RHEIN TECH LABORATORIES, INC.

Engineering Solutions & Electromagnetic Compatibility Services

FCC & ISED Canada
Certification Application Report

Test Lab:	Applicant:
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FCC ID **IC**	2AN9X-RSS2300WL 26475-RSS2300WL	**Test Report Date**	August 19, 2024
Platform	N/A	**RTL Work Order #**	2023076DXX
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	DXX – Part 15 Low Power Communication Device Transmitter
FCC Rule Part(s)/ Guidance	Part 15C, 15.256: Radio Frequency Devices FCC 14-2: ET Docket No. 10-23: Amendment of Part 15 of the Commission's Rules To Establish Regulations for Level Probing Radars and Tank Level Probing Radars in the Frequency Bands 5.925-7.250 GHz, 24.05-29.00 GHz and 75-85 GHz KDB 890966-D01 Meas Level Probing Radars V01 (April 4, 2014)
ISED Canada	RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus RSS-211: Level Probing Radar Equipment
Digital Interface Information	Digital Interface was found to be compliant

Frequency Range (GHz)	Output Power (W)	Frequency Tolerance	Emission Designator
77-81	0.014	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 19, 2024

Typed/Printed Name: Desmond A. Fraser Position: President

Replaces Report R1.2.

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1 General Information

1.1 Scope

This measurement report is prepared on behalf of Geolux d.o.o. in accordance with the applicable Federal Communications Commission and ISED Canada rules and regulations.

1.2 Description of EUT

The Equipment Under Test (EUT) was the Geolux RSS-2-300WL Non-Contact Flow Meter, FCC ID: 2AN9X-RSS2300WL; IC: 26475-RSS2300WL.

1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, Inc., 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 Geolux Model/HVIN RSS-2-300WL, 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 System Details

The test sample was received on March 27, 2024. 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.

Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this testing, as applicable.

Table 2-1: Equipment under Test (EUT)

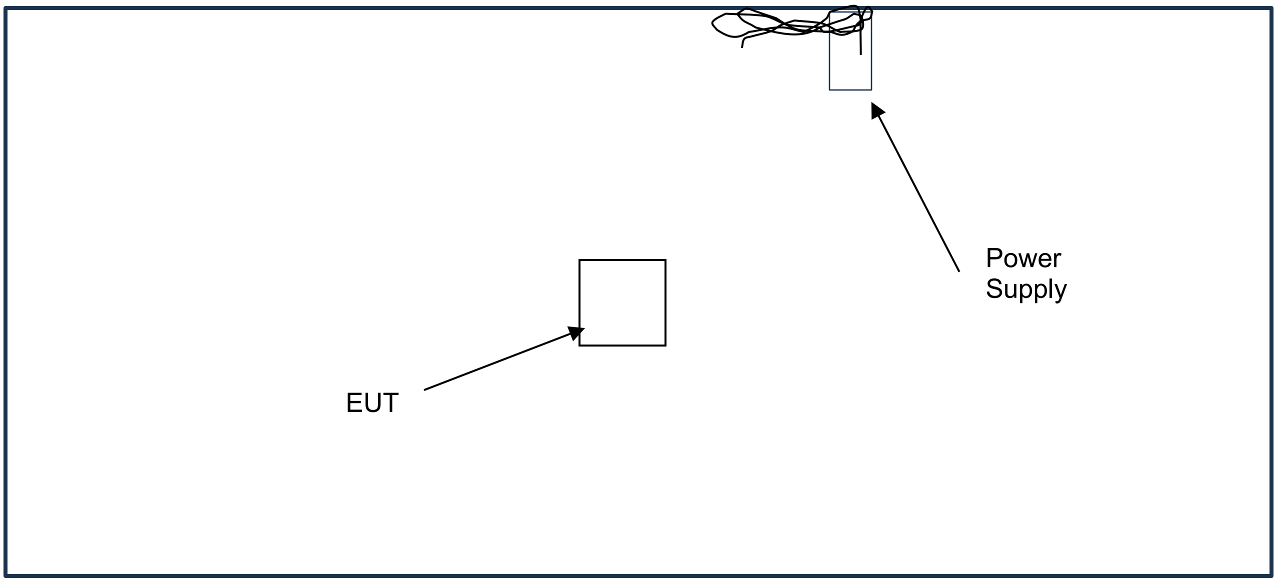
Part	Manufacturer	Model (HVIN)	Serial Number	FCC ID	Cable Description	RTL Bar Code
Flow Meter	Geolux d.o.o.	RSS-2-300WL	RSS-0012-0279	2AN9X-RSS2300WL	9.3m shielded	24414
Flow Meter	Geolux d.o.o.	RSS-2-300WL	RSS-0012-0280	2AN9X-RSS2300WL	9.3m shielded	24413

Table 2-2: 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

Photograph 1: RSS-2-300WL (EUT)

Figure 2-1: Configuration of Tested System



2.1 Test Distance

The final radiated emissions tests were performed at a 3-meter horizontal distance from the edge of the radar to the test antenna. The EUT was also investigated at closer test distances in order to discern any emissions.

3 Modulated Bandwidth – ANSI C63.10 6.9; FCC 15.256(f)(1)RSS-Gen 6.6

3.1 Modulated Bandwidth Test Procedure

The minimum 10 dB bandwidth was measured using a 50-ohm spectrum analyzer with the resolution bandwidth set at 1 MHz and the video bandwidth set at 3 MHz. The spectrum analyzer's display markers were set to -10 dB using max hold and the spectrum filled and a plot taken.

The analyzer "Signal ID" and "Auto ID" were used to aid in discerning between the ghost images displayed by the mixer. The spectrum analyzer's mixer mode results in an overlapping bandwidth of images with Trace 1 being the Upper Side Band (USB) of the LO (test sweep) and Trace 2 the Lower Side Band (LSB) reference sweep resulting in an overlay of the actual bandwidth. The reference sweep is performed using an LO setting shifted downwards by 2*IF/<Harmonic Order>. Input signals in the desired sideband that are converted using the specified harmonic are displayed in both traces at the same position on the frequency axis. Max hold was used until the spectrum was adequately filled to portray the bandwidth and a plot was taken.

3.2 Limits

(f) The fundamental bandwidth of an LPR emission is defined as the width of the signal between two points, one below and one above the center frequency, outside of which all emissions are attenuated by at least 10 dB relative to the maximum transmitter output power when measured in an equivalent resolution bandwidth.

(1) The minimum fundamental emission bandwidth shall be 50 MHz for LPR operation under the provisions of this section.

