

FCC and ISCED Canada Testing of the

Cinch Systems Inc
RF-UT-EI-CO-319

In accordance with FCC 47 CFR part 15.231 and
ISCED Canada's Radio Standards Specifications
RSS-210

Prepared for: Cinch Systems Inc
12075 43rd St NE Ste 300
Saint Michael, MN 55376

FCC ID: 2ABBZ-RF-CO-319
IC: 11817A-RFCO319

COMMERCIAL-IN-CONFIDENCE

Document Number: NC721003871.9 | Issue: 2

1

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Authorized Signatory	Ferdinand S. Custodio	2025 -November-22	
Testing	Yves-Thierry Jean-Charles	2025-November-22	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

FCC Accreditation Designation Number US1148 New Brighton, MN Test Laboratory	Innovation, Science, and Economic Development Canada Accreditation Site Number 4512A New Brighton, MN Test Laboratory
--	---

EXECUTIVE SUMMARY

Samples of this product were tested and found to be compliant with the standards listed above and the tests shown in Table 1.3-1 of this report.

 A2LA Cert. No. 2955.11	DISCLAIMER AND COPYRIGHT This non-binding report has been prepared by TÜV SÜD America with all reasonable skill and care. The document is confidential to the potential Client and TÜV SÜD America. No part of this document may be reproduced without the prior written approval of TÜV SÜD America. © TÜV SÜD.
	DISCLAIMER AND COPYRIGHT Our A2LA Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our A2LA Accreditation. Results of test not covered by our A2LA Accreditation Schedule are marked NUA (Not A2LA Accredited).

TÜV SÜD America Inc
141 14th Street NW
New Brighton, MN 55112

Phone: 651-631-2487
www.tuv-sud-america.com

TÜV SÜD

TÜV®



America

Add value.
Inspire trust.



Contents

1 Report Summary 3

1.1 Report Modification Record..... 3

1.2 Introduction..... 3

1.3 Summary of Results 5

1.4 Product Information 6

1.5 Deviations from the Standard..... 7

1.6 EUT Modification Record 7

1.7 Test Location 8

2 Test Details 9

2.1 Antenna Requirements..... 9

2.2 Periodic Operation..... 11

2.3 Radiated Field Strength and Spurious Emissions..... 18

2.4 20 dB Bandwidth 44

2.5 99% Bandwidth 47

3 Test Equipment Information 49

3.1 General Test Equipment Used 49

4 Diagram of Test Set-ups..... 51

5 Measurement Uncertainty 54

6 Accreditation, Disclaimers and Copyright..... 55



1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	2025-November-12
2	Updated the Model Number and the antenna gain information	2025-November-22

1.2 Introduction

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC’s Code of Federal Regulations Section 15.231 and Innovation Science and Economic Development Canada’s Radio Standards Specification RSS-210 for the tests documented herein.



Applicant	Cinch Systems Inc
Manufacturer	Cinch Systems Inc
Applicant's Email Address	mark.cawley@cinchsystems.com
Model Number(s)	RF-UT-EI-CO-319
Serial Number(s)	X5-3 (Radiated Emissions), X5-12 (Timing)
FCC ID	2ABBZ-RF-CO-319
ISED Certification Number	11817A-RFCO319
HVIN	RF-CO-319
Hardware Version(s)	x5
Software Version(s)	v013
Number of Samples Tested	2
Test Specification/Issue/Date	US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2024. Innovation, Science and Economic Development Canada Radio Standards Specification RSS-210, Licence-Exempt Radio Apparatus: Category I Equipment, issue 11, June 2024.
Order Number	721003871
Date	2024-September-06
Date of Receipt of EUT	2025-September-23
Start of Test	2025-September-23
Finish of Test	2025-September-25
Name of Engineer(s)	Yves-Thierry Jean-Charles Duranta K. Barua
Related Document(s)	ANSI C63.10-2020: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2024. Innovation, Science and Economic Development Canada Radio Standards Specification: RSS-GEN - General Requirements for Compliance of Radio Apparatus, Issue 5, April 2018, Amendment 1, March 2019, Amendment 2, February 2021.



1.3 Summary of Results

A summary of the tests carried out in accordance with FCC Part 15.231 and ISED Canada's RSS-210 is shown below.

Table 1.3-1 – Test Result Summary

Test Parameter	Test Plan (Yes/No)	Test Result	FCC 47 CFR Rule Part	ISED Canada's RSS	Test Report Page No
Antenna Requirement	Yes	Pass	15.203, 15.204	-----	9
Periodic Operation	Yes	Pass	15.231(a)	RSS-210 A.1.2	11
Radiated Field Strength of Fundamental and Spurious Emissions	Yes	Pass	15.231(b)	RSS-210 A.1.3	18
20 dB Bandwidth	Yes	Pass	15.231 (c)	-----	44
99% Bandwidth	Yes	Pass	-----	RSS-210 A.1.4	47
*Power Line Conducted Emissions	No	Not Tested	15.207	RSS-GEN 8.8	-----

*The device is a battery-operated equipment without provisions for connection to the AC Mains. The device is exempted from the power line conducted emissions requirements.



1.4 Product Information

1.4.1 Technical Description

The device under test was a Carbon Monoxide Detector. The device includes a 319 MHz transceiver. The EUT is a standalone battery-operated device without provisions for connection to external equipment.

Technical Details

Mode of Operation: 319 MHz Proprietary Transceiver
Frequency Range: 319.508 MHz
Number of Channels: 1
Channel Separation: N/A
Data Rate: 5 kbps
Modulations: OOK
Antenna Type/Gain: Wire Antenna / -18.51 dBi
Input Power: 3 VDC (AA Battery)

A full description and detailed product specification details are available from the manufacturer.

1.4.2 Modes of Operation

The power setting of the device was preconfigured by the manufacturer and was not modified during the evaluation.

The EUT was set to following configurations for the purpose of the evaluation.

Table 1.4.2-1 – Modes of Operation

Test	Firmware	Firmware Description
Radiated Emissions	Test	Modulated Signal at maximum data rate allowed by the test firmware.
Momentary Operation	Production Firmware	Packet Transmissions at Representative Maximum Duty Cycle.

1.4.3 Monitoring of Performance

For the radiated emissions evaluation, the EUT was evaluated in three orthogonal orientations. Where applicable, the results are provided for the configurations leading to the highest emissions with respect to the limits.

For the transmission duration evaluation was performed using production firmware.



1.4.4 Performance Criteria

The EUT was evaluated in according to the test criteria listed below.

Table 1.4.4-1 – Performance Criteria

Parameter	Requirement
Antenna Requirement	FCC: Section 15.203. 15.204
Periodic Operation	FCC; Section 15.231(a); ISED Canada: RSS-210 A.1.2
Radiated Field Strength of Fundamental and Spurious Emissions	FCC: Section 15.231(b); ISED Canada: RSS-210 A.1.3
20 dB Bandwidth	FCC: Section 15.231(c)
99% Bandwidth	ISED Canada: RSS-210 A.1.4

1.5 Deviations from the Standard

The evaluation was performed without any deviation from the test standard.

1.6 EUT Modification Record

The table below details modifications made to the EUT during the test program. The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	None	N/A	N/A

The equipment was tested as provided without any modifications.



1.7 Test Location

TÜV SÜD Product Service conducted the following tests at our New Brighton, MN Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Battery Powered, Operating		
Antenna Requirement	Thierry Jean-Charles	A2LA
Periodic Operation	Thierry Jean-Charles	A2LA
Radiated Field Strength of Fundamental and Spurious Emissions	Thierry Jean-Charles Duranta K. Barua	A2LA
20 dB Bandwidth	Thierry Jean-Charles	A2LA
99% Bandwidth	Thierry Jean-Charles	A2LA

Office Address:

TÜV SÜD America, Inc.
141 14th Street NW
New Brighton, MN 55112
USA



2 Test Details

2.1 Antenna Requirements

2.1.1 Specification Reference

FCC: Section 15.203, 15.204

2.1.2 Equipment Under Test and Modification State

S/N: X5-3

2.1.3 Date of Test

9/23/2025

2.1.4 Test Method

N/A

2.1.5 Environmental Conditions

Ambient Temperature N/A

Relative Humidity N/A

Atmospheric Pressure N/A

2.1.6 Test Results

Limit Clause FCC Sections: 15.203, 15.204

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Table 2.1.6-1 – Antenna Used In EUT

Antenna Type	Connection Type	Antenna Gain (dBi)
Wire	Soldered on PCB	-18.51



Test Summary:

The EUT uses a wire antenna that is directly soldered to the PCB. The antenna is not removable and therefore meets the requirements of FCC Section 15.203.

Test Result: Pass

2.1.7 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 141 14th Street NW, New Brighton, MN 55112, USA.

As this was a visual inspection, no test equipment was used.



2.2 Periodic Operation

2.2.1 Specification Reference

FCC Sections: 15.231(a);
ISED Canada: RSS-210 A.1.2

2.2.2 Equipment Under Test and Modification State

S/N: X5-12

2.2.3 Date of Test

9/24/2025 to 9/25/2025

2.2.4 Test Method

The transmitter was activated automatically and was evaluated using a spectrum analyzer at zero span.

2.2.5 Environmental Conditions

Ambient Temperature	22.8 °C
Relative Humidity	48 %
Atmospheric Pressure	984 mBar

2.2.6 Test Results

Battery Powered, Operating

Limit Clause FCC Sections 15.231(a), ISED Canada: RSS-210 A.1.2

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. A transmitter activated automatically shall cease transmission within 5 seconds after activation.

Test Summary:

Transmission from the EUT only occurred within 5 seconds after activation.

In supervisory mode the total Number of transmissions did not exceed 2 seconds over one hour of observation period.

Test Result: Pass



2.2.6.1 Transmission Timing Operation

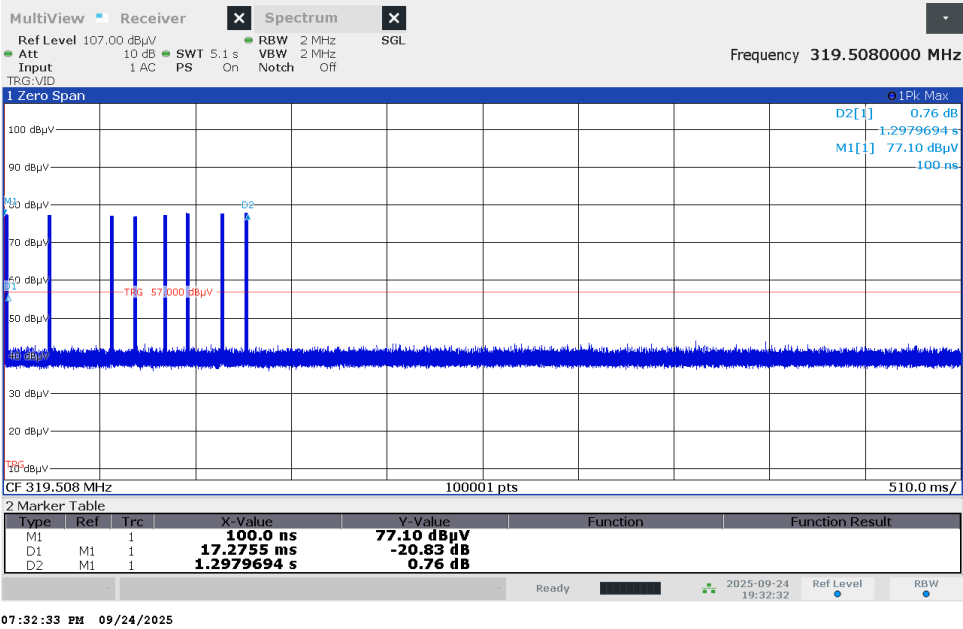


Figure 2.2.6.1-1 – Transmitter Deactivation Time Test Results

Table 2.2.6.1-1 – Transmitter Deactivation Time Test Results

Frequency M Hz	Transmission Type	Turn Off Time (s)	Limit (s)	Result
319.508	Automatic	1.2979694	5	Pass

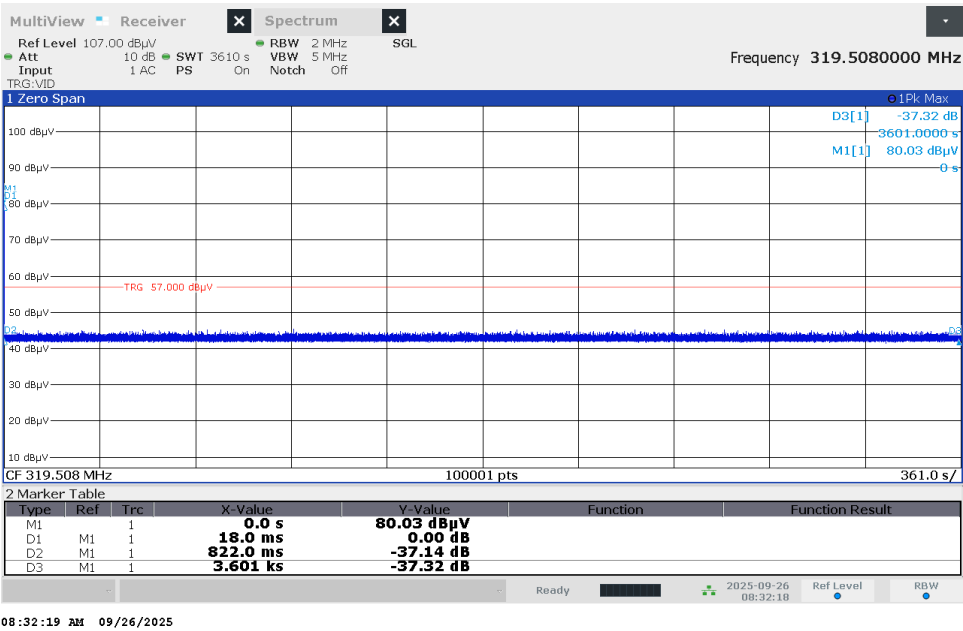


Figure 2.2.6.1-2 – Timing Measurement Test Results – Maximum Transmission Over One Hour – Supervisory

