



Prüfbericht-Nr.: <i>Test Report No.:</i>	50044853 001	Auftrags-Nr.: <i>Order No.:</i>	154165381	Seite 1 von 15 Page 1 of 15	
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	52158228	Auftragsdatum: <i>Order date:</i>	04.05.2016		
Auftraggeber: <i>Client:</i>	Top Victory Electronics (Taiwan) Co.,Ltd. 10F., No. 230, Liancheng Rd., Zhonghe Dist., New Taipei City, 23553 Taiwan				
Prüfgegenstand: <i>Test item:</i>	Monitor				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	Model Name: 240LM00010 Model Number: E2460PDA;E2460PHU;E2460PQ;E2460SD;E2460SD2;E2460SDA; E2460SH; E2460SHU				
Auftrags-Inhalt: <i>Order content:</i>	TÜV Rheinland Energy Star test report				
Prüfgrundlage: <i>Test specification:</i>	ENERGY STAR Program Requirements for Displays Version 7.0 IEC 62301 Ed 2.0: Household Electrical Appliances - Measurement of Stdby Power IEC 62087 Ed 3.0: Methods of Measurement for the Power Consumption of A/V				
Wareneingangsdatum: <i>Date of receipt:</i>	04.05.2016				
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000358837-001				
Prüfzeitraum: <i>Testing period:</i>	04.05.2016-23.05.2016				
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shanghai) Co., Ltd.				
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.				
Prüfergebnis*: <i>Test result*:</i>	Pass				
geprüft von / tested by:		kontrolliert von / reviewed by:			
					
23.05.2016	Paul Zhang /PE	23.05.2016	Ken Huang /Reviewer		
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other: See appendix 1 for the additional information. LCD panel and LCD panel manufacturer: TPM240WF1-HTN01 (TPV)					
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested					
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>					

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1. General Remarks

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

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"(see remark #)" refers to a remark appended to the report.

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

1.1 Complementary Materials

All attachments are integral parts of this test report.

1.2 Abbreviations Used

ABC:	Automatic Brightness Control	LAN:	Local Area Network
AEC:	Annual Energy Consumption	THD:	Total Harmonic Distortion
BD:	Blu-ray Disc	USB:	Universal Serial Bus
DVD:	Digital Versatile Disc	STB:	Set-top Box
DVI:	Digital Visual Interface	WAN:	Wide Area Network
HDMI:	High Definition Multimedia Interface	NOPR:	Notice of Proposed Rulemaking
EPCA:	Energy Policy and Conservation Act	TEC:	Total Energy Consumption
UUT:	Unit Under Test		

2. Number of Units used for testing

A single representative unit shall be selected for testing the Basic Model; or

Units shall be selected for testing per the sampling requirements defined in 10 CFR 429.25, which references 10 CFR 429.11.

3. General Product Information

3.1 Product description:

The model 240LM00010 is a 24.0inch LCD Monitor for the use with information technology equipment.

Rating plate: (Below marking plate represents all related models)



Configuration Summary:

1	Forced menu	Not applicable
2	Sleep mode	Provided
3	Off mode	Provided
4	Enhanced performance display	No
5	ABC function	Not provided
6	Bridging function	Not provided
7	Networking	Not provided
8	Touchscreen function	Not provided
9	Built-in speaker	Optional
10	Occupancy sensor	Not provided
11	Signal interface	HDMI
12	Resolution	1920x1200
13	Refresh rate	60 Hz

Remark:

1. The test results were obtained according to the submitted test sample.

3.2 General Requirements

Clause	Requirement – Test	Result	Verdict
3.2.1	<u>External Power Supply:</u> External Power Supplies (EPSs): Single- and Multiple-voltage EPSs shall meet the Level VI or higher performance requirements under the International Efficiency Marking Protocol when tested according to the Uniform Test Method for Measuring the Energy Consumption of External Power Supplies, Appendix Z to 10 CFR Part 430.		N/A
3.2.2	<u>Power Management:</u> i. Products shall offer at least one power management feature that is enabled by default, and that can be used to automatically transition from Sleep Mode to On Mode either by a connected host device or internally (e.g., support for VESA Display Power Management Signaling (DPMS), enabled by default). ii. Products that generate content for display from one or more internal sources shall have a sensor or timer enabled by default to automatically engage Sleep or Off Mode. iii. For products that have an internal default delay time after which the product transitions from On Mode to Sleep Mode or Off Mode, the delay time shall be reported. iv. Monitors shall automatically enter Sleep Mode or Off Mode within 5 minutes of being disconnected from a host computer.		P
3.2.3	<u>True Power Factor:</u> Signage Displays shall have a true power factor in On Mode of 0.7 or greater per Section 5.2.F) in the ENERGY STAR Test Method.		N/A

3.3 Energy Requirements for Computer Monitors

Clause	Requirement – Test	Result	Verdict
3.3.1	The Total Energy Consumption (TEC) in kWh shall be calculated per Equation 1 based on measured values.	See test result	P
3.3.2	The Maximum TEC (E_{TEC_MAX}) in kWh for Monitors shall be calculated per Table 1.	See test result	P
3.3.3	For all Monitors, Calculated TEC (E_{TEC}) in kWh shall be less than or equal the calculation of Maximum TEC (E_{TEC_MAX}) with the applicable allowances and adjustments (applied at most once) per Equation 2.	See test result	P

Clause	Requirement – Test	Result	Verdict
3.3.4	<p>For Monitors meeting the enhanced performance display (EPD) requirements below, <u>only one</u> of the following Table 2 allowances shall be used in Equation 2:</p> <p>i. Contrast ratio of at least 60:1 measured at a horizontal viewing angle of at least 85° from the perpendicular on a flat screen and at least 83° from the perpendicular on a curved screen, with or without a screen cover glass;</p> <p>ii. A native resolution greater than or equal to 2.3 megapixels (MP); and</p> <p>iii. Color Gamut greater than or equal to 32.9% of CIE LUV.</p>	Not applicable	N/A
3.3.5	<p>For monitors with Automatic Brightness Control (ABC) enabled by default, an energy allowance (E_{ABC}), as calculated per Equation 4, shall be added to E_{TEC_MAX} in Equation 2, if the On Mode power reduction (R_{ABC}), as calculated per Equation 3, is greater than or equal to 20%.</p>	Not applicable	N/A
3.3.6	<p>Products with Full Network Connectivity confirmed in Section 6.7 of the ENERGY STAR Test Method shall apply the allowance specified in Table 3.</p>	Not applicable	N/A
3.3.7	<p>Products tested with an Occupancy Sensor active shall apply the allowance specified in Table 4.</p>	Not applicable	N/A
3.3.7	<p>Products tested with Touch Technology active in On Mode shall apply the allowance specified in Equation 5.</p>	Not applicable	N/A

3.4 On Mode Requirements for Signage Displays

Clause	Requirement – Test	Result	Verdict
3.4.1	The Maximum On Mode Power (P_{ON_MAX}) in watts shall be calculated per Equation 6.	Not applicable	N/A
3.4.2	For Signage Displays with ABC enabled by default, a power allowance (P_{ABC}), as calculated per Equation 8, shall be added to P_{ON_MAX} , as calculated per Equation 6, if the On Mode power reduction (R_{ABC}), as calculated per Equation 3, is greater than or equal to 20 percent.	Not applicable	N/A

3.5 Sleep Mode Requirements for Signage Displays

Clause	Requirement – Test	Result	Verdict
3.5.1	Measured Sleep Mode Power (P_{SLEEP}) in watts shall be less than or equal the sum of the Maximum Sleep Mode Power Requirement (P_{SLEEP_MAX}) and any allowances (applied at most once) per Equation 9.	Not applicable	N/A
3.5.2	Products with Full Network Connectivity confirmed in Section 6.7 of the ENERGY STAR Test Method shall apply the allowance specified in Table 6.	Not applicable	N/A
3.5.3	Products tested with an Occupancy Sensor or Touch Technology active in Sleep Mode shall apply the allowances specified in Table 7.	Not applicable	N/A

