# FCC and ISED Canada Testing of the

# Bogen Communications LLC
# Nyquist NQ-SERPAIR

## In accordance with FCC 47 CFR part 15.225 and ISED Canada's Radio Standards Specifications RSS-210

America

**Add value.**
**Inspire trust.**

Prepared for: Bogen Communications LLC
3862 Quadrangle Blvd Suite 150
Orlando, FL 32817

FCC ID: CD2-NQSERPAIR01
IC: 1727A-NQSERPAIR

## COMMERCIAL-IN-CONFIDENCE

Document Number: TP0721009645.100 | Version Number: 01

| RESPONSIBLE FOR | NAME | DATE | SIGNATURE |
|---|---|---|---|
| **Authorized Signatory** | Dave Ernest | 2025 -May-21 | |
| **Testing** | Thierry Jean-Charles | 2025-May-16 | |

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

| | |
|---|---|
| FCC Accreditation<br>Designation Number US1063 Tampa, FL Test Laboratory | Innovation, Science, and Economic Development Canada Accreditation<br>Site Number 2087A-2 Tampa, FL Test Laboratory |

EXECUTIVE SUMMARY
Samples of this product were tested and found to be in compliance with FCC Part 15.225 and ISED Canada's RSS-210.

A2LA Cert. No. 2955.15



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# Contents

# 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-May-21 |

## 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 15.225 and Innovation Science and Economic Development Canada's Radio Standards Specification RSS-210 for the tests documented herein.

| | |
|---|---|
| Applicant | Bogen Communications LLC |
| Manufacturer | Bogen Communications LLC |
| Applicant's Email Address | rpace@bogen.com |
| Model Number(s) | Nyquist NQ-SERPAIR |
| Serial Number(s) | N/A |
| FCC ID | CD2-NQSERPAIR01 |
| ISED Certification Number | 1727A-NQSERPAIR |
| Hardware Version(s) | 1.0 |
| Software Version(s) | 1.0 |
| Number of Samples Tested | 2 |
| Test Specification/Issue/Date | US Code of Federal Reglations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2025<br>Innovation, Science and Economic Development Canada Radio Standards Specification: RSS-210 — Licence-Exempt Radio Apparatus: Category I Equipment, Issue 11, June 2024 |
| Test Plan/Issue/Date | 2025-March-25 |
| Order Number | 0721009645 |
| Date | 2025-March-28 |
| Date of Receipt of EUT | 2025-May-06 |
| Start of Test | 2025-May-06 |
| Finish of Test | 2025-May-15 |
| Name of Engineer(s) | Thierry Jean-Charles |
| Related Document(s) | ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices<br>US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2025.<br>Innovation, Science and Economic Development Canada Radio Standards Specification: RSS-GEN - General Requirements for Compliance of Radio Apparatus, Issue 5, Amendment 1, March 2019, Amendment 2, February 2021.<br>FCC KDB Publication 174176 D01 Line Conducted FAQ v01r01: AC Power Line Conducted Emissions Frequently Asked Questions, June 2015. |

## 1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC Part 15.225 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 | ------- | 10 |
| 20 dB Bandwidth | Yes | Pass | 15.215(c) | ------- | 11 |
| 99% Bandwidth | Yes | Pass | ------- | RSS-GEN 6.7 | 13 |
| Field strength of Emissions within the Band 13.110-14.010 MHz | Yes | Pass | 15.225(a),(b),(c) | RSS-210 Annex B.6(a) | 15 |
| Field Strength of Emissions outside of the Band 13.110-14.010 MHz | Yes | Pass | 15.209, 15.225(d) | RSS-210 7.2, RSS-210 Annex B.6(a), RSS-GEN 8.9 | 19 |
| Power Line Conducted Emissions | Yes | Pass | 15.207 | RSS-GEN 8.8 | 28 |
| Frequency Tolerance of the Carrier Signal | Yes | Pass | 15.225(e) | RSS-210 B.6(b) | 34 |
| Duty Cycle of the Test Mode of Operation | No | -------- | -------- | -------- | 37 |

## 1.4 Product Information

### 1.4.1 Technical Description

The EUT is a 5V CAN BUS powered NFC Antenna/ transciever operating at 13.56 MHz. It will be used to pair a BT handheld microphone to a Bluetooth Receiver in a Classroom/Lecture hall.

Technical Details

| | |
|---|---|
| Mode of Operation: | 13.56 MHz NFC |
| Frequency Range: | 13.56 MHz |
| Number of Channels: | 1 |
| Channel Separation: | Not Applicable |
| Data Rate: | 106 kbps |
| Modulations: | ASK |
| Antenna Type/Gain: | Differential Magnetic 3 coils/loops PCB / 4mm x 6.5mm |
| Input Power: | 5 VDC |

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

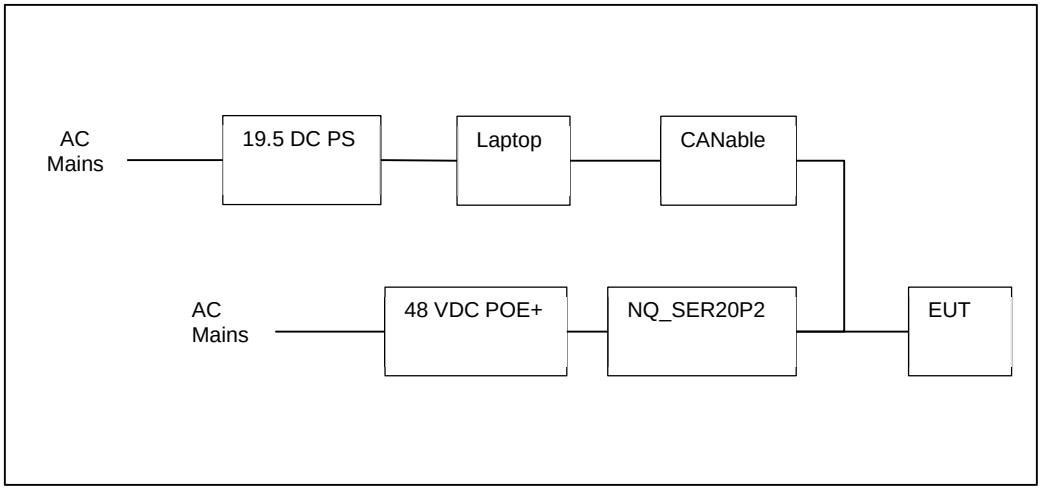


**Figure 1.4.1-1 – Test Setup Block Diagram**

**Table 1.4.1-1 – Cable Descriptions**

| Cable/Port | Description |
|---|---|
| CAN | 9.0 m, CAT 5E, EUT to NQ-SER20P2 |
| CAN | 0.7 m, NQ-SER20P2 to USB to CAN Adapter |
| POE | 1.7 m, CAT 5E, POE Adapter to NQ-SER20P2 |
| USB Micro to USB A | 1.0 m, USB to CAN Adapter to Laptop |
| AC Power | 0.9 m, POE Adapter to AC Mains |
| DC Power | 1.8 m, Laptop Power Supply to Laptop |
| Power | 0.9 m, Laptop Power Supply to AC Mains |

For the radiated emissions evaluation, the support equipment was set outside of the test environment.

**Table 1.4.1-2 – Support Equipment Descriptions**

| Make/Model | Description |
|---|---|
| Makerbase / MKS CANable V1.0 | 2.0 USB to CAN canbus adapter |
| Bogen /NQ-SER20P2 | POE + NFC Supply |
| Ubiquity, Inc. / GP-H480-050G | 48V POE Adapter, S/N: 2125-0005729 |
| Dell / Latitude 3120 | Laptop Computer, SN: 5TFLGY3 |
| Dell / LA65NS2-01 | 19.5 VDC Laptop Power Supply, S/N: CN-506TM1C-LOC00-466-0C8F-A13 |

Declaration of Build Status

| EQUIPMENT DESCRIPTION | |
|---|---|
| Model Name/Number | Nyquist NQ-SERPAIR |
| Part Number | N/A |
| Hardware Version | 1.0 |
| Software Version | 1.0 |
| FCC ID (if applicable) | FCC ID: CD2-NQSERPAIR01 |
| ISED ID (if applicable) | IC: 1727A-NQSERPAIR |
| Technical Description (Please provide a brief description of the intended use of the equipment) | 5V CAN Based NFC Antenna operating at 13.56 MHz It will be used to pair a BT handheld microphone to a Bluetooth Receiver in a Classroom/Lecture hall. |

| UN-INTENTIONAL RADIATOR | |
|---|---|
| Highest frequency generated or used in the device or on which the device operates or tunes | **80 MHz** |
| Lowest frequency generated or used in the device or on which the device operates or tunes | 125 kHz |
| Class A Digital Device (Use in commercial, industrial or business environment) X<br>Class B Digital Device (Use in residential environment only) | |

| Power Source | | | |
|---|---|---|---|
| AC | Single Phase | Three Phase | Nominal Voltage |
| | | ☐ | |
| External DC | Nominal Voltage | Maximum Current | |
| | 5.0 VDC | 300 mA | |
| Battery | Nominal Voltage | Battery Operating End Point Voltage | |
| | | | |
| | | | |

| EXTREME CONDITIONS | | | | | |
|---|---|---|---|---|---|
| Maximum temperature | +40 | °C | Minimum temperature | -5 | °C |

| Ancillaries |
|---|
| Please list all ancillaries which will be used with the device. |
| NQ-SER20P2, NQ-SEHMIC, NQ-SEPMIC, NQ-SECSTAT, |

I hereby declare that the information supplied is correct and complete.

Name: Ray Pace

Position held: Senior EE Date: 05/15/2025

### 1.4.2 Modes of Operation

The EUT was evaluated for the 13.56 MHz NFC reader in continuous transmission mode. The reader was pre-configured to be on upon power up. The TX output power was not configurable during testing. The EUT was powered with 5 VDC through the NQ-SER20P2 device. The EUT was communicating to a laptop computer through a USB to CAN adapter. The laptop was running a Nyquist Can NFC Test v1.0.0 application which allowed to enable or disable the NFC device.

For the power line conducted emissions evaluation, a second sample was used with a matching dummy load at the antenna port for the measurement of the transmitter frequency range of operation.

### 1.4.3 Monitoring of Performance

The EUT was evaluated to the requirements of FCC Section 15.225 and ISED Canada RSS-210 Annex B.6.

### 1.4.4 Performance Criteria

The EUT was evaluated for the following performance criteria.

**Table 1.4.4-1 – Performance Criteria**

| Parameter | Requirement |
|---|---|
| Antenna Requirement | FCC: Section 15.203. 15.204 |
| 20 dB Bandwidth | FCC: Section 15.215(c) |
| 99% Bandwidth | ISED Canada: RSS-GEN 6.7 |
| Radiated Field Strength of Emissions within the 13.110-14.010 band | FCC: Section 15.225 (a),(b),(c); ISED Canada: RSS-210 Annex B.6 (a) |
| Radiated Field Strength of Emissions outside of the 13.110-14.010 band | FCC: Section 15.209, 15.225; ISED Canada: RSS-210 7.2, RSS-210 Annex B.6 (a), RSS-GEN 8.9 |
| Power Line Conducted Emissions | FCC: Section 15.207; ISED Canada: RSS-GEN 8.8 |
| Frequency Tolerance of the Carrier Signal | FCC: Section 15.225(e); ISED Canada: RSS-210 B.6 (b) |
| Duty Cycle of the Test Mode of Operation | N/A |

## 1.5 Deviations from the Standard

The EUT uses an IC with a USB positive overvoltage protection controller with an overvoltage Lockout (OVLO) threshold ranging between 5.43 V to 5.9 V. The circuit turns off the transmitter once the voltage exceeds the OVLO threshold. The upper extreme voltage used for the frequency stability measurements was limited to the maximum input voltage permitted by the IC.

