays for professional use such as video-editing, computer-aided design, graphics or for the broadcast sector, possess enhanced performance and very specific features that, although usually involving higher energy use, should be not subject to on-mode energy efficiency requirements set for more generic products.

(11) The Commission Communication on the circular economy ([5]) and the Communication on the ecodesign working plan ([6]) underline the importance of using the ecodesign framework to support the move towards a more resource efficient and circular economy. Recital (11) and Article 4 of Directive 2012/19/EU of the European Parliament and of the Council ([7]) refer as well to Directive 2009/125/EC and indicate that ecodesign requirements should facilitate the re-use, dismantling and recovery of waste electrical and electronic equipment (WEEE) by tackling the issues upstream, thus facilitating the objectives of waste prevention and recovery in Member States as from Directive (EU) 2018/851 of the European Parliament and of the Council ([8]). In addition, Decision No 1386/2013/EU of the European Parliament and of the Council ([9]) on a General Union Environment Action Programme to 2020 includes the goal 'to turn the Union into a resource-efficient, green and competitive low-carbon economy'. Implementable and enforceable requirements at the product design phase may be appropriate for optimising resource and material efficiency at end of life. Finally, in accordance with the Union action plan for the Circular Economy ([10]), the Commission should make sure that special emphasis is placed on aspects relevant to the circular economy when setting out or revising ecodesign criteria. This Regulation should therefore lay down appropriate non-energy related requirements contributing to circular economy objectives including requirements to facilitate repair and the availability of spare parts.

(12) Liquid crystal screens (LCD) with a screen area greater than 100 square centimetres are in the scope of the requirements set in Article 8 and Annex VII of the Directive 2012/19/EU in relation to the selective treatment for materials and components of WEEE which means that such displays need to be removed from the product integrating them. Considering, in addition, that screens with a screen area smaller than or equal to 100 square centimetres have very limited energy use, all such electronic displays should be outside the scope of this Regulation both for energy and for requirements contributing to circular economy objectives.

(13) Once delivered to an electrical and electronic equipment waste collection facility at the end of their life, televisions, computer monitors, digital signage displays, professional displays, broadcast displays, security displays, as well as displays integrated into tablets, 'all-in-one' desktop or portable computers are, generally, not distinguishable from each other. Therefore they should all be subject to the same requirements for proper end of life treatment and they should also facilitate circular economy objectives. However electronic displays integrated into

([4]) Commission Regulation (EC) No 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode, and networked standby, electric power consumption of electrical and electronic household and office equipment (OJ L 339, 18.12.2008, p. 45).

([5]) Communication from the Commission to the European Parliament, the Council, the European Economic Social Committee and the Committee of the Regions: Closing the loop — An EU action plan for the Circular Economy (COM(2015) 614 final of 2.12.2015).

([6]) Communication from the Commission: Ecodesign Working Plan 2016-2019 (COM(2016) 773 final of 30.11.2016).

([7]) Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (OJ L 197, 24.7.2012, p. 38).

([8]) Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (OJ L 150, 14.6.2018, p. 109).

([9]) Decision No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet' (OJ L 354, 28.12.2013, p. 171).

([10]) COM(2015) 614 final.

computers, such as tablets, laptops or all-in-one desktops, although hardly distinguishable from other electronic displays, should be covered in a review of Commission Regulation (EU) No 617/2013 ([11]) on computers.

(14) Shredding of electronic displays causes large losses of resources and hinders circular economy objectives such as recovery of some rare and precious materials. Moreover, Article 8(1) and (2) of the Directive 2012/19/EU require Member States to ensure that all separately collected waste undergoes proper treatment including, as a minimum, a selective treatment of a number of components – typically present in electronic displays – in preparation for recovery or recycling and before schredding. Dismantling of at least the specific components listed in Annex VII of that Directive should therefore be facilitated. Furthermore, Article 15 makes provision for information to be provided free of charge by producers to facilitate the preparation for re-use and the correct and environmentally sound treatment of WEEE, which can be provided using a voluntary electronic platform ([12]).

