



Canada

RF Test Report

As per

RSS-210 Issue 10:2019 & FCC Part 15 Subpart 15.249

Unlicensed Intentional Radiators

on the

LumiNode LW2300

Issued by:

TÜV SÜD Canada Inc.
11 Gordon Collins Dr,
Gormley, ON, L0H 1G0
Canada
Ph: (905) 883-7255

Prepared by:

Amir Emami,
Project Engineer

Reviewed by:

Min Xie,
Sr. Project Engineer

Testing produced for

aoms.

See Appendix A for full client &
EUT details.



Registration #
6844A-3



Testing Laboratory
Certificate #2955.02



R-14023, G-20072
C-14498, T-20060



Registration #
CA6844

Client	AOMS Technologies	
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Table of Contents

Table of Contents	2
Report Scope	3
Summary	4
Test Results Summary	5
Notes, Justifications, or Deviations	6
Sample Calculation(s)	6
Applicable Standards, Specifications and Methods	7
Document Revision Status	8
Definitions and Acronyms	9
Testing Facility	10
Calibrations and Accreditations	10
Testing Environmental Conditions and Dates	11
Detailed Test Results Section	12
Maximum Output Power	13
Transmitter Spurious Radiated Emissions	16
Emission Bandwidth	29
Appendix A – EUT Summary	32
Appendix B – EUT and Test Setup Photos	34

Client	AOMS Technologies	
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Report Scope

This report addresses the EMC verification testing and test results of the **LumiNode** Model: **LW2300** and is herein referred to as EUT (Equipment Under Test). The EUT was tested for compliance against the following standards:

RSS-210 Issue 10:2019

FCC Part 15 Subpart C 15.249

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

This report does not imply product endorsement by any government, accreditation agency, or TÜV SÜD Canada Inc.

Opinions or interpretations expressed in this report, if any, are outside the scope of TÜV SÜD Canada Inc. accreditations. Any opinions expressed do not necessarily reflect the opinions of TÜV SÜD Canada Inc., unless otherwise stated.

Client	AOMS Technologies	
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Summary

The results contained in this report relate only to the item(s) tested.

EUT:	LumiNode LW2300
FCC Certification #, FCC ID:	2A2RL-LW2300
ISED Certification #, IC:	27642-LW2300
EUT passed all tests performed	Yes
Tests conducted by	Amir Emami
Report reviewed by	Min Xie

For testing dates, see "Testing Environmental Conditions and Dates".

Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Test Results Summary

Standard/Method	Description	Class/Limit	Result
FCC 15.203	Antenna Requirement	Unique	Pass See Justification
FCC 15.205 RSS-GEN (Table 7)	Restricted Bands for Intentional Operation	QuasiPeak Average	Pass
FCC 15.207 RSS-GEN (Table 4)	Power Line Conducted Emissions	QuasiPeak Average	N/A See Justification
FCC 15.249(a) RSS-210 F.1(a)	Maximum Output Power	< 50 mV/m	Pass
FCC 15.249(d) RSS-210 F.1(e)	Transmitter Spurious Radiated Emissions	QuasiPeak Average	Pass
FCC 15.249 RSS-GEN 6.7	Emission Bandwidth	99% BW	Pass
Overall Result			Pass

If the product as tested or otherwise complies with the specification, the EUT is deemed to comply with the requirement and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' / 'FAIL' grade is independent of any measurement uncertainties. A 'PASS' / 'FAIL' grade within measurement uncertainty is marked with a '*'.

Client	AOMS Technologies	
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Notes, Justifications, or Deviations

The following notes, justifications for tests not performed or deviations from the above listed specifications apply:

For the Antenna requirement specified in FCC 15.203, the unit uses a 0.5dBi gain PCB trace antenna which is less than the 6 dBi gain limit.

For the Restricted Bands of operation, the EUT is designed to only operate between 902 – 928 MHz.

The EUT was mounted in three orthogonal axes. Worst case results were obtained with the EUT in the Z-axis (facing up). Worst case results are presented. See Appendix B for axis details.

Power line conducted emissions was not applicable since the EUT is a battery operated device. It contains a removable rechargeable Li-Ion battery. All tests were performed with the battery fully charged.

Sample Calculation(s)

Radiated Emission Test

E-Field Level = Received Signal + Antenna Factor + Cable Loss – Pre-Amp Gain

E-Field Level = 50dB μ V + 10dB/m + 2dB – 20dB

E-Field Level = 42dB μ V/m

Margin = Limit – E-Field Level

Margin = 50dB μ V/m – 42dB μ V/m

Margin = 8.0 dB (pass)

Client	AOMS Technologies	
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Applicable Standards, Specifications and Methods

ANSI C63.4:2014	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10:2013	American National Standard For Testing Unlicensed Wireless Devices
CFR 47 FCC 15 Subpart C	Code of Federal Regulations – Radio Frequency Devices, Intentional Radiators
FCC KDB 558074: 2019	FCC KDB 558074 Digital Transmission Systems, measurements and procedures
FCC KDB 447498: 2015	RF exposure procedures and equipment authorization policies for mobile and portable devices
ICES-003 Issue 7 2020	Digital Apparatus - Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard
RSS-GEN Issue 5 2019	General Requirements and Information for the Certification of Radio Apparatus
RSS-210 Issue 10 2019	Licence-Exempt Radio Apparatus: Category I Equipment
ISO 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories

Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Document Revision Status

Revision	Date	Description	Initials
000	October 18, 2021	Initial Release	AE

Client	AOMS Technologies	
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Definitions and Acronyms

The following definitions and acronyms are applicable in this report.
See also ANSI C63.14.

DTS – Digital Transmission System
LISN – Line Impedance Stabilization Network
NCR – No Calibration Required
NSA – Normalized Site Attenuation
N/A – Not Applicable
RF – Radio Frequency

AE – Auxiliary Equipment. A digital accessory that feeds data into or receives data from another device (host) that in turn, controls its operation.

Antenna Port – Port, other than a broadcast receiver tuner port, for connection of an antenna used for intentional transmission and/or reception of radiated RF energy.

BW – Bandwidth. Unless otherwise stated, this refers to the 6 dB bandwidth.

EMC – Electro-Magnetic Compatibility. The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

EMI – Electro-Magnetic Immunity. The ability to maintain a specified performance when the equipment is subjected to disturbance (unwanted) signals of specified levels.

EUT – Equipment Under Test. A device or system being evaluated for compliance that is representative of a product to be marketed.