## 1.6 EUT Modification Record

The table below details modifications made to the EUT during the test programme. 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 |
|---|---|---|---|
| None | N/A | 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 Tampa FL Test Laboratory.

| Test Name | Name of Engineer(s) | Accreditation |
|---|---|---|
| DC Powered Operating | | |
| Antenna Requirement | Thierry Jean-Charles | A2LA |
| 20 dB Bandwidth | Thierry Jean-Charles | A2LA |
| 99% Bandwidth | Thierry Jean-Charles | A2LA |
| Radiated Field Strength of Emissions within the 13.110-14.010 band | Thierry Jean-Charles | A2LA |
| Radiated Field Strength of Emissions outside of the 13.110-14.010 band | Thierry Jean-Charles | A2LA |
| Power Line Conducted Emissions | Thierry Jean-Charles | A2LA |
| Frequency Tolerance of Carrier Signal | Thierry Jean-Charles | A2LA |
| Duty Cycle of the Test Mode of Operation | Thierry Jean-Charles | A2LA |

Office Address:

TÜV SÜD America, Inc.
5610 W. Sligh Ave, Suite 100
Tampa, FL 33634
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

SN: N/A

### 2.1.3 Date of Test

5/6/2025

### 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 EUT uses a printed loop antenna which is integral to the transceiver's PCB. The antenna is not replaceable and therefore meets the requirements of FCC Section 15.203.

### 2.1.7 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

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

## 2.2 20 dB Bandwidth

### 2.2.1 Specification Reference

FCC: Section 15.215(c)

### 2.2.2 Equipment Under Test and Modification State

SN: N/A

### 2.2.3 Date of Test

5/8/2025

### 2.2.4 Test Method

The 20 dB bandwidth was measured in accordance with ANSI C63.10 Subclause 6.9.2. The spectrum analyzer span was set between two times and five times the OBW. The RBW of the spectrum analyzer was set to 1% to 5% if the OBW. The VBW was approximately three times RBW. A peak detector was used for the measurements.

### 2.2.5 Environmental Conditions

| | |
|---|---|
| Ambient Temperature | 23.8°C |
| Relative Humidity | 42.2 % |
| Atmospheric Pressure | 1015.7 mbar |

### 2.2.6 Test Results

DC Powered Operating

Limit Clause FCC Part 15.215

The intentional radiator must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated.

**Table 2.2.6-1 – 20 dB Bandwidth Test Results**

| Frequency (MHz) | 20 dB Bandwidth (kHz) |
|---|---|
| 13.56 | 426.16 |

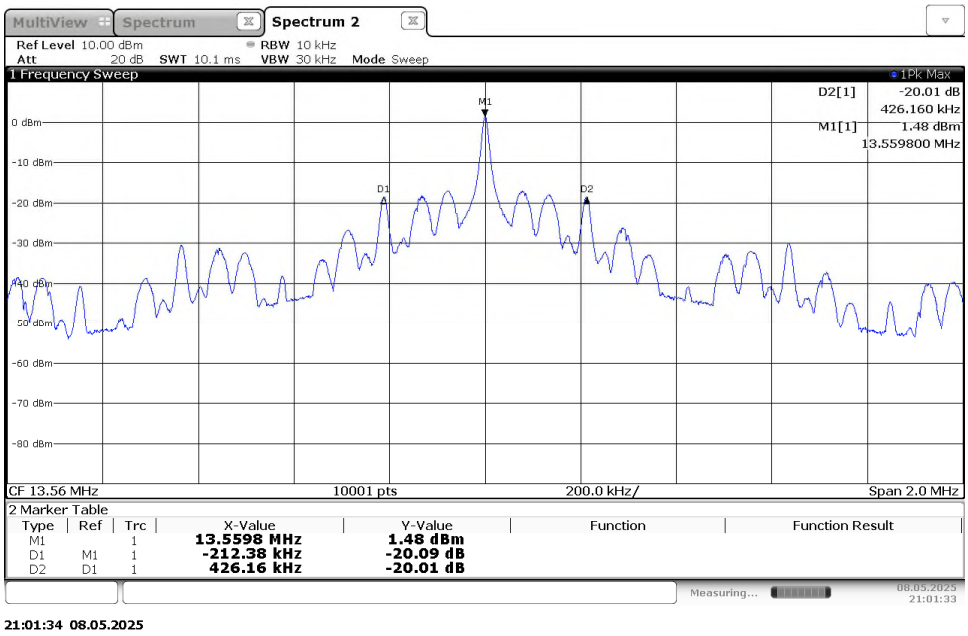


**Figure 2.2.6-1 – 20 dB Bandwidth Test Results**

### 2.2.7 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

| Instrument | Manufacturer | Type No | TE No | Software / Firmware Revision | Calibration Period (months) | Calibration Due |
|---|---|---|---|---|---|---|
| Duratest 175 Cable 26.5GHz | Teledyne Storm Products | 921-0101-036 | BEMC02112 | N/A | 12 | 18-Oct-2025 |
| PCB Loop Antenna | FAU EMI R&D Lab | EMI-LOOP | BEMC02141 | N/A | N/A | NCR |
| Atten 10dB 2.9mm-M/F, DC-26.5GHz, 2W | Aeroflex Inmet | 26AH-10 | DEMC3046 | N/A | 12 | 25-Jun-2025 |
| Signal & Spectrum Analyzer | Rohde & Schwarz | FSW43 | DEMC3085 | 2.90 SP1 | 12 | 03-Jun-2025 |

TU - Traceability Unscheduled
O/P MON - Output Monitored with Calibrated Equipment
N/A - Not Applicable
NCR – No Calibration Required

## 2.3 99% Bandwidth

### 2.3.1 Specification Reference

ISED Canada: RSS-GEN 6.7

### 2.3.2 Equipment Under Test and Modification State

SN: N/A

### 2.3.3 Date of Test

5/8/2025

### 2.3.4 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.

### 2.3.5 Environmental Conditions

| | |
|---|---|
| Ambient Temperature | 23.8°C |
| Relative Humidity | 42.2 % |
| Atmospheric Pressure | 1015.7 mbar |

### 2.3.6 Test Results

DC Powered Operating

Limit Clause ISED RSS-GEN 6.6

**Table 2.3.6-1 – 99% dB Bandwidth Test Results**

| Frequency (MHz) | 99% Bandwidth (kHz) |
|---|---|
| 13.56 | 598.0677 |

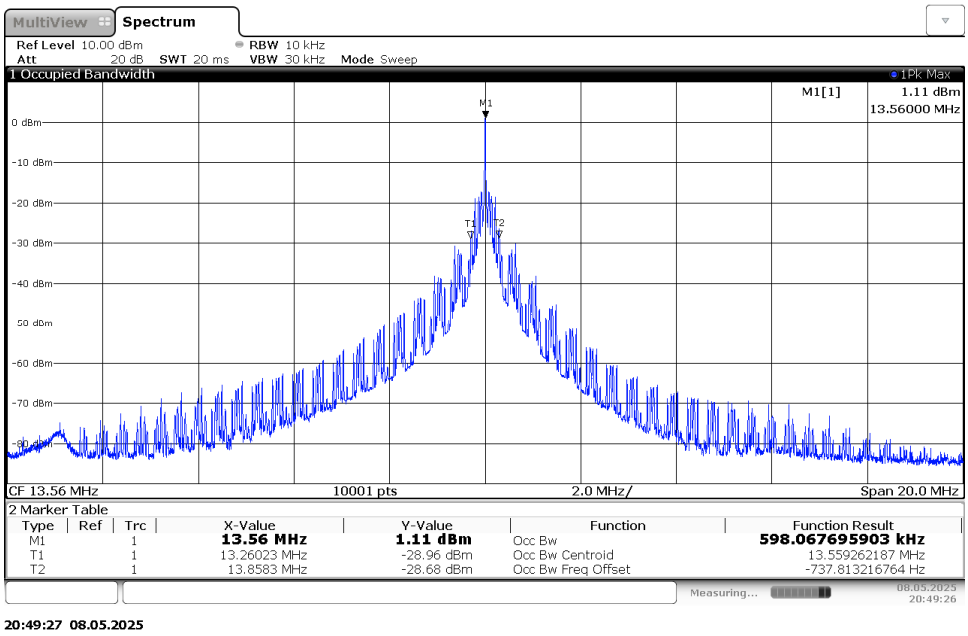


**Figure 2.3.6-1 – 99% Bandwidth Test Results**

### 2.3.7 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

| Instrument | Manufacturer | Type No | TE No | Software / Firmware Revision | Calibration Period (months) | Calibration Due |
|---|---|---|---|---|---|---|
| Duratest 175 Cable 26.5GHz | Teledyne Storm Products | 921-0101-036 | BEMC02112 | N/A | 12 | 18-Oct-2025 |
| PCB Loop Antenna | FAU EMI R&D Lab | EMI-LOOP | BEMC02141 | N/A | N/A | NCR |
| Atten 10dB 2.9mm-M/F, DC-26.5GHz, 2W | Aeroflex Inmet | 26AH-10 | DEMC3046 | N/A | 12 | 25-Jun-2025 |
| Signal & Spectrum Analyzer | Rohde & Schwarz | FSW43 | DEMC3085 | 2.90 SP1 | 12 | 03-Jun-2025 |

TU - Traceability Unscheduled
O/P MON - Output Monitored with Calibrated Equipment
N/A - Not Applicable
NCR – No Calibration Required

## 2.4 Radiated Field Strength of Emissions within the 13.110-14.010 band

### 2.4.1 Specification Reference

FCC Sections: 15.225(a),(b),(c);
ISED Canada: RSS-210 Annex B.6(a)

### 2.4.2 Equipment Under Test and Modification State

SN: N/A

### 2.4.3 Date of Test

5/7/2025

### 2.4.4 Test Method

Radiated emissions tests were made over the frequency range of 13.110 to 14.010 MHz. The receive antenna height was set to 1 m and the EUT was rotated through 360 degrees. The resolution bandwidth was set to 9 kHz, and a Quasi-Peak detector was used. The emissions were assessed against the radiated emission limits as defined in FCC Sections: 15.225(a),(b),(c) and ISED Canada: RSS-210 Annex B.6(a).

### 2.4.5 Environmental Conditions

| | |
|---|---|
| Ambient Temperature | 25.2 °C |
| Relative Humidity | 36.2 % |
| Atmospheric Pressure | 1013.7 mbar |

### 2.4.6 Test Results

DC Powered Operating

Limit Clause FCC Sections 15.225 (a),(b),(c), ISED Canada: RSS-210 Annex B.6 (a)

| Frequency (MHz) | Field Strength (microvolts/meter) | Field Strength (dBuV/m) | Measurement Distance (meters) |
|---|---|---|---|
| 13.110 – 13.410 | 106 | 40.5 | 30 |
| 13.410 – 13.553 | 334 | 50.5 | 30 |
| 13.553 – 13.567 | 15,848 | 84 | 30 |
| 13.567 – 13.710 | 334 | 50.5 | 30 |
| 13.710 – 14.010 | 106* | 40.5 | 30 |

Radiated measurements were performed at a distance closer than 30m as required, according to Part 15.209. Therefore, a correction factor was applied to account for propagation loss at the specified distance. The propagation loss was determined by using the square of an inverse linear distance

extrapolation factor (40dB/decade) according to FCC Part 15.31 and ISED Canada's RSS-Gen 6.5. A sample calculation of the distance correction factor is shown below for limits expressed at a 30m measurement distance.

