TEST REPORT

COMMISSION REGULATION (EU) 2019/2021
Implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to eco design requirements for electronic displays
COMMISSION DELEGATED REGULATION (EU) 2019/2013
Implementing Directive (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of electronic displays

Report Reference No. ..... : 220620118EER-1

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Date of issue.....: 2022-08-24

Testing Laboratory Name .....:	**Shenzhen UnionTrust Quality and Technology Co., Ltd.**
Address .....:	Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China
Applicant's Name .....:	**Cooler Master Technology Inc.**
Address .....:	7F., No.398, Xinhu 1st Rd., Neihu Dist., Taipei City 114065, Taiwan
Manufacturer's Name .....:	**Cooler Master Technology Inc.**
Address .....:	7F., No.398, Xinhu 1st Rd., Neihu Dist., Taipei City 114065, Taiwan
Test specification	
Standard.....:	(EU) 2019/2021, (EU) 2021/341, (EU) 2019/2013, (EU) 2021/340
Test method .....:	EN50564: 2011; BS EN50564: 2011 EN 62087-3:2016, EN 62087-2:2016, EN 62087-1:2016 BS EN 62087-3:2016, BS EN 62087-2:2016, BS EN 62087-1:2016 IEC 62087-3:2015, IEC 62087-2:2015, IEC 62087-1:2015
Non-standard test method .....:	N/A
Description of EUT set. .....:	**Gaming Monitor, LED Monitor, LCD Monitor**
Brand name.....:	Cooler Master
Model name.....:	GM238-FFS, GM238-********** (The symbol "*" can be 0-9, A-Z, a-z, "/", "\", "_", "-", "(", ")", "," or blank for the marketing purpose, only different model designations on the marking plate for different markets. No safety concerns.)
Series number .....:	N/A
Rating(s).....:	LCD Monitor Input: 12V ⎓4.5A

Conclusion

The energy efficiency index (EEI) is 0.702, in standby-mode is 0.24W, in off-mode is 0.18W.
These results compliance with the all stage requirements of the EC regulation (EU) 2019/2021.
The energy efficiency class of the models were determined as SDR Class "E".

General remarks:

If any questions of the inspection report, please proposed within 15 days from receiving the report, deadline will not be accepted.

Report would be inefficiency if any scrawling or modification was made.

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

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

Throughout this report a point is used as the decimal separator.

Gerneral product information:

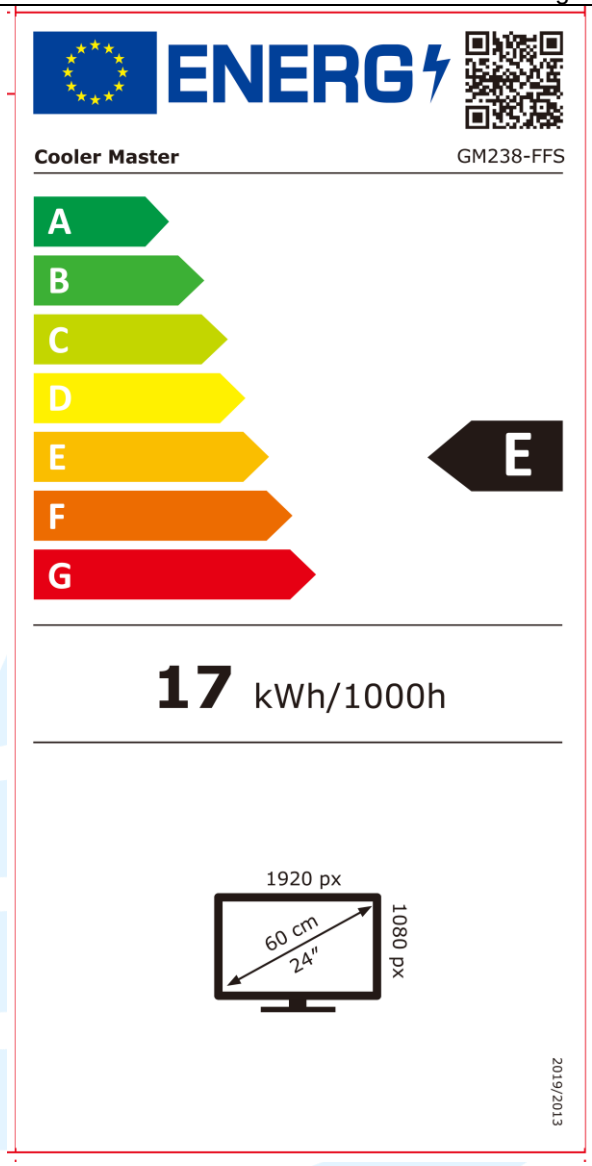
1. The appliance tested in this report is a 23.8 inch Gaming Monitor, LED Monitor, LCD Monitor, supplied by an external power supply which rating: 100-240V~, 50/60Hz, 1.5A Max. for input; 12.0V ⎓4.5A, 54.0W for output and comply with (EU)2019/1782.
2. All models are the same except model number.