(15) Presence of halogenated flame retardants represents a major issue in the recycling of plastics of electronic displays. Some halogenated compounds have been restricted by Directive 2011/65/EU of the European Parliament and of the Council ([13]) because of their high toxicity, but may be still found in old displays and others are still allowed. Control on maximum content of non permitted compounds in recycled plastic is not cost-effective, resulting in all being incinerated. Alternative solutions would exist for the bulk of the plastic part in an electronic display, such as the enclosure and the stand, permitting higher yields of recycled plastics. Use of halogenated flame retardants in these parts should be limited.

(16) Presence of cadmium, a highly toxic and carcinogenic substance in display panels is an additional obstacle to efficient management of the waste stream. Use of certain hazardous substances in electrical and electronic equipment, including cadmium, is restricted by Directive 2011/65/EU. Use of cadmium in electronic displays, however, is among the applications in Annex III exempted from the restriction for a limited time. A specific marking on displays that contain cadmium, to facilitate the correct and environmentally sound treatment at end of life, should therefore be provided by manufacturers.

(17) The relevant product parameters should be measured using reliable, accurate and reproducible methods, which take into account recognised state-of-the-art measurement methods and, where available, harmonised standards adopted by the European standardisation bodies, as listed in Annex I to Regulation (EU) No 1025/2012 of the European Parliament and of the Council ([14]).

(18) In line with Article 8 of Directive 2009/125/EC, this Regulation should specify the applicable conformity assessment procedures.

(19) To facilitate compliance checks, manufacturers, importers or authorised representatives should provide information in the technical documentation referred to in Annexes IV and V to Directive 2009/125/EC in so far as that information relates to the requirements laid down in this Regulation. For market surveillance purposes, manufacturers, importers or authorised representatives should be allowed to refer to the product database if the technical documentation as per Commission Delegated Regulation (EU) 2019/2013 ([15]) contains the same information.

(20) To improve the effectiveness of this Regulation and to protect consumers, products that automatically alter their performance in test conditions to improve the declared parameters should be prohibited from being placed on the market.

([11]) Commission Regulation (EU) No 617/2013 of 26 June 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for computers and computer servers (OJ L 175, 27.6.2013, p. 13).

([12]) 'Information for Recyclers — I4R' platform for the exchange of information between manufacturers of electrical and electronic equipment (EEE) and recyclers of Waste EEE: http://www.i4r-platform.eu.

([13]) 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 in electrical and electronic equipment (OJ L 174, 1.7.2011, p. 88).

([14]) Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council (OJ L 316, 14.11.2012, p. 12).

([15]) Commission Delegated Regulation (EU) 2019/2013 of 11 March 2019 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of electronic displays and repealing Commission Delegated Regulation (EU) No 1062/2010 (see page 1 of this Official Journal).

(21) In addition to the legally binding requirements laid down in this Regulation, indicative benchmarks for best available technologies should be identified to make information on products environmental performance over their life-cycle subject to this Regulation widely available and easily accessible, in accordance with Directive 2009/125/EC, Annex I, part 3, point (2).

(22) A review of this Regulation should assess the appropriateness and effectiveness of its provisions in achieving its goals. The timing of the review should take into account the fast rate of technological progress in the products covered by this Regulation.

(23) Regulation (EC) No 642/2009 should therefore be repealed.

(24) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19 of Directive 2009/125/EC,

HAS ADOPTED THIS REGULATION:

Article 1

Subject matter and scope

1. This Regulation establishes ecodesign requirements for the placing on the market and putting into service of electronic displays, including televisions, monitors and digital signage displays.

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 listed into Article 2, point 3(a) and point 4 of Directive 2012/19/EU;

(g) displays that are components or subassemblies of products covered by implementing measures adopted under Directive 2009/125/EC.

3. The requirements in points A and B of Annex II shall not apply to the following displays:

(a) broadcast displays;

(b) professional displays;

(c) security displays;

(d) digital interactive whiteboards;

(e) digital photo frames;

(f) digital signage displays.

4. The requirements in points A, B and C of Annex II shall not apply to the following displays:

(a) status displays;

(b) control panels.