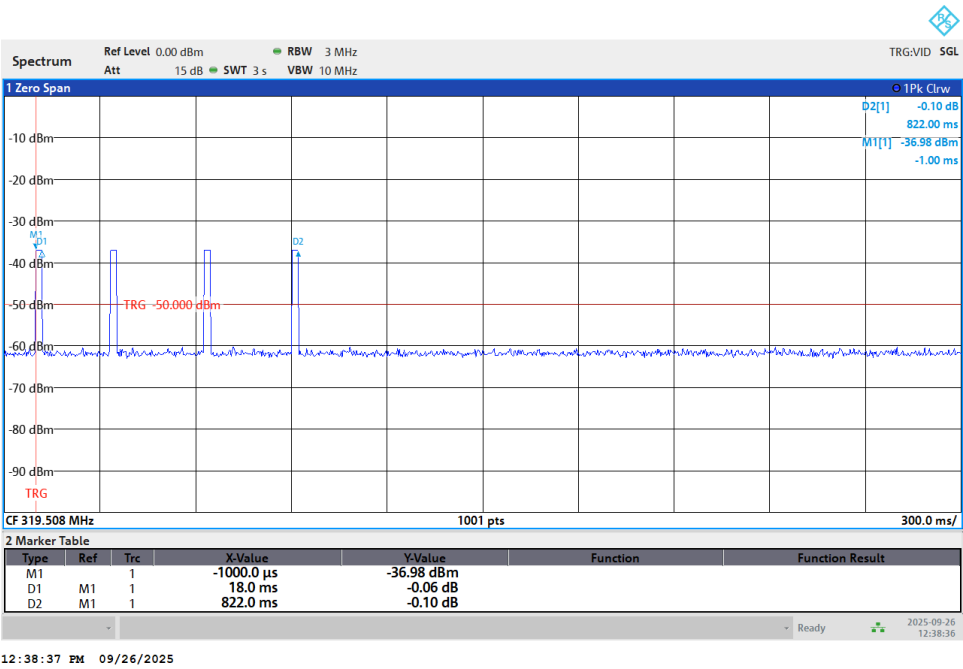


Figure 2.2.6.1-3 – Timing Measurement Test Results – Maximum Transmission Over One Hour – Supervisory – Number of Packets

**Table 2.2.6.1-2 – Transmitter Deactivation Time Test Results**

Frequency MHz	Transmission Type	Packets Length (s)	Number of Packets	Transmission Time (s)	Limit (s)	Result
319.508	Automatic	0.0182	4	0.0727	2	Pass



2.2.6.2 Transmitter Duty Cycle

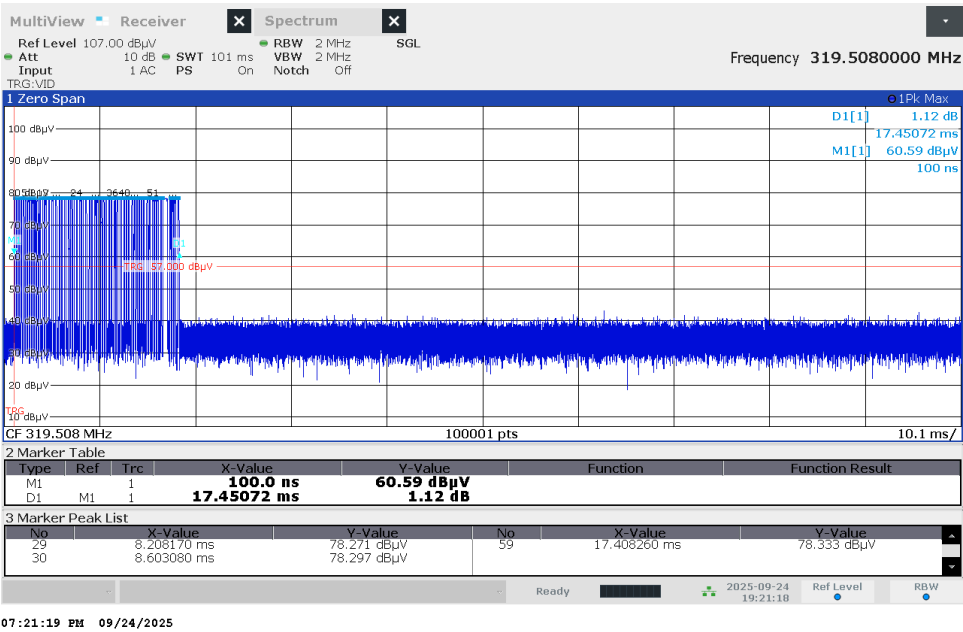


Figure 2.2.6.2-1 – Transmitter Duty Cycle – Number of Packets

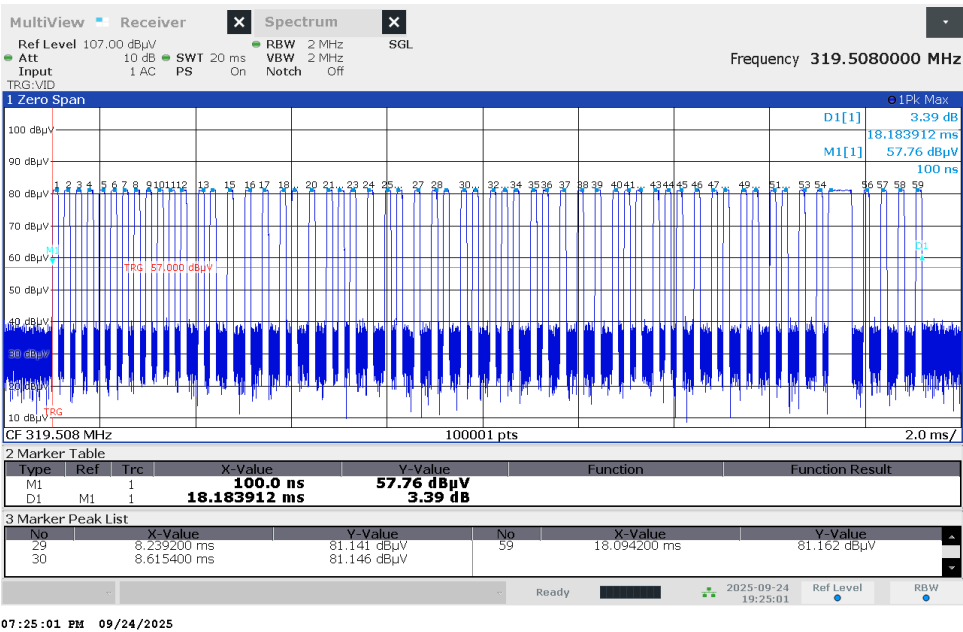


Figure 2.2.6.2-2 – Total Number of Pulses Test Results / Packet Length

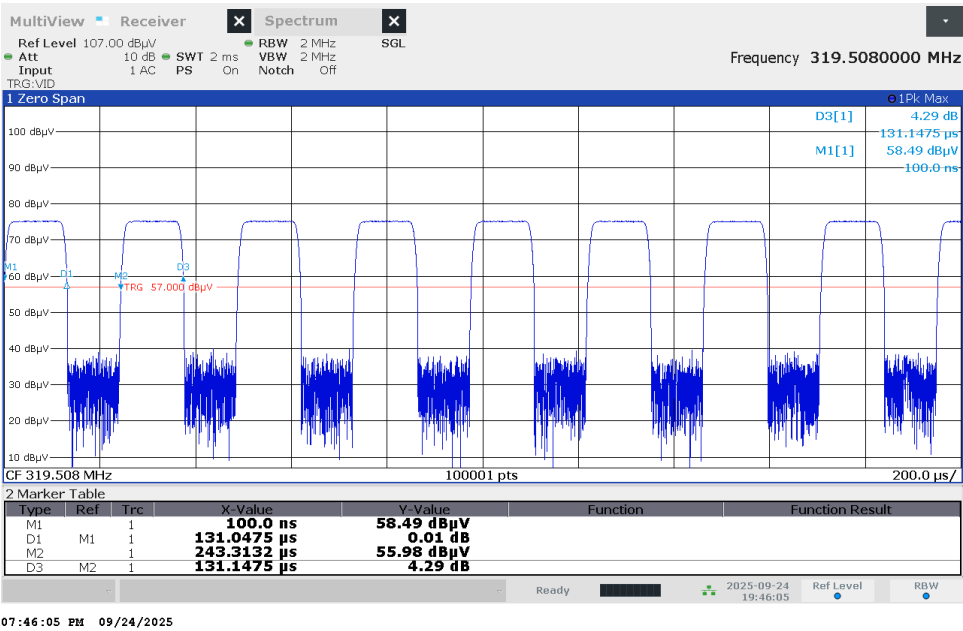


Figure 2.2.6.2-3 – Pulse Width Test Results

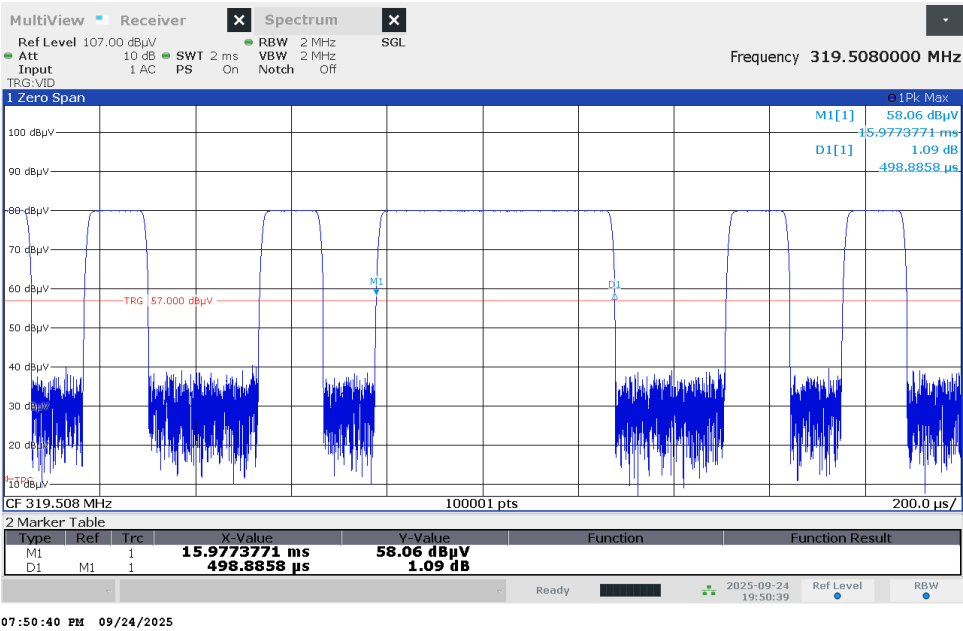


Figure 2.2.6.2-4 – Pulse Width Test Results

**Table 2.2.6.2-1 – Transmitter Duty Cycle Test Results**

Frequency MHz	Pulse Length (ms)	Number of Pulses	Transmission Time (ms)	Observation Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
319.508	0.1311475	58	7.606555	100	7.61%	-----
	0.4989	1	0.4989	100	0.50%	-----
Total	-----	59	8.1054	100	8.11%	-21.82

2.2.7 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 141 14th Street NW, New Brighton, MN 55112, USA.

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE03560	Huber & Suhner	Cable, BNC 1M	HS142	1M-8	B	08/04/2025	08/04/2026
NBLE11052	Huber & Suhner	Cable, BNC 1M	EF14211/BNC/11BNC	11052	B	03/17/2025	03/17/2026
NBLE11054	Huber & Suhner	Cable, BNC 1M	EF14211/BNC/11BNC	11054	B	01/09/2025	01/09/2026
WRLE11124	RF Precision Cables	2 Way Pwr Div, Type N	PDX2103	none	B	04/22/2025	04/22/2026
BEMC00079	ETS Lindgren (EMCO)	E & H Near Field Probe Set	7405	93	Y	O/M	O/M
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/01/2024	10/01/2025
NBLE11903	Rohde & Schwarz	Spectrum Analyzer, 5 kHz-7.5 GHz	FPL	200054	G	05/22/2025	05/22/2026

Cal Code G = Calibration performed by an accredited outside source.

Cal Code B = Calibration verification performed internally.

Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

O/M = Output Monitored with Calibrated Equipment.



2.3 Radiated Field Strength and Spurious Emissions

2.3.1 Specification Reference

FCC Sections: 15.231(b);
ISED Canada: RSS-210 A.1.3

2.3.2 Equipment Under Test and Modification State

S/N: X5-3

2.3.3 Date of Test

9/23/2025

2.3.4 Test Method

Radiated emissions tests were made over the frequency range of 9 kHz to 4 GHz, 10 times the highest fundamental frequency. Each emission found to be in a restricted band as defined by FCC 47 CFR Part 15 Subpart B Section 15.205, including any emission at the operational band-edge, was compared to the applicable radiated emission limits.

For measurements below 30 MHz, the receive antenna height was set to 1 m and the EUT was rotated through 360 degrees. The resolution bandwidth was set to 200 Hz below 150 kHz and to 9 kHz above 150 kHz.

For measurements above 30 MHz, the EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies which fall in the restricted bands between 30 MHz and 1 GHz, measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000 MHz, peak measurements are made with RBW of 1 MHz and VBW of 3 MHz.

The peak emissions were compared to a limit corresponding to 20 dB above the maximum permitted average limit according to Part 15.35. The final measurements were then corrected by antenna correction factors and cable loss for comparison to the limits. Further, compliance with the provisions of Section 15.205 was demonstrated using the measurement instrumentation specified in that section where applicable.

For the average test results, a duty cycle correction factor as described below was applied to the peak measurements.

