

November 1, 2022

Lumin
Ethan Bush
501 Locust Ave,
Floor 1, Ste 2,
Charlottesville, VA, 22902

Dear Ethan Bush,

Enclosed is the Electromagnetic Compatibility for the Lumin Smart Panel, LSP-12, tested to the requirements of:

- FCC Part 15 Subpart B
- Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7

Thank you for using the services of Eurofins Electrical and Electronic Testing NA, Inc. Please contact me if you have any questions regarding these results or if Eurofins E&E can be of further service to you.

Sincerely,

Michelle Tawmging

Documentation Department
Eurofins Electrical and Electronic Testing NA, Inc.

Reference: EMC117048-FCC-IC Rev. 1



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Eurofins Electrical and Electronic Testing NA, Inc. is part of the Eurofins Electrical & Electronics (E&E) global compliance network.

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	August 26, 2022	Initial Issue.
1	November 1, 2022	Updated customer address; Updated EUT name

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1.0 Testing Summary

The Lumin Smart Panel, LSP-12 was found to be compliant to the following specification(s).

- FCC Part 15 Subpart B
- Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7



Donald Salguero
EMC Laboratory Engineer

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements.



Michael Griffiths
Manager, Electromagnetic Compatibility Lab

2.0 Overview

Eurofins Electrical and Electronic Testing NA, Inc. was contracted by Lumin to perform testing on the Lumin Smart Panel, LSP-12, under purchase order number 220105-E1.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Lumin Smart Panel, LSP-12

The results obtained relate only to the item(s) tested.

Model(s) Tested:	LSP-12
Equipment Emissions Class:	B

Test Standard	Test Description	Compliance
FCC Part 15 Subpart B (per ANSI C63.4: 2014) Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7	CE (Mains), Class B	Compliant
	RE, Class B	Compliant

2.1 Test Site

All testing was performed at Eurofins Electrical and Electronic Testing NA, Inc., 914 West Patapsco Avenue, Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology. Eurofins Electrical and Electronic Testing NA, Inc. has been accredited by the American Association for Laboratory Accreditation (A2LA) (Certificate #: 0591.01) in accordance with ISO/IEC 17025:2017.

2.2 Measurement Uncertainty

Measurement uncertainty calculated as per NIST Technical Note (TN) 1297 and ANSI / NCSL Z540-2, as equivalent to EN 55016-4-2 / IEC CISPR 16-4-2.

Test Method	Typical Expanded Uncertainty (dB)	K	Confidence Level
Radiated Emissions, (30 MHz – 1 GHz)	±3.20	2	95%
Conducted Emission Voltage	±2.03	2	95%

Table 1. Measurement Uncertainty

2.3 Equipment Overview and Test Configuration

Name of EUT/Model:	Lumin Smart Panel / LSP-12
Description of EUT and Intended Use:	Sample Lumin Smart Panel — residential electrical load management device — with support equipment (primarily a breaker panel) to simplify setup to connection with a 120/240 VAC power source and provide representative conditions. Breakers and wiring are included to simulate completed installation.
Selected Operation Mode(s):	Online Operation Mode: The device operates with a continuous network connection. The provided EUT setup shall be powered and connected to the local network via Ethernet while simultaneously broadcasting test mode data across 2.4 GHz Wi-Fi bands. Lumin will provide an operating manual for directly controlling the Wi-Fi radio.
Rational for the selection of the Operation Mode(s):	The device operates with a continuous network connection when installed. The device supports Ethernet and 2.4 GHz Wi-Fi, typically with data transfer only occurring over one or the other protocol (Bluetooth and 5 GHz Wi-Fi radios in the transceiver module are disabled in the factory-installed and -managed software, and can not be enabled by the end user). However, it is possible for momentary transition states in which both Ethernet and Wi-Fi transmitters are active, so this is selected as the peak emission operation mode. The physical EUT assembly provides a representative radiofrequency environment with respect to dead metal and 60 Hz AC power conductors.
Monitoring Method(s):	System operation for the EUT is verified by navigating to http://lumin-C43A35C500E3.local/ in a Web Browser once the EUT is connected to the local network via Ethernet. Refresh the site to check for continued operation. If the site reloads successfully, the device is operating properly. If the site fails to reload, the device has lost power, been improperly configured, or malfunctioned.
Emissions Class Declaration:	Class B
Configurations:	See the block diagram of the EUT assembly (LS-100693). Remove the outer product cover by unlatching the pair of clasps, pulling the bottom of the cover out, and lifting up. Remove the bag of hardware from the exposed interface compartment. Install an Ethernet cable between a router and the RJ45 port in the product labelled "Ethernet," utilizing the 3/4" knockout in the bottom of the enclosure to route the cable. Replace the product outer cover by hooking over the top and latching. Mount the EUT vertically (the Lumin logo on the smart panel oriented upright). Install the included external antenna on the RP-SMA jack of the product. Orient the installed antenna to point up.
EUT Power Requirement	
Voltage:	120/240
AC or DC:	AC
Voltage Frequency:	60
Number of Phases:	1
Current:	0.5
Physical Description	
EUT Arrangement:	Floor Standing

