

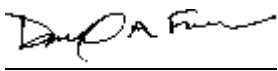


Engineering Solutions & Electromagnetic Compatibility Services

**FCC & ISED Canada
Certification Application Report**

Test Lab: Rhein Tech Laboratories, Inc. Tel: 703-689-0368 360 Herndon Parkway www.rheintech.com Suite 1400 Herndon, VA 20170		Applicant: Geolux d.o.o. Tel: +385 1 6701 241 Ljudevita Gaja 62 Samobor, 10430 Croatia	
FCC ID IC	2AN9X-RSS2300WL 26475-RSS2300WL	Test Report Date	August 12, 2024
Platform	N/A	RTL Work Order #	2023076FDS
Model / HVIN	RSS-2-300WL	RTL Quote #	QRTL23-076B
American National Standard Institute	ANSI C63.10-2020: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
FCC Classification	FDS - Field Disturbance Sensor		
FCC Rule Part(s)/ Guidance	FCC Rules Part 15.245: Operation within the bands 902–928 MHz, 2435–2465 MHz, 5785–5815 MHz, 10500–10550 MHz, and 24075–24175 MHz (10-01-21)		
ISED Canada	RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus RSS-210 Issue 10 – Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands) Category I Equipment		
Digital Interface Information	Digital Interface was found to be compliant		
Frequency Range (MHz)	Output Power* (W)	Frequency Tolerance	Emission Designator
24125	N/A	N/A	N/A

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards. Furthermore, there was no deviation from, additions to, or exclusions from, the applicable parts of FCC Part 2, FCC Part 15, ISED RSS-Gen and ANSI C63.10.

Signature: 

Date: August 12, 2024

Typed/Printed Name: Desmond A. Fraser

Position: President

*This report may not be reproduced, except in full, without the written approval of Rhein Tech Laboratories, Inc. and Geolux d.o.o. The test results relate only to the item(s) tested.
Replaces Report R1.1.*

These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by ANAB. Refer to certificate and scope of accreditation AT-1445

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1 General Information

1.1 Scope

This is an original FCC and ISED Canada certification application report.

Applicable Standards:

- FCC Part 15.245: Operation within the bands 902–928 MHz, 2435–2465 MHz, 5785–5815 MHz, 10500–10550 MHz, and 24075–24175 MHz
- RSS-210 Issue 10 – Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands) Category I Equipment

1.2 Description of EUT

Equipment Under Test	Flow Meter
Model	RSS-2-300WL
Power Supply	External 12 VDC
Modulation Type	CW
Frequency Range	24158.3 MHz
Antenna Connector Type	N/A
Antenna Type	Array Antenna

1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170.

CAB ID: US0079

1.4 Measurement Uncertainty

The measurement uncertainty complies with CISPR 16-4-2 limits and is not used to adjust measurements for compliance determination. Expanded uncertainty (U) for each scope, calculated per ANSI/NCSL Z540-2-1997 (R2002) with a type B evaluation, is provided in this RTL report. While this demonstrates RTL's commitment to transparency, compliance decisions are based solely on comparing measured values directly to the relevant standards' limits.

1.5 Related Submittal(s)/Grant(s)

This is an original application for certification for the Geolux RSS-2-300WL Non-Contact Flow Meter, FCC ID: 2AN9X-RSS2300WL; IC: 26475-RSS2300WL.

1.6 Modifications

No modifications were made to the equipment during testing in order to achieve compliance with these standards.

2 Test Information

2.1 Description of Test Modes

In accordance with FCC 15.31(m), one frequency was tested.

2.2 Exercising the EUT

The EUT was supplied with test firmware Geolux Water Discharge Sensor - RSS-2-300WL 6.9.0. RTL used the PuTTY terminal emulator to send commands to switch frequencies to the firmware. The EUT was tested in all three orthogonal planes in order to determine worst-case emissions.

2.3 Test Result Summary

Table 2-1: Test Result Summary

Test	FCC Standard	ISED Standard	Pass/Fail or N/A
AC Power Conducted Emissions	FCC 15.207	RSS-Gen	Pass
Radiated Emissions	FCC 15.209	RSS-Gen	Pass
Field Strength of Fundamental and Harmonics	FCC 15.245(b)	RSS-210 F1	Pass
20 dB Bandwidth	FCC 15.215(c)	RSS-Gen	Pass

2.4 Test System Details

The test sample was received on March 27, 2024. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this testing, as applicable.