ITE – Information Technology Equipment. Has a primary function of entry, storage, display, retrieval, transmission, processing, switching, or control of data and/or telecommunication messages and which may be equipped with one or more ports typically for information transfer.

Client	AOMS Technologies	
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Testing Facility

Testing for EMC on the EUT was carried out at TÜV SÜD Canada testing lab near Toronto, Ontario. The testing lab has calibrated 3m semi-anechoic chambers which allow measurements on a EUT that has a maximum width or length of up to 2m and a height of up to 3m. The testing lab also has a calibrated 10m Open Area Test Site (OATS). The chambers are equipped with a turntable that is capable of testing devices up to 5000lb in weight and are equipped with a mast that controls the polarization and height of the antenna. Control of the mast occurs in the control room adjoining the shielded chamber. This facility is capable of testing products that are rated for single phase or 3-phase AC input and DC capability is also available. Radiated emission measurements are performed using a BiLog antenna and a Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN and using the vertical ground plane if applicable.

Calibrations and Accreditations

The 3m semi-anechoic chamber is registered with Federal Communications Commission (FCC, CA6844), Innovation, Science and Economic Development Canada (ISED, 6844A-3) and Voluntary Control Council for Interference (VCCI, R-14023, G-20072, C-14498, and T-20060). This chamber was calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The chamber is lined with ferrite tiles and absorption cones to minimize any undesired reflections. The NSA data is kept on file at TÜV SÜD Canada. For radiated susceptibility testing, a 16 point field calibration has been performed on the chamber. The field uniformity data is kept on file at TÜV SÜD Canada. TÜV SÜD Canada Inc. is accredited to ISO 17025 by A2LA with Testing Certificate #2955.02. The laboratory's current scope of accreditation listing can be found as listed on the A2LA website. All measuring equipment is calibrated on an annual or biennial basis as listed for each respective test.

Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Testing Environmental Conditions and Dates

Following environmental conditions were recorded in the facility during time of testing

Date	Test	Initials	Temperature (°C)	Humidity (%)	Pressure (kPa)
July 21 & 30, 2021	Radiated Emissions	AE	24 – 25	45 – 60	101 – 103

Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Detailed Test Results Section

Client	AOMS Technologies	
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Maximum Output Power

Purpose

The purpose of this test is to ensure that the maximum equivalent isotropically radiated power does not exceed the limits specified.

Limits and Method

The limits are defined in FCC Part 15.249(a) and RSS-210 F.1(a). The method is given in ANSI C63.10 Section 11.9.

Fundamental Frequency	Field Strength of Fundamental	Field Strength of Harmonics
902 – 928MHz	50 mV/m (94 dBuV/m) at 3m	500 uV/m (54 dBuV/m) at 3m

Harmonic emissions falling into restricted frequency bands listed in RSS-Gen 8.10 Table 7 shall meet the general field strength limits specified in RSS-Gen 8.9 Tables 5 & 6, regardless of the limits given above. See also the Transmitter Spurious Radiated Emissions section of this test report.

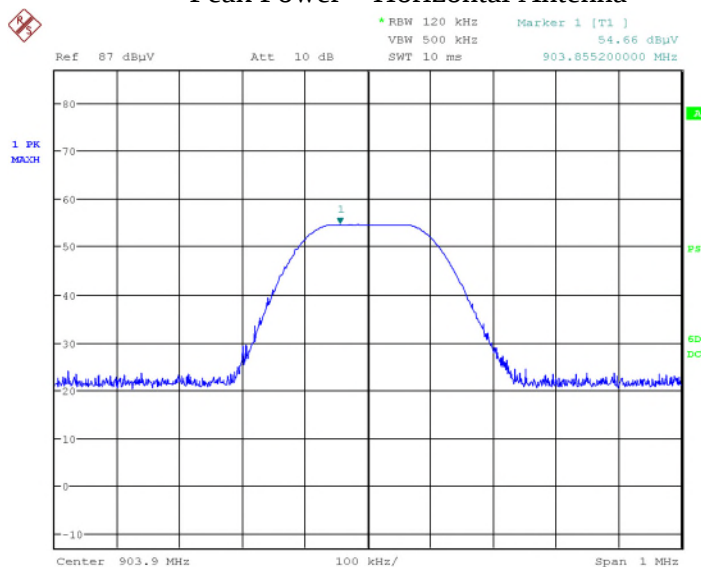
Results

The EUT passed. Maximum field strength of fundamental: 93.2 dB μ V/m

Frequency (MHz)	Antenna Polarization	EUT Axis	Detector	Received Signal (dB μ V)	Correction Factor (dB)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Test Result
903.9	Horz	Z	Peak	54.7	34.4	89.1	94.0	4.9	Pass
903.9	Vert	Z	Peak	58.8	34.4	93.2	94.0	0.8	Pass
916.8	Horz	Z	Peak	54.0	34.6	88.6	94.0	5.4	Pass
916.8	Vert	Z	Peak	56.2	34.6	90.8	94.0	3.2	Pass
927.0	Horz	Z	Peak	53.3	34.7	88.0	94.0	6.0	Pass
927.0	Vert	Z	Peak	55.8	34.7	90.5	94.0	3.5	Pass

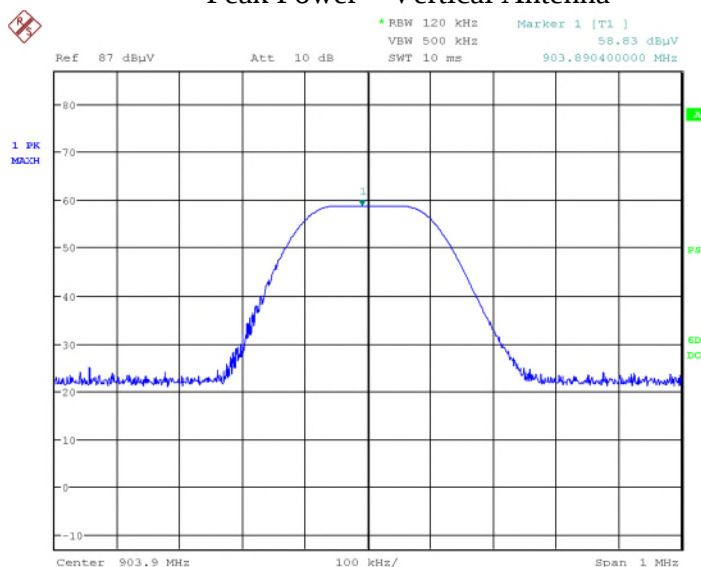
Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Peak Power – Horizontal Antenna



Date: 27..JUL.2021 10:37:33

Peak Power – Vertical Antenna



Date: 27..JUL.2021 10:35:28

Note: The plots above are the received signal. See the table above for final measurements with the correction factors.

Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration Date	Next Calibration Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 15, 2020	Jan. 15, 2022	GEMC 233
BiLog Antenna	3142-C	ETS-Lindgren	Nov. 25, 2020	Nov. 25, 2022	GEMC 8
Attenuator 6 dB	6N5W-06	Inmet	NCR	NCR	GEMC 345
Pre-Amp 9 kHz – 1 GHz	LNA 6901	Teseq	Feb. 12, 2021	Feb. 12, 2023	GEMC 168
RF Cable <1GHz	LMR-400	LexTec	NCR	NCR	GEMC 274
RF Cable <1GHz	Sucoflex 104A	Huber+Suhner	NCR	NCR	GEMC 271

Client	AOMS Technologies	 TUV SUD Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Transmitter Spurious Radiated Emissions

Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT does not exceed the limits listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect broadcast radio services such as television, FM radio, pagers, cellular telephones, emergency services, and so on, from unwanted interference.

Limits and Method

The method is as defined in ANSI C63.10 Section 6.3.

The limits, as defined in FCC Part 15.249(d) and RSS-210 F.1(e) for unintentional radiated emissions, apply for those emissions that fall in the restricted bands defined in FCC Part 15.205(a) and RSS-GEN 8.10 Table 7. These emissions must comply with the radiated emission limits specified in FCC Part 15.209(a) and RSS-GEN 8.9 Tables 5 & 6.

Frequency	Field Strength Limit ($\mu\text{V/m}$)	Field Strength at 3m (dB $\mu\text{V/m}$)
0.009 MHz – 0.490 MHz	2400/F(kHz) ^a (at 300m)	128.5 to 93.8 ^a
0.490 MHz – 1.705 MHz	24000/F(kHz) ^a (at 30m)	73.8 to 63.0 ^a
1.705 MHz – 30 MHz	30 ^a (at 30m)	69.5 ^a
30 MHz – 88 MHz	100 ^a (at 3m)	40.0 ^a
88 MHz – 216 MHz	150 ^a (at 3m)	43.5 ^a
216 MHz – 960 MHz	200 ^a (at 3m)	46.0 ^a
Above 960 MHz	500 ^a (at 3m)	54.0 ^a
Above 1000 MHz	500 ^b (at 3m)	54.0 ^b
Above 1000 MHz	5 mV/m ^c (at 3m)	74.0 ^c

^aLimit is with Quasi Peak detector with bandwidths as defined in CISPR-16-1-1

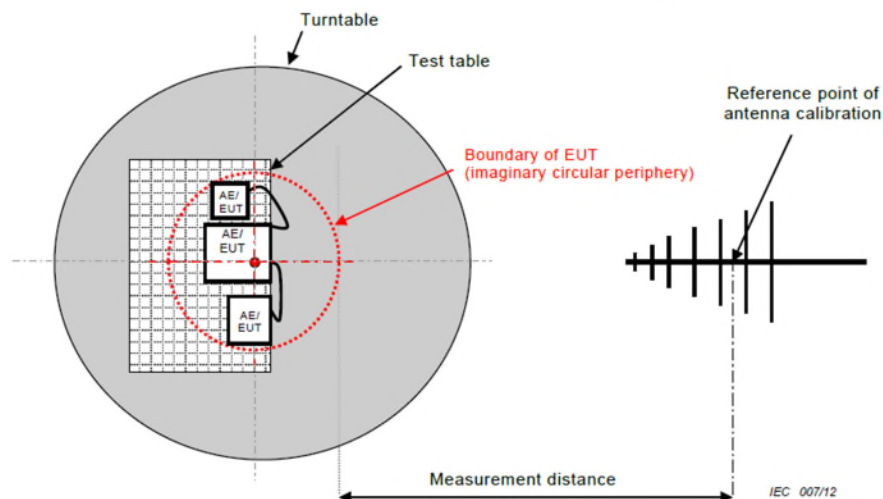
^bLimit is with 1 MHz measurement bandwidth and using an Average detector

^cLimit is with 1 MHz measurement bandwidth and using a Peak detector

Based on ANSI C63.4 Section 4.2, if the Peak detector measurements do not exceed the Quasi-Peak limits, where defined, then the EUT is deemed to have passed the requirements.

Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Typical Radiated Emissions Setup



Measurement Uncertainty

The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is $\pm 5.67\text{dB}$ for 30MHz – 1GHz and $\pm 4.58\text{dB}$ for 1GHz – 18GHz with a 'k=2' coverage factor and a 95% confidence level.

Preliminary Graphs

The graphs shown below are maximized peak measurement graphs measured with a resolution bandwidth greater than or equal to the final required detector over a full 0-360°. This peaking process is done as a worst case measurement and enables the detection of frequencies of concern for final measurement. For final measurements with the appropriate detector, where applicable, please refer to the tables under Final Measurements.

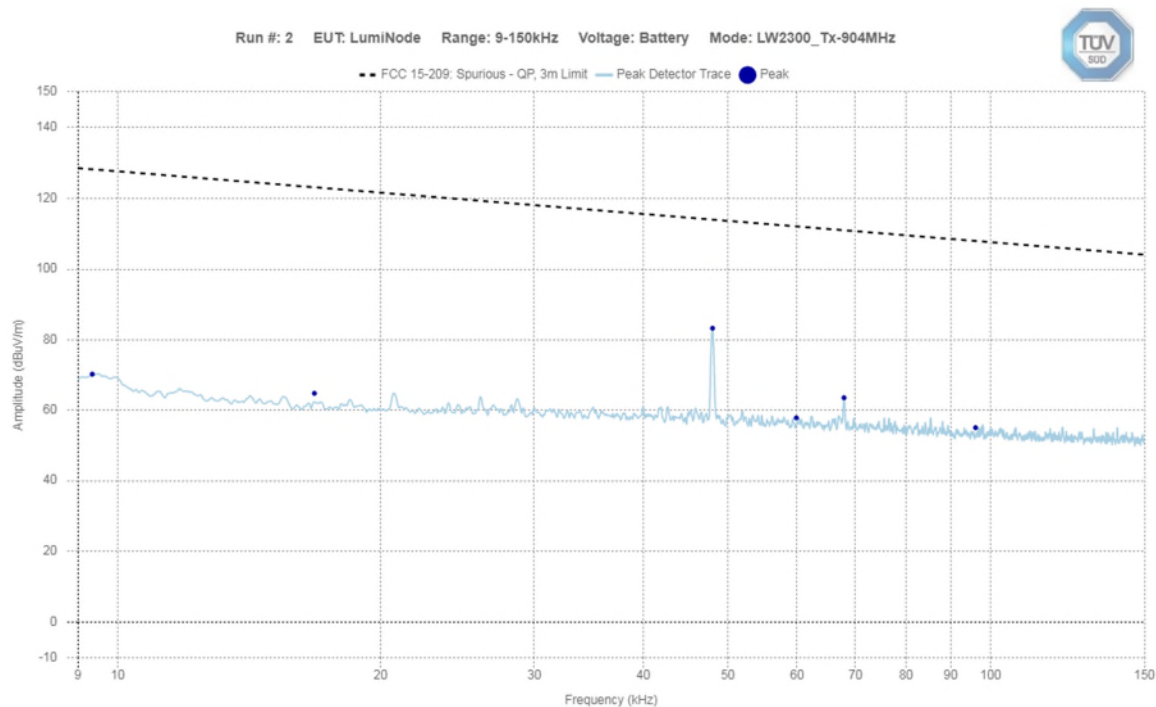
In accordance with FCC Part 15, Subpart A, Section 15.33, the device was scanned to the 10th harmonic (a minimum of 9280 MHz).

