FCC and ISED Canada Radio Testing of the

Sensus Metering Systems Inc.
M420 with M400G2 PA

In accordance with FCC 47 CFR Part 24 Subpart D, Part 101 Subpart C and ISED Canada's Radio Standards Specifications RSS-119, RSS-134

America

Add value.
Inspire trust.

Prepared for: Sensus Metering Systems Inc.
639 Davis Drive
Morrisville, NC 27560

FCC ID: SDBM420V01
IC: 2220A-M420V01

COMMERCIAL-IN-CONFIDENCE

Document Number: TP72181297.600 | Version Number: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Authorized Signatory	Peter Walsh	2022 -November-18	
Testing	Thierry Jean-Charles	2022-November-12	

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

FCC Accreditation	Innovation, Science, and Economic Development Canada Accreditation
Designation Number US1063 Tampa, FL Test Laboratory	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 24 Subpart D, Part 101 Subpart C and ISED Canada's RSS-119, RSS-134.

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	2022-November-18

1.2 Introduction

The purpose of this report is to demonstrate compliance with the FCC's Code of Federal Regulations Part 24 Subpart D, Part 101 Subpart C and Innovation Science and Economic Development Canada's Radio Standards Specification RSS-119, RSS-134 for the tests documented herein.

Applicant	Sensus Metering Systems Inc.
Manufacturer	Sensus Metering Systems Inc.
Applicant's Email Address	james.francisco@xyleminc.com
Model Number(s)	M420 with M400G2 PA
Serial Number(s)	M420, SN: 1953335308 M400G2 PA, SN: 582402163100074
FCC ID	SDBM420V01
ISED Certification Number	2220A-M420V01
Hardware Version(s)	Rev E
Software Version(s)	OS: 3.0.0, RF: V0.1 Beta
Number of Samples Tested	1
Test Specification/Issue/Date	US Code of Federal Regulations (CFR): Title 47, Part 24, Subpart D: Personal Communications Services – 2021 US Code of Federal Regulations (CFR): Title 47, Part 101, Subpart C: Fixed Microwave Services -2012 Industry Canada Radio Standards Specification: RSS-119 - Land Mobile and Fixed Equipment Operating in the Frequency Range 27.41-960 MHz, Issue 12, May 2015 Industry Canada Radio Standards Specification: RSS-134 - 900 MHz Narrowband Personal Communication Service, Issue 2, February 2016
Test Plan/Issue/Date	2022-June-24
Order Number	72181297
Date	2022-June-29
Date of Receipt of EUT	2022-August-05
Start of Test	2022-August-08
Finish of Test	2022-September-24
Name of Engineer(s)	Thierry Jean-Charles
Related Document(s)	US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures - 2021 Innovation, Science and Economic Development Canada Radio Standards Specification: RSS-GEN - General Requirements for Compliance of Radio Apparatus, Issue 5, Amendment 1, March 2019 ANSI C63.26: 2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with 24 Subpart D, Part 101 Subpart C and ISED Canada's RSS-119, RSS-134 is shown below.

Table 1.3-1: Test Result Summary

Test Parameter	Test Plan (Yes/No)	Test Results	FCC 47 CFR Rule Part	ISED Canada's RSS	Test Report Page No.
RF Power Output	Yes	Pass	2.1046; 24.132; 101.113(a)	RSS-Gen 6.12; RSS-119 5.4; RSS-134 4.3(a), (b)	12
Out of Band Unwanted Emissions	Yes	Pass	2.1053; 24.133 a(1), a(2); 101.111 a(6)	RSS-Gen 6.13; RSS-119 5.8.6; RSS-134 4.4	21
Occupied Bandwidth	Yes	Pass	2.1049; 101.109	RSS-Gen 6.7	47
Spurious Emissions at Antenna Terminals	Yes	Pass	2.1053; 24.133 a(1), a(2); 101.111 a(6)	RSS-Gen 6.13; RSS-119 5.8.6; RSS-134 4.4	70
Field Strength of Spurious Radiation	Yes	Pass	2.1053; 24.133 a(1), a(2); 101.111a(6)	RSS-Gen 6.13; RSS-119 5.8.6; RSS-134 4.4	77
Frequency Stability	Yes	Pass	2.1055; 24.135; 101.107	RSS-Gen 6.11; RSS-119 5.3; RSS-134 4.5	91

1.4 Product Information

1.4.1 Technical Description

The equipment under test was the M420 Base station. The M420 base station product is a transceiver and power amplifier combination that can either be utilized in a 3U 19"rackmount configuration or a single unit in a pole mount cabinet. The 19"rackmount unit can have either a single or dual combined transceiver and PA. The M420 transceiver is designed to be used with either the M420 PA or the M400G2 PA. Both PA options have power control options. The test report documents the compliance of the M420 base station single unit with the M400G2 PA.

Technical Details

Mode of Operation	Flexnet Radio
Frequency Range:	930 - 960 MHz
Antenna Type/Gain:	Panel, 20.1 dBi
	Omni, 12.1 dBi
Input Power:	24 VDC

The M420 transmitters produce 4 distinct modulation formats. The emissions designators for the modulation types used by the M420 transmitters are as follows:

EMISSIONS DESIGNATORS:

mPass: 5K90F1D
mPass2: 11K8F1D
m4Pass: 8K75F1D
m4Pass2: 17K5F1D

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

Table 1.4.1-1 – Cable Descriptions

Cable/Port	Description
Coaxial Cable / GPS SMA	1.1 m, Shielded, M420 to GPS Antenna
8 wire / Alarm RJ45	1.5 m, Shielded, M420 to Terminal Bock.
Ethernet / ETH 0 RJ45	2 m, Shielded, M420 to Ethernet Switch
Twisted Pair / 24VDC Power	1.85m, Not Shielded, DC Power Supply to M420
DSUB / PA	0.25 m, Shielded, M420 to M400G2 PA
Coaxial / RX SMA	1.2 m, Shielded, M420 to Load
Power	1.9 m, Not Shielded, AC Adapter to Ethernet Switch
Semi-rigid Coaxial / TX SMA	0.27 m, Shielded, M420 to M400G2 PA
Coaxial / SMA to N-Type	0.2 m, Shielded, M400G2 PA to Load

Table 1.4.1-2 – Support Equipment Descriptions

Make/Model	Description
Trimble / 57860-00	GPS Antenna, S/N; 2891102012
Lineage Power / J2007003 L102 (CC109163184)	22-29 VDC Power Supply, S/N: 10KZ47016361
Netgear / GS105	ProSAFE Gigabit Ethernet Switch, S/N: 3TL1525K09AFC
Netgear /AD2015F23	12VDC AC-DC Adapter, S/N: 31150531Y1070201L9
Narda /376BNF	40-Watt Termination
Mini-Circuits / BW-40N100W+	100-Watt Attenuator, 40 dB
Alan Industries / 50LH10	10-Watt Termination

Declaration of Build Status

EQUIPMENT DESCRIPTION	
Model Name/Number	M420 with M400G2 PA
Part Number	96015276
Hardware Version	Rev E
Software Version	OS: 3.0.0, RF: V0.1 Beta
FCC ID (if applicable)	SDBM420V01
ISED ID (if applicable)	2220A-M20V01
Technical Description (Please provide a brief description of the intended use of the equipment)	The M420 is a base station transceiver with a M400G2 PA module.

UN-INTENTIONAL RADIATOR	
Highest frequency generated or used in the device or on which the device operates or tunes	2GHz
Lowest frequency generated or used in the device or on which the device operates or tunes	32.768kHz
Class A Digital Device (Use in commercial, industrial or business environment) ☐	

Power Source			
AC	Single Phase	Three Phase	Nominal Voltage
	☐	☐	
External DC	Nominal Voltage		Maximum Current
	24VDC		7A
Battery	Nominal Voltage		Battery Operating End Point Voltage

EXTREME CONDITIONS					
Maximum temperature	+70	°C	Minimum temperature	-40	°C

Ancillaries
Please list all ancillaries which will be used with the device.
External PA: M400G2 PA, PN:96003451

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

Name: James Francisco

Position held: Sr. Regulatory Compliance Engineer Date: 10/25/2022

1.4.2 Modes of Operation

The tested mode of operation was for the EUT configured with the M400G2 PA. The EUT was evaluated for the lowest and highest TX output power configurations. The EUT was configured using a terminal emulator.

1.4.3 Monitoring of Performance

The following performance attributes were monitored during the evaluation.

1. Transmitter Output Power
2. Transmitter Emissions Masks
3. Transmitter Occupied Bandwidth
4. Transmitter Spurious Emissions at the Antenna Port
5. Transmitter Radiated Spurious Emissions
6. Transmitter Frequency Stability over Temperature and Voltage

The EUT is designed to operate in multiple bands under the requirements of CFR 47 Parts 24 and 101. The following is a list of the frequency bands of operation sorted based on the FCC rule parts in which the band is associated.

CFR Title 47 Rule Part	ISED Canada RSS	Frequency Band of Operation (MHz)
24D	134	930.0 - 931.0
24D	134	940.0 - 941.0
101	119	941.0 - 941.5
101	119	952.0 – 953.0
101	N/A	959.85 - 960.0

Based on the requirements set forth in accordance 47 CFR 2.1046-2.1057 as stated above, the methodology in selecting the places to test in the available bands of operation is outlined in the following table.

CFR Title 47 Rule Part	ISED Canada RSS	Frequency Band of Operation (MHz)	Location in the Range of Operation	Approx. Test Freq.
24D	134	930.0 - 931.0	Middle	930.5000
24D	134	940.0 - 941.0	1 near top and 1 near bottom	940.0125
101	119	941.0 - 941.5		941.4875
101	119	952.0 – 953.0	Middle	952.5000
101	N/A	959.85 – 960.0	Middle	959.9250

1.4.4 Performance Criteria

The parameters evaluated are summarized below.

Table 1.4.4-1: Performance Criteria

Parameter	Requirement
RF Output Power	FCC 47 CFR Part 2.1046; 24.132; 101.113(a) ISED Canada RSS-119 5.4; RSS-134 4.3(a),(b)
Out-of-Band Unwanted Emissions	FCC 47 CFR Parts: 2.1053; 24.133 a(1), a(2); 101.111 a(6) ISED Canada RSS-119 5.8.6; RSS-134 4.4
Occupied Bandwidth	ISED Canada RSS-GEN 6.7
Unwanted Emissions at the Antenna Terminal	FCC 47 CFR Parts: 2.1053; 24.133 a(1), a(2); 101.111 a(6) ISED Canada RSS-119 5.8.6; RSS-134 4.4
Radiated Spurious Emissions	FCC 47 CFR Parts: 2.1053; 24.133 a(1), a(2); 101.111 a(6) ISED Canada RSS-119 5.8.6; RSS-134 4.4
Frequency Stability	FCC Parts: 2.1055; 24.135 ISED Canada RSS-134 4.5

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
None			

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		
RF Power Output	Thierry Jean-Charles	A2LA
Out of Band Emissions	Thierry Jean-Charles	A2LA
Occupied Bandwidth	Thierry Jean-Charles	A2LA
Spurious Emissions at the Antenna Terminal	Thierry Jean-Charles	A2LA
Field Strength of Spurious Radiation	Thierry Jean-Charles	A2LA
Frequency Stability	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 RF Power Output

2.1.1 Specification Reference

FCC 47 CFR Part 2.1046; 24.132; 101.113(a)
ISED Canada RSS-119 5.4; RSS-134 4.3(a),(b)

2.1.2 Equipment Under Test and Modification State

M420, SN: 1953335308
M400G2 PA, SN: 582402163100074

2.1.3 Date of Test

2022-August-15

2.1.4 Test Method

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through 50 dB of passive attenuation. The resolution and video bandwidths of the spectrum analyzer were set at sufficient levels, >> signal bandwidth.

2.1.5 Environmental Conditions

Ambient Temperature	22.7 °C
Relative Humidity	51 %
Atmospheric Pressure	1013 mbar

2.1.6 Test Results

FCC 47 CFR Part 24.132; ISED Canada RSS-134 4.3

High Power Mode

Table 2.1.6-1: RF Output Power – High Power

Frequency MHz	Power (dBm)	Power (W)
930.5	47.18	52.24
940.0125	47.23	52.84

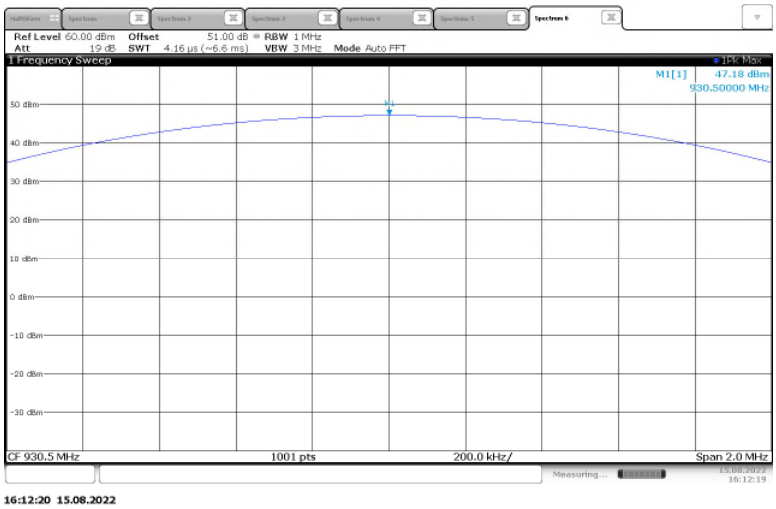

Figure 2.1.6-1: RF Output Power – 930.5 MHz – High Power

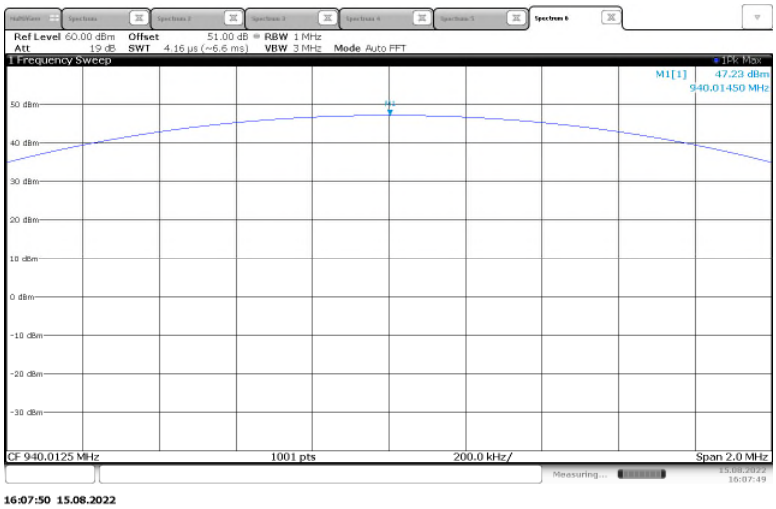

Figure 2.1.6-2: RF Output Power – 940.0125 MHz – High Power

Low Power Mode

Table 2.1.6-2: RF Output Power – Low Power

Frequency MHz	Power (dBm)	Power (W)
930.5	32.28	1.69
940.0125	32.36	1.72

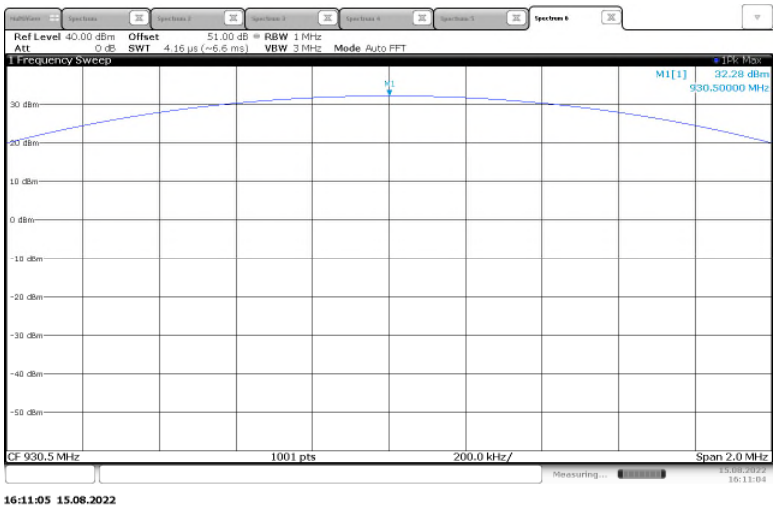

Figure 2.1.6-3: RF Output Power – 930.5 MHz – Low Power

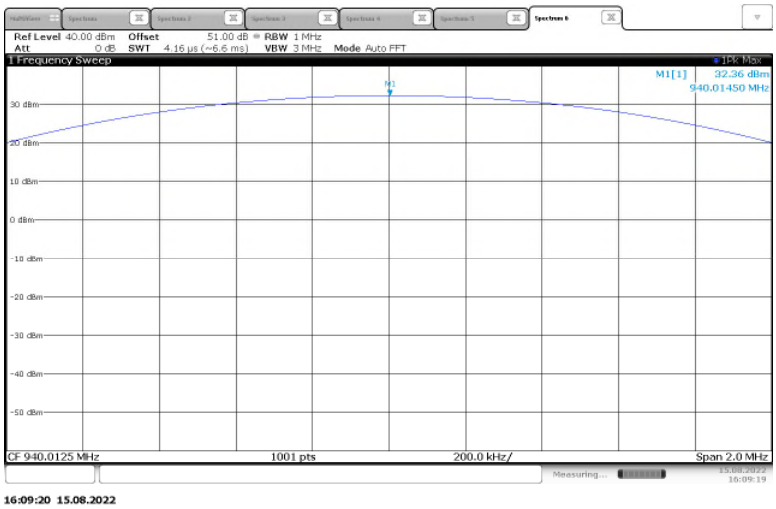

Figure 2.1.6-4: RF Output Power – 940.0125 MHz – Low Power

FCC 47 CFR Part 101.113(a); ISED Canada RSS-119 5.4

High Power Mode

Table 2.1.6-3: RF Output Power – High Power

Frequency MHz	Power (dBm)	Power (W)
941.4875	47.27	53.33
952.5	47.02	50.35
959.925	46.73	47.1

