

# Report on the Testing of the

## Landis + Gyr Technology, Inc.

### T1501 Series-5 Mesh

In accordance with:  
FCC 47 CFR part 15.247  
ISED RSS-247 Issue 2, February 2017

Prepared for: Landis + Gyr Technology, Inc.  
30000 Mill Creek Ave., Suite 100  
Alpharetta, GA 30022



America

**Add value.  
Inspire trust.**

## COMMERCIAL-IN-CONFIDENCE

Document Number: AT72172746.1C0

### SIGNATURE

A handwritten signature in black ink, appearing to read "Kirby Munroe".

| NAME         | JOB TITLE                                                                         | RESPONSIBLE FOR      | ISSUE DATE |
|--------------|-----------------------------------------------------------------------------------|----------------------|------------|
| Kirby Munroe | Wireless / EMC Technical and Certification<br>Manager, NA<br>TUV SUD America Inc. | Authorized Signatory | 11/17/2021 |

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD America, Inc. document control rules.

FCC Accreditation Designation Number US1233  
FCC Test Site Registration Number 967699  
Innovation, Science, and Economic Development Canada Lab Code 23932

### EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with the standards listed above.



A2LA Cert. No. 2955.09

### 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.

### ACCREDITATION

Our A2LA Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our A2LA Accreditation.

TÜV SÜD America  
5945 Cabot Parkway, Suite 100  
Alpharetta, GA 3005

Phone: 678-341-5900  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)

# TÜV SÜD

TÜV®



## Contents

|          |                                                                  |                                     |
|----------|------------------------------------------------------------------|-------------------------------------|
| <b>1</b> | <b>Report Summary .....</b>                                      | <b>3</b>                            |
| 1.1      | Report Modification Record.....                                  | 3                                   |
| 1.2      | Introduction.....                                                | 3                                   |
| 1.3      | Brief Summary of Results .....                                   | 5                                   |
| 1.4      | Product Information .....                                        | 6                                   |
| 1.5      | Deviations from the Standard.....                                | 8                                   |
| 1.6      | EUT Modification Record .....                                    | 9                                   |
| 1.7      | Test Location .....                                              | 9                                   |
| <b>2</b> | <b>Test Details .....</b>                                        | <b>10</b>                           |
| 2.1      | Antenna Requirement .....                                        | 10                                  |
| 2.2      | Power Line Conducted Emissions .....                             | 11                                  |
| 2.3      | Peak Output Power .....                                          | 13                                  |
| 2.4      | Carrier Frequency Separation.....                                | 15                                  |
| 2.5      | Number of Hopping Channels.....                                  | 17                                  |
| 2.6      | Channel Dwell Time .....                                         | 20                                  |
| 2.7      | 20dB / 99% Bandwidth .....                                       | 21                                  |
| 2.8      | Band-Edge Compliance of RF Conducted Emissions .....             | 27                                  |
| 2.9      | RF Conducted Spurious Emissions .....                            | 30                                  |
| 2.10     | Radiated Spurious Emissions into Restricted Frequency Bands..... | 32                                  |
| 2.11     | Test Equipment Used.....                                         | 37                                  |
| <b>3</b> | <b>Diagram of Test Set-ups.....</b>                              | <b>38</b>                           |
| <b>4</b> | <b>Accreditation, Disclaimers and Copyright.....</b>             | <b>40</b>                           |
|          | <b>Appendix A: Test Setup Photos.....</b>                        | <b>Error! Bookmark not defined.</b> |



# 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.

**Table 1.1-1 – Modification Record**

| Issue | Description of Change | Date of Issue |
|-------|-----------------------|---------------|
| 0     | First Issue           | 11/17/2021    |

## 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 15.247 and Innovation Science and Economic Development Canada's Radio Standards Specification RSS-247 for the tests documented herein.

|                               |                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicant                     | Tim Walters                                                                                                                                                                                                                                                                                                                           |
| Manufacturer                  | Landis + Gyr Technology, Inc                                                                                                                                                                                                                                                                                                          |
| Applicant's Email Address     | <a href="mailto:Tim.walters@landisgyr.com">Tim.walters@landisgyr.com</a>                                                                                                                                                                                                                                                              |
| Model Number(s)               | T1501 Series-5 Mesh                                                                                                                                                                                                                                                                                                                   |
| Serial Number(s)              | LAN ID: 9160F62C (Conducted and Field strength measurement)<br>LAN ID: 9160F63C (Radiated measurement)                                                                                                                                                                                                                                |
| FCC ID                        | R7PNG0R1S5LP                                                                                                                                                                                                                                                                                                                          |
| ISED Certification Number     | 5294A-NG0R1S5LP                                                                                                                                                                                                                                                                                                                       |
| Hardware Version(s)           | N/A                                                                                                                                                                                                                                                                                                                                   |
| Software Version(s)           | N/A                                                                                                                                                                                                                                                                                                                                   |
| Number of Samples Tested      | 1                                                                                                                                                                                                                                                                                                                                     |
| Test Specification/Issue/Date | US Code of Federal Regulation (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2021<br>ISED Canada Radio Standards Specification: RSS-247 – Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices, Issue 2, February 2017. |
| Order Number                  | 72172746                                                                                                                                                                                                                                                                                                                              |
| Date of Receipt of EUT        | 2021-October-11                                                                                                                                                                                                                                                                                                                       |
| Start of Test                 | 2021-October-11                                                                                                                                                                                                                                                                                                                       |
| Finish of Test                | 2021-October-15                                                                                                                                                                                                                                                                                                                       |



Related Document(s)

ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Device.

FCC OET KDB 558074 D01 15.247 Meas Guidance v05r02: Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of the FCC Rules, April 2, 2019

US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2021.

ISED Canada Radio Standards Specification: RSS-GEN – General Requirements for Compliance of Radio Apparatus, Issue 5, Amendment 1 (March 2019), Amendment 2 (February 2021)

### 1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC Part 15.247 and ISED Canada's RSS-247 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               | -----             | 10                  |
| Carrier Frequency Separation                                | Yes                | Pass        | 15.247(a)(1)         | RSS-247 5.1(b)    | 15                  |
| Number of Hopping Channels                                  | Yes                | Pass        | 15.247(a)(1)(i)      | RSS-247 5.1(c)    | 17                  |
| Channel Dwell Time                                          | Yes                | Pass        | 15.247(a)(1)(i)      | RSS-247 5.1(c)    | 20                  |
| 20 dB Bandwidth                                             | Yes                | Pass        | 15.247(a)(1)(i)      | RSS-247 5.1(c)    | 21                  |
| 99% Bandwidth                                               | Yes                | Pass        | -----                | RSS-GEN 6.7       | 21                  |
| Peak Output Power                                           | Yes                | Pass        | 15.247(b)(2)         | RSS-247 5.4(a)    | 13                  |
| Band-Edge Compliance of RF Conducted Emissions              | Yes                | Pass        | 15.247(d)            | RSS-247 5.5       | 27                  |
| RF Conducted Spurious Emissions                             | Yes                | Pass        | 15.247(d)            | RSS-247 5.5       | 30                  |
| Radiated Spurious Emissions into Restricted Frequency Bands | Yes                | Pass        | 15.205, 15.209       | RSS-GEN 8.9, 8.10 | 32                  |
| Power Line Conducted Emissions                              | Yes                | Pass        | 15.207               | RSS-GEN 8.8       | 10                  |
| Duty Cycle                                                  | No                 | -----       |                      |                   | -----               |

## 1.4 Product Information

### 1.4.1 Technical Description

The Series-5 RF proprietary protocol supports baud rates up to 115.2 kbps. operation in the Sub-GHz band. There are 2 types of RF proprietary protocol radios with wide band and narrow band mode.

**Table 1.4-1 – Wireless Technical Information**

| Detail                      | Description                       |
|-----------------------------|-----------------------------------|
| FCC ID                      | R7PNG0R1S5LP                      |
| IC ID                       | 5294A-NG0R1S5LP                   |
| Transceiver Model #         | T1501 Series-5 Mesh               |
| Modulation Format           | Proprietary FSK                   |
| Antenna Type / Description: | Monopole chip antenna / 1dBi Gain |

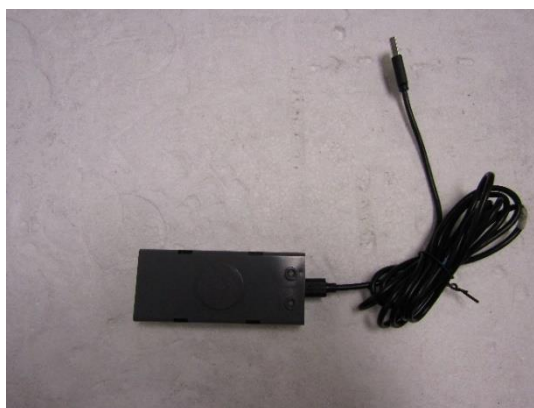
A full description and detailed product specification details are available from the manufacturer.



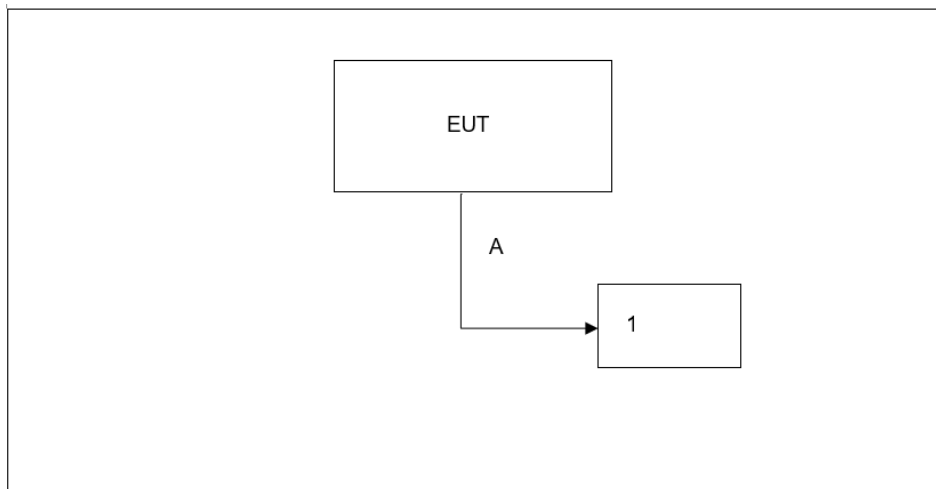
**Photo 1.4.1-1 –Front view of the EUT**



**Photo 1.4.1-2 – Back view of the EUT**



**Photo 1.4.1-3 –EUT with USB cable**



**Figure 1.4.1-4 – Test Setup Block Diagram**

**Table 1.4.1-1 – Cable Descriptions**

| Item | Cable/Port | Description |
|------|------------|-------------|
| A    | USB        | Power Cable |

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

| Item | Make/Model | Description                                                         |
|------|------------|---------------------------------------------------------------------|
| 1    | Lenovo     | Laptop used for configuring wireless module – Landis + Gyr provided |

### 1.4.2 Modes of Operation

T1501 Series-5 Mesh model provides 2 distinct proprietary modes of operation using FHSS classifications as outlined below.

| Mode of Operation | Frequency Range (MHz) | Number of Channels | Channel Separation (kHz) | Stack / Mode              | Data Rates Supported (kbps) | Classification |
|-------------------|-----------------------|--------------------|--------------------------|---------------------------|-----------------------------|----------------|
| 1                 | 902.3 - 927.8         | 86                 | 300                      | Mesh (Wide band)<br>FSK   | 9.6, 19.2, 38.4, 115.2      | FHSS           |
| 2                 | 904.0 - 927.8         | 239                | 100                      | Mesh (Narrow band)<br>FSK | 9.6, 19.2, 38.4             | FHSS           |

### 1.4.3 Monitoring of Performance

For radiated emissions, the EUT was evaluated in three orthogonal orientations. The worst-case orientation was X-position. See test setup photos for more information. The EUT was programmed to generate a continuously modulated signal on each channel evaluated.

For RF Conducted measurements, the EUT was connected to the test equipment with a MMCX to SMA connector.

Worst case mode for all other parameters measured listed below:

| Mode | Classification | 20dB Bandwidth         | Number of hopping channels | RF Channel Separation | Peak Output Power      | Conducted Spurious Emissions | Conducted Band Edge | Radiated Spurious Emissions |
|------|----------------|------------------------|----------------------------|-----------------------|------------------------|------------------------------|---------------------|-----------------------------|
|      |                | Data Rate (kbps)       |                            |                       |                        |                              |                     |                             |
| 1    | FHSS           | 9.6, 19.2, 38.4, 115.2 | 9.6                        | 9.6                   | 9.6, 19.2, 38.4, 115.2 | 9.6                          | 115.2               | 9.6                         |
| 2    | FHSS           | *                      | 9.6                        | 9.6                   | **                     | *                            | 38.4                | *                           |

\* Addressed by mode 1

\*\*Only channel 904 MHz was evaluated. All other data rates / channels addressed by mode 1.