Table 3-1: Environmental Conditions

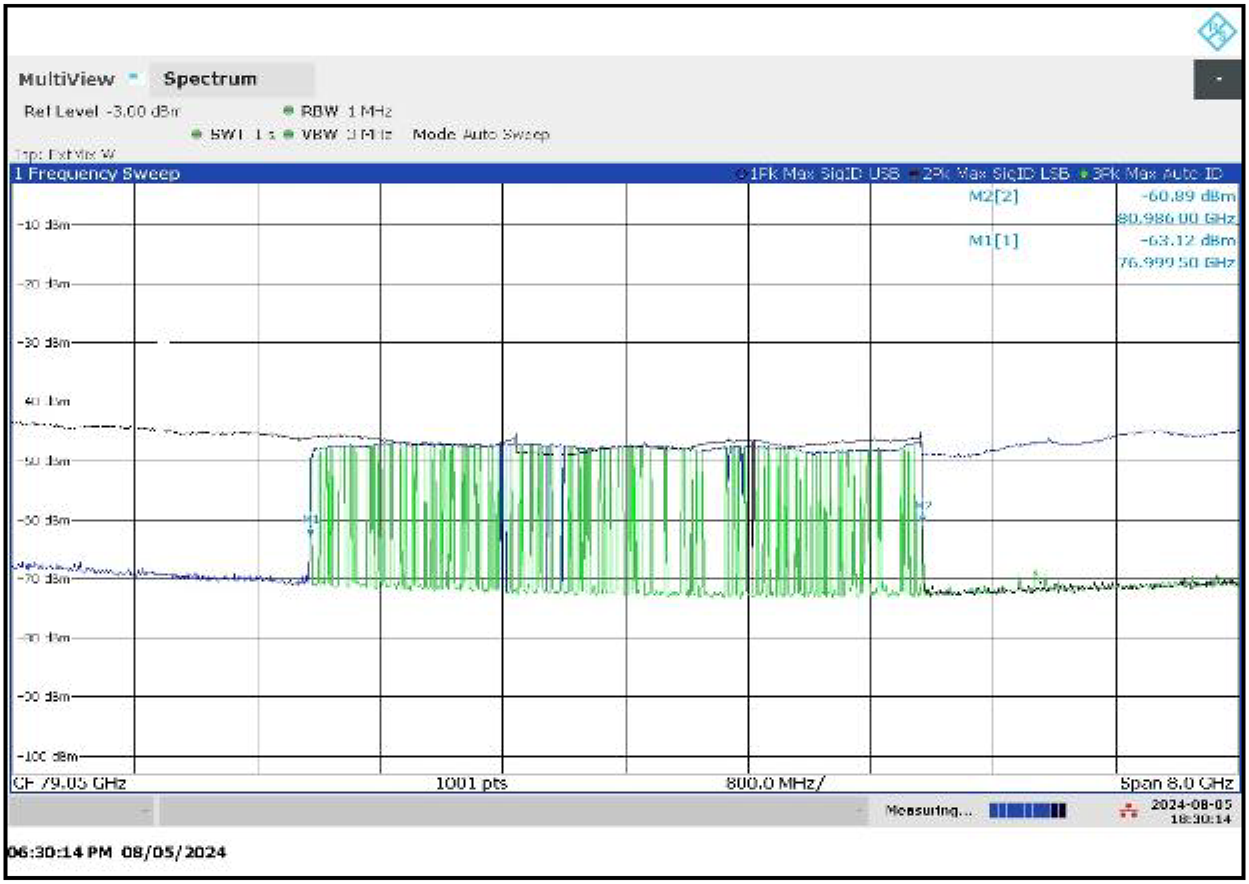
Temperature (°C)	Humidity (%)	Air Pressure (kPa)
24.1	35	101.5

3.3 Modulated Bandwidth Test Data

Table 3-2: 10 dB Modulated Bandwidth - 15.256(f)(1)

Part	10 dB Bandwidth (MHz)	Minimum Limit (MHz)	Margin (MHz)
RSS-2-300WL	3986.5	50	-3929

Plot 3-1: 10 dB Modulated Bandwidth



Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ±0.5 Hz; ±0.8 dB

Results: Pass

Table 3-3: Modulated Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW50	Spectrum Analyzer	101021	05/30/2027

Test Personnel:

Daniel W. Baltzell		August 5, 2024
Test Engineer	Signature	Date of Test

4 Radiated Emissions – ANSI C63.10 6.6; FCC 15.256(g)(3); RSS-Gen 6.12

4.1 Radiated Fundamental Emissions Test Procedure

Radiated emissions of the fundamental were tested by "bore sighting" the main-beam emissions to produce the maximum realizable antenna coupling. The EUT was also checked in all three orthogonal planes. Measurement was based on an average detector for -3 dBm/1 MHz power density limit and peak detector for 34 dBm/50 MHz limit. Limits are -3dBm/MHz and 34 dBm/50 MHz bandwidth. Since these limits are power density, no pulse desensitization correction factor is required. Both were also measured finding the maximum amplitude at 3 meters and switching from 1 MHz to 50 MHz resolution bandwidths.

Limits: The EIRP limits for LPR operations in the bands authorized by this rule section are provided in the following table. These emission limits are based on bore sight measurements (i.e., measurements performed within the main beam of the LPR antenna).

Frequency Band of Operation (GHz)	Average Emission Limit (EIRP in dBm measured in 1 MHz)	Peak Emission Limit (EIRP in dBm measured in 50 MHz)
5.925-7.250	-33	7
24.05-29.00	-14	26
75-85	-3	34

4.2 Radiated Fundamental Emissions Test Data

Radiated measurements are converted from dBuV/m to dBm using the following equation from FCC KDB 890966 6 b:

For radiated emission measurements:

EIRP (dBm) = field strength (dBμV/m) – 104.8 + 20 Log D

where:

D is the measurement distance. Measurements were at 1 meter.

All power averaging (RMS) emission levels are to be measured utilizing a 1 MHz resolution bandwidth with a one millisecond dwell time over each 1 MHz segment. The frequency span of the analyzer should equal the number of sampling bins times 1 MHz and the sweep rate of the analyzer should equal the number of sampling bins times one millisecond.

The video bandwidth of the measurement instrument shall not be less than the resolution bandwidth and trace averaging shall not be employed. The RMS average emission measurement is to be repeated over multiple sweeps with the analyzer set for maximum hold until the amplitude stabilizes. The peak emission measurement is to be repeated over multiple sweeps with the analyzer set for maximum hold until the amplitude stabilizes.

NOTE: Number of sampling BINS used = 10000

For ISED, ETSI EN 302 729 was used to test the EUT.

Table 4-1: Environmental Conditions

Temperature (°C)	Humidity (%)	Air Pressure (kPa)
23.2	29	99.4

Table 4-2: Radiated Fundamental Emissions (EIRP in 1 MHz, Average Detector)

Frequency (GHz)	Spectrum Analyzer Level (dBuV) (1m)	Site Correction Factor (dB/m)	Average Factor (dB)	Corrected Average Measurement (dBuV/m)	Converted to dBm	Limit (dBm)	Margin (dB)
83.185*	60.2	45.9	-43.8	52.8	-42.5	-3.0	-39.5