Table 2-2: Equipment Under Test

Part	Manufacturer	Model (HVIN)	Serial Number	FCC ID	Cable Description	RTL Bar Code
Flow Meter	Geolux d.o.o.	RSS-2-300WL	RSS-0012-0279	2AN9X-RSS2300WL	9.3 m shielded	24414
Flow Meter	Geolux d.o.o.	RSS-2-300WL	RSS-0012-0280	2AN9X-RSS2300WL	9.3 m shielded	24413

Table 2-3: Ancillary Equipment

Part	Manufacturer	Model (HVIN)	Serial Number	FCC ID	Cable Description	RTL Bar Code
2679	GW Instek	PSS-3203	Power Supply	B200344	N/A	2679

2.5 Configuration of Tested System

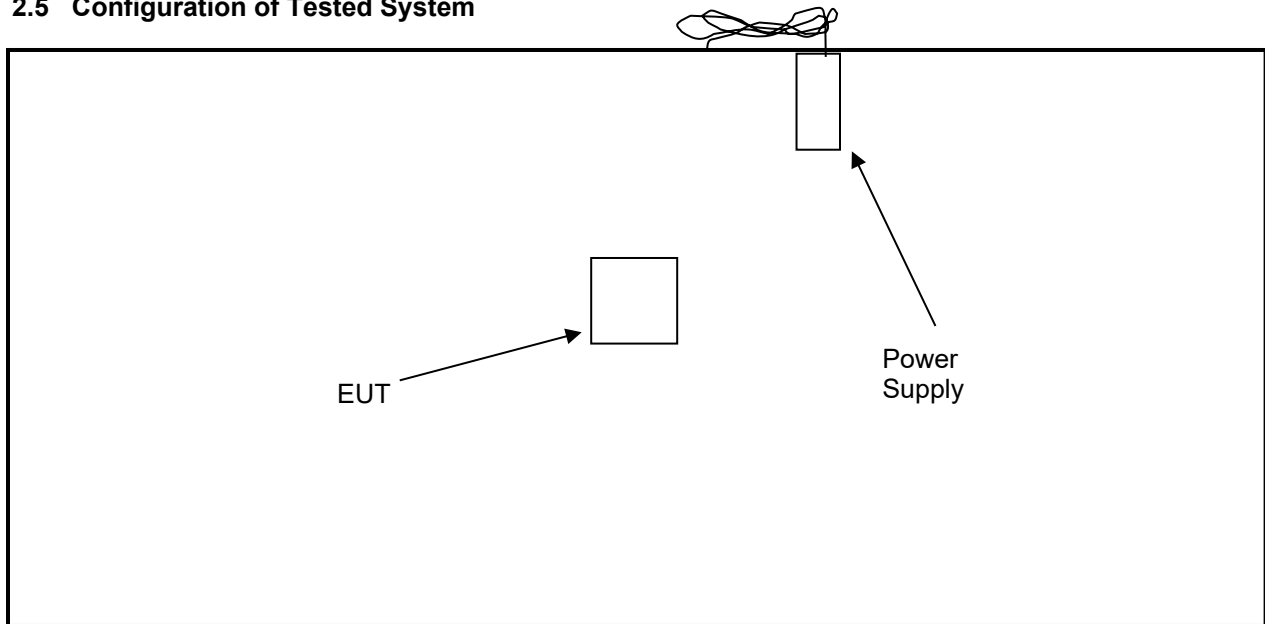


Figure 2-1: Configuration of System Under Test

3 Radiated Emissions – FCC 15.209, 15.245(b); RSS-Gen, RSS-210

3.1 Limits of Radiated Emissions Measurement

15.209 Limits		
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009-0.490	2400/f (kHz)	300
0.490-1.705	2400/f (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
10,500 – 10,550 (fundamental)	2,500,000	3
harmonics	25,000	3

As shown in 15.35(b), for frequencies above 1,000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any circumstances of modulation.

15.245 Limits		
Fundamental Frequency (MHz)	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (millivolts/meter)
902-928	500	1.6
2435-2465	500	1.6
5786-5815	500	1.6
10500-10550	2500	25.0
24075-24175	2500	25.0

3.2 Radiated Emissions Measurement Test Procedure

Before final measurements of radiated emissions were made on the open-field three/ten meter range, the EUT was scanned indoors at one and three meter distances. This was done in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three/ten-meter open-field test site. The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The spectrum was examined from 9 kHz to 100 GHz per FCC 15.33(2).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations. For frequencies between 30 and 1000 MHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1000 MHz, emissions are measured using the average detector function with a minimum resolution bandwidth of 1 MHz. No video filter less than 10 times the resolution bandwidth was used. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Table 3-1: Radiated Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	01/30/2025
900905	Rhein Tech Laboratories	PR-1040	OATS 1 Preamplifier 40dB (30 MHz – 2 GHz)	1006	05/10/2025
901727	Insulated Wire Inc.	KPS-1503-360-KPR	SMK RF Cables 36"	NA	11/30/2025
901774	RF Depot	TMS-SFT-205	36" SMA Cable	N/A	07/06/2024
901775	Rosenberger	LU7-022-1000	1m SMA Cable	N/A	07/06/2024
901639	Wiltron	35WR19F	Waveguide (40 – 50 GHz)	N/A	N/A
901586	Rohde & Schwarz	FS-Z75	Harmonic Mixer (50 – 75 GHz)	100098	01/23/2025
901640	Rohde & Schwarz	FS-Z110	Mixer (75 – 110 GHz)	100010	05/03/2025
901256	ATM	19-443-6R	Horn antenna (40 - 60 GHz, WR-19)	8041704-01	05/03/2025
901303	EMCO	3160-10	Horn Antenna (26.5 - 40.0 GHz) WR-28	960452-007	08/05/2024
901161	Advanced Technical Materials	28-25K-6	Waveguide (26.5 – 40 GHz)	B082304	Not required
900711	ATM	10-443-6R	Horn Antenna (75 - 110 GHz)	8051905-1	06/23/2025
900712	ATM	15-443-6R	Horn Antenna (50 - 75 GHz)	8051805-1	06/23/2025
901669	ETS-Lindgren	3142E	Biconilog Antenna (30 MHz – 6000 MHz)	00166065	07/11/2025
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	08/05/2024
900321	EMCO	3161-03	Horn Antenna (4.0 - 8.2 GHz)	9508-1020	08/05/2024
900323	EMCO	3160-07	Horn Antenna (8.2 - 12.4 GHz)	9605-1054	08/05/2024
900356	EMCO	3160-08	Horn Antenna (12.4 - 18 GHz)	9607-1044	08/05/2024
901218	EMCO	3160-09	Horn Antenna (18 - 26.5 GHz)	960281-003	08/05/2024
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 kHz – 6.5 GHz)	3325A00159	09/16/2024
900914	Hewlett Packard	85460A	RF Filter Section (100 kHz - 6.5 GHz)	3330A00107	09/16/2024