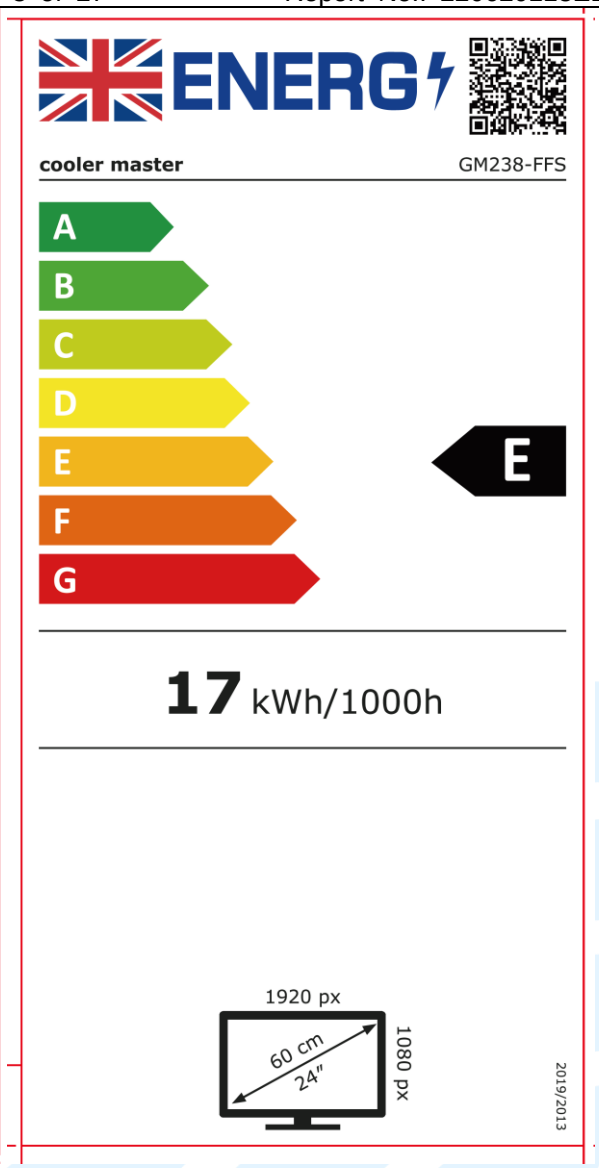
Testing……..…..:

Date of receipt of test ……..……..:	2022-08-09
Date(s) of performance of test ……..:	2022-08-12

Factory's Name 1……..…..…..:	Shenzhen KTC Commercial Display Technology CO., LTD.
Factory's Address1 ……..……..:	No.1 Workshop, No. 4023, Northern Wuhe Road, Bantian Street, Longgang District, Shenzhen, Guangdong 518129, China
Factory's Name 2 ……..…..…..…:	HUIZHOU KTC TECHNOLOGY CO.,LTD.
Factory's Address 2……..……..:	NO.38 GUANGTAI ROAD,HUINAN HI-TECH INDUSTRIAL PARK,HUIZHOU,CHINA

Copy of marking plate (representative):





Note:

1. The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Critical component list:				
Part Name	manufacturer/ trademark	type/model	technical data	mark(s) of conformity1)
LCD Panel	SHENZHEN KTC COMMERCIAL DISPLAY TECHNOLOGY CO., LTD	K238WL2	23.8 inchTFT Liquid Crystal Display module with LED Backlight,This module supports 1920 x 1080 mode	Tested with appliance
External power supply	ShenZhen Fujia Appliance Co., Ltd.	FJ-SW20171204500	Input: 100-240V~, 50/60Hz, 1.5A Max. Output: 12.0V ⎓4.5A, 54.0W	Marke level VI