Devices scanned may be scanned at alternate test distances and in accordance with FCC Part 15, Subpart A, Section 15.31, an extrapolation factor of 20 dB/decade was used above 30 MHz and 40 dB/decade below 30 MHz. For example for 1 meter measurements, an extrapolation factor 9.5 dB from 20 Log (1m / 3m) is applied.

Low, middle, and high channels, each in three orthogonal axes were checked. However, the worst case graphs are presented from the Z-axis.

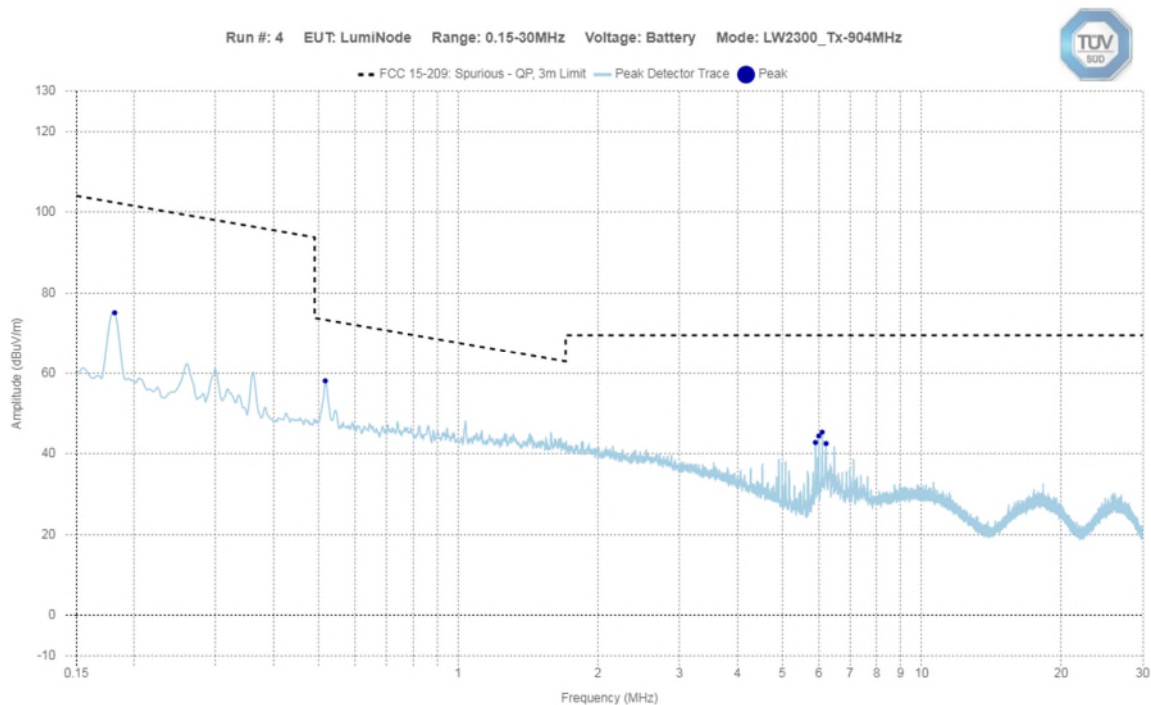
Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Low Channel
9 kHz – 150 kHz
Peak Emission Graph



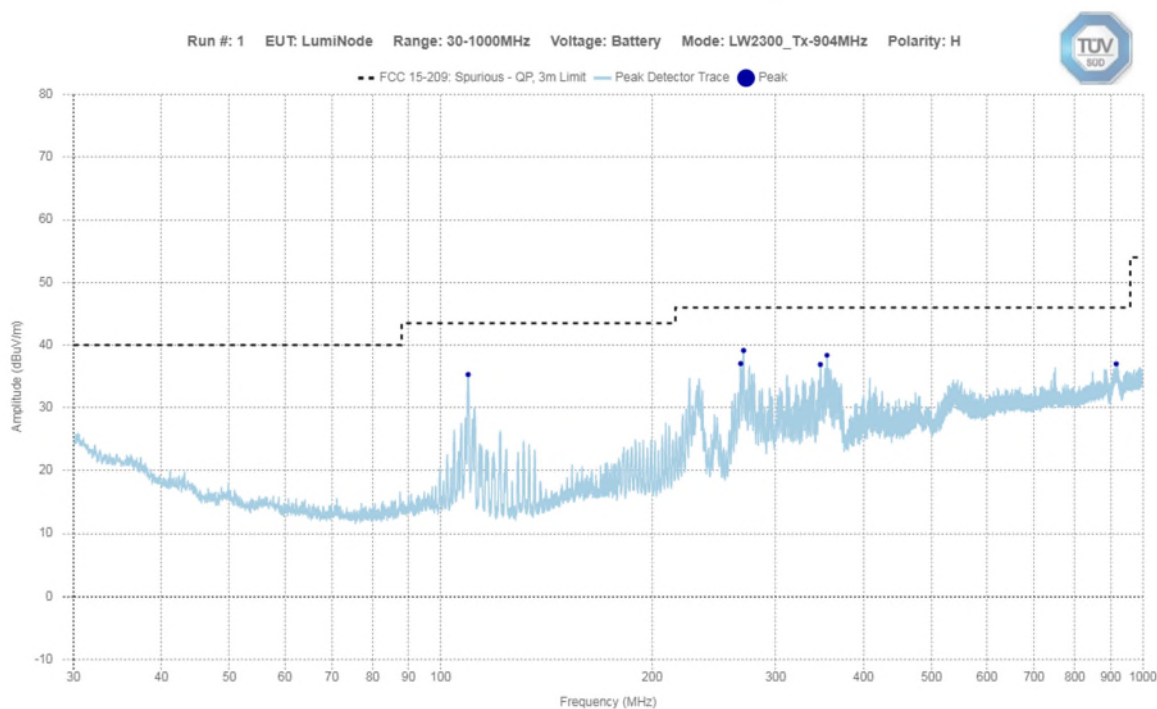
Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Low Channel
150 kHz – 30 MHz
Peak Emission Graph