System with Multiple Chassis?	False
Size (HxWxD) inches:	48x31x6
Weight (lbs.):	60
Highest Internal Frequency (MHz):	2500
Other Info	
EUT Software (Internal to EUT):	QCMBR
Support Software (used by support PC to exercise EUT):	Web Browser
Transmitter Parameters	
Description of your unit:	DSSS
Modulation Type:	Adaptive
Number of Channels:	13
Frequency Range (MHz):	2401-2483
Antenna Type:	External dipole
Antenna Gain (dB):	2
PMN:	Lumin Smart
HVIN:	8274B-SR
FVIN:	1.0
Data Rates:	600 Mbps
Expected Power Level:	20 dBm
Number of Antenna:	1
Number of Intentional Transmitters:	1
Number of Certified Intentional Transmitter Modules:	0
FCC ID:	2AY52-LSP12W
IC ID:	27016-LSP12W

Table 2. Equipment Details

Ref. ID	Slot#	Name/Description	Model Number	Part Number	Serial Number	Rev. #
	1	UFB 6AWG 2C 7STR CU BLK WHT, 10AWG SOLID CU BARE, GRY JACKET		21469203		
	2	UFB 10AWG 2C SOLID CU BLK WHT, 10AWG SOLID CU BARE, GRY JACKET		13056717		
	3	NM B, 6/3 STRANDED CU BLK WHT RED, 12/1 SOLID CU BARE, BLK JACKET		63950045		
LS-100501	4	LOAD CENTER, 2 PHASE, 6 SPACES, 12 CIRCUITS, 125A		BR612L125RP		
	5	5 TERMINAL GALVANIZED GROUND BAR KIT		GBK5CS		
	6	CIRCUIT BREAKER, 15A, 1 POLE, STANDARD TRIP		BR115		
	7	CIRCUIT BREAKER, 20A, 2 POLE, STANDARD TRIP		BR220		
	8	CIRCUIT BREAKER, 40A, 1 POLE, STANDARD TRIP		BR140		
	9	CIRCUIT BREAKER, 70A, 2 POLE, STANDARD TRIP		BR270		
	10	3/8 IN CLAMP ON TYPE SERVICE ENTRANCE CONNECTOR CONDUIT FITTINGS		49650		
	11	3/4 IN CLAMP ON TYPE SERVICE ENTRANCE CONNECTOR CONDUIT FITTINGS		49660		
	12	BLACK INSULATED MULTI CABLE CONNECTOR DUAL ENTRY 2 PORTS 4 14		97102		
LS-100687	13	LSP 12 OR.1.7 TOP LEVEL		LS-100687		
LS-100417	14	LSP 12 OR.2.0 BRACKET		LS-100417		
LS-100419	15	LSP 12 OR.2.0 SPACER		LS-100419		
LS-100007	16	200A CT ASSEMBLY A		LS-100007		
LS-100009	17	200A CT ASSEMBLY B		LS-100009		
LS-100546	18	STAINLESS 1/4" 20 LOCKNUT		96278A511		
LS-100158	19	FLAT WASHER FOR 1/4" SCREW		90107A029		
LS-100164	20	1/4" WOOD SCREW HEX HEAD 2" LONG		91478A550		

Table 3. Equipment Configuration

Ref. ID	Port Name on EUT	Cable Desc. or reason for none	QTY	Length as tested (m)	Max Length (m)	Shielded?	Termination Box ID & Port Name
	RP-SMA JACK	NONE: DIRECT CXN FOR EXTERNAL ANTENNA	1			No	
	ETHER NET	CAT 5+ ETHERNET	1		30	Yes	
	USB	NONE: NOT USED IN END APPLICATIONS	2			No	
	RS-485	NONE: NOT USED IN END APPLICATION	1			No	

Table 4. Ports and Cabling

2.4 Modifications to the EUT

No modifications were made to the EUT.

2.5 Modifications to the Standard

No modifications were made to the Test Standard.

2.6 Disposition of EUT

The test sample including all support equipment (if any), submitted to the Electromagnetic Compatibility Lab for testing was returned to Lumin upon completion of testing.

3.0 Electromagnetic Compatibility Emission Criteria

3.1 Limits for Conducted Disturbance at Mains Terminals

Test Method: ANSI 63.4: 2014

Sample Calculation:

$$R_f - S = M$$

where:

R_f = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

Sample formula for calculating the Corrected Data for the Conducted Emissions Measurements:

Line	Freq (MHz)	Uncorrected QP** Amplitude (dBuV)	LISN IL (dB)	CBL (dB)	Corrected QP** Amplitude (dBuV)	QP** Limit (dBuV)	Delta (dB)	Results
XYZ	0.18	42.65	10	0.58	53.23	79	-25.77	Pass

*Corrected QP** Amplitude (dBuV) = Uncorrected Amplitude (dBuV) + LISN IL (dB) + CBL (dB) = 42.65 + 10 + 0.58 = 53.23*

*** Same Calculation applies to Corrected Avg. amplitude as well.*

Test Requirement(s): The following standards specified below are covered in the scope of this section of the test report:

- FCC Part 15 Subpart B
- Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7

The EUT shall meet the Class B limits shown in the table below.

Frequency Range (MHz)	Class A Limits (dBuV)		Class B Limits (dBuV)	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15 - 0.5	79	66	66 to 56	56 to 46
0.5 - 5	73	60	56	46
5 - 30	73	60	60	50
Note 1 – The lower limit shall apply at the transition frequencies. Note 2 – The limit decreases linearly with the logarithm if the frequency in the range 0.15 MHz to 0.5 MHz.				