Article 2

Definitions

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

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

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

(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;

(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;

(5) '*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;

(6) '*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);

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

(8) '*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;

(9) '*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;

(10) '*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;

(11) '*all-in-one video conference system*' means a dedicated system designed for video conferencing and collaboration, integrated within a single enclosure, whose specification 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;

(12) '*HiNA*' means High Network Availability as defined in Article 2 of Regulation (EC) No 1275/2008;

(13) '*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 characteristics:

(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;

(14) '*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 desk or fixed to a physical structure for viewing by multiple people;

(b) to 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;

(15) '*professional display*' means an electronic display designed and marketed for professional use for editing video and graphic images. Its specification shall include all of the following features:

(a) a contrast ratio of at least 1000:1 measured at a perpendicular to the vertical plane of the screen and at least 60:1 measured at a horizontal viewing angle of at least 85° relative to that perpendicular and at least 83° from the perpendicular on a curved screen, with or without a screen cover glass;

(b) a native resolution of at least 2,3 mega pixels;

(c) colour Gamut support is 38,4 % of CIE LUV or greater (equivalent to greater than 99 % of Adobe RGB and over 100 % of sRGB colour space). Shifts in colour space are allowable as long as the resultant colour space is at least 38,4 % of CIE LUV. Colour and luminance uniformity shall be as required for grade 1 monitors;

(16) '*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;

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

(18) '*medical display*' means an electronic display covered by the scope of:

(a) Council Directive 93/42/EEC ([16]) concerning medical devices; or

(b) Regulation (EU) 2017/745 of the European Parliament and of the Council ([17]) on medical devices; or

(c) Council Directive 90/385/EEC ([18]) on the approximation of the laws of the Member States relating to active implantable medical devices; or

(d) Directive 98/79/EC of the European Parliament and of the Council ([19]) on in vitro diagnostic medical devices; or

(e) Regulation (EU) 2017/746 of the European Parliament and of the Council ([20]) on in vitro diagnostic medical devices;

(19) '*grade-1 monitor*' means a monitor for high-level technical quality evaluation of images at key points in a production or broadcast workflow, such as image capture, post-production, transmission and storage;

(20) '*Virtual reality headset*' means a head-weareable device that provides immersive virtual reality for the wearer by displaying stereoscopic images for each eye with head motion tracking functions.

For the purposes of the Annexes, additional definitions are set out in Annex I.

Article 3

Ecodesign requirements

The ecodesign requirements set out in Annex II shall apply from the dates indicated therein.

Article 4

Conformity assessment

1. The conformity assessment procedure referred to in Article 8 of Directive 2009/125/EC shall be the internal design control system set out in Annex IV to that Directive or the management system set out in Annex V to that Directive.

2. For the purposes of conformity assessment pursuant to Article 8 of Directive 2009/125/EC, the technical documentation shall contain the reason why certain, if any, plastic parts are not marked as per the exemption set out in point D(2) of Annex II, and the details and results of the calculations set out in Annex III to this Regulation.

([16]) Council Directive 93/42/EEC of 14 June 1993 concerning medical devices (OJ L 169, 12.7.1993, p. 1).
([17]) Regulation (EU) 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC (OJ L 117, 5.5.2017, p. 1).
([18]) Council Directive 90/385/EEC of 20 June 1990 on the approximation of the laws of the Member States relating to active implantable medical devices (OJ L 189, 20.7.1990, p. 17).
([19]) Directive 98/79/EC of the European Parliament and of the Council of 27 October 1998 on in vitro diagnostic medical devices (OJ L 331, 7.12.1998, p. 1).
([20]) Regulation (EU) 2017/746 of the European Parliament and of the Council of 5 April 2017 on in vitro diagnostic medical devices and repealing Directive 98/79/EC and Commission Decision 2010/227/EU (OJ L 117, 5.5.2017, p. 176).

3. Where the information included in the technical documentation for a particular 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 extrapolation from another model of the same or a different manufacturer, or both,

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

The technical documentation shall include a list of all equivalent models, including the model identifiers.

4. The technical documentation shall include the information in the order and as set out in Annex VI of Regulation (EU) 2019/2013. For market surveillance purposes, manufacturers, importers or authorised representatives may, without prejudice to Annex IV, point 2(g) of Directive 2009/125/EC, refer to the technical documentation uploaded to the product database which contains the same information laid down in Regulation (EU) 2019/2013.