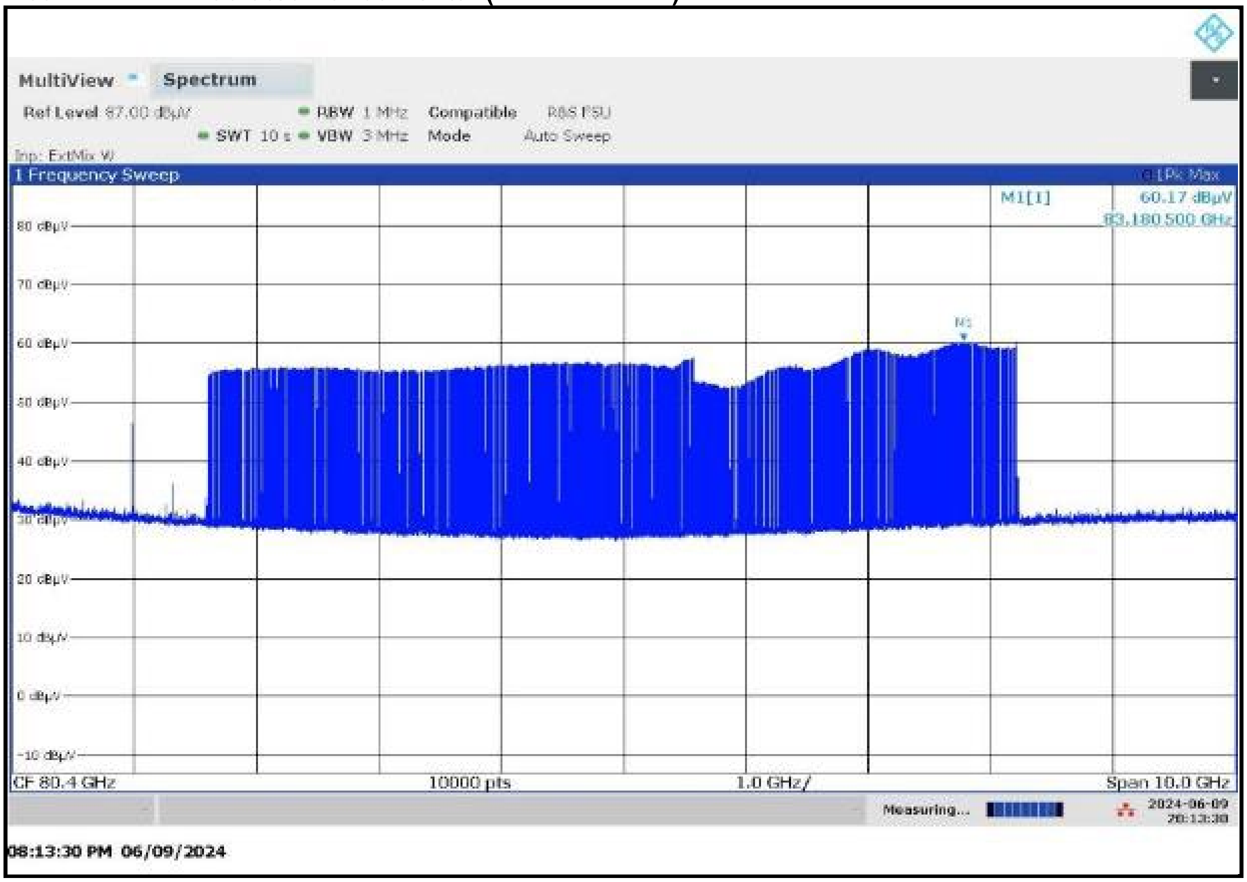
*Measured at 1m, interpolated to 3m

Table 4-3: Radiated Fundamental Emissions (EIRP in 50 MHz, Peak Detector)

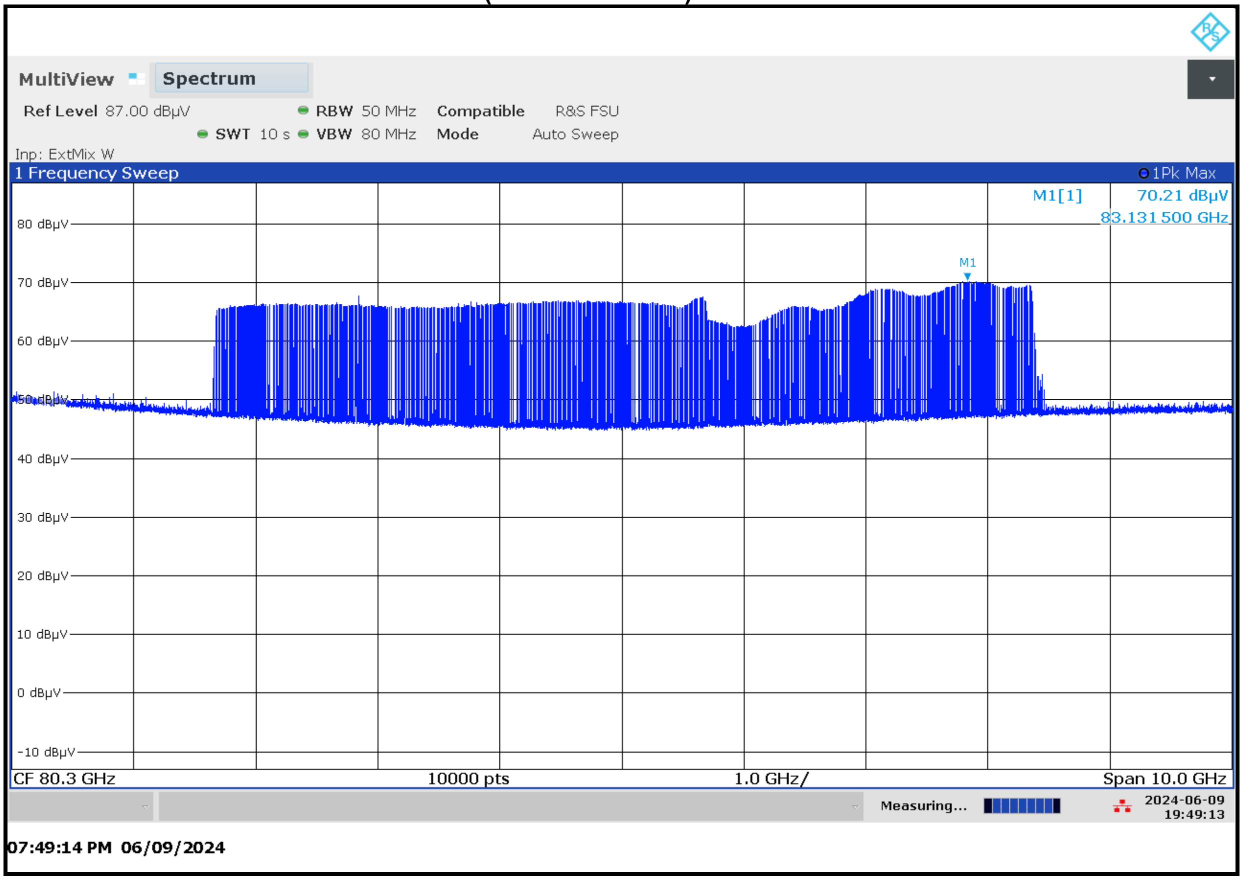
Frequency (GHz)	Peak EIRP Measured (dBuV) (1m)	Site Correction Factor (dB/m)	Corrected Peak Measurement (dBuV/m)	Converted to dBm	Limit (dBm)	Margin (dB)
83.1085*	70.2	45.9	106.6	11.4	34.0	-22.6