Table 5. Conducted Emissions - Limits

Test Procedure: The EUT was isolated from the ground plane by up to 12 mm of insulating material. The method of testing, test conditions, and test procedures of ANSI 63.4: 2014 were used. The EUT was powered through a 50Ω/50μH LISN. An EMI receiver, connected to the measurement port of the LISN, scanned the frequency range from 150 kHz to 30 MHz in order to find the peak conducted emissions. All peak emissions within 6 dB of the limit were re-measured using a quasi-peak and/or average detector as appropriate. Any measured frequency that exhibits a margin of compliance that is less than 3 dB below the specification limit is marked. Eurofins E&E recommends that every emission measured, has at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process. Photographs of test setup are presented below.

Test Software Used: Trace Data Grabber version 11/24/08 was used to perform this test.

Test Results:

Test Standard:	FCC Part 15 Subpart B Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7 Class B
Test Name:	Conducted Emissions
Test Dates:	August 18, 2022
Laboratory:	Eurofins Electrical and Electronic Testing NA, Inc.
Test Engineer:	Donald Salguero
Test Results:	Compliant

Test Data

Test Specification:	FCC Part 15B Class B // ICES-003 Issue 7 Class B
Test Method:	Conducted Emissions, 150 kHz to 30 MHz
Job Number:	117048
Customer:	Lumin
EUT Name:	Lumin Smart Panel Outdoor
Part/Model Number:	LS-100693
Mode of Operation:	Test Mode
Engineer:	Donald Salguero
Date:	8/18/2022
Temperature:	21.2°C
Humidity:	58%
Lead Tested:	240 VAC L-L, 60 Hz

Table 6. CEV, Header

	Frequency	Quasi-Peak Measurement	Correction Factor	Corrected Measurement	Quasi-Peak Limit	Margin	Result	Average Measurement	Correction Factor	Corrected Measurement	Average Limit	Margin	Result
	MHz	dBuV	dB	dBuV	dBuV	dB	Pass/Fail	dBuV	dB	dBuV	dBuV	dB	Pass/Fail
Line 1	0.1500	46.88	10.36	57.23	65.99	-8.76	PASS	24.32	10.36	34.68	55.99	-21.31	PASS
	0.1970	43.11	10.18	53.29	64.67	-11.38	PASS	13.75	10.18	23.92	54.67	-30.75	PASS
	0.7730	34.97	9.99	44.96	56.00	-11.04	PASS	13.84	9.99	23.83	46.00	-22.17	PASS
	5.3660	43.45	10.00	53.45	60.00	-6.55	PASS	38.17	10.00	48.18	50.00	-1.82	PASS
	7.0930	43.98	10.02	54.00	60.00	-6.00	PASS	38.05	10.02	48.07	50.00	-1.93	PASS
	7.3080	43.32	10.02	53.34	60.00	-6.66	PASS	37.98	10.02	48.00	50.00	-2.00	PASS
	5.3990	24.61	10.00	34.61	60.00	-25.39	PASS	13.92	10.00	23.92	50.00	-26.08	PASS
Line 2	8.4340	32.68	10.04	42.72	60.00	-17.28	PASS	13.94	10.04	23.98	50.00	-26.02	PASS
	9.4020	27.52	10.05	37.57	60.00	-22.43	PASS	13.94	10.05	23.99	50.00	-26.01	PASS
	13.9560	25.32	10.10	35.43	60.00	-24.57	PASS	13.97	10.10	24.07	50.00	-25.93	PASS
	17.2310	21.92	10.14	32.06	60.00	-27.94	PASS	13.98	10.14	24.12	50.00	-25.88	PASS
	24.1820	19.20	10.31	29.51	60.00	-30.49	PASS	12.32	10.31	22.63	50.00	-27.37	PASS
	2.8410	20.58	9.98	30.57	56.00	-25.43	PASS	13.73	9.98	23.71	46.00	-22.29	PASS
	4.8160	35.20	10.00	45.20	56.00	-10.80	PASS	26.67	10.00	36.67	46.00	-9.33	PASS
Neutral	5.3560	38.21	10.00	48.21	60.00	-11.79	PASS	34.97	10.00	44.97	50.00	-5.03	PASS
	7.0540	40.22	10.02	50.24	60.00	-9.76	PASS	36.33	10.02	46.35	50.00	-3.65	PASS
	7.5170	38.79	10.02	48.81	60.00	-11.19	PASS	35.21	10.02	45.24	50.00	-4.76	PASS
	14.0500	20.49	10.10	30.59	60.00	-29.41	PASS	13.78	10.10	23.88	50.00	-26.12	PASS