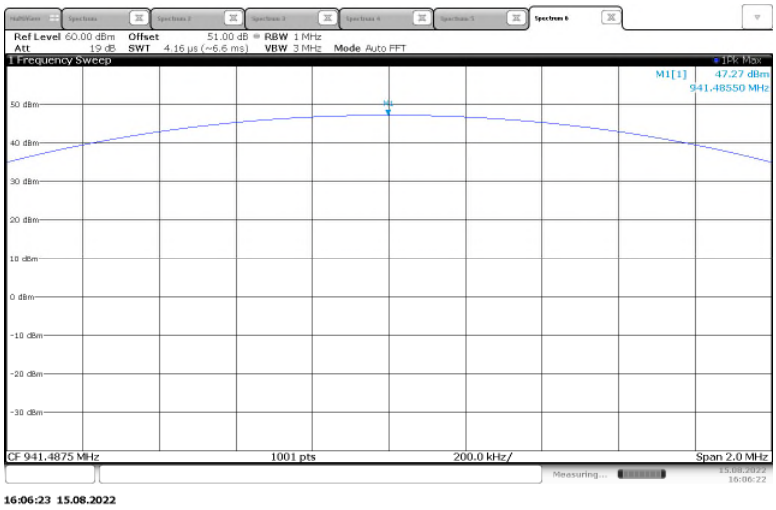

Figure 2.1.6-5: RF Output Power – 941.4875 MHz – High Power

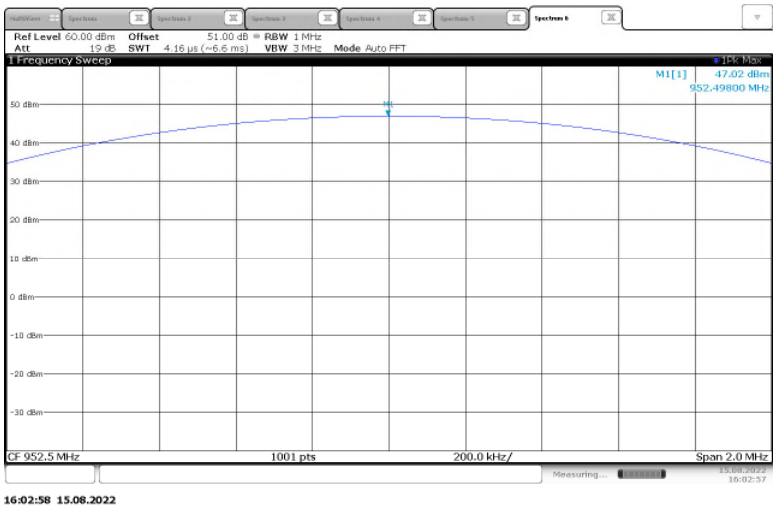

Figure 2.1.6-6: RF Output Power – 952.5 MHz – High Power

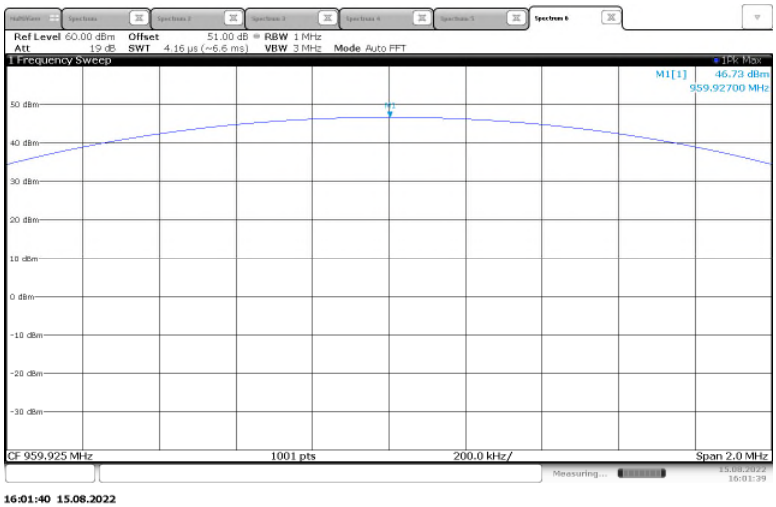

Figure 2.1.6-7: RF Output Power – 959.925 MHz – High Power

Low Power Mode

Table 2.1.6-4: RF Output Power – Low Power

Frequency MHz	Power (dBm)	Power (W)
941.4875	32.47	1.77
952.5	32.24	1.67
959.925	31.99	1.58

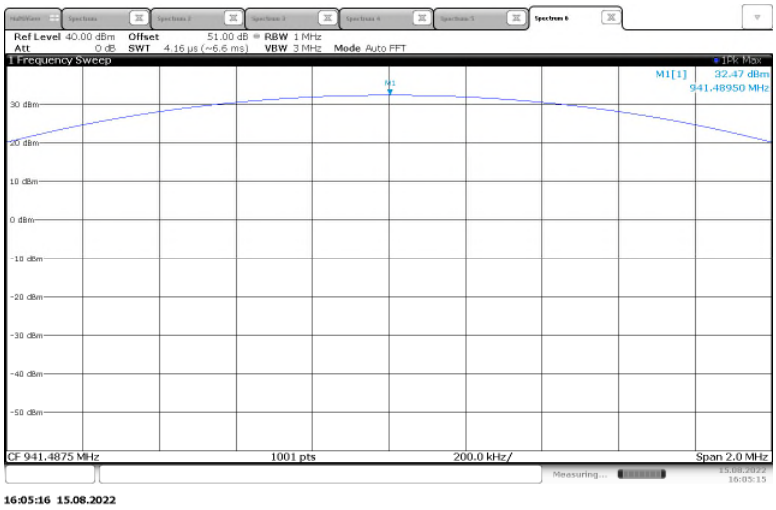

Figure 2.1.6-8: RF Output Power – 941.4875 MHz – Low Power

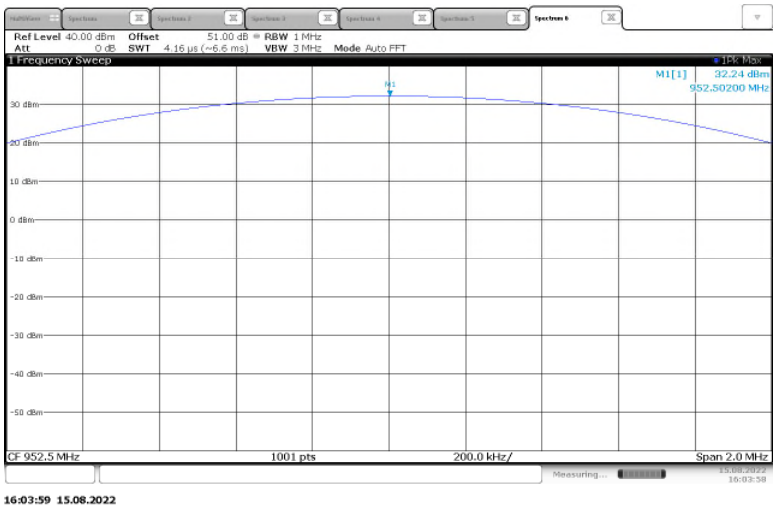

Figure 2.1.6-9: RF Output Power – 952.5 MHz – Low Power

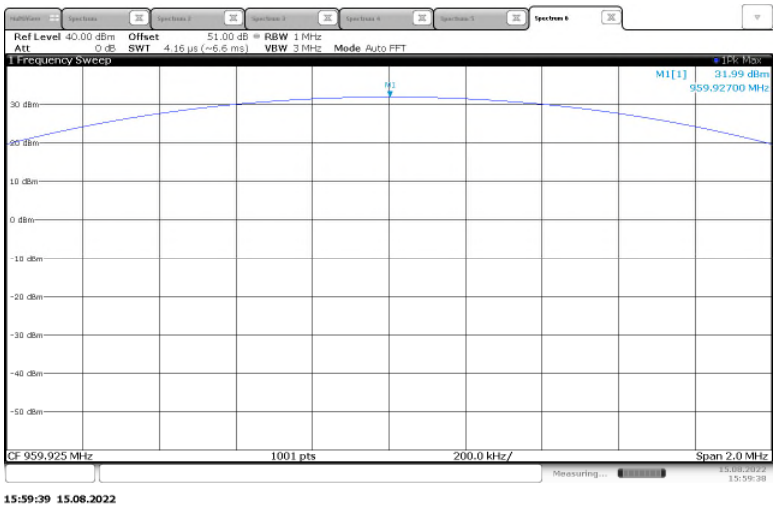

Figure 2.1.6-10: RF Output Power – 959.925 MHz – Low Power

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.

Instrument	Manufacturer	Type No	TE No	Software / Firmware Revision	Calibration Period (months)	Calibration Due
50ohms M/F 4GHz, 100W Attenuator	Fairview Microwave Inc.	SA4N100-20	615	N/A	12	25-Mar-2023
Duratest High Frequency Cable 26.5GHz	Teledyne Storm Products	921-0101-036	BEMC02112	N/A	12	20-Oct-2022
Atten 30dB N-M/F, DC, 18 GHz, 10W	Aeroflex Inmet	18N10W-30	DEMC3041	N/A	12	15-Jul-2023
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	07-Jun-2023

TU - Traceability Unscheduled
O/P MON - Traceability Unscheduled
N/A - Not Applicable
NCR – No Calibration Required

2.2 Out of Band Unwanted Emissions

2.2.1 Specification Reference

FCC 47 CFR Parts: 2.1053; 24.133 a(1), a(2); 101.111 a(6)
ISED Canada RSS-119 5.8.6; RSS-134 4.4

2.2.2 Equipment Under Test and Modification State

M420, SN: 1953335308
M400G2 PA, SN: 582402163100074

2.2.3 Date of Test

2022-September-01

2.2.4 Test Method

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through a 50 dB passive attenuator. The spectrum analyzer resolution and video bandwidths were set to 300 Hz and 3000 Hz, respectively. The internal correction factors of the spectrum analyzer were employed to correct for any cable or attenuator losses. Results of the test are shown below for all modes of operation.

2.2.5 Environmental Conditions

Ambient Temperature	21.8 °C
Relative Humidity	50 %
Atmospheric Pressure	1011 mbar

2.2.6 Test Results

DC Powered Operating

FCC 47 CFR Parts: 2.1053; 24.133 a(1), a(2); ISED Canada RSS-134 4.4

High Power Mode

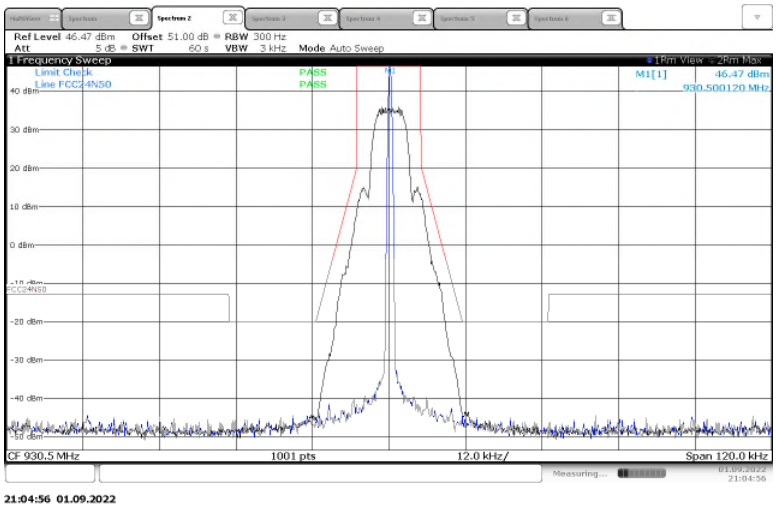

Figure 2.2.6-1: Emissions Mask – 930.5 MHz - 12.5 kHz Channel Spacing - mPass Mode – High Power

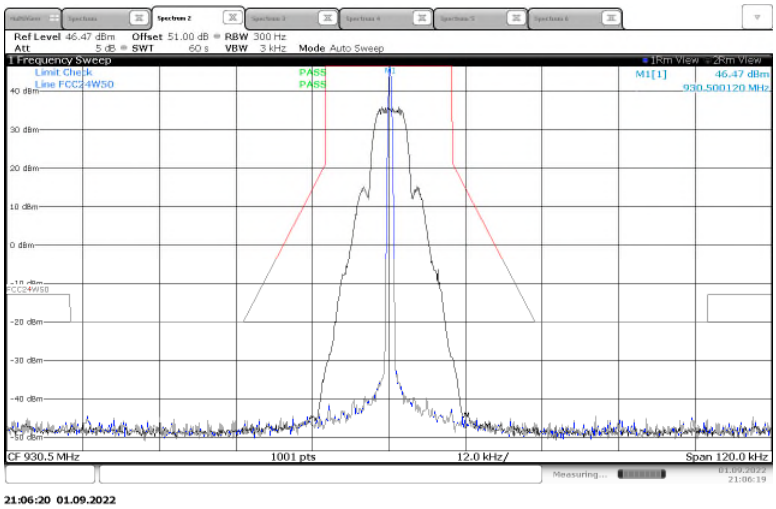

Figure 2.2.6-2: Emissions Mask – 930.5 MHz - 25 kHz Channel Spacing- mPass Mode – High Power

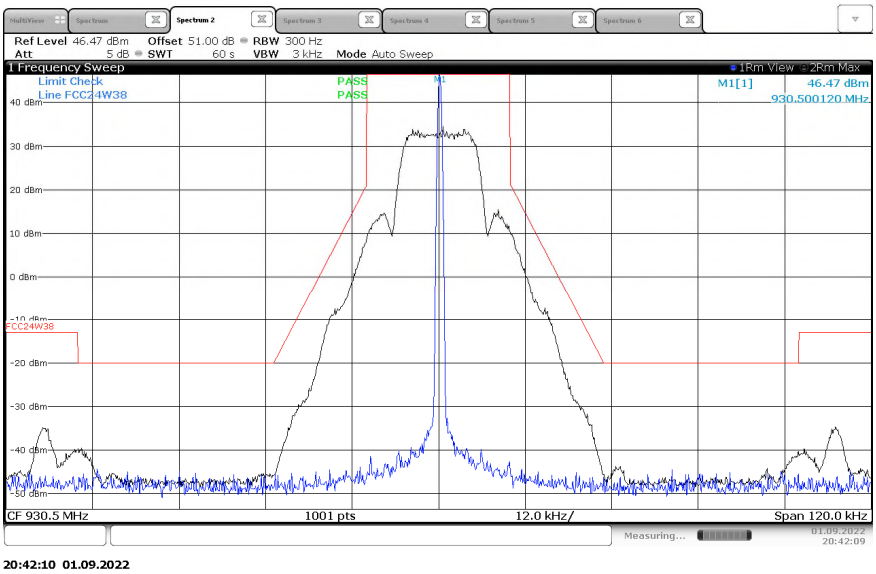

Figure 2.2.6-3: Emissions Mask – 930.5 MHz - 25 kHz Channel Spacing- mPass2 Mode – High Power

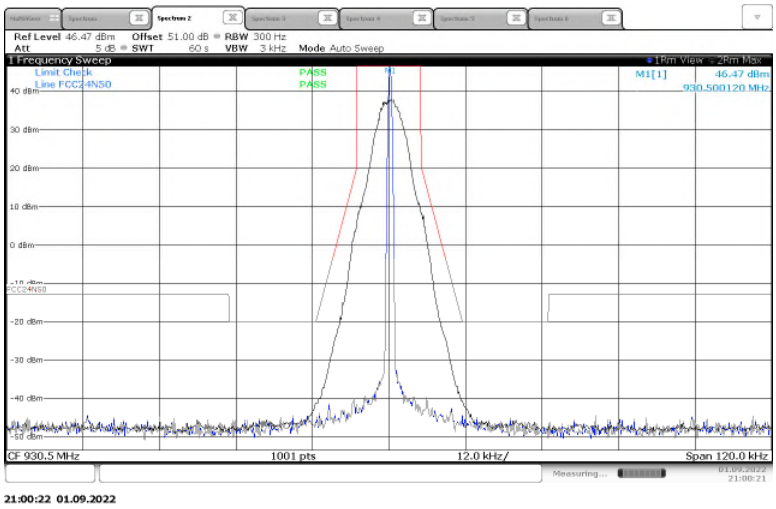

Figure 2.2.6-4: Emissions Mask – 930.5 MHz - 12.5 kHz Channel Spacing - m4Pass Mode – High Power

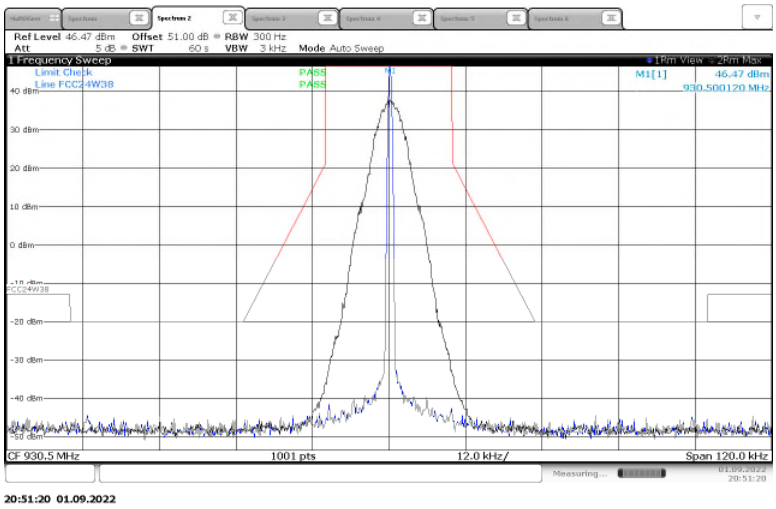

Figure 2.2.6-5: Emissions Mask – 930.5 MHz - 25 kHz Channel Spacing- m4Pass Mode – High Power

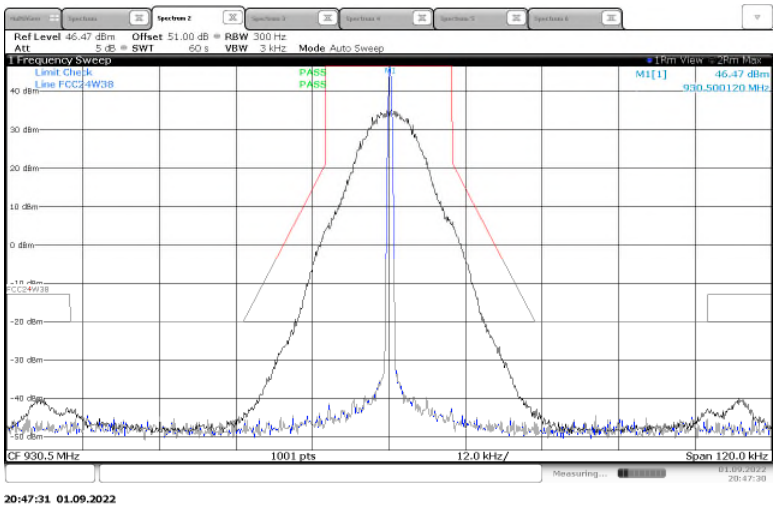

Figure 2.2.6-6: Emissions Mask – 930.5 MHz - 25 kHz Channel Spacing- m4Pass2 Mode – High Power

