ENERGY SAVING CHARACTERISTICS

Product:	**LCD Monitor**
Name/address of the applicant:	**Taiwan BOE Vision-electronic Technology Co., Ltd.** **7F, 2, Rei Kuang Road, Nei Hu, Taipei, Taiwan, R.O.C.**
Name/address of the manufacturer:	**Taiwan BOE Vision-electronic Technology Co., Ltd.** **7F, 2, Rei Kuang Road, Nei Hu, Taipei, Taiwan, R.O.C.**
Trade mark	**AOC**
Model number:	**238LM00008**
Model name:	**I2475PXQU, I2475SXJ**
Testing Standards:	**ENERGY STAR Program Requirements for Displays Eligibility Criteria (Version 7.0)** **ENERGY STAR Program Requirements for Displays - Final Test Method Rev. Sep. 2015**
Reference standards:	**ICDM Version 1.03** **CEA-2037-A** **IEC 62087 Ed. 3.0** **VESA FPDM Standard 2.0** **IEC 62301 Ed. 2.0**
Test period:	**2016/10/15**
Test results:	**The UUT compliance with criterion specification specified in this test report.**

Signature:

Tested by	Reviewed by
Name: **Lisa Chen**	Name: **Jeff Chuang**
Date: **2016/10/15**	Date: **2016/10/24**
Engineer	**Senior Project Manager**

Test facility: **Nemko AS Taiwan Branch (Lab. Code: 1105429)**
5F, No. 409, Section 2, Tiding Blvd., Neihu, Taipei 11469, Taiwan

Test Equipment's / Power Supply Unit Information

Test Equipment's

Ref. No	Equipment's	Manufacturer	Model	Series No	Cal. Date	Due Date
NTW033	Digital power meter	YOKOGAWA	WT210	91F223219	2016/03	2017/03
NTW008	AC source	APC	AFC-1102	F101110011	N/A	N/A
NTW001	Display Analysis system	Microvision	SS210	10-221	2015/08	2017/08
NTW048	Hot Wire Anemometer	Lutron	YK-2005AH	Q587292	2016/03	2017/03
NTWPC008	Lab NB_008	Nemko TW	-	-	N/A	N/A
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

Power Supply Unit (PSU), Ambient, Supply voltage, UUT information.

Items:		Contents:
Power Type		Ac power supply
UUT Input	Voltage:	100~240Vac
	Current:	1.5A
	Frequency:	50/60Hz
PSU Information	AC-DC/AC-AC:	N/A
	Output Type:	N/A
	Efficiency Level (EPS only):	N/A
	EPS manufacture name:	N/A
	EPS manufacture type:	N/A
	EPS Input rating:	N/A
	EPS Output rating:	N/A
Test supply voltage	fluctuation:	≤ 0.5%
	harmonic:	≤ 2%
	crest facto:	Selectable for 3 or 6 (≥ 3) for difference range.
	accuracy (V):	≤ 2%
	wattmeter:	≤ 0.5%
	resolution:	0.00001W (≤ 10W), 0.001W (10W≤ W ≤ 100W), 0.01W(>100W)
	Scanning freq.:	100kHz
Level of confidence at:		95%, K=2
Coverage factor:		UC≤2% (Power > 0.5 W) or 0.01W (≤ 0.5W)
Ambient	Temperature(°C):	26.0°C
	Humidity(%):	52.0 %
	Air Speed(m/s):	0.2 m/s
Sample series no.		P08G4QA001571
Model Difference		NA
Additional Information		N/A