Table 7. CEV, Data

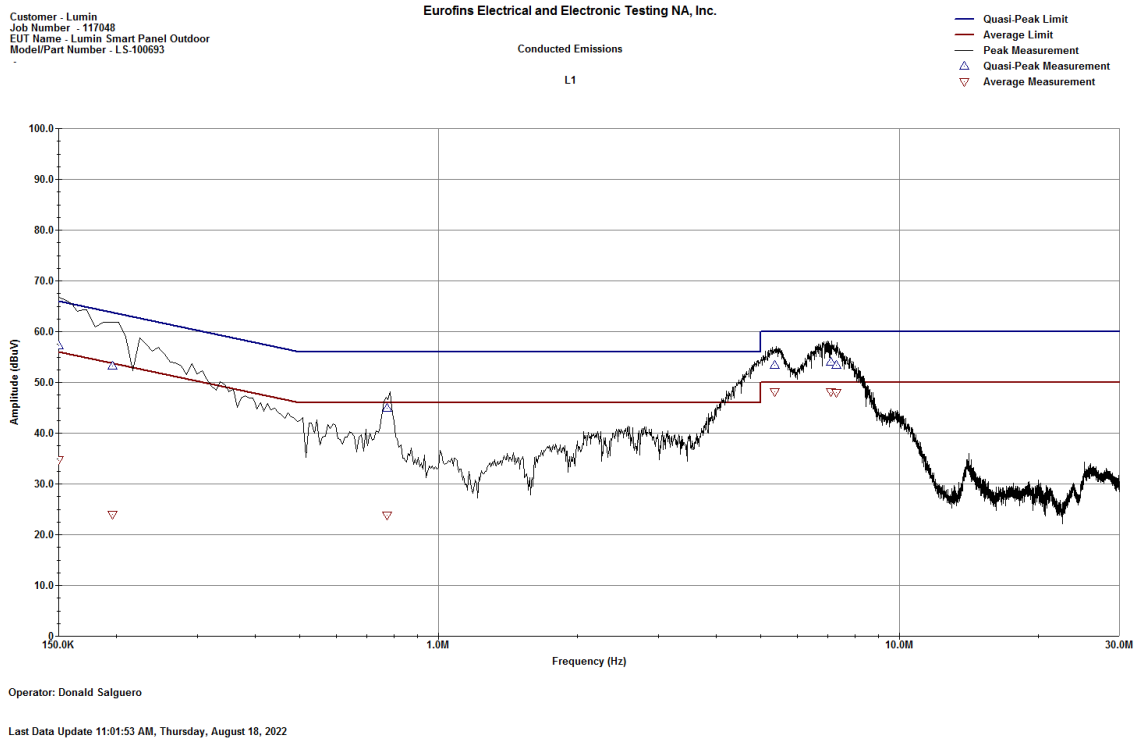


Figure 1. CEV L1

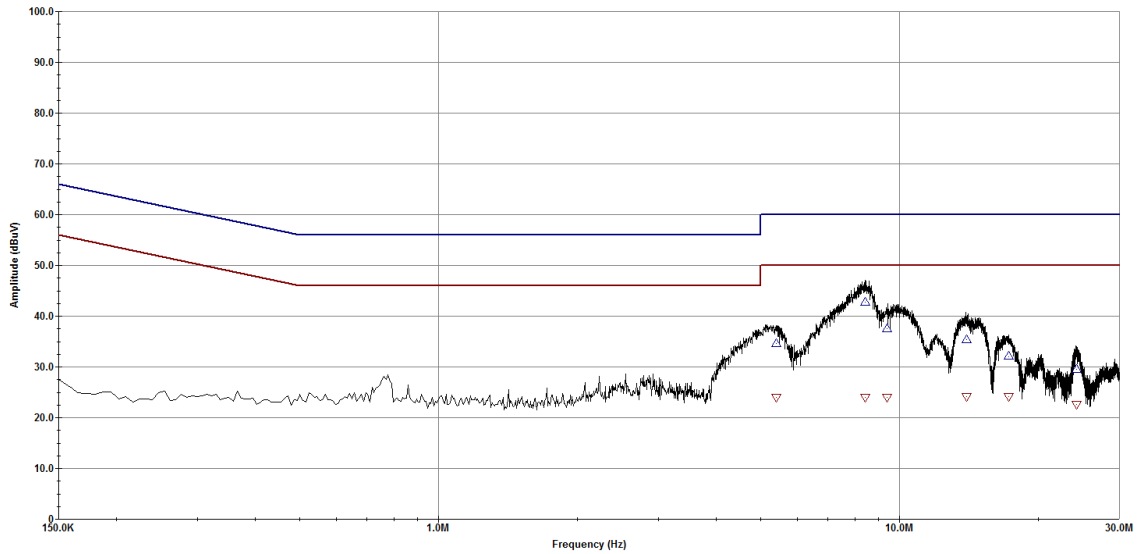
Customer - Lumin
Job Number - 117048
EUT Name - Lumin Smart Panel Outdoor
Model/Part Number - LS-100693

Eurofins Electrical and Electronic Testing NA, Inc.

Conducted Emissions

L2

— Quasi-Peak Limit
— Average Limit
— Peak Measurement
△ Quasi-Peak Measurement
▽ Average Measurement