3.6 Off Mode Requirements for all Displays

Clause	Requirement – Test	Result	Verdict
3.6.1	A product need not have an Off Mode to be eligible for certification. For products that do offer Off Mode, measured Off Mode power (P_{OFF}) shall be less than or equal to the Maximum Off Mode Power Requirement (P_{OFF_MAX}) in Table 8.	Not applicable	P

3.7 Luminance Requirements

Clause	Requirement – Test	Result	Verdict
3.7.1	Maximum Reported and Maximum Measured Luminance shall be reported for all products; As-Shipped Luminance shall be reported for all products except those with ABC enabled by default.	See test result	P

4. TEST ROOM SET-UP

4.1 Ambient Temperature Conditions

Ambient temperature shall be $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

4.2 Ambient Relative Humidity Conditions

Relative humidity shall be from 10% to 80%.

4.3 Ambient Light Values

- a) At 12 lux, ambient lighting shall be within ± 1.0 lux; and
- b) At 300 lux, ambient lighting shall be within ± 9.0 lux.

4.4 UUT Alignment:

- a) All four corners of the face of the Unit Under Test (UUT) shall be equidistant from a vertical reference plane (e.g., wall).
- b) The bottom two corners of the face of the UUT shall be equidistant from a horizontal reference plane (e.g., floor).

4.5 Light Source for On Mode Testing:

Lamp Type:

- a) Standard spectrum halogen flood reflector lamp. The lamp shall not meet the definition of "Modified spectrum" as defined in 10 CFR 430.2 -Definitions¹.
- b) Rated Brightness: $980 \pm 5\%$ lumens.

4.6 Installation

Install the UUT in accordance with manufacturer's instructions.

4.7 Light source Alignment for Testing Products with ABC function:

- a) There shall be no obstructions between the lamp and the UUT's Automatic Brightness Control (ABC) sensor (e.g., diffusing media, frosted lamp covers, etc.).
- b) The center of the lamp shall be placed at a distance of 5 feet from the center of the ABC sensor.
- c) The center of the lamp shall be aligned at a horizontal angle of 0° with respect to the center of the UUT's ABC sensor.
- d) The center of the lamp shall be aligned at a height equal to the center of the UUT's ABC sensor with respect to the floor (i.e. the light source shall be placed at a vertical angle of 0° with respect to the center of the UUT's ABC sensor).
- e) No test room surface (i.e., floor, ceiling, and wall) shall be within 2 feet of the center of the UUT's ABC Sensor.
- f) Illuminance values shall be obtained by varying the input voltage of the lamp.

4.8 Measurement Uncertainty

The measured input power is: $P\text{ (W)} \pm 0.15\%$

The measured ambient light value is 100 lx (± 5 lx), 35 lx (± 2 lx), 12 lx (± 1 lx), and 3 lux (± 1 lx).

The luminance and illuminance meters: $\pm 2\%$ (± 2 digits) of the digitally displayed value.

5. Test Conduct

5.1 Guidance for Power Measurements

- A) Testing at Factory Default Settings
- B) Point of Deployment (POD) Modules: Optional POD modules shall not be installed.
- C) Plug-in Modules: Optional Plug-in Modules shall be removed from the Display if the Display can be tested according to the test method without the module installed.
- D) Sleep Mode with Multiple Functionalities: If the product offers multiple options for device behavior in Sleep Mode (e.g., quick start) or multiple methods by which Sleep Mode may be entered, the power during all Sleep Modes shall be measured and recorded. All Sleep Mode testing shall be carried out as per Section 6.5.