COMMISSION REGULATION (EU) 2019/2021 ANNEX II Ecodesign requirements			
Clause	Subject matter and scope	Remark	Verdict
3	The requirements in points A and B of Annex II shall not apply to the some displays		N/A
4	The requirements in points A, B and C of Annex II shall not apply to the some displays:		N/A
A. ENERGY EFFICIENCY REQUIREMENTS			
1.	Energy Efficiency Index limits for On-mode		--
	Energy Efficiency Index (EEI): $EEI = \frac{(P_{measured} + 1)}{(3 \times [90 \times tanh(0,02 + 0,004 \times (A - 11)) + 4] + 3) + corr}$ 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 in point B (1). This shall apply until 28 February 2023. corr shall be zero in all other cases.	See table 2	P
	From 1 March 2021		--
	EEI_{max} for electronic displays with resolution up to 2 073 600 pixels (HD): $EEI_{max} \leq 0.90$;		P
	EEImax for electronic displays with resolution above 2 073 600 pixels (HD) and up to 8 294 400 pixels (UHD-4k): EEImax≤ 1.10		N/A
	From 1 March 2023		--
	EEImax for electronic displays with resolution up to 2 073 600 pixels (HD): EEImax ≤ 0.75;		P
	EEImax for electronic displays with resolution above 2 073 600 pixels (HD) and up to 8 294 400 pixels (UHD-4k): EEImax ≤ 0.90;		N/A
	EEImax for electronic displays with resolution above 8 294 400 pixels (UHD-4k) and for MicroLED displays: EEImax ≤ 0.90		N/A
B. ALLOWANCES AND ADJUSTMENTS FOR THE PURPOSE OF THE EEI CALCULATION AND FUNCTIONAL REQUIREMENTS (From 1 March 2021)			
1.	Electronic displays with automatic brightness control (ABC)		--
	Electronic displays qualify for a 10 % reduction in Pmeasured, if they meet all of the following requirements:	without automatic brightness control	N/A
1(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

Clause	Subject matter and scope	Remark	Verdict
1(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
1(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
1(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
1(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
2.	Forced menu and set up menu		--
	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.		N/A
	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.		N/A
	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.		N/A
	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.		N/A
3.	Peak white luminance ratio		--

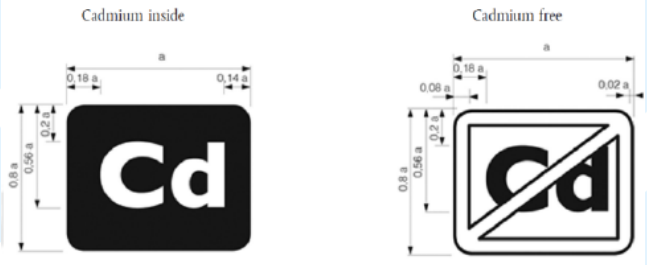
Clause	Subject matter and scope	Remark	Verdict
	In the normal configuration, the peak white luminance of the electronic display in a 100 lux ambient light viewing environment shall not be less than 220 cd/m^2 or, if the electronic display is primarily intended for close viewing by a single user, not less than 150 cd/m^2. 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.	The electronic display is primarily intended for close viewing by a single user, not less than 150 cd/m^2	P
C. OFF MODE, STANDBY MODE AND NETWORKED STANDBY MODE REQUIREMENTS (From 1 March 2021)			
1.	Power demand limits other than on-mode		--
	Power consumption in any off-mode condition shall not exceed 0.30 Watts		P
	Electronic displays shall not exceed power demand limits in standby/networked standby modes and conditions listed in Table 2	See table 3	P

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

2.	Availability of off, standby and networked standby mode		--
	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	Off mode Standby mode	P
	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		P

Clause	Subject matter and scope	Remark	Verdict
	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		N/A
	Networked electronic displays shall comply with the requirements for standby mode when networked standby mode is disabled		N/A
3.	Automatic standby in televisions		--
	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.		N/A
	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.		N/A
	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.		N/A
	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.		N/A
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.		P
	Before triggering such a switch, a warning message shall be display and the switch completed within 10 minutes.		P