Power setting during test: Mode of operation 1: 28.5 dBm

Mode of operation 2: 28.0 dBm

### 1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

## 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                  | Initial State                                   |                        |                          |

The equipment was tested as provided without any modifications.

## 1.7 Test Location

TÜV SÜD conducted the following tests at our Alpharetta, GA test laboratory.

| Test Name                                                   | Name of Engineer(s)   | Accreditation |
|-------------------------------------------------------------|-----------------------|---------------|
| DC Powered Operating                                        |                       |               |
| Antenna Requirement                                         | Divya Adusumilli      | A2LA          |
| Power Line Conducted Emissions                              | Bhagyashree Chaudhary | A2LA          |
| Peak Output Power                                           | Divya Adusumilli      | A2LA          |
| Carrier Frequency Separation                                | Divya Adusumilli      | A2LA          |
| Number of Hopping Channels                                  | Divya Adusumilli      | A2LA          |
| 20dB / 99% Bandwidth                                        | Divya Adusumilli      | A2LA          |
| Band-Edge Compliance of RF Conducted Emissions              | Bhagyashree Chaudhary | A2LA          |
| RF Conducted Spurious Emissions                             | Divya Adusumilli      | A2LA          |
| Radiated Spurious Emissions into Restricted Frequency Bands | Divya Adusumilli      | A2LA          |

Office address:  
TÜV SÜD America  
5945 Cabot Parkway, Suite 100  
Alpharetta, GA 30005, USA

## 2 Test Details

### 2.1 Antenna Requirement

#### 2.1.1 Specification Reference

FCC Section: 15.203

#### 2.1.2 Equipment Under Test and Modification State

As shown in §1.4 with modification state “0”, as noted in §1.6.

#### 2.1.3 Date of Test

10/13/2021

#### 2.1.4 Test Method

N/A

#### 2.1.5 Environmental Conditions

The EUT was evaluated within the temperature, humidity and pressure range of the EUT as specified by the standard. The laboratory shall have an ambient temperature range of 15°C to 35°C, relative humidity range of 30% to 60% and atmospheric pressure range of 86 kPa to 106 kPa.

|                      |            |
|----------------------|------------|
| Ambient Temperature  | 22.3 °C    |
| Relative Humidity    | 53.8 %     |
| Atmospheric Pressure | 972.2 mbar |

#### 2.1.6 Test Results

The EUT utilizes monopole chip antenna with peak gain 1 dBi which is mounted on the bottom side of the printed circuit board, therefore satisfying the requirements of Section 15.203.

## 2.2 Power Line Conducted Emissions

### 2.2.1 Specification Reference

FCC Section: 15.207  
ISED Canada: RSS-Gen 8.8

### 2.2.2 Equipment Under Test and Modification State

As shown in §1.4 with modification state "0", as noted in §1.6.

### 2.2.3 Date of Test

10/14/2021

### 2.2.4 Test Method

ANSI C63.10 section 6 was the guiding documents for this evaluation. Conducted emissions were performed from 150kHz to 30MHz with the spectrum analyzer's resolution bandwidth set to 9kHz and the video bandwidth set to 30kHz. The calculation for the conducted emissions is as follows:

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

### 2.2.5 Environmental Conditions

The EUT was evaluated within the temperature, humidity and pressure range of the EUT as specified by the standard. The laboratory shall have an ambient temperature range of 15°C to 35°C, relative humidity range of 30% to 60% and atmospheric pressure range of 86 kPa to 106 kPa.

Ambient Temperature     22.3 °C  
Relative Humidity        53.8 %  
Atmospheric Pressure    972.2 mbar

### 2.2.6 Test Results

**Table 2.2.6-1: Conducted EMI Results-Avg – Line 1**

| Frequency (MHz) | Avg Limit | Avg Level Corrected | Avg Level | Correction Fact. | Avg Margin | Result |
|-----------------|-----------|---------------------|-----------|------------------|------------|--------|
| 0.15            | 56        | 42.3                | 32.6      | 9.682            | -13.7      | PASS   |
| 0.8             | 46        | 22.3                | 12.6      | 9.668            | -23.7      | PASS   |
| 1.6             | 46        | 23.4                | 13.7      | 9.662            | -22.6      | PASS   |
| 1.64            | 46        | 22.2                | 12.6      | 9.663            | -23.8      | PASS   |
| 1.68            | 46        | 23.2                | 13.5      | 9.664            | -22.8      | PASS   |
| 2.47            | 46        | 22.8                | 13.1      | 9.689            | -23.2      | PASS   |

**Table 2.2.6-2: Conducted EMI Results-QP – Line 1**

| Frequency (MHz) | QP Limit | QP Level Corrected | QP Level | Correction Fact. | QP Margin | Result |
|-----------------|----------|--------------------|----------|------------------|-----------|--------|
| 0.15            | 66       | 50.7               | 41.1     | 9.682            | -15.3     | PASS   |
| 0.8             | 56       | 29.5               | 19.8     | 9.668            | -26.5     | PASS   |
| 1.6             | 56       | 29.5               | 19.8     | 9.662            | -26.5     | PASS   |
| 1.64            | 56       | 29.3               | 19.6     | 9.663            | -26.7     | PASS   |
| 1.68            | 56       | 29.4               | 19.8     | 9.664            | -26.6     | PASS   |
| 2.47            | 56       | 29.1               | 19.4     | 9.689            | -26.9     | PASS   |

**Table 2.2.6-3: Conducted EMI Results-Avg – Line 2**

| Frequency (MHz) | Avg Limit | Avg Level Corrected | Avg Level | Correction Fact. | Avg Margin | Result |
|-----------------|-----------|---------------------|-----------|------------------|------------|--------|
| 0.15            | 56        | 40.5                | 30.8      | 9.675            | -15.5      | PASS   |
| 0.5             | 46.1      | 26.4                | 16.7      | 9.631            | -19.8      | PASS   |
| 1.34            | 46        | 20.2                | 10.5      | 9.667            | -25.8      | PASS   |
| 1.52            | 46        | 21.8                | 12.1      | 9.67             | -24.2      | PASS   |
| 1.96            | 46        | 21.8                | 12.1      | 9.661            | -24.2      | PASS   |
| 3.13            | 46        | 21.7                | 12        | 9.693            | -24.3      | PASS   |

**Table 2.2.6-4: Conducted EMI Results-QP – Line 2**

| Frequency (MHz) | QP Limit | QP Level Corrected | QP Level | Correction Fact. | QP Margin | Result |
|-----------------|----------|--------------------|----------|------------------|-----------|--------|
| 0.15            | 66       | 49.2               | 39.5     | 9.675            | -16.8     | PASS   |
| 0.5             | 56.1     | 29.1               | 19.4     | 9.631            | -27.1     | PASS   |
| 1.34            | 56       | 25.5               | 15.9     | 9.667            | -30.5     | PASS   |
| 1.52            | 56       | 26.4               | 16.7     | 9.67             | -29.6     | PASS   |
| 1.96            | 56       | 26.2               | 16.5     | 9.661            | -29.8     | PASS   |
| 3.13            | 56       | 25.7               | 16       | 9.693            | -30.3     | PASS   |

## **2.3 Peak Output Power**

### **2.3.1 Specification Reference**

FCC Sections: 15.247(b)(2)  
ISED Canada: RSS-247 5.4(a)

### **2.3.2 Equipment Under Test and Modification State**

As shown in §1.4 with modification state "0", as noted in §1.6.

### **2.3.3 Date of Test**

10/12/2021

### **2.3.4 Test Method**

The maximum conducted peak output power was measured in accordance with ANSI C63.10 Subclause 7.8.5. The RF output port of the EUT was directly connected to the input of a peak power meter. The resulting peak value was recorded.

### **2.3.5 Environmental Conditions**

The EUT was evaluated within the temperature, humidity and pressure range of the EUT as specified by the standard. The laboratory shall have an ambient temperature range of 15°C to 35°C, relative humidity range of 30% to 60% and atmospheric pressure range of 86 kPa to 106 kPa.

|                      |            |
|----------------------|------------|
| Ambient Temperature  | 22.3 °C    |
| Relative Humidity    | 53.8 %     |
| Atmospheric Pressure | 972.2 mbar |

### **2.3.6 Test Results**

**Test Summary: EUT was set to transmit mode.**

**Test Results: Pass**

See data below for detailed results.

**Table 2.3.6-1: RF Output Power - FHSS**

| <b>Frequency<br/>[MHz]</b> | <b>Peak Output Power<br/>(dBm)</b> | <b>Data Rate<br/>(kbps)</b> | <b>Mode(s)</b> |
|----------------------------|------------------------------------|-----------------------------|----------------|
| 902.3                      | 29.96                              | 9.6                         | 1              |
| 902.3                      | 29.97                              | 19.2                        | 1              |
| 902.3                      | 29.95                              | 38.4                        | 1              |
| 902.3                      | 29.91                              | 115.2                       | 1              |
| 904.0                      | 29.74                              | 9.6                         | 2              |
| 904.0                      | 29.65                              | 19.2                        | 2              |
| 904.0                      | 29.74                              | 38.4                        | 2              |
| 915.2                      | 29.93                              | 9.6                         | 1              |
| 915.2                      | 29.88                              | 19.2                        | 1              |
| 915.2                      | 29.85                              | 38.4                        | 1              |
| 915.2                      | 29.82                              | 115.2                       | 1              |
| 927.8                      | 28.72                              | 9.6                         | 1              |
| 927.8                      | 28.69                              | 19.2                        | 1              |
| 927.8                      | 28.53                              | 38.4                        | 1              |
| 927.8                      | 28.63                              | 115.2                       | 1              |

## **2.4 Carrier Frequency Separation**

### **2.4.1 Specification Reference**

FCC Sections: 15.247(a)(1)  
ISED Canada: RSS-247 5.1(b)

### **2.4.2 Equipment Under Test and Modification State**

As shown in §1.4 with modification state "0", as noted in §1.6.

### **2.4.3 Date of Test**

10/12/2021

### **2.4.4 Test Method**

The RF output port of the EUT was directly connected to the input of the spectrum analyzer with suitable attenuation. The span of the spectrum analyzer was set wide enough to capture two adjacent peaks and the RBW started at approximately 30% of the channel spacing and adjusted as necessary to best identify the center of each individual channel. The VBW was set to  $\geq$  RBW.

### **2.4.5 Environmental Conditions**

The EUT was evaluated within the temperature, humidity and pressure range of the EUT as specified by the standard. The laboratory shall have an ambient temperature range of 15°C to 35°C, relative humidity range of 30% to 60% and atmospheric pressure range of 86 kPa to 106 kPa.

|                      |            |
|----------------------|------------|
| Ambient Temperature  | 22.3 °C    |
| Relative Humidity    | 53.8 %     |
| Atmospheric Pressure | 972.2 mbar |

### **2.4.6 Test Results**

**Test Summary: EUT was set to transmit mode.**

**Test Results: Pass**

See below plots for detailed results.

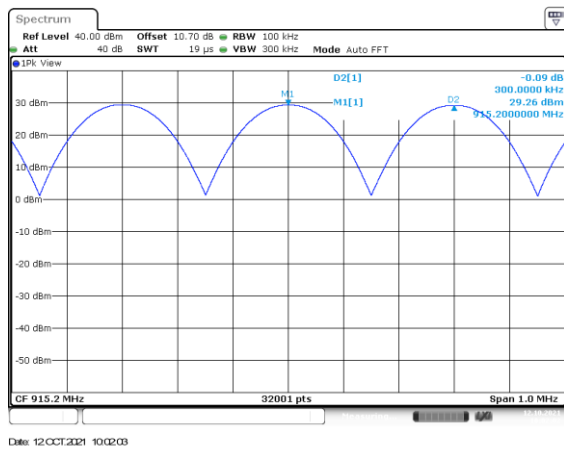


Figure 2.4.6-1: Channel Separation – Mode 1 – 9.6 kbps

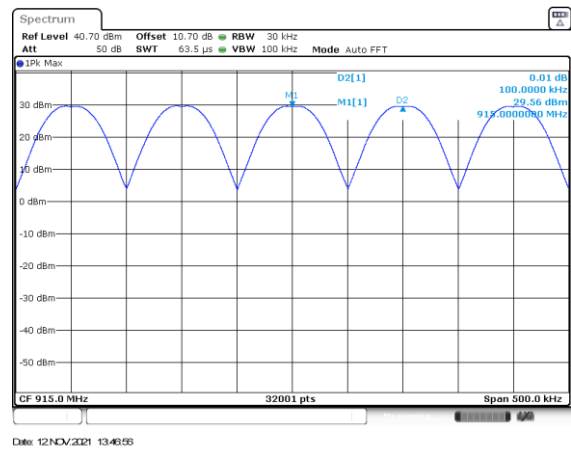


Figure 2.4.6-2: Channel Separation – Mode 2 – 9.6 kbps

## **2.5 Number of Hopping Channels**

### **2.5.1 Specification Reference**

FCC Sections: 15.247(a)(1)(i)  
ISED Canada: RSS 247 5.1 (c)

### **2.5.2 Equipment Under Test and Modification State**

As shown in §1.4 with modification state "0", as noted in §1.6.