Operator: Donald Salguero

Last Data Update 11:16:20 AM, Thursday, August 18, 2022

Figure 2. CEV L2

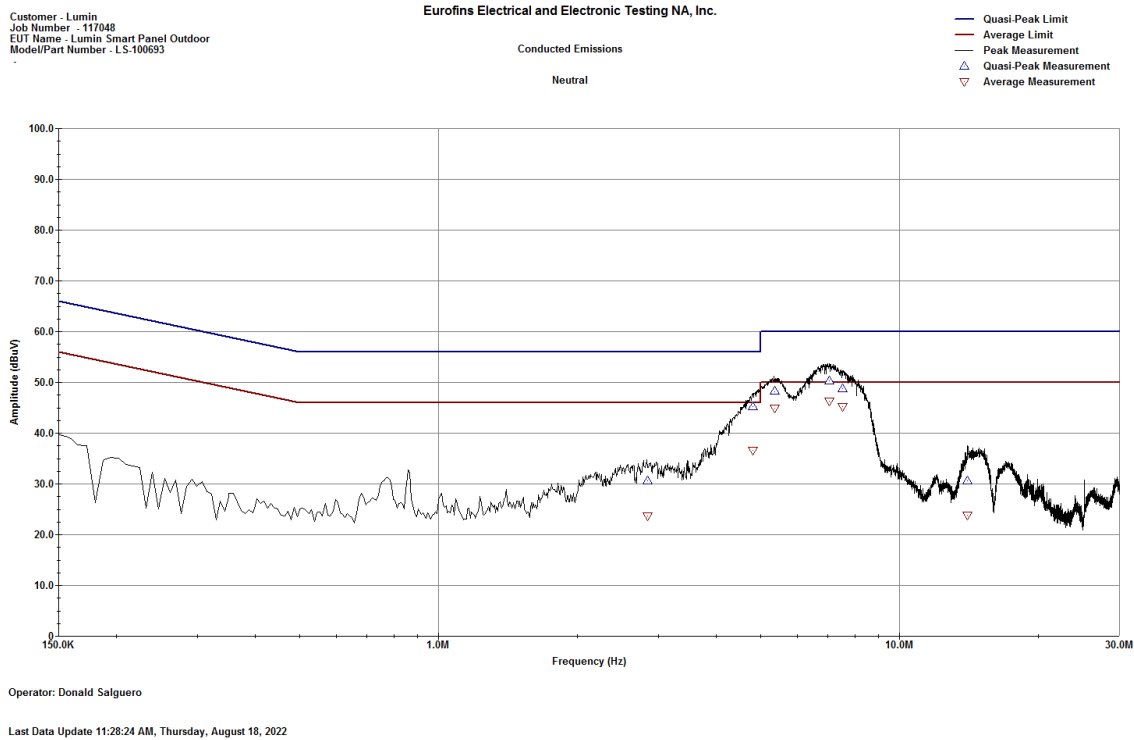


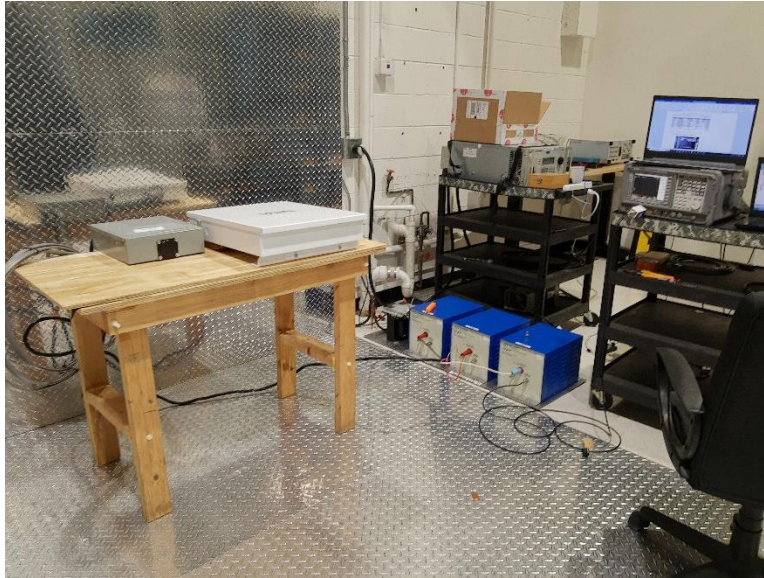
Figure 3. CEV Neutral

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Asset	Equipment	Manufacturer	Model	Calibration Date	Calibration Due Date
1T6658	Spectrum Analyzer	Agilent Technologies	E4407B	9/7/2021	3/7/2023
1T8909	LISN	Com-Power	LI-150C	4/12/2021	10/12/2022
1T8908	LISN	Com-Power	LI-150C	4/12/2021	10/12/2022
1T8907	LISN	Com-Power	LI-150C	4/12/2021	10/12/2022
1T7450	Transient Limiter	Com-Power	LIT-153A	Not Required	Not Required

Table 8. CEV Equipment List

3.1.1 Limits for Conducted Disturbance at Mains Terminals Photographs



Photograph 1. CEV Test Setup

3.2 Radiated Emissions: Limits of Electromagnetic Radiation Disturbance

Test Method: ANSI 63.4: 2014

Test Requirement(s): The following standards specified below are covered in the scope of this section of the test report:

- FCC Part 15 Subpart B
- Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7

§15.109 (a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Field Strength (dBμV/m)
30 - 88	40.00
88 - 216	43.50
216 - 960	46.00
Above 960	54.00

ICES-003 Issue 7, §3.2.2 The quasi-peak limits for the electric component of the radiated field strength emitted from ITE or digital apparatus, within 30 MHz to 1 GHz, for a measurement distance of 3 m, are presented in the table below:

Frequency (MHz)	Field Strength (dBμV/m)
30 - 88	40.00
88 - 216	43.50
216 - 960	47.00
Above 960	54.00

Sample Calculation for Distance Correction factor (DCF) measurement:

$$F_d = 20 \cdot \log_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

Sample formula for calculating the Corrected Data for the Radiated Emissions Measurements:

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBμV)	ACF (dB/m) (+)	Pre Amp Gain (dB)(-)	CBL (dB) (+)	DCF (dB) (+)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
249.99	V	359.9	240.7	55.46	11.4	28.335	0	0	38.505	47	-8.495

$$\begin{aligned} \text{Corrected Amplitude (dBμV/m)} &= \text{Uncorrected Amplitude (dBμV)} + \text{ACF (dB/m)} - \text{Preamp Gain (dB)} + \text{CBL (dB)} + \text{DCF (dB)} \\ &= 55.46 + 11.4 - 28.335 + 0 + 0 = \mathbf{38.505} \end{aligned}$$

Test Procedure: The EUT was isolated from the ground plane up to 150 mm of thin insulating material inside a semi-anechoic chamber. The method of testing, test conditions, and test procedures of ANSI C63.4: 2014 were used. Any measured frequency that exhibits a margin of compliance that is less than 3 dB below the specification limit is marked. Eurofins E&E recommends that every emission measured, has at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process.