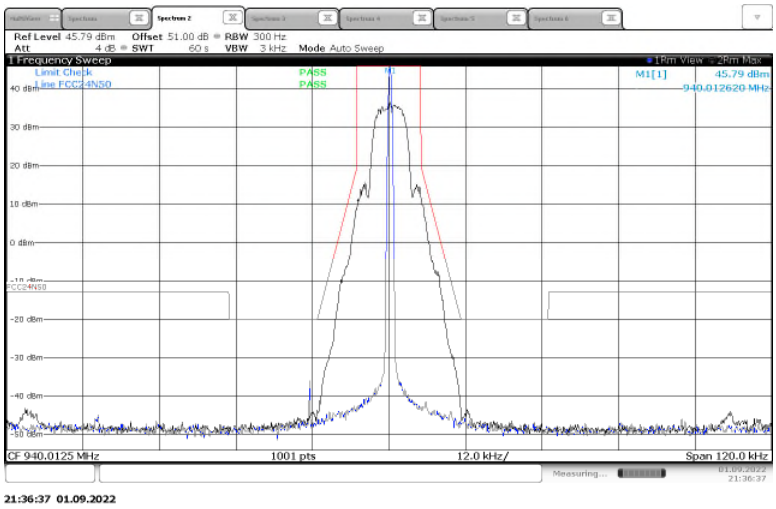

Figure 2.2.6-7: Emissions Mask – 940.0125 MHz - 12.5 kHz Channel Spacing - mPass Mode – High Power

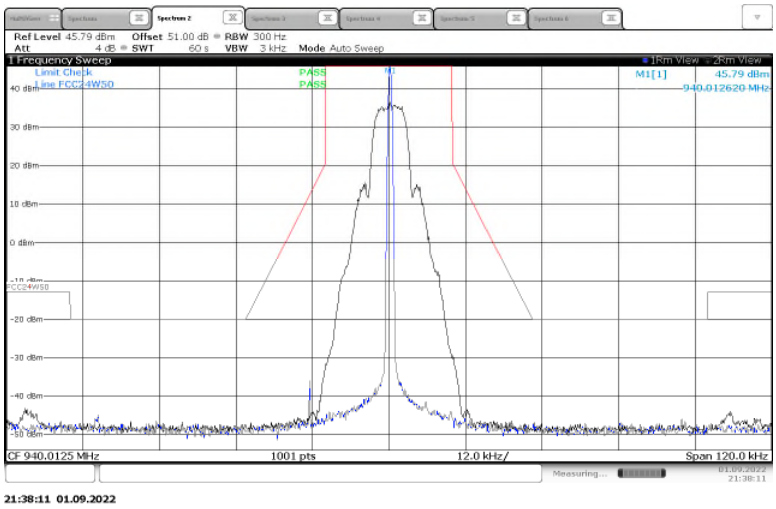

Figure 2.2.6-8: Emissions Mask – 940.0125 MHz - 25 kHz Channel Spacing- mPass Mode – High Power

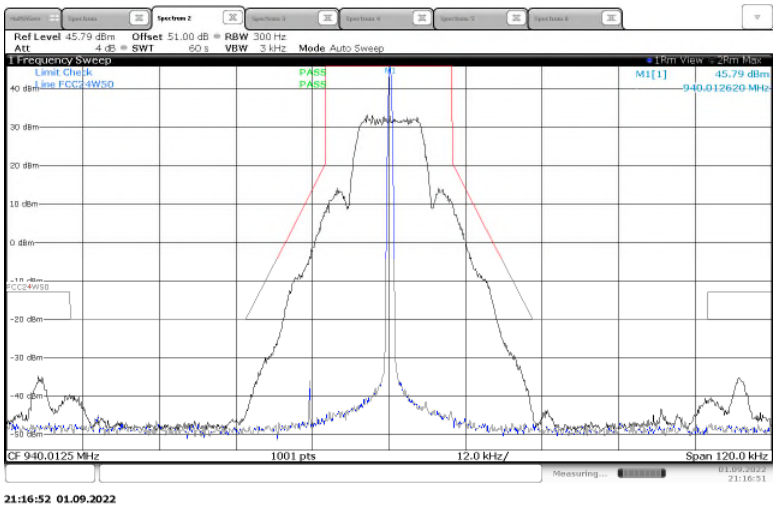

Figure 2.2.6-9: Emissions Mask – 940.0125 MHz - 25 kHz Channel Spacing- mPass2 Mode – High Power

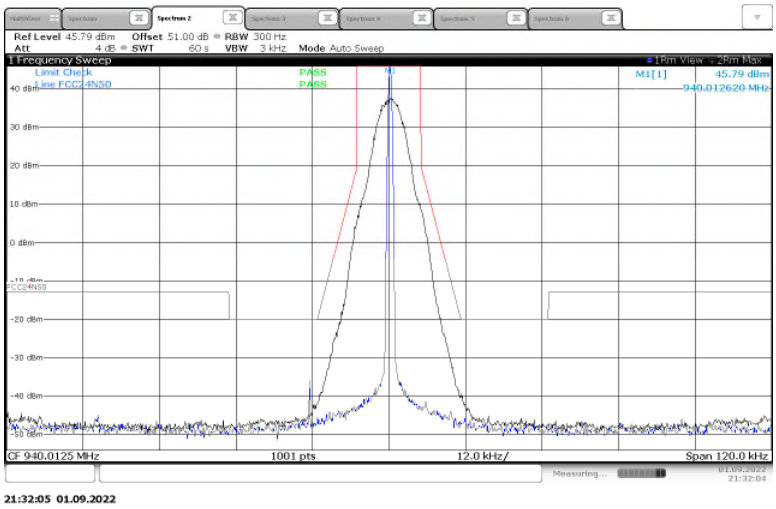

Figure 2.2.6-10: Emissions Mask – 940.0125 MHz - 12.5 kHz Channel Spacing - m4Pass Mode – High Power

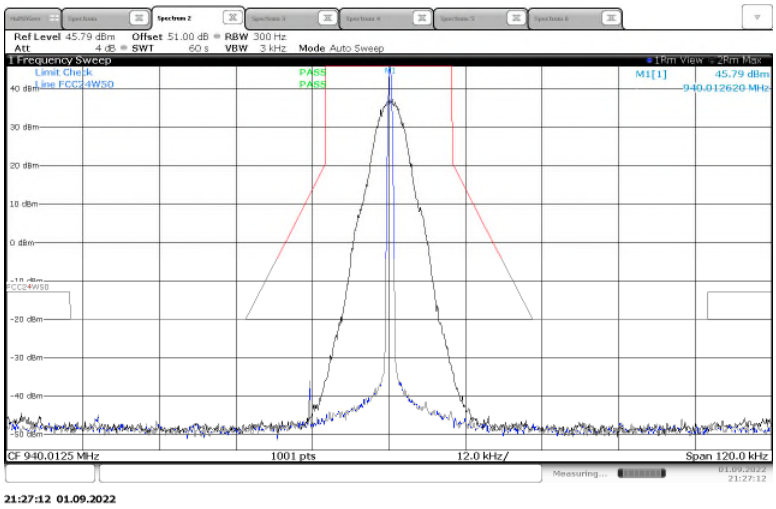

Figure 2.2.6-11: Emissions Mask – 940.0125 MHz - 25 kHz Channel Spacing- m4Pass Mode – High Power

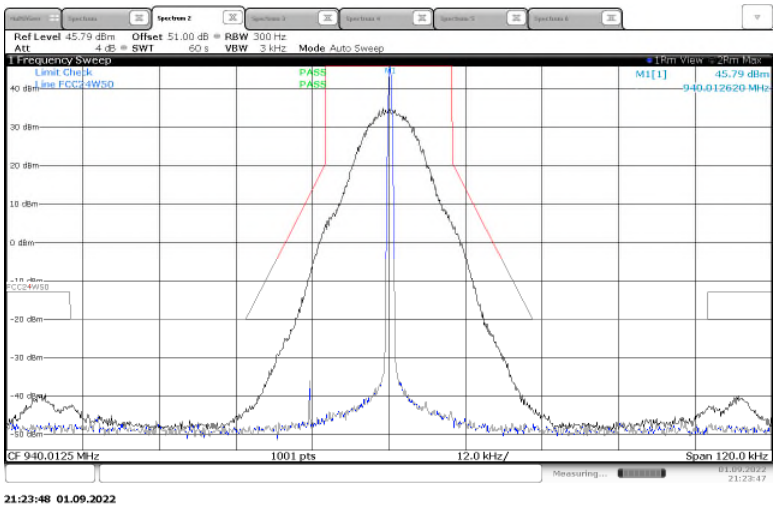

Figure 2.2.6-12: Emissions Mask – 940.0125 MHz - 25 kHz Channel Spacing- m4Pass2 Mode – High Power

Low Power Mode

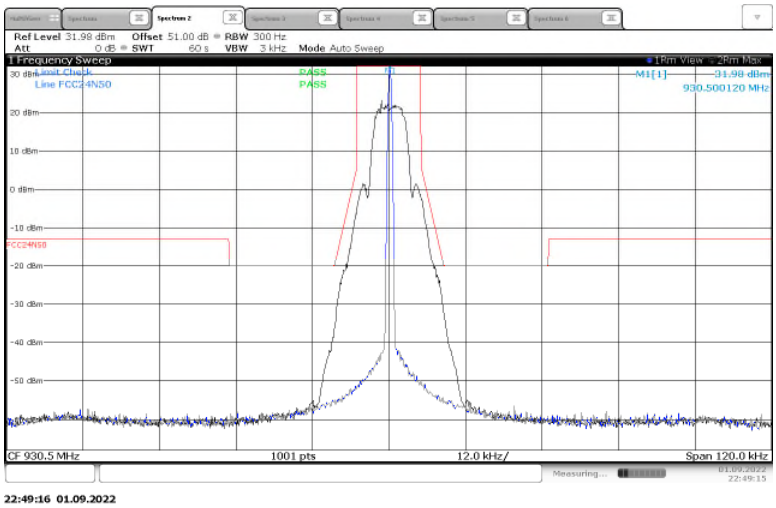

Figure 2.2.6-13: Emissions Mask – 930.5 MHz - 12.5 kHz Channel Spacing - mPass Mode – Low Power

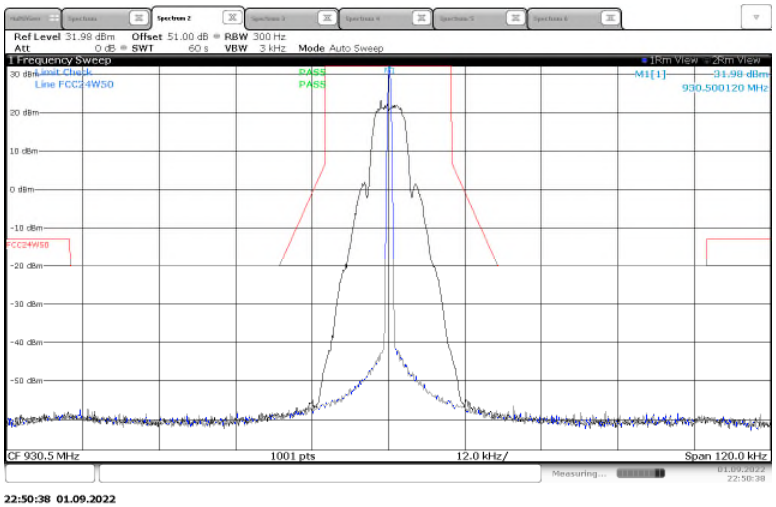

Figure 2.2.6-14: Emissions Mask – 930.5 MHz - 25 kHz Channel Spacing- mPass Mode – Low Power

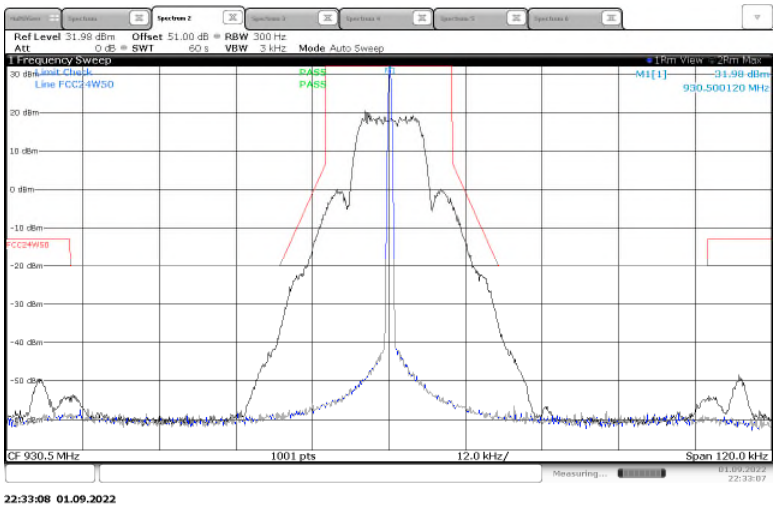

Figure 2.2.6-15: Emissions Mask – 930.5 MHz - 25 kHz Channel Spacing- mPass2 Mode – Low Power

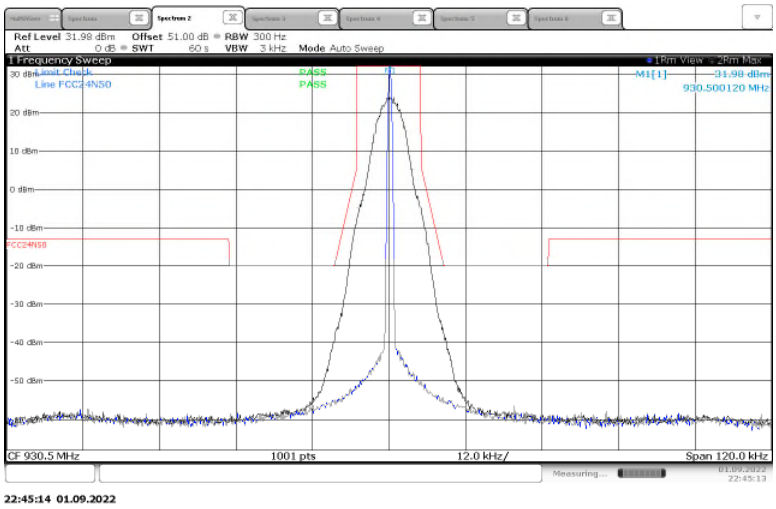

Figure 2.2.6-16: Emissions Mask – 930.5 MHz - 12.5 kHz Channel Spacing - m4Pass Mode – Low Power

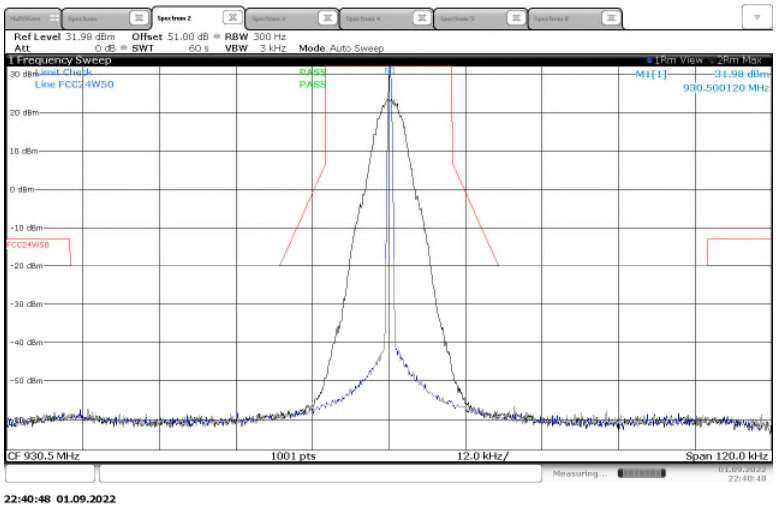

Figure 2.2.6-17: Emissions Mask – 930.5 MHz - 25 kHz Channel Spacing- m4Pass Mode – Low Power

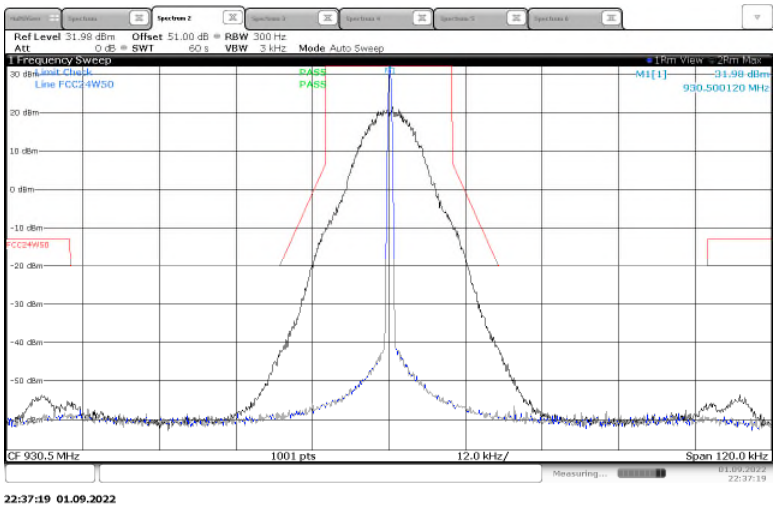

Figure 2.2.6-18: Emissions Mask – 930.5 MHz - 25 kHz Channel Spacing- m4Pass2 Mode – Low Power

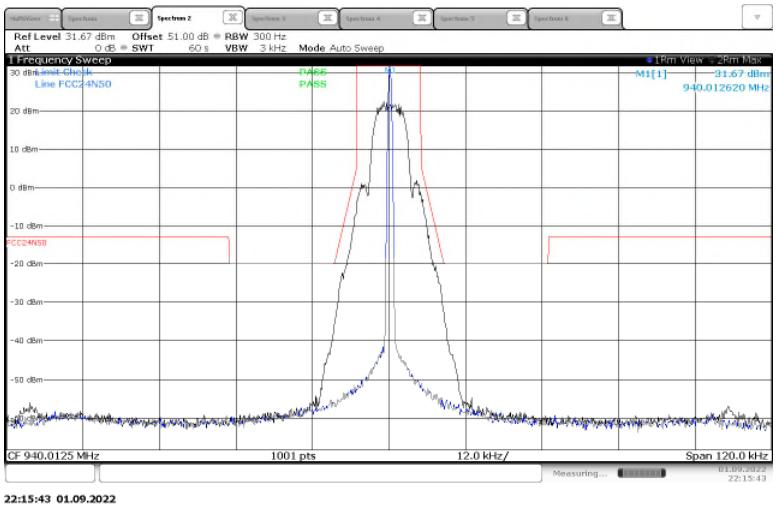

Figure 2.2.6-19: Emissions Mask – 940.0125 MHz - 12.5 kHz Channel Spacing - mPass Mode – Low Power

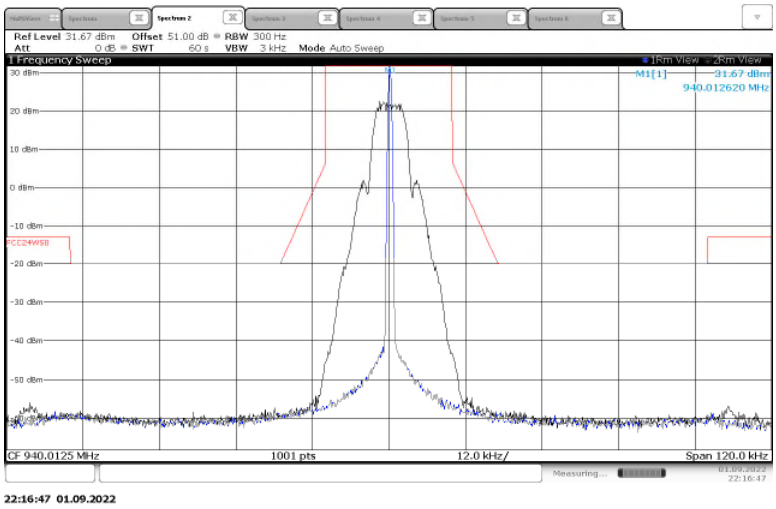

Figure 2.2.6-20: Emissions Mask – 940.0125 MHz - 25 kHz Channel Spacing- mPass Mode – Low Power