*Measured at 1m, interpolated to 3m

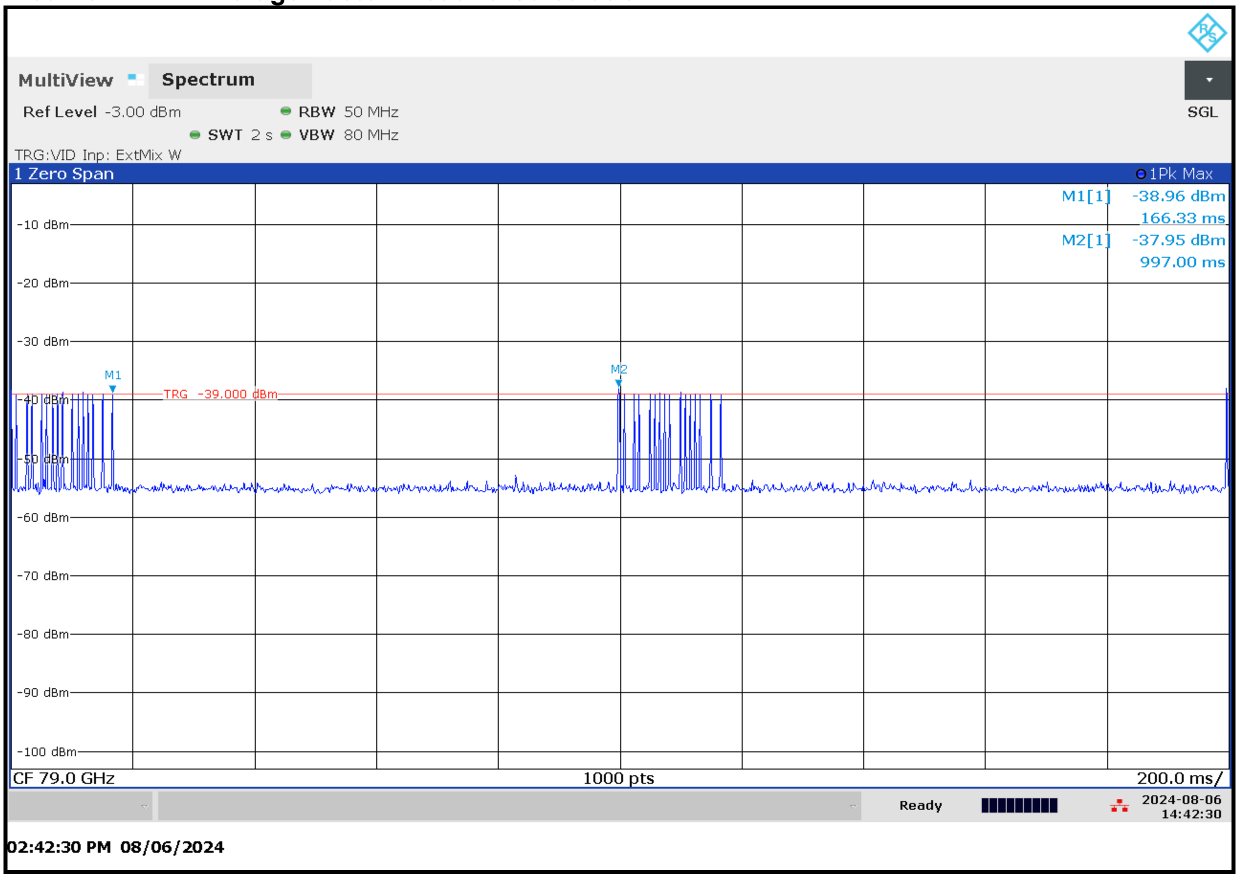
Plot 4-1: Radiated Fundamental (EIRP in 1 MHz)



Plot 4-2: Radiated Fundamental (EIRP in 50 MHz)



Plot 4-3: Average Factor Plot and Calculation



Average Factor = 10Log (Sweep frequency time 0.166 s / Sweep span 3987 MHz) = -43.8 dB
Cycle Time 1s

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.

Results: Pass

Table 4-4: Radiated Fundamental Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW50	Analyzer	101021	05/30/2025
900711	ATM	10-443-6R	Horn Antenna (75-110 GHz)	8051905-1	06/23/2025
901640	Rohde & Schwarz	FS-Z110	Mixer (75–110 GHz)	100010	05/03/2025

Test Personnel:

Daniel W. Baltzell	Daniel W. Baltzell	June 9 and August 6, 2024
Test Engineer	Signature	Dates of Test

5 Radiated Emissions – ANSI C63.10 9; 15.256(h)(k); RSS-Gen 6.13

5.1 Radiated Emissions Harmonics/Spurious Test Procedure

No radiated emissions of the harmonics were found to be measured; noise floor data was taken and corrected to three meters. The EUT was checked in the three orthogonal planes with the receive antenna in both polarities. A resolution bandwidth of 100 kHz was used for frequencies less than 1000 MHz, and a resolution bandwidth of 1 MHz was used for frequencies greater than or equal to 1000 MHz.

Limit: Unwanted Emissions from LPR devices shall not exceed the general emission limit in §15.209 of this chapter.

5.2 Radiated Emissions Harmonics/Spurious Test Data

No radiated harmonics were found to be measured or unintentional emissions above 1 GHz. The following plots are provided as reference.

The plot was taken with the measuring antenna abutted to the transmit antenna, showing no indication or detectable frequencies, this reduces signal to noise ratio as a distance of 1 mm corrected to 3 m is 20 log (0.001/3) = -69.5 dB. The emissions from the EUT were investigated at 0.001 m and 3 m to ensure no indication of detectable emissions.

Plot 5-1: Radiated Spurious Emissions (Second Harmonic)