Distance correction factor (30m Specified Test Distance) = 40*Log (Test Distance/30)
= 40*Log (3/30)
= - 40 dB

**Table 2.4.6-1 – Radiated Field Strength of Emissions within the 13.110-14.010 band**

| Frequency (MHz) | Quasi-peak (dBµV) | Height (cm) | Polarity | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|---|
| 12.994000 | 23.8 | 100.0 | V | 0.0 | 39.9 | 45.8 | 69.5 |
| 13.270000 | 24.0 | 100.0 | V | 0.0 | 39.2 | 56.5 | 80.5 |
| 13.350000 | 27.8 | 100.0 | V | 0.0 | 38.9 | 52.7 | 80.5 |
| 13.430000 | 27.7 | 100.0 | V | 0.0 | 38.7 | 62.8 | 90.5 |
| 13.480000 | 29.3 | 100.0 | V | 0.0 | 38.6 | 61.1 | 90.5 |
| 13.546000 | 34.7 | 100.0 | V | 0.0 | 38.4 | 55.8 | 90.5 |
| 13.553000 | 56.4 | 100.0 | V | 0.0 | 38.4 | 34.1 | 90.5 |
| 13.560000 | 71.4 | 100.0 | V | 0.0 | 38.4 | 52.6 | 124.0 |
| 13.567000 | 56.9 | 100.0 | V | 0.0 | 38.3 | 67.1 | 124.0 |
| 13.578000 | 33.9 | 100.0 | V | 0.0 | 38.3 | 56.5 | 90.5 |
| 13.641000 | 28.8 | 100.0 | V | 0.0 | 38.1 | 61.7 | 90.5 |
| 13.696000 | 27.3 | 100.0 | V | 0.0 | 38.0 | 63.2 | 90.5 |
| 13.771000 | 27.4 | 100.0 | V | 0.0 | 37.8 | 53.1 | 80.5 |
| 13.851000 | 22.6 | 100.0 | V | 0.0 | 37.6 | 57.9 | 80.5 |
| 14.062000 | 20.6 | 100.0 | V | 0.0 | 37.0 | 48.9 | 69.5 |

Notes:

- The measurements were performed at ta test distance of 3m. The limits are corrected using a distance correction factor of 40 dB per decade as described above.
- The results are reported for the worst case receive loop antenna orientation.
- All other emissions were attenuated below the noise floor of the measurement equipment.

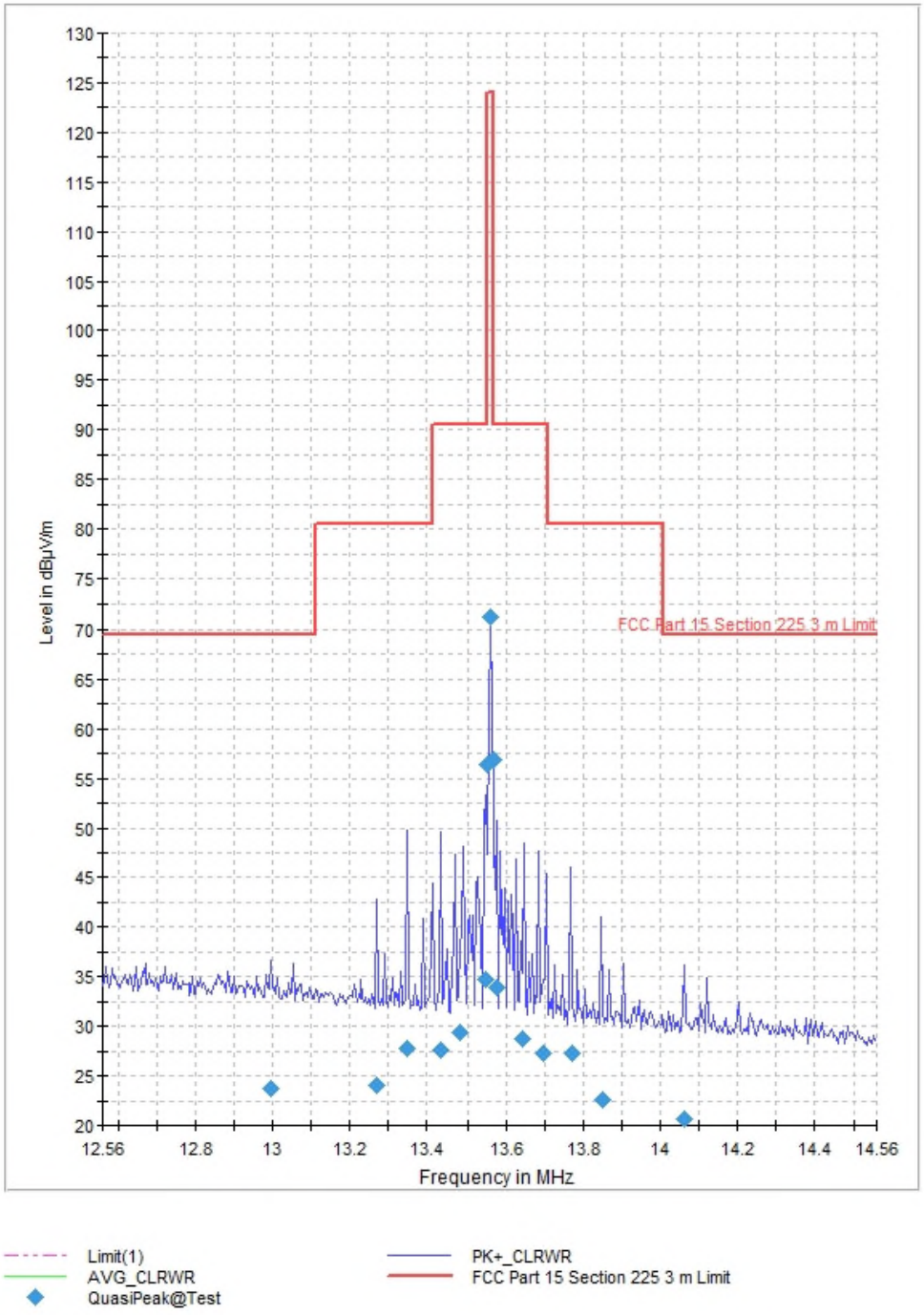


**Figure 2.4.6-1 – Radiated Field Strength of Emissions within the 13.110-14.010 MHz band**

### 2.4.7 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: Quasi-Peak**
Corrected Level: 33 + 38.4 = 71.4 dBµV/m
Margin: 124 dBµV/m – 71.4 dBµV/m = 52.6 dB

### 2.4.8 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

| Instrument | Manufacturer | Type No | TE No | Software / Firmware Revision | Calibration Period (months) | Calibration Due |
|---|---|---|---|---|---|---|
| Active Loop Antenna | EMCO | 6502 | BEMC00078 | N/A | 24 | 06-Sep-2025 |
| EMC Chamber | Panashield | N/A | TEMC00031 | N/A | 24 | 19-Oct-2025 |
| Loop Antenna | Electro-metrics | ALR 30M | TEMC00075 | N/A | 24 | 26-Jun-2025 |
| Test Software | Rohde & Schwarz | EMC32 | TEMC00184 | 11.50.00 | N/A | NCR |
| R & S ESW EMI Test Receiver | Rohde & Schwarz | ESW | TEMC00232 | 2.00 SP1 | 12 | 04-Jun-2025 |
| DC to 18 GHz Cable | SSI Technologies | 2801-03-03-360/WN | TEMC00293 | N/A | 12 | 13-Dec-2025 |

TU - Traceability Unscheduled
O/P MON - Output Monitored with Calibrated Equipment
N/A - Not Applicable
NCR – No Calibration Required

## 2.5 Radiated Field Strength of Emissions outside of the 13.110-14.010 band

### 2.5.1 Specification Reference

FCC Sections: 15.225(d), 15.209;
ISED Canada: RSS-210 7.2, RSS-210 Annex B.6(a), RSS-GEN 8.9

### 2.5.2 Equipment Under Test and Modification State

SN: N/A

### 2.5.3 Date of Test

5/6/2025 to 5/7/2025

### 2.5.4 Test Method

Radiated emissions tests were made over the frequency range of 9 kHz to 1 GHz, 10 times the highest fundamental frequency. Each emission was compared to the radiated emission limits as defined in Section 15.209.

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.

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 below 1000 MHz, quasi-peak 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. Average measurements are performed in the linear scale using VBW of 30 Hz.

### 2.5.5 Duty Cycle Correction

The EUT was configured to transmit at 75.8% duty cycle during the evaluation. The measured transmission time was 192.6 ms which is greater than the 100 ms observation period for duty cycle correction calculation. Therefore, a Duty Cycle Correction of 100% corresponding to 20*log(100/100) = 0 dB was applied to the average measurements for the corrected average results.

### 2.5.6 Environmental Conditions

| | |
|---|---|
| Ambient Temperature | 23.7 °C |
| Relative Humidity | 36.9 % |
| Atmospheric Pressure | 1014.2 mbar |

### 2.5.7 Test Results

DC Powered Operating

Limit Clause FCC Sections 15.209, 15.225(d), ISED Canada: RSS-210 7.2, RSS-GEN 8.9

| 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 |

Radiated measurements were performed at a distance closer than 300 meters and 30m as required, according to Part 15.209. Therefore, a correction factor was applied to account for propagation loss at the specified distance. The propagation loss was determined by using the square of an inverse linear distance extrapolation factor (40dB/decade) according to 15.31. A sample calculation of the distance correction factor is shown below for limits expressed at a 300m measurement distance and a 30m measurement distance.

Distance correction factor (300m Specified Test Distance) = 40*Log (Test Distance/300)
= 40*Log (3/300)
= - 80 dB

Distance correction factor (30m Specified Test Distance) = 40*Log (Test Distance/30)
= 40*Log (3/30)
= - 40 dB

**Table 2.5.7-1 – Transmitter Radiated Spurious Emissions – Quasi-Peak Test Results below 30 MHz**

| Frequency (MHz) | Quasi-peak (dBµV) | Height (cm) | Polarity | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|---|
| 0.506000 | 41.36 | 100.0 | V | 53.0 | 10.2 | 32.16 | 73.52 |
| 0.521000 | 41.18 | 100.0 | V | 312.0 | 10.2 | 32.09 | 73.27 |
| 0.637000 | 39.18 | 100.0 | V | 20.0 | 10.2 | 32.34 | 71.52 |
| 0.649000 | 38.98 | 100.0 | V | 0.0 | 10.2 | 32.38 | 71.36 |
| 0.741000 | 37.56 | 100.0 | V | 90.0 | 10.2 | 32.65 | 70.21 |
| 0.909000 | 35.42 | 100.0 | V | 81.0 | 10.2 | 33.02 | 68.43 |
| 0.977000 | 35.01 | 100.0 | V | 258.0 | 10.4 | 32.80 | 67.81 |
| 1.209000 | 32.57 | 100.0 | V | 236.0 | 10.5 | 33.39 | 65.96 |
| 1.241000 | 32.38 | 100.0 | V | 270.0 | 10.5 | 33.34 | 65.73 |
| 1.517000 | 30.54 | 100.0 | V | 90.0 | 10.5 | 33.44 | 63.99 |
| 1.557000 | 30.10 | 100.0 | V | 180.0 | 10.5 | 33.66 | 63.76 |
| 13.353000 | 21.51 | 100.0 | V | 19.0 | 11.0 | 58.99 | 80.51 |
| 27.120000 | 17.3 | 100.0 | V | 250.0 | 9.3 | 52.3 | 69.5 |

Notes:

- The measurements were performed at ta test distance of 3m. The limits are corrected using a distance correction factor of 40 dB per decade as described above.
- The results are reported for the worst case receive loop antenna orientation.

