

Prüfbericht-Nr.: <i>Test report no.:</i>	CN21KSRM 001	Auftrags-Nr.: <i>Order no.:</i>	169760820	Seite 1 von 22 Page 1 of 22
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2021-11-12	
Auftraggeber: <i>Client:</i>	PROMETHEAN LIMITED PROMETHEAN HOUSE LOWER PHILIPS RD, WHITEBIRK INDUSTRIAL ESTATE BLACKBURN, BB1 5TH United Kingdom			
Prüfgegenstand: <i>Test item:</i>	Signage Display			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	Model Number: AP9-B75 Model Name: AP9-B75 (trademark: promethean)			
Auftrags-Inhalt: <i>Order content:</i>	TÜV Rheinland Energy Star test report			
Prüfgrundlage: <i>Test specification:</i>	ENERGY STAR Program Requirements for Displays Version 8.0 IEC 62301 Ed 2.0: Household Electrical Appliances - Measurement of Standby Power IEC 62087 Ed 3.0: Methods of Measurement for the Power Consumption of A/V			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2021-11-12	Detaillierte Fotodokumentation siehe Seite 15 zu diesem Bericht Detailed photo documentation see page 15 to this report		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003081289-002			
Prüfzeitraum: <i>Testing period:</i>	2022-03-20 - 2022-03-21			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: Julia Yan <i>tested by:</i>	genehmigt von: Iris Du <i>authorized by:</i>			
Datum: 2022-04-07 <i>Date:</i>	Ausstellungsdatum: 2022-04-07 <i>Issue date:</i>			
Stellung / Position: Project engineer	Stellung / Position: Reviewer			
Sonstiges / Other: 1. This product is powered by the Internal power supply. 2. The panel inside the unit is UV750QUB-N9D-97P1 / Hefei BOE Display TECHNOLOGY CO., LTD. Remark: For additional information on the sample and tests also see appendix 1.				
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 P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient 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.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(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	HDR:	High Dynamic Range

2. Number of Units used for testing

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

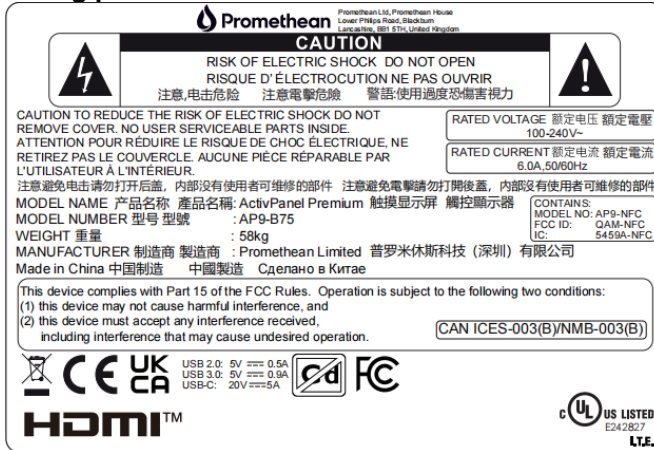
Units shall be selected for testing per the sampling requirements defined in 10 CFR 429.25, which references 10 CFR 429.11.

3. General Product Information

3.1 Product description:

The product is signage display for multiple people to view in non-desk-based environments.

Rating plate:



Configuration Summary:

1	Forced menu	Provided
2	Sleep mode	Provided
3	Off mode	Provided
4	Enhanced performance display	No
5	ABC function	Provided, disabled by default
6	HDR function	Not provided
7	Bridging function	Not provided
8	Networking	Provided
9	Full Network Connectivity	No
10	Touchscreen function	Provided, enabled by default
11	Built-in speaker	Provided
12	Occupancy sensor	Provided, enabled by default
13	Signal interface	DisplayPort
14	Resolution	3840x2160
15	Refresh rate	60Hz

Remark:

1. The test results were obtained according to the submitted test sample.
2. No nameplate was marked on the submitted test sample.