2.3.5 Duty Cycle Correction

The EUT was configured to transmit at 100% duty cycle during the evaluation. Per the measurements of Section 2.2.6.2, a Duty Cycle Correction of 8.11% corresponding to $20 \cdot \log(8.11/100) = -21.820$ dB was applied to the peak measurements for the corrected average results.



2.3.6 Environmental Conditions

Ambient Temperature	23 - 25 °C
Relative Humidity	40 - 44 %
Atmospheric Pressure	985 - 989 mBar

2.3.7 Test Results

Battery Powered, Operating

Limit Clause FCC Sections 15.231(a), ISED Canada: RSS-210 A.1.3

Table 2.3.7-1 – Fundamental and Spurious Emissions Limits

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1250
Above 470	12,500	1250

¹Linear Interpolations

Limit Clause FCC Sections 15.205, 15.209, ISED Canada: RSS-GEN 8.9, 8.10

Table 2.3.7-2 – Spurious Emissions Limits in the Restricted Bands

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.4090-1.705	24000/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

** Except as provided in FCC 15.209 paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.



2.3.7.1 Field Strength of Fundamental Emissions

Fundamental Maximize only X axis S unit_15.231b

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
200 MHz - 400 MHz	3m	Vertical	1 MHz	18001 Pts	Auto
200 MHz - 400 MHz	3m	Horizontal	1 MHz	18001 Pts	Auto

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/23/2025	24.5 C	40 %	986 mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary OOK modulation	319.508 MHz	N/A	TX	X-axis

Limit:
FCC Part 15.231/FCC 15.231(b) 2025

Test Results:
Pass

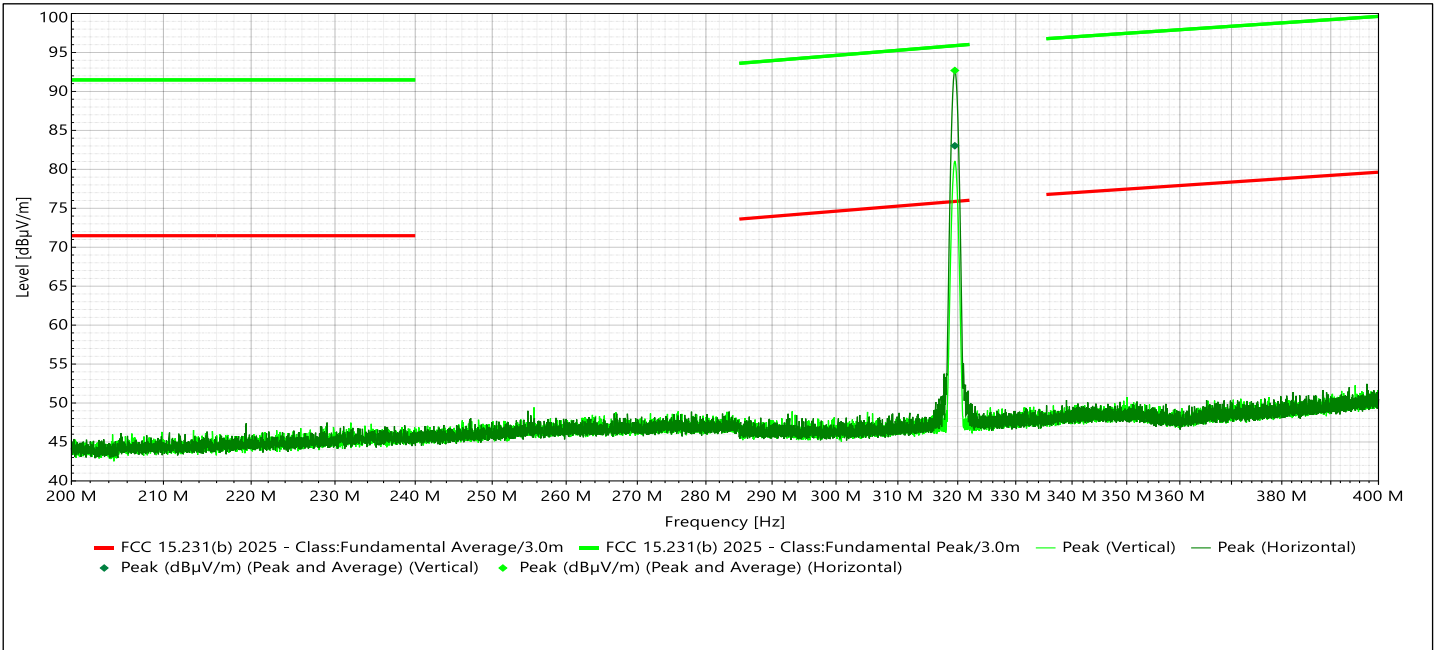


Figure 2.3.7.1-1 – Radiated Emissions Test Results



Finals

Table 3– Radiated Emissions Test Results

Frequency (MHz)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
319.508	83.02	95.88	-12.85	61.20	75.88	-14.68	271.00	1.42	Vertical	Pass
319.508	92.69	95.88	-3.18	70.87	75.88	-5.01	60.00	1.00	Horizontal	Pass

Test Notes: Fundamental Field Strength



Fundamental Maximize only Y axis S unit_15.231b

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
200 MHz - 400 MHz	3m	Vertical	1 MHz	18001 Pts	Auto
200 MHz - 400 MHz	3m	Horizontal	1 MHz	18001 Pts	Auto

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/23/2025	24.5 C	40 %	986 mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary OOK modulation	319.508 MHz	N/A	TX	Y-axis

Limit:
FCC Part 15.231/FCC 15.231(b) 2025

Test Results:
Pass

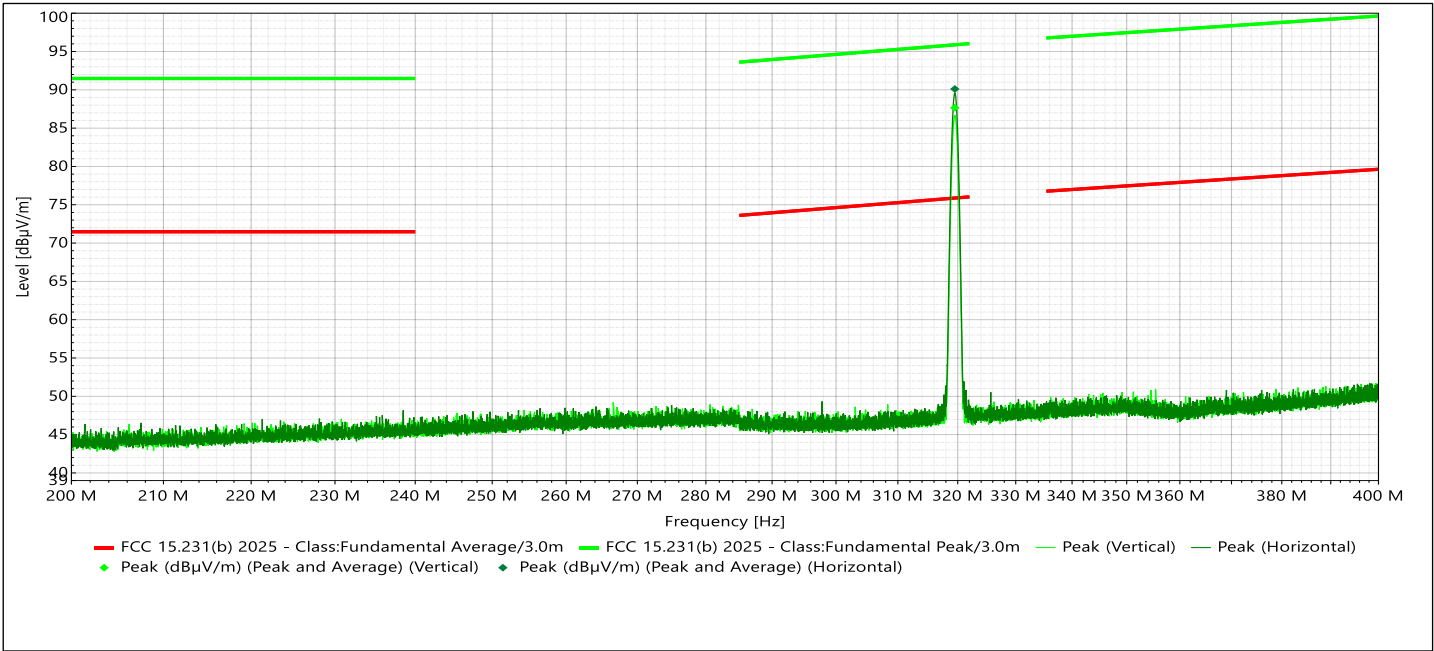


Figure 2.3.7.1-2 – Radiated Emissions Test Results



Finals

Table 4– Radiated Emissions Test Results

Frequency (MHz)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
319.509	87.66	95.88	-8.22	65.84	75.88	-10.04	109.00	1.92	Vertical	Pass
319.509	90.11	95.88	-5.77	68.29	75.88	-7.59	205.00	1.00	Horizontal	Pass

Test Notes: Fundamental Field Strength



Fundamental Maximize only Z axis S unit_15.231b

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
200 MHz - 400 MHz	3m	Vertical	1 MHz	18001 Pts	Auto
200 MHz - 400 MHz	3m	Horizontal	1 MHz	18001 Pts	Auto

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/23/2025	24.5 C	40 %	986 mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary OOK modulation	319.508 MHz	N/A	TX	Z-axis

Limit:
FCC Part 15.231/FCC 15.231(b) 2025

Test Results:
Pass

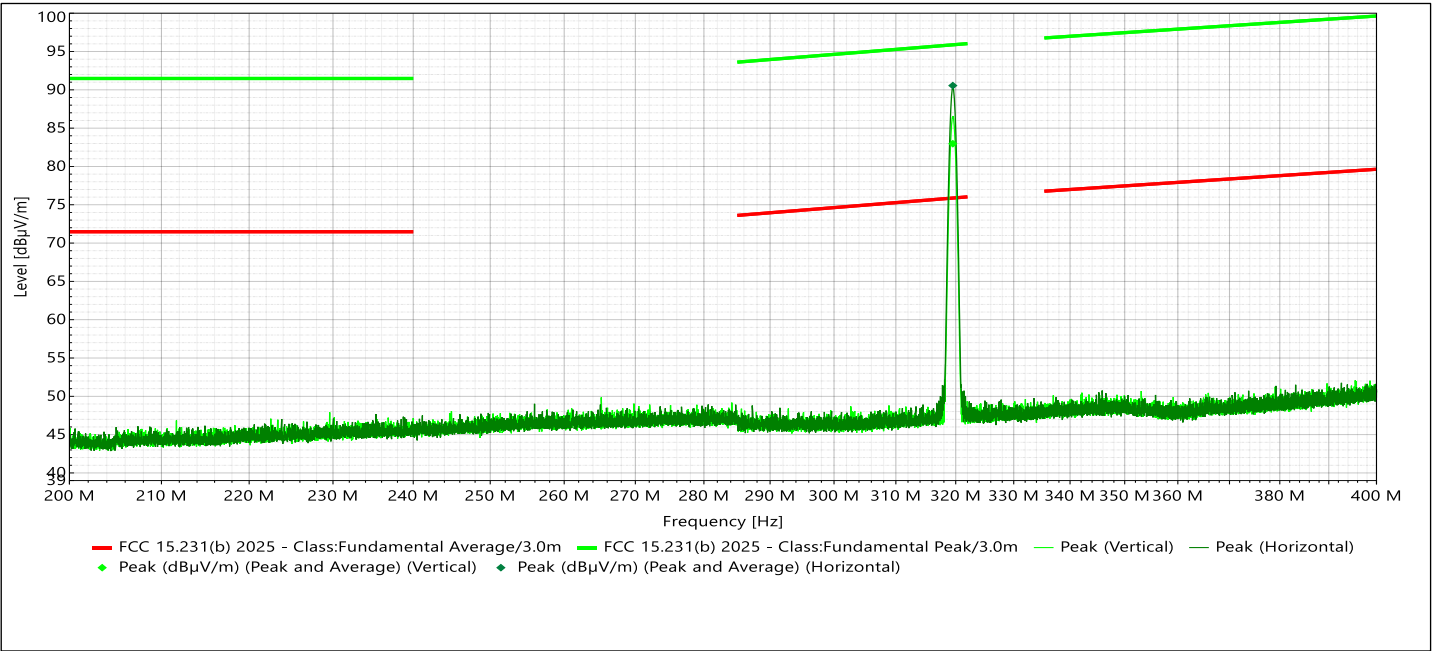


Figure 2.3.7.1-3 – Radiated Emissions Test Results



Finals

Table 5– Radiated Emissions Test Results

Frequency (MHz)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
319.508	82.97	95.88	-12.91	61.15	75.88	-14.73	104.00	2.84	Vertical	Pass
319.508	90.55	95.88	-5.32	68.73	75.88	-7.15	204.00	1.00	Horizontal	Pass

Test Notes: Fundamental Field Strength

2.3.7.2 Field Strength of Spurious Emissions

Spurious - 9kHz-30MHz - X Axis S unit - Vertical Co-Axial

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
9 kHz - 150 kHz	3m	Vertical	200 Hz	1411 Pts	5 ms/MHz
150 kHz - 30 MHz	3m	Vertical	9 kHz	5971 Pts	5 ms/MHz

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/23/2025	24.7C	40%	986 mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary OOK Modulation	319.508 MHz	N/A	TX	X-axis

Limit:

FCC Part 15/FCC §15.209_2025_09_23

Test Results:

Pass

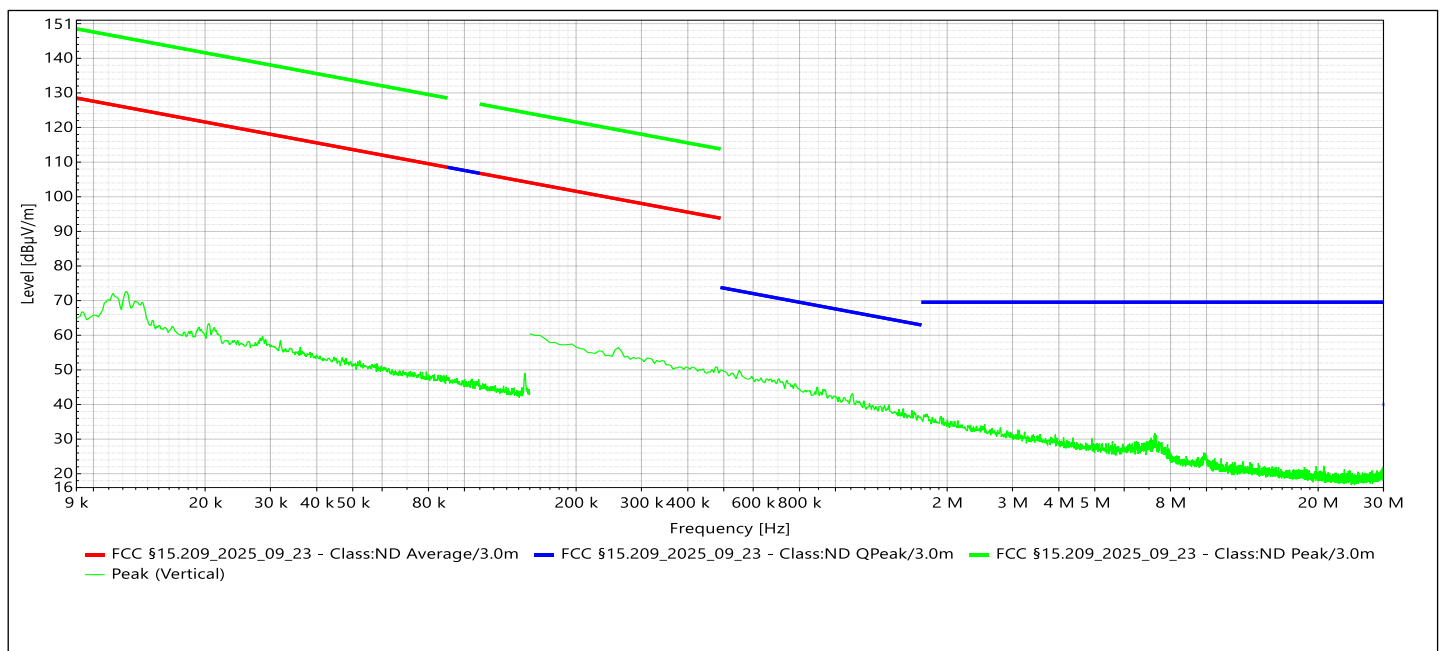


Figure 2.3.7.2-1 – Radiated Emissions Test Results

Test Notes:

- Field Strength of Spurious Emissions - Vertical Coaxial.
- No significant emissions were observed.



Spurious - 9kHz-30MHz - X Axis S unit - Vertical Co-Planar

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
9 kHz - 150 kHz	3m	Vertical	200 Hz	1411 Pts	5 ms/MHz
150 kHz - 30 MHz	3m	Vertical	9 kHz	5971 Pts	5 ms/MHz

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/23/2025	24.7C	40%	986 mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary OOK Modulation	319.508 MHz	N/A	TX	X-axis

Limit:
FCC Part 15/FCC §15.209_2025_09_23

Test Results:
Pass

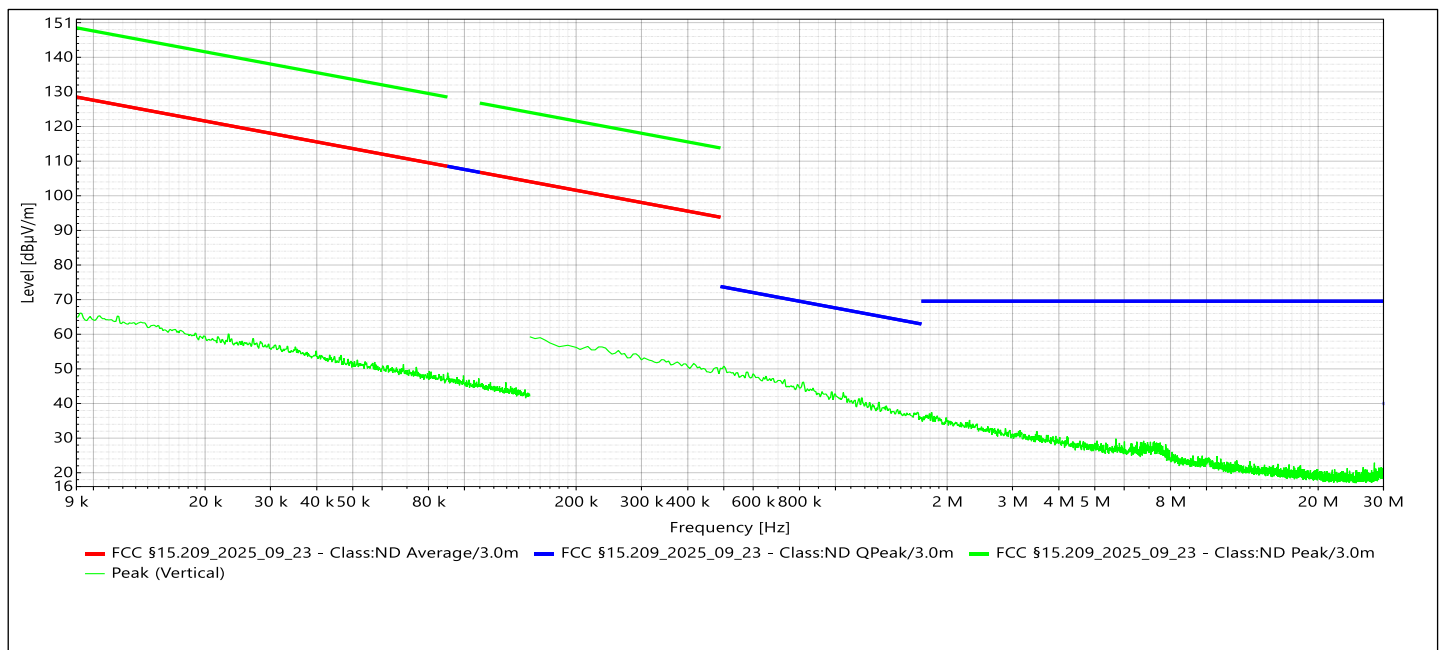


Figure 2.3.7.2-2 – Radiated Emissions Test Results

Test Notes:

- Field Strength of Spurious Emissions - Vertical Coplanar I.
- No significant emissions were observed.



Spurious - 9kHz-30MHz - X Axis S unit - Horizontal Co-Planar

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
9 kHz - 150 kHz	3m	Horizontal	200 Hz	1411 Pts	5 ms/MHz
150 kHz - 30 MHz	3m	Horizontal	9 kHz	5971 Pts	5 ms/MHz

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/23/2025	24.7C	40%	986 mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary OOK Modulation	319.508 MHz	N/A	TX	X-axis

Limit:

FCC Part 15/FCC §15.209_2025_09_23

Test Results:

Pass

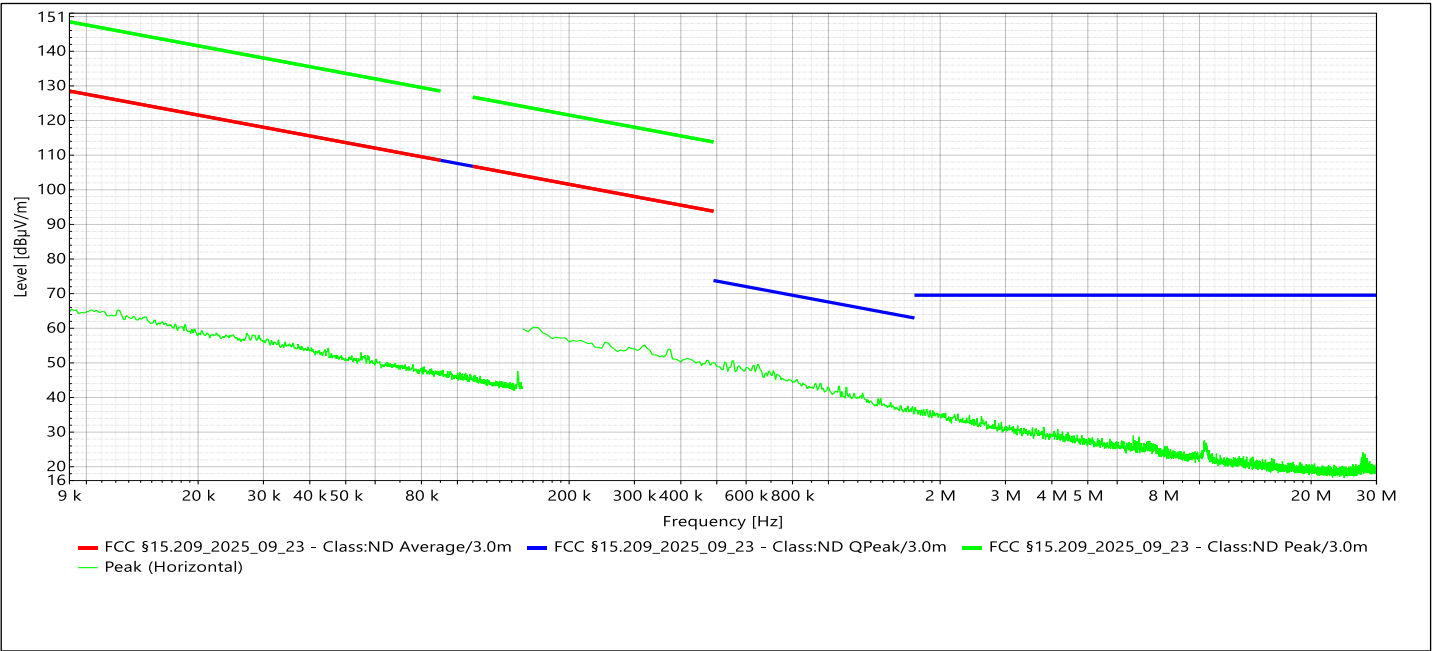


Figure 2.3.7.2-3 – Radiated Emissions Test Results

- Test Notes:
- Field Strength of Spurious Emissions - Horizontal Coplanar.
 - No significant emissions were observed.



Spurious - 30MHz - 1GHz - X axis S unit_15.231b

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
30 MHz - 1 GHz	3m	Vertical	1 MHz	19401 Pts	Auto
30 MHz - 1 GHz	3m	Horizontal	1 MHz	19401 Pts	Auto

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/23/2025	24.5 C	40 %	986 mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary OOK modulation	319.508 MHz	N/A	TX	X-axis

Limit:
FCC Part 15.231/FCC 15.231(b) 2025

Test Results:
Pass

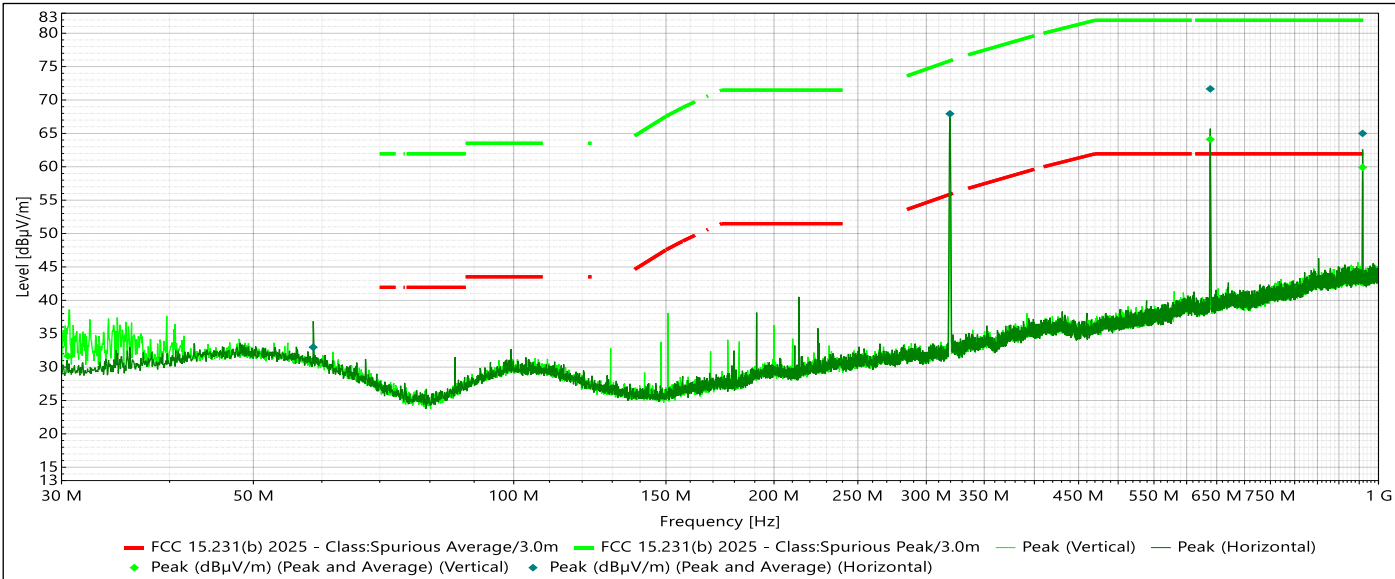


Figure 2.3.7.2-4 – Radiated Emissions Test Results



Finals

Table 2.3.7.2-1 – Radiated Emissions Test Results

Frequency (MHz)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
639.017	64.11	81.94	-17.83	42.29	61.94	-19.65	300.00	1.00	Vertical	Pass
958.526	59.92	81.94	-22.02	38.10	61.94	-23.84	204.00	1.16	Vertical	Pass
639.017	71.67	81.94	-10.27	49.85	61.94	-12.09	35.00	1.37	Horizontal	Pass
958.526	65.00	81.94	-16.94	43.18	61.94	-18.76	178.00	1.52	Horizontal	Pass

Test Notes:

- Field Strength of Spurious Emissions
- A Duty cycle correction factor of -21.82 dB was applied to the peak levels for the corrected average emissions test results.