Product Feature

Product Information		
UUT test voltage		115Vac/60Hz, 230Vac/50Hz, 100Vac/50Hz, 100Vac/60Hz
Display signal ports	Test used:	DisplayPort 1.2
	Ports:	DisplayPort 1.2, DVI, HDMI1.4, USB2.0, USB3.0, D-Sub
Display bridge capability	Test used:	USB(3.x)
	Ports:	USB(3.x)
Display network capability	Test used:	UUT without network capability.
	Ports:	N/A
Display ABC feature	Available:	Without ABC control
	Default Setting:	N/A
	ABC Switch function:	N/A
Display adjustability	Brightness:	Yes
	Contrast:	Yes
Display information	Display type:	Panel Tech.:IPS LCD, Panel Type:TFT, Back Light:LED
	Panel supplier:	K-Tronics(BOEA238WU1)
	Area (inch²):	242.2
	Size:	527.04 mm/296.46 mm/23.8 Inch
	Resolution:	1920 x 1080 (Horizontal x Vertical)
	Frequency:	66.6 kHz/60 Hz(Horizontal / Vertical)
	Aspect ratio:	16:9 H:V
	MegaPixels:	2.07
UUT default	Brightness:	90/100
	Contrast:	50/100
	CCT:	6500
	$L_{MAX\_Reported}$:	250.0 cd/m²
	$L_{MAX\_Measured}$:	368.7 cd/m²
	$L_{AS\_Shipped}$:	286.5 cd/m²
	$L_{On\_Specified}$ (200 cd/m² or 65% of Reported Max._L):	200.0 cd/m²
Test condition	$L_{On\_Measured}$:	202.7 cd/m²
	Brightness:	42/100
	Contrast:	100/100
UUT warm up time		> 20min. till luminance stable within 2% of reading.
Test pattern		IEC 62087 dynamic broadcast-content video signal 3 bar for luminance and On-Average for On mode testing.
Sequence of mode	On Mode:	The on mode driving normally, signal support from ordinary personal computer.
	Sleep Mode:	The display into sleep mode by received a signal from computer, and also can be wake up from sleep mode by received a signal from computer.
	Off Mode:	the display during off mode did not provide with any funciton, the user must actuate a function/secondary switch to bring display out of off mode.

Certification criterion and test data

3 CERTIFICATION CRITERIA (Sub-clause refer to Energy Star Program Requirements for Displays Version 7.0 for detail requirement)	
3.1 Significant Digits and Rounding	
3.1.1 All calculations shall be carried out with directly measured values.	Directly measured values used for all calculation.
3.1.2 Requirements shall be evaluated using directly measured values without any benefit from rounding.	All calculation use directly measured value.
3.1.3 Reported result shall be rounded to the nearest significant digit as specification criterion.	Report result rounded as specification criterion.
3.2 General Requirements for Monitors and Signage Displays	
3.2.1 External power Supplies (EPSs)	Not applicable for build-in internal power supply.
3.2.2 Power Management	
3.2.2 i Power management enabled by default.	The display design with power management system which enabled by defult and capable to transit display amount On/Sleep/Off modes automatically.
3.2.2 ii If internal source exist, UUT shall have a sensor or timer enabled by default.	The display didn't design with internal signal source.
3.2.2 iii If display design with default delay time, the delay time shall be reported.	Display design without default delay time.
3.2.2 iv Display shall automatically enter Sleep or Off Mode within 5 minutes of being disconnected from host computer.	Display can into sleep/off mode <≤ 1 min. min. after discounnected from host computer.
3.2.3 Signage display shall have PF in On mode ≥ 0.7.	Not applicable for computer monitor.
3.3 Energy Requirements for Computer Monitors	Detail test result refer to test table below.
3.3.1 Total Energy Consumption ETC:	Calculation result refer to test table below.
3.3.2 Maximum TEC E_{TEC_MAX}:	Calculation result refer to test table below.
3.3.3 Total Energy Consumption Requirement for Monitors	Calculation result refer to test table below.
3.3.4 Enhanced performance display (EPD)	Display did not meet EPD criterion.
Contrast Ratio(Left):	N/A at (85° for flat screen, 83° for curved screen)
Contrast Ratio(Right):	N/A at (85° for flat screen, 83° for curved screen)
Native resolution ≥ 2.3 MP:	2.07
Color Gamut ≥ 32.9% of CIE LUV.:	34.2
E_{EP}:	Refer to test table below.
3.3.5 Automatic Brightness Control (ABC) Available:	Without ABC control
Default Setting:	N/A
ABC Switch function:	N/A
E_{ABC}:	Refer to test table below.
3.3.6 Full network connectivity E_N:	Refer to test table below.
3.3.7 Occupancy sensor E_{OS}:	Refer to test table below.
3.4 On mode requirement for Signage display	Not applicable for computer monitor.
3.5 Sleep mode requirement for Signage display	Not applicable for computer monitor.
3.6 Off mode requirement for all display	≤0.5W (Test result refer to test table below.)
3.7 Luminance reporting requirements	Detail result refer to product information.