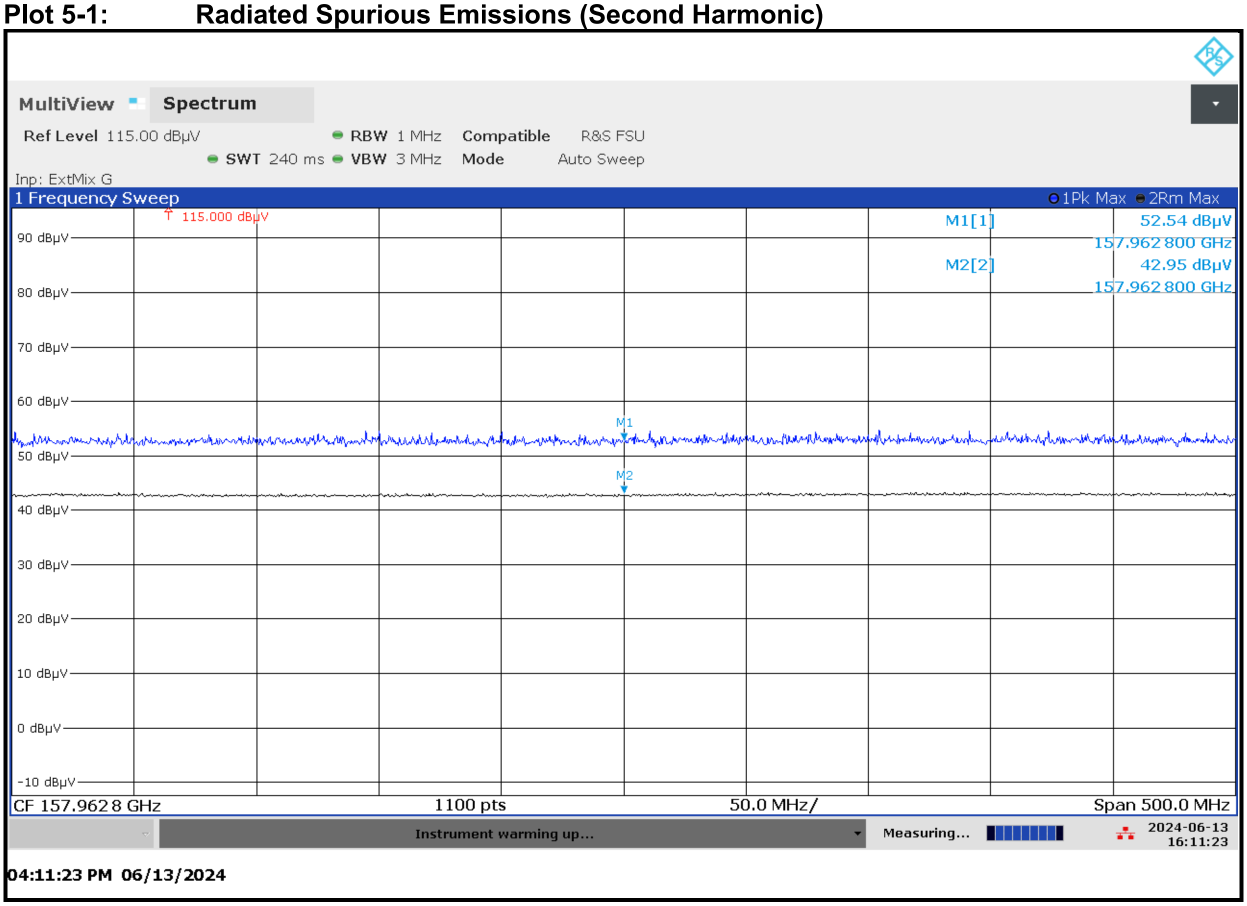


Table 5-1: Radiated Second Harmonic Noise Floor Calculation

Frequency (GHz)	EIRP Measured (dBuV)	Antenna Factor (dB/m)	Corrected Measurement (dBuV/m)	FCC Limit (dBuV)	Margin (dB)	Peak/ Average
157.963	52.5	51.2	34.2	74.0	-39.8	Peak
157.963	43.0	51.2	24.7	54.0	-29.3	Average

5.3 Radiated Emissions Unintentional/Digital Test Data

Table 5-2: 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

Unwanted emissions were investigated (other than harmonics) as required by 15.33(a)(3).

“If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

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.

Results: Pass

Table 5-3: Radiated Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
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	06/14/2025
901775	Rosenberger	LU7-022-1000	1m SMA Cable	N/A	06/14/2025
901773	Rohde & Schwarz	FSW50	Analyzer	101021	02/02/2025
901639	Wiltron	35WR19F	Waveguide (40–50 GHz)	N/A	N/A
901586	Rohde & Schwarz	FS-Z75	HMixer (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)	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
900874	Continental Microwave & Tool	RA42-K-F-4B-C	18-26.5 GHz Waveguide	990706-002	N/A
900932	Hewlett Packard	8449B OPT H02	Preamp (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
900913	Hewlett Packard	85462A	RF Filter Section (100 kHz – 6.5 GHz)	3325A00159	09/16/2024
900914	Hewlett Packard	85460A	EMI Receiver Section (9 kHz – 6.5 GHz)	3330A00107	09/16/2024

Test Personnel:

Daniel W. Baltzell	Daniel W. Baltzell	June 13, 2024
Test Engineer	Signature	Date of Test

6 Frequency Stability - ANSI C63.10 6.8; FCC 15.256(f); RSS-Gen 6.11

6.1 Frequency Stability Test Procedure

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

The EUT was evaluated over the temperature range -30°C to +50°C.

The temperature was initially set to -30°C and a 1-hour period was observed for stabilization of the EUT. The frequency stability was measured within one minute after application of primary power to the transmitter. The temperature was raised at intervals of 10 degrees centigrade through the range. A ½-hour period was observed to stabilize the EUT at each measurement step and the frequency stability was measured within one minute after application of primary power to the transmitter. Additionally, the power supply voltage of the EUT was varied +/-15% nominal input voltage, +15% of minimum voltage and -15% of maximum voltage.

Table 6-1: Frequency Stability Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900946	Tenney Engineering, Inc.	TH65	Temperature Chamber with Humidity	11380	06/23/2025
901773	Rohde & Schwarz	FSW50	Analyzer	101021	05/30/2025
900711	ATM	10-443-6R	Horn Antenna (75-110 GHz)	8051905-1	06/23/2025
901640	Rohde & Schwarz	FS-Z110	Mixer (75–110 GHz)	100010	05/03/2025
901350	Meterman	33XR	Multimeter	040402802	10/18/2024
3279	GW Instek	PSS-3203	Power Supply	B200344	N/A
900711	ATM	10-443-6R	Horn Antenna (75-110 GHz)	8051905-1	06/23/2025
901640	Rohde & Schwarz	FS-Z110	Mixer (75–110 GHz)	100010	05/03/2025

6.2 FCC 15.256(f) Limit

LPR devices operating under this section must confine their fundamental emission bandwidth within the 5.925-7.250 GHz, 24.05-29.00 GHz, and 75-85 GHz bands under all conditions of operation.