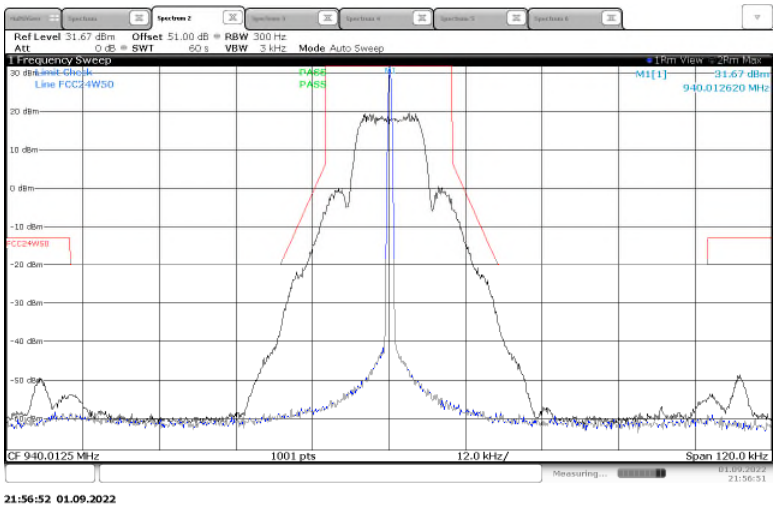

Figure 2.2.6-21: Emissions Mask – 940.0125 MHz - 25 kHz Channel Spacing- mPass2 Mode – Low Power

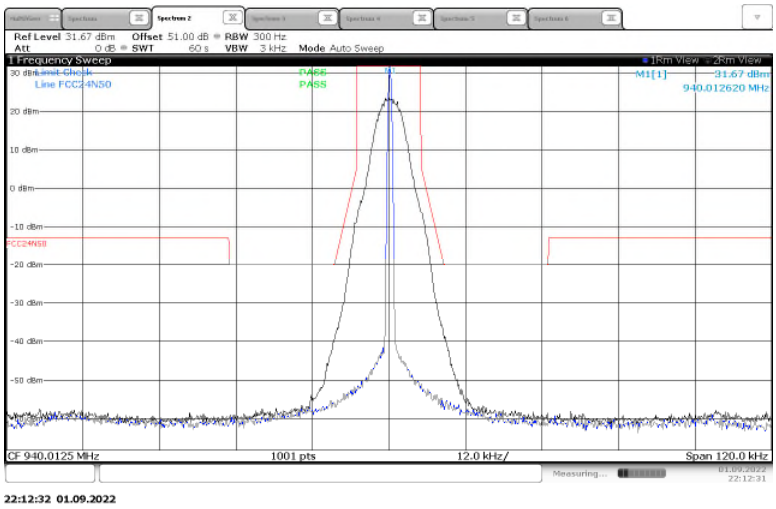

Figure 2.2.6-22: Emissions Mask – 940.0125 MHz - 12.5 kHz Channel Spacing - m4Pass Mode – Low Power

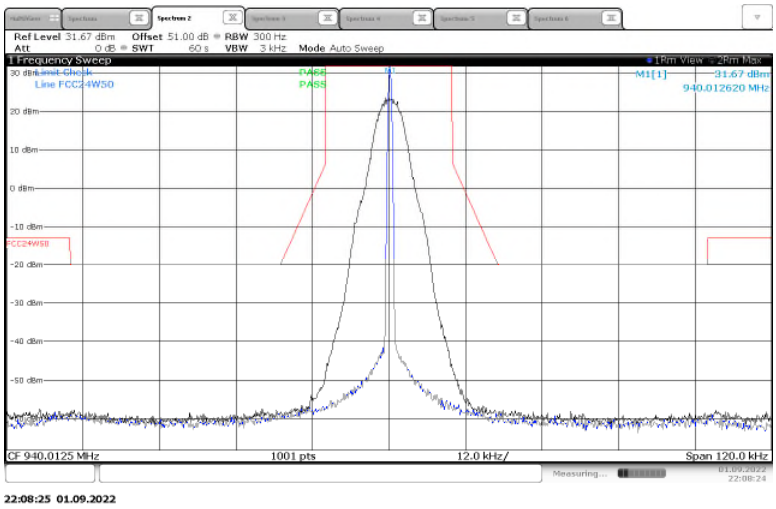

Figure 2.2.6-23: Emissions Mask – 940.0125 MHz - 25 kHz Channel Spacing- m4Pass Mode – Low Power

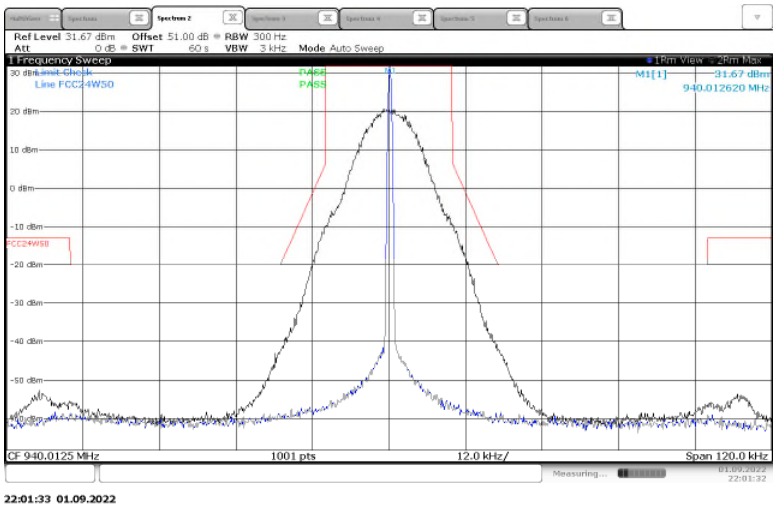

Figure 2.2.6-24: Emissions Mask – 940.0125 MHz - 25 kHz Channel Spacing- m4Pass2 Mode – Low Power

FCC 47 CFR Parts: 2.1053; 101.111 a(6); ISED Canada RSS-119 5.8.6

High Power Mode

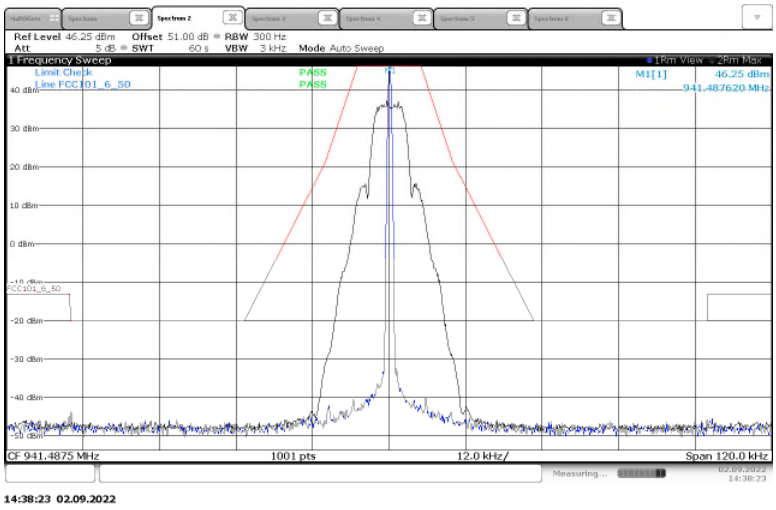

Figure 2.2.6-25: Emissions Mask – 941.4875 MHz - 25 kHz Channel Spacing- mPass Mode – High Power

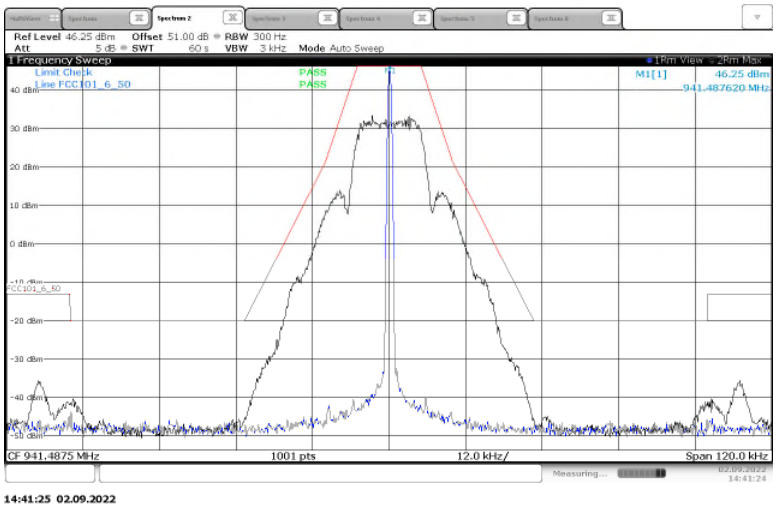

Figure 2.2.6-26: Emissions Mask – 941.4875 MHz - 25 kHz Channel Spacing- mPass2 Mode – High Power

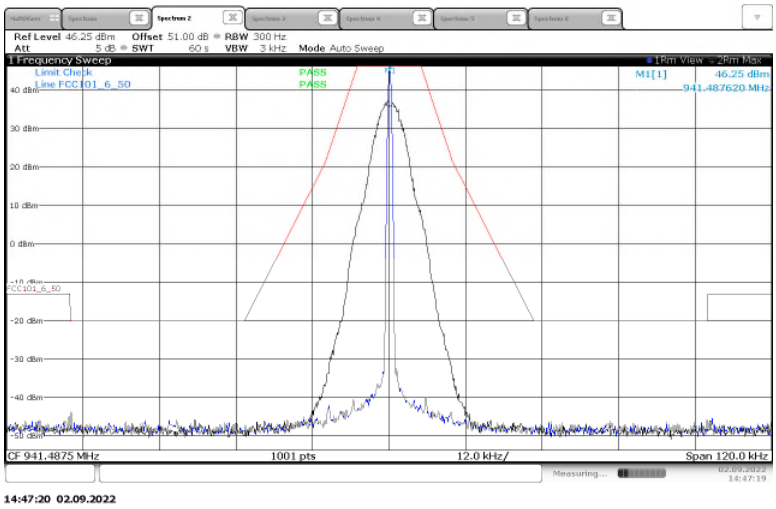

Figure 2.2.6-27: Emissions Mask – 941.4875 MHz - 25 kHz Channel Spacing- m4Pass Mode – High Power

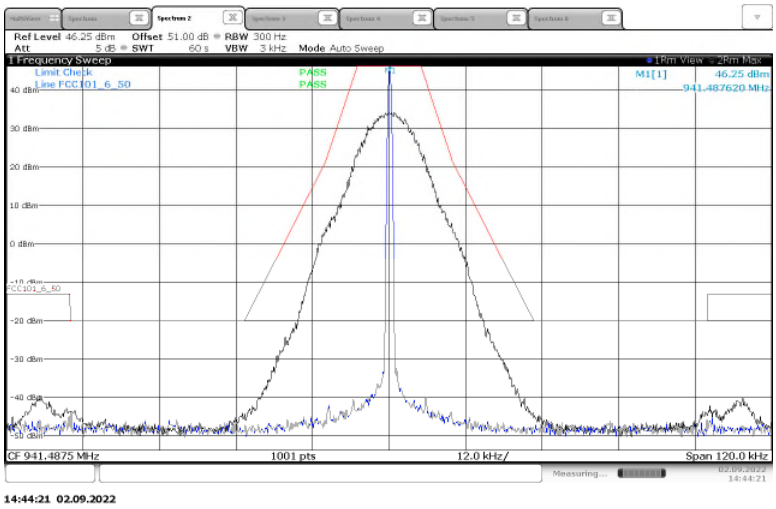

Figure 2.2.6-28: Emissions Mask – 941.4875 MHz - 25 kHz Channel Spacing- m4Pass2 Mode – High Power

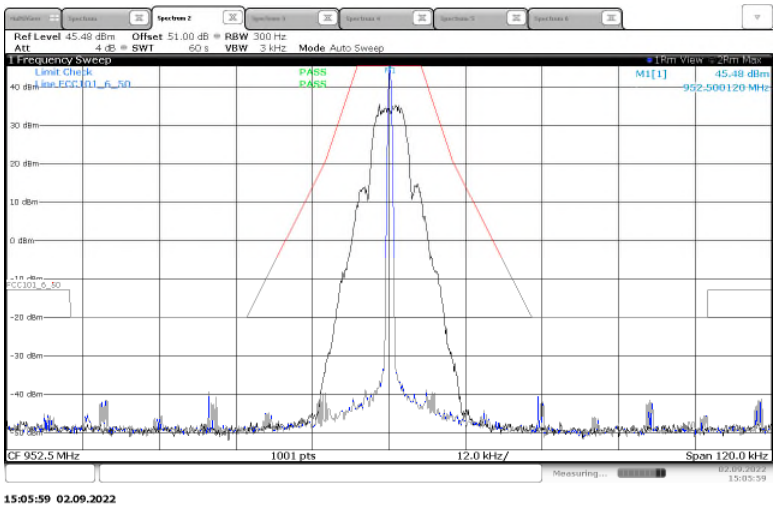

Figure 2.2.6-29: Emissions Mask – 952.5 MHz - 25 kHz Channel Spacing- mPass Mode – High Power

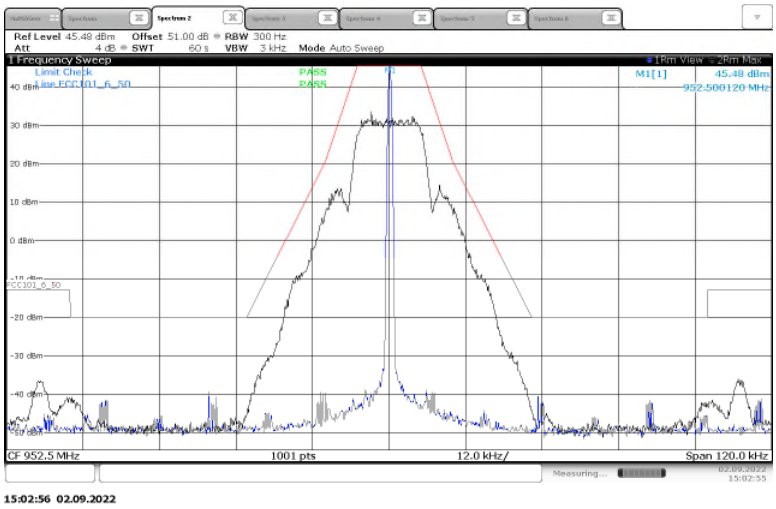

Figure 2.2.6-30: Emissions Mask – 952.5 MHz - 25 kHz Channel Spacing- mPass2 Mode – High Power

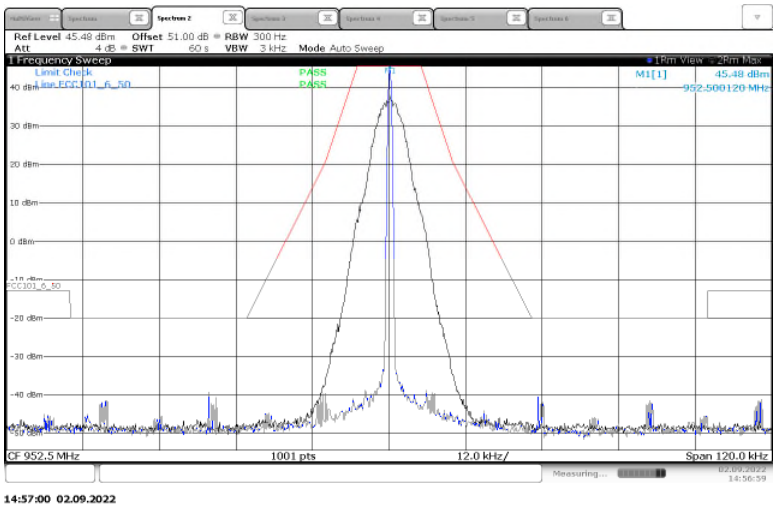

Figure 2.2.6-31: Emissions Mask – 952.5 MHz - 25 kHz Channel Spacing- m4Pass Mode – High Power

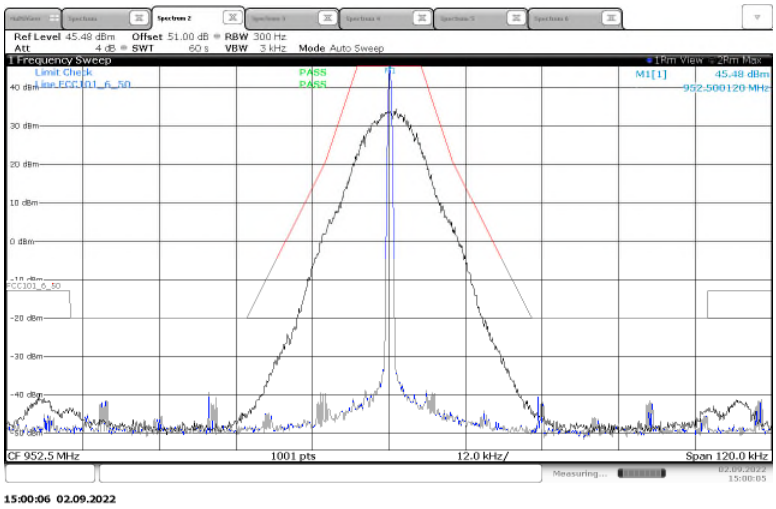

Figure 2.2.6-32: Emissions Mask – 952.5 MHz - 25 kHz Channel Spacing- m4Pass2 Mode – High Power

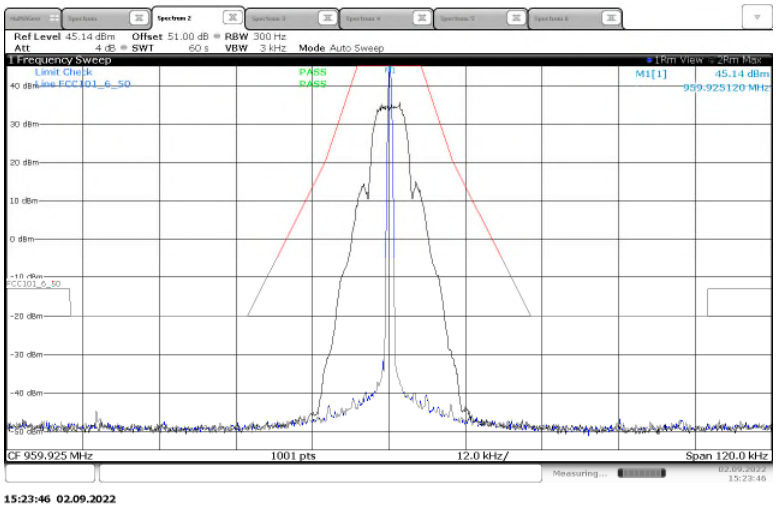

Figure 2.2.6-33: Emissions Mask – 959.925 MHz - 25 kHz Channel Spacing- mPass Mode – High Power