3.2 General Requirements

Clause	Requirement – Test	Result	Verdict
3.2.1	<p><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.</p>	Class I product, not applicable.	N/A
3.2.2	<p><u>General User Information:</u> The product shall ship with consumer informational materials located in either (1) the hard copy or electronic user manual, or (2) a package or box insert. These materials shall include: a) Information about the ENERGY STAR program, b) Information on the energy consumption implications of changes to default as-shipped displays configuration and settings, and c) Notification that enabling certain optional features and functionalities (e.g., instant-on), may increase energy consumption beyond the limits required for ENERGY STAR certification, as applicable.</p>		P
3.2.3	<p><u>Forced Menu:</u> Any product that includes a Forced Menu upon initial start-up shall upon selection of any mode other than the Default Picture Setting as identified and tested by the ENERGY STAR test procedure either (1) display a second prompt requiring the user to confirm the choice of the other mode, or (2) display information either with the ENERGY STAR mark or copy on the start-up menu that the Default Picture Setting is the setting in which the product qualifies for ENERGY STAR.</p>		P
3.2.4	<p><u>Preset Picture Setting Menu:</u> For any product where consumers have the option of selecting different picture settings from a preset menu at any time: a) The product shall identify on-screen the Default Picture Setting under which the product qualifies for the ENERGY STAR, if available. For example, the product may display an electronic ENERGY STAR mark alongside the name or description of that Default Picture Setting or display a message each time any setting other than the Default Picture Setting is selected. b) The product shall return to the identified Default Picture Setting, including all energy saving features enabled by default, whenever the user selects that Preset Picture Setting.</p>		P

3.2.5	<p><u>Sleep Mode Settings:</u> If users can select and enable Sleep Mode functions from a display prompt in On Mode or a settings menu other than a Forced Menu, and if these functions may alter power draw (i.e. quick start) from the default as-shipped Sleep Mode in which the product qualifies for the ENERGY STAR:</p> <p>a) The product shall display on-screen information identifying the settings under which the product qualifies for the ENERGY STAR. For example, such information may be indicated by including an electronic ENERGY STAR mark alongside the name or description of the default as-shipped settings or in the form of a message displayed each time any setting other than a default as-shipped setting is selected.</p> <p>b) Products with a physical ENERGY STAR mark affixed to the front or top of the Display may alternatively display on-screen information that enabling settings other than those under which the product qualifies for the ENERGY STAR may change the energy consumption of the product.</p>		P
3.2.6	<p><u>Power Management:</u></p> <p>i. Products shall offer at least one power management feature that is enabled by default, and that can be used to automatically transition from On Mode to Sleep Mode either by a connected host device or internally (e.g., support for VESA Display Power Management Signaling (DPMS), enabled by default).</p> <p>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.</p> <p>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.</p> <p>iv. Monitors shall automatically enter Sleep Mode or Off Mode within 5 minutes of being disconnected from a host computer.</p>		P
3.2.7	<p><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.</p>		P

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.	Not applicable	N/A
3.3.2	The Maximum TEC (E_{TEC_MAX}) in kWh for Monitors shall be calculated per Table 1.	Not applicable	N/A
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.	Not applicable	N/A

Clause	Requirement – Test	Result	Verdict
3.3.4	<p>For Monitors meeting the enhanced performance display (EPD) requirements below, the energy allowance in Equation 3 shall be applied to the Total Energy Consumption requirement 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 5, shall be added to E_{TEC_MAX} in Equation 2, if the On Mode power reduction (R_{ABC}), as calculated per Equation 4, 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 2.</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 6.</p>	Not applicable	N/A
3.3.8	<p>Products tested with curved Displays shall apply the allowance specified in Equation 7.</p>	Not applicable	N/A
3.3.9	<p>Monitors that meet either the following DisplayHDR 600 or DisplayHDR 1000 White Luminance Criteria specified in Table 2-1: DisplayHDR Performance Tier Summary of the Video Electronics Standards Association (VESA) High-performance Monitor and Display Compliance Test Specification (DisplayHDR CTS) Version 1.0 shall apply the allowance specified in Table 3.</p> <p>a) 10% Center Patch Minimum Requirement (cd/m²);</p> <p>b) Full-screen Flash Minimum Requirement (cd/m²); and</p> <p>c) Full-screen Long-duration Minimum Requirement (cd/m²).</p>	Not applicable	N/A
3.3.10	<p>Products with USB Type C interface compatibility capable of delivering greater than or equal to 45 W of power to connected devices shall apply the allowance specified in Table 4.</p>	Not applicable	N/A