### **2.5.3 Date of Test**

10/12/2021

### **2.5.4 Test Method**

The RF output port of the EUT was directly connected to the input of the spectrum analyzer with suitable attenuation. The span of the spectrum analyzer was set wide enough to capture the frequency band of operation. The RBW was set to less than 30% of the channel spacing or the 20dB bandwidth, whichever is smaller. The VBW was set to  $\geq$  RBW.

### **2.5.5 Environmental Conditions**

The EUT was evaluated within the temperature, humidity and pressure range of the EUT as specified by the standard. The laboratory shall have an ambient temperature range of 15°C to 35°C, relative humidity range of 30% to 60% and atmospheric pressure range of 86 kPa to 106 kPa.

|                      |            |
|----------------------|------------|
| Ambient Temperature  | 22.3 °C    |
| Relative Humidity    | 53.8 %     |
| Atmospheric Pressure | 972.2 mbar |

### **2.5.6 Test Results**

**Test Summary: EUT was set to transmit mode.**

**Test Results: Pass**

See below plots for detailed results.

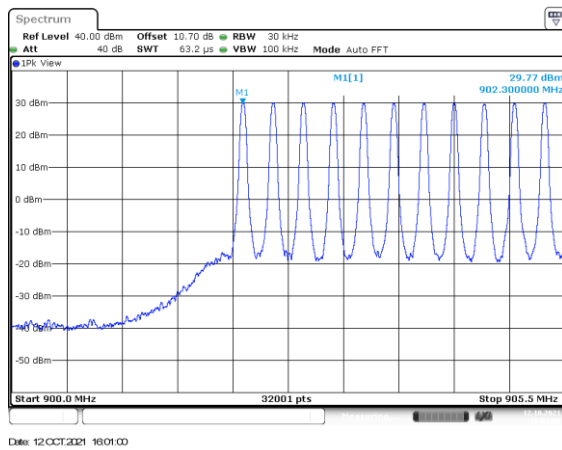


Figure 2.5.6-1: Mode 1 – 9.6 kbps (86 Channels)

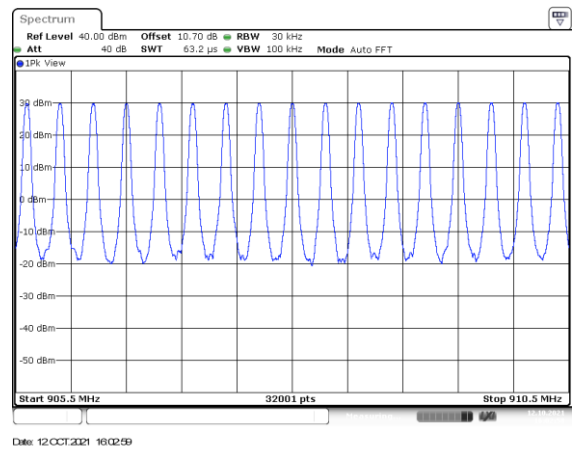


Figure 2.5.6-2: Mode 1 – 9.6 kbps (86 Channels)

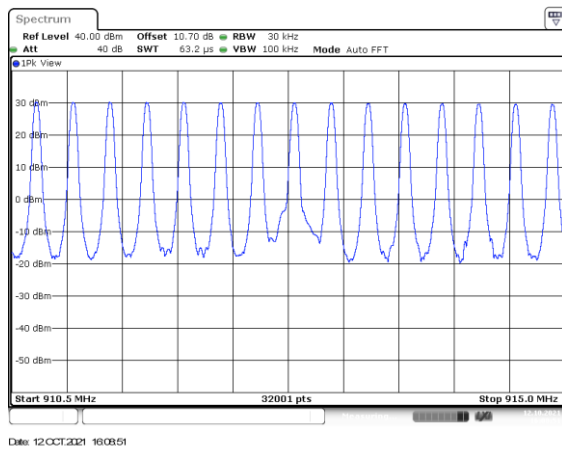


Figure 2.5.6-3: Mode 1 – 9.6 kbps (86 Channels)

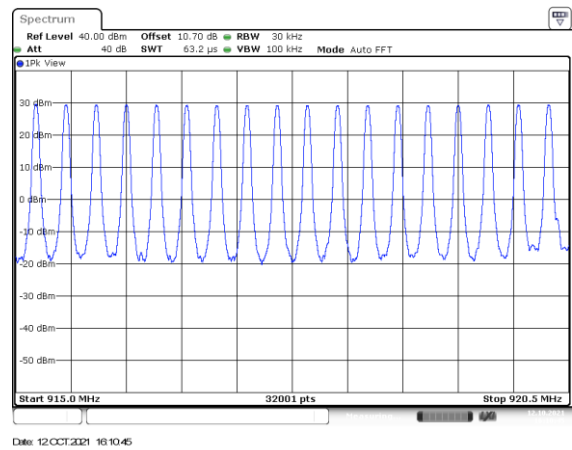


Figure 2.5.6-4: Mode 1 – 9.6 kbps (86 Channels)

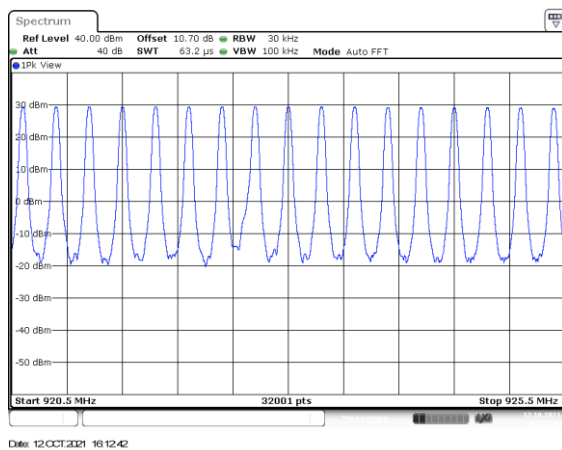


Figure 2.5.6-5: Mode 1 – 9.6 kbps (86 Channels)

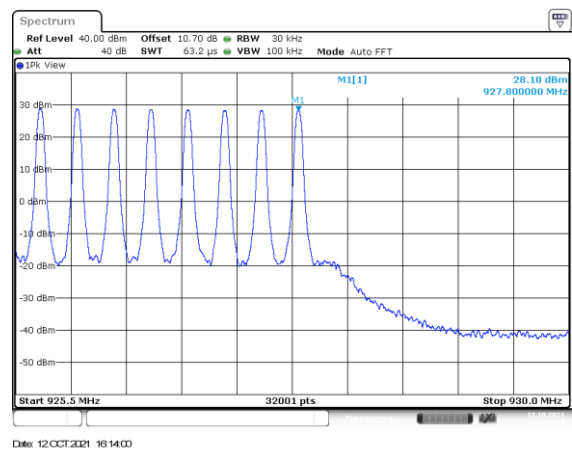
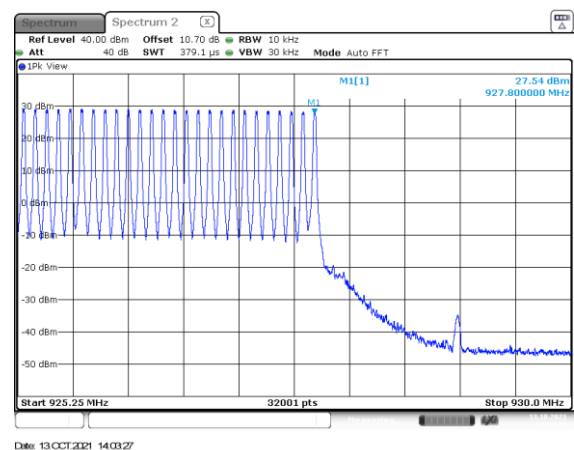
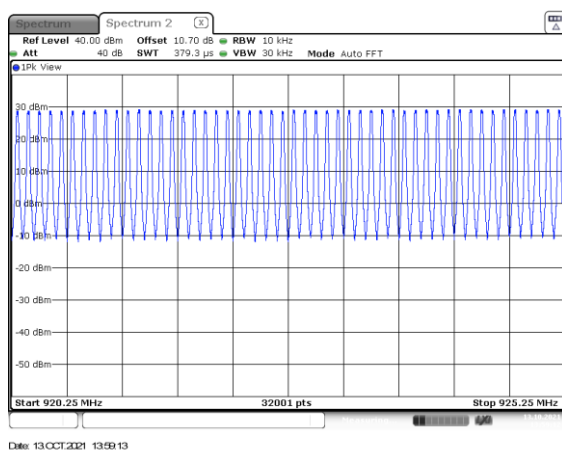
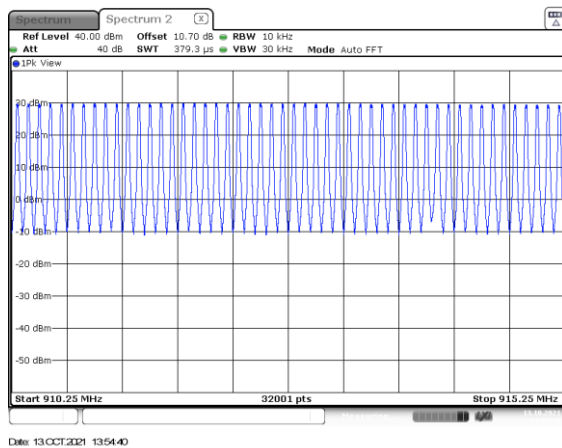
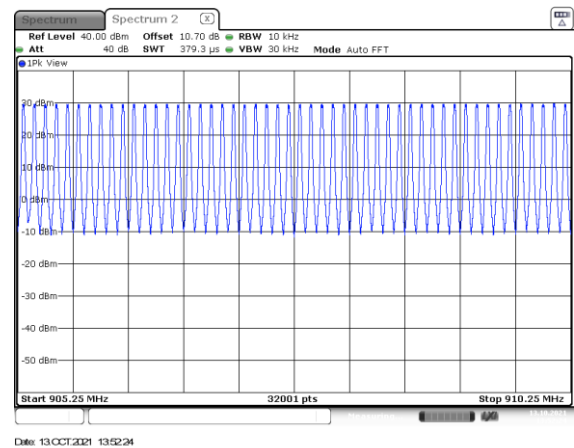
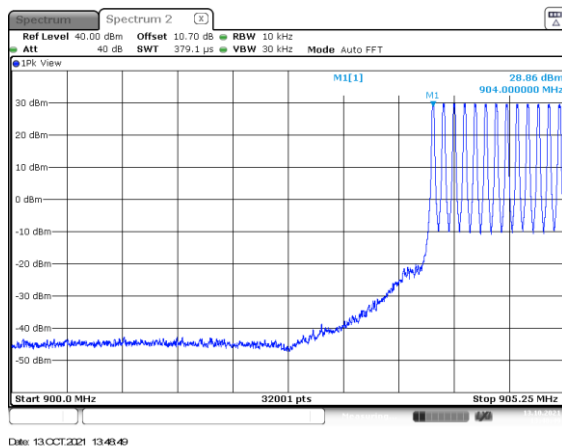


Figure 2.5.6-6: Mode 1 – 9.6 kbps (86 Channels)



## **2.6 Channel Dwell Time**

### **2.6.1 Specification Reference**

FCC Sections: 15.247(a)(1)(i)  
ISED: RSS-247 5.1(c)

### **2.6.2 Equipment Under Test and Modification State**

As shown in §1.4 with modification state "0", as noted in §1.6.

### **2.6.3 Date of Test**

10/13/2021

### **2.6.4 Test Method**

N/A

### **2.6.5 Environmental Conditions**

The EUT was evaluated within the temperature, humidity and pressure range of the EUT as specified by the standard. The laboratory shall have an ambient temperature range of 15°C to 35°C, relative humidity range of 30% to 60% and atmospheric pressure range of 86 kPa to 106 kPa.

|                      |            |
|----------------------|------------|
| Ambient Temperature  | 22.3 °C    |
| Relative Humidity    | 53.8 %     |
| Atmospheric Pressure | 972.2 mbar |

### **2.6.6 Test Results**

The EUT test mode does not generate a worst-case channel dwell time therefore a detailed engineering analysis is provided in the theory of operation.

