

TEST REPORT

Product Name : LCD MONITOR

Model Number : PN-M652,PN-P656

Prepared for : Shenzhen KTC Commercial Display Technology CO., LTD.
Address : The B district of the first floor, third floor and fourth floor, 1#
Building, NO. 4023, Wuhe Street, Bantian, longgang
District, Shenzhen City, Guangdong Province, China

Prepared by : EMTEK (SHENZHEN) CO., LTD.
Address : Bldg 69, Majialong Industry Zone, Nanshan District,
Shenzhen, Guangdong, China

Tel: (0755) 26954280
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Report Number : ENS2412180010S00202R

TEST REPORT

COMMISSION REGULATION (EU) 2019/2021 of 1 October 2019 with amended by (EU) 2021/341 of 23 February 2021 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
COMMISSION DELEGATED REGULATION (EU) 2019/2013 of 11 March 2019 with amended by (EU) 2021/340 of 17 December 2020 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of electronic displays

Report Reference No. : ENS2412180010S00202R

Compiled by (name + signature) : Amy Wei / Engineer

Approved by (name + signature) : William Guo / Manager

Date of issue : Dec. 23, 2024

Total number of pages : 33 pages

Testing Laboratory

Name : EMTEK (Shenzhen) Co., Ltd.

Address : Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

Testing location / address : Same as above

Applicant's name : Shenzhen KTC Commercial Display Technology CO., LTD.

Address : The B district of the first floor, third floor and fourth floor, 1# Building, NO. 4023, Wuhe Street, Bantian, longgang District, Shenzhen City, Guangdong Province, China

Test specification:

Standard :

COMMISSION REGULATION (EU) 2019/2021, (EU) 2021/341, (EU) 2019/2013, (EU) 2021/340, IEC 62087-1:2015, EN 62087-1:2016, EN 50564:2011, IEC 62087-2:2023, EN IEC 62087-2:2023, BS EN IEC 62087-2:2023, IEC 62087-3:2023, EN IEC 62087-3:2023, BS EN IEC 62087-3:2023

Test procedure :

COMMISSION REGULATION (EU) 2019/2021, (EU) 2021/341, (EU) 2019/2013, (EU) 2021/340, IEC 62087-1:2015, EN 62087-1:2016, EN 50564:2011, IEC 62087-2:2023, EN IEC 62087-2:2023, BS EN IEC 62087-2:2023, IEC 62087-3:2023, EN IEC 62087-3:2023, BS EN IEC 62087-3:2023

Non-standard test method : N/A

Test Report Form No. : (EU)2019_2021&(EU)2019_2013A

Test Report Form(s) Originator : EMTEK

Master TRF : Dated 2021-04

Test item description : LCD MONITOR

Trade Mark : SHARP



Manufacturer : SHARP CORPORATION
 Address..... : 1 Takumi-cho, Sakai-ku, Sakai-City, Osaka 590-8522, Japan
 Model/Type reference : PN-M652, PN-P656
 Ratings..... : Input: 100-240V~, 4.6-1.9A, 50/60Hz (for PN-M652);
 100-240V~, 5.0-2.1A, 50/60Hz (for PN-P656)

Copy of marking plate:

Label for PN-M652:

SHARP MultiSync M652

VOLTS Вольт 输入电压 輸入電壓: 100-240V~
 AMPERES Ампер 电流 電流: 4.6-1.9A
 FREQUENCY Частота 工作频率 工作頻率: 50/60Hz

CAUTION: TO PREVENT ELECTRIC SHOCK, DO NOT REMOVE THE ENCLOSURE.
 NO USER-SERVICEABLE PARTS INSIDE.

ATTENTION: AFIN DE PREVENIR DE TOUT CHOC ELECTRIQUES, NE PAS OUVRIR CE BOITIER.
 AUCUNE PIECE INTERNE NE PEUT-ETRE CHANGEES PAR L'UTILISATEUR.

ACHTUNG: ZUR TRENNUNG VOM NETZ IST DER NETZSTECKER AUS DER STECKDOSE ZU ZIEHEN.
 GERÄT NICHT ÖFFNEN. ES SIND KEINE DURCH DEN BENUTZER AUSWECHSELBAREN TEILE IM GERÄT VORHANDEN.