6.3 Temperature-Voltage Frequency Stability Test Data

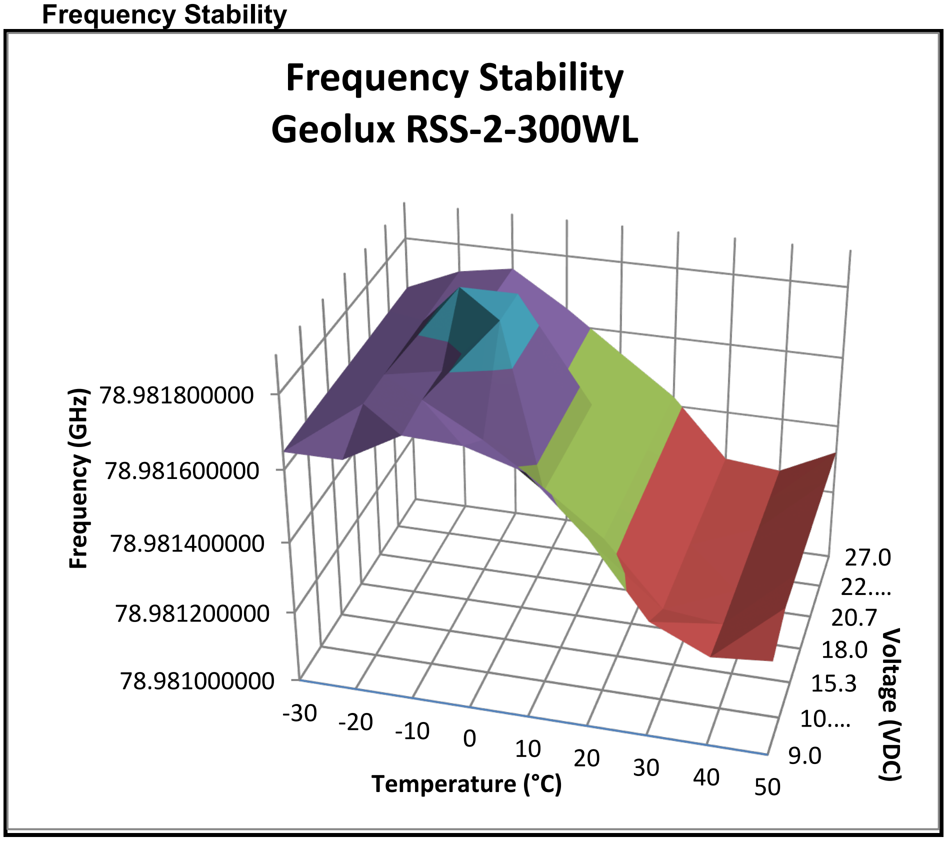
Table 6-2: Environmental Conditions

Temperature (°C)	Humidity (%)	Air Pressure (kPa)
23.4	31	99.2

Table 6-3: Temperature-Voltage Frequency Stability

Temp (°C)	+/- 15% VDC						
	9.0 (Min.)	10.35 (Min. + 15%)	15.3 (-15%)	18.0 (Mid)	20.7 (+ 15%)	22.95 (Max. -15%)	27.0 (Max.)
-30	78.9816477	78.9816517	78.9816531	78.9816540	78.9816551	78.9816569	78.9816577
-20	78.9816477	78.9817169	78.9817186	78.9817195	78.9817203	78.9817211	78.9817216
-10	78.9817331	78.9817473	78.9817474	79.9817473	78.9817475	78.9817473	78.9817469
0	78.9817268	78.9816614	79.9816552	79.9816536	78.9816529	78.9816509	78.9816497
10	78.9816793	78.9815448	78.9815424	78.9815409	78.9815396	78.9815384	78.9815375
20	78.9815263	78.9814365	78.9814333	78.9814318	78.9814299	78.9814283	78.9814271
30	78.9813251	78.9812635	78.9812626	78.9812627	78.9812616	78.9812607	78.9812601
40	78.9812519	78.9812463	78.9812456	78.9812453	78.9812449	78.9812448	78.9812447
50	78.9812666	78.9813172	78.9813185	78.9813197	78.9813204	78.9813213	78.9813222

Plot 6-1: Frequency Stability



To determine if the bandwidth of the signal remains within the band 75 GHz – 85 GHz, the highest frequency generated, 79.9817473 GHz (at -10°C, 18 VDC), and the lowest frequency generated, 78.9812447 GHz (at 40°C, 27 VDC), are compared to the measured bandwidth, 3979 MHz.

To determine the edge of the frequency, half the bandwidth is subtracted from the lowest frequency generated and added to the highest frequency generated.

½ bandwidth = 3979 MHz ÷ 2 = 1985.5 MHz.

Lowest frequency generated: 78.9812447 GHz – 1.9855 GHz = 76.996 GHz,
which is within the band 75 - 85 GHz (passing with margin 76.996 GHz - 75 GHz = 1.996 GHz).

Highest frequency generated: 79.9817473 GHz + 1.9855 GHz = 81.9672473 GHz,
which is within the band 75-85 GHz (passing with margin 85 GHz – 81.9672473 GHz = 3.03 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

Results: Pass

Test Personnel:

Daniel W. Baltzell	Daniel W. Baltzell	June 6, 2024
Test Engineer	Signature	Date of Tests

7 AC Conducted Emissions - FCC Rules and Regulations ANSI C63.10 6.2, Part 15.207; RSS-Gen 7.2.4

7.1 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 placed on a wooden table. Power was fed to the EUT through a 50-ohm/50 μHenry Line Impedance Stabilization Network (LISN). The EUT LISN was fed power through an AC 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's auxiliary equipment. This peripheral LISN was also fed AC power.

The spectrum analyzer was connected to the AC line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Solar 100 kHz 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. Video filter less than 10 times the resolution bandwidth is not used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, 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 limits were measured and have been recorded.

7.2 Conducted Line Emissions Test Procedure

Conducted emissions were performed on the DC input to the EUT, an off-the-shelf power supply was used to provide DC to the LISN powering the EUT. The general conducted limit under Part 15.207 was applied. The emissions were scanned between 150 kHz to 30 MHz on the negative and positive conductors.

Table 7-1: Conducted Line Emissions Test Equipment

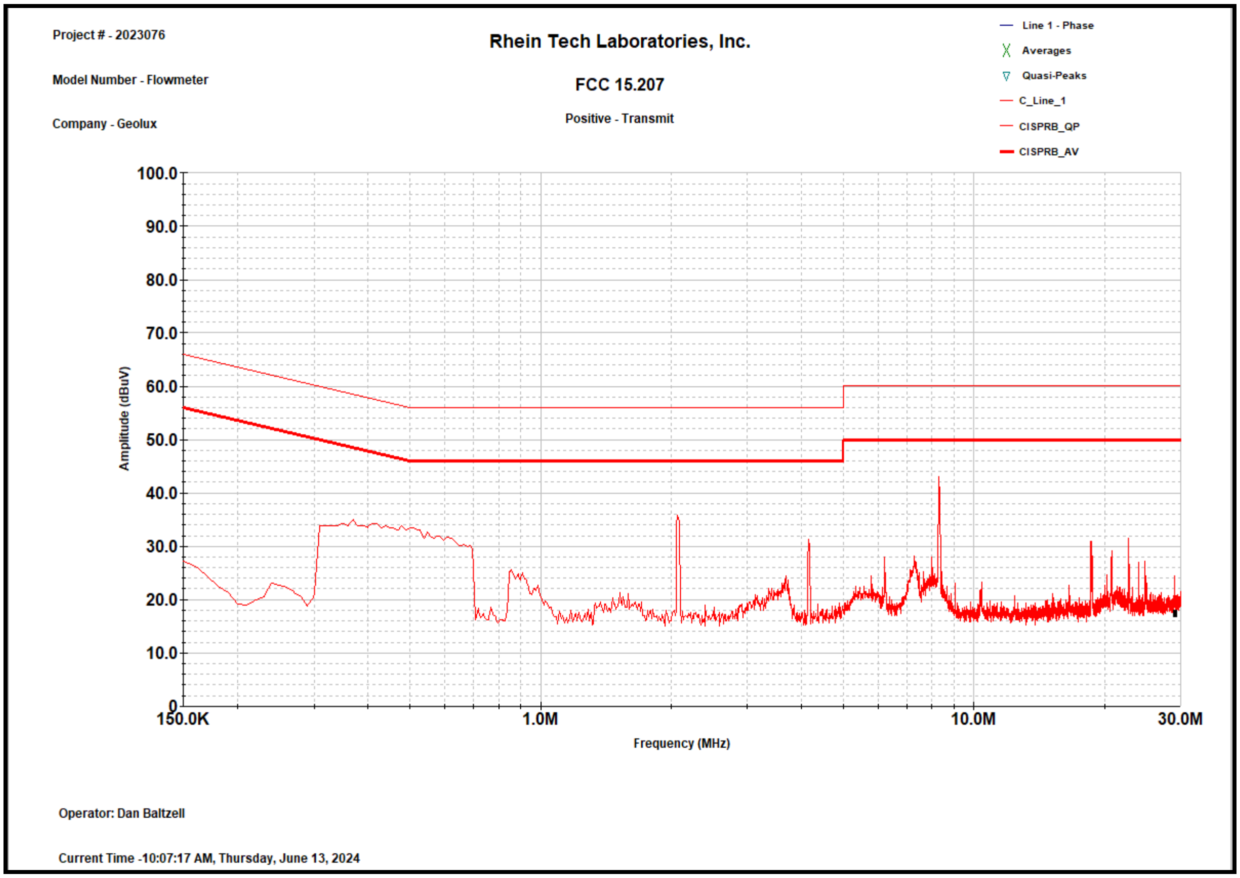
RTL Asset #	Manufacturer	Model	Part	Serial Number	Calibration Due Date
900339	Hewlett Packard	85650A	Quasi-Peak Adapter	2521A00743	09/16/2024
900930	Hewlett Packard	85662A 067	Spectrum Analyzer Display	3144A20839	02/26/2025
900931	Hewlett Packard	8566B	Spectrum Analyzer RF Section (100 Hz – 22 GHz)	2138A07771	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 7-2: Environmental Conditions