## **2.7 20dB / 99% Bandwidth**

### **2.7.1 Specification Reference**

FCC Sections: 15.247(a)(1)(i)  
ISED Canada: RSS-247 5.1(c), RSS-GEN 6.7

### **2.7.2 Equipment Under Test and Modification State**

As shown in §1.4 with modification state "0", as noted in §1.6.

### **2.7.3 Date of Test**

10/12/2021

### **2.7.4 Test Method**

The RF output port of the EUT was directly connected to the input of the spectrum analyzer with suitable attenuation. The span of the spectrum analyzer display was set between two times and five times the occupied bandwidth (OBW) of the emission. The RBW of the spectrum analyzer was set to approximately 1 % to 5 % of the OBW. The trace was set to max hold with a peak detector active. The Delta and ndB down functions of the analyzer were utilized to determine the 20 dB bandwidth of the emission.

The occupied bandwidth measurement function of the spectrum analyzer was used to measure the 99% bandwidth. The span of the analyzer was set to capture all products of the modulation process, including the emission sidebands. The resolution bandwidth was set to 1% to 5% of the occupied bandwidth. The video bandwidth was set to 3 times the resolution bandwidth. A peak detector was used.

### **2.7.5 Environmental Conditions**

The EUT was evaluated within the temperature, humidity and pressure range of the EUT as specified by the standard. The laboratory shall have an ambient temperature range of 15°C to 35°C, relative humidity range of 30% to 60% and atmospheric pressure range of 86 kPa to 106 kPa.

|                      |            |
|----------------------|------------|
| Ambient Temperature  | 22.3 °C    |
| Relative Humidity    | 53.8 %     |
| Atmospheric Pressure | 972.2 mbar |

### **2.7.6 Test Results**

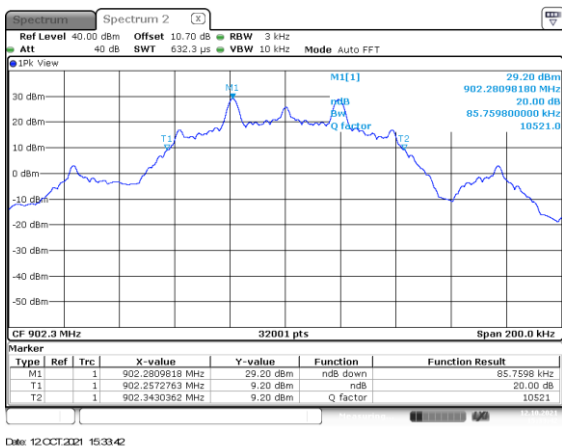
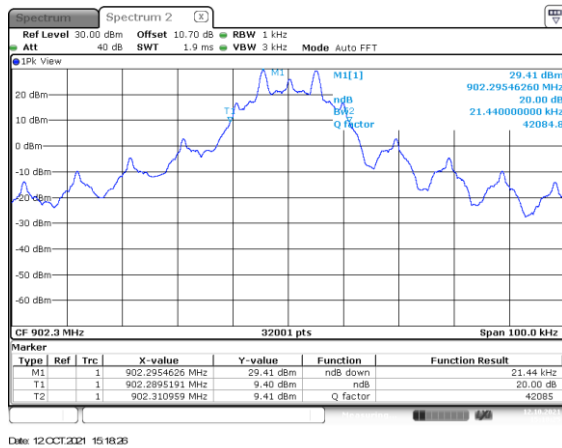
**Test Summary: EUT was set to transmit mode.**

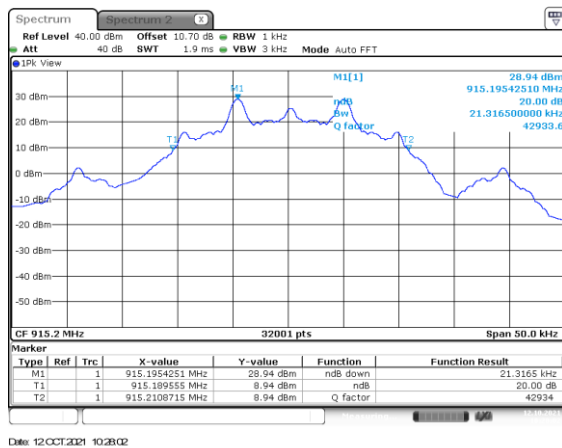
**Test Results: Pass**

See data below for detailed results.

Table 2.7.6-1: 20dB / 99% Bandwidth

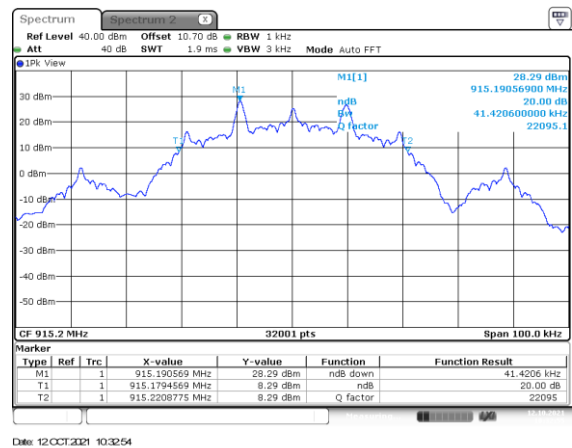
| Frequency [MHz] | 20dB Bandwidth (kHz) | 99% Bandwidth (kHz) | Data Rate (kbps) | Mode(s) |
|-----------------|----------------------|---------------------|------------------|---------|
| 902.3           | 21.440               | 20.669              | 9.6              | 1       |
| 902.3           | 41.783               | 42.133              | 19.2             | 1       |
| 902.3           | 85.759               | 82.516              | 38.4             | 1       |
| 902.3           | 234.514              | 214.143             | 115.2            | 1       |
| 915.2           | 21.316               | 20.746              | 9.6              | 1       |
| 915.2           | 41.421               | 42.217              | 19.2             | 1       |
| 915.2           | 85.622               | 83.535              | 38.4             | 1       |
| 915.2           | 234.555              | 216.493             | 115.2            | 1       |
| 927.8           | 21.351               | 20.651              | 9.6              | 1       |
| 927.8           | 42.268               | 42.027              | 19.2             | 1       |
| 927.8           | 85.309               | 83.609              | 38.4             | 1       |
| 927.8           | 234.480              | 214.693             | 115.2            | 1       |