3.4 Signage Displays Tested in a Tiled Display System Configuration

Clause	Requirement – Test	Result	Verdict
3.4.1	Signage Displays marketed, shipped, and tested in a Tiled Display System configuration shall meet the Signage Display On Mode and Sleep Mode criteria as calculated per Equation 9 and Equation 11, in which the Screen Area used for all such calculations shall be the total screen area of the Maximum Tiled Configuration.	Not applicable	N/A

3.5 On Mode Requirements for Signage Displays

Clause	Requirement – Test	Result	Verdict
3.5.1	The maximum On Mode power (P_{ON_MAX}) in watts shall be calculated per Equation 8.	See test result	P
3.5.2	For Signage Displays with ABC enabled by default, a power allowance (P_{ABC}), as calculated per Equation 10, shall be added to P_{ON_MAX} , as calculated per Equation 9, if the On Mode power reduction (R_{ABC}), as calculated per Equation 4, is greater than or equal to 20 percent.	Not applicable	N/A
3.5.3	For Signage Displays with an Embedded Module, a power allowance (P_{Module}) determined by Table 5 shall be added to P_{ON_MAX} , as calculated per Equation 9.	Not applicable	N/A

3.6 Sleep Mode Requirements for Signage Displays

Clause	Requirement – Test	Result	Verdict
3.6.1	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 11.	See test result	P
3.6.2	Products with Full Network Connectivity confirmed in Section 6.7 of the ENERGY STAR Test Method shall apply the allowance specified in Table 7.	Not applicable	N/A
3.6.3	Products tested with an Occupancy Sensor or Touch Technology active in Sleep Mode shall apply the allowances specified in Table 8.	See test result	P

3.7 Off Mode Requirements for all Displays

Clause	Requirement – Test	Result	Verdict
3.7.1	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 9.	See test result	P

3.8 Luminance Requirements

Clause	Requirement – Test	Result	Verdict
3.8.1	Maximum Reported, Maximum Measured Luminance, and Total Native Resolution shall be reported for all products; As-Shipped Luminance shall be reported for all products except those with ABC enabled by default. a) Testing for the above measurements shall be conducted for the individual Signage Display of a Tiled Display System.	See test result	P

4. TEST ROOM SET-UP

4.1 Ambient Temperature Conditions

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

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.
- g) Figure 2 and Figure 3 and provide more information on UUT and light source alignment.

4.8 Measurement Uncertainty

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

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.
- E) Tiled Display Systems: Products that meet the definition of Tiled Displays Systems shall be tested in the Maximum Tiled Configuration which is considered the UUT. The power meter shall be placed between the power source and external power supply supporting the maximum number of panels. In all other respects, Tiled Display Systems shall be tested and shall qualify for ENERGY STAR certification according to the requirements for Signage Displays.

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. USB-C
- iv. HDMI
- v. DVI
- vi. VGA
- vii. Other Digital Interface
- viii. 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

6.1 Test Data and Results

RESULT:

PASS

Mandate: 1. The Maximum On Mode Power (P_{ON_MAX}) in watts shall be less than $P_{ON_MAX} + P_{ABC}$

2. Sleep Mode power shall be less than $P_{SLEEP_MAX} + P_N + P_{OS} + P_T$

3. Off mode power shall be less than or equal to 0.5W

Display Information and settings

diagonal screen size:	(189.2 cm)	74.5 inch
Active Screen Area:		2372.72 square inch
Resolution in Megapixels		8.3 M
Enhanced performance display		No
Full network connectivity		No
Occupancy sensor		Yes
Touchscreen		No

Limits: P_{on_limit} :	≤ 178.47 Watt
P_{SLEEP} :	≤ 0.8 Watt
P_{OFF} :	≤ 0.5 Watt

Test result:

Settings	
Brightness setting:	50/100
Contrast setting:	50/100
Maximum report luminance	400.0 cd/m ²
Maximum Measured Luminance	637.3 cd/m ²
As-Shipped Luminance	311.4 cd/m ²
As-tested Luminance	262.0 cd/m ²
Minimum-white Luminance – 10% Center Patch(for HDR only)	N/A
Minimum-white Luminance – Full-screen Flash(for HDR only)	N/A
Minimum-white Luminance – Full-screen Long-duration(for HDR only)	N/A
Input Signal used	DisplayPort
Default Delay Time to Sleep	60 min
True Power Factor	0.97

On Mode

On Mode Requirements for Signage Displays						
Volt.	Freq.	P _{ON}	P _{ON_MAX}	P _{ABC}	P _{module}	P _{ON} Limit
[V]	[Hz]	[W]	[W]	[W]	[W]	[W]
100	50	163.22	178.47	0	0.00	178.47
100	60	163.35	178.47	0	0.00	178.47
115	60	162.69	178.47	0	0.00	178.47
230	50	163.94	178.47	0	0.00	178.47

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Sleep Mode

Sleep Mode Requirements for Signage Displays							
Volt.	Freq.	P _{SLEEP}	P _{SLEEP_MAX}	P _N	P _{OS}	P _T	P _{SLEEP Limit}
[V]	[Hz]	[W]	[W]	[W]	[W]	[W]	[W]
100	50	0.21	0.50	0.00	0.3	0.00	0.80
100	60	0.21	0.50	0.00	0.3	0.00	0.80
115	60	0.22	0.50	0.00	0.3	0.00	0.80
230	50	0.29	0.50	0.00	0.3	0.00	0.80

Off Mode

Volt.	Freq.	P _{OFF}
[V]	[Hz]	[W]
100	50	0.01
100	60	0.01
115	60	0.01
230	50	0.01

Note:

1. Maximal THD measured while performing all tests was 0.39%.
2. There is a power off switch near the AC inlet which is used to disconnect the power from the mains. The off mode is measured with this switch off.