Clause	Subject matter and scope	Remark	Verdict
D. MATERIAL EFFICIENCY REQUIREMENTS (From 1 March 2021)			
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.		P
	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.		P
	This dismantling information shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.		P
	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.		P
2.	Marking of plastic components		--
	Plastic components heavier than 50g.		P
2.(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.		P
	Plastic components are exempt from marking requirements in the following circumstances: 1) The marking is not possible because of the shape or size; 2) The marking would impact on the performance or functionality of the plastic component; and 3) Marking is technically not possible because of the molding method.		P
	For the following plastic components no marking is required: 1) Packaging, tape, labels and stretch wraps; 2) Wiring, cables and connectors, rubber parts and anywhere not enough appropriate surface area is available for the marking to be of a legible size; 3) PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers; 4) Transparent parts where the marking would obstruct the function of the part in question.		P

Clause	Subject matter and scope	Remark	Verdict
2.(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.		P
3.	Cadmium logo		--
	Electronic displays with a screen panel in which concentration values of Cadmium (Cd) by weight in homogeneous materials exceed 0,01 % as defined in Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment, shall be labelled with the 'Cadmium inside' logo. The logo shall be clearly visible durable, legible and indelible. The logo shall be in the form of the following graphic:  The dimension of 'a' shall be greater than 9 mm and the typeface to be used is 'Gill Sans'.		P
	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.		N/A
	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.		P
4.	Halogenated flame retardants		--
	The use of halogenated flame retardants is not allowed in the enclosure and stand of electronic displays.		P

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

5.(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: a) 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; b) 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: 1) The unequivocal appliance identification; 2) A disassembly map or exploded view; 3) List of necessary repair and test equipment; 4) Component and diagnosis information (such as minimum and maximum theoretical values for measurements); 5) Wiring and connection diagrams; 6) Diagnostic fault and error codes (including manufacturer-specific codes, where applicable); 7) Data records of reported failure incidents stored on the electronic display (where applicable).		P

Clause	Subject matter and scope	Remark	Verdict
5.(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).		P
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).		N/A
1.	Availability of software and firmware updates		--
1.(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.		N/A
1.(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.		N/A

COMMISSION DELEGATED REGULATION (EU) 2019/2013
ANNEX II Energy labelling requirements

Clause	Subject matter and scope	Remark	Verdict
A. Energy efficiency classes			
1.	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. a	SDR mode: Class E	P

Table 1

Energy efficiency classes of electronic displays

Energy Efficiency Class	Energy Efficiency Index (EEI_{label})
A	$EEI_{label} < 0,30$
B	$0,30 \le EEI_{label} < 0,40$
C	$0,40 \le EEI_{label} < 0,50$
D	$0,50 \le EEI_{label} < 0,60$
E	$0,60 \le EEI_{label} < 0,75$
F	$0,75 \le EEI_{label} < 0,90$
G	$0,90 \le EEI_{label}$

B. Energy Efficiency Index (EEI_{label})			
1	The Energy Efficiency Index (EEI_{label}) shall be calculated using the following equation:	SDR mode: EEI_{label} = 0.682	P

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

A represents the screen 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 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

$corr_t$ value

Electronic Display type	$corr_t$ 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*

Clause	Subject matter and scope	Remark	Verdict
C. Allowances and adjustments for the purpose of the EEI_{label} calculation			
1.	Electronic displays with automatic brightness control (ABC) shall qualify for a 10 % reduction in $P_{measured}$, if they meet all of the following requirements:		N/A
1.(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
1.(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
1.(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		N/A
1.(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
1.(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

Table 1	Sequence of steps for each mode:

1. On- mode test:

For on-mode test, follow section 6.3.2 and 6.4.2 of EN62087-3: 2016, to ensure that we get stable condition with the respect to the power consumptions.

1.1 Ensure that the EUT set is in cool down condition according to 6.3.2.

1. 2 Turn on the EUT by using the remote control, Leave the TV turned on, warm up the EUT by conducting with the dynamic peak white luminance test pattern, once the power readings are stable, then the UUT was warmed up, and begins on mode test.