Date: 12.OCT.2021 10:28:02

Figure 2.7.6-5: Mode 1 - 20 dB BW - MCH - 9.6 kbps



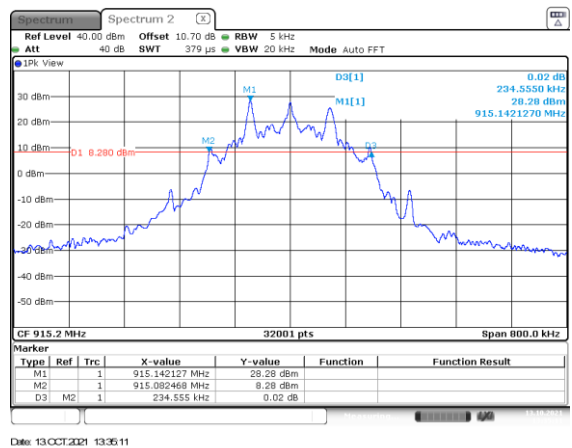
Date: 12.OCT.2021 10:32:54

Figure 2.7.6-6: Mode 1 - 20 dB BW - MCH - 19.2 kbps



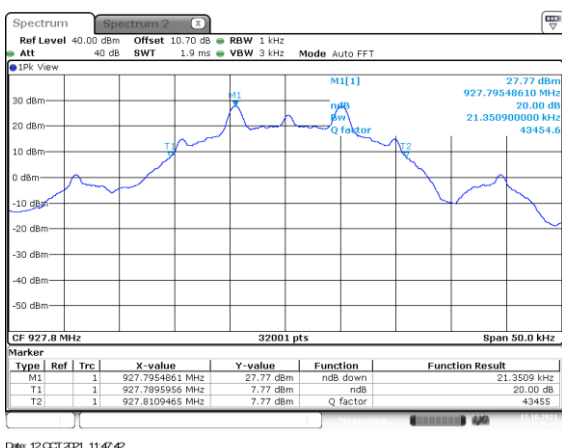
Date: 12.OCT.2021 10:43:22

Figure 2.7.6-7: Mode 1 - 20 dB BW - MCH - 38.4 kbps



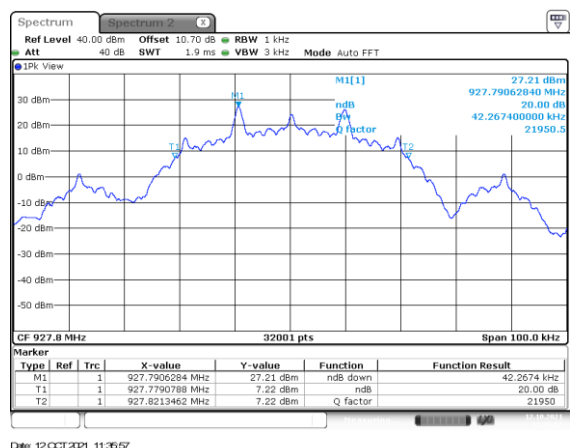
Date: 13.OCT.2021 13:36:11

Figure 2.7.6-8: Mode 1 - 20 dB BW - MCH - 115.2



Date: 12.OCT.2021 11:47:42

Figure 2.7.6-9: Mode 1 - 20 dB BW - HCH - 9.6 kbps



Date: 12.OCT.2021 11:36:57

Figure 2.7.6-10: Mode 1 - 20 dB BW - HCH - 19.2 kbps

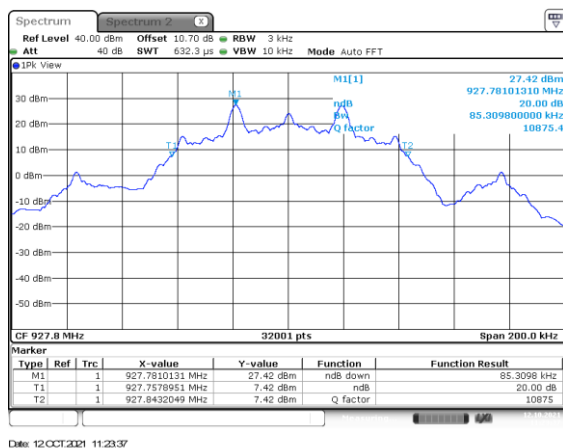


Figure 2.7.6-11: Mode 1 – 20 dB BW – HCH – 38.4 kbps

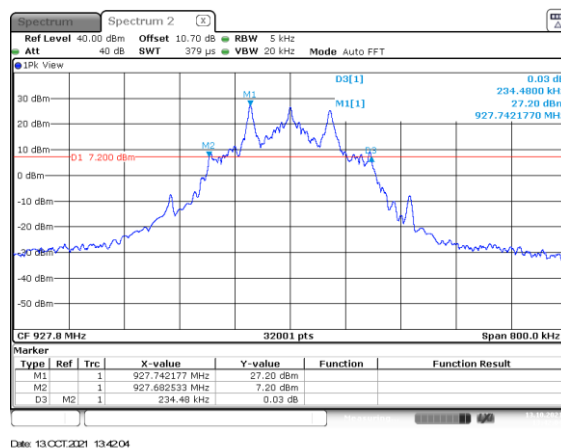


Figure 2.7.6-12: Mode 1 – 20 dB BW – HCH – 115.2

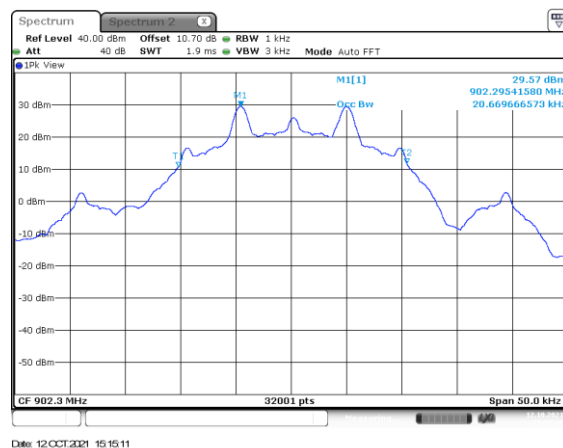


Figure 2.7.6-13: Mode 1 – 99% BW – LCH – 9.6 kbps

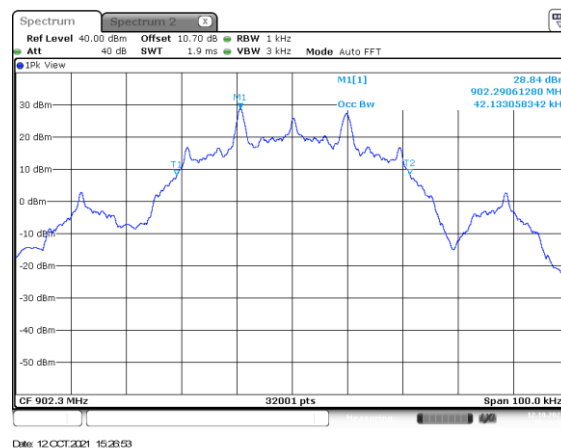


Figure 2.7.6-14: Mode 1 – 99% BW – LCH – 19.2 kbps



Figure 2.7.6-15: Mode 1 – 99% BW – LCH – 38.4 kbps

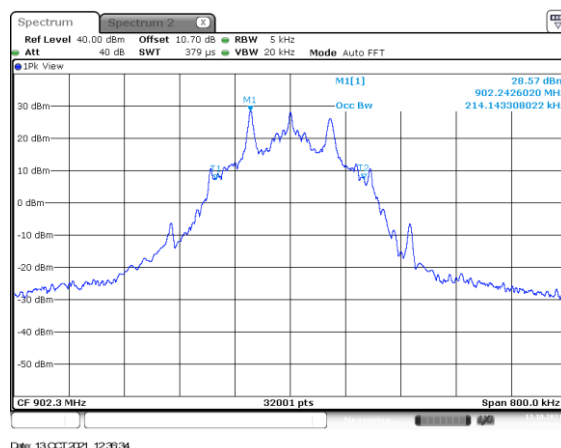
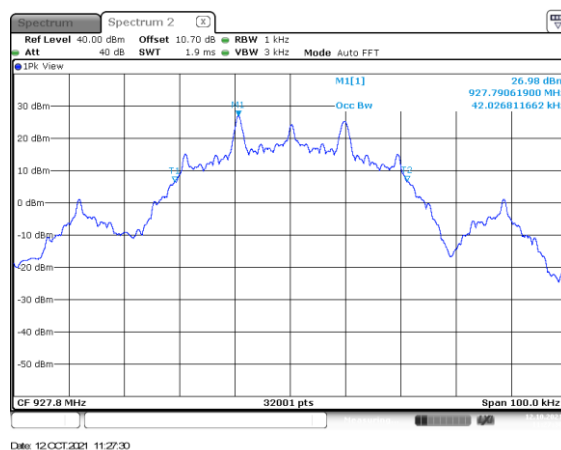
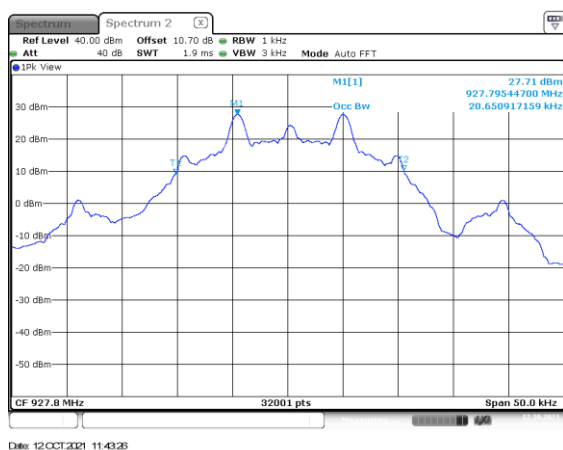
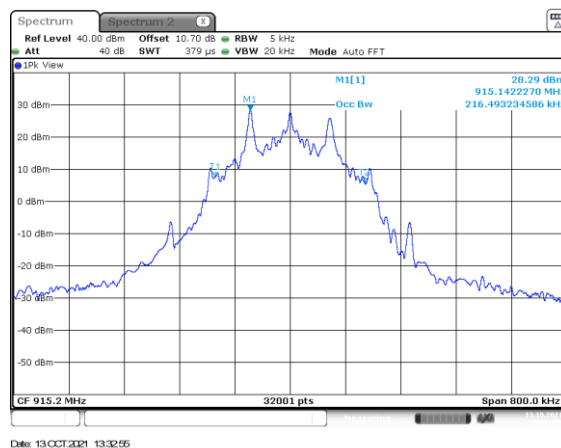
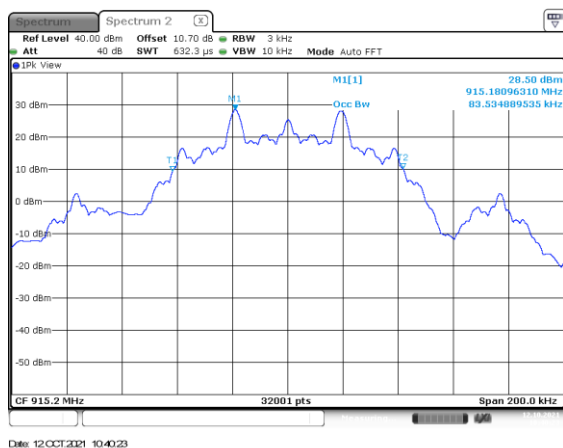
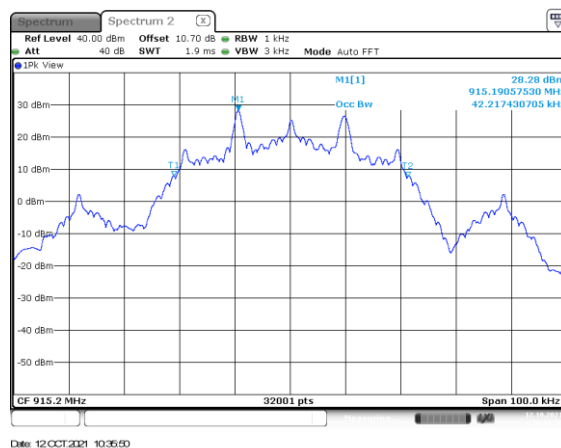
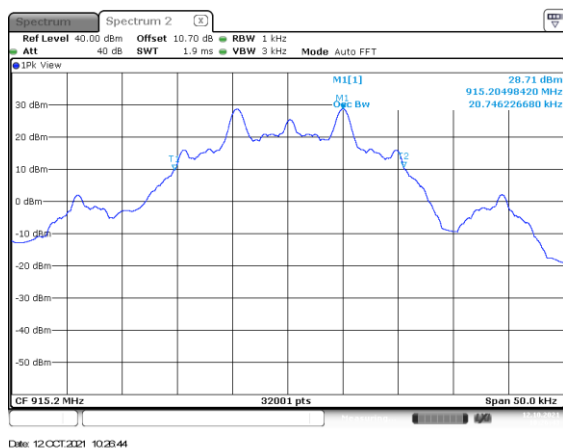


Figure 2.7.6-16: Mode 1 – 99% BW – LCH – 115.2



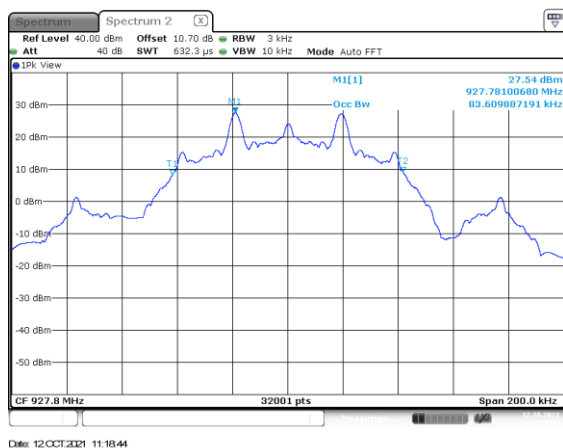


Figure 2.7.6-23: Mode 1 – 99% BW – HCH – 38.4 kbps

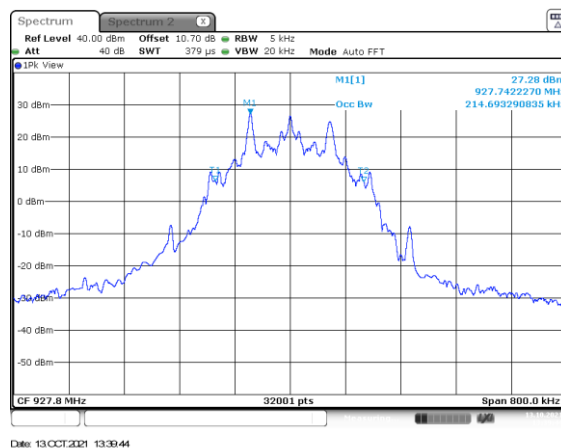


Figure 2.7.6-24: Mode 1 – 99% BW – HCH – 115.2

## **2.8 Band-Edge Compliance of RF Conducted Emissions**

### **2.8.1 Specification Reference**

FCC Sections: 15.247(d)  
ISED Canada: RSS-247 5.5

### **2.8.2 Equipment Under Test and Modification State**

As shown in §1.4 with modification state "0", as noted in §1.6.

### **2.8.3 Date of Test**

10/12/2021

### **2.8.4 Test Method**

The RF output port of the EUT was directly connected to the input of the spectrum analyzer with suitable attenuation. The EUT was investigated at the lowest and highest channel available to determine band-edge compliance. For each measurement, the spectrum analyzer's RBW was set to 100kHz and the VBW was set to 300kHz.

If the maximum peak conducted output power procedure was used to determine compliance, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc)

### **2.8.5 Environmental Conditions**

The EUT was evaluated within the temperature, humidity and pressure range of the EUT as specified by the standard. The laboratory shall have an ambient temperature range of 15°C to 35°C, relative humidity range of 30% to 60% and atmospheric pressure range of 86 kPa to 106 kPa.

|                      |            |
|----------------------|------------|
| Ambient Temperature  | 22.3 °C    |
| Relative Humidity    | 53.8 %     |
| Atmospheric Pressure | 972.2 mbar |

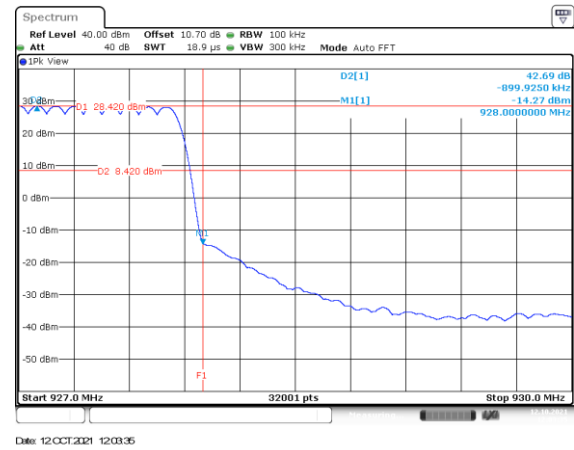
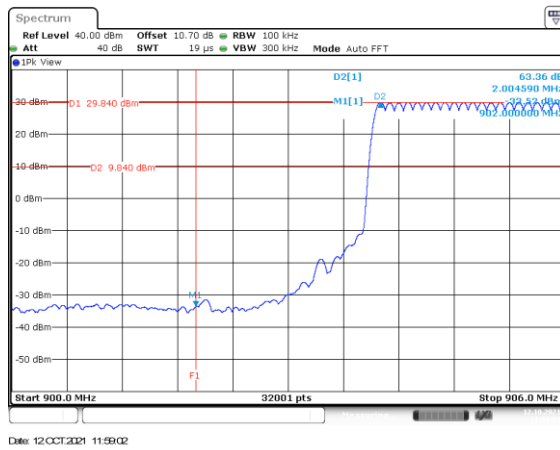
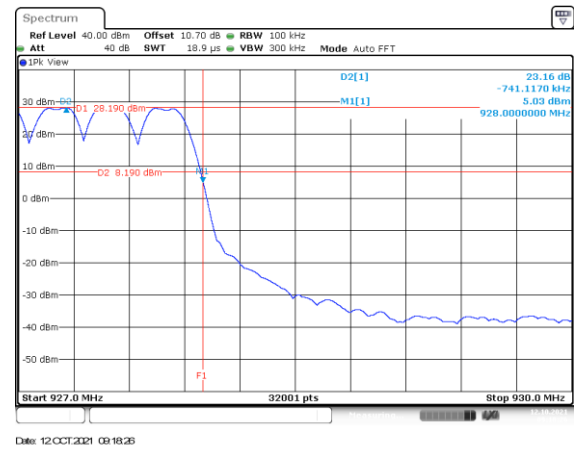
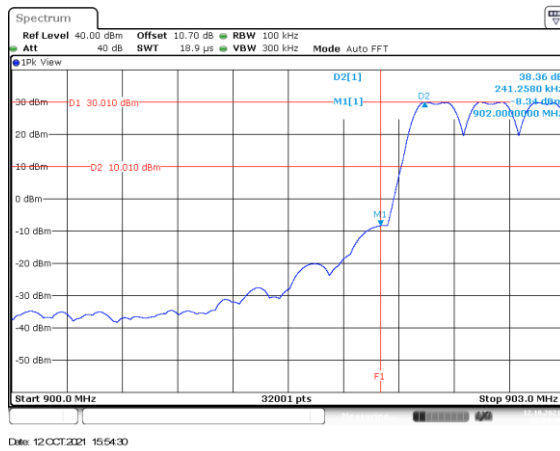
### **2.8.6 Test Results**