PRECAUCIÓN: PARA PREVENIR DESCARGA ELÉCTRICA, NO quite el recinto.
 NINGUNAS PIEZAS DEL USUARIO SERVICABLE ADENTRO.

VAROITUS: LAITE ON LITETTÄVÄ SUOJAKOSKETTIMILLA VARUSTETTUUN PISTORASIAAN.
VARNING: APPARATEN SKALL ANSLUTAS TILL JORDAT UTTAG.

ADVARSEL: APPARATET MÅ TILKOPLES JORDET STIKKONTAKT.

ADVARSEL: APPARATETS STIKPROP SKAL TILSLUTTES EN STIKKONTAKT
 MED JORD SOM GIVER FORBINDELSE TIL STIKPROPPENS JORD.

⚠ 注意: 请勿打开后盖, 小心高压电击, 机内并无用户配件。
 ⚠ 注意: 請勿打開後蓋, 小心高壓電擊, 機內並無用戶配件。
 ⚠ 警語: 使用過度恐傷害視力。

사용상 주의사항 감전의 위험 및 제품의 손상이 발생할 수
 있으므로 제품의 커버를 열지 마십시오.
 인증 서비스 센터 전화 번호: 080-022-1155 (호성ITX주식회사)
 * 본 라벨과 전화번호는 국내 규정 내에서 적절한 목적으로만
 사용되어야 합니다.

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES.
 OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:
 (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND
 (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED,
 INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRABLE OPERATION.

CAN ICES (B) / NMB (B)

تنبيه
 تجنب فتح الغطاء العلوي للجهاز منعا للتعرض لصدمة كهربائية.
 لا يحتوي الجهاز على أجزاء داخلية قابلة للصيانة من قبل المستخدم.

LCD MONITOR
ЖК-монитор
 液晶显示器 彩色显示器
 모니터 (65 인치 LCD 모니터)
 (MODEL / Модель / 型号 / 型號 / 모델명: PN-M652)

FOR JAPAN ONLY

警告

高圧注意
 サービスマン以外の方は分解しない
 てください。内部には高電圧部分が
 あり、万一さわると危険です。

感電注意
 電源コードのアースリード線は必ず
 接地ください。故障のときに感電の
 原因になります。

定格電圧: 100-240V~
 定格電流: 4.6-1.9A
 定格周波数: 50/60Hz

UL Japan JP24046

SHARP

IP30

TÜV Rheinland
 ZERTIFIZIERT

UL **CS**
 AR XXXX

SAFETY MARK
 XXXXXX-XX

HDMI™ **CRESTRON CONNECTED** **cd** **Hg**

BRAND OWNER:
 SHARP CORPORATION
 シャープ株式会社
 大阪府堺市堺区匠町 1 番地
 日本国大阪府堺市堺区匠町 1 番地
 1 Takumi-cho, Sakai-ku, Sakai-City, Osaka 590-8522, Japan
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 Sharp NEC Display Solutions Europe GmbH
 Landshuter Allee 12-14, 80637 Munich, Germany
 Contact address for UK
 Sharp Electronics (Europe) Limited
 4 Furzeground Way, Stockley Park, Uxbridge, Middlesex, UB11 1EZ, United Kingdom
 www.sharpedisplays.eu

生産廠: 惠州市康冠科技有限公司 生产厂: 惠州市康冠科技有限公司
 生产地址: 广东省惠州市惠城区三栋镇惠南高科技产业园广泰路 38 号
 제조/국가: HUIZHOU KTC TECHNOLOGY Co., Ltd. / 중국

Mounting Interface
 400mm x 400mm
 4-M6 Depth 12mm Max

Landscape
 TOP

Portrait
 TOP

中国制造 中國製造
 MADE IN CHINA FABRIQUE EN CHINE
 FABRICADO EN CHINA Сделано в Китае

Label for PN-P656:

SHARP MultiSync P656

VOLTS Вольт 输入电压 輸入電壓: 100-240V~
 AMPERES Ампер 电流 電流: 5.0-2.1A
 FREQUENCY Частота 工作频率 工作頻率: 50/60Hz

CAUTION: TO PREVENT ELECTRIC SHOCK, DO NOT REMOVE THE ENCLOSURE.
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 AUCUNE PIECE INTERNE NE PEUT-ETRE CHANGEES PAR L'UTILISATEUR.