**Table 2.5.7-2 – Transmitter Radiated Spurious Emissions – Average Test Results below 30 MHz**

| Frequency (MHz) | Average (dBµV) | Height (cm) | Polarity | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|---|
| 0.150000 | 29.83 | 100.0 | V | 46.0 | 10.2 | 74.25 | 104.08 |
| 0.158000 | 45.97 | 100.0 | V | 302.0 | 10.1 | 57.66 | 103.63 |
| 0.161000 | 46.16 | 100.0 | V | 306.0 | 10.1 | 57.30 | 103.47 |
| 0.162000 | 46.10 | 100.0 | V | 45.0 | 10.1 | 57.32 | 103.41 |
| 0.181000 | 44.96 | 100.0 | V | 26.0 | 10.1 | 57.49 | 102.45 |
| 0.189000 | 44.44 | 100.0 | V | 178.0 | 10.1 | 57.63 | 102.08 |
| 0.225000 | 42.64 | 100.0 | V | 220.0 | 10.1 | 57.92 | 100.56 |
| 0.253000 | 41.46 | 100.0 | V | 135.0 | 10.1 | 58.08 | 99.54 |
| 0.313000 | 39.64 | 100.0 | V | 211.0 | 10.0 | 58.05 | 97.69 |
| 0.337000 | 38.97 | 100.0 | V | 315.0 | 10.0 | 58.08 | 97.05 |
| 0.429000 | 36.90 | 100.0 | V | 45.0 | 10.0 | 58.06 | 94.96 |

Notes:

- The measurements were performed at ta test distance of 3m. The limits are corrected using a distance correction factor of 40 dB per decade as described above.
- The results are reported for the worst case receive loop antenna orientation.

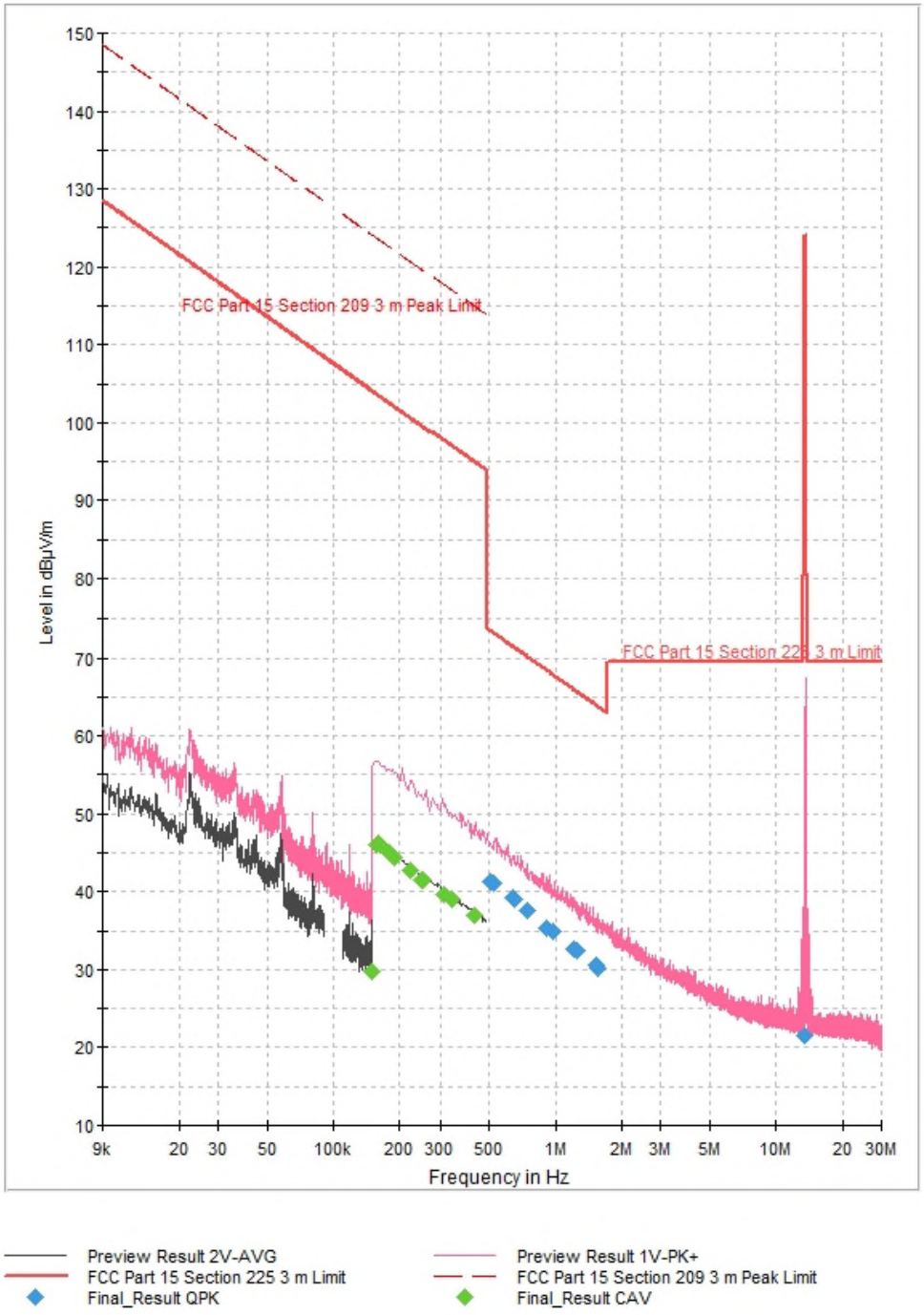


**Figure 2.5.7-1 – Transmitter Radiated Spurious Emissions below 30 MHz**

**Table 2.5.7-3 – Transmitter Radiated Spurious Emissions – Average Test Results above 30 MHz**

| Frequency (MHz) | Quasi-peak (dBµV) | Height (cm) | Polarity | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|---|
| 30.510000 | 19.08 | 338.0 | V | 270.0 | 25.7 | 20.92 | 40.00 |
| 30.780000 | 18.67 | 295.0 | V | 24.0 | 25.5 | 21.33 | 40.00 |
| 71.970000 | 21.39 | 180.0 | V | 0.0 | 13.2 | 18.61 | 40.00 |
| 76.290000 | 23.41 | 191.0 | H | 154.0 | 13.4 | 16.59 | 40.00 |
| 97.830000 | 16.29 | 174.0 | V | 173.0 | 17.1 | 27.21 | 43.50 |
| 127.140000 | 20.78 | 231.0 | V | 34.0 | 19.1 | 22.72 | 43.50 |
| 139.860000 | 21.79 | 221.0 | V | 77.0 | 18.3 | 21.71 | 43.50 |
| 480.990000 | 17.55 | 203.0 | V | 45.0 | 25.1 | 28.45 | 46.00 |
| 492.000000 | 17.73 | 150.0 | V | 222.0 | 25.1 | 28.27 | 46.00 |
| 622.260000 | 19.37 | 174.0 | V | 28.0 | 27.0 | 26.63 | 46.00 |
| 673.170000 | 19.04 | 175.0 | V | 90.0 | 26.9 | 26.96 | 46.00 |
| 764.790000 | 21.32 | 143.0 | V | 267.0 | 28.1 | 24.68 | 46.00 |

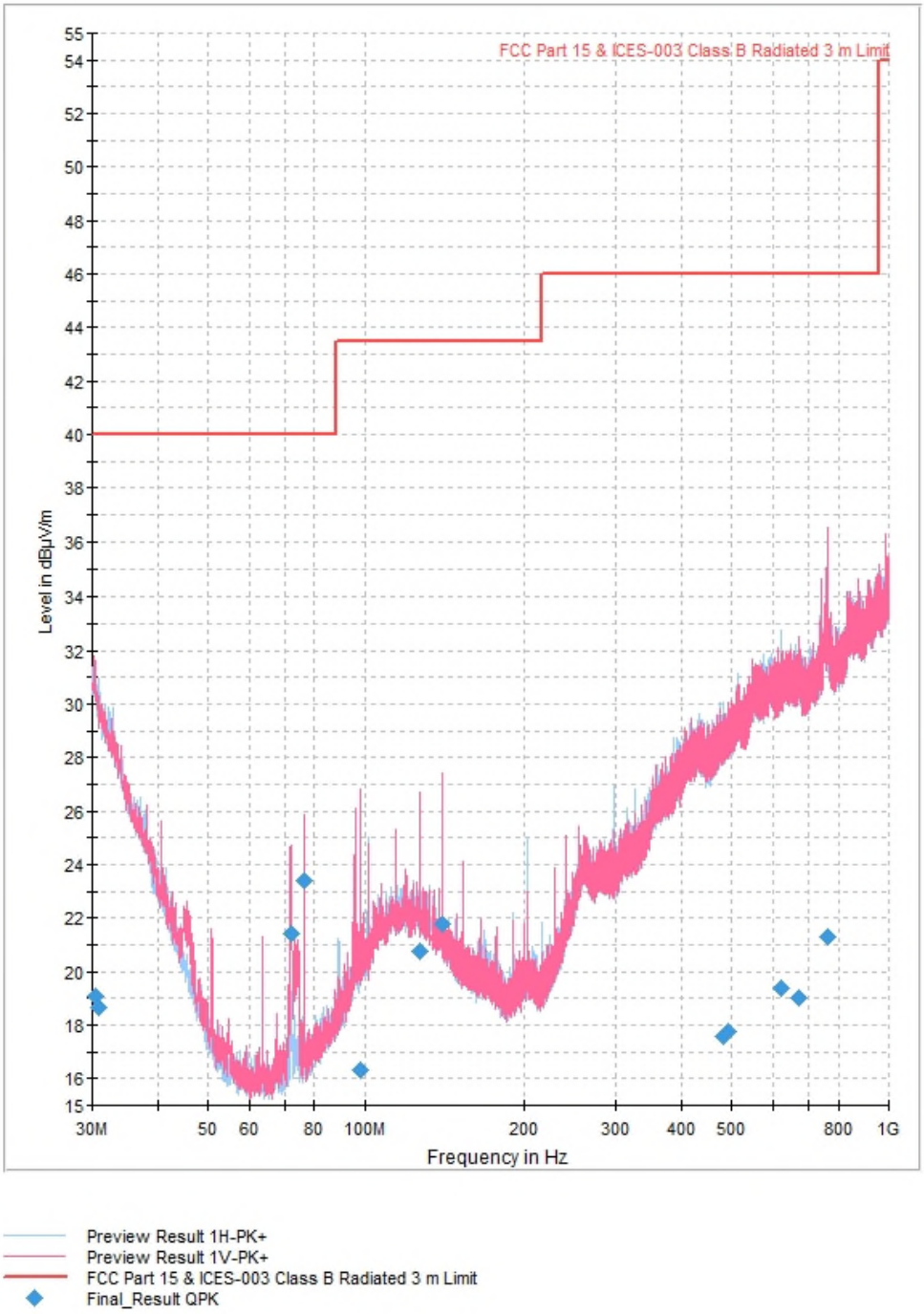


**Figure 2.5.7-2 – Transmitter Radiated Spurious Emissions above 30 MHz**

### 2.5.8 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: Quasi-Peak**
Corrected Level: 31.16 + 10.2 = 41.36 dBµV/m
Margin: 73.52 dBµV/m – 41.36 dBµV/m = 32.16 dB

**Example Calculation: Average**
Corrected Level: 36 + 10.1 - 0 = 46.10 dBµV/m
Margin: 103.41 dBµV/m – 46.10 dBµV/m = 57.31 dB