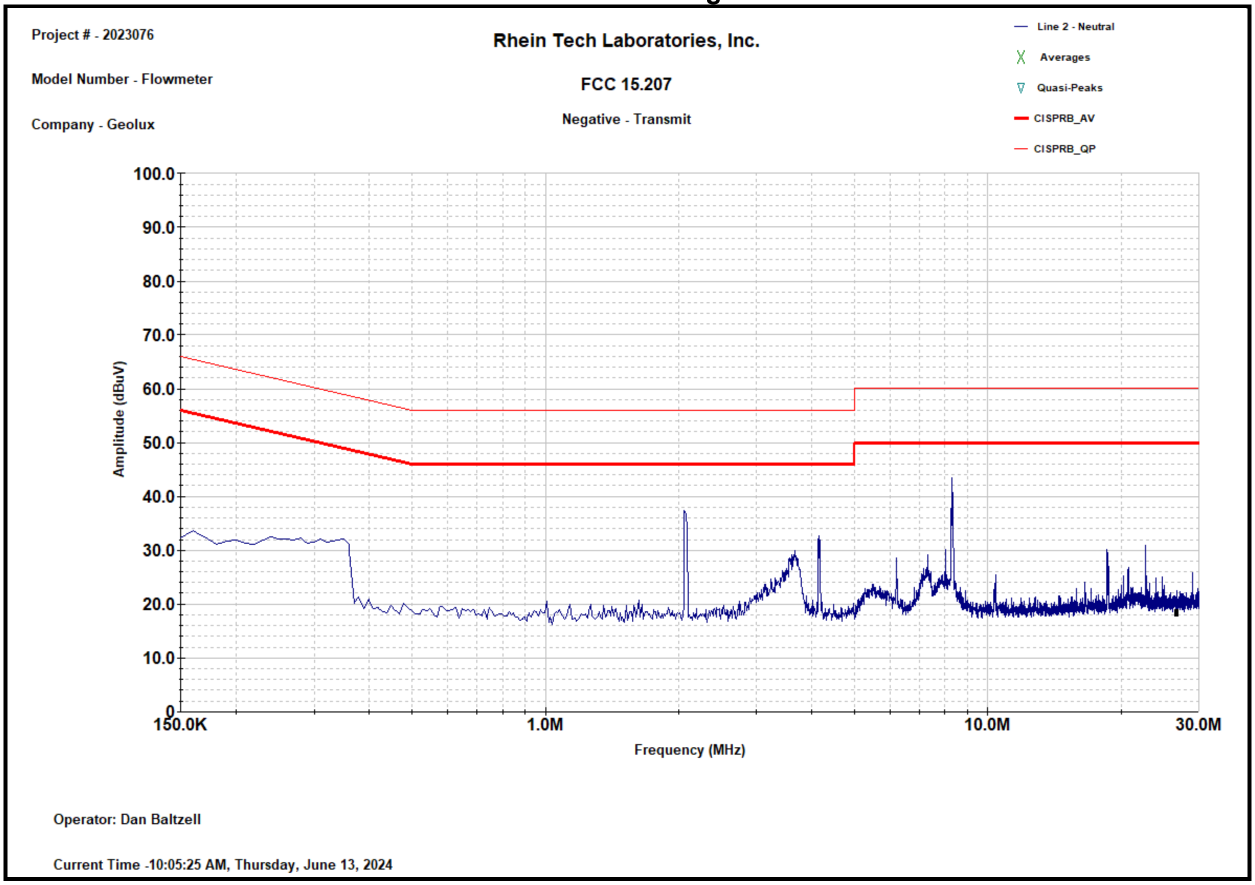
Temperature (°C)	Humidity (%)	Air Pressure (kPa)
22.9	35	101.6

7.3 Conducted Line Emissions Test Data

Plot 7-1: DC Conducted Emissions Transmit - Positive



Plot 7-2: DC 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

Results: Pass

Test Personnel:

Daniel W. Baltzell		June 13, 2024
Test Engineer	Signature	Date of Test

8 Compliance with the LPR Antenna Beamwidth and Side Lobe Gain - FCC Rules and Regulations 15.256(i), (j); RSS-211 5.2(a), (c)

8.1 Limits

FCC 15.256

(i) Antenna beamwidth.

(A) LPR devices operating under the provisions of this section within the 5.925–7.250 GHz and 24.05–29.00 GHz bands must use an antenna with a -3 dB beamwidth no greater than 12 degrees.

(B) LPR devices operating under the provisions of this section within the 75– 85 GHz band must use an antenna with a -3 dB beamwidth no greater than 8 degrees.

(j) Antenna side lobe gain. LPR devices operating under the provisions of this section must limit the side lobe antenna gain relative to the main beam gain for off-axis angles from the main beam of greater than 60 degrees to the levels provided in Table 2.

Table 2: Antenna Side Lobe Gain Limits

Frequency range (GHz)	Antenna side lobe gain limit relative to main beam gain (dB)
5.925-7.250 ………………………………	-22
24.05-29.00 ………………………………	-27
75-85 ……………………………………	-38

ISED RSS-211 5.2

(a) For devices operating in open-air environments, the antenna shall have a maximum half-power beamwidth of 12° for bands 5.65-8.5 GHz and 24.05-29 GHz, and a maximum half-power beamwidth of 8° for the band 75-85 GHz.

(c) LPR devices must limit the antenna side lobe gain relative to the main beam gain for off-axis angles from the main beam of greater than 60° for the levels provided in Table 2.