ACHTUNG: ZUR TRENNUNG VOM NETZ IST DER NETZSTECKER AUS DER STECKDOSE ZU ZIEHEN.
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WARNING: APPARATEN SKALL ANSLUTAS TILL JORDAT UTGÅG.
ADVÅRSEL: APPARATET MÅ TILKOPLES JORDET STIKKONTAKT.
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 لا يحتوي الجهاز على أجزاء داخلية قابلة للصيانة من قبل المستخدم.

E227390

BRAND OWNER:
SHARP CORPORATION
 シャープ株式会社
 大阪府堺市堺区匠町 1 番地
 日本国大阪府堺市堺区匠町 1 番地
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 生产地址: 广东省惠州市惠城区三栋镇惠南高科技产业园广泰路 38 号
 제조/국가: HUIZHOU KTC TECHNOLOGY Co., Ltd. / 중국

LCD MONITOR
 ЖК-монитор
 液晶显示器 彩色显示器
 모니터 (65 인치 LCD 모니터)
 (MODEL / Модель / 型号 / 型號 / 모델명: PN-P656)

FOR JAPAN ONLY

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 定格電圧: 100-240V~
 定格電流: 5.0-2.1A
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IP30

Mounting Interface
 400mm x 400mm
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 Landscape
 Portrait

中国制造 中國製造
 MADE IN CHINA FABRIQUE EN CHINE
 FABRICADO EN CHINA Сделано в Китае

Summary of testing:

The product has been tested according to COMMISSION REGULATION (EU) 2019/2021, (EU) 2021/341, (EU) 2019/2013, (EU) 2021/340, IEC 62087-1:2015, EN 62087-1:2016, EN 50564:2011, IEC 62087-2:2023, EN IEC 62087-2:2023, BS EN IEC 62087-2:2023, IEC 62087-3:2023, EN IEC 62087-3:2023, BS EN IEC 62087-3:2023.

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)

Testing

Date of receipt of test item : N/A

Date(s) of performance of tests : N/A

General remarks:

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.

"(see Enclosure #)" refers to additional information appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

General product information:

This test report was amended from previous report ENS2409100112S01601R which was issued on Nov. 29, 2024, due to below amendment(s):

- Add. manufacturer's declared values for on mode power and the EEI.
- No test need to be considered.

All the models are identically the same to each other, except the LCD modules and the input current.

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict

COMMISSION REGULATION (EU) 2019/2021 of 1 October 2019 with amended by (EU) 2021/341 of 23 February 2021 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			
ANNEX II	Ecodesign requirements	See below	N/A
A	ENERGY EFFICIENCY REQUIREMENTS	The EUT is signage display.	N/A
1	ENERGY EFFICIENCY INDEX LIMITS FOR ON-MODE		N/A
1.1	The energy efficiency index (EEI) of an electronic display shall be calculated using the following equation: $EEI = \frac{(P_{measured} + 1)}{(3 \times [90 \times \tanh(0,02 + 0,004 \times (A - 11)) + 4] + 3) + corr}$ Where: A represents the screen area in dm²; 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.		N/A
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.	The EUT is signage display.	N/A
1	Electronic displays with automatic brightness control (ABC)	The EUT is without automatic brightness control (ABC).	N/A
(a)	Electronic displays qualify for a 10% reduction in P _{measured} , if they meet all of the following requirements: 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

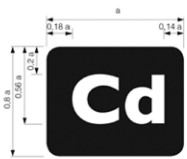
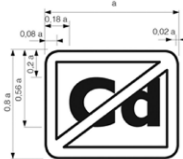
(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
(c)	the value of P _{measured} with ABC disabled, if applicable, shall be equal to or greater than the on mode power measured with ABC enabled in an ambient light condition of 100 lux measured at the ABC sensor;		N/A
(d)	with ABC enabled, 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
2	Forced menu and set up menus		N/A
	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	The EUT is signage display.	N/A