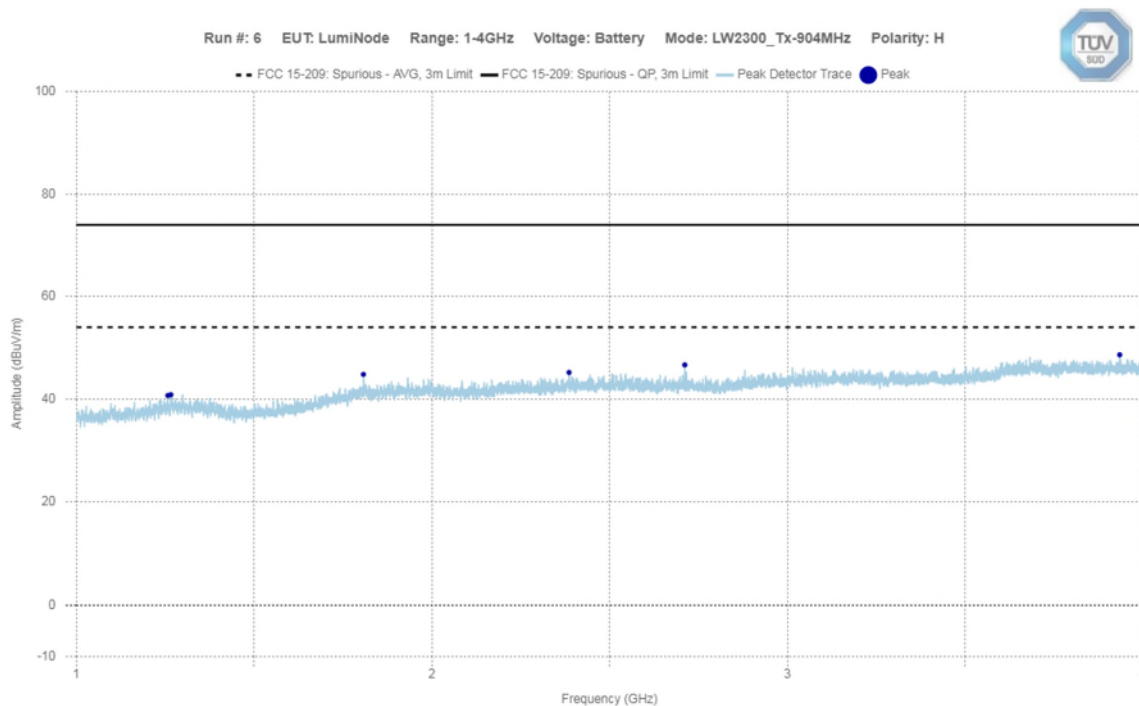
Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Low Channel – 30 MHz – 1 GHz
Horizontal - Peak Emission Graph



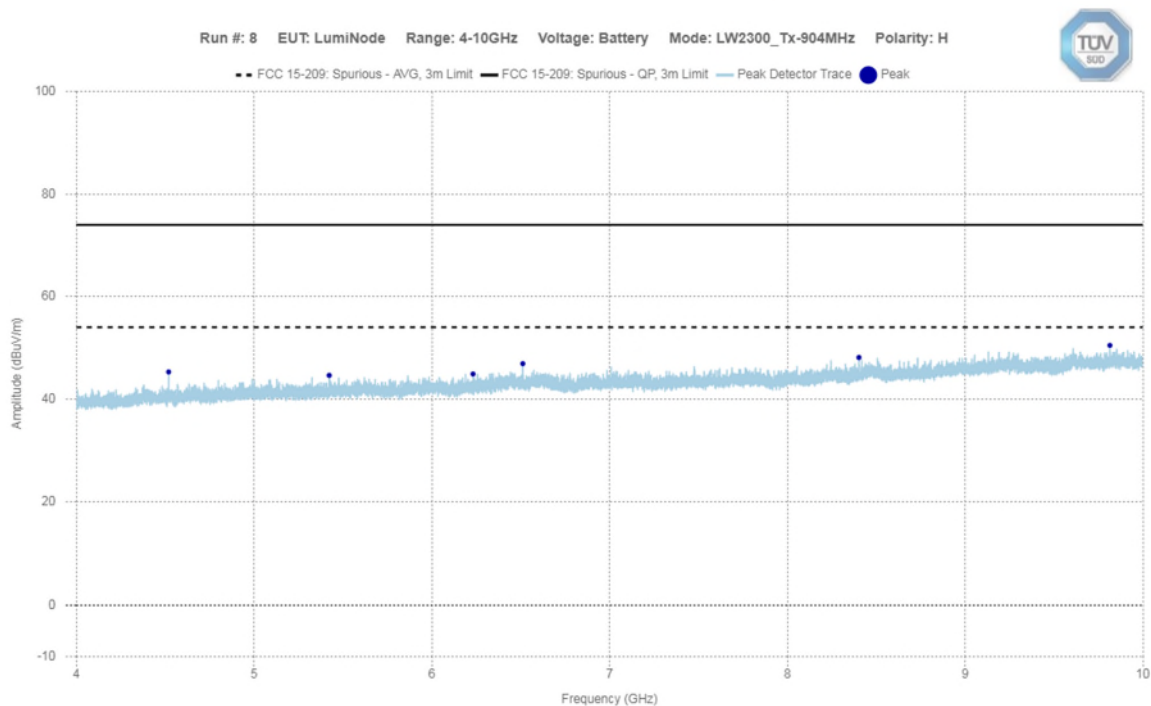
Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Low Channel – 1 GHz – 4 GHz
Horizontal - Peak Emission Graph