Spurious RE 1-4GHz - X axis S unit_15.231b

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
1 GHz - 4 GHz	3m	Vertical	1 MHz	6001 Pts	200 ms
1 GHz - 4 GHz	3m	Horizontal	1 MHz	6001 Pts	200 ms

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/24/2025	23.7C	44%	989mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary, OOK Modulation	319.508 MHz	N/A	TX	X-axis

Limit:
FCC Part 15.231/FCC 15.231(b) 2025

Test Results:
Pass

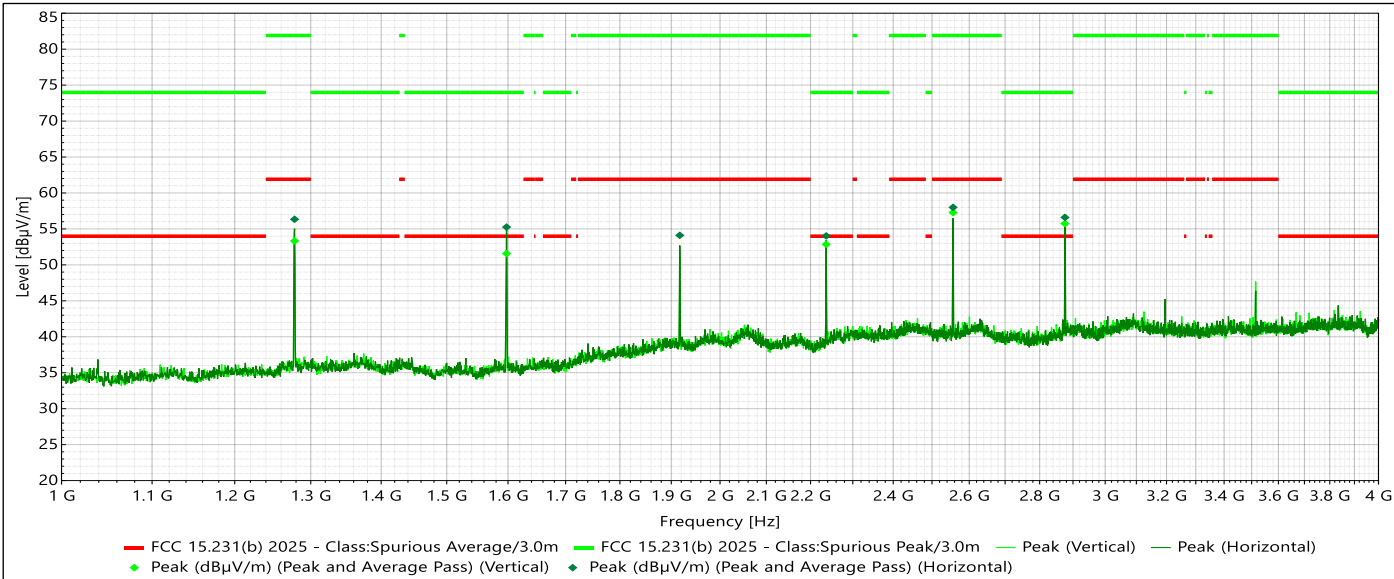


Figure 2.3.7.2-5 – Radiated Emissions Test Results



Finals

Table 2.3.7.2-2 – Radiated Emissions Test Results

Frequency (MHz)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
1278.034	53.33	81.90	-28.57	31.51	61.90	-30.39	23.00	1.00	Vertical	Pass
1597.543	51.57	73.98	-22.41	29.75	53.98	-24.23	47.00	1.47	Vertical	Pass
2236.560	52.86	73.98	-21.12	31.04	53.98	-22.94	47.00	1.19	Vertical	Pass
2556.069	57.27	81.90	-24.63	35.45	61.90	-26.45	217.00	3.60	Vertical	Pass
2875.576	55.74	73.98	-18.24	33.92	53.98	-20.06	47.00	1.00	Vertical	Pass
1278.034	56.34	81.90	-25.56	34.52	61.90	-27.38	63.00	1.40	Horizontal	Pass
1597.543	55.26	73.98	-18.72	33.44	53.98	-20.54	177.00	1.62	Horizontal	Pass
1917.052	54.11	81.90	-27.79	32.29	61.90	-29.61	192.00	1.48	Horizontal	Pass
2236.560	54.03	73.98	-19.95	32.21	53.98	-21.77	159.00	1.00	Horizontal	Pass
2556.069	58.00	81.90	-23.90	36.18	61.90	-25.72	77.00	1.82	Horizontal	Pass
2875.576	56.60	73.98	-17.38	34.78	53.98	-19.20	71.00	2.68	Horizontal	Pass

Test Notes:

- Field Strength of Spurious Emissions
- A Duty cycle correction factor of -21.82 dB was applied to the peak levels for the corrected average emissions test results.



Spurious - 9kHz-30MHz - Y Axis S unit - Vertical Co-Axial

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
9 kHz - 150 kHz	3m	Vertical	200 Hz	1411 Pts	5 ms/MHz
150 kHz - 30 MHz	3m	Vertical	9 kHz	5971 Pts	5 ms/MHz

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/23/2025	24.7C	40%	986 mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary OOK Modulation	319.508 MHz	N/A	TX	Y-axis

Limit:
FCC Part 15/FCC §15.209_2025_09_23

Test Results:
Pass

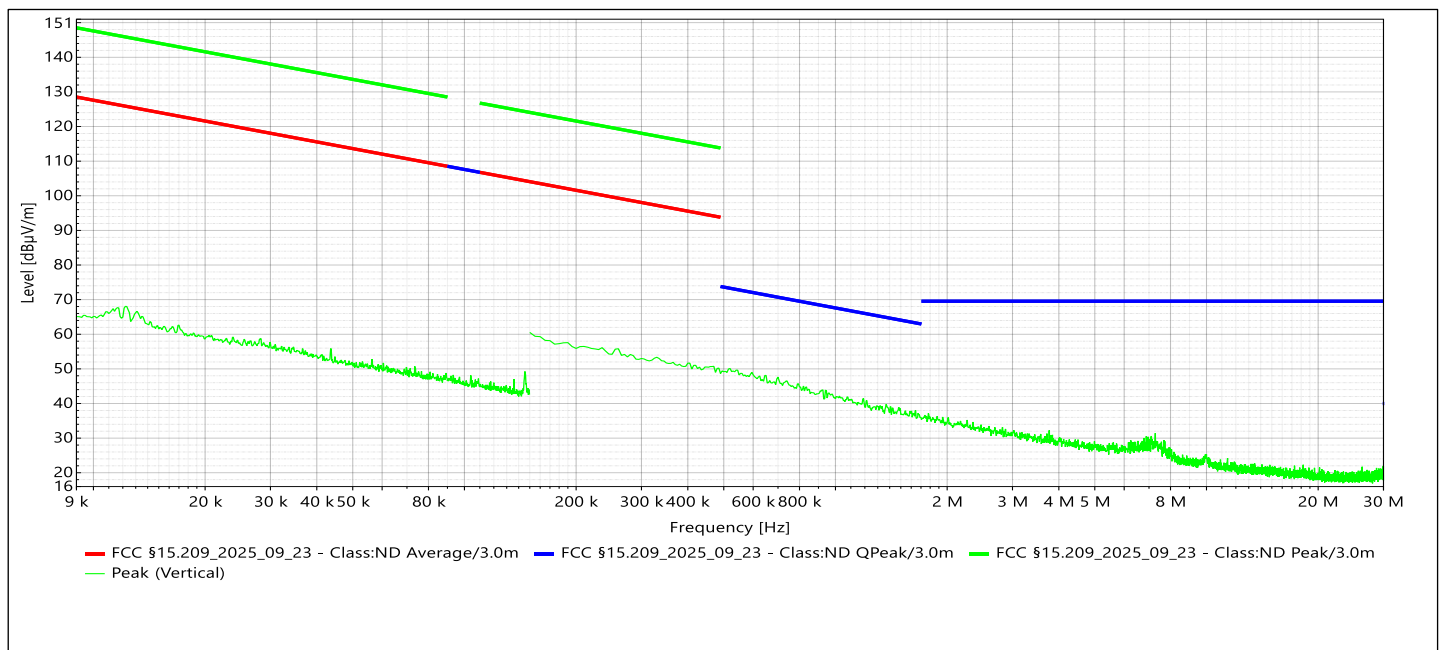


Figure 2.3.7.2-6 – Radiated Emissions Test Results

Test Notes:

- Field Strength of Spurious Emissions - Vertical Coaxial.
- No Significant Emissions were observed.



Spurious - 30MHz - 1GHz - Y axis S unit_15.231b

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
30 MHz - 1 GHz	3m	Vertical	1 MHz	19401 Pts	Auto
30 MHz - 1 GHz	3m	Horizontal	1 MHz	19401 Pts	Auto

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/23/2025	24.8 C	40 %	985 mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary OOK modulation	319.508 MHz	N/A	TX	Y-axis

Limit:
FCC Part 15.231/FCC 15.231(b) 2025

Test Results:
Pass

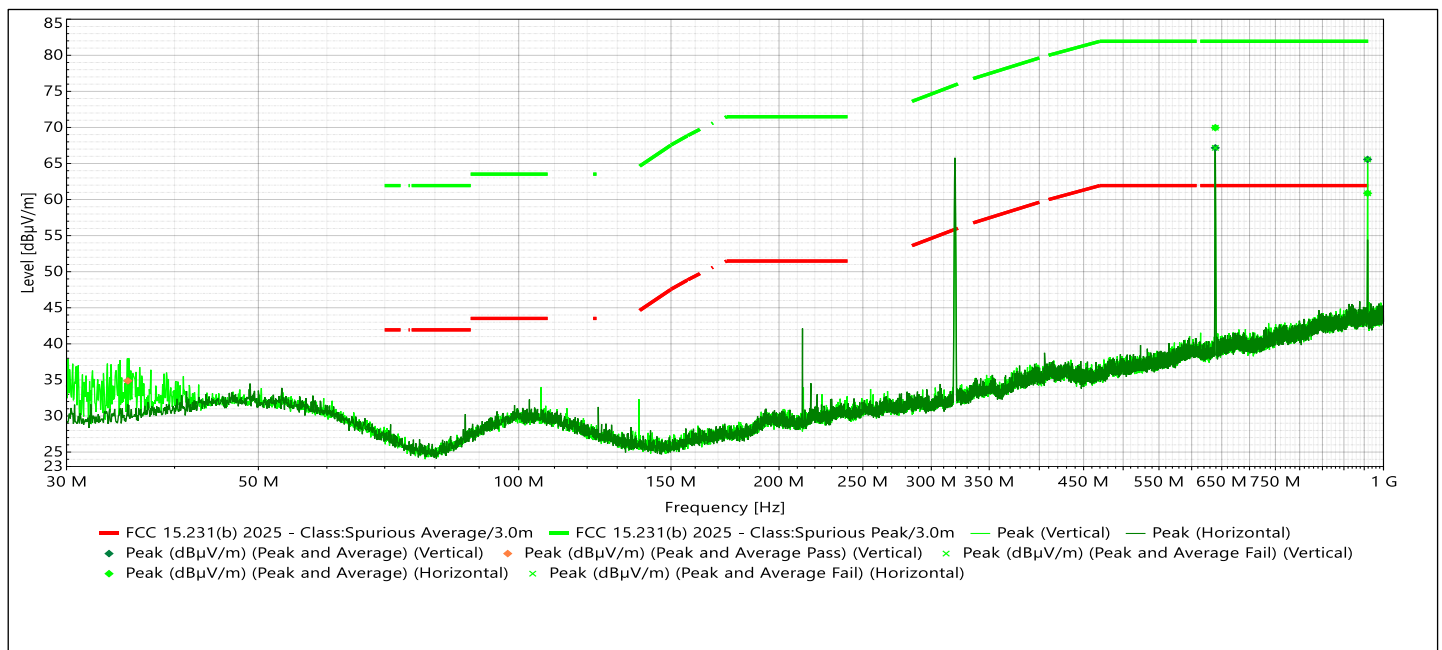


Figure 2.3.7.2-7 – Radiated Emissions Test Results



Finals

Table 2.3.7.2-3 – Radiated Emissions Test Results

Frequency (MHz)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
639.017	67.17	81.94	-14.77	45.35	61.94	-16.59	97.00	1.00	Vertical	Pass
958.526	65.57	81.94	-16.37	43.75	61.94	-18.19	215.00	1.11	Vertical	Pass
639.017	69.96	81.94	-11.98	48.14	61.94	-13.8	344.00	1.26	Horizontal	Pass
958.525	60.87	81.94	-21.07	39.05	61.94	-22.89	249.00	1.41	Horizontal	Pass

Test Notes:

- Field Strength of Spurious Emissions
- A Duty cycle correction factor of -21.82 dB was applied to the peak levels for the corrected average emissions test results.