(EU) 2019/2021			
Clause	Requirement + Test	Result - 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 .		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.		N/A
C	OFF MODE, STANDBY AND NETWORKED STANDBY MODE REQUIREMENTS		P
	From 1 March 2021, electronic displays shall meet the requirements listed below.		P
1	Power demand limits other than on-mode		P
	Electronic displays shall not exceed power demand limits in the different modes and conditions listed in Table 2:		P
2	Availability of off, standby and networked standby modes		P
	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.		P
3	Automatic standby in televisions		N/A

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
(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.		N/A
(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.		N/A
(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.	The EUT is without a room presence sensor.	N/A
(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.		N/A
4.	Automatic standby in displays other than televisions		P
	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.		P
D.	MATERIAL EFFICIENCY REQUIREMENTS: From 1 March 2021, electronic displays shall meet the requirements indicated below.	Declared by Manufacturer.	P
1.	Design for dismantling, recycling and recovery	Declared by Manufacturer.	P

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
	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.		P
2.	Marking of plastic components: Plastic components heavier than 50 g:	Declared by Manufacturer.	P
(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

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
	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. 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.		P
(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	Declared by Manufacturer.	P

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
	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.		P
4.	Halogenated flame retardants: The use of halogenated flame retardants is not allowed in the enclosure and stand of electronic displays.	Declared by Manufacturer.	P
5.	Design for repair and reuse	Declared by Manufacturer.	P
(a)	Availability of spare parts:		P
(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;		P

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
(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;		P
(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;		P
(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		P
(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
(b)	Access to repair and maintenance information		P
	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:		P

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
(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;		P
(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;		P
(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).		P
(c)	Maximum delivery time of spare parts	Declared by Manufacturer.	P

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict
	(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;		P
	(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	Declared by Manufacturer.	P
	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).		P
	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.		P

(EU) 2019/2021			
Clause	Requirement + Test	Result - Remark	Verdict

Table 1
EEL limits for on-mode

	<i>EEL_{max}</i> for electronic displays with resolution up to HD	<i>EEL_{max}</i> for electronic displays with resolution above HD and up to UHD	<i>EEL_{max}</i> for electronic displays with resolution above UHD and for MicroLED displays
1 March 2021	0,90	1,10	n.a.
1 March 2023	0,75	0,90	0,90'

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
<i>Total maximum power demand with all additional functions when present and enabled</i>	<i>0,30</i>	<i>2,20</i>	<i>7,70</i>

(EU) 2019/2013			
Clause	Requirement + Test	Result - Remark	Verdict

COMMISSION DELEGATED REGULATION (EU) 2019/2013 of 11 March 2019 with amended by (EU) 2021/340 of 17 December 2020 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of electronic displays			
ANNEX II		See below	N/A
A.	Energy efficiency class		N/A
	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.		N/A
B.	Energy Efficiency Index (EEI _{label}):		N/A
	The Energy Efficiency Index (EEI_{label}) of the electronic display shall be calculated using the following equation: $EEI_{label} = \frac{(P_{measured} + 1)}{(3 \times [90 \times \tanh(0,025 + 0,0035 \times (A - 11)) + 4] + 3) + corr_1}$ where: A represents the viewing surface area in dm²; P_{measured} is the measured power in on mode in Watts in the normal configuration and set as indicated in Table 2; corr₁ is a correction factor set as indicated in Table 3. The declared values of the on mode power (P_{measured}) and viewing surface area (A) as listed in Table 5 of Annex VI shall be used for the EEI calculation. -Add. by (EU) 2021/340.		N/A
C.	Allowances and adjustments for the purpose of the EEI _{label} calculation		N/A

(EU) 2019/2013			
Clause	Requirement + Test	Result - Remark	Verdict
	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; (d) 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.		N/A
ANNEX III	Label for electronic displays If the electronic display does not support HDR, the HDR pictogram and the letters of energy efficiency classes are not displayed. The screen pictogram, indicating screen size and resolution, shall be vertically centred in the area below the indication of the energy consumption. -Add. by (EU) 2021/340.		N/A