1. 3 $P_{measured}$ (SDR) test sequence: 10-minute Dynamic Broadcast video sequence was used for EUT's $P_{measured}$ (SDR) test. HD resolution file was used for all display resolutions .SD HD resolution file was used when the EUT has the limited types of display that cannot accept or display higher resolution standards. $P_{measured}$ (SDR) was measured.

1. 4 If the EUT support HDR, then 2 HDR test sequences should be taken after Pmeasured (SDR) test sequence. There are 2 types of the HDR Dynamic Video Power Test signal, one is "HDR-HLG Power.mp4" and "HDR_HDR10 Power.mp4", measured Pav HDR-HLG and Pav HDR_HDR for each 5-minutes.

2. luminance test:

For luminance test mode, follow section "6.5 Determination of peak luminance ratio and power factor" of EN62087-3:2016, use HDMI terminal and use "box and outline" test pattern for luminance test.

2.1 The peak luminance determination procedure shall be started within 10 min after determination of On mode power consumption.

2.2 Selected "box and outline" test pattern for test, shall be applied to the UUT within 30s after stalilization. Peak luminance at the nominal centre of the display area shall be measured 30s±5s after the video signal is initially displayed using the luminance measuring device.

2.3 Select each default picture mode and repeated the luminance measurement step.

2.4 Luminance meter location: 1000mm measurement distance between light and measuring device and centre of the display screen.

2.5 $L_{default}$ and/ or $L_{brightest}$ should be measured.

3. Standby-mode and off- mode test:

For Standby-mode and off-mode test, use sampling method for test, which is clearly stated in EN50564. Strictly follow Figure 7 of EN62087-3:2016 to take measurements. Switch the UUT into the standby-mode, by pressing "⏻" button on the remote control, the equipment will enter the standy-mode; if the equipment support networked standby mode,the networked standby power consumption shall be measured.

3.1 Ensure that the EUT enter the standby-mode or off-mode.
3.2 Use sampling method for Standby-mode test and off-mode test, which is clearly stated in EN50564 (section 5.3.2).
3.3 Standby-mode should take all the steps state in Figure 7 in EN62087-3:2016.

3.4 Power consumption in the Off- mode shall be determined as specified in IEC 62087-1:2015, Clause 6.

Set-up and circuit used for electrical testing:

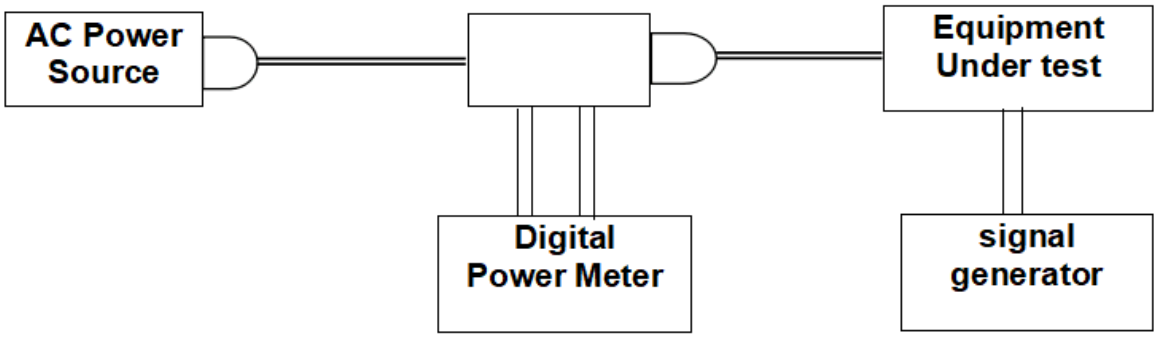


Table 2	Energy consumption test (On mode and peak white luminance)
Tests should be undertaken in accordance with EN 62087-1:2016, EN 62087-2:2016, EN 62087-3:2016, IEC62087-1:2015, IEC62087-2:2015, IEC 62087-3:2015	
Rms input voltage (V)	230.2
Input supply frequency (Hz)	50
Total harmonic distortion (THD) of the electricity supply system (%)	0.40
Ambient Temperature (°C)	24.9°C
Ambient Humidity RH (%)	57.2%
Airspeed, room m/s	0.4
The input terminal for the audio and video test signals	DisplayPort
Screen Width (cm)	52.7
Screen Height (cm)	29.6
Claimed Screen Size(diagonal dimension cm)	60.0
Visible screen area (dm^2)	15.6
Display resolution	1920 × 1080
$P_{measured}$ (SDR) (W)	16.8
P_{av} HLG	N/A
P_{av} HDR	N/A
$P_{measured}$ (HDR)	N/A
Availability of forced menu((Yes or No)	N/A
The peak luminance of the on-mode condition of the EUT (cd/m2)	173.8
Name of on-mode picture mode	Standard mode
The peak luminance of the brightest on-mode condition provided by the EUT (cd/m2)	319.1
Name of brightest picture mode	User mode
Peak Luminance ratio (%)	N/A
Limit for peak Luminance ratio (%)	N/A
EEI (On-mode)according to (EU) No 2019/2021	0.702
EEI (label) according to (EU) 2019/2013	0.682
On-mode energy consumption in kWh per 1000 h (for SDR)	17.0
On-mode energy consumption in kWh per 1000 h (for HDR)	N/A
Energy efficiency class (according to (EU) 2019/2013)	Class E
EEI limit (according to (EU) No 2019/2021)	See below
March 01,2021	☒ 0.90 for electronic displays with resolution up to 2 073 600 pixels(HD)

	☐ 1.10 for electronic displays with resolution ＞2 073 600 pixels(HD) and ≤ to 8294 400 pixels(UHD-4k) ☐ N/A for electronic displays with resolution＞ 8294 400 pixels(UHD-4k) and Micro LED display
March 01,2023	☐ N/A ☒ 0.75 for electronic displays with resolution ≤ 2 073 600 pixels(HD) ☐ 0.9 for electronic displays with resolution ＞ 2 073 600 pixels (HD) and ≤ to 8294 400 pixels(UHD-4k) ☐ 0.9 for electronic displays with resolution ＞ 8294 400 pixels(UHD-4k) and Micro LED display
Verdict	**Pass**

Table 3	Energy consumption test (Off mode, Standby mode, Networked standby mode)
Tests should be undertaken in accordance with EN 62087-1:2016, EN 62087-3:2016, IEC 62087-1:2015, IEC 62087- 3:2015, EN 50564:2011	
Voltage (V)	230.2
Frequency (Hz)	50
Total harmonic distortion (THD) of the electricity supply system (%)	0.43
Ambient Temperature (°C)	24.9
Ambient Humidity RH (%)	57.2
Airspeed, room m/s	0.4
Off mode Power(W)	0.18
Standby mode Power (W)	0.24
Networked standby mode Power (W)	N/A

For the networked electronic displays only:

The number and type of network interfaces and, except for wireless network interfaces, their position in the electronic displays, the trigger to be used to reactivate the electronic display:	No.	Type	Location	Trigger
	1	Wi-Fi	N/A	N/A
	2	LAN	N/A	N/A
	3	HDMI	N/A	N/A
whether networked electronic display provides functionality allowing the power management function and/or the end-user to switch the electronic display from networked standby mode into standby mode, or off mode or another condition:				--

Limits for Off mode, Standby mode, Networked standby mode power

	Off mode(W)	Standby mode(W)	Networked standby mode(W)
Maximum limits	0.3	0.5	N/A
Allowances for additional functions when present and enabled			
Status display	☐0.0	☐0.2	☐0.2
Deactivation using room presence detection	☐0.0	☐0.5	☐0.5
Touch functionality, if usable for activation	☐0.0	☐1.0	☐1.0
HiNA function	☐0.0	☐1.0	☐4.0
Total maximum power demand with all additional functions when present and enabled	☐N/A ☒0.3	☒0.5 ☐Max. 2.2	☐2.0 ☐Max. 7.7