Article 5

Verification procedure for market surveillance purposes

Member State authorities shall apply the verification procedure set out in Annex IV to this Regulation when performing the market surveillance checks referred to in Article 3 point 2 of Directive 2009/125/EC.

Article 6

Circumvention and software updates

The manufacturer or importer or authorised representative shall not place on the market products designed to be able to detect they are being tested (e.g. by recognising the test conditions or test cycle) and to react specifically by automatically altering their performance during the test with the aim of reaching a more favourable level, for any of the parameters declared by the manufacturer, importer or authorised representative, in the technical documentation or included in any of the documentation provided.

The energy consumption of the product and any of the other declared parameters shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity except with explicit consent of the end-user prior to the update. No performance change shall occur as result of rejecting the update.

A software update shall never have the effect of changing the product's performance in a way that makes it non-compliant with the ecodesign requirements applicable for the declaration of conformity.

Article 7

Indicative benchmarks

The indicative benchmarks for the best-performing products and technologies available on the market at the time of adopting this Regulation are set out in Annex V.

Article 8

Review

The Commission shall review this Regulation in the light of technological progress and shall present the results of the assessment, including, if appropriate, a draft revision proposal, to the Consultation Forum no later than 25 December 2022.

This review shall in particular assess:

(a) the need to update the definitions or the scope of the Regulation;

(b) the appropriateness of the balance of stringency between larger and smaller products;

(c) the need to adapt regulatory requirements as result of new technologies available, such as HDR, 3D mode, high frame rate, resolution levels above UHD-8K;

(d) the appropriateness of the allowances;

(e) the appropriateness of setting on-mode energy efficiency requirements for digital signage displays or other displays not covered in this respect;

(f) the appropriateness of setting different or additional requirements to enhance durability, to facilitate repair and reuse, including the time frame for making available spare parts, and for including a standardised external power supply;

(g) the appropriateness of setting different or additional requirements to improve dismantling at end of life and recyclability, including in relation to critical raw materials and in relation to the conveying of information to recyclers;

(h) resource efficiency requirements for displays integrated into products covered by Directive 2009/125/EC and into any other product belonging to the scope of Directive 2012/19/EU.

Article 9

Amendment to Regulation (EC) No 1275/2008

Annex I to Regulation (EC) No 1275/2008 is amended as follows:

(a) point 2 is replaced by the following:

'2. Information technology equipment intended primarily for use in the domestic environment, but excluding desktop computers, integrated desktop computers and notebook computers as defined in Commission Regulation (EU) No 617/2013, as well as electronic displays covered by Regulation (EU) 2019/2021 (*).

(*) Commission Regulation (EU) 2019/2021 of 1 October 2019 laying down eco-design requirements for electronic displays pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Commission Regulation (EC) No 1275/2008 and repealing Commission Regulation (EC) 642/2009 (OJ L 315, 5.12.2019, p. 241).'

(b) in point 3, the last entry is replaced by the following:

'and other equipment for the purpose of recording or reproducing sound or images, including signals or other technologies for the distribution of sound and image other than by telecommunications, but excluding electronic displays covered by Regulation (EU) 2019/2021'.

Article 10

Repeal

Regulation (EC) No 642/2009 is repealed with effect from 1 March 2021.

Article 11

Entry into force and application

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

It shall apply from 1 March 2021. However, Article 6, first paragraph shall apply from 25 December 2019.

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

Done at Brussels, 1 October 2019.

For the Commission

The President

Jean-Claude JUNCKER

ANNEX I

Definitions applicable for the Annexes

The following definitions shall apply:

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

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

(1) conditions providing only an indication of off mode condition;

(2) conditions providing only functionalities intended to ensure electromagnetic compatibility pursuant to Directive 2014/30/EU of the European Parliament and of the Council [1];

(3) '*standby mode*' means a condition where the electronic display is connected to a power source, depends on energy input from that source to work as intended and provides only the following functions, which may persist for an indefinite time:

— reactivation function, or reactivation function and only an indication of enabled reactivation function; and/or

— information or status display;

(4) '*organic light emitting diode* (OLED)' means a technology in which light is produced from a solid state device embodying a pn junction of organic material. A junction emits optical radiation when excited by electric current;