Spurious RE 1-4GHz - Y axis S unit_15.231b

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
1 GHz - 4 GHz	3m	Vertical	1 MHz	6001 Pts	200 ms
1 GHz - 4 GHz	3m	Horizontal	1 MHz	6001 Pts	200 ms

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/24/2025	23.7C	44%	989mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary, OOK Modulation	319.508 MHz	N/A	TX	Y-axis

Limit:
FCC Part 15.231/FCC 15.231(b) 2025

Test Results:
Pass

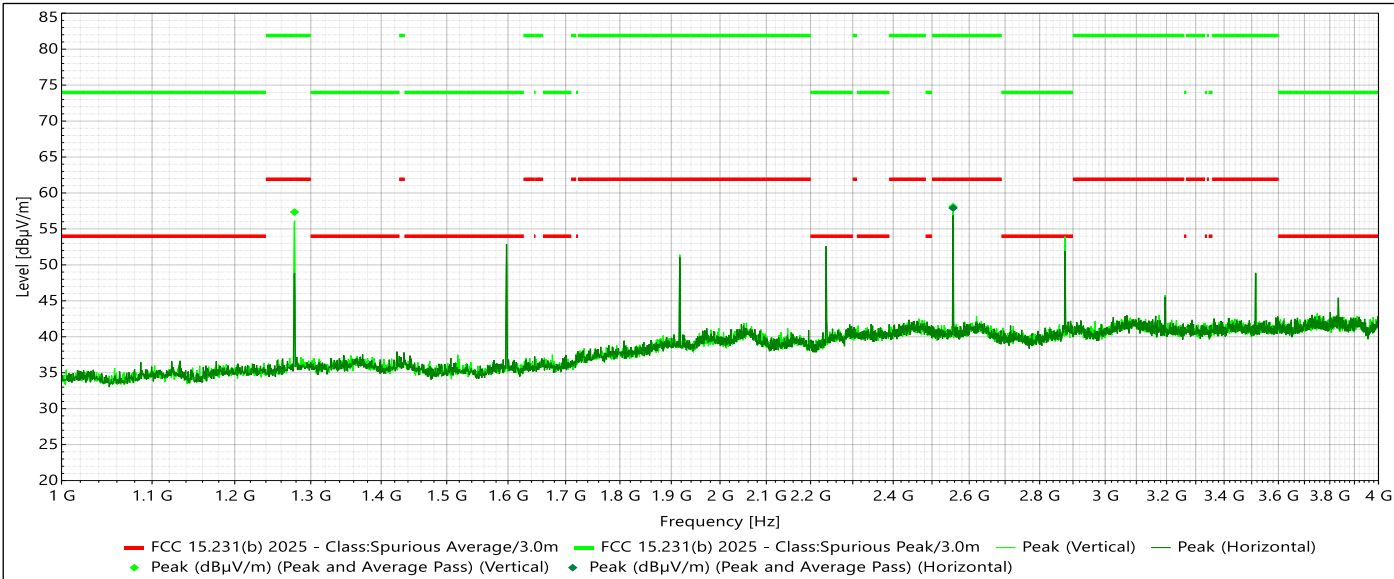


Figure 2.3.7.2-8 – Radiated Emissions Test Results



Finals

Table 2.3.7.2-4 – Radiated Emissions Test Results

Frequency (MHz)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
1278.034	57.34	81.90	-24.56	35.52	61.9	-26.38	161.00	1.47	Vertical	Pass
2556.069	58.10	81.90	-23.80	36.28	61.9	-25.62	161.00	1.00	Vertical	Pass
2556.069	57.90	81.90	-24.00	36.08	61.9	-25.82	226.00	1.97	Horizontal	Pass

Test Notes:

- Field Strength of Spurious Emissions
- A Duty cycle correction factor of -21.82 dB was applied to the peak levels for the corrected average emissions test results.



Spurious - 9kHz-30MHz - Z Axis S unit - Vertical Co-Axial

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
9 kHz - 150 kHz	3m	Vertical	200 Hz	1411 Pts	5 ms/MHz
150 kHz - 30 MHz	3m	Vertical	9 kHz	5971 Pts	5 ms/MHz

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/23/2025	24.7 C	40%	986 mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary OOK Modulation	319.508 MHz	N/A	TX	Z-axis

Limit:

FCC Part 15/FCC §15.209_2025_09_23

Test Results:

Pass

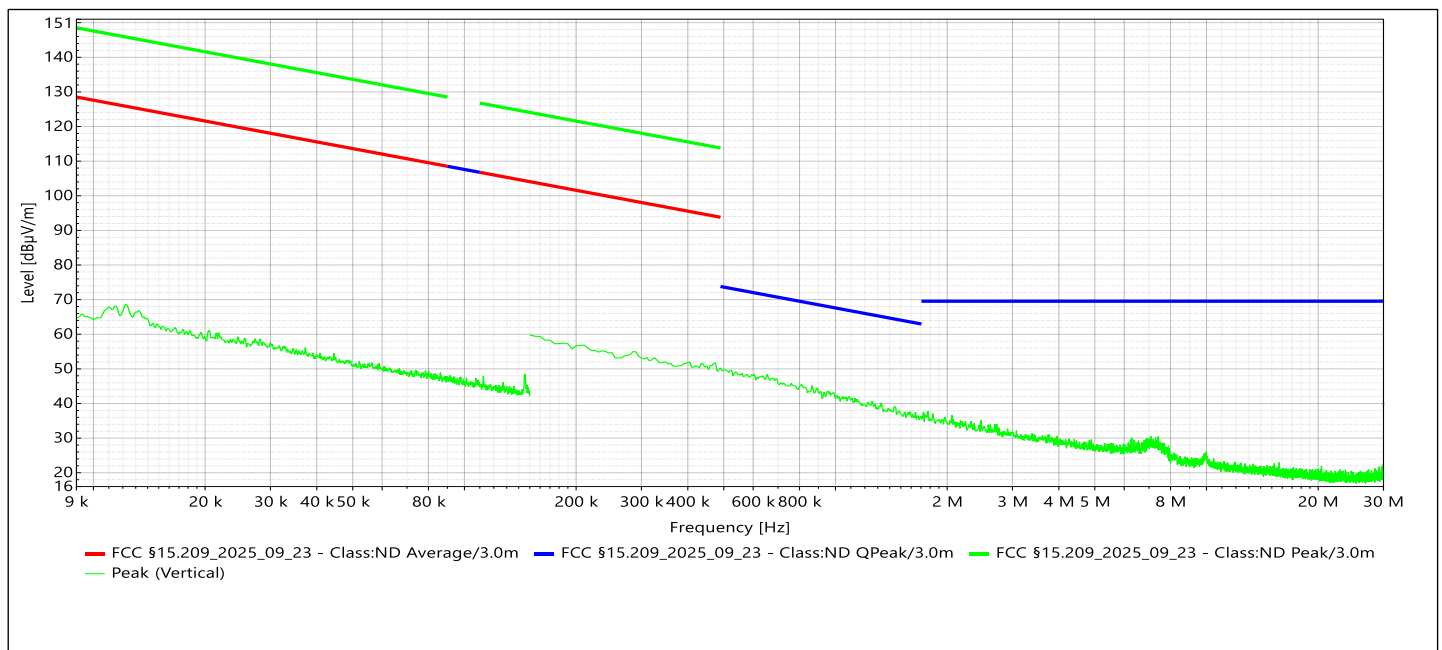


Figure 9 – Radiated Emissions Test Results

Test Notes:

- Field Strength of Spurious Emissions - Vertical Coaxial.
- No significant emissions were observed.



Spurious - 30MHz - 1GHz - Z axis S unit_15.231b

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
30 MHz - 1 GHz	3m	Vertical	1 MHz	19401 Pts	Auto
30 MHz - 1 GHz	3m	Horizontal	1 MHz	19401 Pts	Auto

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/23/2025	24.9 C	40 %	985 mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary OOK modulation	319.508 MHz	N/A	TX	Z-axis

Limit:
FCC Part 15.231/FCC 15.231(b) 2025

Test Results:
Pass

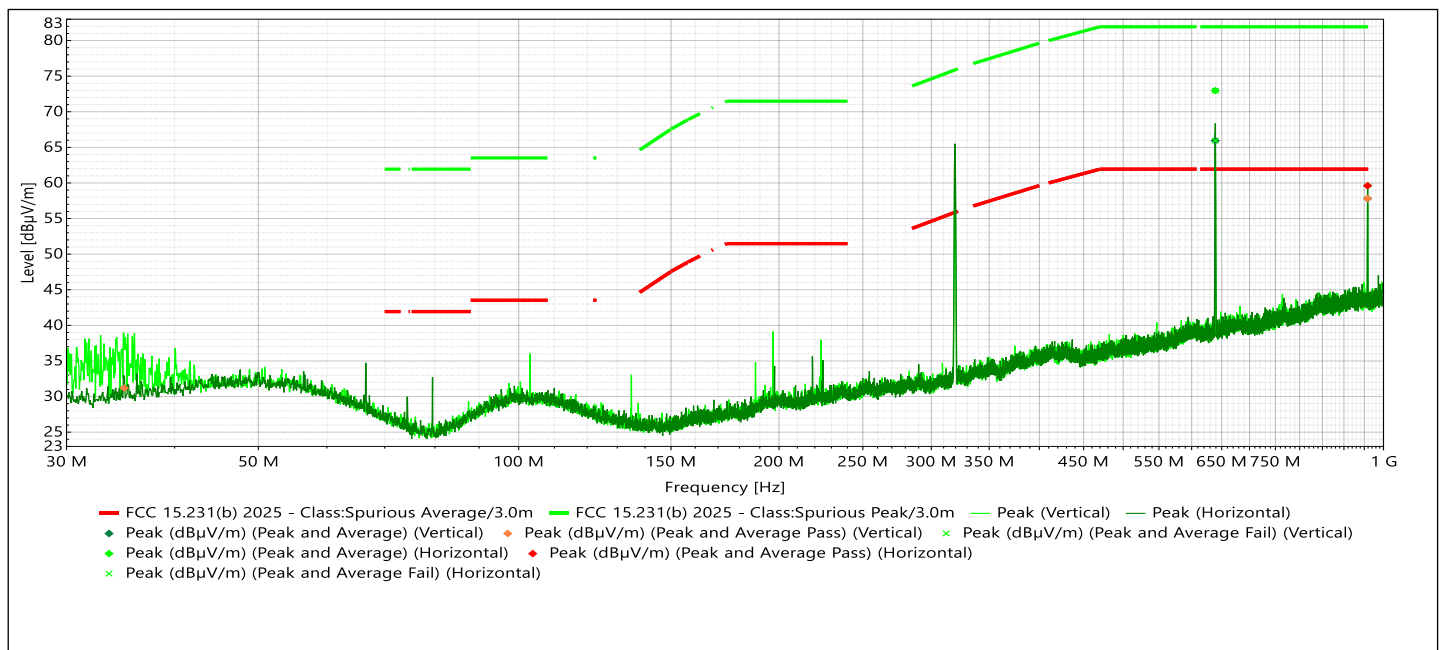


Figure 2.3.7.2-10 – Radiated Emissions Test Results



Finals

Table 2.3.7.2-5 – Radiated Emissions Test Results

Frequency (MHz)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
639.017	65.95	81.94	-15.99	44.13	61.94	-17.81	117.00	1.00	Vertical	Pass
958.526	57.82	81.94	-24.12	36.00	61.94	-25.94	236.00	1.00	Vertical	Pass
639.017	72.97	81.94	-8.97	51.15	61.94	-10.79	340.00	1.26	Horizontal	Pass
958.526	59.61	81.94	-22.33	37.79	61.94	-24.15	123.00	3.75	Horizontal	Pass

Test Notes:

- Field Strength of Spurious Emissions
- A Duty cycle correction factor of -21.82 dB was applied to the peak levels for the corrected average emissions test results.



Spurious RE 1-4GHz - Z axis S unit_15.231b

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
1 GHz - 4 GHz	3m	Vertical	1 MHz	6001 Pts	200 ms
1 GHz - 4 GHz	3m	Horizontal	1 MHz	6001 Pts	200 ms

Test Area	Tested By	Test Date	Temperature	Humidity	Pressure
3mSAC	Thierry Jean-Charles	9/24/2025	24.9C	42%	989mBar

Technology	Frequency	Channel	Mode	EUT Orientation
Proprietary, OOK Modulation	319.508 MHz	N/A	TX	Z-axis

Limit:
FCC Part 15.231/FCC 15.231(b) 2025

Test Results:
Pass

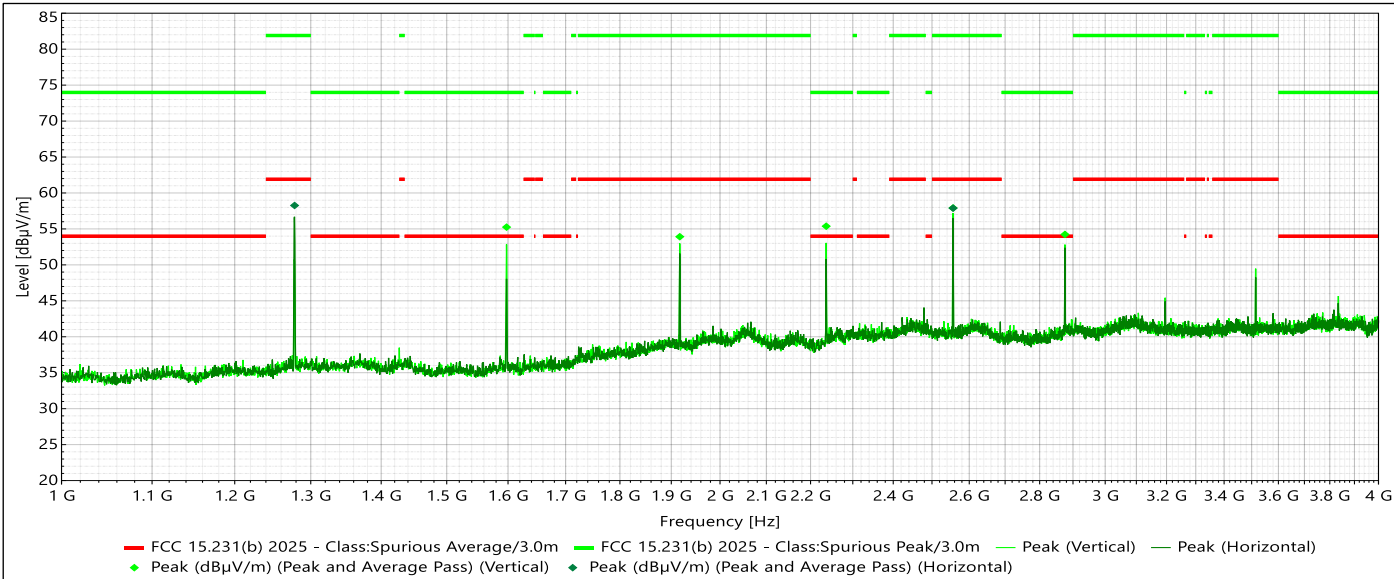


Figure 2.3.7.2-11 – Radiated Emissions Test Results



Finals

Table 2.3.7.2-6 – Radiated Emissions Test Results

Frequency (MHz)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
1597.543	55.25	73.98	-18.73	33.43	53.98	-20.55	136.00	1.19	Vertical	Pass
1917.050	53.92	81.90	-27.98	32.1	61.9	-29.8	104.00	1.12	Vertical	Pass
2236.560	55.38	73.98	-18.60	33.56	53.98	-20.42	144.00	1.33	Vertical	Pass
2556.069	57.91	81.90	-23.99	36.09	61.9	-25.81	185.00	4.00	Vertical	Pass
2875.576	54.24	73.98	-19.74	32.42	53.98	-21.56	209.00	2.25	Vertical	Pass
1278.034	58.26	81.90	-23.64	36.44	61.9	-25.46	200.00	1.12	Horizontal	Pass
2556.069	57.89	81.90	-24.01	36.07	61.9	-25.83	37.00	2.89	Horizontal	Pass

Test Notes:

- Field Strength of Spurious Emissions.
- A Duty cycle correction factor of -21.82 dB was applied to the peak levels for the corrected average emissions test results.