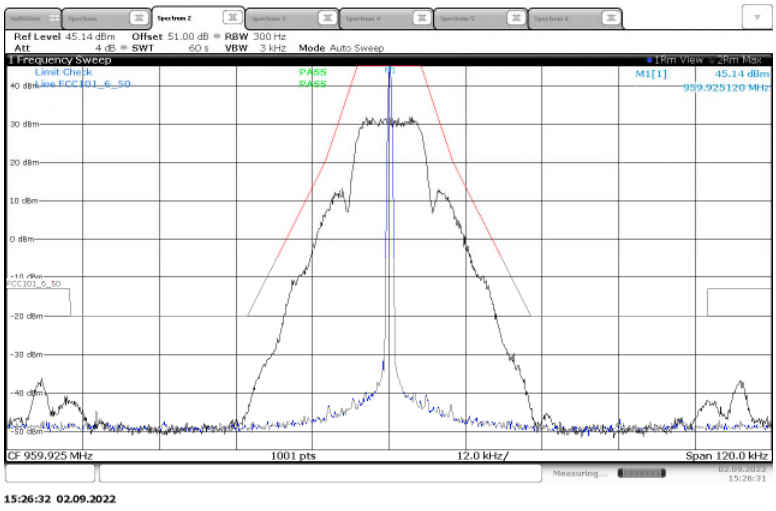

Figure 2.2.6-34: Emissions Mask – 959.925 MHz - 25 kHz Channel Spacing- mPass2 Mode – High Power

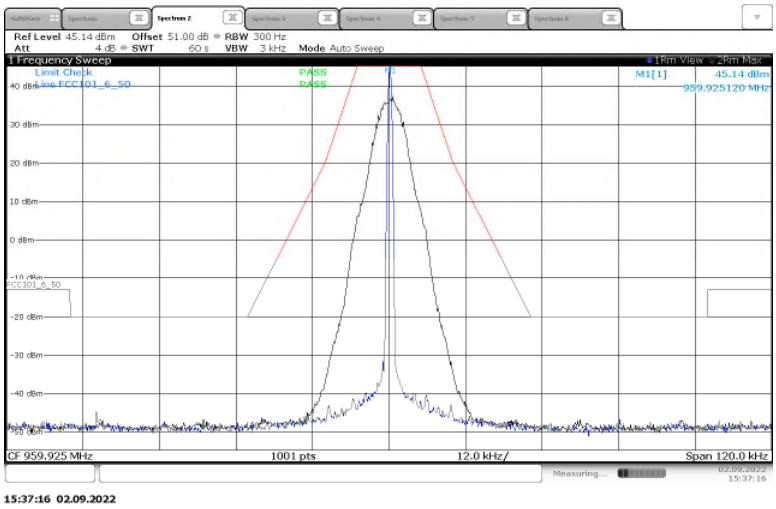

Figure 2.2.6-35: Emissions Mask – 959.925 MHz - 25 kHz Channel Spacing- m4Pass Mode – High Power

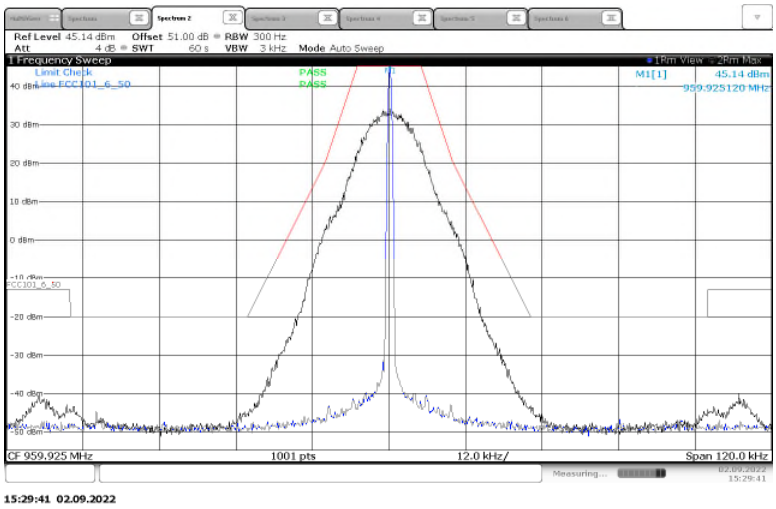

Figure 2.2.6-36: Emissions Mask – 959.925 MHz - 25 kHz Channel Spacing- m4Pass2 Mode – High Power

Low Power Mode

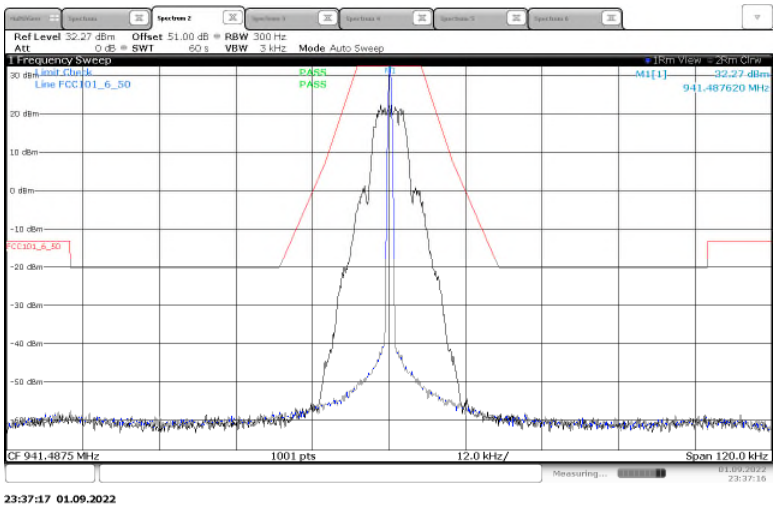

Figure 2.2.6-37: Emissions Mask – 941.4875 MHz - 25 kHz Channel Spacing- mPass Mode – Low Power

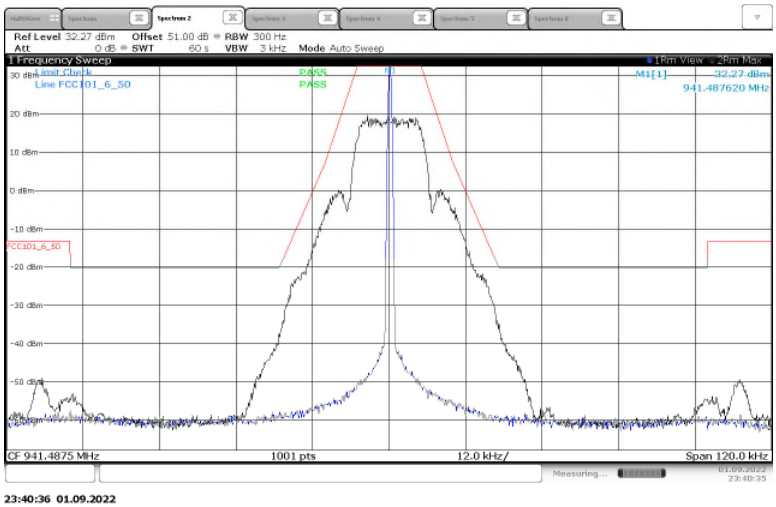

Figure 2.2.6-38: Emissions Mask – 941.4875 MHz - 25 kHz Channel Spacing- mPass2 Mode – Low Power

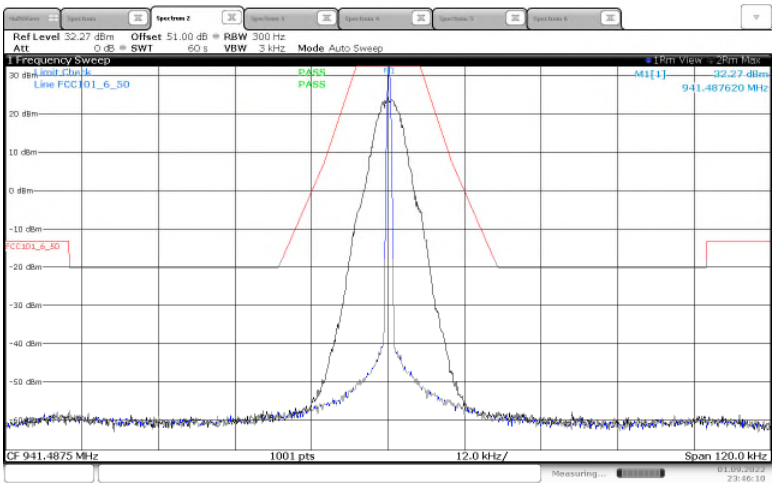

Figure 2.2.6-39: Emissions Mask – 941.4875 MHz - 25 kHz Channel Spacing- m4Pass Mode – Low Power

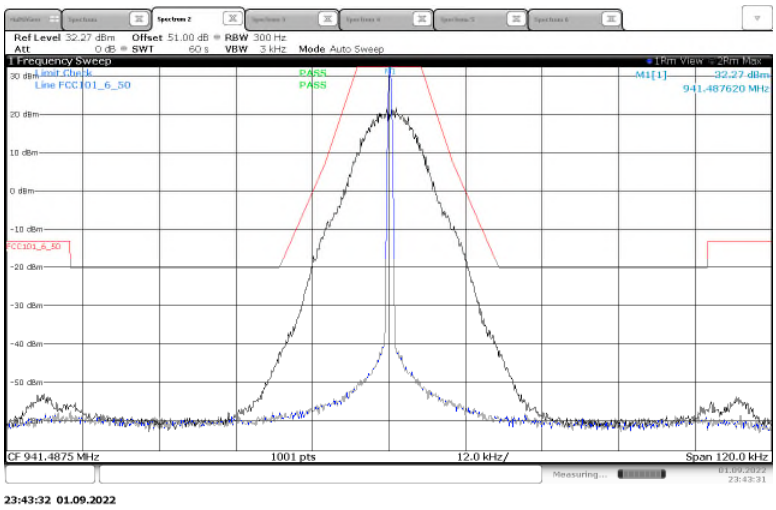

Figure 2.2.6-40: Emissions Mask – 941.4875 MHz - 25 kHz Channel Spacing- m4Pass2 Mode – Low Power

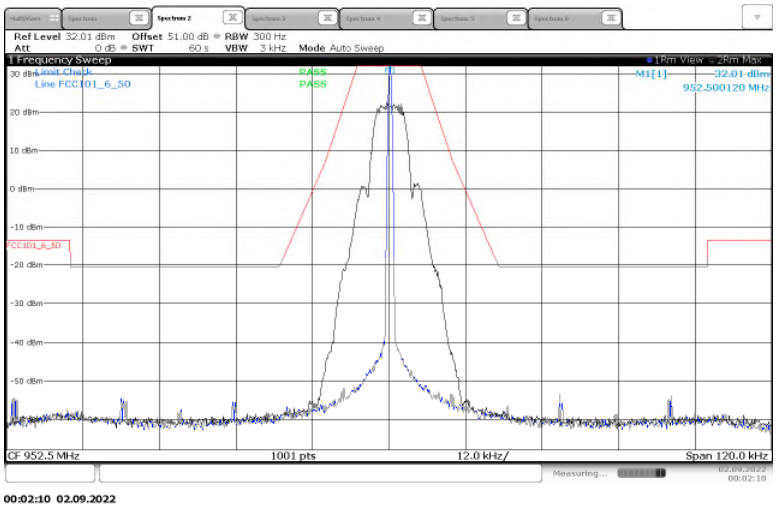

Figure 2.2.6-41: Emissions Mask – 952.5 MHz - 25 kHz Channel Spacing- mPass Mode – Low Power

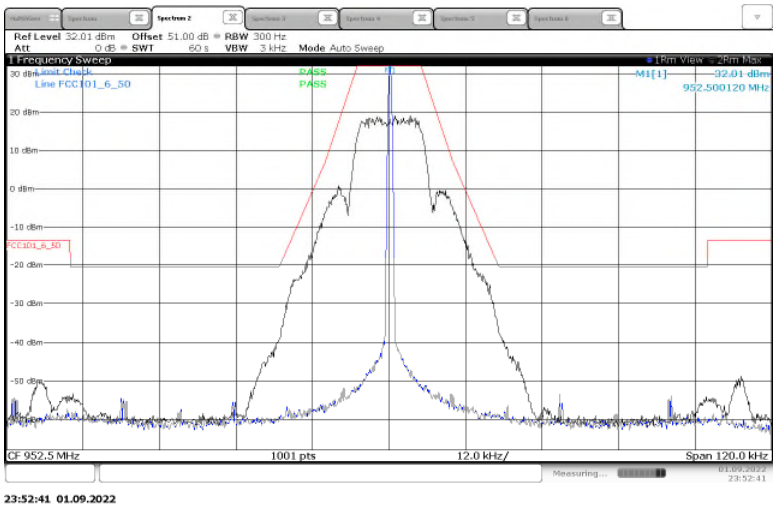

Figure 2.2.6-42: Emissions Mask – 952.5 MHz - 25 kHz Channel Spacing- mPass2 Mode – Low Power

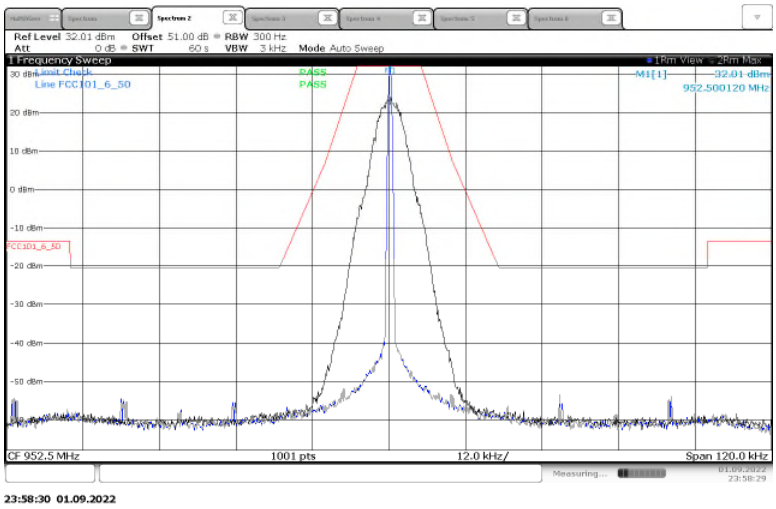

Figure 2.2.6-43: Emissions Mask – 952.5 MHz - 25 kHz Channel Spacing- m4Pass Mode – Low Power

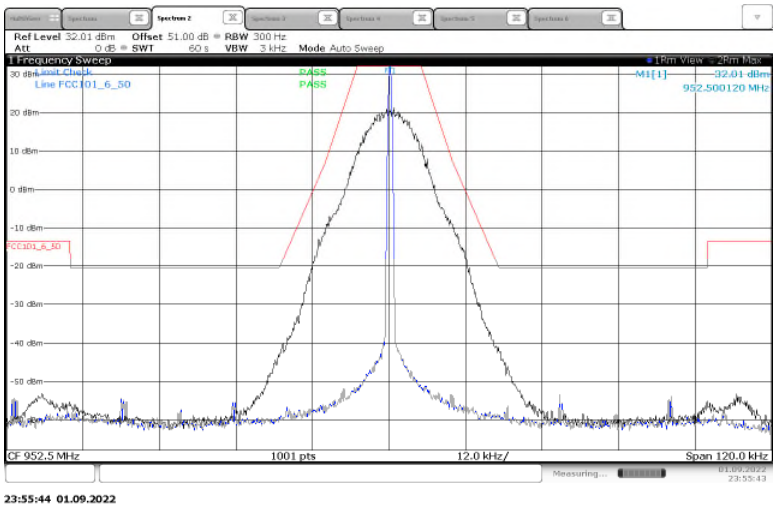

Figure 2.2.6-44: Emissions Mask – 952.5 MHz - 25 kHz Channel Spacing- m4Pass2 Mode – Low Power

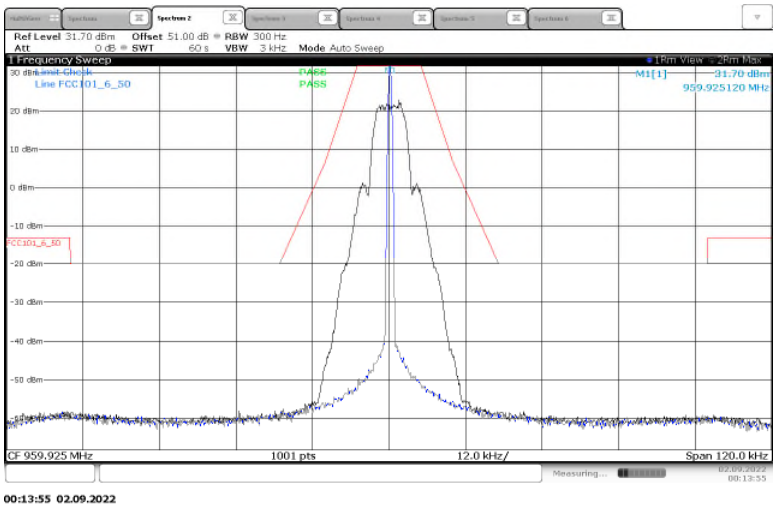

Figure 2.2.6-45: Emissions Mask – 959.925 MHz - 25 kHz Channel Spacing- mPass Mode – Low Power

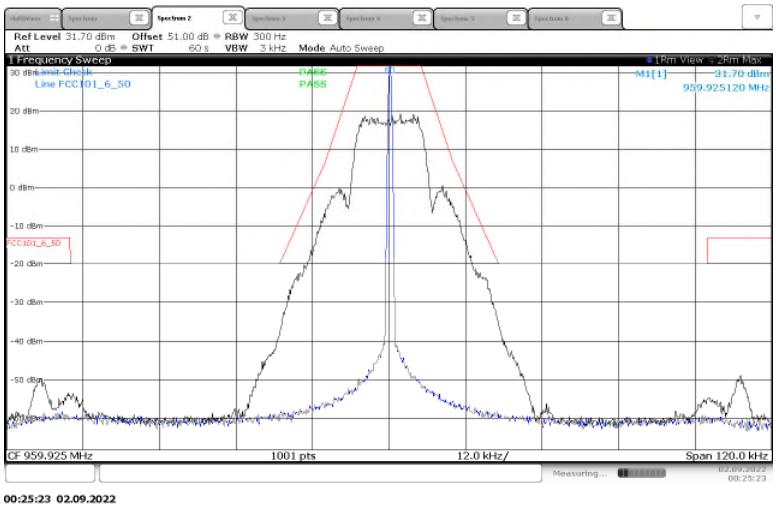

Figure 2.2.6-46: Emissions Mask – 959.925 MHz - 25 kHz Channel Spacing- mPass2 Mode – Low Power