(EU) 2019/2013			
Clause	Requirement + Test	Result - Remark	Verdict

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	$0,90 \leq EEI_{label}$

Table 2
Measurement of $P_{measured}$

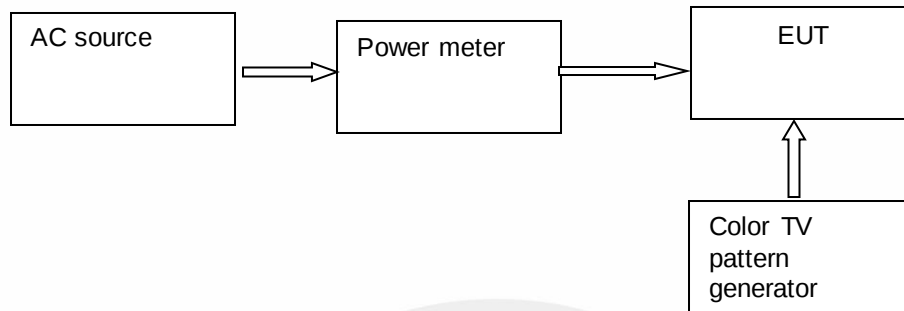
Dynamic Range level	$P_{measured}$
Standard Dynamic Range (SDR): $P_{measured_{SDR}}$	Power demand in Watts (W) in on mode, measured when displaying standardised test sequences of moving picture from dynamic broadcast content. Where allowances are applicable according to part C of this Annex, they should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

Electronic Display type	$corr_1$ value
Television	0,0
Monitor	0,0
Digital signage	$0,00062 \cdot (lum-500) \cdot A$ where 'lum' is the peak white luminance, in cd/m^2 , of the brightest on mode configuration of the electronic display and A is the screen area in dm^2

Tables

Test setup drawing:



Description of how the appliance mode was selected or programmed:

1. The EUT is connected to mains.
2. When the EUT works in standby-mode, by pressing “⏻” button on the remote control, the EUT will enter on-mode.
3. When the EUT works in on-mode, by pressing “⏻” button on the remote control, the EUT will enter the standby- mode
4. By using the DP input sources, by pressing the “⏻” button, the EUT will change between on-mode and standby- mode.
5. When connect to the mains, after the last user interaction or/and a channel change, the EUT shall automatically switched into standby -mode in less than 60 minutes.

Tables

Sequence of steps for each mode:

1. On- mode test:

For on-mode test, follow section 6.4 of IEC 62087-2:2023, to ensure that we get stable condition with the respect to the power consumptions.

1.1. Ensure that the electronic displays set is in stabilization condition according to 6.4.2.

1.2. Turn on the electronic displays 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 electronic displays has the limited types of display that cannot accept or display higher resolution standards. P_{measured} (SDR) was measured.

1.4. If the electronic displays support HDR, then 2 HDR test sequences should be taken after P_{measured} (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 P_{av} HDR and P_{av} HDR for each 5-minutes, and P_{av} HLG and P_{av} HDR were measured.

1.5. If the electronic displays is with automatic brightness control (ABC), follow the methodology in Annex IIIa in (EU) 2021/341.

2. luminance test:

For luminance test mode, follow section " 6.5 Determination of peak luminance ratio and power factor" of IEC 62087-2:2023, 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. Select "box and outline" test pattern for test, shall be applied to the UUT within 30s after stabilization. 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. L_{normal} and/ or L_{brightest} should be measured.

2.5. If the electronic display is with automatic brightness control (ABC), follow the methodology in Annex IIIa in (EU) 2021/341.

3. Standby-mode and off- mode test:

For Standby-mode and off-mode test, use sampling method for test according to EN 50564.

Switch the UUT into the standby-mode, by pressing "⏻" button on the remote control, the equipment will enter the standby- 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).

Tables

☒ On mode and peak white luminance test data for electronic displays without automatic brightness control (ABC): (for PN-M652)