7. Photographs of the UUT



Figure 1. Front view



Figure 2. Back view

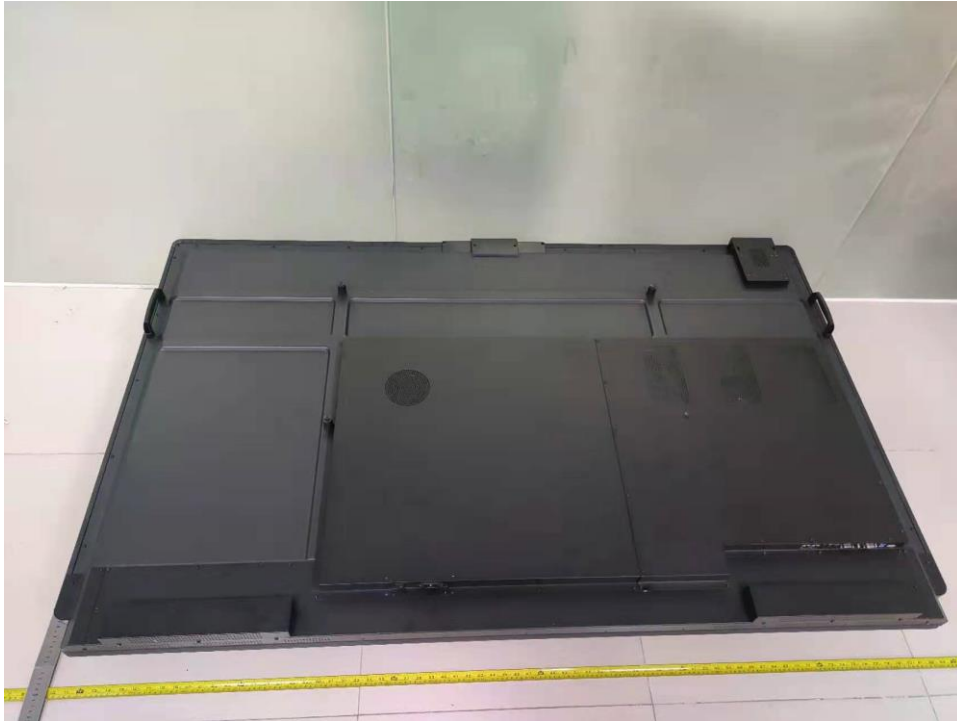


Figure 3. Back view

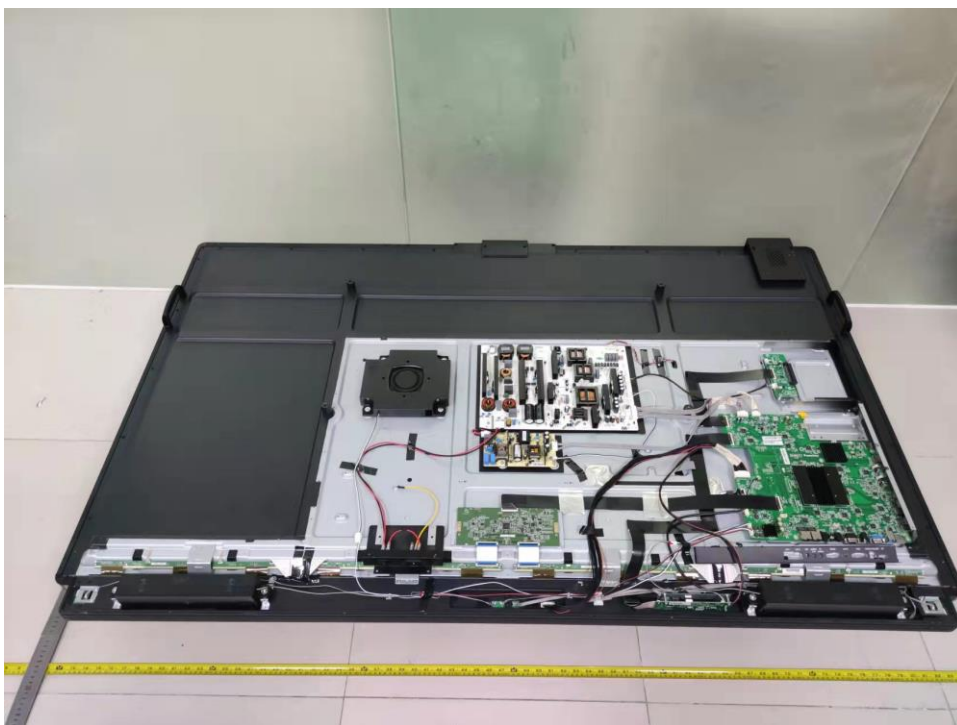


Figure 4. Internal view



Figure 5. Terminal view



Figure 6. Terminal view

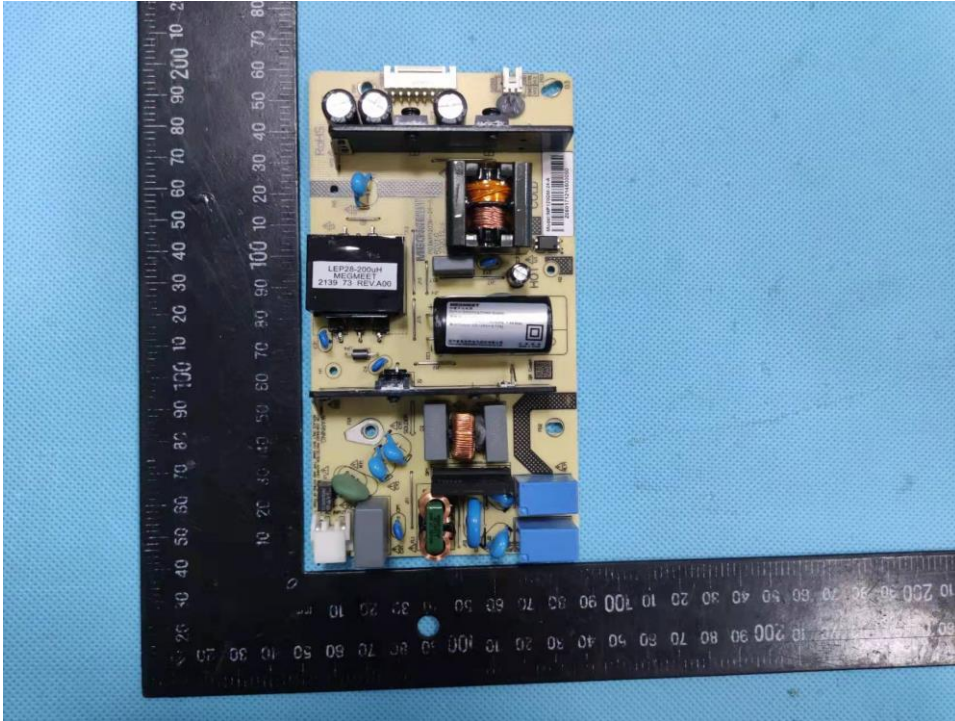


Figure 7. Power Board

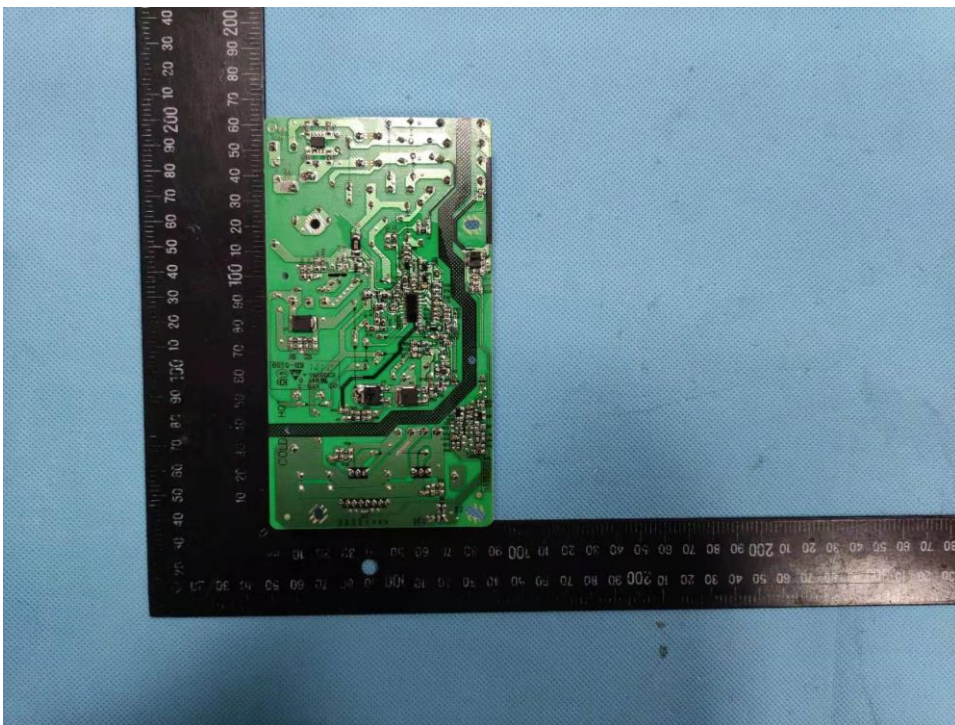