3.3 Radiated Emissions Test Results

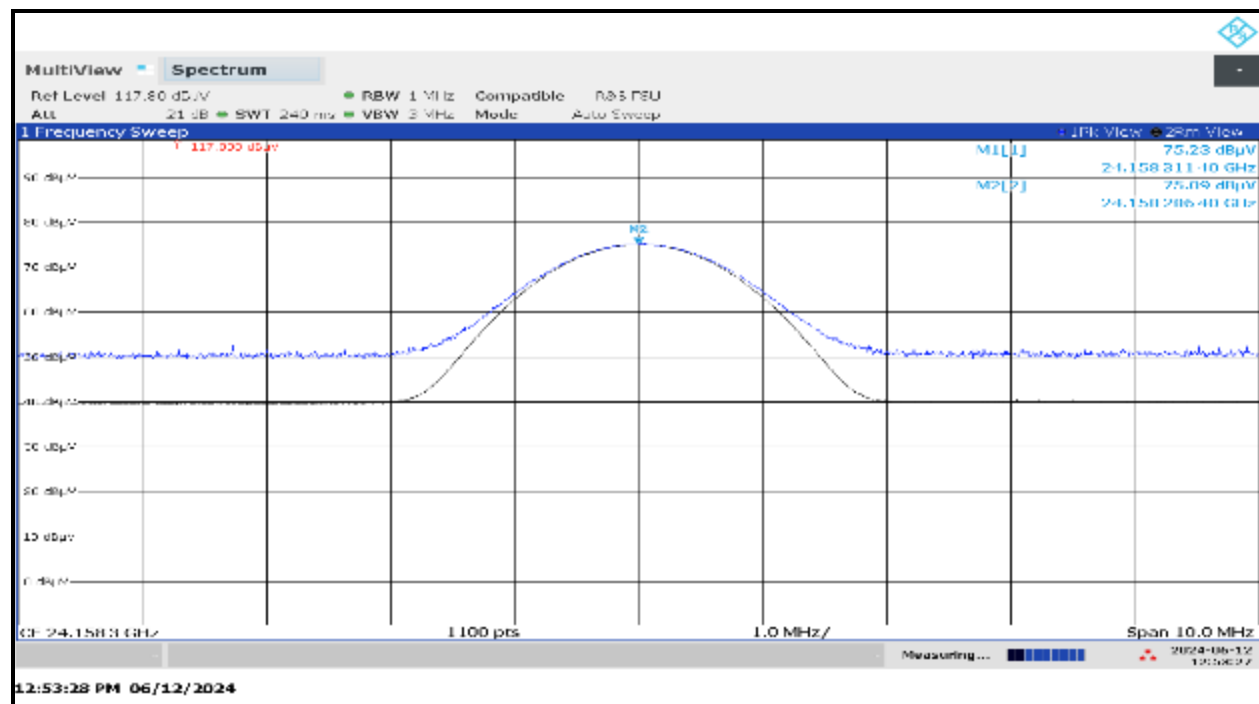
Table 3-2: Environmental Conditions

Temperature (°C)	Humidity (%)	Air Pressure (kPa)
23.2	29	101.7

Table 3-3: Radiated Emissions Test Data (Fundamentals)

Emission Frequency (MHz)	Peak Analyzer Detector (dBuV/m)	Average Analyzer Detector (dBuV/m)	Site Correction Factor (dB/m)	Corrected Analyzer Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Limit (dBuV/m)	Average Margin (dB)
24158.3	75.2	-	40.2	115.4	148.0	-32.6	-	-
24158.3	-	75.1	40.2	115.3	-	-	128.0	-12.7