**Test Summary: EUT was set to transmit mode.**

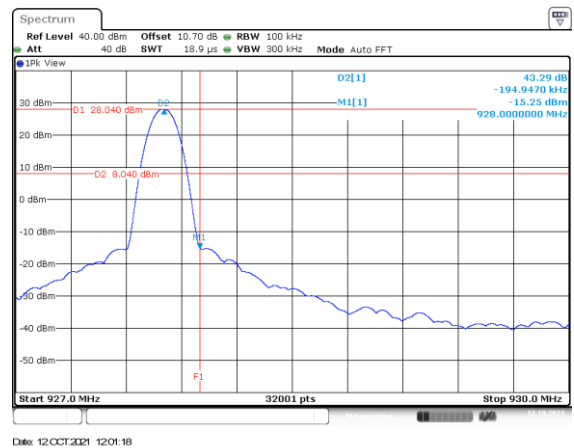
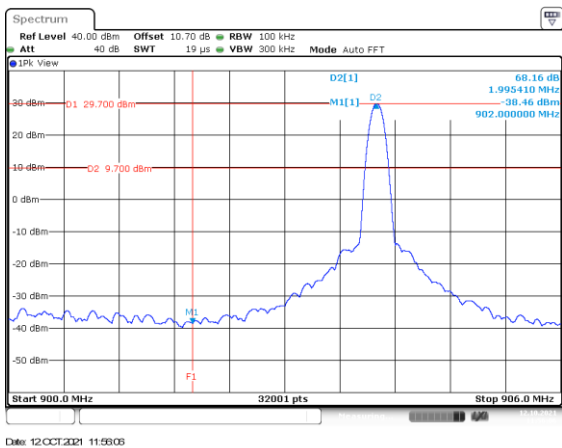
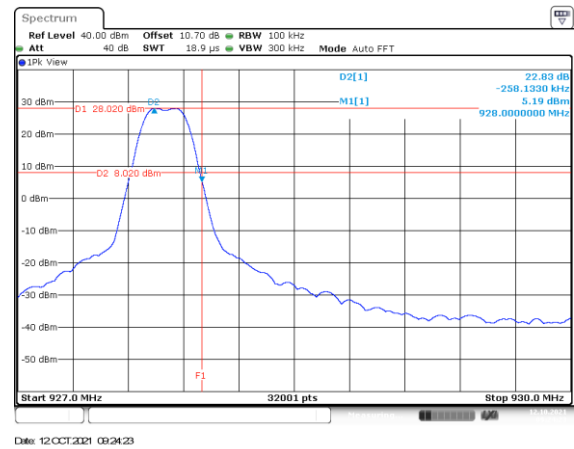
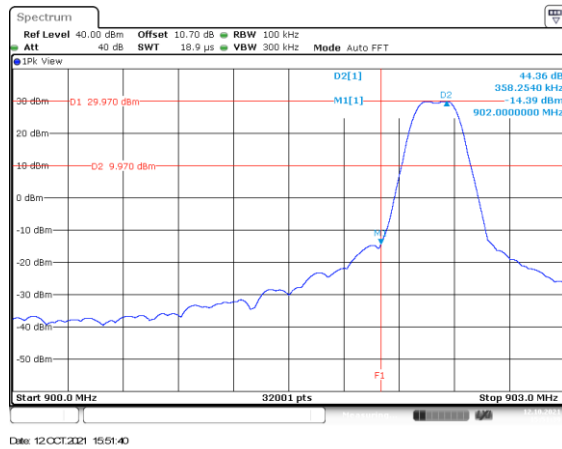
**Test Results: Pass**

See data below for detailed results.

## HOPPING MODE:



## NON-HOPPING MODE:



## **2.9 RF Conducted Spurious Emissions**

### **2.9.1 Specification Reference**

FCC Sections: 15.247(d)  
ISED Canada: RSS-247 5.5

### **2.9.2 Equipment Under Test and Modification State**

As shown in §1.4 with modification state "0", as noted in §1.6.

### **2.9.3 Date of Test**

10/12/2021

### **2.9.4 Test Method**

The RF output port of the EUT was directly connected to the input of the spectrum analyzer. The EUT was investigated for conducted spurious emissions from 30MHz to 10 GHz, 10 times the highest fundamental frequency. Measurements were made at the low, center and high channels of the EUT. For each measurement, the spectrum analyzer's RBW was set to 100kHz. A peak detector function was used with the trace set to max hold.

If the maximum peak conducted output power procedure was used to determine compliance, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

### **2.9.5 Environmental Conditions**

The EUT was evaluated within the temperature, humidity and pressure range of the EUT as specified by the standard. The laboratory shall have an ambient temperature range of 15°C to 35°C, relative humidity range of 30% to 60% and atmospheric pressure range of 86 kPa to 106 kPa.

|                      |            |
|----------------------|------------|
| Ambient Temperature  | 22.3 °C    |
| Relative Humidity    | 53.8 %     |
| Atmospheric Pressure | 972.2 mbar |

### **2.9.6 Test Results**

**Test Summary:** EUT was set to transmit mode.

**Test Results:** Pass

See data below for detailed results.

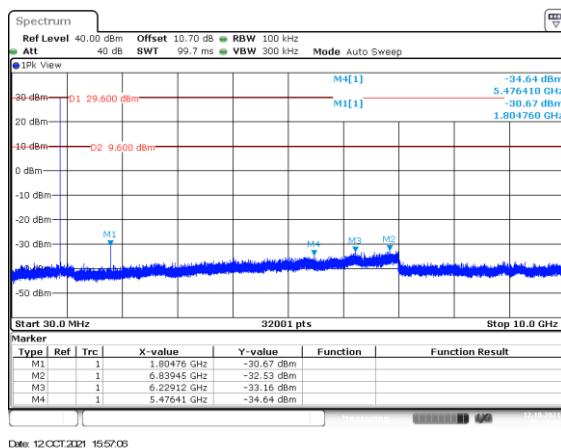


Figure 2.9.6-1: Mode 1 - 30MHz - 10GHz - LCH - 9.6 kbps

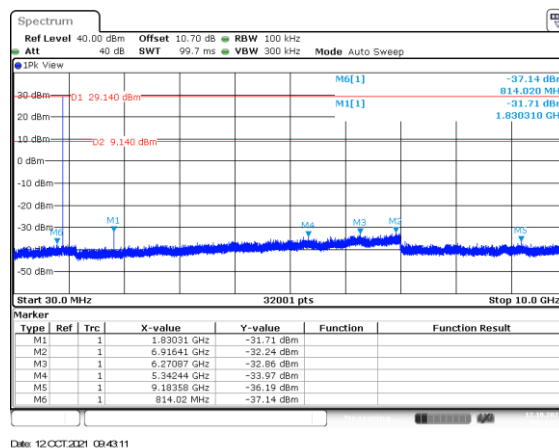


Figure 2.9.6-2: Mode 1 - 30MHz - 10GHz - MCH - 9.6 kbps

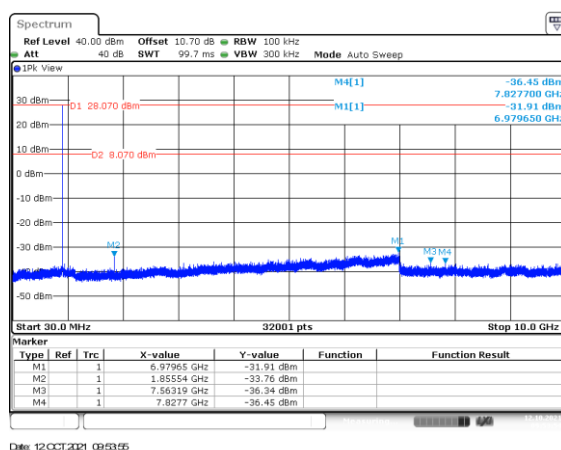


Figure 2.9.6-3: Mode 1 - 30MHz - 10GHz - HCH - 9.6 kbps

## **2.10 Radiated Spurious Emissions into Restricted Frequency Bands**

### **2.10.1 Specification Reference**

FCC Sections: 15.205, 15.209.  
ISED Canada RSS – Gen 8.9/8.10

### **2.10.2 Equipment Under Test and Modification State**

As shown in §1.4 with modification state “0”, as noted in §1.6.

### **2.10.3 Date of Test**

10/13/2021 to 10/15/2021

### **2.10.4 Test Method**

Radiated emissions tests were made over the frequency range of 9 kHz to 10 GHz, 10 times the highest fundamental frequency of 900 MHz. Each emission found to be in a restricted band as defined by section 15.205, including any emission at the operational band-edge, 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 150 kHz, quasi-peak measurements were made using a resolution bandwidth RBW of 300 Hz and a video bandwidth VBW of 1 kHz and frequencies below 30MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 10 kHz and a video bandwidth VBW of 30 kHz. For frequencies below 1000 MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 100 kHz and a video bandwidth VBW of 300 kHz. 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 and average measurements are made with RBW of 1 MHz and VBW of 3 MHz.

### **2.10.5 Environmental Conditions**

The EUT was evaluated within the temperature, humidity and pressure range of the EUT as specified by the standard. The laboratory shall have an ambient temperature range of 15°C to 35°C, relative humidity range of 30% to 60% and atmospheric pressure range of 86 kPa to 106 kPa.

|                      |            |
|----------------------|------------|
| Ambient Temperature  | 22.3 °C    |
| Relative Humidity    | 53.8 %     |
| Atmospheric Pressure | 972.2 mbar |

## 2.10.6 Test Results

**Test Summary:** EUT was set to transmit mode.

**Test Results:** Pass

See data below for detailed results.

**Table 2.10.6-1: Radiated Spurious Emissions Tabulated Data – Mode 1**

| Frequency<br>(MHz) | Level<br>(dBuV) |         | Antenna<br>Polarity<br>(H/V) | Correction<br>Factors<br>(dB) | Corrected Level<br>(dBuV/m) |         | Limit<br>(dBuV/m) |         | Margin<br>(dB) |         |
|--------------------|-----------------|---------|------------------------------|-------------------------------|-----------------------------|---------|-------------------|---------|----------------|---------|
|                    | pk              | Qpk/Avg |                              |                               | pk                          | Qpk/Avg | pk                | Qpk/Avg | pk             | Qpk/Avg |
| LCH                |                 |         |                              |                               |                             |         |                   |         |                |         |
| 1059.3             | 48.10           | 36.20   | H                            | -3.36                         | 44.74                       | 32.84   | 74.0              | 54.0    | 29.3           | 21.2    |
| 1059.3             | 46.20           | 33.30   | V                            | -3.36                         | 42.84                       | 29.94   | 74.0              | 54.0    | 31.2           | 24.1    |
| 2709.4             | 42.30           | 28.00   | H                            | 5.56                          | 47.86                       | 33.56   | 74.0              | 54.0    | 26.1           | 20.4    |
| 2709.4             | 42.40           | 28.00   | V                            | 5.56                          | 47.96                       | 33.56   | 74.0              | 54.0    | 26.0           | 20.4    |
| 4511.5             | 45.70           | 38.40   | H                            | 8.97                          | 54.67                       | 47.37   | 74.0              | 54.0    | 19.3           | 6.6     |
| 4511.5             | 48.00           | 42.70   | V                            | 8.97                          | 56.97                       | 51.67   | 74.0              | 54.0    | 17.0           | 2.3     |
| MCH                |                 |         |                              |                               |                             |         |                   |         |                |         |
| 1055.8             | 47.90           | 30.80   | H                            | -3.38                         | 44.52                       | 27.42   | 74.0              | 54.0    | 29.5           | 26.6    |
| 1055.8             | 45.40           | 30.00   | V                            | -3.38                         | 42.02                       | 26.62   | 74.0              | 54.0    | 32.0           | 27.4    |
| 2745.6             | 41.50           | 27.90   | H                            | 5.65                          | 47.15                       | 33.55   | 74.0              | 54.0    | 26.9           | 20.5    |
| 2745.6             | 43.20           | 28.30   | V                            | 5.65                          | 48.85                       | 33.95   | 74.0              | 54.0    | 25.2           | 20.1    |
| 4576.0             | 46.40           | 39.50   | H                            | 9.09                          | 55.49                       | 48.59   | 74.0              | 54.0    | 18.5           | 5.4     |
| 4576.0             | 46.30           | 40.40   | V                            | 9.09                          | 55.39                       | 49.49   | 74.0              | 54.0    | 18.6           | 4.5     |
| HCH                |                 |         |                              |                               |                             |         |                   |         |                |         |
| 1077.8             | 48.50           | 36.50   | H                            | -3.24                         | 45.26                       | 33.26   | 74.0              | 54.0    | 28.7           | 20.7    |
| 1077.8             | 47.20           | 34.20   | V                            | -3.24                         | 43.96                       | 30.96   | 74.0              | 54.0    | 30.0           | 23.0    |
| 2783.4             | 43.00           | 31.40   | H                            | 5.74                          | 48.74                       | 37.14   | 74.0              | 54.0    | 25.3           | 16.9    |
| 2783.4             | 44.40           | 31.90   | V                            | 5.74                          | 50.14                       | 37.64   | 74.0              | 54.0    | 23.9           | 16.4    |
| 4639.0             | 45.10           | 36.60   | H                            | 9.20                          | 54.30                       | 45.80   | 74.0              | 54.0    | 19.7           | 8.2     |
| 4639.0             | 47.60           | 41.80   | V                            | 9.20                          | 56.80                       | 51.00   | 74.0              | 54.0    | 17.2           | 3.0     |

