

UL48 Testing

July 24th - July 26th, 2019

Nanov Display Research and Development Center

Brooklyn, NY



November 18th, 2019

Prepared by: compliance@nanovdisplay.com



Test Performed

<u>Test Name</u>	<u>Description</u>
Input Test	Measures the input current and input power at the LCD Sign's mains power connection to determine if the input electrical rating provided on the product's main rating plate is accurate.
Normal Temperature Test	Tracks the temperature of the components inside the LCD Sign to determine the temperature does not exceed the safety range.
Dielectric Voltage Withstand Test	Ensures the electric safety of the outdoor LCD Signs in situations where thunder can strike the LCD Sign. It involves placing an extra high voltage of 1500 Volts across the insulation barrier of the LCD Sign for one minute. If the insulation holds the 1500 Volts, the LCD Sign is considered to have passed the test.
Bond Impedance Test	Test the electrical impedance(resistance) and determines if the ground points of a device under test are well connected in between each other, and also to the mains ground.
Leakage Current	Checks that all circuits on the LCD Signs are properly grounded preventing any current from flowing through other paths such as the human body. For this test, a meter measures the flowing current between the LCD signs to the earth. If the current exceeds 0.75mA, the circuits are considered a shock hazard.

Test Performed

<u>Test Name</u>	<u>Description</u>
Abnormal Operation Test	Ensures that the LCD Sign is protected from shock and fire hazards in the event of any single fault condition (abnormal operating condition).
Maximum Output Voltage Test	Verifies that the output voltage of the LCD Sign is stable and within the operating range.
Maximum Output Current and Power Test	Verifies that the output current and power of the LCD Sign is stable and within the operating range.
Glass Impact Test	Determines the susceptibility of glasses to cracking or breakage. For outdoor LCD Signs, this test ensures security against vandalism. During testing, a 5kg stainless steel ball is dropped from 1 meter above glass producing a potential energy of 49 Joules. The drop-ball test certifies the LCD Sign an IK08 rating
Locked Rotor Test	Measures the current, voltage and power input of the LCD Sign by locking the rotor and applying a low voltage. It determines the rotor's effective resistance.
Rain Test	Evaluates the resistance of the outdoor LCD signs against water leakage caused by heavy rain. It is conducted by placing shower heads with water flow pressure of 5psi above the outdoor LCD Sign for a time period of 4 hours.



UL Testing Models



Temp Model
^



Component Temperature Test



Vandal Proof - Ball Drop Test (IK -8)