(5) '*microLED display*' means an electronic display where individual pixels are lit using microscopic GaN LED technology;

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

(7) '*External Power Supply (EPS)*' means a device as defined in Commission Regulation (EU) 2019/1782 [2];

(8) '*USB*' means Universal Serial Bus;

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

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

(11) '*luminance*' means the photometric measure of the luminous intensity per unit area of light traveling in a given direction, expressed in units of candelas per square meter (cd/m^2). The term brightness is often used to 'subjectively' qualify the luminance of a display;

(12) '*close viewing*' means a viewing distance comparable to that obtained when viewing an electronic display held in the hand or when sitting at the desk;

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

[2] Commission Regulation (EU) 2019/1782 of 1 October 2019 laying down ecodesign requirements for external power supplies pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulation (EC) No 278/2009 (see page 95 of this Official Journal).

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

(14) '*network*' means a communication infrastructure with a topology of links and an architecture that includes the physical components, organisational principles and communication procedures and formats (protocols);

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

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

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

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

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

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

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

(22) '*touch functionality*' means the possibility of inputting commands using, as input device, a touch-sensitive device, that generally is in the form of a transparent film layered on top of an electronic display panel;

(23) '*brightest on mode configuration*' means the configuration of the electronic display, set by the manufacturer, which provides an acceptable picture with the highest measured peak white luminance;

(24) '*shop configuration*' means the configuration for use specifically in the context of demonstrating the electronic display, for example in high illumination (retail) conditions and not involving an auto power-off if no user action or presence is detected. This configuration may be not accessible through a displayed menu;

(25) '*dismantling*' means possibly irreversible taking apart of an assembled product into its constituent materials and/or components;

(26) '*disassembling*' means reversible taking apart of an assembled product into its constituent materials and/or components without functional damage that would preclude reassembling, reuse or refurbishment of the product;

(27) '*step*' referring to *dismantling or disassembling,* means an operation that finishes with a change of tool or with the removal of a component or part;

(28) '*Printed Circuit Board*' *(PCB)* means an assembly that mechanically supports and electrically connects electronic or electrical components using conductive tracks, pads and other features etched from one or more sheet layers of conductive metal laminated onto or between sheet layers of a non-conductive substrate;

(29) '*PMMA*' means PolyMethylMethAcrylate;

(30) '*flame retardant*' or '*fire retardant*' means a substance that markedly retards the propagation of a flame;

(31) '*halogenated flame retardant*' means a flame retardant that contains any halogen;

(32) '*homogeneous material*' means one material of uniform composition throughout or a material consisting of a combination of materials, that cannot be disjointed or separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes;

(33) '*product database*' means a collection of data concerning products which is arranged in a systematic manner and consists of a consumer-oriented public part, where information concerning individual product parameters is accessible by electronic means, of an online portal for accessibility and of a compliance part, with clearly specified accessibility and security requirements, as laid down in Regulation (EU) 2017/1369;

(34) '*equivalent model*' means a model which has the same technical characteristics relevant for the technical information to be provided, but which is placed on the market or put into service by the same manufacturer, importer or authorised representative as another model with a different model identifier;

(35) '*model identifier*' means the code, usually alphanumeric, which distinguishes a specific product model from other models with the same trade mark of the same manufacturer's, importer's or authorised representative's name;

(36) '*spare part*' means a separate part that can replace a part with the same function in a product;

(37) '*professional repairer*' means an operator or undertaking which provides services of repair and professional maintenance of electronic displays.

ANNEX II

Ecodesign requirements

A. ENERGY EFFICIENCY REQUIREMENTS

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

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

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

Where:

A represents the screen area in dm^2;

$P_{measured}$ is the measured power in Watts in on mode in the normal configuration, in standard dynamic range (SDR);

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

The EEI of an electronic display shall not exceed the maximum EEI (EEI_{max}) according to the limits in Table 1 from the dates indicated.