### Sample Calculation:

$$R_c = R_u + CF_T$$

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

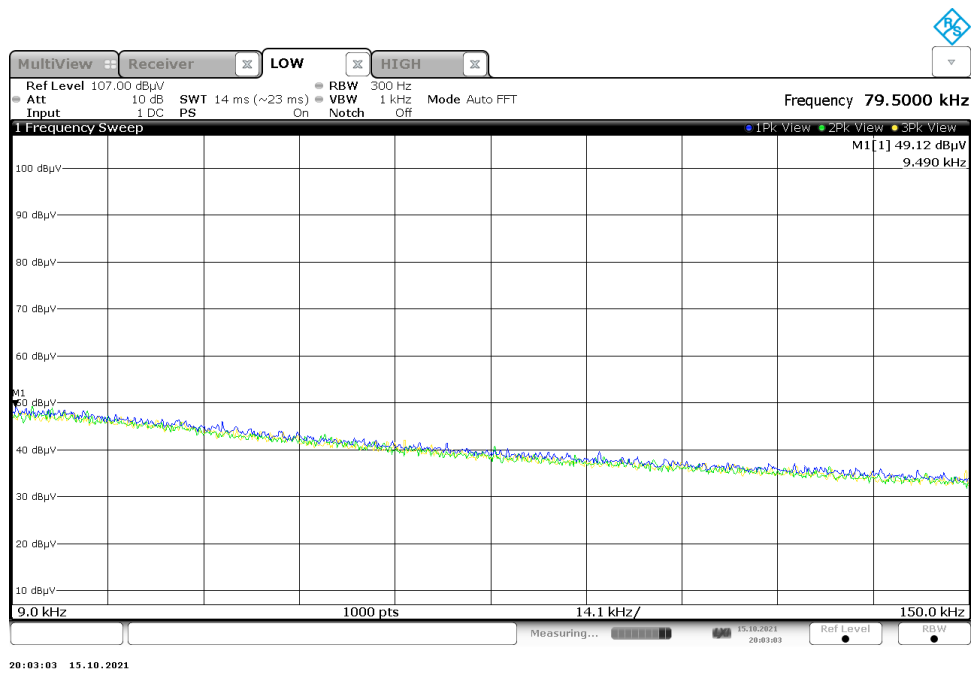
Corrected Level:  $48.50 + -3.24 = 45.26$  dBuV/m

Margin:  $74\text{dBuV/m} - 45.26\text{ dBuV/m} = 28.7\text{ dB}$

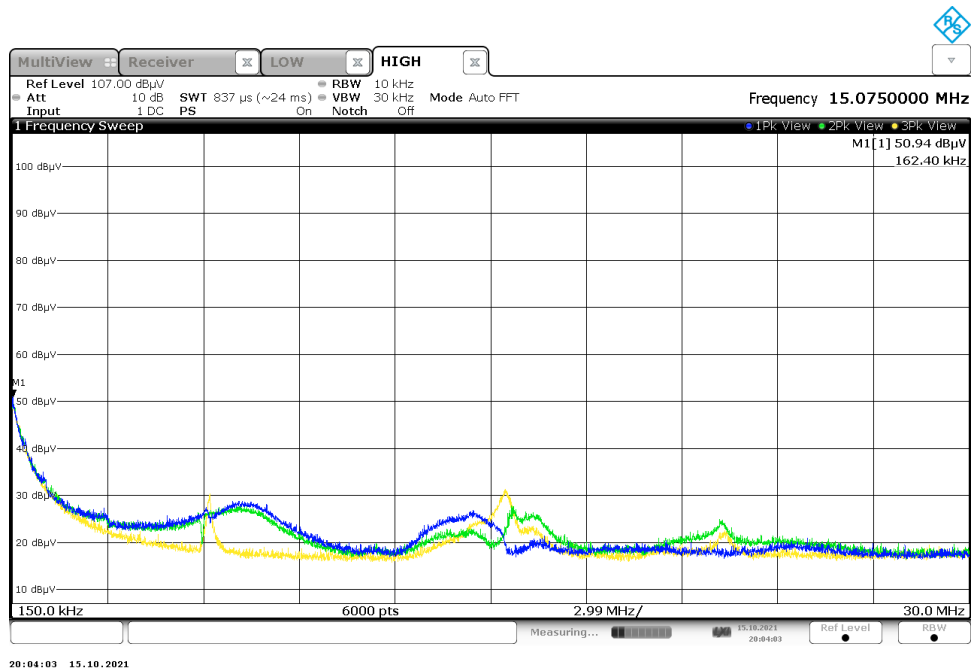
### Example Calculation: Average

Corrected Level:  $36.60 + 9.20 = 45.80$  dBuV/m

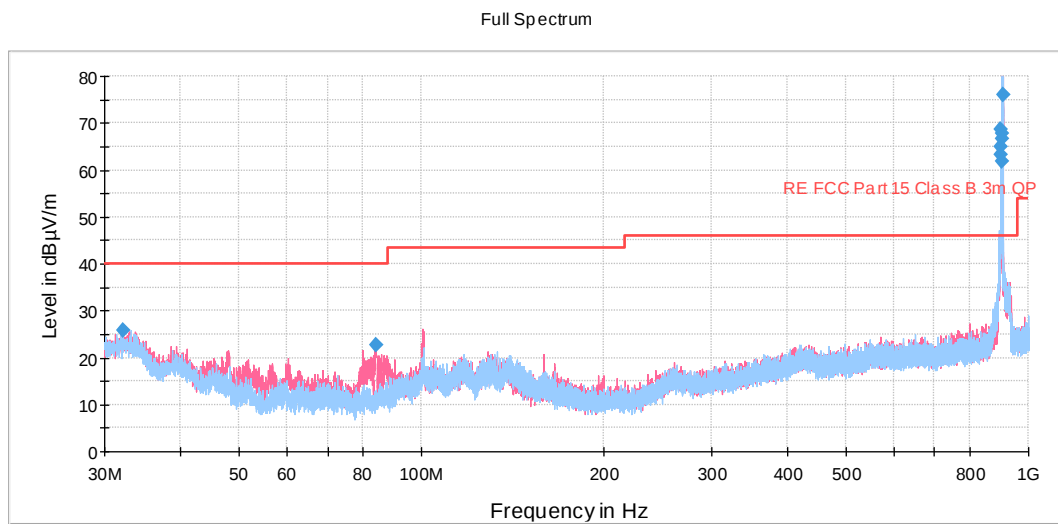
Margin:  $54\text{ dBuV/m} - 45.80\text{ dBuV/m} = 8.2\text{ dB}$



**Figure 1: Reference plot for Radiated Spurious Emissions – 9 kHz – 150 kHz**

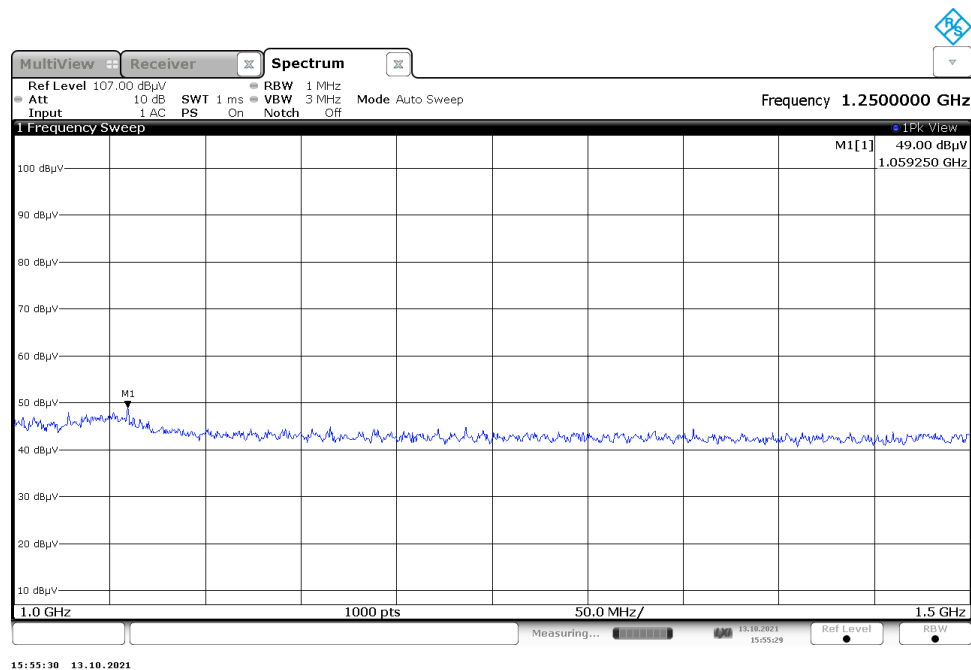


**Figure 2: Reference plot for Radiated Spurious Emissions– 150 kHz – 30 MHz**  
Note: Emissions above the noise floor are ambient not associated with the EUT.

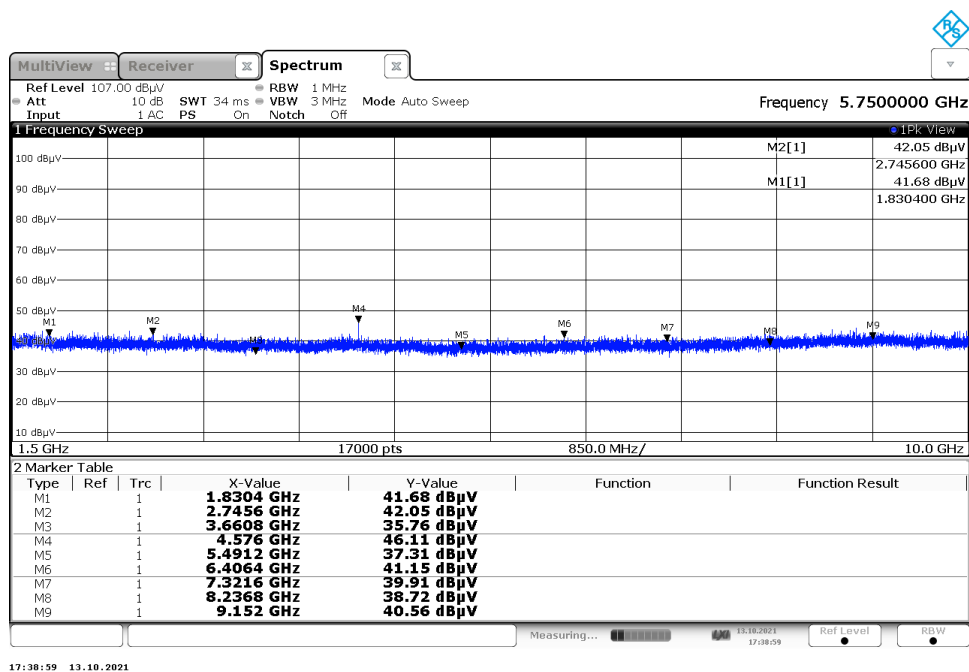


**Figure 3: Reference plot for Radiated Spurious Emissions – 30 MHz – 1 GHz**

Note: Emissions above the noise floor do not falls within restricted bands.