Plot 3-1: Fundamental - 24.1583 GHz



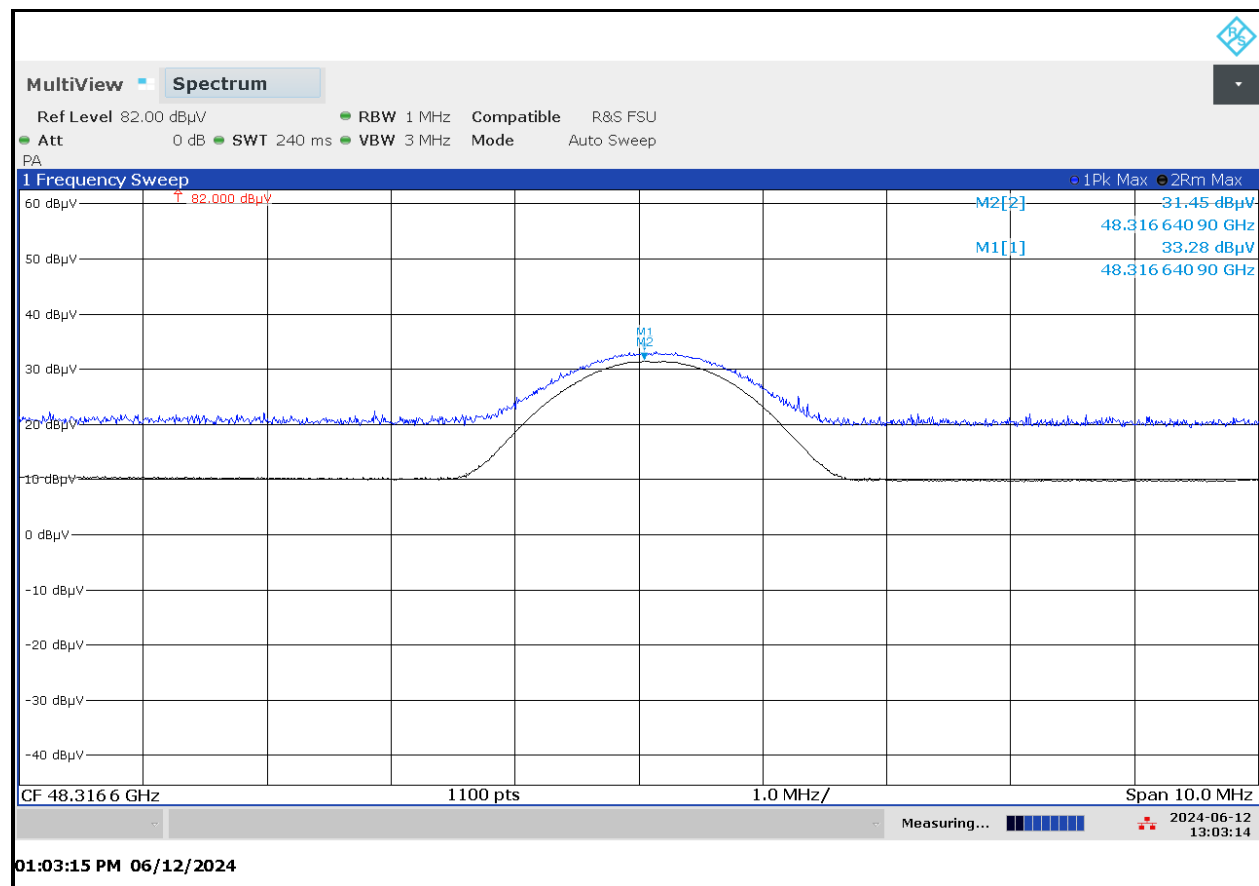
3.4 Radiated Emissions Harmonics/Spurious Test Data