Table A	
Tests should be undertaken in accordance with IEC 62087-3:2023.	
Model No.	PN-M652
Rms input voltage (V)	230.8
Input supply frequency (Hz)	49.994
Ambient Temperature (°C)	23.9
Ambient Humidity RH (%)	65.3
Airspeed, room (m/s)	0.4
Total harmonic distortion (THD) of the electricity supply system (%)	0.454
The input terminal for the audio and video test signals	HDMI
Screen Width (dm)	14.2848
Screen Height (dm)	8.0352
The visible screen area expressed (dm ²)	114.78122496
Display resolution	3840*2160
Is the forced menu available?	☐ Yes ☒ No
P _{measured} (SDR) (W)	126.588
P _{av} HLG (W)	125.436
P _{av} HDR (W)	105.9888
P _{measured} (HDR) (W)	115.7124
The peak luminance of the on-mode condition of the electronic displays (L _{normal}) (cd/m ²)	420.3
Power Factor	0.9043
Name of on-mode picture mode	Native
The peak luminance of the brightest on-mode condition provided by the electronic displays (L _{brightest}) (cd/m ²)	561.7
Name of brightest picture mode	Transportation
Peak Luminance ratio (%)	74.8264197970447
Limit for peak Luminance ratio (%)	N/A
EEI Calculation:	
For SDR	
EEI according to (EU) 2019/2013	1.06994870911917
EEI according to (EU) 2019/2021	--
On-mode energy consumption in kWh per 1000 h (for SDR)	126.588
Energy efficiency class	G
For HDR	

Tables

EEI according to (EU) 2019/2013	0.97874629054613
EEI according to (EU) 2019/2021	--
On-mode energy consumption in kWh per 1 000 h (for HDR)	115.7124
Energy efficiency class	G
EEI limit (according to (EU) 2019/2021)	See below
March 01,2021	☒ N/A ☐ 0.9 for EEI _{max} for electronic displays with resolution up to HD ☐ 1.10 for EEI _{max} for electronic displays with resolution above HD and up to UHD ☐ N/A for EEI _{max} for electronic displays with resolution above UHD and for MicroLED displays
March 01,2023	☒ N/A ☐ 0.75 for EEI _{max} for electronic displays with resolution up to HD ☐ 0.9 for EEI _{max} for electronic displays with resolution above HD and up to UHD ☐ 0.9 for EEI _{max} for electronic displays with resolution above UHD and for MicroLED displays
Verdict	N/A

Table : Declared values and calculation for PN-M652	
For SDR	
EEI according to (EU) 2019/2013	1.090
EEI according to (EU) 2019/2021	--
On-mode energy consumption in kWh per 1000 h (for SDR)	130.0
Energy efficiency class	G
For HDR	
EEI according to (EU) 2019/2013	1.065
EEI according to (EU) 2019/2021	--
On-mode energy consumption in kWh per 1 000 h (for HDR)	127.0
Energy efficiency class	G

Tables

☒ Energy consumption test (Off mode, Standby mode, Networked standby mode) (for PN-M652)

Table C			
Tests should be undertaken in accordance with EN 50564:2011.			
Voltage (V)	230.3		
Frequency (Hz)	49.994		
Current (A)	0.03416		
Ambient temperature (°C)	65.3		
Procedure for Standby mode, Networked standby mode, Off mode Power testing	EN 50564:2011		
Off mode Power(W)	0.013404		
Standby mode Power (W)	0.41108		
Networked standby mode Power (W)	1.12112		
Verdict	Pass		
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	☒ 2.0
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	☐ 0.0	☐ 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 ☐ N/A

Tables

☒ On mode and peak white luminance test data for electronic displays without automatic brightness control (ABC): (for PN-P656)

Table A	
Tests should be undertaken in accordance with IEC 62087-3:2023.	
Model No.	PN-P656
Rms input voltage (V)	230.68
Input supply frequency (Hz)	49.994
Ambient Temperature (°C)	24.6
Ambient Humidity RH (%)	64.87
Airspeed, room (m/s)	0.4
Total harmonic distortion (THD) of the electricity supply system (%)	0.427
The input terminal for the audio and video test signals	HDMI
Screen Width (dm)	14.2848
Screen Height (dm)	8.0352
The visible screen area expressed (dm ²)	114.78122496
Display resolution	3840*2160
Is the forced menu available?	☐ Yes ☒ No
P _{measured} (SDR) (W)	102.45
P _{av} HLG (W)	108.8208
P _{av} HDR (W)	93.6252
P _{measured} (HDR) (W)	101.223
The peak luminance of the on-mode condition of the electronic displays (L _{normal}) (cd/m ²)	535.1
Power Factor	0.8932
Name of on-mode picture mode	Native
The peak luminance of the brightest on-mode condition provided by the electronic displays (L _{brightest}) (cd/m ²)	669.3
Name of brightest picture mode	TRANSPORTATION
Peak Luminance ratio (%)	79.9492006574033
Limit for peak Luminance ratio (%)	N/A
EEI Calculation:	
For SDR	
EEI according to (EU) 2019/2013	0.815182342249212
EEI according to (EU) 2019/2021	--
On-mode energy consumption in kWh per 1000 h (for SDR)	102.45
Energy efficiency class	F
For HDR	
EEI according to (EU) 2019/2013	0.805513625633071