### 2.5.9 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

| Instrument | Manufacturer | Type No | TE No | Software / Firmware Revision | Calibration Period (months) | Calibration Due |
|---|---|---|---|---|---|---|
| Active Loop Antenna | EMCO | 6502 | BEMC00078 | N/A | 24 | 06-Sep-2025 |
| 100Hz-26.5GHz EMC analyzer/HYZ | Hewlett Packard | E7405A | BEMC00523 | A.14.06 | 12 | 25-Jun-2025 |
| Tile Automation Software | ETS Lindgren | TILE4! - Version 4.2.A | BEMC02095 | 4.2A | N/A | NCR |
| BI LOG PERIODIC, ANTENNA | Schaffner | CBL6112B | TEMC00005 | N/A | 24 | 07-Nov-2025 |
| EMC Chamber | Panashield | N/A | TEMC00031 | N/A | 24 | 19-Oct-2025 |
| Loop Antenna | Electro-metrics | ALR 30M | TEMC00075 | N/A | 24 | 26-Jun-2025 |
| Test Software | Rohde & Schwarz | EMC32 | TEMC00184 | 11.50.00 | N/A | NCR |
| R & S ESW EMI Test Receiver | Rohde & Schwarz | ESW | TEMC00232 | 2.00 SP1 | 12 | 04-Jun-2025 |
| DC to 18 GHz Cable | SSI Technologies | 2801-03-03-360/WN | TEMC00293 | N/A | 12 | 13-Dec-2025 |

TU - Traceability Unscheduled
O/P MON - Output Monitored with Calibrated Equipment
N/A - Not Applicable
NCR – No Calibration Required

## 2.6 Power Line Conducted Emissions

### 2.6.1 Specification Reference

FCC: Section 15.207
ISED Canada; RSS-GEN 8.8

### 2.6.2 Equipment Under Test and Modification State

S/N: N/A

### 2.6.3 Date of Test

5/8/2025 to 5/13/2025

### 2.6.4 Test Method

ANSI C63.10 section 6.2 was the guiding document for this evaluation. Conducted emissions were performed from 150 kHz to 30 MHz with the spectrum analyzer's resolution bandwidth set to 9 kHz and the video bandwidth set to 30 kHz. The calculation for the conducted emissions is as follows:

**Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss**
**Margin = Applicable Limit - Corrected Reading**

### 2.6.5 Environmental Conditions

| | |
|---|---|
| Ambient Temperature | 23.7 - 23.9 °C |
| Relative Humidity | 36.8 - 46.9 % |
| Atmospheric Pressure | 1013.0 - 1015.7 mbar |

### 2.6.6 Test Results

| Frequency of Emission (MHz) | Conducted Limit (dBµV) | |
|---|---|---|
| | Quasi-Peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

**Table 2.6.6-1 – Power Line Conducted Emissions – Quasi-Peak Detector Results**

| Frequency (MHz) | Quasi-peak (dBµV) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|
| 0.150000 | 52.36 | N | 20.2 | 13.64 | 66.00 |
| 0.217500 | 43.07 | L1 | 20.2 | 19.84 | 62.91 |
| 0.582000 | 51.93 | L1 | 20.2 | 4.07 | 56.00 |
| 1.279500 | 35.30 | L1 | 20.3 | 20.70 | 56.00 |
| 3.502500 | 39.64 | N | 20.4 | 16.36 | 56.00 |
| 3.610500 | 39.91 | N | 20.4 | 16.09 | 56.00 |
| 13.560000 | 53.17 | N | 20.8 | 6.83 | 60.00 |
| 15.405000 | 37.83 | N | 20.9 | 22.17 | 60.00 |
| 18.559500 | 35.08 | N | 21.0 | 24.92 | 60.00 |

**Table 2.6.6-2 – Power Line Conducted Emissions – Average Detector Results**

| Frequency (MHz) | Average (dBµV) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|
| 0.150000 | 34.91 | L1 | 20.2 | 21.09 | 56.00 |
| 0.213000 | 30.95 | L1 | 20.2 | 22.13 | 53.09 |
| 0.586500 | 44.72 | L1 | 20.2 | 1.28 | 46.00 |
| 1.248000 | 28.45 | L1 | 20.3 | 17.55 | 46.00 |
| 3.529500 | 30.89 | N | 20.4 | 15.11 | 46.00 |
| 3.561000 | 30.96 | N | 20.4 | 15.04 | 46.00 |
| 13.560000 | 50.81 | N | 20.8 | -0.81 | 50.00 |
| 15.265500 | 31.47 | N | 20.9 | 18.53 | 50.00 |
| 27.838500 | 33.04 | L1 | 21.0 | 16.96 | 50.00 |

Note: The Measurements at 13.56 MHz were repeated with a matching load at the antenna port in accordance with the FCC KDB 174176 D01 Line Conducted FAQ v01r01.

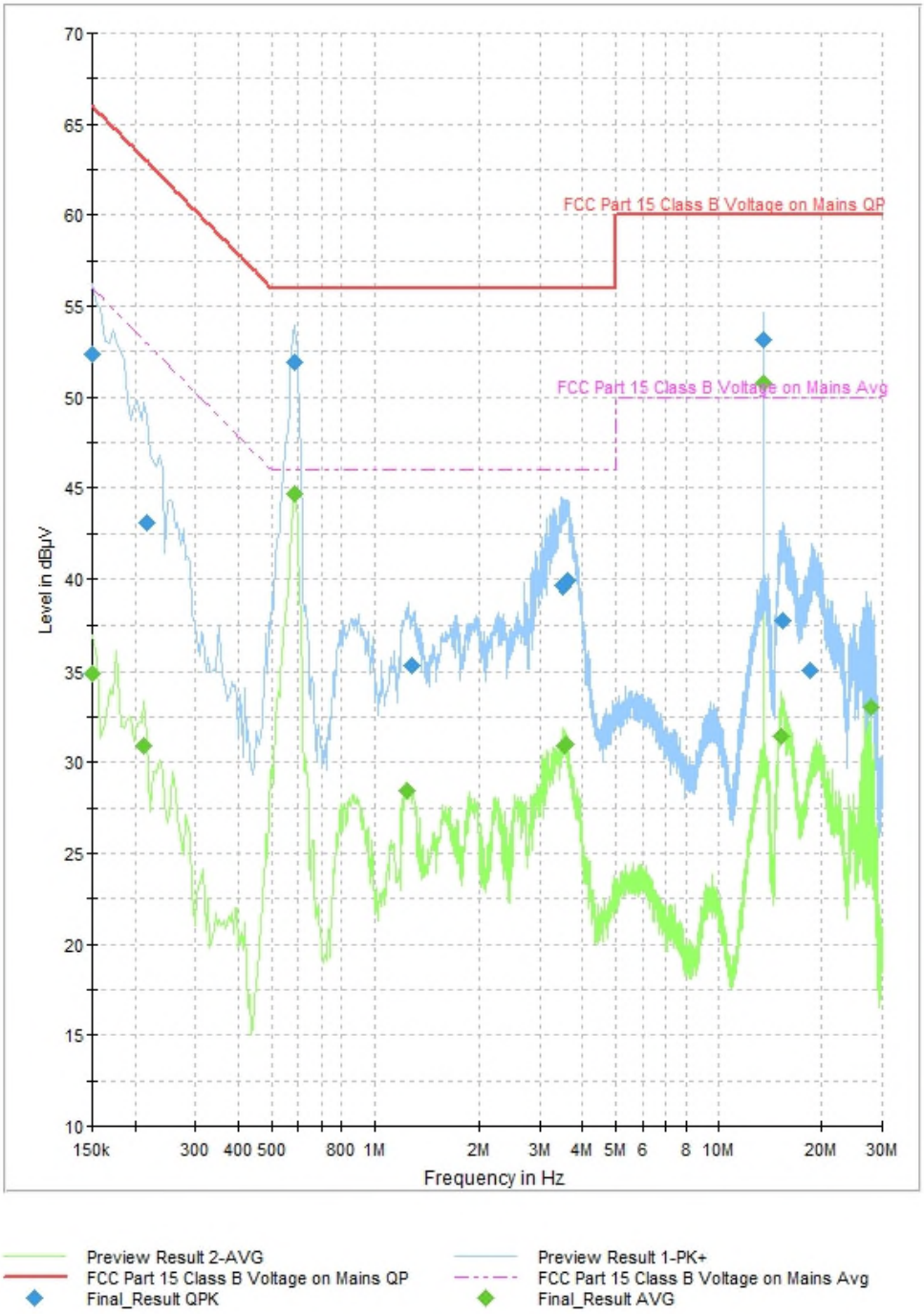


**Figure 2.6.6-1 – Composite Power Line Conducted Emissions Plot**

**Table 2.6.6-3 – Power Line Conducted Emissions – Quasi-Peak Detector Results – Matching Load at the antenna port**

| Frequency (MHz) | Quasi-peak (dBµV) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|
| 13.560000 | 47.9 | N | 20.8 | 12.1 | 60.0 |
| 13.560000 | 47.1 | L1 | 20.8 | 12.9 | 60.0 |

**Table 2.6.6-4 – Power Line Conducted Emissions – Average Detector Results – Matching Load at the antenna port**

| Frequency (MHz) | Average (dBµV) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|
| 13.560000 | 25.6 | N | 20.8 | 24.4 | 50.0 |
| 13.560000 | 24.9 | L1 | 20.8 | 25.1 | 50.0 |