5.2 Conditions for Power Measurements

- A) Power measurements:
- B) Dark Room Conditions: Unless otherwise specified, the illuminance measured at the UUT screen with the UUT in Off Mode shall be less than or equal to 1.0 lux. If the UUT does not have an Off Mode, the illuminance shall be measured at the UUT screen with the UUT's power cord disconnected.
- C) UUT Configuration and Control:
 - 1) Peripherals and Network Connections:
 - a) External peripheral devices (e.g. mouse, keyboard, external hard disk drive (HDD) etc.) shall not be connected to USB ports or other data ports on the UUT.
 - b) Bridging: If the UUT supports bridging per the definition in Section 1, a bridge connection shall be made between the UUT and the Host Machine. The connection shall be made in the following order of preference. Only one connection shall be made and the connection shall be maintained for the duration of the test.
 - i. Thunderbolt
 - ii. USB
 - iii. Firewire (IEEE 1394)
 - iv. Other
 - c) Networking: If the UUT has networking capability, the networking capability shall be activated, and the UUT shall be connected to a live physical network (e.g., WiFi, Ethernet, etc.). If the UUT is equipped with multiple network capabilities, only one connection shall be made in the following order of preference:
 - i. WiFi (Institution of Electrical and Electronics Engineers -IEEE 802.11-2007²)
 - ii. Ethernet (IEEE 802.3). If the UUT supports Energy Efficient Ethernet (IEEE 802.3az2010³), then it shall be connected to a device that also supports IEEE 802.3az
 - iii. Thunderbolt
 - iv. USB
 - v. Firewire (IEEE 1394)
 - vi. Other
 - d) Touchscreen Functionality

If the UUT features a touchscreen that requires a separate data connection, this function shall be set up as directed by the manufacturer's instructions, including connections to the Host Machine and installation of software drivers.

2) Signal Interface:

If the UUT has multiple signal interfaces, the UUT shall be tested with the first available interface from the list below:

- i. Thunderbolt
- ii. DisplayPort
- iii. HDMI
- iv. DVI
- v. VGA
- vi. Other Digital Interface
- vii. Other Analog Interface

3) Occupancy Sensor:

If the UUT has an occupancy sensor, the UUT shall be tested with the occupancy sensor settings in the as-shipped condition. For UUT's with an occupancy sensor enabled as-shipped:

- a) A person shall be within close proximity of the occupancy sensor for the entire warm up, stabilization, luminance testing and On Mode to prevent the UUT from entering a lower power state (e.g. Sleep Mode or Off Mode). The UUT shall remain in On Mode for the duration of the warm up period, stabilization period, luminance test and On Mode test.
- b) No person shall be within close proximity of the occupancy sensor for the duration of the Sleep Mode and Off Mode tests to prevent the UUT from entering a higher power state (e.g. On Mode). The UUT shall remain in Sleep Mode or Off Mode for the duration of the Sleep Mode or Off Mode tests, respectively.

4) Orientation:

If the UUT can be rotated into vertical and horizontal orientations, it shall be tested in the horizontal orientation, with the longest dimension being parallel to the table surface.

6. Measurement

RESULT

1: **Monitors result paste area**

Mandate: 1. Calculated TEC (E_{TEC}) in kWh shall be less than or equal the calculation of Maximum TEC (E_{TEC_MAX}) with the applicable allowances and adjustments
2. Off mode power shall be less than or equal to 0.5W

Display Information and settings

diagonal screen size:	(61.1 cm)	24.1 inch
Active Sreen Area:		260.3 square inch
Resolution in Megapixels		2.3 M
Enhanced performance display		No
Full network connectivity		No
Occupancy sensor		No
Touchscreen		No

Limits:	E_{TEC_limit} :	≤ 59.2 kWh
	P_{OFF} :	≤ 0.5 Watt

Test

Test result:	Settings	
	Brightness setting:	85/100
	Contrast setting:	100/100
	Maximum report luminance	250.0 cd/m ²
	Maximum Measured Luminance	259.8 cd/m ²
	As-Shipped Luminance	201.9 cd/m ²
	As-tested Luminance	200.1 cd/m ²
	Input Signal used	HDMI
	Default Delay Time to Sleep	1.0 min