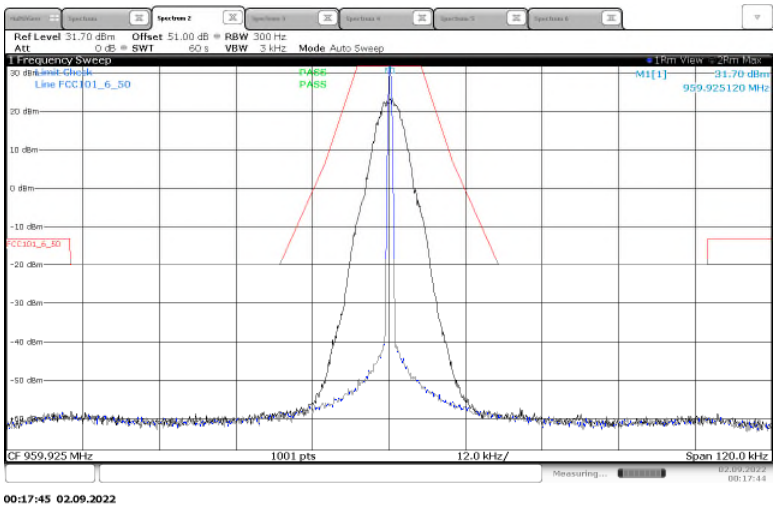

Figure 2.2.6-47: Emissions Mask – 959.925 MHz - 25 kHz Channel Spacing- m4Pass Mode – Low Power

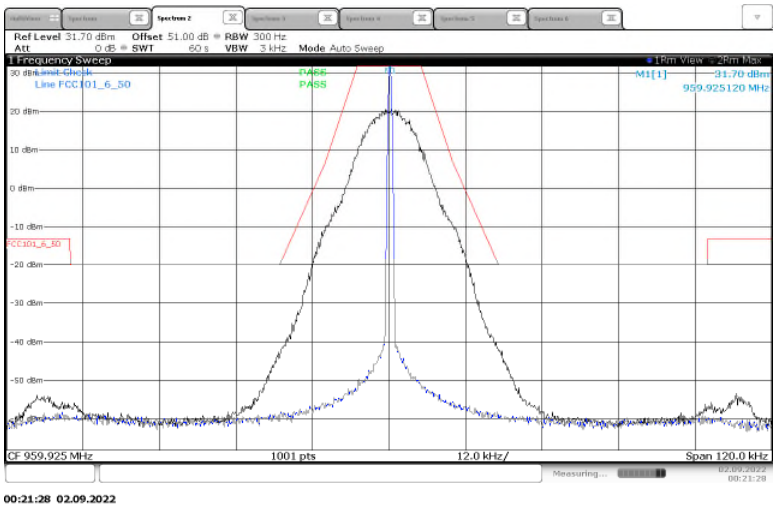

Figure 2.2.6-48: Emissions Mask – 959.925 MHz - 25 kHz Channel Spacing- m4Pass2 Mode – Low Power

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
50ohms M/F 4GHz, 100W Attenuator	Fairview Microwave Inc.	SA4N100-20	615	N/A	12	25-Mar-2023
Duratest High Frequency Cable 26.5GHz	Teledyne Storm Products	921-0101-036	BEMC02112	N/A	12	20-Oct-2022
Atten 30dB N-M/F, DC, 18 GHz, 10W	Aeroflex Inmet	18N10W-30	DEMC3041	N/A	12	15-Jul-2023
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	07-Jun-2023

TU - Traceability Unscheduled
O/P MON - Traceability Unscheduled
N/A - Not Applicable
NCR – No Calibration Required

2.3 Occupied Bandwidth

2.3.1 Specification Reference

FCC Section 2.1049; ISED Canada RSS-GEN 6.7

2.3.2 Equipment Under Test and Modification State

M420, SN: 1953335308
M400G2 PA, SN: 582402163100074

2.3.3 Date of Test

2022-September-01

2.3.4 Test Method

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through suitable of passive attenuation. The internal correction factors of the spectrum analyzer were employed to correct for any cable and attenuator losses.

The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts. The nominal IF filter 3 dB bandwidth (RBW) is in the range of 1% to 5% of the OBW, and the VBW was set ≥ 3 × RBW. The reference level was set to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. The measurements were made using the spectrum analyzer's 99% BW function.

2.3.5 Environmental Conditions

Ambient Temperature	22.1 °C
Relative Humidity	51 %
Atmospheric Pressure	1014 mbar

2.3.6 Test Results

High Power

Table 2.3.6-1: 99% Bandwidth – 930.5 MHz – High Power

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
930.5	RSS-134	mPass	5.797
930.5	RSS-134	mPass2	11.8266
930.5	RSS-134	m4Pass	6.027
930.5	RSS-134	m4Pass2	12.1247

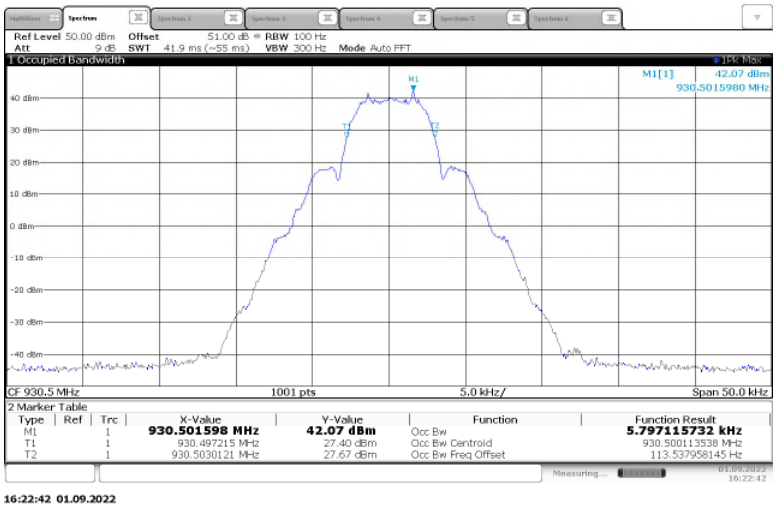

Figure 2.3.6-1: 99% Bandwidth – 930.5 MHz - mPass – High Power

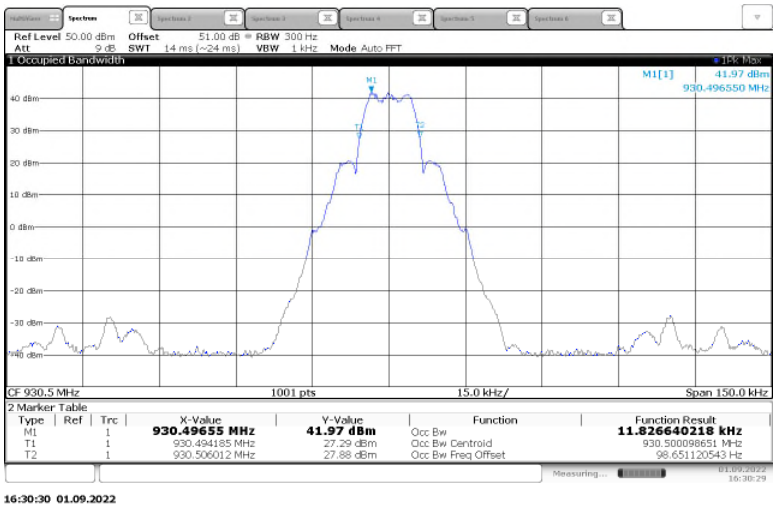

Figure 2.3.6-2: 99% Bandwidth – 930.5 MHz - mPass2 – High Power

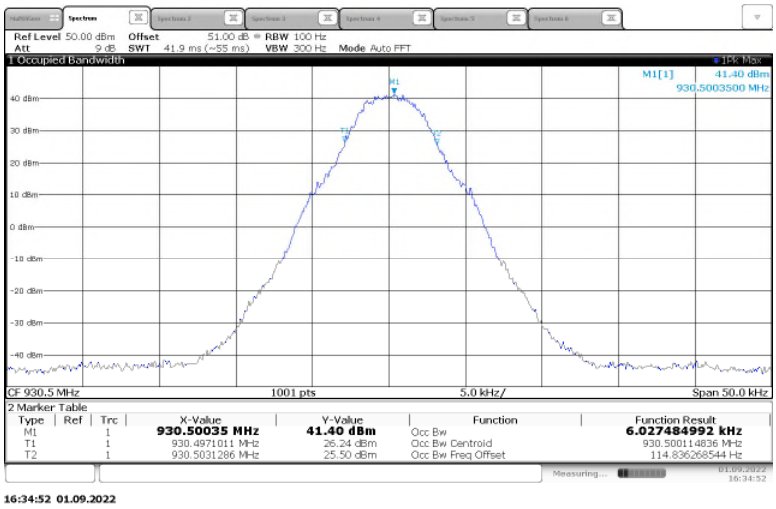

Figure 2.3.6-3: 99% Bandwidth – 930.5 MHz - m4Pass – High Power

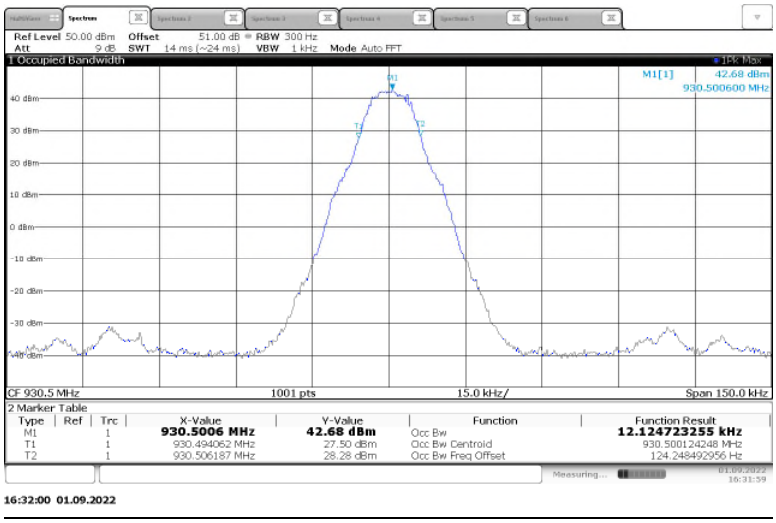

Figure 2.3.6-4: 99% Bandwidth – 930.5 MHz - m4Pass2 – High Power

Table 2.3.6-2: 99% Bandwidth – 940.0125 MHz – High Power

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
940.0125	RSS-134	mPass	5.836
940.0125	RSS-134	mPass2	11.871
940.0125	RSS-134	m4Pass	6.08
940.0125	RSS-134	m4Pass2	12.2372

Figure 2.3.6-5: 99% Bandwidth – 940.0125 MHz - mPass – High Power

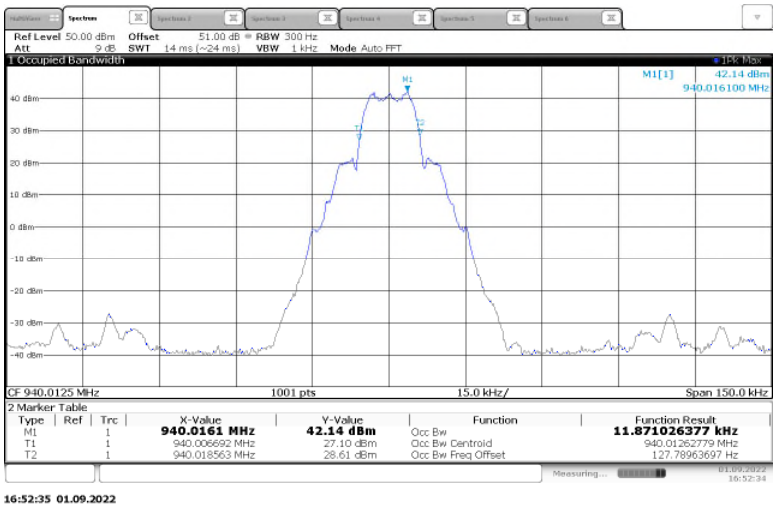

Figure 2.3.6-6: 99% Bandwidth – 940.0125 MHz - mPass2 – High Power

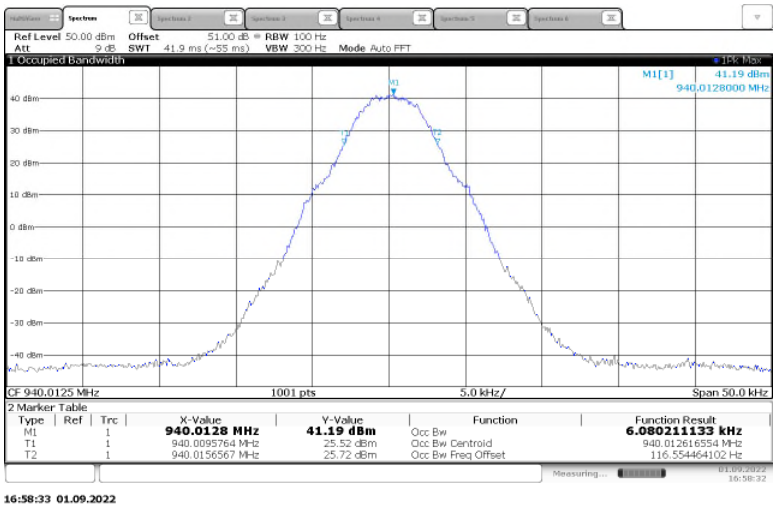

Figure 2.3.6-7: 99% Bandwidth – 940.0125 MHz - m4Pass – High Power

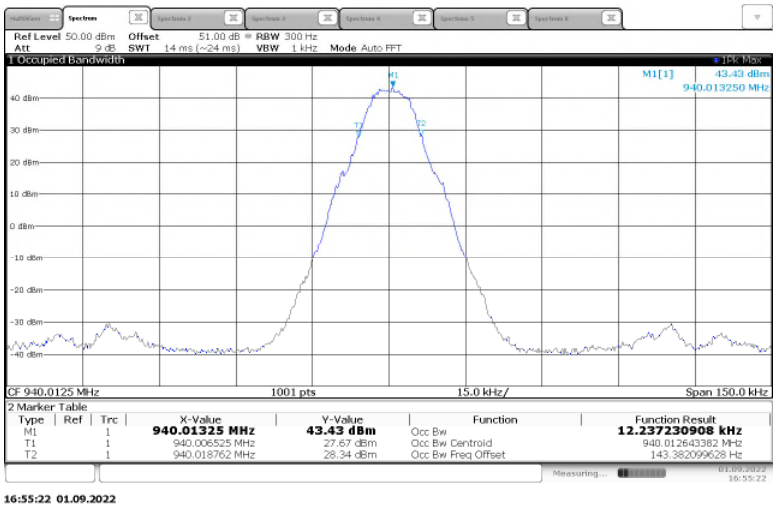

Figure 2.3.6-8: 99% Bandwidth – 940.0125 MHz - m4Pass2 – High Power

Table 2.3.6-3: 99% Bandwidth – 941.4875 MHz – High Power

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
941.4875	RSS-119	mPass	5.81067
941.4875	RSS-119	mPass2	11.8986
941.4875	RSS-119	m4Pass	6.0776
941.4875	RSS-119	m4Pass2	12.1507

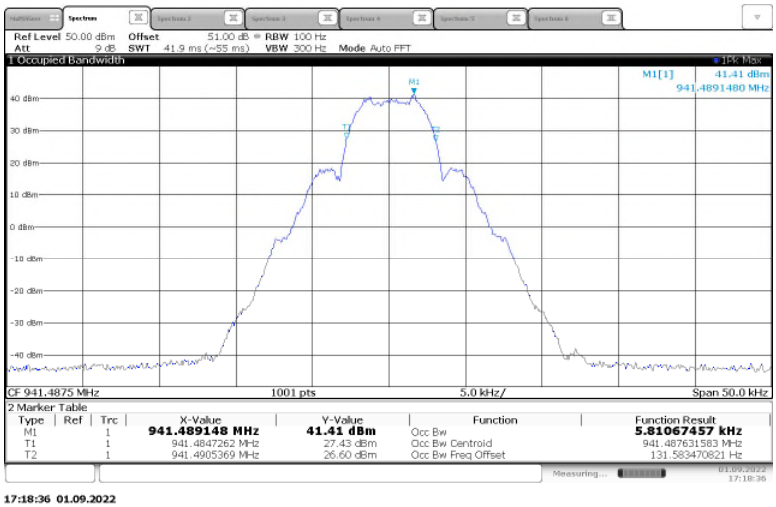

Figure 2.3.6-9: 99% Bandwidth – 941.4875 MHz - mPass – High Power

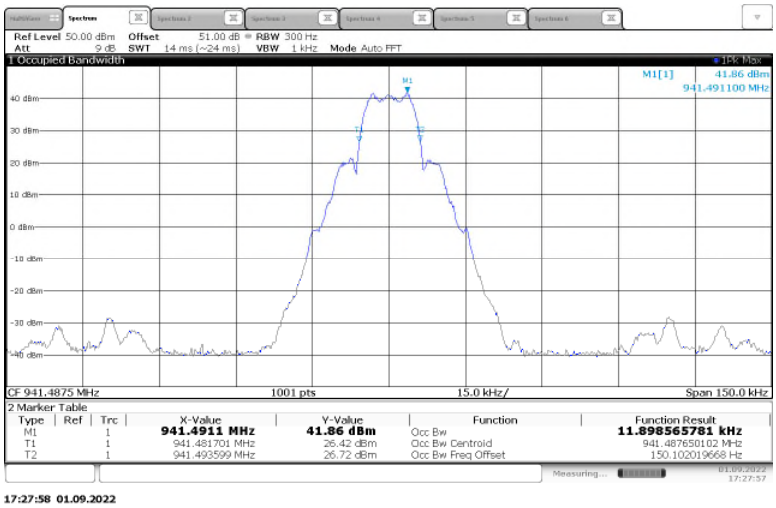

Figure 2.3.6-10: 99% Bandwidth – 941.4875 MHz - mPass2 – High Power

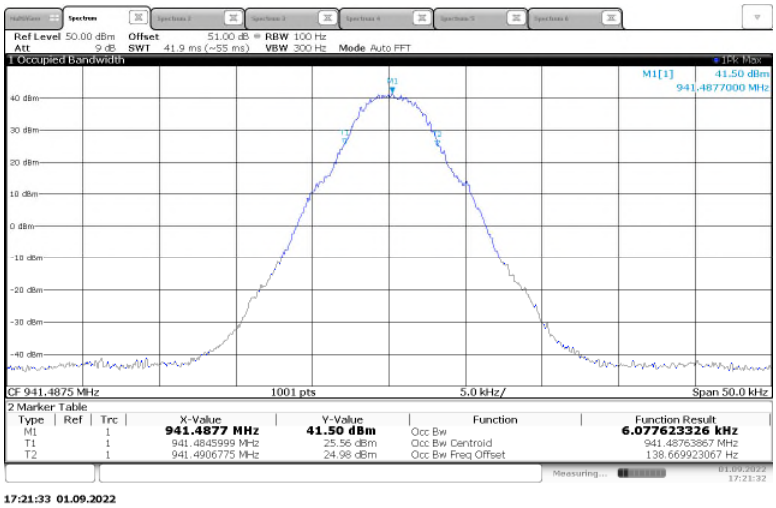

Figure 2.3.6-11: 99% Bandwidth –941.4875 MHz - m4Pass – High Power

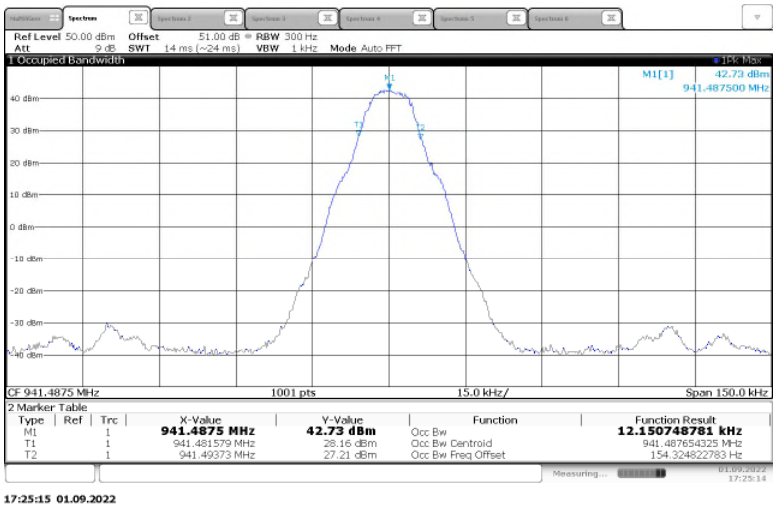

Figure 2.3.6-12: 99% Bandwidth – 941.4875 MHz - m4Pass2 – High Power

Table 2.3.6-4: 99% Bandwidth – 952.5 MHz – High Power

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
952.5	RSS-119	mPass	5.809
952.5	RSS-119	mPass2	11.804
952.5	RSS-119	m4Pass	6.0913
952.5	RSS-119	m4Pass2	12.12988