Table 3-4: Radiated Emissions Harmonics/Spurious

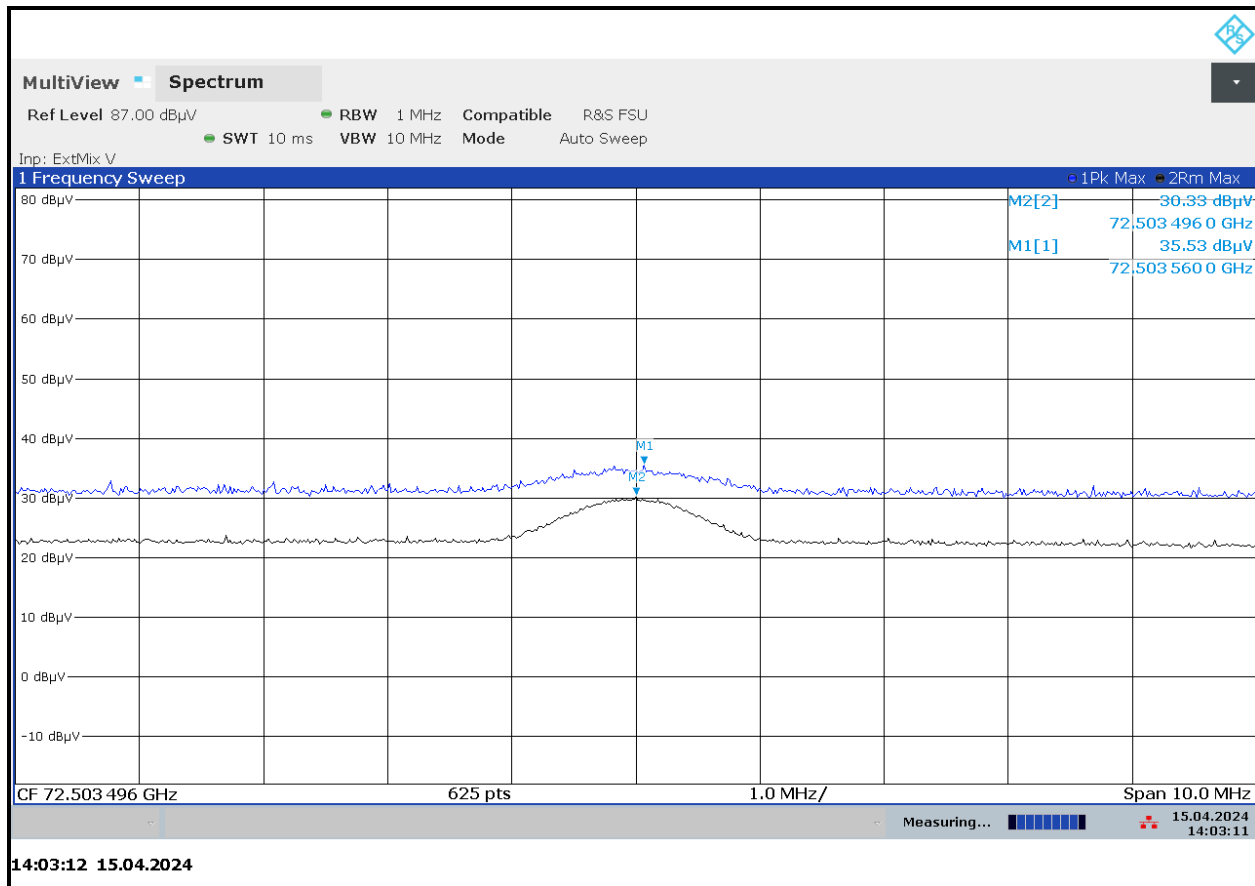
Emission Frequency (MHz)	Peak Analyzer Detector (dBuV/m)	Average Analyzer Detector (dBuV/m)	Site Correction Factor (dB/m)	Corrected Analyzer Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Limit (dBuV/m)	Average Margin (dB)
48316.6*	33.3	-	42.1	65.9	108.0	-42.1	-	-
48316.6*	-	31.5	42.1	64.1	-	-	88.0	-23.9
72503.5*	35.5	-	44.1	70.1	108.0	-37.9	-	-
72503.5*	-	30.3	44.1	64.9	-	-	88.0	-23.1

* Testing performed at 1m, interpolated to 3m. $(20\log(1/3)) = -9.5 \text{ dB}$

Plot 3-2: Harmonic - 48.3166 GHz



Plot 3-3: Harmonic - 72.5035 GHz



3.5 Radiated Emissions Digital Test Data

Table 3-5: Digital Radiated Emissions Test Data

Emission Frequency (MHz)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
33.130	37.0	-15.4	21.6	40.0	-18.4
37.150	42.3	-17.6	24.7	40.0	-15.3
66.444	44.2	-22.5	21.7	40.0	-18.3
68.687	45.2	-22.4	22.8	40.0	-17.2
70.744	44.6	-22.3	22.3	40.0	-17.7
72.333	45.1	-22.2	22.9	40.0	-17.1
74.576	44.0	-22.2	21.8	40.0	-18.2
126.227	37.3	-20.6	16.7	43.5	-26.8
128.318	42.7	-20.7	22.0	43.5	-21.5
130.409	46.3	-20.5	25.8	43.5	-17.7

Rhein Tech Laboratories, Inc.
360 Herndon Parkway
Suite 1400
Herndon, VA 20170
<http://www.rheintech.com>

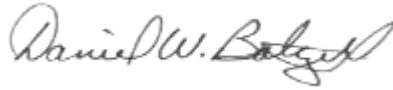
Client: Geolux d.o.o.
Model/HVIN: RSS-2-300WL
Standards: FCC 15.245/RSS-210
IDs: 2AN9X-RSS2300WL/26475-RSS2300WL
Report #: 2023076FDS

Measurement uncertainty 30 MHz – 6 GHz = ± 4.8 dB and from 6 GHz and above = ± 5.2 dB: This measurement uncertainty is expanded for a 95% confidence level received with a coverage factor $k=2$ for the entire frequency range.