Test Data Table

Mode		T1	T2	T3	T4	T5	T6
PON	230Vac/50Hz	14.8W	-	-	-	-	-
	115Vac/60Hz	14.8W	-	-	-	-	-
	100Vac/50Hz	14.8W	-	-	-	-	-
	100Vac/60Hz	14.8W	-	-	-	-	-
PF	230Vac/50Hz	0.44	-	-	-	-	-
	115Vac/60Hz	0.55	-	-	-	-	-
	100Vac/50Hz	0.56	-	-	-	-	-
	100Vac/60Hz	0.57	-	-	-	-	-
PSLEEP	230Vac/50Hz	0.7W	-	-	-	-	-
	115Vac/60Hz	0.6W	-	-	-	-	-
	100Vac/50Hz	0.6W	-	-	-	-	-
	100Vac/60Hz	0.6W	-	-	-	-	-
POFF	230Vac/50Hz	0.2W	-	-	-	-	-
	115Vac/60Hz	0.2W	-	-	-	-	-
	100Vac/50Hz	0.2W	-	-	-	-	-
	100Vac/60Hz	0.2W	-	-	-	-	-
PDisconnect	230Vac/50Hz	0.2W	-	-	-	-	-
	115Vac/60Hz	0.2W	-	-	-	-	-
	100Vac/50Hz	0.2W	-	-	-	-	-
	100Vac/60Hz	0.2W	-	-	-	-	-
P12	230Vac/50Hz	-	-	-	-	-	-
	115Vac/60Hz	-	-	-	-	-	-
	100Vac/50Hz	-	-	-	-	-	-
	100Vac/60Hz	-	-	-	-	-	-
P300	230Vac/50Hz	-	-	-	-	-	-
	115Vac/60Hz	-	-	-	-	-	-
	100Vac/50Hz	-	-	-	-	-	-
	100Vac/60Hz	-	-	-	-	-	-
RABC	230Vac/50Hz	-	-	-	-	-	-
	115Vac/60Hz	-	-	-	-	-	-
	100Vac/50Hz	-	-	-	-	-	-
	100Vac/60Hz	-	-	-	-	-	-
ETEC	230Vac/50Hz	49.1 kWh	-	-	-	-	-
	115Vac/60Hz	48.7 kWh	-	-	-	-	-
	100Vac/50Hz	48.9 kWh	-	-	-	-	-
	100Vac/60Hz	48.8 kWh	-	-	-	-	-
ETEC_MAX		54.1 kWh	-	-	-	-	-
EEP		-	-	-	-	-	-
EABC		-	-	-	-	-	-
EN		-	-	-	-	-	-
EOS		-	-	-	-	-	-
ET		-	-	-	-	-	-
EffAC_DC		1.00	-	-	-	-	-
ETEC_MAX_Total		54.1 kWh	-	-	-	-	-
Result	230Vac/50Hz	PASS	-	-	-	-	-
	115Vac/60Hz	PASS	-	-	-	-	-
	100Vac/50Hz	PASS	-	-	-	-	-
	100Vac/60Hz	PASS	-	-	-	-	-

$$E_{TEC} = 8.76 \times (0.35 \times P_{ON} + 0.65 \times P_{SLEEP})$$

$$E_{TEC} \leq (E_{TEC_{MAX}} + E_{EP} + E_{ABC} + E_N + E_{OS} + E_T) \times eff_{AC\_DC}$$

ETEC_MAX = (6.13 x r) + (0.2 x A) - 7

Test ID identification

T1: Basic configuration. T4: N/A

T2: N/A T5: N/A

T3: N/A T6: N/A

No EEP for non-enhanced display.