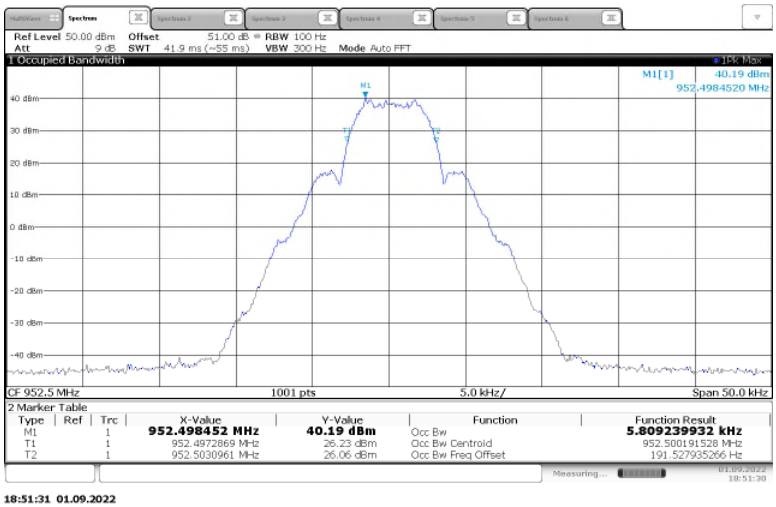

Figure 2.3.6-13: 99% Bandwidth – 952.5 MHz - mPass – High Power

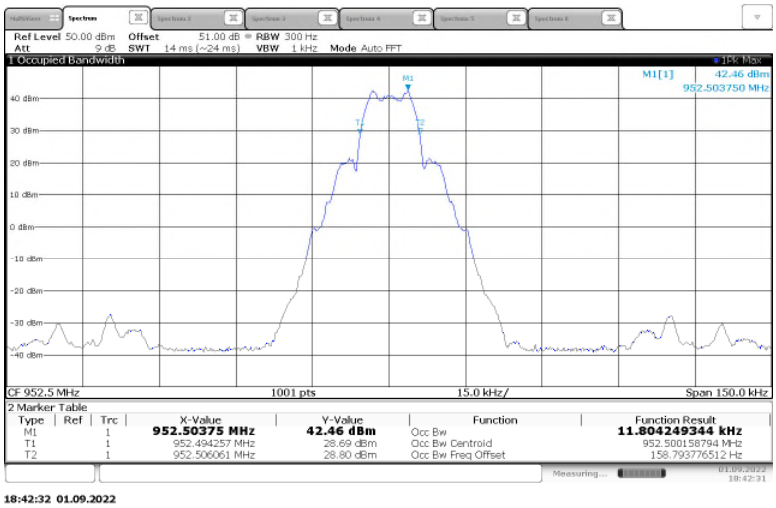

Figure 2.3.6-14: 99% Bandwidth – 952.5 MHz - mPass2 – High Power

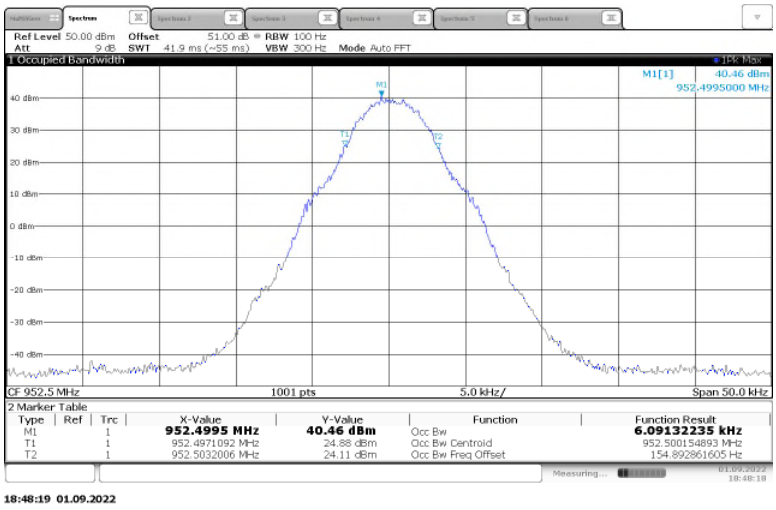

Figure 2.3.6-15: 99% Bandwidth – 952.5 MHz - m4Pass – High Power

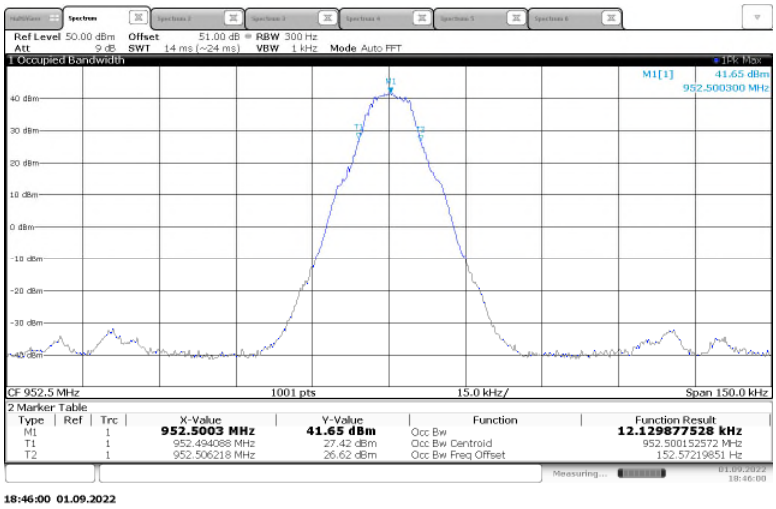

Figure 2.3.6-16: 99% Bandwidth – 952.5 MHz - m4Pass2 – High Power

Table 2.3.6-5: 99% Bandwidth – 959.925 MHz – High Power

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
959.925	RSS-119	mPass	5.8214
959.925	RSS-119	mPass2	11.8698
959.925	RSS-119	m4Pass	6.04787
959.925	RSS-119	m4Pass2	12.32678

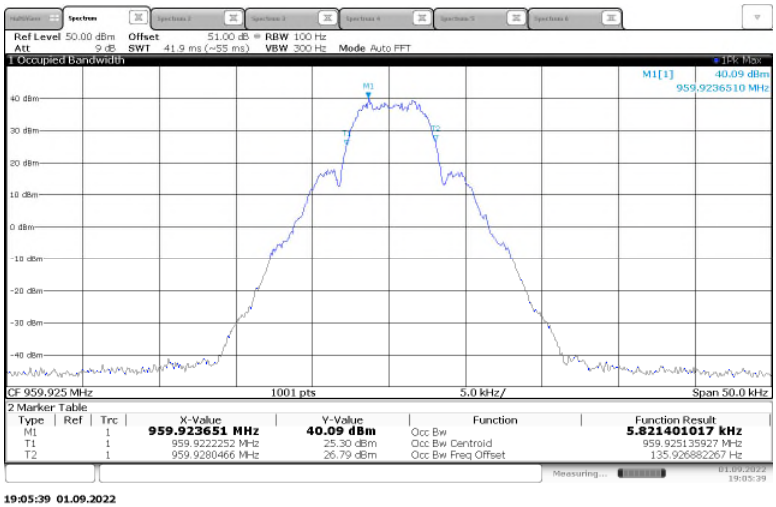

Figure 2.3.6-17: 99% Bandwidth – 959.925 MHz - mPass – High Power

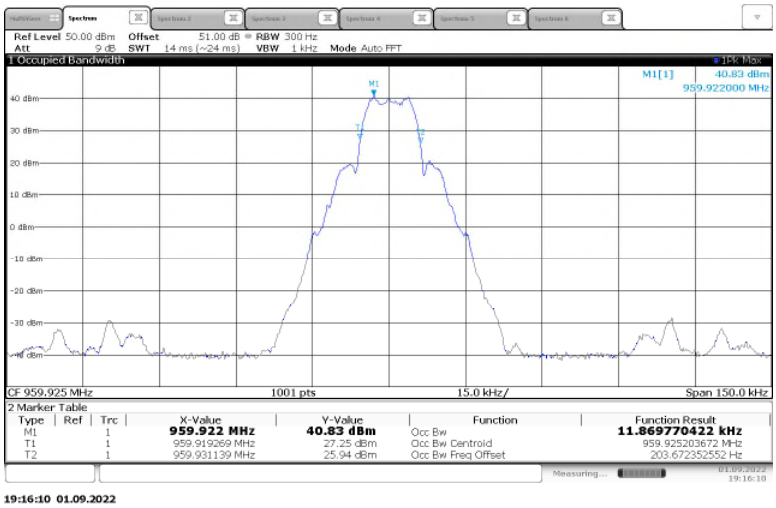

Figure 2.3.6-18: 99% Bandwidth – 959.925 MHz - mPass2 – High Power

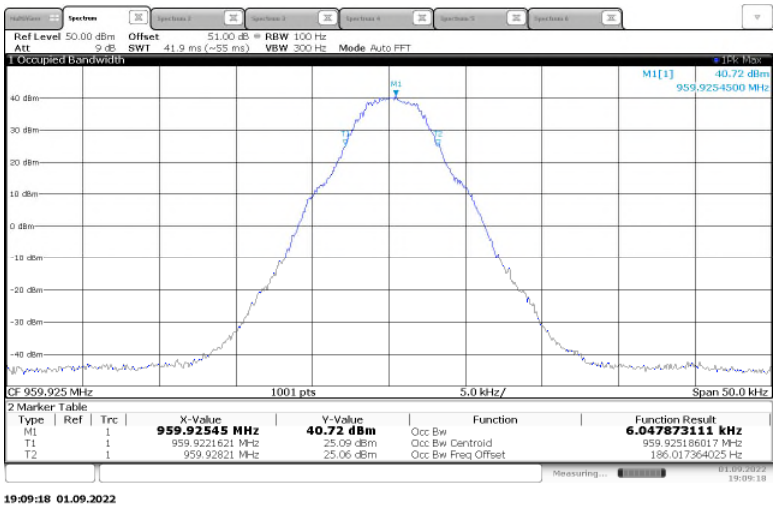

Figure 2.3.6-19: 99% Bandwidth – 959.925 MHz - m4Pass – High Power

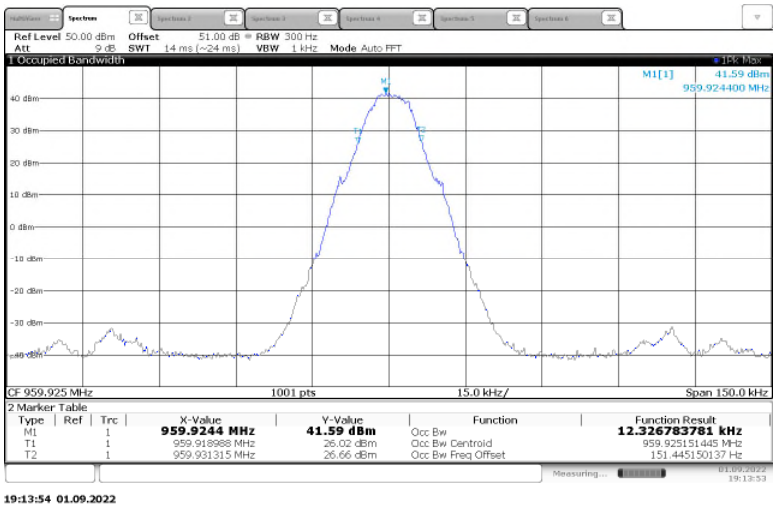

Figure 2.3.6-20: 99% Bandwidth – 959.925 MHz - m4Pass2 – High Power

Low Power

Table 2.3.6-6: 99% Bandwidth – 930.5 MHz – Low Power

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
930.5	RSS-134	mPass	5.8236
930.5	RSS-134	mPass2	11.8735
930.5	RSS-134	m4Pass	6.0488
930.5	RSS-134	m4Pass2	12.2528

Figure 2.3.6-21: 99% Bandwidth – 930.5 MHz - mPass – Low Power

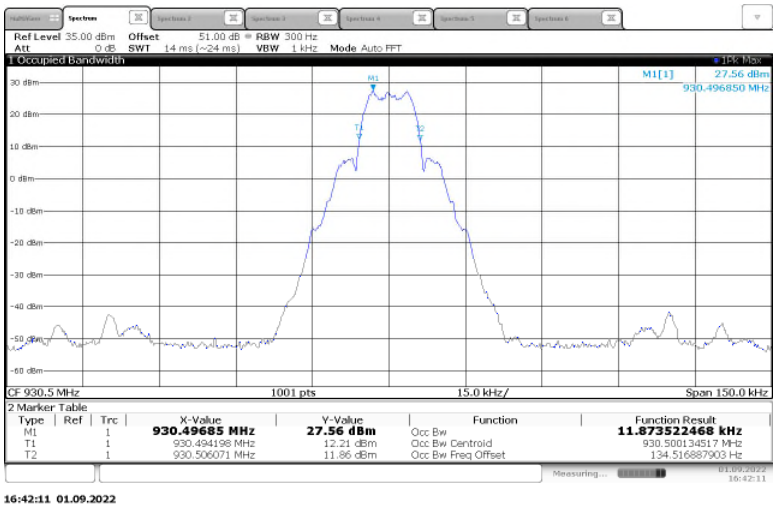

Figure 2.3.6-22: 99% Bandwidth – 930.5 MHz - mPass2 – Low Power

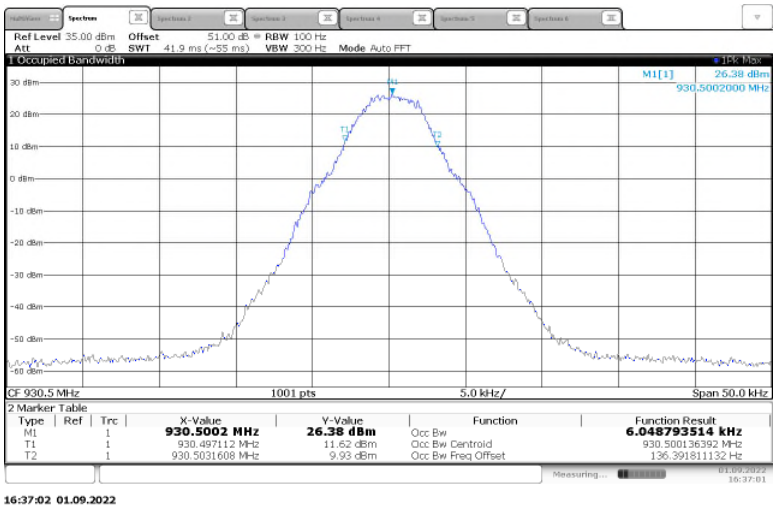

Figure 2.3.6-23: 99% Bandwidth – 930.5 MHz - m4Pass – Low Power

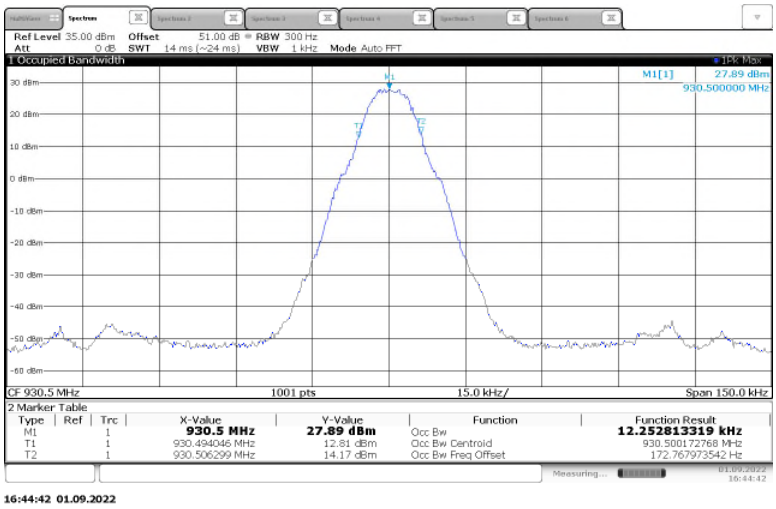

Figure 2.3.6-24: 99% Bandwidth – 930.5 MHz - m4Pass2 – Low Power

Table 2.3.6-7: 99% Bandwidth – 940.0125 MHz – Low Power

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
940.0125	RSS-119	mPass	5.8059
940.0125	RSS-119	mPass2	11.86798
940.0125	RSS-119	m4Pass	6.053
940.0125	RSS-119	m4Pass2	12.2356