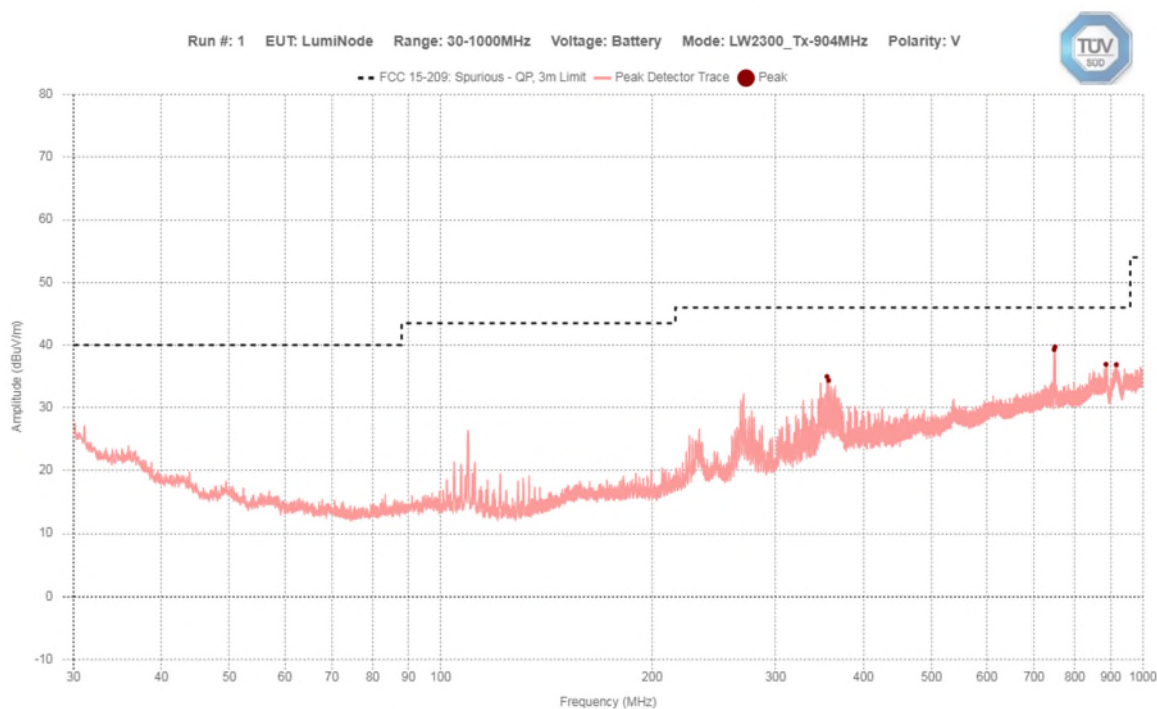
Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Low Channel – 4 GHz – 10 GHz
Horizontal - Peak Emission Graph



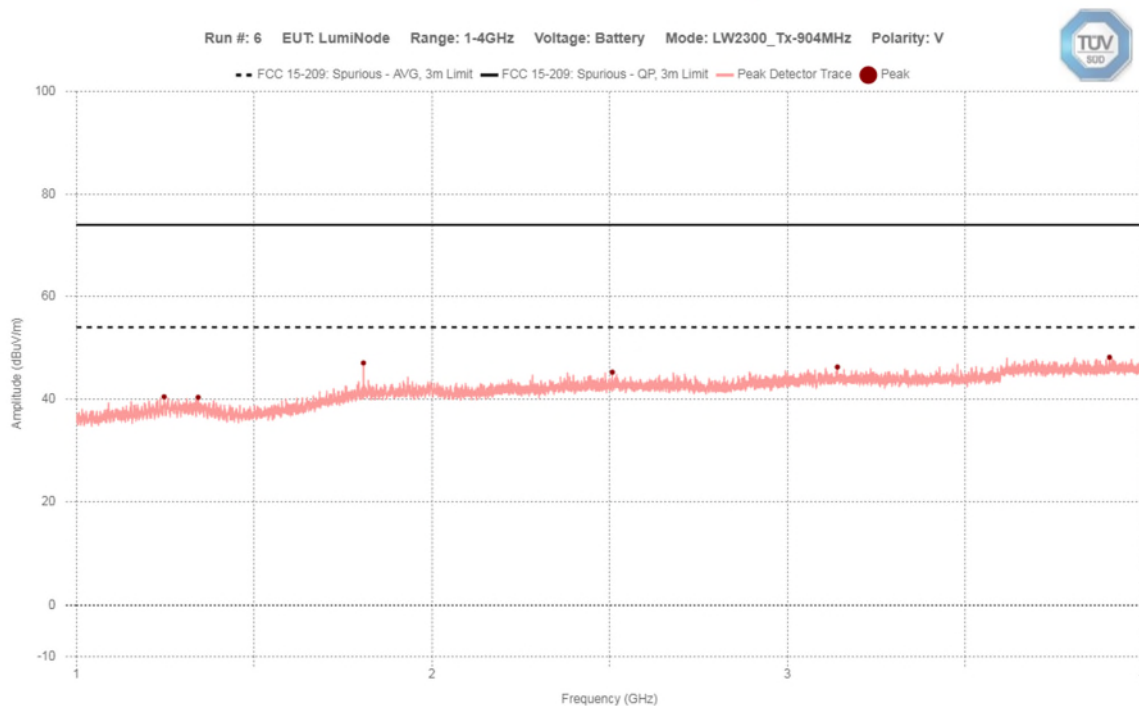
Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Low Channel – 30 MHz – 1 GHz
Vertical - Peak Emission Graph