Result: Pass

Test Personnel:

Daniel W. Baltzell
Test Engineer



Signature

April 15-June 12, 2024
Dates of Test

4 AC Conducted Emissions - FCC 15.207; RSS-Gen

4.1 Test Methodology for Conducted Line Emissions Measurements

The power line conducted emission measurements were performed in a Series 81 type shielded enclosure manufactured by Rayproof. The EUT was assembled on a wooden table 80 centimeters high. Power was fed to the EUT through a 50-ohm / 50 microhenry Line Impedance Stabilization Network (EUT LISN). The EUT LISN was fed power through an A.C. filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT test peripherals. This peripheral LISN was also fed A.C. power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers the EUT host peripherals.

The spectrum analyzer was connected to the A.C. line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Solar high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 100 kHz. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. No video filter less than 10 times the resolution bandwidth was used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by increasing the sweep time in order to obtain a calibrated measurement. The emission spectrum was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in this report.

4.2 Conducted Line Emission Test Procedure

The conducted test was performed with the EUT exercise program loaded, and the emissions were scanned between 150 kHz to 30 MHz on the NEUTRAL SIDE and PHASE SIDE.

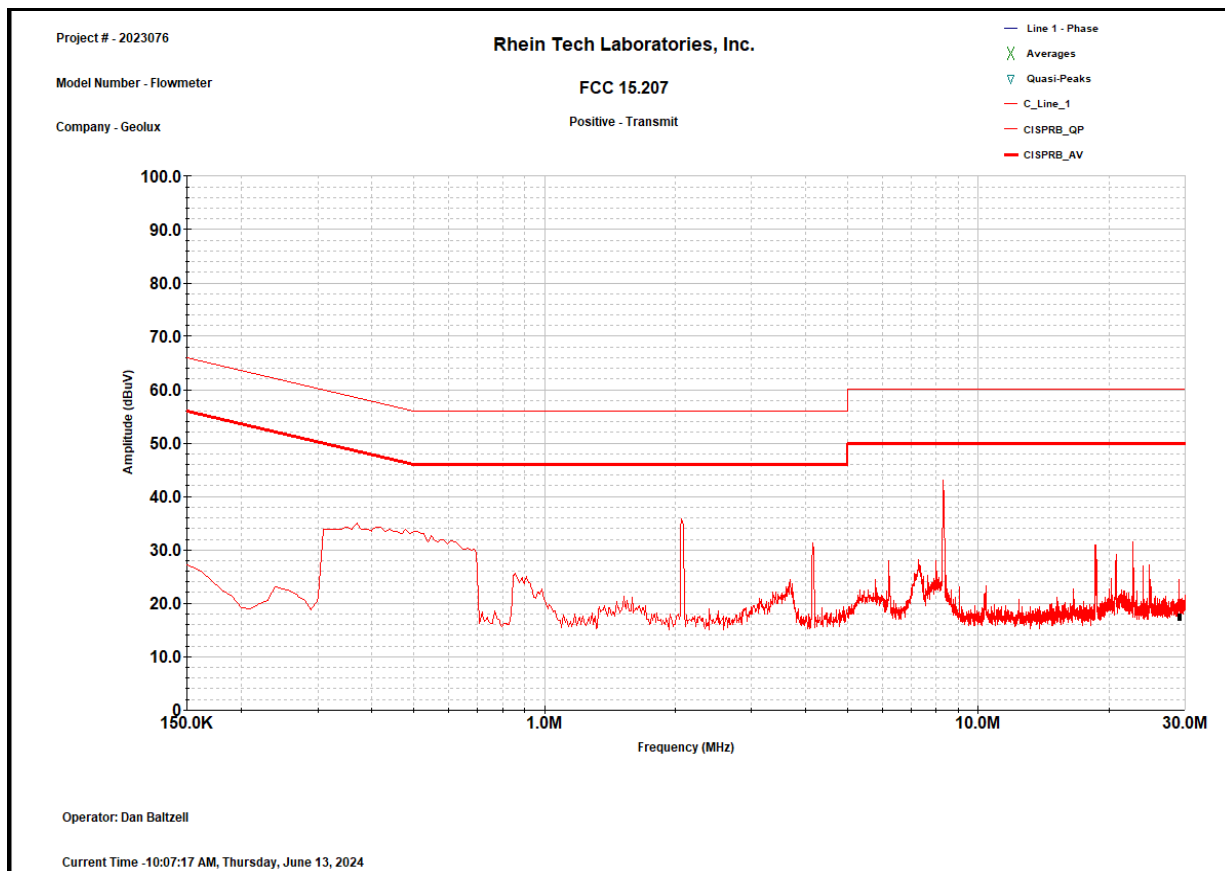
Table 4-1: Conducted Line Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part	Serial Number	Calibration Due Date
900339	Hewlett Packard	85650A	Quasi-Peak Adapter	2521A00743	09/16/2024
900930	Hewlett Packard	85662A 067	Spectrum Analyzer Display	3144A20839	02/26/2025
900931	Hewlett Packard	8566B	Spectrum Analyzer RF Section (100 Hz – 22 GHz)	2138A07771	02/26/2025
901083	AFJ International	LS16/110VAC	16A LISN	16010020080	02/16/2025
900728	Solar	Type 8130-7.0	Filter	N/A	05/08/2026
N/A	ETS-Lindgren	Tile!	Test Software	7.1.3.20	N/A