No EABC adder

No EN adder

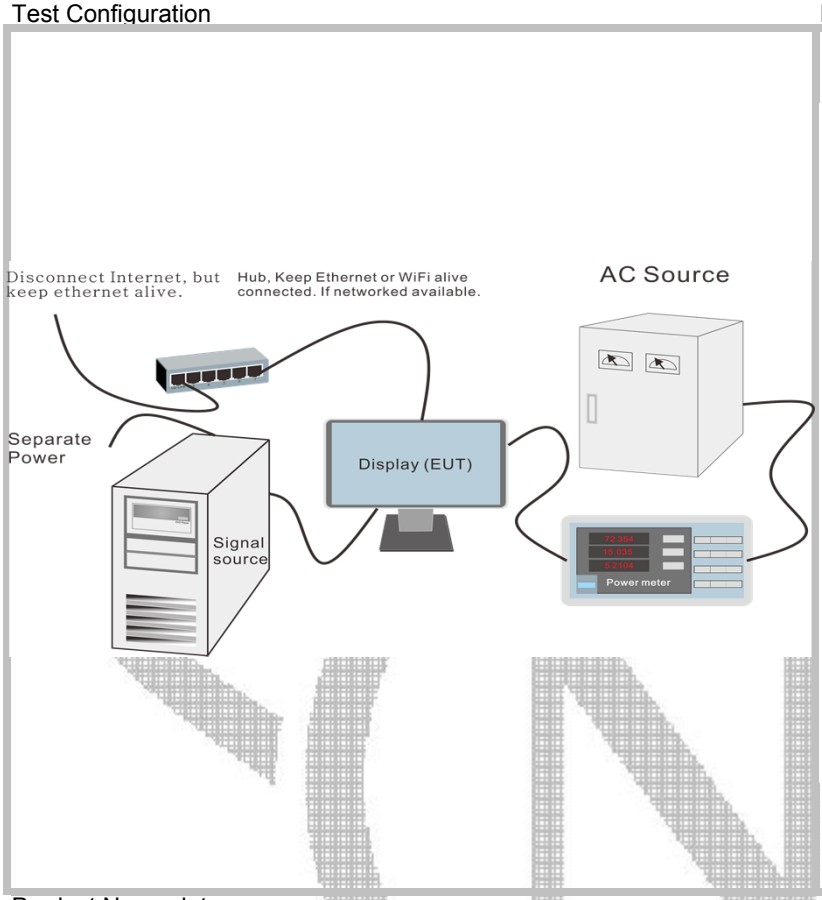
No EOS adder

No ET adder

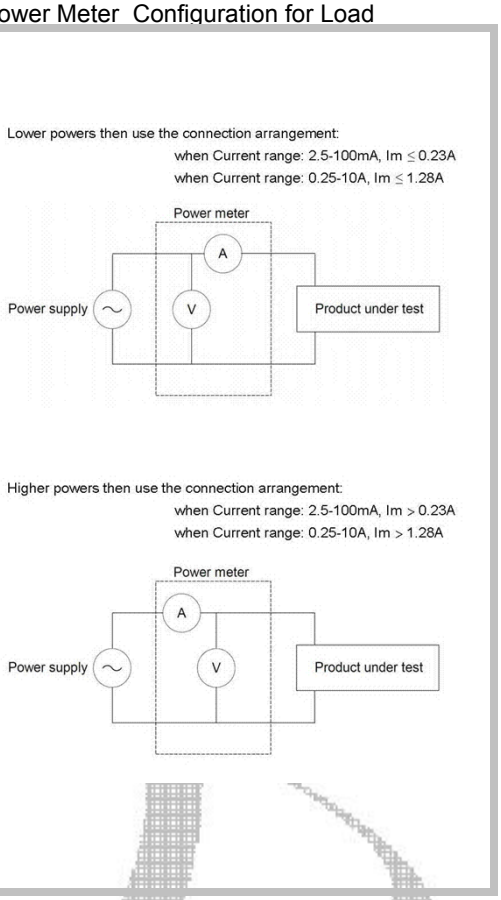
EffAC_DC = 1

Test Configuration Illustration and Nameplate