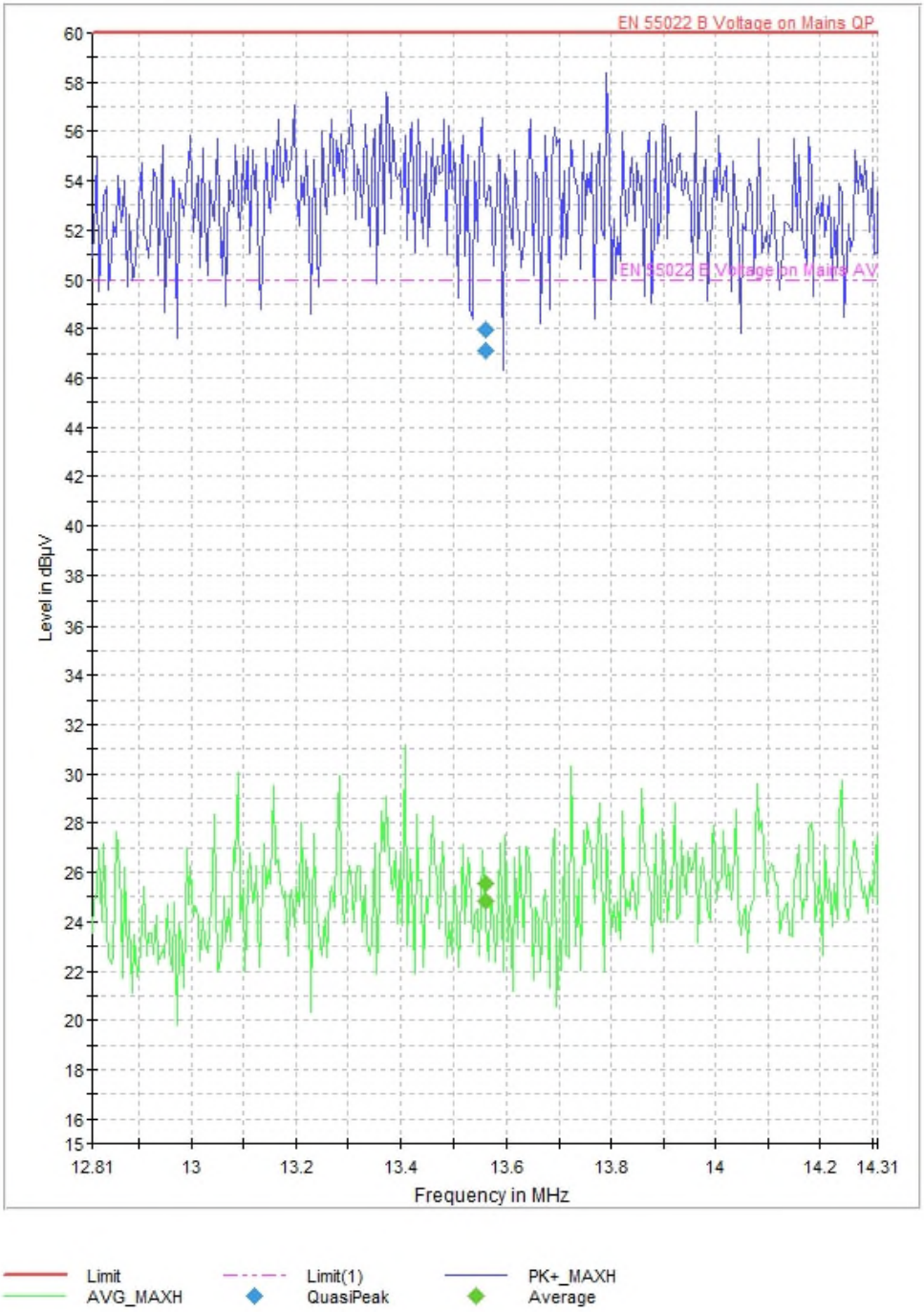


**Figure 2.6.6-2 – Composite Power Line Conducted Emissions Plot – Matching Load**

### 2.6.7 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

| Instrument | Manufacturer | Type No | TE No | Software / Firmware Revision | Calibration Period (months) | Calibration Due |
|---|---|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESCS30 | TEMC00011 | 2.3003.0203.36 | 12 | 14-Jan-2026 |
| RFI/EMI Shielded Enclosure | UNIVERSAL SHIELDING CORP. | N/A | TEMC00100 | N/A | N/A | NCR |
| Test Software | Rohde & Schwarz | EMC32 | TEMC00184 | 10.50.00 | N/A | NCR |
| Two Line V Network | Rohde & Schwarz | ENV 216 | TEMC00244 | N/A | 12 | 06-Jun-2025 |
| 2-Line V-Network | Rohde & Schwarz GmbH & Co. KG | ENV216 | TEMC00290 | N/A | 12 | 06-Jun-2025 |
| Conducted cable with UNAT-10+ attenuator | L-com | RG58C/U | TEMC00291 | N/A | 12 | 18-Oct-2025 |

TU - Traceability Unscheduled
O/P MON - Output Monitored with Calibrated Equipment
N/A - Not Applicable
NCR – No Calibration Required

## 2.7 Frequency Tolerance of Carrier Signal

### 2.7.1 Specification Reference

FCC Section 15.225(e);
ISED Canada RSS-210 Annex B.6(b)

### 2.7.2 Equipment Under Test and Modification State

Model: Nyquist NQ-SERPAIR, Serial Number: N/A

### 2.7.3 Date of Test

2025-May-09

### 2.7.4 Test Method

Frequency stability measurements with respect to ambient temperature and when varying voltage were performed in accordance with ANSI C63.10 section 6.8 and ISED Canada RSS-GEN 6.11. The measurements were performed using a spectrum analyzer. Sufficient stabilization period was used at each temperature prior to each measurement.

### 2.7.5 Environmental Conditions

| | |
|---|---|
| Ambient Temperature | 23.8 °C |
| Relative Humidity | 42.2 % |
| Atmospheric Pressure | 1015.7 mbar |

### 2.7.6 Test Results

Limit Clause FCC Sections 15.225(e),ISED Canada: RSS-210 B.6 (b)

| | Carrier Frequency Tolerance Limits | |
|---|---|---|
| Temperature Range | FCC 15.225 (e) | RSS-210 B6 (b) |
| -20 C to +50C | 0.01% | 100 ppm |

# Frequency Stability

| | |
|---|---|
| **Frequency (MHz):** | 13.560121 |
| **Deviation Limit (%):** | 0.01 |
| **Deviation Limit (PPM):** | 100.00 |
| **Nominal Voltage (VDC):** | 5 |

| Temperature | Frequency | Frequency Error | | Voltage | Voltage |
|---|---|---|---|---|---|
| C | MHz | (%) | PPM | (%) | (VDC) |
| | | | | | |
| -20 C | **13.560238** | **0.00087** | **8.67986** | 100% | 5.00 |
| -10 C | **13.560250** | **0.00096** | **9.57219** | 100% | 5.00 |
| 0 C | **13.560238** | **0.00087** | **8.67249** | 100% | 5.00 |
| 10 C | **13.560191** | **0.00052** | **5.17695** | 100% | 5.00 |
| 20 C | **13.560121** | **0.00000** | **0.00000** | 100% | 5.00 |
| 30 C | **13.560058** | **-0.00046** | **-4.64598** | 100% | 5.00 |
| 40 C | **13.560004** | **-0.00086** | **-8.56187** | 100% | 5.00 |
| 50 C | **13.559965** | **-0.00115** | **-11.48220** | 100% | 5.00 |
| | | | | | |
| 20 C | **13.560130** | **0.00007** | **0.70796** | 85% | 4.25 |
| 20 C | **13.560136** | **0.00012** | **1.16518** | 112% | 5.60 |

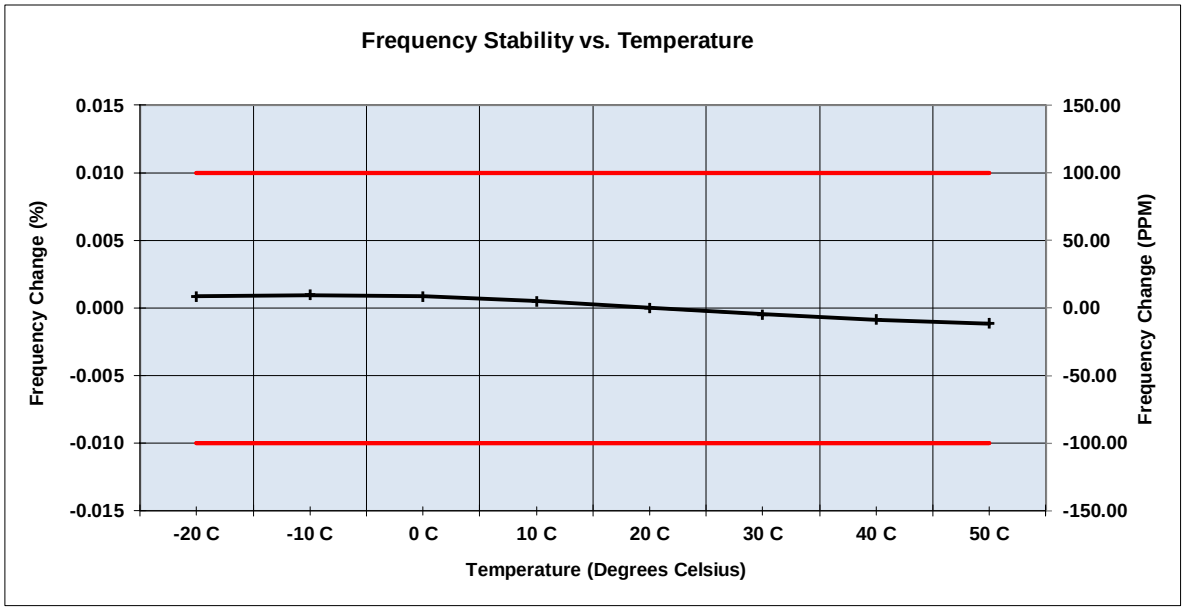


**Figure 2.7.6-1 – Frequency Tolerance of Carrier Signal Result**

Note: The EUT uses an IC with a USB positive overvoltage protection controller with an overvoltage Lockout (OVLO) threshold ranging between 5.43 V to 5.9 V. The circuit turns off the transmitter once the voltage exceeds the OVLO threshold. The measurements were performed using the maximum input voltage permitted by the IC, 5.6 VDC, which is 112% of the nominal voltage.

### 2.7.7 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

| Instrument | Manufacturer | Type No | TE No | Software / Firmware Revision | Calibration Period (months) | Calibration Due |
|---|---|---|---|---|---|---|
| Digital Thermometer | US-Omega Engineering | MDSS41-TC | BEMC00002 | N/A | 24 | 19-Sep-2025 |
| Digital MultiMeter | Fluke | 115 | BEMC02108 | N/A | 12 | 15-Jan-2026 |
| PCB Loop Antenna | FAU EMI R&D Lab | EMI-LOOP | BEMC02141 | N/A | N/A | NCR |
| Signal & Spectrum Analyzer | Rohde & Schwarz | FSW43 | DEMC3085 | 2.90 SP1 | 12 | 03-Jun-2025 |
| DC Power Supply | Xantrex | HPD-60-5 | TAME01064 | N/A | N/A | NCR |
| Temperature Test Chamber | Sun Electronic Systems, Inc. | EC127 | TEMC00242 | 5.10 | N/A | NCR |
| Flexible Test Cable | Mini-Circuits | ULC-8FT-SMSM+ | TEMC00267 | N/A | 12 | 20-Feb-2026 |
| SMA Fixed Attenuator Kit | Mini Circuits | K2-BW2+ | TEMC00272 | N/A | 12 | 05-Mar-2026 |

TU - Traceability Unscheduled
O/P MON - Output Monitored with Calibrated Equipment
N/A - Not Applicable
NCR – No Calibration Required

## 2.8 Duty Cycle of the Test Mode of Operation

### 2.8.1 Specification Reference

FCC: Section: N/A
ISED Canada: N/A

### 2.8.2 Equipment Under Test and Modification State

S/N: N/A

### 2.8.3 Date of Test

5/15/2025

### 2.8.4 Test Method

The spectrum analyzer's RBW was set to >= OBW or the largest value. The measurements were performed using a Peak detector.

### 2.8.5 Environmental Conditions

| | |
|---|---|
| Ambient Temperature | 23.7 °C |
| Relative Humidity | 38.5 % |
| Atmospheric Pressure | 1013.4 mbar |

### 2.8.6 Test Results

DC Powered, Operating

**Table 2.8.6-1: Duty Cycle Results**

| Frequency (MHz) | Tx On (ms) | Period (ms) | Duty Cycle (%) |
|---|---|---|---|
| 13.56 | 192.6 | 254.2 | 75.8% |

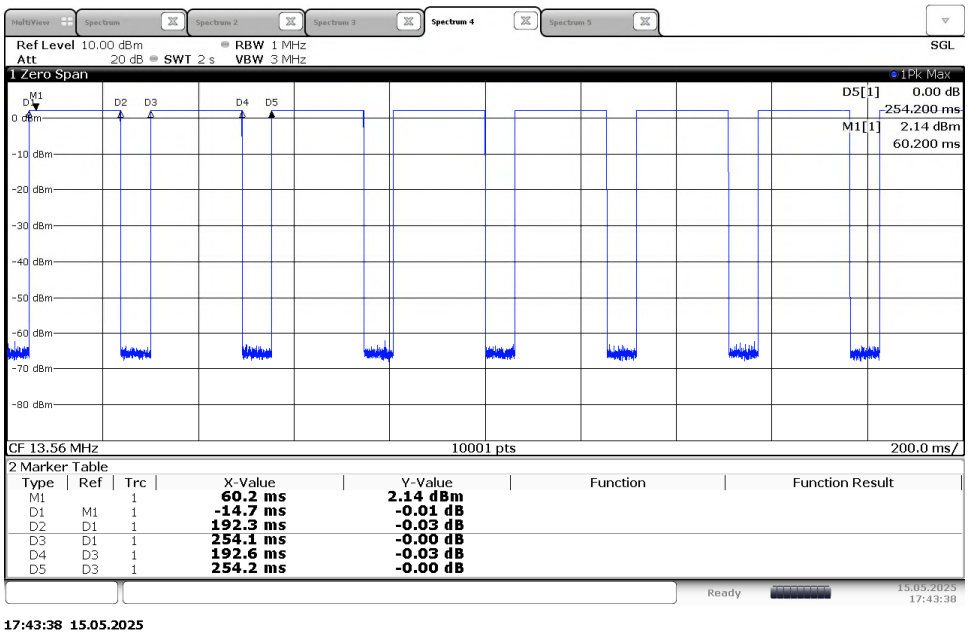


**Figure 2.8.6-1: Duty Cycle Results**

### 2.8.7 Test Location and Test Equipment Used

This test was carried out in TÜV SÜD America, Inc., 5610 W. Sligh Ave, Suite 100, Tampa, FL 33634, USA.