TEC Total Energy Consumption (TEC) in kWh

Volt.	Freq.	P_{ON}	P_{SLEEP}	E_{TEC}	E_{TEC_MAX}	E_{EP}	E_{ABC}	E_N	E_{OS}	E_T	E_{TEC_limit}
[V]	[Hz]	[W]	[W]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]	[kWh]
100	50	16.4	0.3	52.3	59.2	0.0	0.0	0.0	0.0	0.0	59.2
100	60	16.4	0.3	52.3	59.2	0.0	0.0	0.0	0.0	0.0	59.2
115	60	16.4	0.3	52.2	59.2	0.0	0.0	0.0	0.0	0.0	59.2
230	50	16.3	0.4	52.0	59.2	0.0	0.0	0.0	0.0	0.0	59.2

Off Mode

Volt.	Freq.	P_{OFF}
[V]	[Hz]	[W]
100	50	0.15
100	60	0.15
115	60	0.15
230	50	0.17

7. Photographs of the UUT



Figure 1. Front view



Figure 2. Back view



Figure 3. panel label

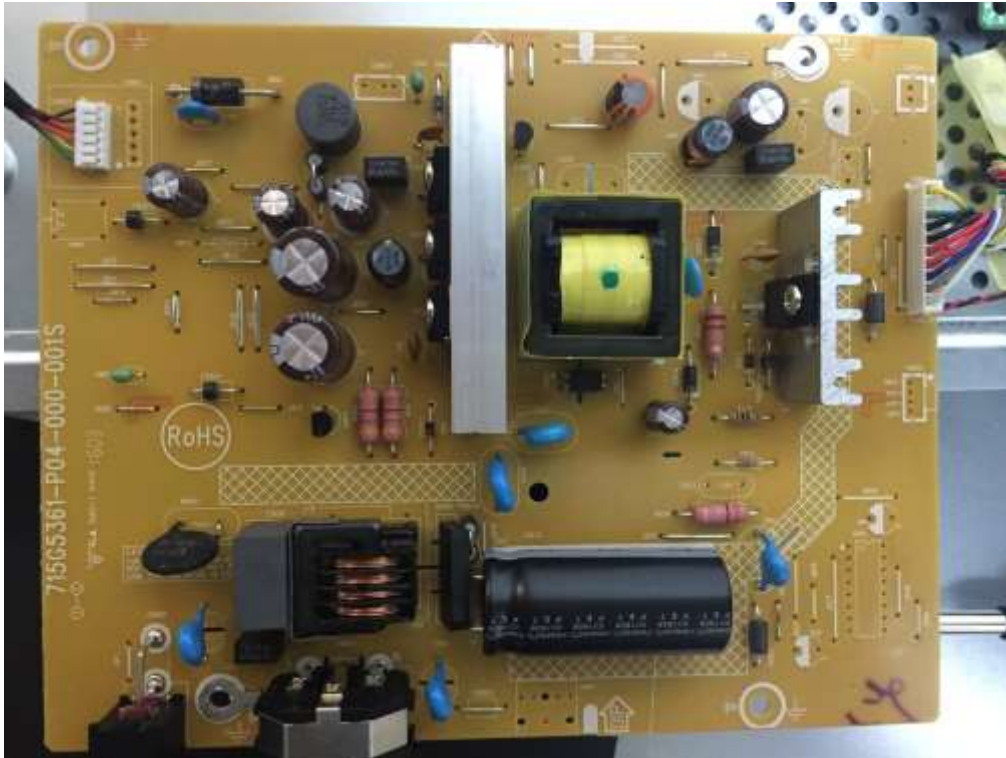


Figure 4 Power board



Figure 5 Main board

Attachment: Signed Declaration of Conformity (DoC) for family models

N/A

8. Attachment: Measurement and Test equipment list

Instrument	Model/ Type	Instrument NO.	Calibration Date	Next Calibration Date
Digital Power Meter	Yokogawa / WT-310	E371	Jun-2015	Jun-2016
Temperature Humidity Recoder	Sato / SK-L200TH	T085	Jul-2015	Jul-2016
Spectroradiometer	Microvision / SS320	Z756	Apr-2016	Apr-2017