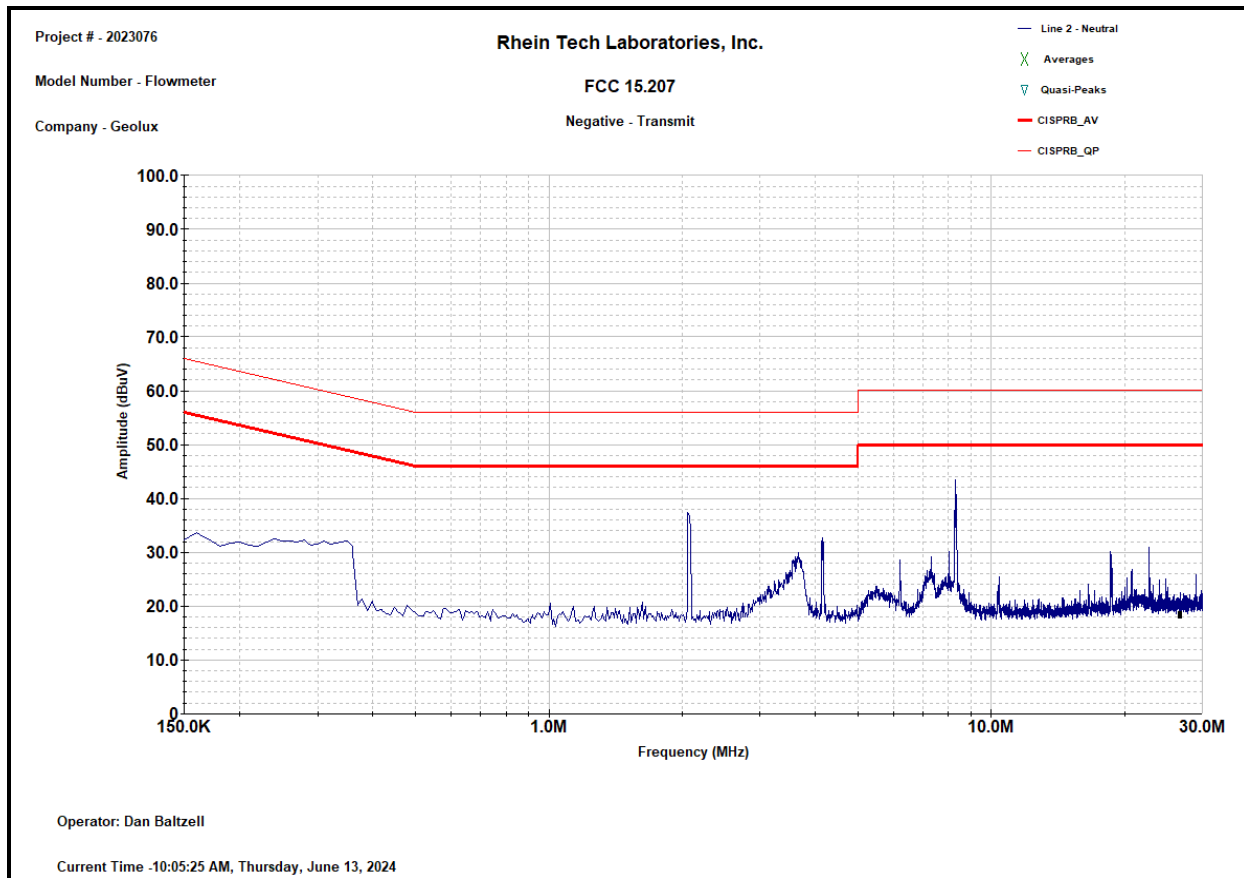
Table 4-2: Environmental Conditions

Temperature (°C)	Humidity (%)	Air Pressure (kPa)
22.9	35	101.6

Plot 4-1: Conducted Emissions Transmit - Positive



Plot 4-2: Conducted Emissions Transmit – Negative



Measurement uncertainties shown for these tests are expanded uncertainties expressed at 95% confidence level using a coverage factor $k = 2$. Conducted Emissions: ± 3.6 dB

Result: PASS

Test Personnel:

Daniel W. Baltzell
Test Engineer

Signature

June 13, 2024
Date of Test

5 20 dB Bandwidth – FCC 15.215(c); RSS-Gen

5.1 20 dB Bandwidth Test Procedure

The 20 dB bandwidths were measured using a 50-ohm spectrum analyzer. The modulated carrier was adjusted on the analyzer so that it was displayed entirely on the spectrum analyzer. The sweep time was auto and allowed through several sweeps with the max hold function used in peak detector mode. The resolution bandwidth was set to 200 Hz, and the video bandwidth set to 3 MHz. The table below contains the bandwidth measurement results.