2.3.8 Sample Calculations

$$R_C = R_U + CF_T$$

Where:

CF_T	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U	=	Uncorrected Reading
R_C	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

Example Calculation: Peak

Corrected Level: $58.27 + (-6.7) = 51.57$ dBuV/m

Margin: 51.57 dBuV/m – 73.98 dBuV/m = -22.41 dB

Example Calculation: Average

Corrected Level: $58.27 + (-6.7) - 21.820 = 29.75$ dBuV/m

Margin: 29.75 dBuV/m – 53.98 dBuV/m = -24.23 dB



2.3.9 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 141 14th Street NW, New Brighton, MN 55112, USA.

Test Site: 3mSAC

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE03504	Florida RF Labs	Cable, N 3ft	FL335	3ft-1	B	03/19/2025	03/19/2026
NBLE10574	Huber & Suhner	Cable, BNC 3M	EF142	10574	B	03/21/2025	03/21/2026
WRLE02418	EMCO/EMC Test	Antenna, Loop	6502	2215	G	03/18/2025	03/18/2027
WRLE10891	Huber & Suhner	Cable, BNC 5M	EF142/11BNC/11BNC/5M	na	B	03/17/2025	03/17/2026
WRLE11214	APT Tech/Spectrum Tech	Filter, 900 MHz High Pass	FF6549-1 (SAP 21003976)	10	B	03/25/2025	03/25/2026
WRLE11519	Com-Power Corp.	Preamplifier, 500 MHz-18 GHz	PAM-118A	18040002	B	01/23/2025	01/23/2026
NBLE11614	Teledyne Storm Microwave	Cable, N 3m	90-195-3MTR	182984-003	B	02/05/2025	02/05/2026
NBLE11618	Teledyne Storm Microwave	Cable, N 8m	90-195-8MTR	182982-004	B	02/05/2025	02/05/2026
NBLE11630	ETS-Lindgren	Antenna, 1-18 GHz	3117	00218816	G	09/27/2024	09/27/2026
NBLE11645	Schwarzbeck	Antenna, Trilog, 30 MHz-7 GHz	VULB 9162	0254	G	06/24/2025	06/24/2027
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/01/2024	10/01/2025

Cal Code G = Calibration performed by an accredited outside source.

Cal Code B = Calibration verification performed internally.

Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.



2.4 20 dB Bandwidth

2.4.1 Specification Reference

FCC: Section 15.215

2.4.2 Equipment Under Test and Modification State

S/N: X5-3

2.4.3 Date of Test

9/23/2025

2.4.4 Test Method

The spectrum analyzer span was set to 2 to 5 times the estimated bandwidth of the emission. The RBW was set from 1% to 5% of the estimated emission bandwidth. The trace was set to max hold with a peak detector active. The 20-dB function of the analyzer was utilized to determine the 20 dB bandwidth of the emission.

2.4.5 Environmental Conditions

Ambient Temperature	22.8°C
Relative Humidity	48 %
Atmospheric Pressure	984 mBar

2.4.6 Test Results

Battery Powered, Operating

Limit Clause FCC Part 15.231(c)

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Summary:

The 20 dB Bandwidth limit is calculated as 0.25% of the 319.508 MHz center frequency. The limit is equal to 0.799 MHz. Therefore, the 20 dB bandwidth of the emission is less than 0.25% of the center frequency.

Test Result: Pass

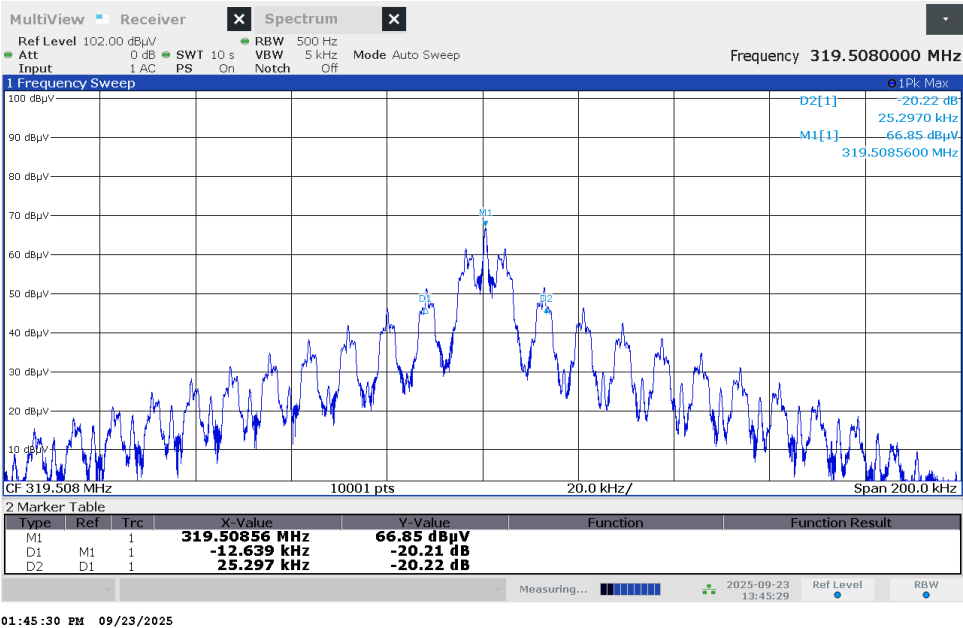


Figure 2.4.6-1 – 20-dB Bandwidth Test Results

Table 2.4.6-1 – 20 dB Bandwidth Test Results

Frequency MHz	Bandwidth (kHz)	Limit (kHz)	Result
319.50856	25.297	79.87714	Pass



2.4.7 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 141 14th Street NW, New Brighton, MN 55112, USA.

Test Site: 3mSAC

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE03504	Florida RF Labs	Cable, N 3ft	FL335	3ft-1	B	03/19/2025	03/19/2026
NBLE11614	Teledyne Storm Microwave	Cable, N 3m	90-195-3MTR	182984-003	B	02/05/2025	02/05/2026
NBLE11618	Teledyne Storm Microwave	Cable, N 8m	90-195-8MTR	182982-004	B	02/05/2025	02/05/2026
NBLE11645	Schwarzbeck	Antenna, Trilog, 30 MHz-7 GHz	VULB 9162	0254	G	06/24/2025	06/24/2027
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/01/2024	10/01/2025

Cal Code G = Calibration performed by an accredited outside source.

Cal Code B = Calibration verification performed internally.

Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.



2.5 99% Bandwidth

2.5.1 Specification Reference

ISED Canada: RSS-210 A.1.4

2.5.2 Equipment Under Test and Modification State

S/N: X5-3

2.5.3 Date of Test

9/23/2025

2.5.4 Test Method

The 99% occupied bandwidth was measured with the spectrum analyzer span set to fully display the emission. The RBW was set to 1% to 5% of the approximated bandwidth. The occupied 99% bandwidth was measured by using 99% bandwidth equipment function of the spectrum analyzer using a peak detector.

2.5.5 Environmental Conditions

Ambient Temperature	22.8°C
Relative Humidity	48 %
Atmospheric Pressure	984 mBar

2.5.6 Test Results

Battery Powered, Operating

Limit Clause ISED RSS-210 A.1.4

The occupied bandwidth of momentarily operated devices shall be less than or equal to 0.25% of the center frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the occupied bandwidth shall be less than or equal to 0.5% of the center frequency.

Test Summary:

The 99% Occupied Bandwidth limit is calculated as 0.25% of the 319.508 MHz center frequency. The limit is equal to 0.799 MHz. Therefore the 99% bandwidth of the emission is less than 0.25% of the center frequency.

Test Result: Pass

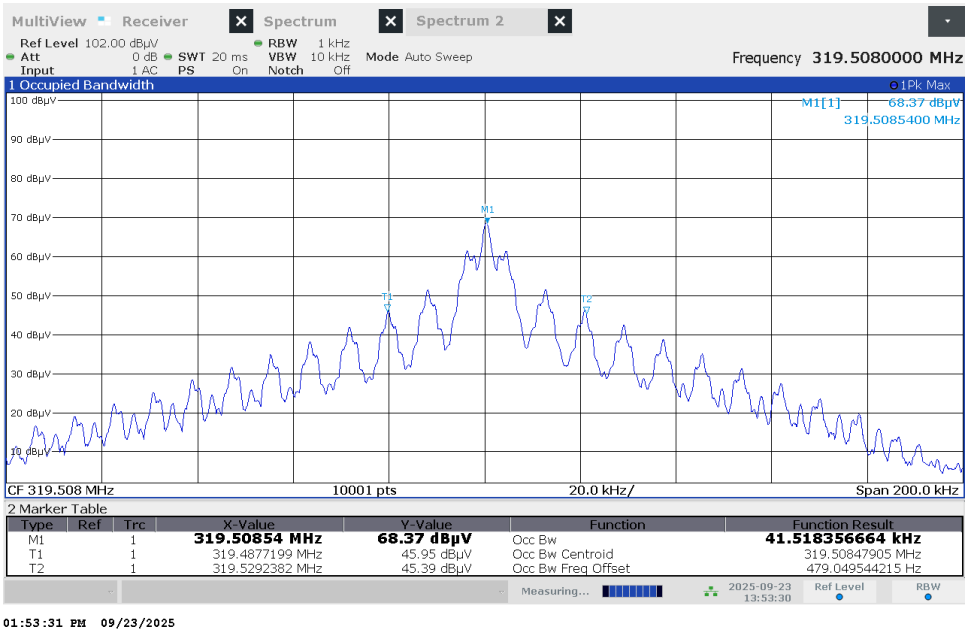


Figure 2.5.6-1 – 99% Bandwidth Test Results

Table 2.5.6-1 – 99% Bandwidth Test Results

Frequency MHz	Bandwidth (kHz)	Limit (kHz)	Result
319.50856	41.5184	79.87714	Pass

2.5.7 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 141 14th Street NW, New Brighton, MN 55112, USA.

Test Site: 3mSAC

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE03504	Florida RF Labs	Cable, N 3ft	FL335	3ft-1	B	03/19/2025	03/19/2026
NBLE11614	Teledyne Storm Microwave	Cable, N 3m	90-195-3MTR	182984-003	B	02/05/2025	02/05/2026
NBLE11618	Teledyne Storm Microwave	Cable, N 8m	90-195-8MTR	182982-004	B	02/05/2025	02/05/2026
NBLE11645	Schwarzbeck	Antenna, Trilog, 30 MHz-7 GHz	VULB 9162	0254	G	06/24/2025	06/24/2027
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/01/2024	10/01/2025

Cal Code G = Calibration performed by an accredited outside source.
Cal Code B = Calibration verification performed internally.
Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.



3 Test Equipment Information

3.1 General Test Equipment Used

TEST EQUIPMENT

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated to meet test method standard requirements and/or manufacturer's specifications

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE03504	Florida RF Labs	Cable, N 3ft	FL335	3ft-1	B	03/19/2025	03/19/2026
NBLE10574	Huber & Suhner	Cable, BNC 3M	EF142	10574	B	03/21/2025	03/21/2026
WRLE02418	EMCO/EMC Test	Antenna, Loop	6502	2215	G	03/18/2025	03/18/2027
WRLE10891	Huber & Suhner	Cable, BNC 5M	EF142/11BNC/11BNC/5M	na	B	03/17/2025	03/17/2026
WRLE11214	APT Tech/Spectrum Tech	Filter, 900 MHz High Pass	FF6549-1 (SAP 21003976)	10	B	03/25/2025	03/25/2026
WRLE11519	Com-Power Corp.	Preamplifier, 500 MHz-18 GHz	PAM-118A	18040002	B	01/23/2025	01/23/2026
NBLE11614	Teledyne Storm Microwave	Cable, N 3m	90-195-3MTR	182984-003	B	02/05/2025	02/05/2026
NBLE11618	Teledyne Storm Microwave	Cable, N 8m	90-195-8MTR	182982-004	B	02/05/2025	02/05/2026
NBLE11630	ETS-Lindgren	Antenna, 1-18 GHz	3117	00218816	G	09/27/2024	09/27/2026
NBLE11645	Schwarzbeck	Antenna, Trilog, 30 MHz-7 GHz	VULB 9162	0254	G	06/24/2025	06/24/2027
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/01/2024	10/01/2025
NBLE03560	Huber & Suhner	Cable, BNC 1M	HS142	1M-8	B	08/04/2025	08/04/2026
NBLE11052	Huber & Suhner	Cable, BNC 1M	EF14211/BNC/11BNC	11052	B	03/17/2025	03/17/2026
NBLE11054	Huber & Suhner	Cable, BNC 1M	EF14211/BNC/11BNC	11054	B	01/09/2025	01/09/2026
WRLE11124	RF Precision Cables	2 Way Pwr Div, Type N	PDX2103	none	B	04/22/2025	04/22/2026
BEMC00079	ETS Lindgren (EMCO)	E & H Near Field Probe Set	7405	93	Y	O/M	O/M



Cal Code G = Calibration performed by an accredited outside source.