For emissions between 30 MHz and 1000 MHz, a biconilog antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz resolution bandwidth.

Test Software Used: EMC-REG-TDS-11, Radiated Emissions Prescan.xls version 06/29/11 were used to perform this test.

Test Results:

Test Standard:	FCC Part 15 Subpart B Innovation, Science, and Economic Development (ISED) Canada ICES-003 Issue 7 Class B
Test Name	Radiated Emissions
Test Dates:	August 5, 2022
Laboratory	Eurofins Electrical and Electronic Testing NA, Inc.
Test Engineer:	Donald Salguero
Test Results:	Compliant

Test Data

Test Specification:	FCC Part 15B Class B // ICES-003 Issue 7 Class B
Test Method:	Radiated Emissions, 30 MHz to 1 GHz
Job Number:	117048
Customer:	Lumin
EUT Name:	Lumin Smart Panel Outdoor
Part/Model Number:	LS-100693
Mode of Operation:	Test Mode
Engineer:	Donald Salguero
Date:	8/5/2022
Temperature:	20.1°C
Humidity:	55%

Table 9. REE, Header

Test Specification Part 15 B Class B									
Frequency	Polarity	Antenna Height	Turntable Position	Measured	Correction Factor	Corrected Reading	Limit	Margin	Results
MHz	Horizontal/Vertical	cm	Degrees	dBuV	dB	dBuV/m	dBuV/m	dB	Pass/Fail
30.54	H	287.00	82.30	-1.11	26.35	25.24	40.00	-14.76	PASS
36.57	H	354.56	90.40	4.03	21.85	25.89	40.00	-14.11	PASS
55.47	H	377.04	290.80	20.50	12.54	33.03	40.00	-6.97	PASS
64.89	H	398.21	285.80	19.88	12.80	32.68	40.00	-7.32	PASS
75.18	H	297.30	298.00	15.07	13.06	28.13	40.00	-11.87	PASS
359.79	H	107.30	95.60	11.42	21.41	32.84	46.00	-13.16	PASS
36.99	V	102.39	15.40	16.39	20.16	36.55	40.00	-3.45	PASS
43.93	V	104.56	65.80	16.52	15.40	31.92	40.00	-8.08	PASS
48.62	V	159.78	13.10	22.81	13.19	36.00	40.00	-4.00	PASS
55.65	V	106.52	24.00	23.34	12.07	35.42	40.00	-4.58	PASS
64.83	V	108.30	-1.00	18.52	12.41	30.93	40.00	-9.07	PASS
788.14	V	118.86	168.50	6.02	28.55	34.56	46.00	-11.44	PASS

Table 10. REE, FCC Data

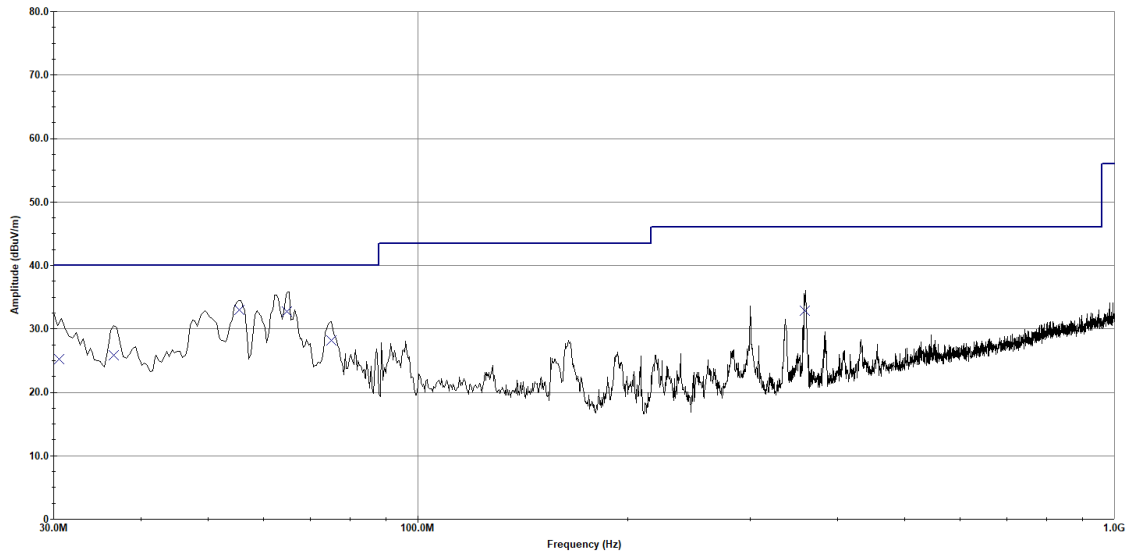
Customer - Lumin
Job Number - 117048
EUT Name - Lumin Smart Panel Outdoor
Serial Number - LS-100693

Eurofins Electrical and Electronic Testing NA, Inc.