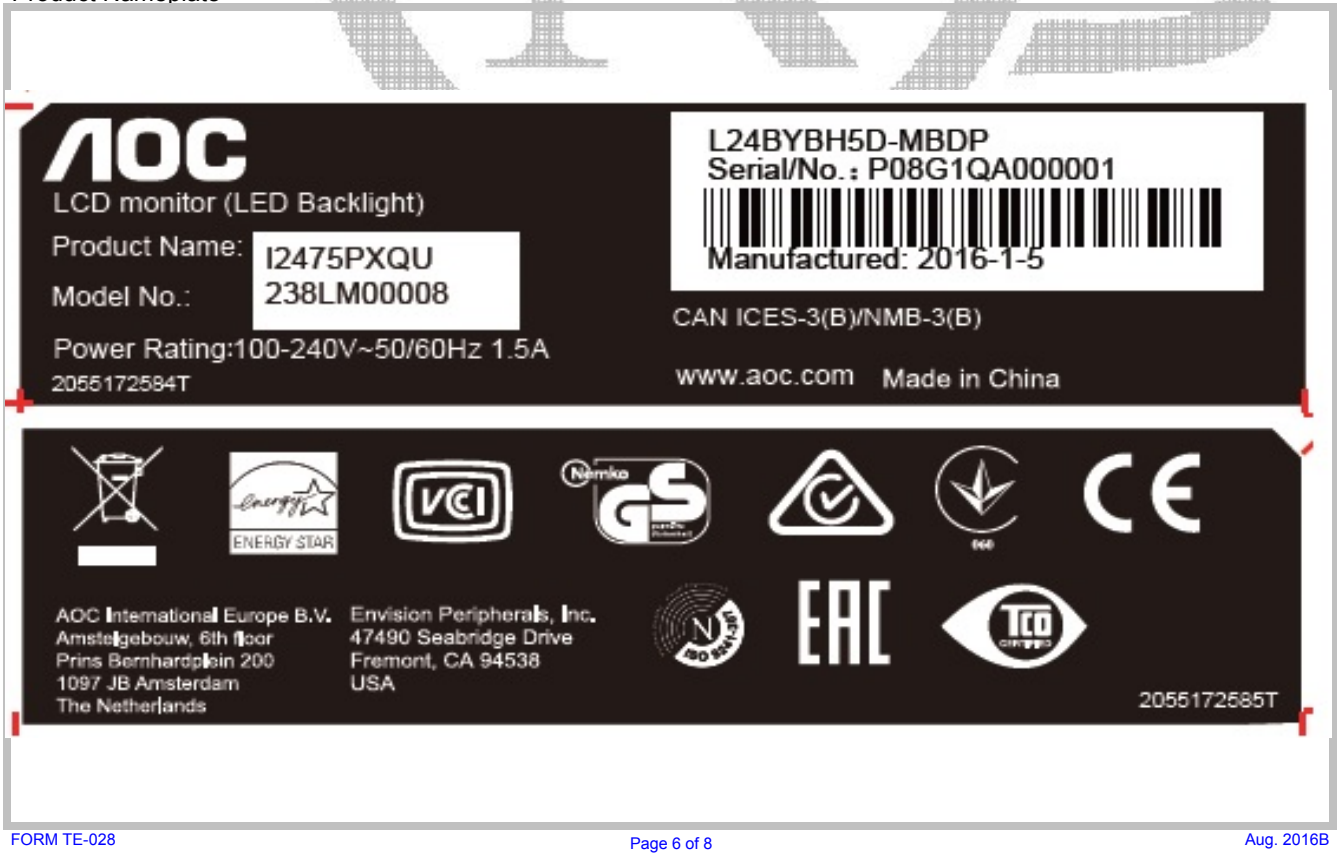
Test Configuration



Power Meter Configuration for Load



Product Nameplate



Front/Rear View of Product

Internal/panel View photos