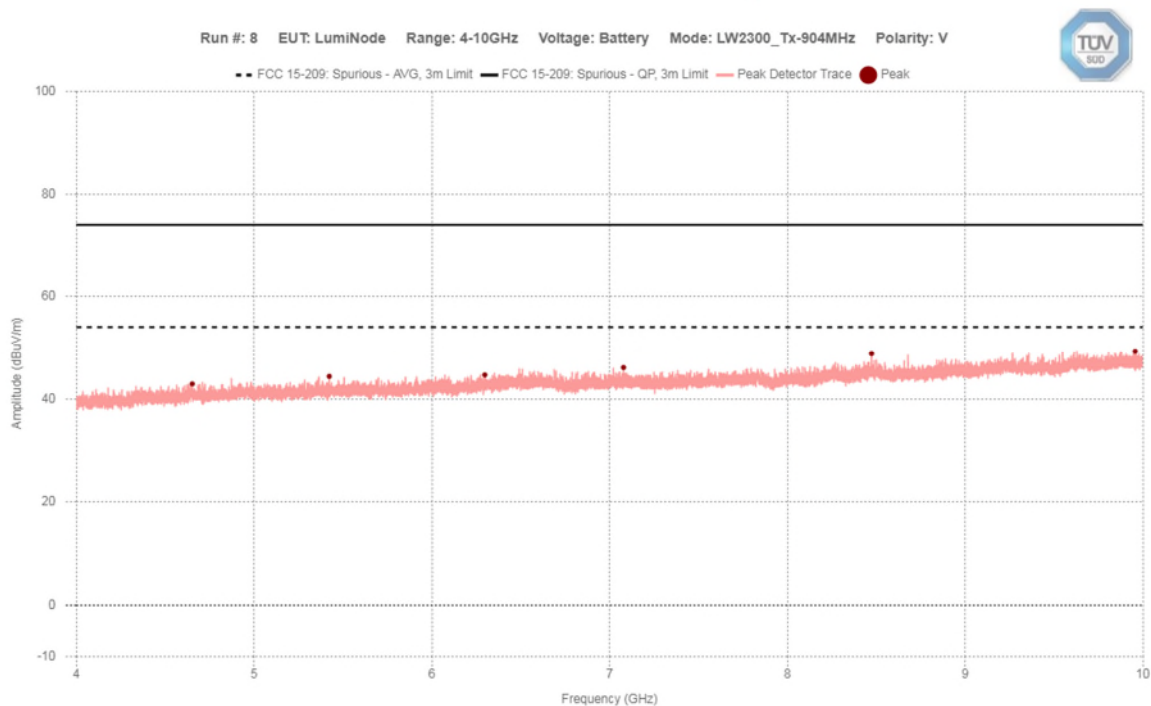
Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Low Channel – 1 GHz – 4 GHz
Vertical - Peak Emission Graph



Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Low Channel – 4 GHz – 10 GHz
Vertical - Peak Emission Graph



Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Final Measurements and Results

Supply		Battery				
Frequency (MHz)	Detector	Correction Factor (dB)	Level (dBμV)	Limit (dBμV/m)	Margin (dBμV/m)	Test Result
Horizontal						
270.06	PEAK	-7.9	39.1	46.0	6.9	Pass
355.02	PEAK	-4.6	38.3	46.0	7.7	Pass
109.44	PEAK	-13.6	35.3	43.5	8.2	Pass
267.51	PEAK	-7.9	37.0	46.0	9.0	Pass
916.59	PEAK	6.5	36.9	46.0	9.1	Pass
347.43	PEAK	-5.1	36.8	46.0	9.2	Pass
1807.8	PEAK	0.5	48.1	74.0	25.9	Pass
1807.8	AVG	0.5	39.8	54.0	14.2	Pass
2711.7	PEAK	3.1	47.0	74.0	27.0	Pass
2711.7	AVG	3.1	38.5	54.0	15.5	Pass
3615.6	PEAK	5.9	48.5	74.0	25.5	Pass
3615.6	AVG	5.9	37.1	54.0	16.9	Pass
4519.5	PEAK	1.5	46.0	74.0	28.0	Pass
4519.5	AVG	1.5	37.0	54.0	17.0	Pass
5423.4	PEAK	3.5	46.8	74.0	27.2	Pass
5423.4	AVG	3.5	38.3	54.0	15.7	Pass
6327.3	PEAK	4.8	45.7	74.0	28.3	Pass
6327.3	AVG	4.8	32.3	54.0	21.7	Pass

Spurious Emissions and Harmonics

Client	AOMS Technologies	 TUV SUD Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

(Continued)

Frequency (MHz)	Detector	Correction Factor (dB)	Level (dBμV)	Limit (dBμV/m)	Margin (dBμV/m)	Test Result
Vertical						
749.97	QP	3.8	34.7	46.0	11.3	Pass
747.72	PEAK	3.8	39.3	46.0	6.7	Pass
886.35	PEAK	5.9	36.9	46.0	9.1	Pass
916.95	PEAK	6.5	36.8	46.0	9.2	Pass
355.05	PEAK	-4.6	34.9	46.0	11.1	Pass
357.06	PEAK	-4.6	34.3	46.0	11.7	Pass
1807.8	PEAK	0.5	47.7	74.0	26.3	Pass
1807.8	AVG	0.5	40.7	54.0	13.3	Pass
2711.7	PEAK	3.1	47.7	74.0	26.3	Pass
2711.7	AVG	3.1	37.6	54.0	16.4	Pass
3615.6	PEAK	5.9	48.4	74.0	25.6	Pass
3615.6	AVG	5.9	36.0	54.0	18.0	Pass
4519.5	PEAK	1.5	45.2	74.0	28.8	Pass
4519.5	AVG	1.5	37.7	54.0	16.3	Pass
5423.4	PEAK	3.5	45.8	74.0	28.2	Pass
5423.4	AVG	3.5	35.8	54.0	18.2	Pass
6327.3	PEAK	4.8	45.9	74.0	28.1	Pass
6327.3	AVG	4.8	32.8	54.0	21.2	Pass

Spurious Emissions and Harmonics

Note:

QP = Quasi-Peak measurement

PEAK = Peak measurement

AVG = Average measurement

Client	AOMS Technologies	 TUV SUD Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration Date	Next Calibration Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 15, 2020	Jan. 15, 2022	GEMC 233
Loop Antenna	EM 6871	Electro-Metrics	Feb 26, 2021	Feb 26, 2023	GEMC 70
Loop Antenna	EM 6872	Electro-Metrics	Feb 26, 2021	Feb 26, 2023	GEMC 71
BiLog Antenna	3142-C	ETS-Lindgren	Nov. 25, 2020	Nov. 25, 2022	GEMC 8
Horn Antenna 1 – 4 GHz	3117	ETS-Lindgren	Feb. 17, 2020	Feb. 17, 2022	GEMC 340
Horn Antenna 4 – 10 GHz	WBH218HN	Q-par	Apr. 1, 2020	Apr. 1, 2022	GEMC 6375
Attenuator 6 dB	6N5W-06	Inmet	NCR	NCR	GEMC 345
Pre-Amp 9 kHz – 1 GHz	LNA 6901	Teseq	Feb. 12, 2021	Feb. 12, 2023	GEMC 168
Pre-Amp 1 – 13 GHz	HP 8449B	HP	Dec. 20, 2019	Dec. 20, 2021	GEMC 189
0.98GHz HPF	8IH40-980	K & L Microwave	NCR	NCR	GEMC 4256
902MHz - 928MHz Notch Filter	BRC50722	Micro-Tronics	NCR	NCR	GEMC 186
4GHz HPF	11SH10-4000	K & L Microwave	NCR	NCR	GEMC 119
RF Cable <1GHz	LMR-400	LexTec	NCR	NCR	GEMC 274
RF Cable <1GHz	Sucoflex 104A	Huber+Suhner	NCR	NCR	GEMC 271
RF Cable >1GHz	EMC2	MegaPhase	NCR	NCR	GEMC 369
Emissions Software	V2.0.6	TUV SUD Canada, Inc.	NCR	NCR	GEMC 361

Client	AOMS Technologies	
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Emission Bandwidth

Purpose

The purpose of this test is to ensure that the upper and lower frequency limits of the transmitter 99% emission power bandwidth remain within the operating frequency limits at all times.