Radiated Emissions

Horizontal Polarization

— Test Limit - Quasi-Peak
— Measured - Peak
× Measured - Quasi-Peak



Operator: Donald Salguero

Last Data Update 04:58:07 PM, Thursday, August 04, 2022

Figure 4. REE FCC Horizontal Polarization, 30-1000 MHz

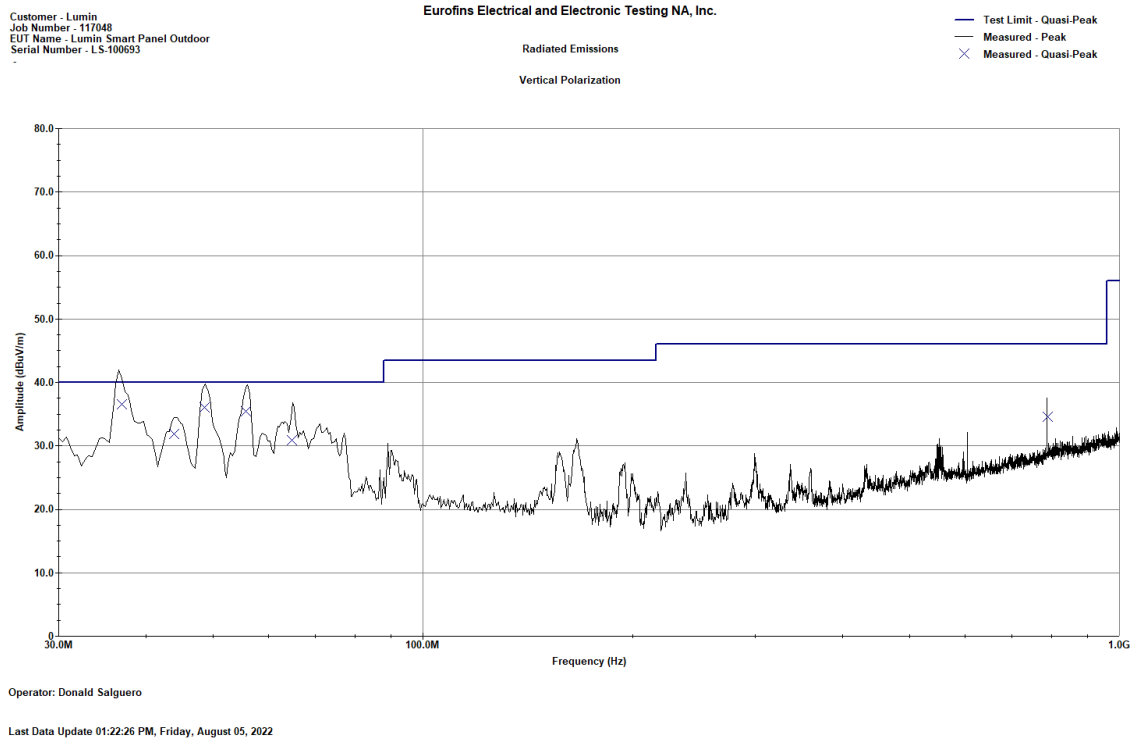


Figure 5. REE FCC Vertical Polarization, 30-1000 MHz

Test Specification									
ICES-003 Issue 7 Class B									
Frequency	Polarity	Antenna Height	Turntable Position	Measured	Correction Factor	Corrected Reading	Limit	Margin	Results
MHz	Horizontal/Vertical	cm	Degrees	dBuV	dB	dBuV/m	dBuV/m	dB	Pass/Fail
30.54	H	287.00	82.30	-1.11	26.35	25.24	40.00	-14.76	PASS
36.57	H	354.56	90.40	4.03	21.85	25.89	40.00	-14.11	PASS
55.47	H	377.04	290.80	20.50	12.54	33.03	40.00	-6.97	PASS
64.89	H	398.21	285.80	19.88	12.80	32.68	40.00	-7.32	PASS
75.18	H	297.30	298.00	15.07	13.06	28.13	40.00	-11.87	PASS
359.79	H	107.30	95.60	11.42	21.41	32.84	47.00	-14.16	PASS
36.99	V	102.39	15.40	16.39	20.16	36.55	40.00	-3.45	PASS
43.93	V	104.56	65.80	16.52	15.40	31.92	40.00	-8.08	PASS
48.62	V	159.78	13.10	22.81	13.19	36.00	40.00	-4.00	PASS
55.65	V	106.52	24.00	23.34	12.07	35.42	40.00	-4.58	PASS
64.83	V	108.30	-1.00	18.52	12.41	30.93	40.00	-9.07	PASS
788.14	V	118.86	168.50	6.02	28.55	34.56	47.00	-12.44	PASS