| Instrument | Manufacturer | Type No | TE No | Software / Firmware Revision | Calibration Period (months) | Calibration Due |
|---|---|---|---|---|---|---|
| Duratest 175 Cable 26.5GHz | Teledyne Storm Products | 921-0101-036 | BEMC02112 | N/A | 12 | 18-Oct-2025 |
| PCB Loop Antenna | FAU EMI R&D Lab | EMI-LOOP | BEMC02141 | N/A | N/A | NCR |
| Atten 10dB 2.9mm-M/F, DC-26.5GHz, 2W | Aeroflex Inmet | 26AH-10 | DEMC3046 | N/A | 12 | 25-Jun-2025 |
| Signal & Spectrum Analyzer | Rohde & Schwarz | FSW43 | DEMC3085 | 2.90 SP1 | 12 | 03-Jun-2025 |

TU - Traceability Unscheduled
O/P MON – Output Monitored with Calibrated Equipment
N/A - Not Applicable
NCR – No Calibration Required

# 3 Test Equipment Information

## 3.1 General Test Equipment Used

| Instrument | Manufacturer | Type No | TE No | Software / Firmware Revision | Calibration Period (months) | Calibration Due |
|---|---|---|---|---|---|---|
| Duratest 175 Cable 26.5GHz | Teledyne Storm Products | 921-0101-036 | BEMC02112 | N/A | 12 | 18-Oct-2025 |
| PCB Loop Antenna | FAU EMI R&D Lab | EMI-LOOP | BEMC02141 | N/A | N/A | NCR |
| Atten 10dB 2.9mm-M/F, DC-26.5GHz, 2W | Aeroflex Inmet | 26AH-10 | DEMC3046 | N/A | 12 | 25-Jun-2025 |
| Signal & Spectrum Analyzer | Rohde & Schwarz | FSW43 | DEMC3085 | 2.90 SP1 | 12 | 03-Jun-2025 |
| Active Loop Antenna | EMCO | 6502 | BEMC00078 | N/A | 24 | 06-Sep-2025 |
| 100Hz-26.5GHz EMC analyzer/HYZ | Hewlett Packard | E7405A | BEMC00523 | A.14.06 | 12 | 25-Jun-2025 |
| Tile Automation Software | ETS Lindgren | TILE4! - Version 4.2.A | BEMC02095 | 4.2A | N/A | NCR |
| BI LOG PERIODIC, ANTENNA | Schaffner | CBL6112B | TEMC00005 | N/A | 24 | 07-Nov-2025 |
| EMC Chamber | Panashield | N/A | TEMC00031 | N/A | 24 | 19-Oct-2025 |
| Loop Antenna | Electro-metrics | ALR 30M | TEMC00075 | N/A | 24 | 26-Jun-2025 |
| Test Software | Rohde & Schwarz | EMC32 | TEMC00184 | 10.50.00 / 11.50.00 | N/A | NCR |
| R & S ESW EMI Test Receiver | Rohde & Schwarz | ESW | TEMC00232 | 2.00 SP1 | 12 | 04-Jun-2025 |
| DC to 18 GHz Cable | SSI Technologies | 2801-03-03-360/WN | TEMC00293 | N/A | 12 | 13-Dec-2025 |
| EMI Test Receiver | Rohde & Schwarz | ESCS30 | TEMC00011 | 2.3003.0203.36 | 12 | 14-Jan-2026 |
| RFI/EMI Shielded Enclosure | UNIVERSAL SHIELDING CORP. | N/A | TEMC00100 | N/A | N/A | NCR |
| Two Line V Network | Rohde & Schwarz | ENV 216 | TEMC00244 | N/A | 12 | 06-Jun-2025 |
| 2-Line V-Network | Rohde & Schwarz GmbH & Co. KG | ENV216 | TEMC00290 | N/A | 12 | 06-Jun-2025 |
| Conducted cable with UNAT-10+ attenuator | L-com | RG58C/U | TEMC00291 | N/A | 12 | 18-Oct-2025 |
| Digital Thermometer | US-Omega Engineering | MDSS41-TC | BEMC00002 | N/A | 24 | 19-Sep-2025 |
| Digital MultiMeter | Fluke | 115 | BEMC02108 | N/A | 12 | 15-Jan-2026 |
| PCB Loop Antenna | FAU EMI R&D Lab | EMI-LOOP | BEMC02141 | N/A | N/A | NCR |
| Temperature Test Chamber | Sun Electronic Systems, Inc. | EC127 | TEMC00242 | 5.10 | N/A | NCR |
| Flexible Test Cable | Mini-Circuits | ULC-8FT-SMSM+ | TEMC00267 | N/A | 12 | 20-Feb-2026 |
| SMA Fixed Attenuator Kit | Mini Circuits | K2-BW2+ | TEMC00272 | N/A | 12 | 05-Mar-2026 |

TU - Traceability Unscheduled
O/P MON - Output Monitored with Calibrated Equipment
N/A - Not Applicable
NCR – No Calibration Required

# 4 Diagram of Test Set-ups

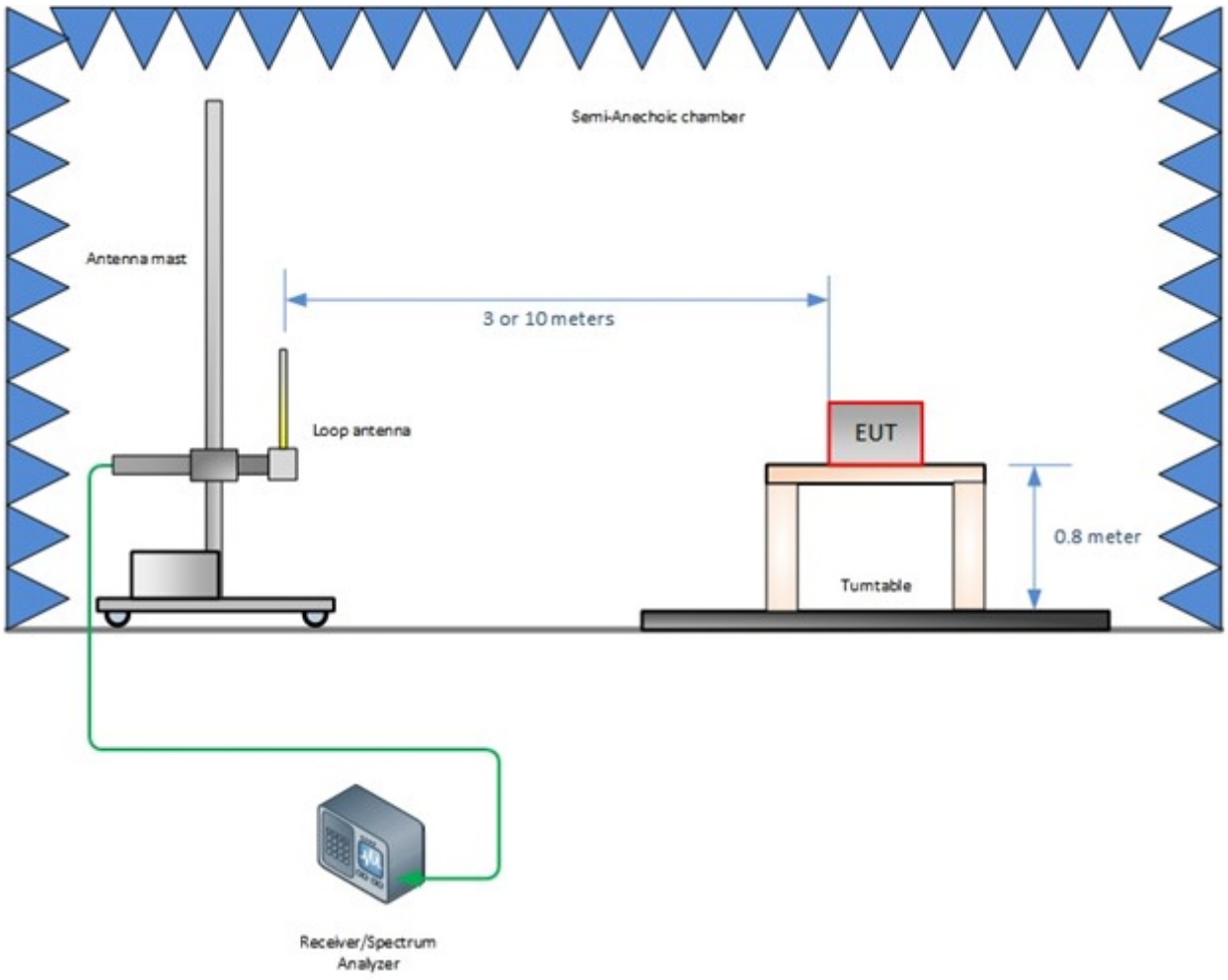


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**Figure 2.8.7-1 - Radiated Emissions Test Setup up to 30 MHz**