Limits and Method

The method is given in ANSI C63.10 Section 6.9.3 and RSS-GEN 6.7.

The 99% bandwidth of systems using digital modulation techniques operating in the 902 – 928 MHz band shall remain within the operating frequency band at all times. This should be measured with a RBW in the range of 1% to 5% of the occupied bandwidth and a VBW of approximately three times RBW.

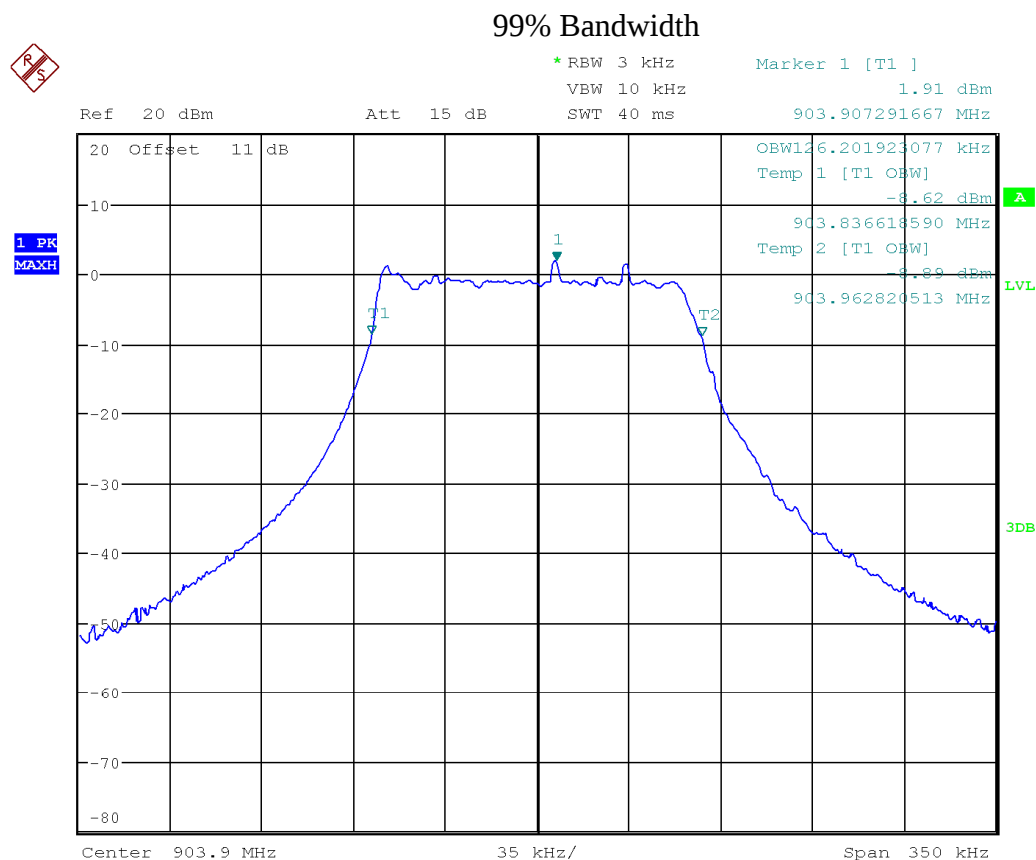
Results

The EUT passed. The 99% bandwidth was measured using the 99% bandwidth function of the spectrum analyzer and using the modified EUT with direct connection to the antenna port for conducted measurement.

Frequency (MHz)	99% Bandwidth			Result
	F _{LOW} (MHz)	F _{HIGH} (MHz)	Occupied Bandwidth (kHz)	
903.9	903.8366	903.9628	126.20	Pass
916.8	916.7366	916.8622	125.64	Pass
927.0	926.9366	927.0622	125.64	Pass

Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Graphs



Date: 30.JUL.2021 09:50:52

Note: See 'Appendix B – EUT & Test Setup Photos' for photos showing the test set-up.

Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration Date	Next Calibration Date	Asset #
Signal Analyzer	FSQ 26	Rohde & Schwarz	Oct. 25, 2019	Oct. 25, 2021	GEMC 234
Attenuator 10 dB	8493B	Agilent	NCR	NCR	GEMC 133

Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Appendix A – EUT Summary

Client	AOMS Technologies	
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

For further details for filing purposes, refer to filing package.

General EUT Description

Client	
Organization / Address	AOMS Technologies 155 Gordon Baker Road Suite 301 Toronto, Ontario, M2H 3N5 Canada
Contact	Terry Weng
Phone	(647) 812-2747 ext 19
Email	terry@aoms-tech.com
EUT Details	
EUT Name	LumiNode
FCC ID	2A2RL-LW2300
IC	27642-LW2300
Equipment Category	ITE
Basic EUT Functionality	The LumiNode sends concrete data collected from the sensor cable to the network edge device or cellular tower wirelessly
Input Voltage	3.7Vdc to 5.2Vdc
Rated Input Current	0.2A
Connectors available on EUT	1 multi-pin connector
Peripherals Required for Test	Laptop with test software to set transmitter parameters
Intentional Radiator Frequency	903.9 – 927.0 MHz for LoRaWAN applications
EUT Configuration	Wireless configured to transmit continuously with the following settings: - Power Level: 3 (+3dBm) - Data Rate: 3 (SF7 / 125kHz) - Mode: 1 (Max duty)

Note the EUT is considered to have been received the date of the commencement of the first test, unless otherwise stated. For a close-up picture of the EUT, see ‘Appendix B – EUT and Test Setup Photos’.

Client	AOMS Technologies	 Canada
Product	LumiNode LW2300	
Standard(s)	RSS 210 Issue 10:2019 FCC Part 15 Subpart 15.249	

Appendix B – EUT and Test Setup Photos

Refer to the files separate from this test report