Tables

EEL according to (EU) 2019/2021	--
On-mode energy consumption in kWh per 1 000 h (for HDR)	101.223
Energy efficiency class	F
EEL limit (according to (EU) 2019/2021)	See below
March 01,2021	☒ N/A ☐ 0.9 for EEL _{max} for electronic displays with resolution up to HD ☐ 1.10 for EEL _{max} for electronic displays with resolution above HD and up to UHD ☐ N/A for EEL _{max} for electronic displays with resolution above UHD and for MicroLED displays
March 01,2023	☒ N/A ☐ 0.75 for EEL _{max} for electronic displays with resolution up to HD ☐ 0.9 for EEL _{max} for electronic displays with resolution above HD and up to UHD ☐ 0.9 for EEL _{max} for electronic displays with resolution above UHD and for MicroLED displays
Verdict	N/A

Table : Declared values and calculation for PN-P656	
For SDR	
EEL according to (EU) 2019/2013	1.064
EEL according to (EU) 2019/2021	--
On-mode energy consumption in kWh per 1000 h (for SDR)	139.0
Energy efficiency class	G
For HDR	
EEL according to (EU) 2019/2013	1.049
EEL according to (EU) 2019/2021	--
On-mode energy consumption in kWh per 1 000 h (for HDR)	137.0
Energy efficiency class	G

Tables

☒ Energy consumption test (Off mode, Standby mode, Networked standby mode) (for PN-P656)

Table C			
Tests should be undertaken in accordance with EN 50564:2011.			
Voltage (V)	230.87		
Frequency (Hz)	49.994		
Current (A)	0.03914		
Ambient temperature (°C)	24.6		
Procedure for Standby mode, Networked standby mode, Off mode Power testing	EN 50564:2011		
Off mode Power(W)	0.013485		
Standby mode Power (W)	0.41952		
Networked standby mode Power (W)	1.218		
Verdict	Pass		
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	☒ 2.0
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	☐ 0.0	☐ 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 ☐ N/A

List of test equipments

List of test equipment used:					
Instrument Code	Measure Machine	Manufacturer	Model	Rating	Calibrate
ES-498	Digital Power Meter	YOKOGAWA	WT310E	600V, 20A, 50Hz-240Hz, 5000W	2024-01-03 to 2025-01-02
ES-311	Stop watch	TIMESTAR	PC9903	1-3600s	2024-07-09 to 2025-07-08
ES-510	Temperature & Humidity Recorder	Elitechus	Tlog 100H	15-40℃,30-90%RH	2024-10-21 to 2025-10-20
ES-628	luminance meter	Kernel	Kernel-20M	0.1~30000cd/m2	2024-03-22 to 2025-03-21
ES-515	lluminometer	TES	TES-1339	0.01-200,000lux	2024-04-04 to 2025-04-03
ES-273	Air velocity meter	TENMARS	TM-402	0.4-30m/s	2024-10-31 to 2025-10-30
ES-214	Multimeters	FLUKE	15B	1000V, 10A, 40MΩ	2024-04-04 to 2025-04-03
ES-049	Steel Tape	Deli	10m	5m	2024-01-23 to 2025-01-22

Pictures



Fig. 1 Front view

Pictures



Fig. 2 Rear view

Pictures



Fig. 3 I/O Terminal view 1



Fig. 4 I/O Terminal view 2

Pictures



Fig. 5 I/O Terminal view 3

*** End of Report ***

Statement

- 1 . This report will be void without authorized signature or special seal for testing report.
- 2 . This report shall not be copied partly without authorization.
- 3 . The test results or observations are applicable only to tested sample. Client shall be responsible for representativeness of the sample and authenticity of the material.
- 4 . The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.
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