Verdict	Pass

Photos

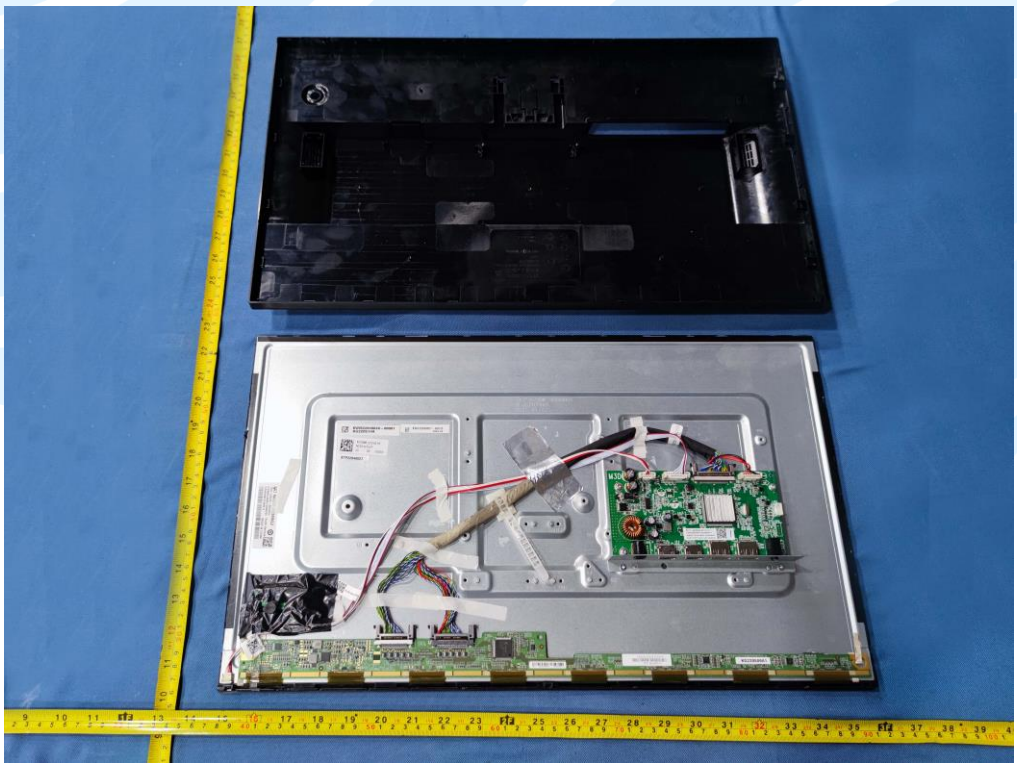
Front view of EUT(Base support type A)

Rear view of EUT(Base support type A)

Front view of EUT(Base support type B)

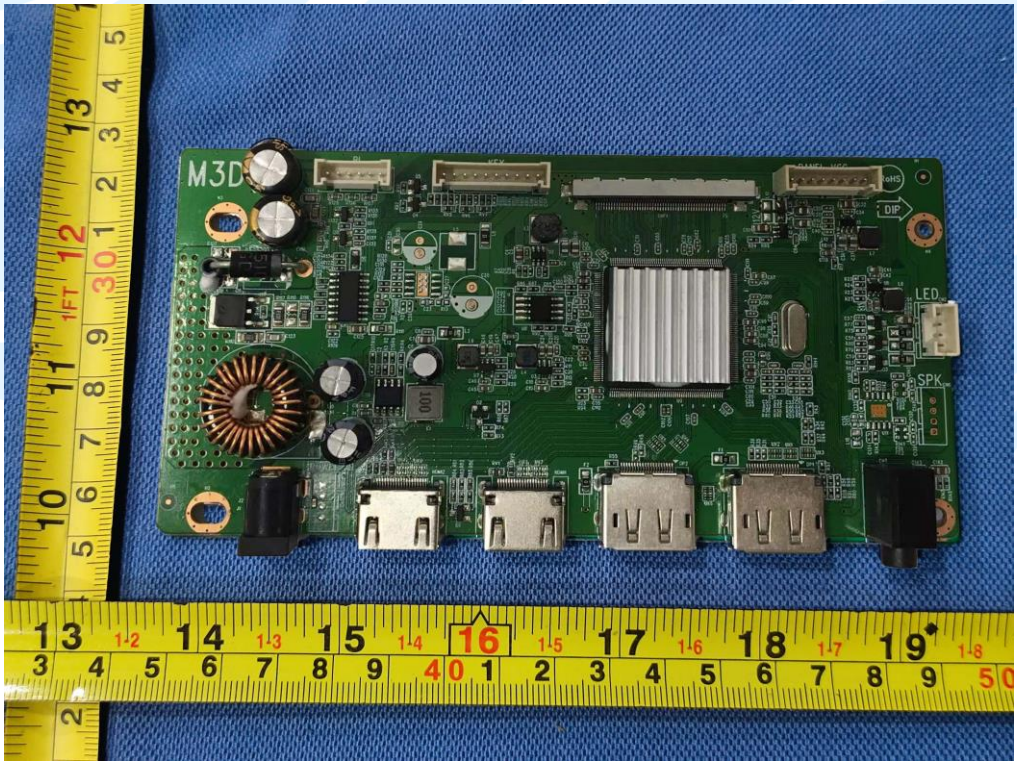
Rear view of EUT(Base support type B)