Table 2: Antenna Side Lobe Gain Limits

Frequency Band (GHz)	Antenna Side Lobe Gain Limit Relative to Main Beam Gain (dB)
5.65-8.50	-22
24.05-29.00	-27
75-85	-38

8.2 Antenna Beamwidth and Side Lobe Gains

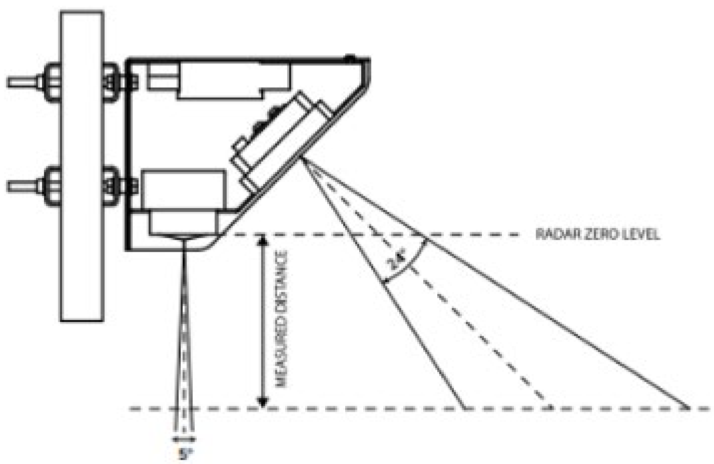
Radar Velocity Sensor:

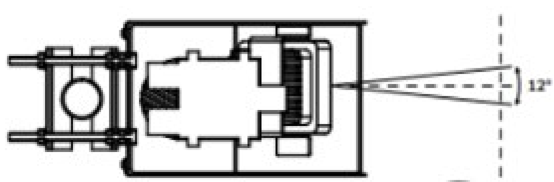
Frequency 24.168 GHz

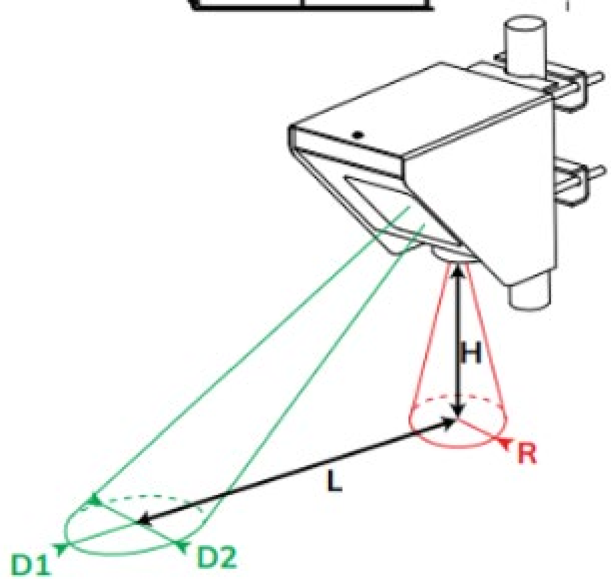
Beam-width (3 dB) – Azimuth 12°
Beam-width (3 dB) – Elevation 24°

Frequency 77-81 GHz

Beam-width (3 dB) – Azimuth 12°
Beam-width (3 dB) – Elevation 24°



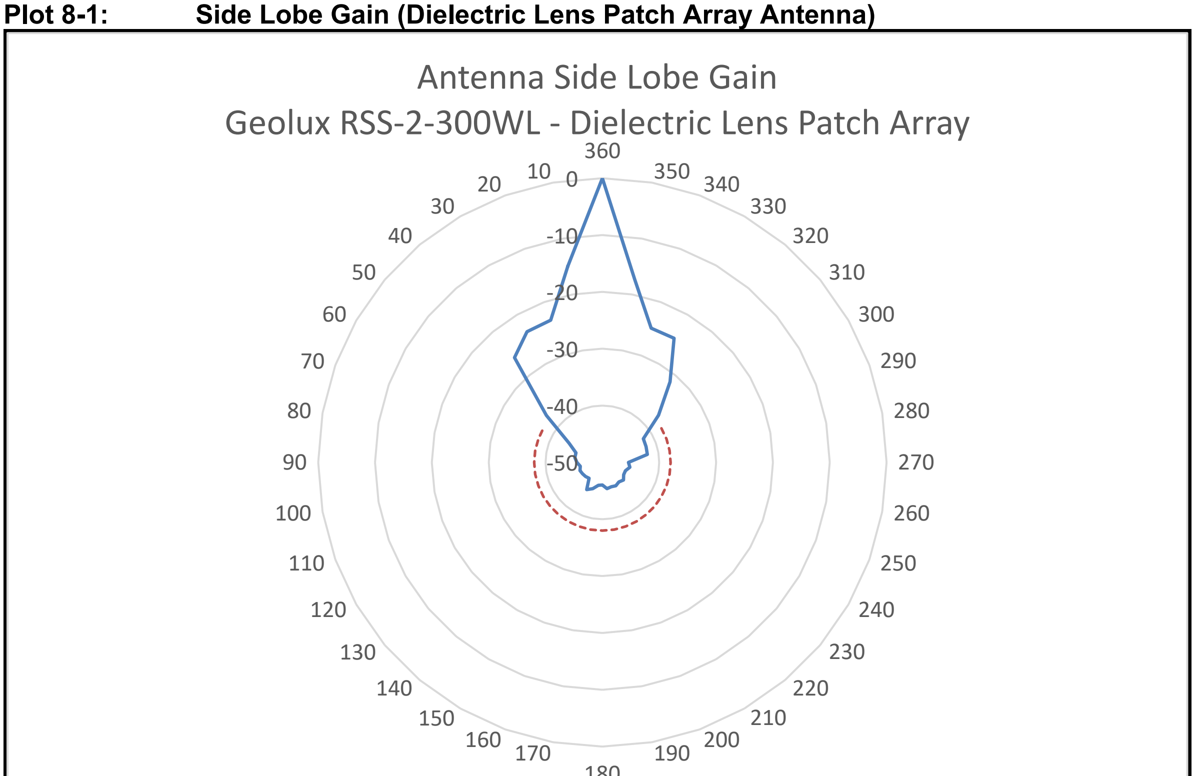




Height (H)	L (m)	D1 (m)	D2 (m)	R (m)
0.3 m	0.3	0.3	0.2	0.03
0.5 m	0.5	0.5	0.3	0.04
1 m	1.0	0.9	0.3	0.09
2 m	2.0	1.8	0.6	0.17
3 m	3.0	2.7	0.9	0.26
4 m	4.0	3.6	1.2	0.35
5 m	5.0	4.5	1.5	0.44
6 m	6.0	5.3	1.8	0.52
7 m	7.0	6.2	21	0.81
8 m	8.0	7.1	2.4	0.70
9 m	90	8.0	2.7	0.79
10 m	10.0	8.9	3.0	0.98
11 m	11.0	9.8	3.3	0.96
12 m	12.0	10.7	3.6	1.05
13 m	13.0	11.6	3.9	1.14
14 m	14.0	12.5	4.2	1.22
15 m	15.0	13.4	4.5	1.31

Lengths and diameters are calculated based on 3 dB signal drop (half signal power) due to the antenna pattern. For practical application the impact is that most of the return energy is reflected from the inside of the bounding shapes, ellipse for surface velocity sensor and circle for level sensor, but some energy could also be received from objects outside from the bounding shapes.

Plot 8-1: Side Lobe Gain (Dielectric Lens Patch Array Antenna)



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.

Results: Pass

Table 8-1: LPR Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901774	RF Depot	TMS-SFT-205	36” SMA Cable	N/A	06/14/2025
901775	Rosenberger	LU7-022-1000	1m SMA Cable	N/A	06/14/2025
901773	Rohde & Schwarz	FSW50	Analyzer	101021	02/02/2025
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

Test Personnel:

Daniel W. Baltzell		August 19, 2024
Test Engineer	Signature	Date of Test

9 Conclusion

The data in this measurement report shows that the Geolux d.o.o. Model RSS-2-300WL, FCC ID: 2AN9X-RSS2300WL; IC: 26475-RSS2300WL complies with the applicable requirements of Parts 2 and 15 of the FCC rules and regulations and ISED Canada RSS-Gen.