Table 1

EEI limits for on-mode

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

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

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

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

Electronic displays qualify for a 10 % reduction in $P_{measured}$, 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) the value of $P_{measured}$ with ABC disabled, if applicable, shall be equal to or greater than the on mode power measured with ABC enabled in an ambient light condition of 100 lux measured at the ABC sensor;

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

(e) the ABC control of the display screen luminance meets all of the following characteristics when the ambient light condition measured at the ABC sensor changes:

— the measured screen luminance at 60 lux is between 65 % and 95 % of the screen luminance measured at 100 lux;

— the measured screen luminance at 35 lux is between 50 % and 80 % of the screen luminance measured at 100 lux; and

— the measured screen luminance at 12 lux is between 35 % and 70 % of the screen luminance measured at 100 lux.

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

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

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

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

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

3. **Peak white luminance ratio**

In the normal configuration, the peak white luminance of the electronic display in a 100 lux ambient light viewing environment shall not be less than 220 cd/m² or, if the electronic display is primarily intended for close viewing by a single user, not less than 150 cd/m².

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

C. OFF MODE, STANDBY AND NETWORKED STANDBY MODE REQUIREMENTS

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

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

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

Table 2

power demand limits other than on-mode, in Watts

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

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

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

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

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

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

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

3. **Automatic standby in televisions**

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

(b) If the television provides a function allowing the user to shorten, extend or disable the 4-hour period for automatic mode transitions detailed in (a), a warning message shall appear about a potential increase in energy use and a confirmation of the new setting must be requested when an extension beyond the 4-hour period or disabling is selected.

(c) If the television is equipped with a room presence sensor, the automatic transition from on mode into any mode as detailed in (a) applies if no presence is detected for no more than 1 hour.

(d) Televisions with various selectable input sources shall prioritise the power management protocols of the signal source selected and displayed over those default power management mechanisms described in the paragraphs (a) to (c) above.

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

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

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

D. MATERIAL EFFICIENCY REQUIREMENTS

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

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

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

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

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

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

2. **Marking of plastic components**

Plastic components heavier than 50 g:

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

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

(i) the marking is not possible because of the shape or size;

(ii) the marking would impact on the performance or functionality of the plastic component; and

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

[1] Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC (OJ L 266, 26.9.2006, p. 1).

For the following plastic components no marking is required:

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

(ii) wiring, cables and connectors, rubber parts and anywhere not enough appropriate surface area is available for the marking to be of a legible size;

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

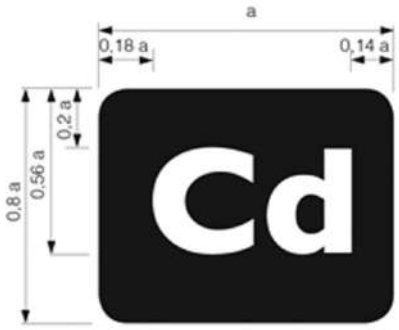
(iv) transparent parts where the marking would obstruct the function of the part in question.

(b) Components containing flame retardants shall additionally be marked with the abbreviated term of the polymer followed by hyphen, then the symbol 'FR' followed by the code number of the flame retardant in parentheses. The marking on the enclosure and stand components shall be clearly visible and readable.

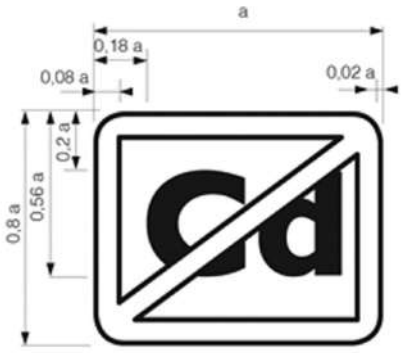
3. **Cadmium logo**

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

Cadmium inside



Cadmium free



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

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

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

4. **Halogenated flame retardants**

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

5. **Design for repair and reuse**

(a) Availability of spare parts:

(1) manufacturers, importers or authorised representatives of electronic displays shall make available to professional repairers at least the following spare parts: internal power supply, connectors to connect external equipment (cable, antenna, USB, DVD and Blue-Ray), capacitors, batteries and accumulators, DVD/Blue-Ray module if applicable and HD/SSD module if applicable for a minimum period of seven years after placing the last unit of the model on the market;

(2) manufacturers, importers or authorised representatives of electronic displays shall make available to professional repairers and end-users at least the following spare parts: external power supply and remote control for a minimum period of seven years after placing the last unit of the model on the market;