Cal Code B = Calibration verification performed internally.

Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

O/M = Output Monitored with Calibrated Equipment.

4 Diagram of Test Set-ups

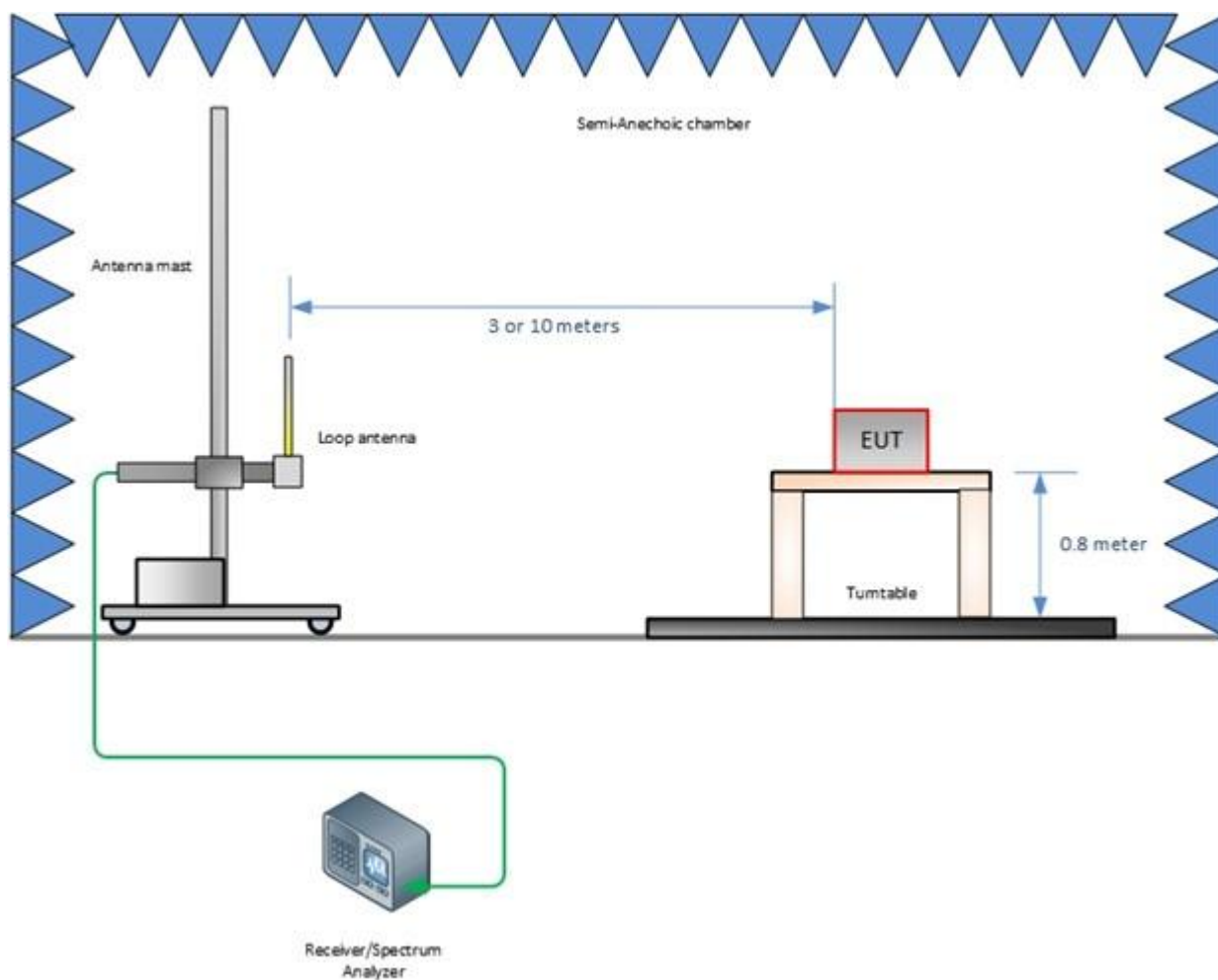


Figure 4-1 – Radiated Emissions Test Setup below 30 MHz

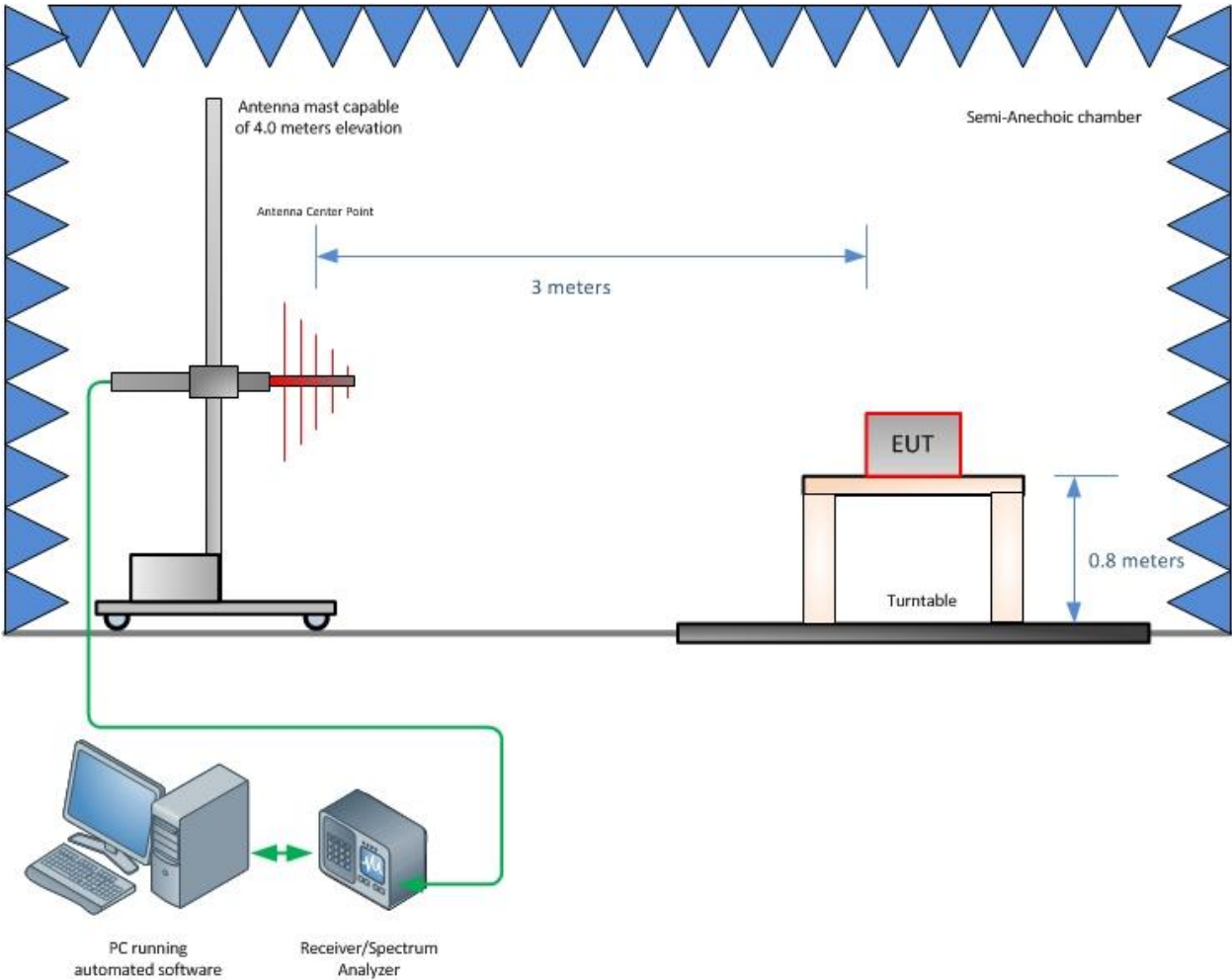


Figure 4-2 – Radiated Emissions Test Setup up to 1 GHz

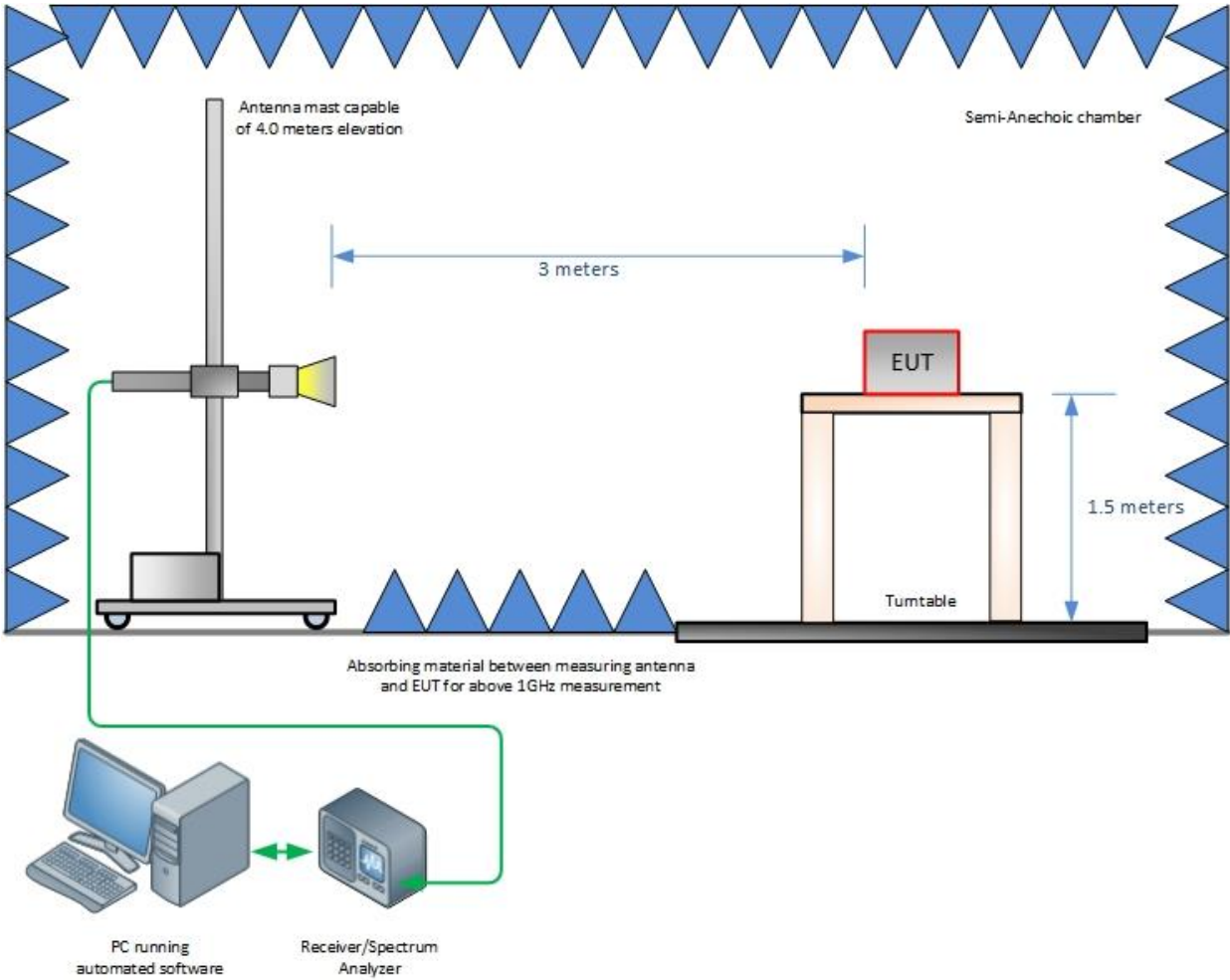


Figure 4-3 – Radiated Emissions Test Setup above 1 GHz



5 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Table 5-1- Values of U_{CISPR} and U_{Lab}

Measurement	U_{CISPR}	U_{Lab}
Radiated disturbance (electric field strength on an open area test site or alternative test site)		
(30 MHz – 1 000 MHz)	6.3 dB	5.88 dB
(1 – 6 GHz)	5.2 dB	4.47 dB
(6-18 GHz)	5.5 dB	4.47 dB

Notes:

U_{CISPR} resembles a value of measurement uncertainty for a specific test, which was determined by considering uncertainties associated with the quantities listed in CISPR 16-4-2:2011.

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. This test system has a measurement uncertainty of ± 3.30 dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. This test system for 30 MHz-1000 MHz has a measurement uncertainty of ± 5.88 dB and above 1 GHz a measurement uncertainty of ± 4.47 dB. The measurement uncertainty values for conducted and radiated emissions meet the requirements as expressed in CISPR 16-4-2. The equipment comprising the test systems is calibrated on an annual basis.



6 Accreditation, Disclaimers and Copyright

TÜV SÜD America Inc.'s reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. TÜV SÜD America, Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America, Inc.'s issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and TÜV SÜD America, Inc., extracts from the test report shall not be reproduced, except in full without TÜV SÜD America, Inc.'s written approval.

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal government.