Table 11. REE, ICES Data

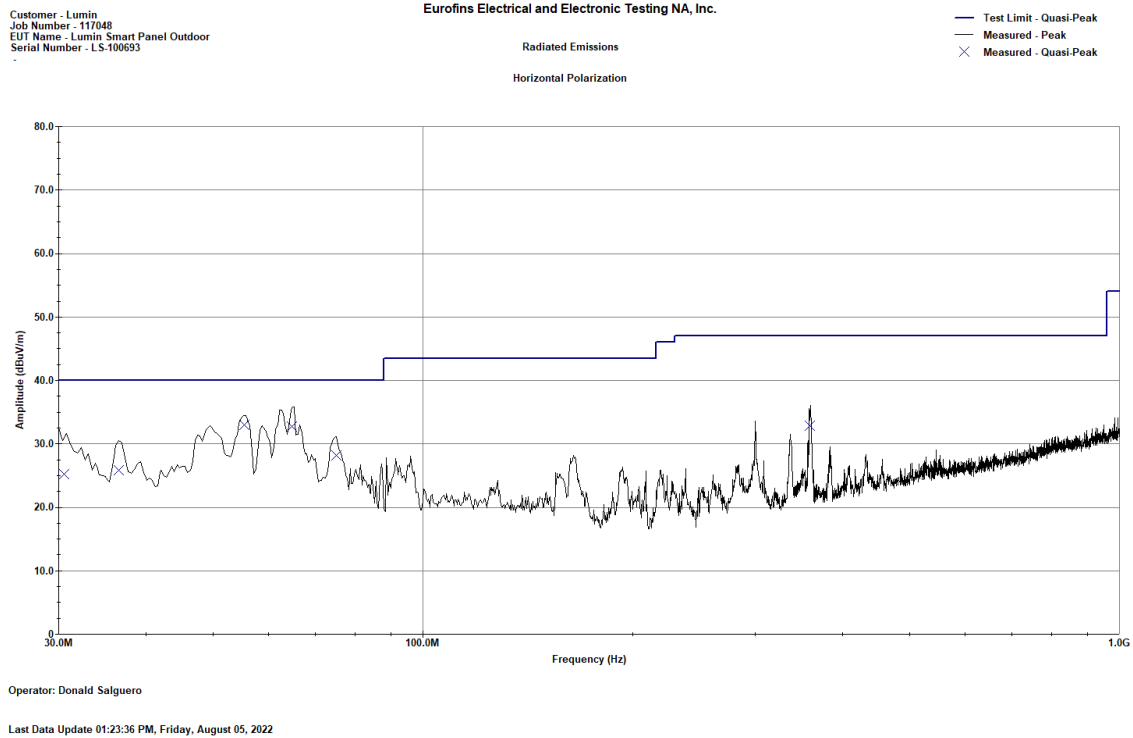


Figure 6. REE ICES-003 Horizontal Polarization, 30-1000 MHz

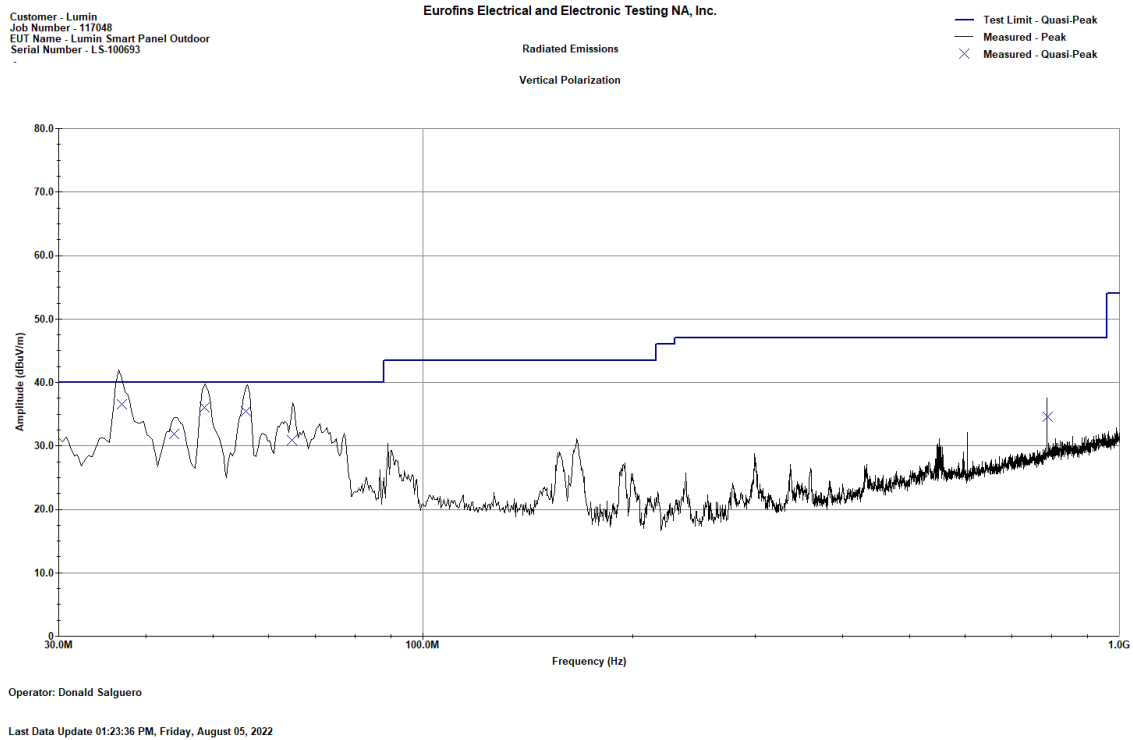


Figure 7. REE ICES-003 Vertical Polarization, 30-1000 MHz

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Asset	Equipment	Manufacturer	Model	Calibration Date	Calibration Due Date
1T4409	EMI Receiver	Rohde & Schwarz	ESIB7	2/16/2022	8/31/2023
1T4751	Antenna - Bilog	Sunol Sciences	JB6	6/1/2022	12/1/2023
1T4300B	Semi-Anechoic 3m Chamber sVSWR	EMC TEST SYSTEMS	NONE	9/30/2021	9/30/2023
1T4300	SEMI-ANECHOIC CHAMBER (NSA)	EMC TEST SYSTEMS	NONE	8/19/2021	8/31/2023

Table 12. REE Equipment List

3.2.1 Radiated Emissions: Limits of Electromagnetic Radiation Disturbance Photographs



Photograph 2. REE Test Setup, 30-1000 MHz

END OF REPORT