(3) manufacturers shall ensure that these spare parts can be replaced with the use of commonly available tools and without permanent damage to the appliance;

(4) the list of spare parts concerned by point 1 and the procedure for ordering them shall be publicly available on the free access website of the manufacturer, importer or authorised representative, at the latest two years after the placing on the market of the first unit of a model and until the end of the period of availability of these spare parts; and

(5) the list of spare parts concerned by point 2 and the procedure for ordering them and the repair instructions shall be publicly available on the manufacturer's, the importer's or authorised representative's free access web-site, at the moment of the placing on the market of the first unit of a model and until the end of the period of availability of these spare parts.

(b) Access to repair and maintenance information

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

(1) the manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information; to accept such a request, manufacturers, importers or authorised representative may require the professional repairer to demonstrate that:

(i) the professional repairer has the technical competence to repair electronic displays and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;

(ii) the professional repairer is covered by insurance covering liabilities resulting from its activity, regardless of whether this is required by the Member State;

(2) the manufacturers, importers or authorised representatives shall accept or refuse the registration within 5 working days from the date of request by the professional repairer;

(3) manufacturers, importers or authorised representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for receiving regular updates. A fee is reasonable if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information.

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

— the unequivocal appliance identification;

— a disassembly map or exploded view;

— list of necessary repair and test equipment;

— component and diagnosis information (such as minimum and maximum theoretical values for measurements);

— wiring and connection diagrams;

— diagnostic fault and error codes (including manufacturer-specific codes, where applicable); and

— data records of reported failure incidents stored on the electronic display (where applicable).

(c) Maximum delivery time of spare parts

(1) during the period mentioned under point 5(a)(1) and point 5(a)(2), the manufacturer, importer or authorised representatives shall ensure the delivery of the spare parts for electronic displays within 15 working days after having received the order;

(2) in the case of spare parts available only to professional repairers, this availability may be limited to professional repairers registered in accordance with point (b).

E. INFORMATION AVAILABILITY REQUIREMENTS

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

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

1. **Availability of software and firmware updates**

(a) The latest available version of the firmware shall be made available for a minimum period of eight years after the placing on the market of the last unit of a certain product model, free of charge or at a fair, transparent and non-discriminatory cost. The latest available security update to the firmware shall be made available until at least eight years after the placing on the market of the last product of a certain product model, free of charge.

(b) Information on the minimum guaranteed availability of software and firmware updates, availability of spare parts and product support shall be indicated in the product information sheet as from Annex V of Regulation (EU) 2019/2013.

ANNEX III

Measurement methods and calculations

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

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

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

1. General conditions

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

2. Measurements of on mode power demand

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

(a) measurements of power demand ($P_{measured}$) shall be made in the normal configuration;

(b) measurements shall be made using a dynamic broadcast-content video signal representing typical broadcast content for electronic displays in standard dynamic range (SDR). The measurement shall be the average power consumed over 10 consecutive minutes;

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

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

Measurements of peak white luminance

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

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

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

ANNEX IV

Verification procedure for market surveillance purposes

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

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

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

1. General procedure

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

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

(a) the values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC (declared values) and, where applicable, the values used to calculate these values are not more favourable for the manufacturer, importer or authorised representative than the results of the corresponding measurements carried out pursuant to paragraph (g) thereof;

(b) the declared values meet any requirements laid down in this Regulation and any product information published by the manufacturer, importer or authorised representative does not contain values that are more favourable for the manufacturer, importer or authorised representative than the declared values;

(c) when the Member State authorities test the unit of the model, the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) comply with the respective verification tolerances as given in Table 3; and

(d) when the Member State authorities check the unit of the model, it complies with the functional requirements and the requirements on repair and end-of-life aspects.

1.1. Verification procedure for requirements established in Annex II, point B.1

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

(a) the ABC of the product is enabled by default and persists in all SDR modes, except in the shop configuration;

(b) the measured on mode power of the product decreases by 20 % or more when the ambient light condition measured at the ABC sensor is reduced from 100 lux to 12 lux;

(c) the ABC control of display luminance meets the requirements of Annex II, point B.1(e).