Table 5-1: 20 dB Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW50	Analyzer	101021	05/30/2025
901640	Rohde & Schwarz	FS-Z110	Mixer (75 – 110 GHz)	100010	05/03/2025
900711	ATM	10-443-6R	Horn Antenna (75 - 110 GHz)	8051905-1	06/23/2025
901727	Insulated Wire Inc.	KPS-1503-360-KPR	SMK RF Cables 36"	NA	11/30/2025
901774	RF Depot	TMS-SFT-205	36" SMA Cable	N/A	07/06/2025

5.2 Bandwidth Test Data

Table 5-2: Environmental Conditions

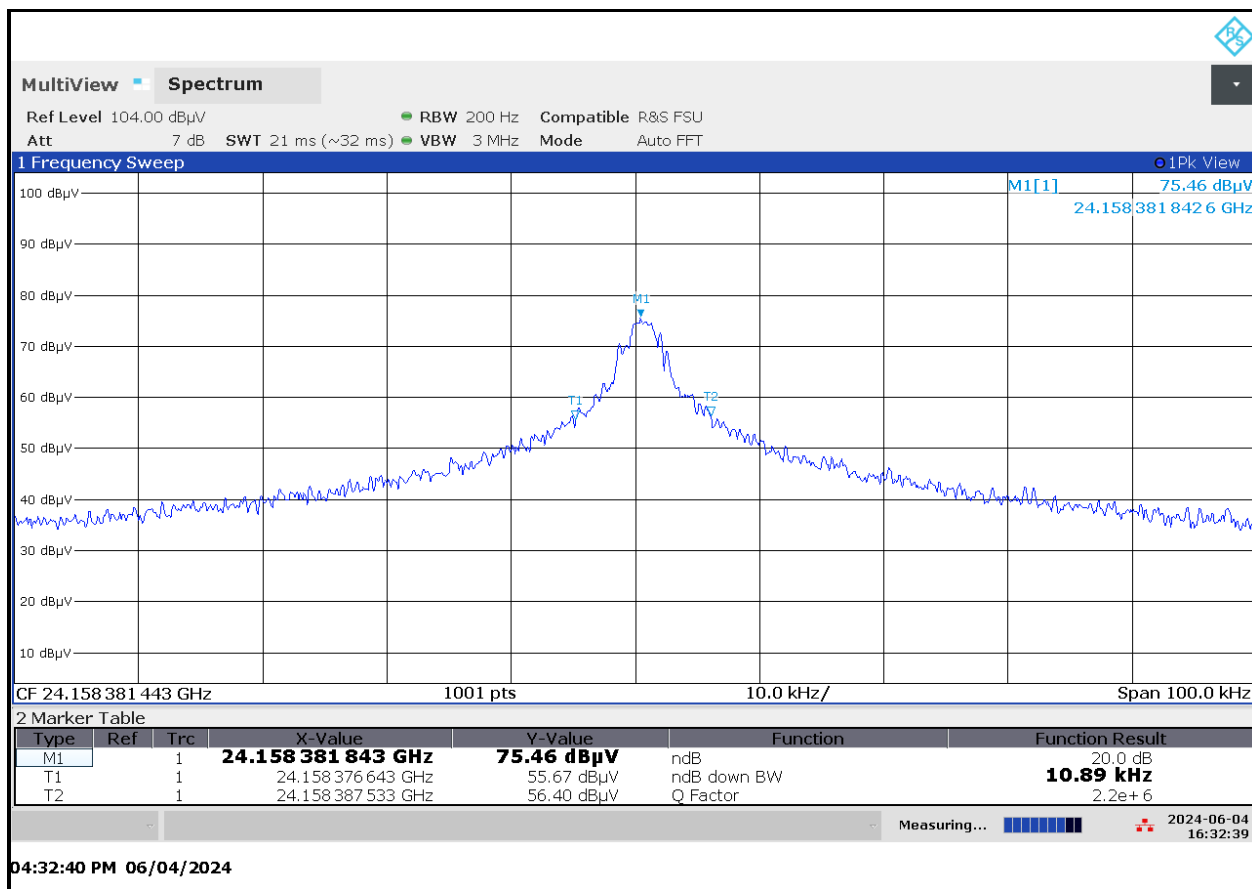
Temperature (°C)	Humidity (%)	Air Pressure (kPa)
23.4	32	100.3

Table 5-3: Bandwidth Test Data

Frequency (GHz)	20 dB Bandwidth (kHz)
24.158	10.9

5.3 20 dB Bandwidth Plot

Plot 5-1: 20 dB Bandwidth (24.158 GHz)



Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ± 4.6 dB

Result: Pass

Test Personnel:

Daniel W. Baltzell
Test Engineer

Signature

June 4, 2024
Date of Test

6 Conclusion

The data in this measurement report shows that the EUT as tested, Geolux d.o.o. Model RSS-2-300WL, FCC ID: 2AN9X-RSS2300WL; IC: 26475-RSS2300WL, complies with all the applicable requirements of Parts 2 and 15 of the FCC Rules and Regulations and ISSED Canada RSS-210 and RSS-Gen.