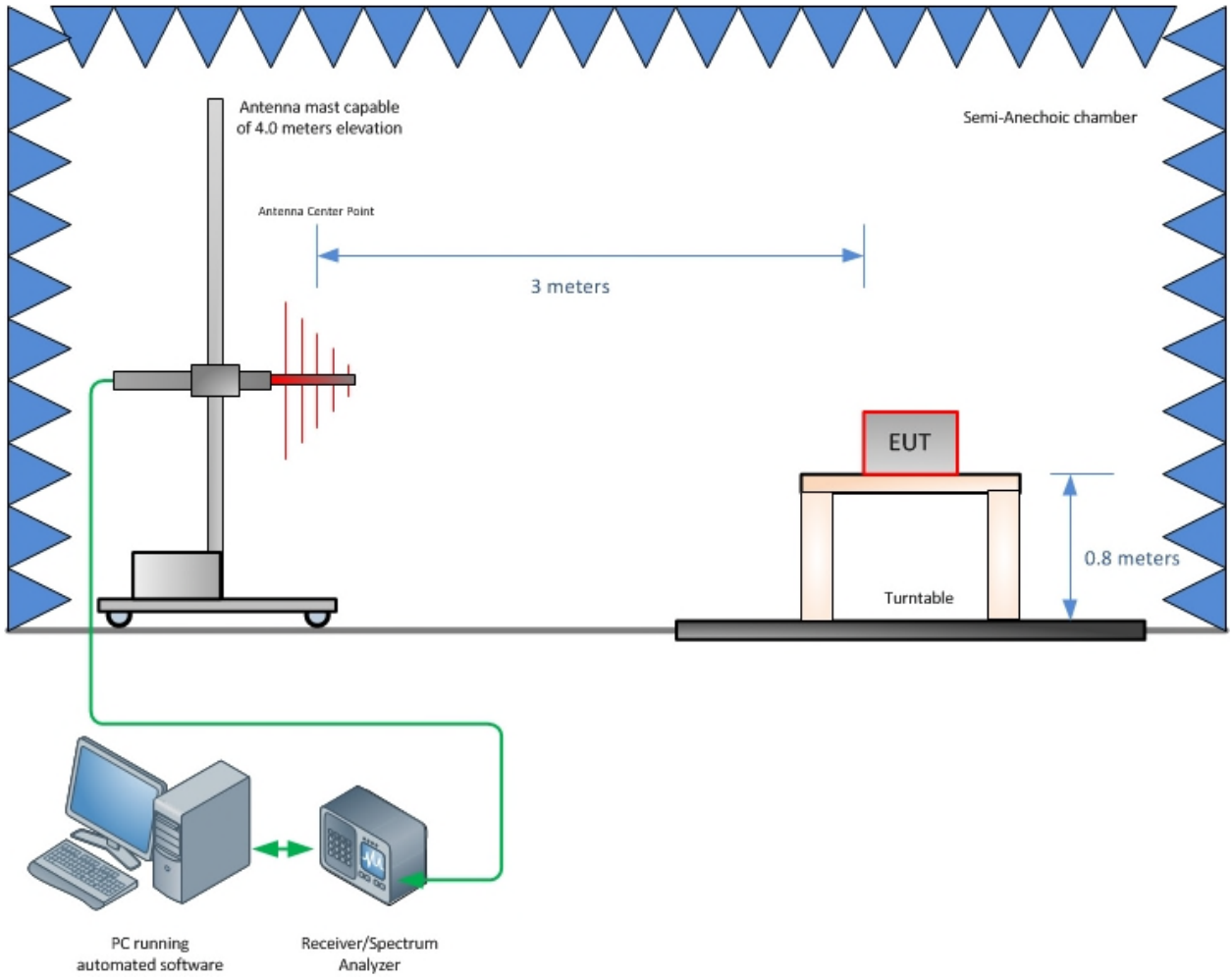


**Figure 2.8.7-2 - Radiated Emissions Test Setup up to 1 GHz**

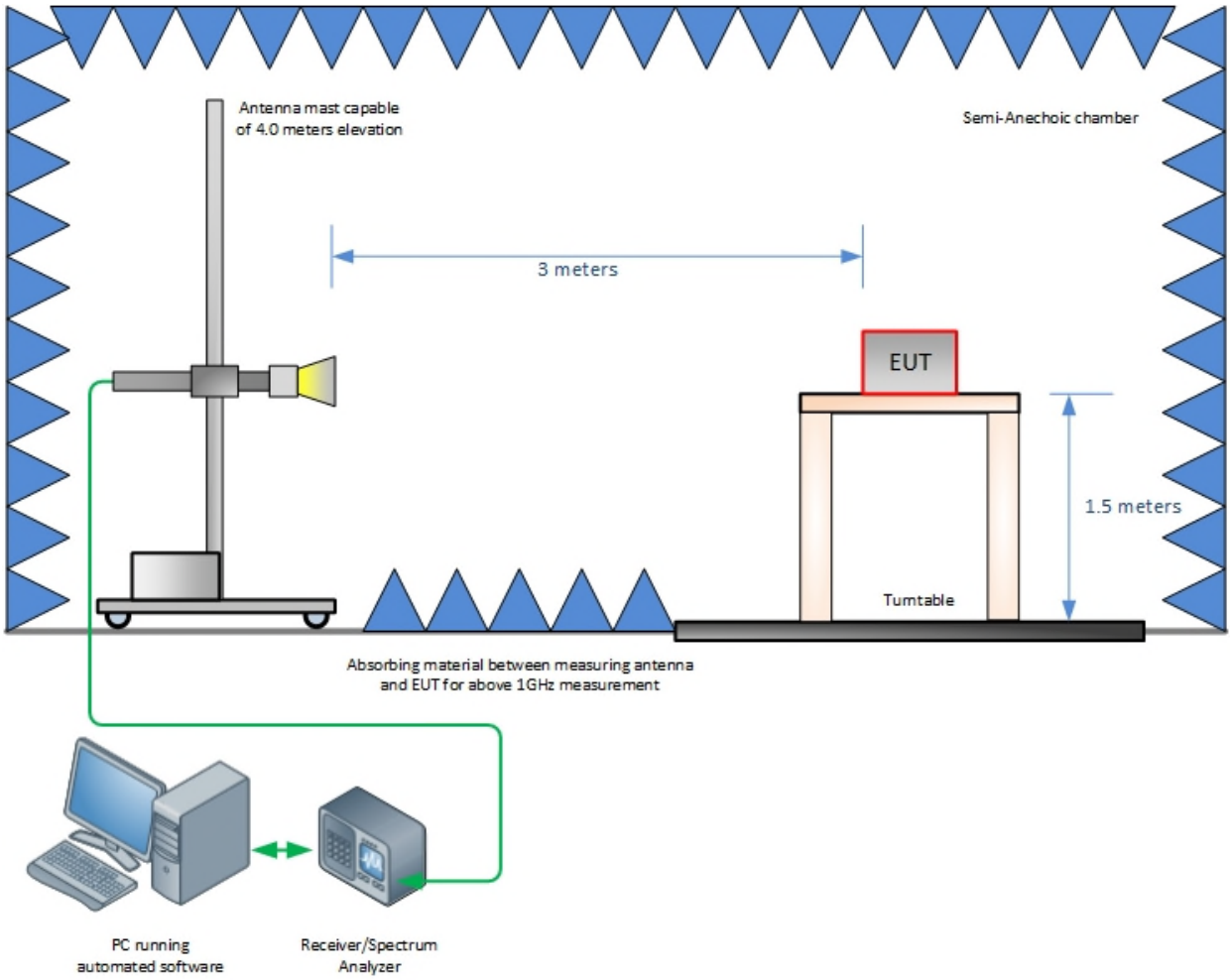


**Figure 2.8.7-3 - Radiated Emissions Test Setup above 1 GHz**

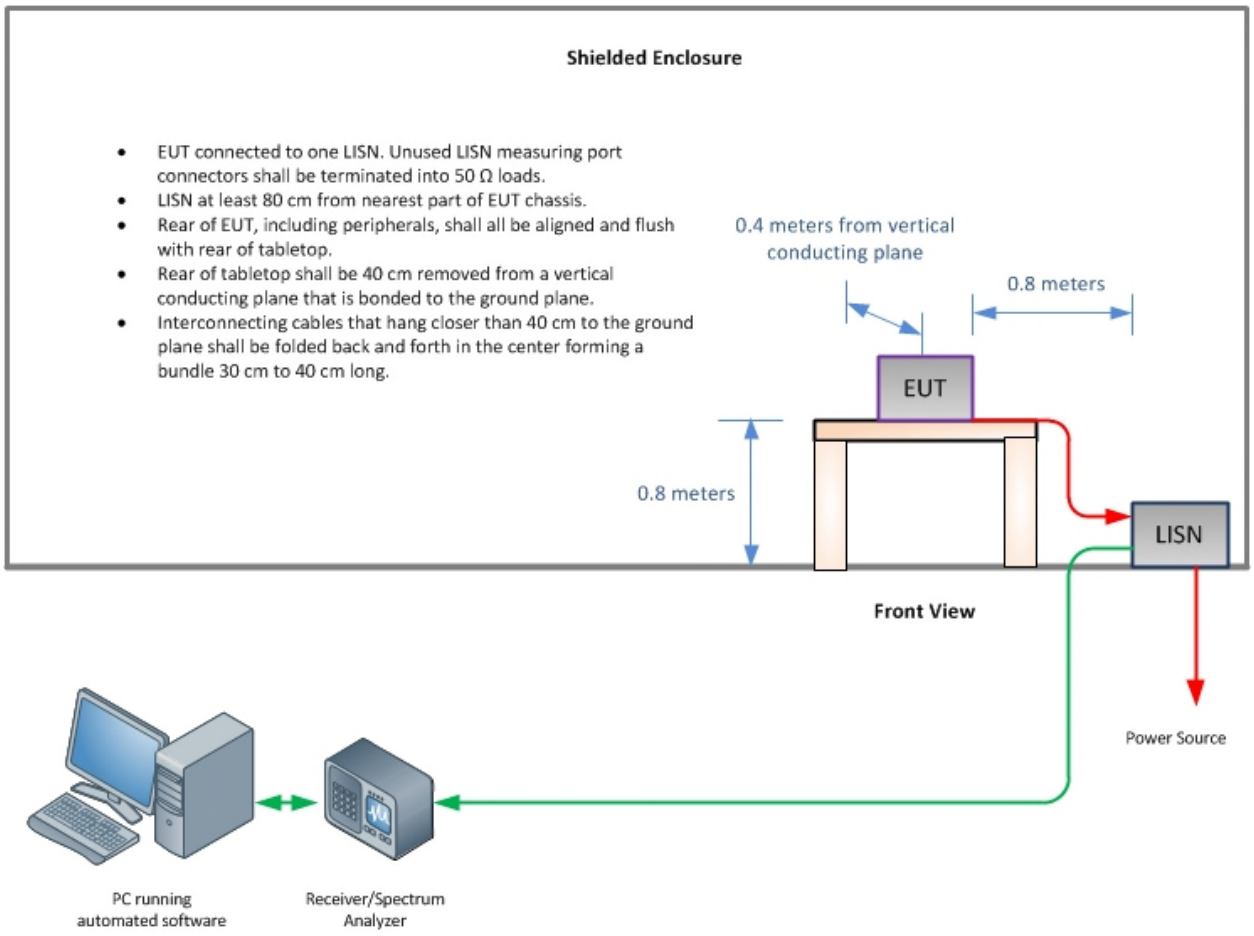


**Figure 2.8.7-4 - Conducted Emissions Test Setup**

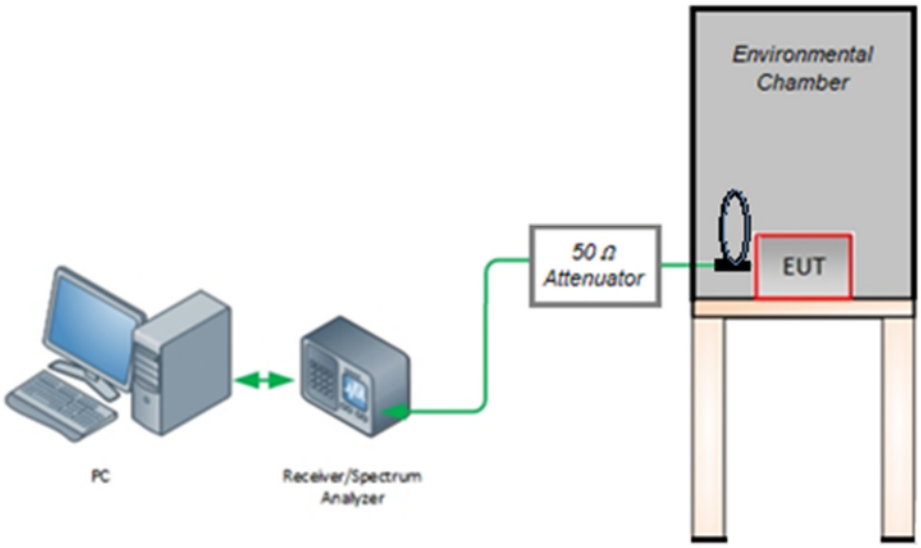


**Figure 2.8.7-5 – Frequency Stability Test Setup**

# 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 | $U_{cispr}$ | $U_{Lab}$ |
|---|---|---|
| Conducted disturbance (mains port)<br>(9 kHz – 150 kHz)<br>(150 kHz – 30 MHz) | <br>3.8 dB<br>3.4 dB | <br>3.71 dB<br>3.31 dB |
| Conducted disturbance (telecom port)<br>(150 kHz – 30 MHz 55 dB LCL)<br>(150 kHz – 30 MHz 65 dB LCL)<br>(150 kHz – 30 MHz 75 dB LCL) | <br>5.0 dB<br>5.0 dB<br>5.0 dB | <br>4.11 dB<br>4.50 dB<br>4.94 dB |
| Radiated disturbance (electric field strength on an open area test site or alternative test site)<br>(30 MHz – 1 000 MHz)<br>(1 – 6 GHz)<br>(6-18 GHz) | <br>6.3 dB<br>5.2 dB<br>5.5 dB | <br>5.85 dB<br>4.48 dB<br>4.48 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.

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