Figure 8. Power Board

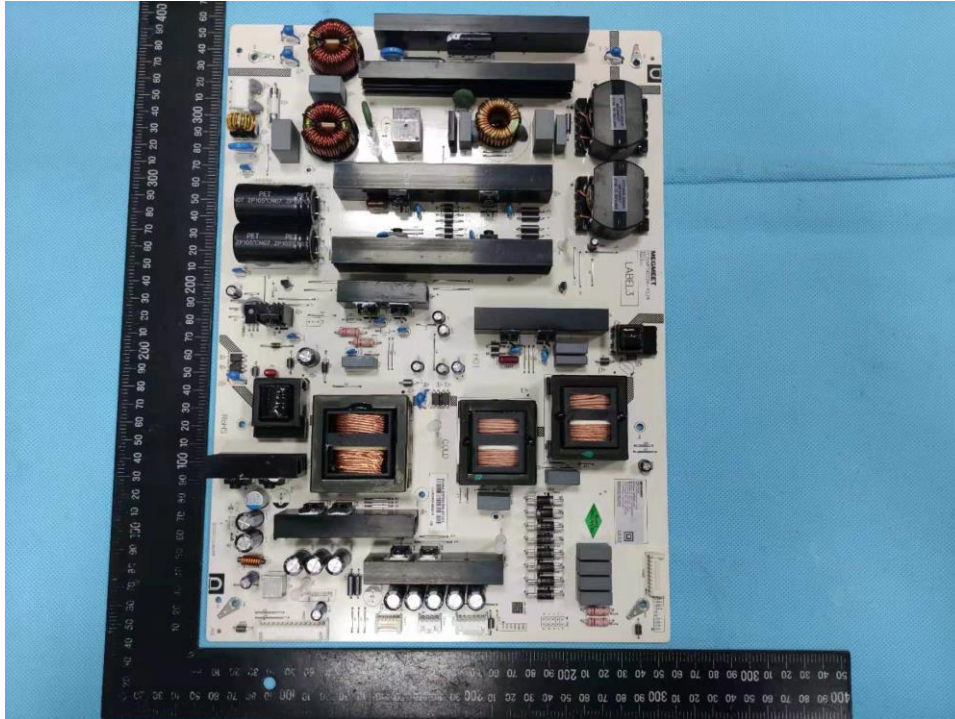


Figure 9. Power Board

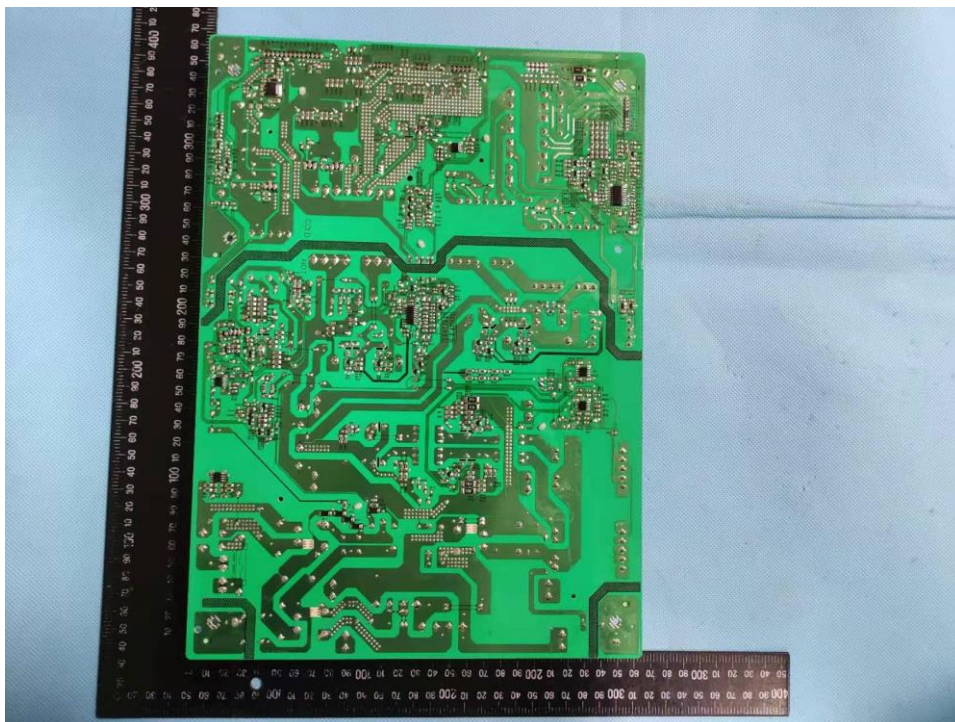


Figure 10. Power Board



Figure 11. Interface board



Figure 12. Interface board



Figure 13. Inlet View

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

N/A

9. Attachment: Measurement and Test equipment list

Ref. No	Equipments	Model	Cal. Date	Due Date
1.742	Digital Power Meter	Chroma / 66205	Jan-2022	Jan-2023
1.720	Luminance Meter	KONICA MINOLTA / LS-150	Jul-2021	Jul-2022
1.736	Temperature Humidity Recorder	Huawei / TH20R-EX	Oct-2021	Oct-2022
1.741	Programmable AC Source	Chroma / 61602	Jan-2022	Jan-2023
1.891	Stop watch	LEAF / PC396	Jan-2022	Jan-2023