**Figure 4: Reference plot for Radiated Spurious Emissions – 1 GHz – 1.5 GHz**



**Figure 5: Reference plot for Radiated Spurious Emissions – 1.5 GHz – 10 GHz**

## 2.11 Test Equipment Used

**Table 2.111-1 –Equipment List**

| Asset ID | Manufacturer            | Model          | Equipment Type                                               | Serial Number | Last Calibration Date | Calibration Due Date |
|----------|-------------------------|----------------|--------------------------------------------------------------|---------------|-----------------------|----------------------|
| 628      | EMCO                    | 6502           | Active Loop Antenna 10kHz-30MHz                              | 9407-2877     | 6/8/2021              | 6/8/2023             |
| 857      | ETS Lindgren            | 3117           | Horn Antenna 1-18GHz                                         | 00153608      | 11/12/2019            | 11/12/2021           |
| DEMC3161 | Ametek CTS Germany GmbH | CBL 6112D      | Bilog Antenna; Attenuator                                    | 51323         | 3/19/2021             | 3/19/2022            |
| 213      | TEC                     | PA 102         | Amplifier                                                    | 44927         | 7/30/2021             | 7/30/2022            |
| 22       | Hewlett Packard         | 8449B          | High Frequency Pre-Amp                                       | 3008A00526    | 11/19/2020            | 11/19/2021           |
| 331      | Microwave Circuits      | H1G513G1       | Microwave Bandpass Filter                                    | 31417         | 6/9/2021              | 6/9/2022             |
| 827      | (-)                     | 997 Rack Cable | TS8997 Rack Cable Set                                        | N/A           | 9/4/2020              | 12/4/2021            |
| 267      | Hewlett Packard         | N1911A         | Power Meter                                                  | MY45100129    | 7/27/2021             | 7/27/2023            |
| 882      | Rohde & Schwarz         | ESW44          | Test Receiver                                                | 111961        | 6/24/2021             | 6/24/2022            |
| 836      | ETS Lindgren            | SAC Cable Set  | SAC Cable Set includes 620, 837, 838                         | N/A           | 5/11/2021             | 5/11/2022            |
| 3010     | Rohde & Schwarz         | ENV216         | Two-Line V-Network                                           | 3010          | 6/23/2021             | 6/23/2022            |
| 872      | Agilent                 | E7402A         | EMC Spectrum Analyzer                                        | US40240258    | 6/22/2021             | 6/22/2022            |
| 861      | Com-Power Corporation   | LI-1100C       | Line Impedance Stabilization Network                         | 20180038      | 2/26/2021             | 2/26/2022            |
| 862      | Com-Power Corporation   | LI01100C       | Line Impedance Stabilization Network                         | 20180039      | 2/26/2021             | 2/26/2022            |
| 703      | Hewlett Packard         | 8594E          | Spectrum Analyzer                                            | 3523A02134    | NCR                   | NCR                  |
| 856      | Huber & Suhner          | Multiflex 104  | Blue Cable                                                   | 326050        | NCR                   | NCR                  |
| 691      | Com-Power Corp.         | 691            | E-Field Fine Tip (100kHz to 5GHz), H-Field Loop (9kHz to 5GH | 151514        | NCR                   | NCR                  |
| 494      | Omega                   | iBTHX-W        | Environmental Sensor                                         | 9460211       | 11/3/2020             | 11/3/2021            |
| 813      | PMM                     | 9010           | EMI Receiver; RF Input 50ohm; 10Hz-50MHz; 10Hz-30MHz         | 697WW30606    | 6/8/2021              | 6/8/2022             |
| 168      | Hewlett Packard         | 11947A         | Transient Pulse Limiter                                      | 44829         | 3/3/2021              | 3/3/2022             |

N/A – Not Applicable

NCR – No Calibration Required

### 3 Diagram of Test Set-ups

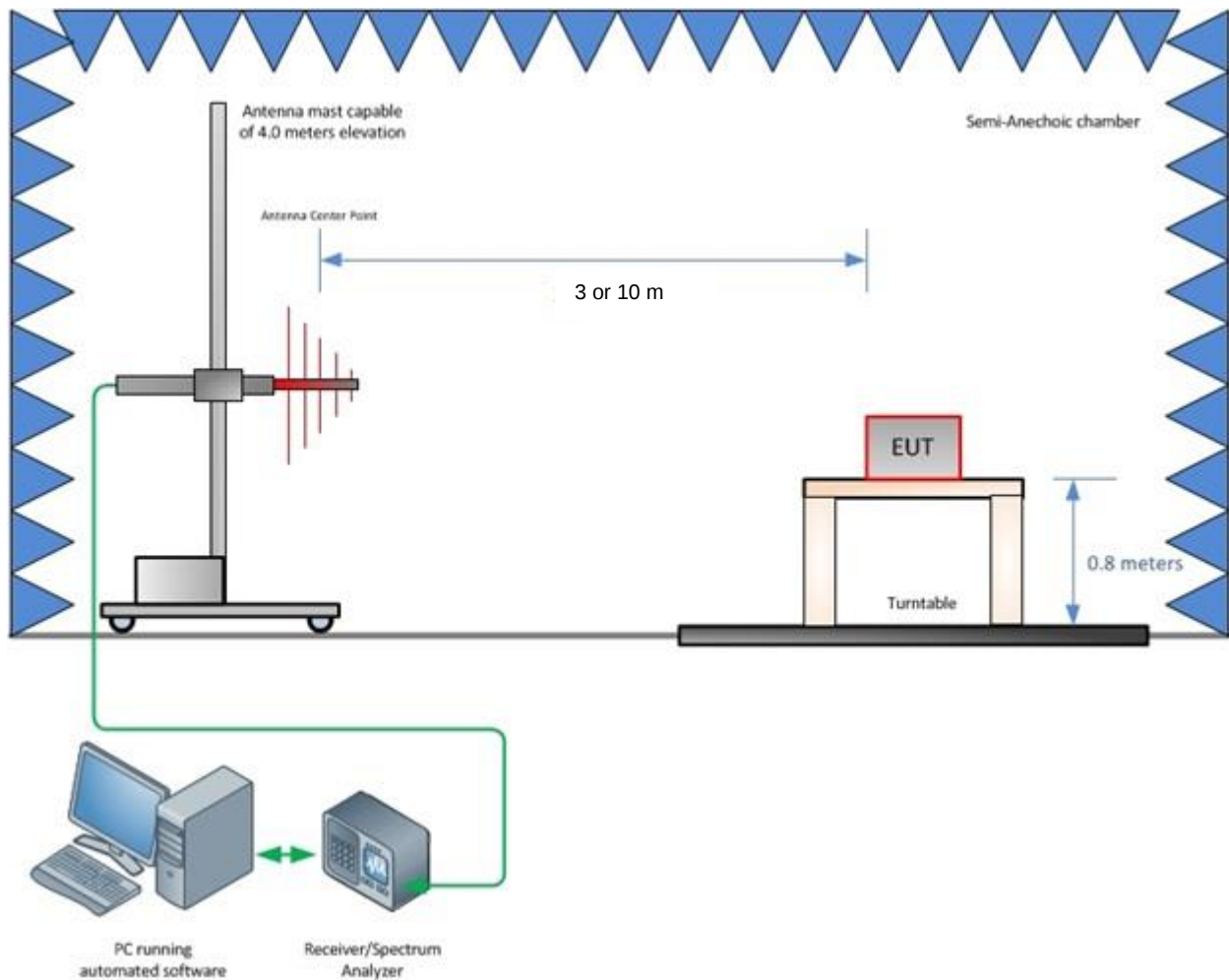
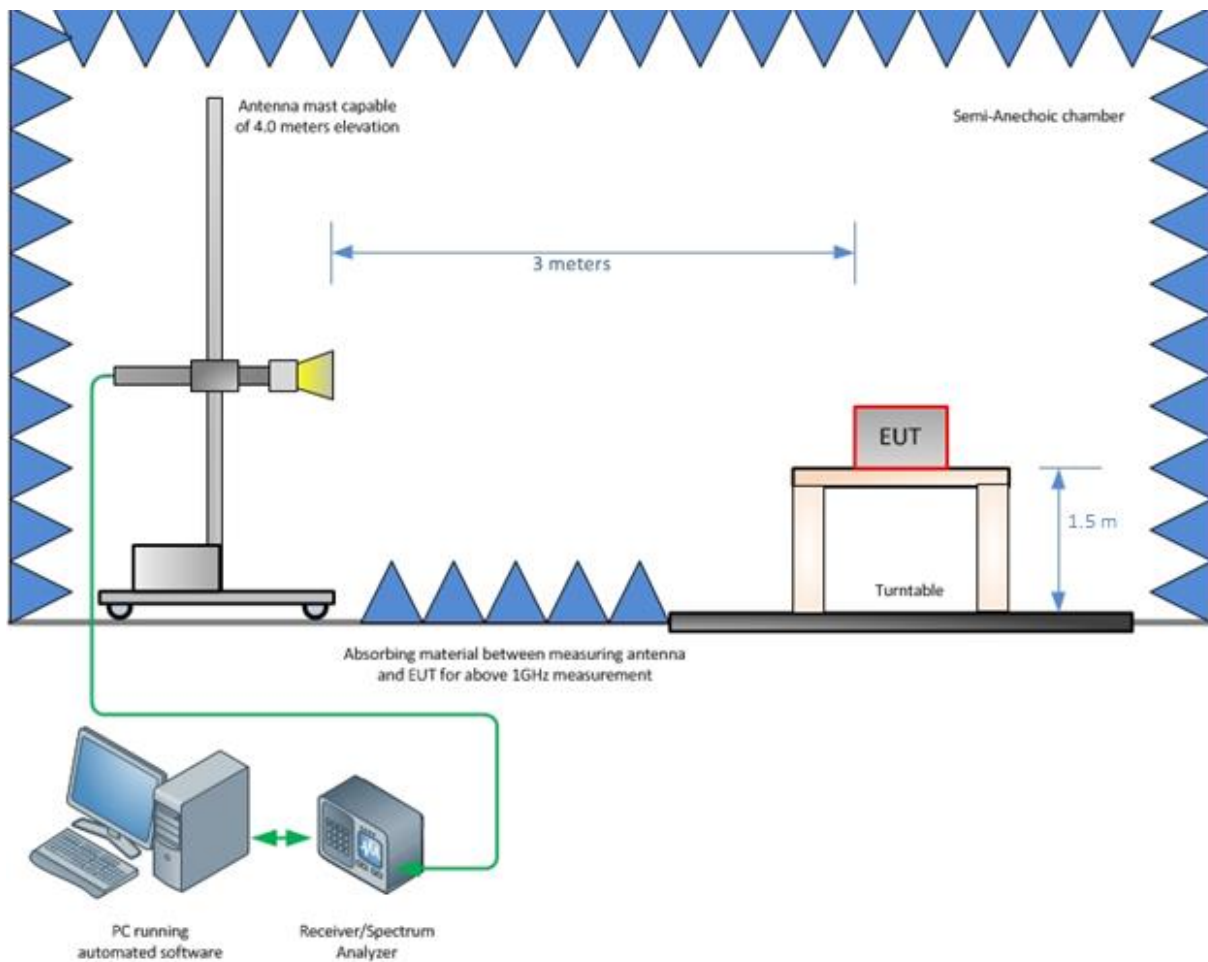
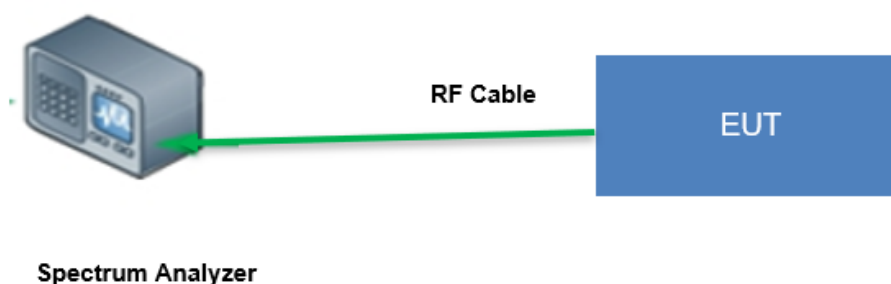


Figure 3-1 – Radiated Emissions Test Setup up to 1 GHz



**Figure 3-2 – Radiated Emissions Test Setup above 1 GHz**



**Figure 3-3 – Conducted Test Setup: Antenna Port measurement**

## 4 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.

### STATEMENT OF MEASUREMENT UNCERTAINTY

The expanded laboratory measurement uncertainty figures ( $U_{\text{Lab}}$ ) provided below correspond to an expansion factor (coverage factor)  $k = 1.96$  which provide confidence levels of 95%.

**Table 4-1: Estimation of Measurement Uncertainty**

| Parameter                               | $U_{\text{lab}}$                     |
|-----------------------------------------|--------------------------------------|
| Occupied Channel Bandwidth              | $\pm 0.009 \%$                       |
| RF Conducted Output Power               | $\pm 0.349 \text{ dB}$               |
| Power Spectral Density                  | $\pm 0.372 \text{ dB}$               |
| Antenna Port Conducted Emissions        | $\pm 1.264 \text{ dB}$               |
| Radiated Emissions $\leq 1 \text{ GHz}$ | $\pm 5.814 \text{ dB}$               |
| Radiated Emissions $> 1 \text{ GHz}$    | $\pm 4.318 \text{ dB}$               |
| Temperature                             | $\pm 0.860 \text{ }^{\circ}\text{C}$ |
| Radio Frequency                         | $\pm 2.832 \times 10^{-8}$           |
| AC Power Line Conducted Emissions       | $\pm 3.360 \text{ dB}$               |

### 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