Leakage Current Test

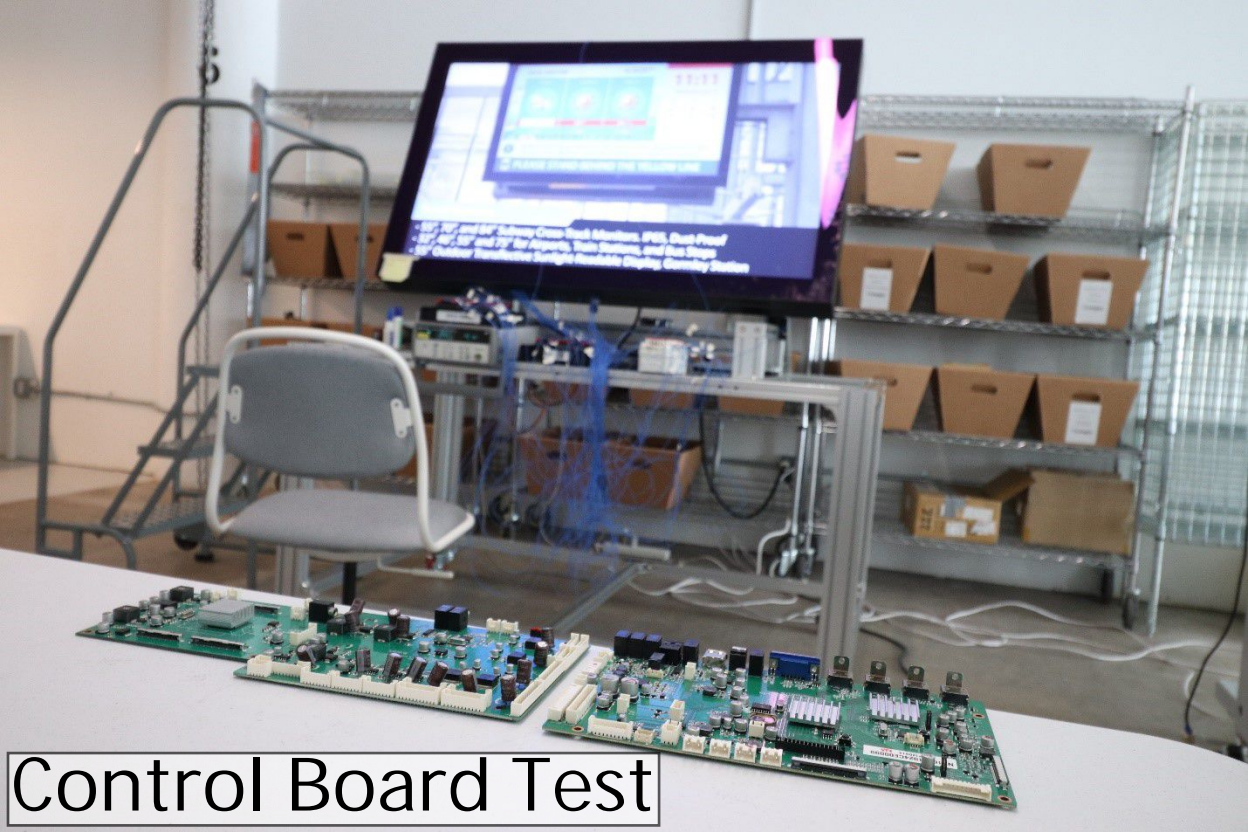


Inst Model
A



Dielectric Test

Control Board Test



Hi-Voltage Test (1500V)
(Abnormal Situation)



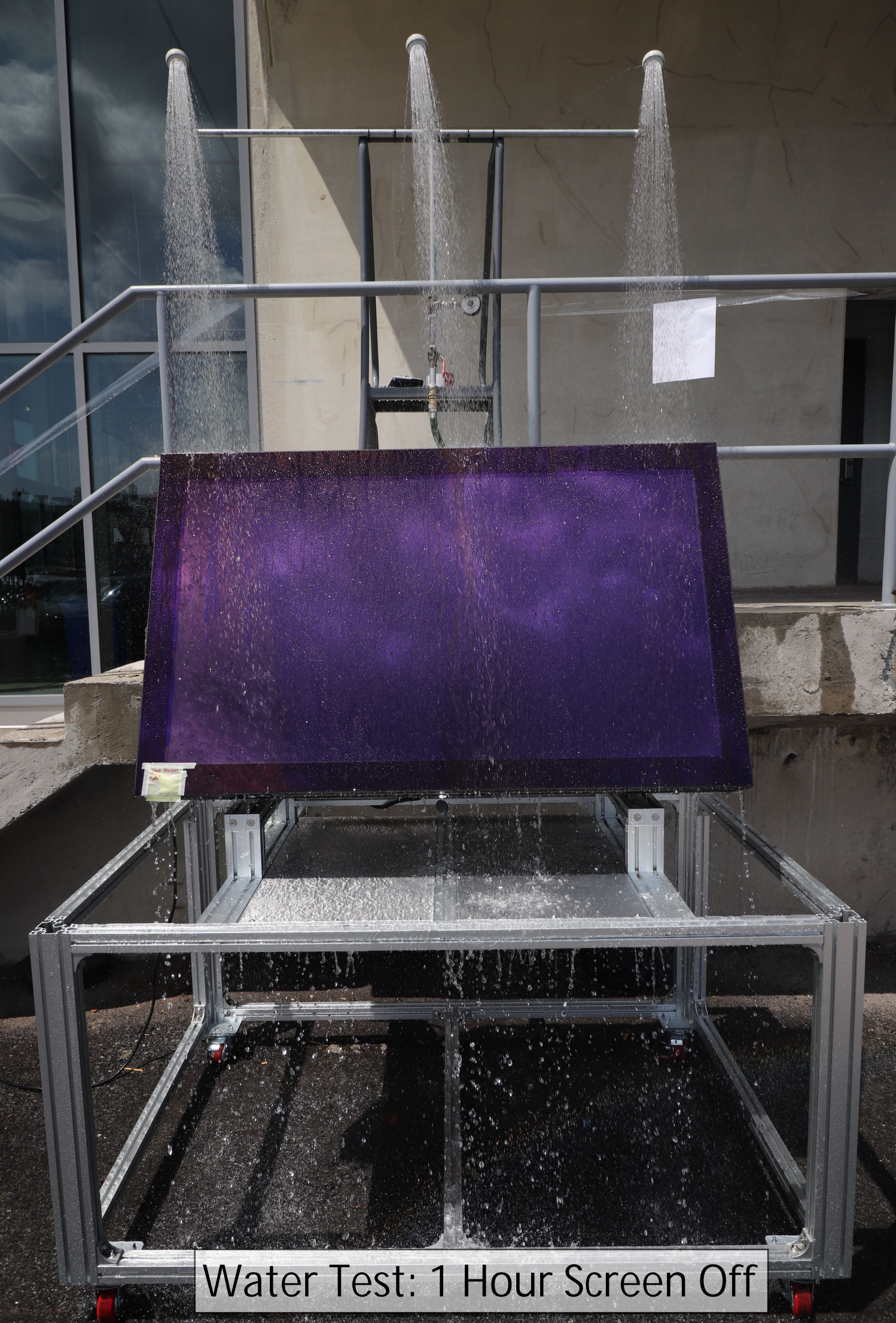


NO PARKING
TOW AWAY ZONE
(THIS IS RESERVED
FOR THE
COMPACTOR)

4 Hour Rain Test:
1 Hour On, 1 Hour Off,
2 Hours Abnormal Situations



Water Test: 1 Hour Screen On



Water Test: 1 Hour Screen Off