Terminal view of EUT

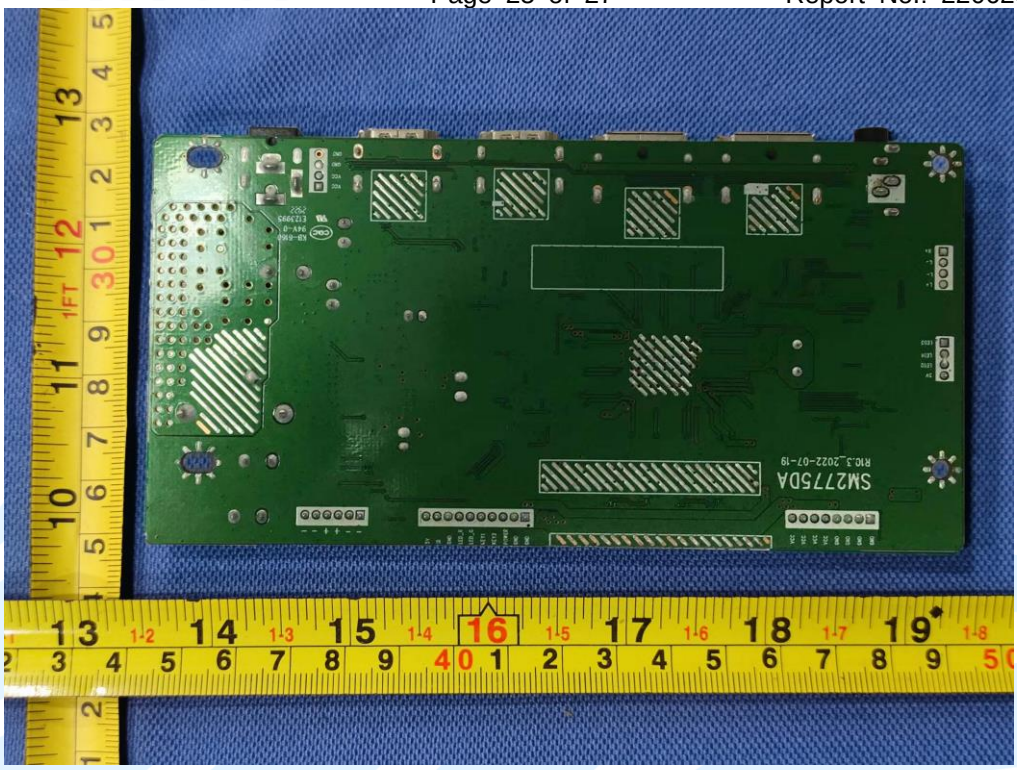


Internal view of EUT

Internal view of EUT



PCB view of Main board



PCB view of Main board

View of external adapter

View of external adapter

Test equipment list

Equipment No.	Name	Manufacture	Type/Model	Cal. Date.	Next Cal. Date
UTTL-S001	Digital Power Meter	Yokogawa	WT210	2022-02-18	2023-02-17
UTTL-S067	Anemometer	KANOMAX	KA23	2022-08-17	2023-08-16
UTTL-S072	Gray level meter	MINLTA	LS-110	2022-01-07	2023-01-06
UTTL-S073	luminance meter	TES	TES-1339	2022-01-20	2023-01-19
UTTL-S084	Tapeline	TAJIMA	3.0m	2022-08-16	2023-08-15
UTTL-S356	Temp&Humidity Recorder	CEM	DT-172	2022-04-19	2023-04-18

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