1.2. Verification procedure for requirements established in Annex II, point B.2

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

(a) the normal configuration is provided as the default choice on initial activation of the electronic display; and

(b) if the user selects a mode other than normal configuration, a second selection process is prompted to confirm the choice.

1.3. **Verification procedure for requirements established in Annex II, point B.3**

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

1.4. **Verification procedure for requirements established in Annex II, point C.1**

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

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

(b) if the unit provides networked standby mode with HiNA, the unit does not exceed the applicable power demand requirements for HiNA when networked standby is enabled; and

(c) if the unit provides networked standby mode without HiNA, the unit does not exceed the applicable power demand requirements without HiNA when networked standby is enabled.

1.5. **Verification procedure for requirements established in Annex II, point C.2**

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

(a) the unit provides off mode and/or standby mode, and/or another mode which does not exceed the applicable power demand requirements for off mode and/or standby mode, when the electronic display is connected to the power source; and

(b) the activation of the network availability requires the end-user's intervention; and

(c) the network availability can be disabled by the end-user; and

(d) it complies with the requirements for standby mode when networked standby mode is not enabled.

1.6. **Verification procedure for requirements established in Annex II, point C.3**

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

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

(b) the function is set as default; and

(c) in on mode, the television shows an alert message before automatically switching from on mode to the applicable mode; and

(d) if the television provides a function allowing the user to modify the 4-hour period for automatic mode transitions detailed in (a), a warning message is prompted about a potential increase in energy use and a confirmation of the new setting is requested when an extension beyond the 4-hour period or disabling is selected; and

(e) if the television is equipped with a room presence sensor, the automatic transition from on mode into any mode as detailed in (a) applies if no presence is detected for no more than 1 hour; and

(f) in televisions with various selectable input sources the power management protocols of the signal source selected is prioritised over those default power management mechanisms described in (a) above.

1.7. **Verification procedure for requirements established in Annex II, point C.4**

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

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

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

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

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

If the results referred to in point 1(c) and 1(d) related to requirements involving measured values are not achieved, the Member State authorities shall select three additional units of the same model or equivalent models for testing. The model shall be considered to comply with the applicable requirements if, for these three units, the arithmetical mean of the determined values complies with the respective verification tolerances given in Table 3. Otherwise the model and all equivalent models shall be considered not to comply.

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

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

3. **Verification tolerances**

The Member State authorities shall only apply the verification tolerances that are set out in Table 3. No other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

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

Table 3

Verification tolerances

Parameter	*Verification tolerances*
On mode power demand, ($P_{measured}$, Watts) excluding allowances and adjustments in Annex II, point B, for the purposes of EEI calculation set out in Annex II, point A.	The determined value (*) shall not exceed the declared value by more than 7 %
Off mode, standby mode and networked standby mode power demand (Watts), as applicable	The determined value (*) shall not exceed the declared value by more than 0,10 Watt if the declared value is 1,00 W or less, or by more than 10 % if the declared value is more than 1,00 W
Peak white luminance ratio	Where applicable, the determined value shall not be lower than 60 % of the peak white luminance of the brightest on mode configuration provided by the electronic display

Parameter	*Verification tolerances*
Peak white luminance (cd/m²)	The determined value (*) shall not be lower than the declared value by more than 8 %
Visible screen diagonal in centimetres (and inches, if declared)	The determined value (*) shall not be lower than the declared value by more than 1 cm (or 0,4 inches).
Screen area in dm²	The determined value (*) shall not be lower than the declared value by more than 0,1 dm²
Timed functions as set out in Annex II, points C.3 and C.4	The switch shall be completed within 5 seconds of the set out values
Weight of plastic components as qualified in Annex II, point D.2	The determined value (*) shall not be different from the declared value by more than 5 grams

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

ANNEX V

Benchmarks

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

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

Diagonal of screen area		HD	UHD
(cm)	(inches)	Watt	Watt
55,9	22	15	
81,3	32	25	
108,0	43	33	47
123,2	49	43	57
152,4	60	62	67
165,1	65	56	71

Other functioning modes:

Off mode (physical switch):	0,0 W
Off mode (no physical switch):	0,1 W
Standby	0,2 W
Networked standby (non-HiNA):	0,9 W