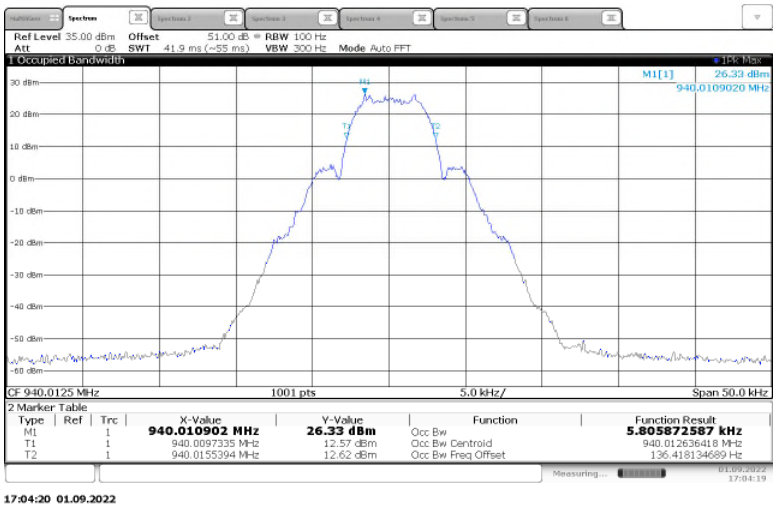

Figure 2.3.6-25: 99% Bandwidth – 940.0125 MHz - mPass – Low Power

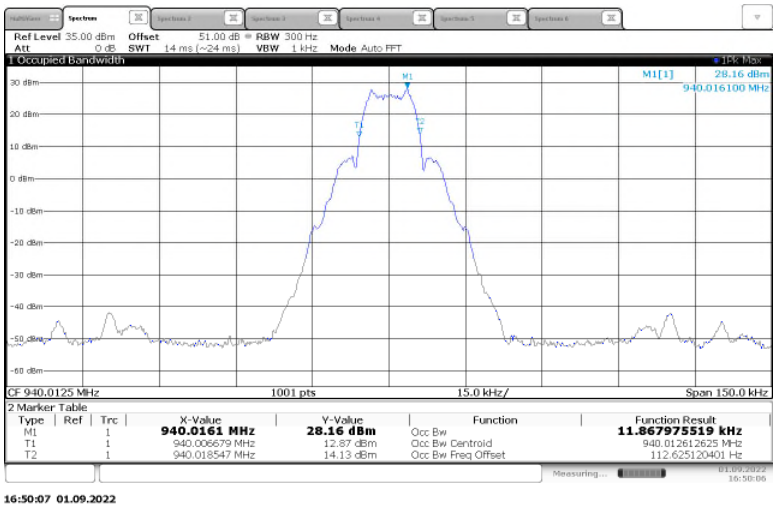

Figure 2.3.6-26: 99% Bandwidth – 940.0125 MHz - mPass2 – Low Power

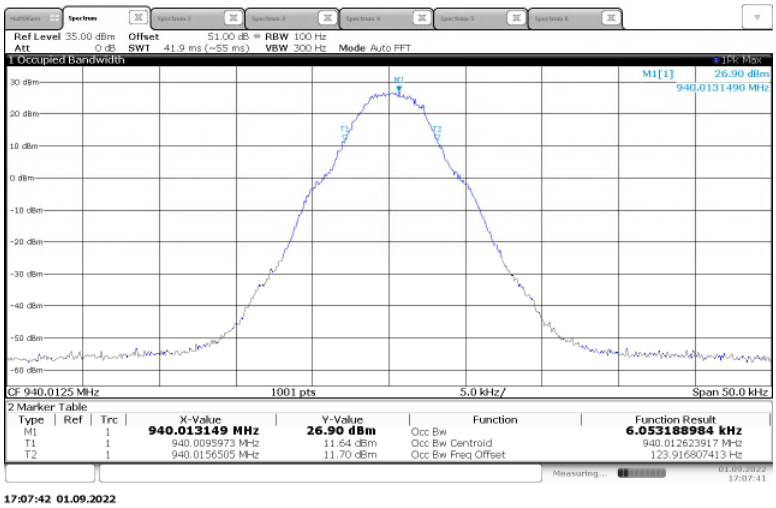

Figure 2.3.6-27: 99% Bandwidth – 940.0125 MHz - m4Pass – Low Power

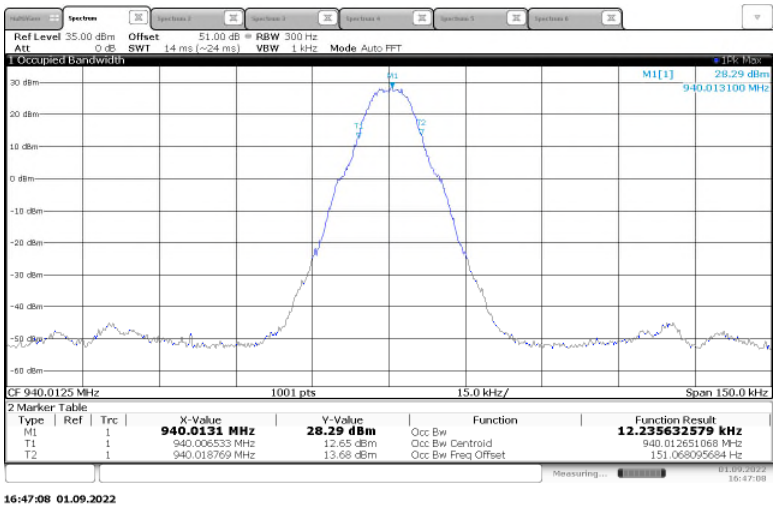

Figure 2.3.6-28: 99% Bandwidth – 940.0125 MHz - m4Pass2 – Low Power

Table 2.3.6-8: 99% Bandwidth – 941.4875 MHz – Low Power

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
941.4875	RSS-119	mPass	5.804
941.4875	RSS-119	mPass2	11.817
941.4875	RSS-119	m4Pass	5.9905
941.4875	RSS-119	m4Pass2	12.1816

Figure 2.3.6-29: 99% Bandwidth – 941.4875 MHz - mPass – Low Power

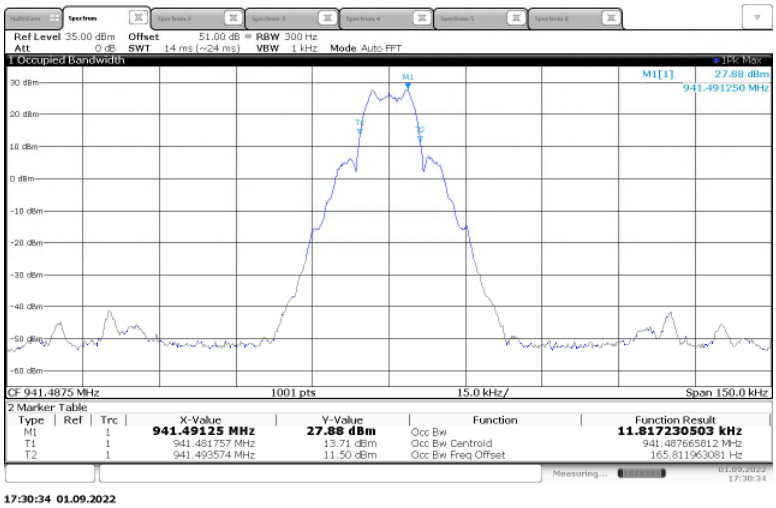

Figure 2.3.6-30: 99% Bandwidth – 941.4875 MHz - mPass2 – Low Power

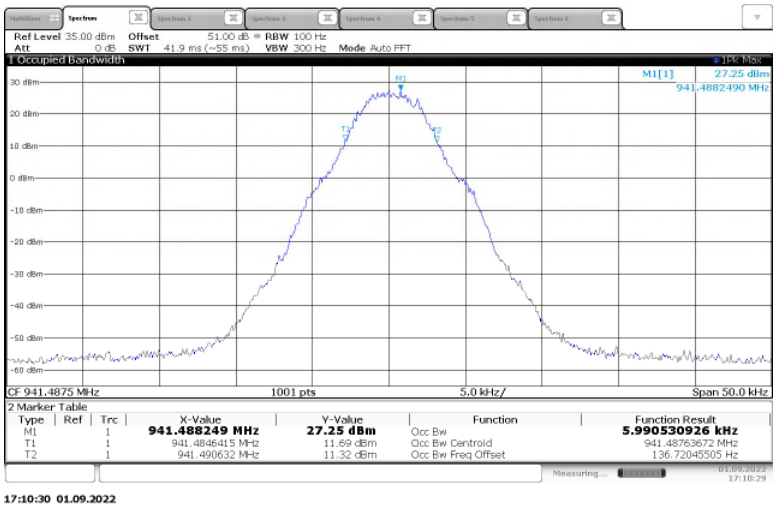

Figure 2.3.6-31: 99% Bandwidth – 941.4875 MHz - m4Pass – Low Power

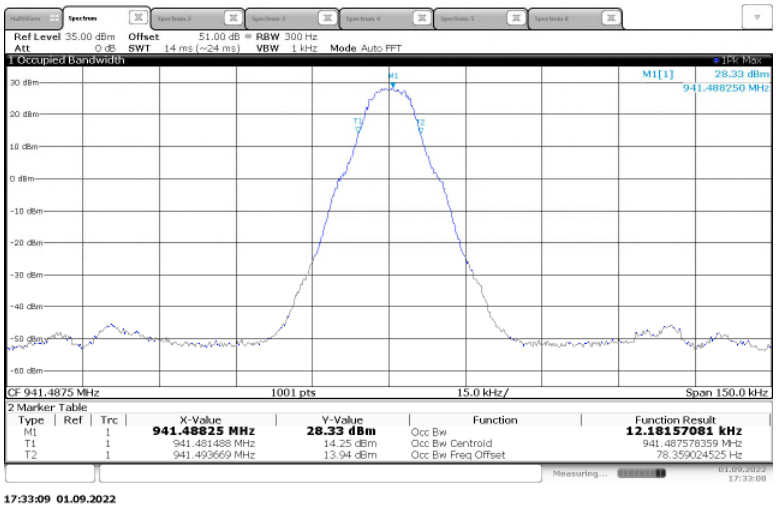

Figure 2.3.6-32: 99% Bandwidth – 941.4875 MHz - m4Pass2 – Low Power

Table 2.3.6-9: 99% Bandwidth – 952.5 MHz – Low Power

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
952.5	RSS-119	mPass	5.7982
952.5	RSS-119	mPass2	11.819
952.5	RSS-119	m4Pass	6.04677
952.5	RSS-119	m4Pass2	12.225

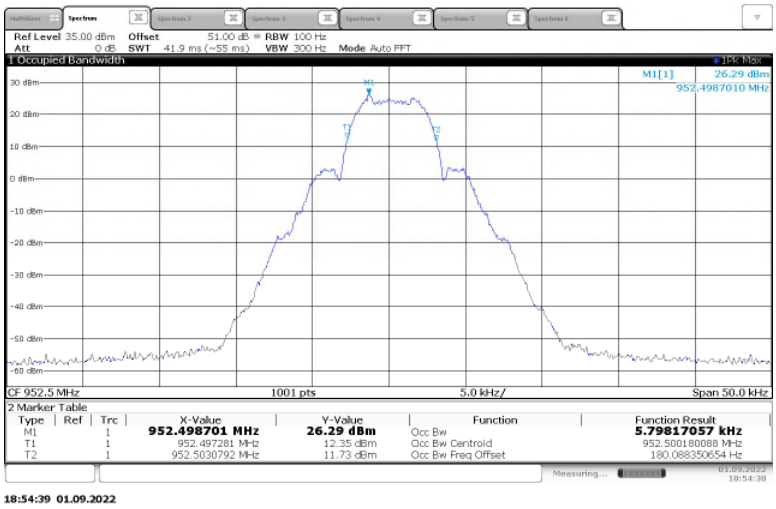

Figure 2.3.6-33: 99% Bandwidth – 952.5 MHz - mPass – Low Power

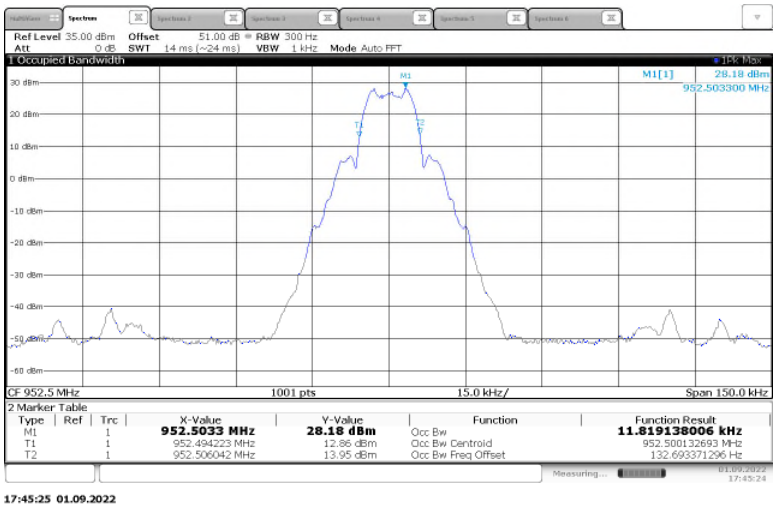

Figure 2.3.6-34: 99% Bandwidth – 952.5 MHz - mPass2 – Low Power

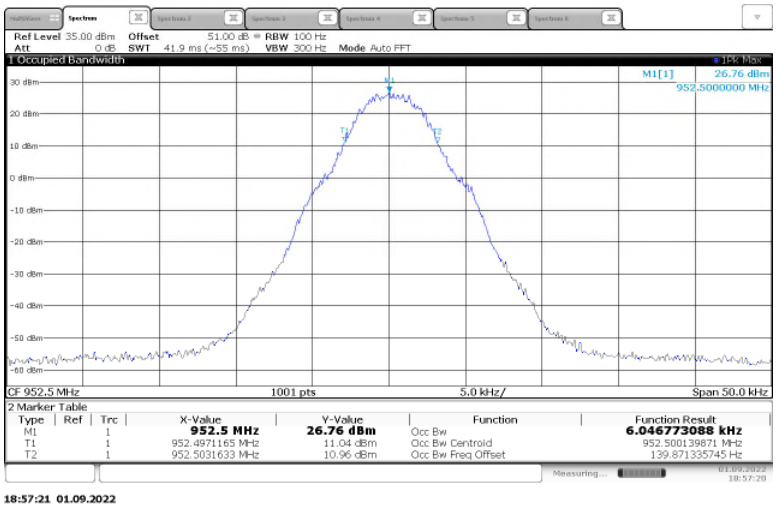

Figure 2.3.6-35: 99% Bandwidth – 952.5 MHz - m4Pass – Low Power

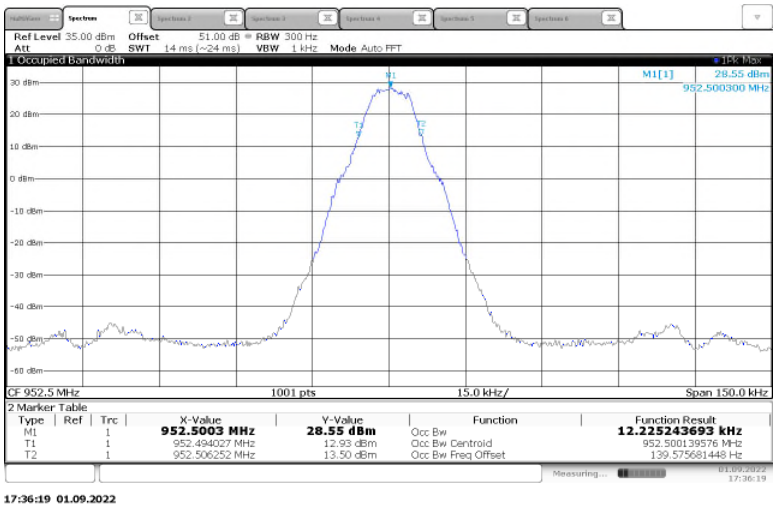

Figure 2.3.6-36: 99% Bandwidth – 952.5 MHz - m4Pass2 – Low Power

Table 2.3.6-10: 99% Bandwidth – 959.925 MHz – Low Power

Frequency (MHz)	ISED Canada Rule Part	Mode	99% Bandwidth (kHz)
959.925	RSS-119	mPass	5.8307
959.925	RSS-119	mPass2	11.812
959.925	RSS-119	m4Pass	5.9857
959.925	RSS-119	m4Pass2	12.2026

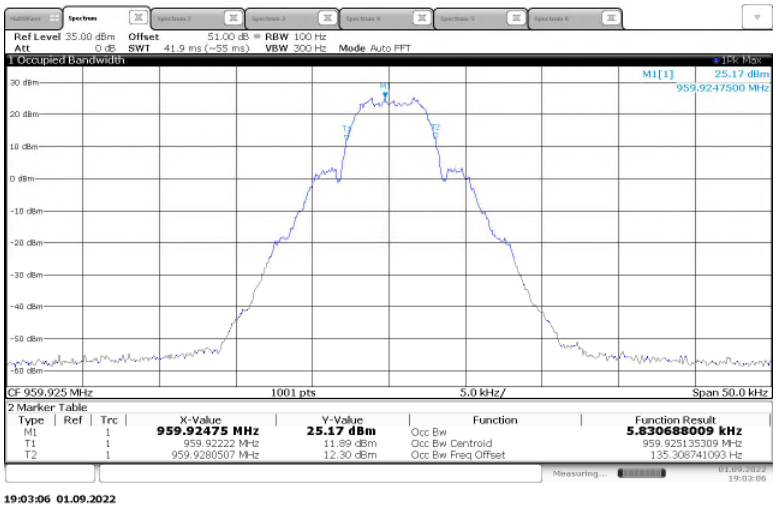

Figure 2.3.6-37: 99% Bandwidth – 959.925 MHz - mPass – Low Power

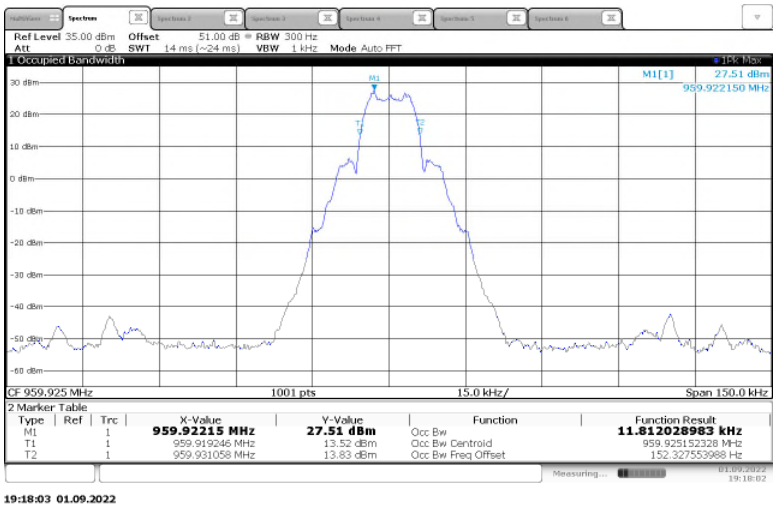

Figure 2.3.6-38: 99% Bandwidth – 959.925 MHz - mPass2 – Low Power

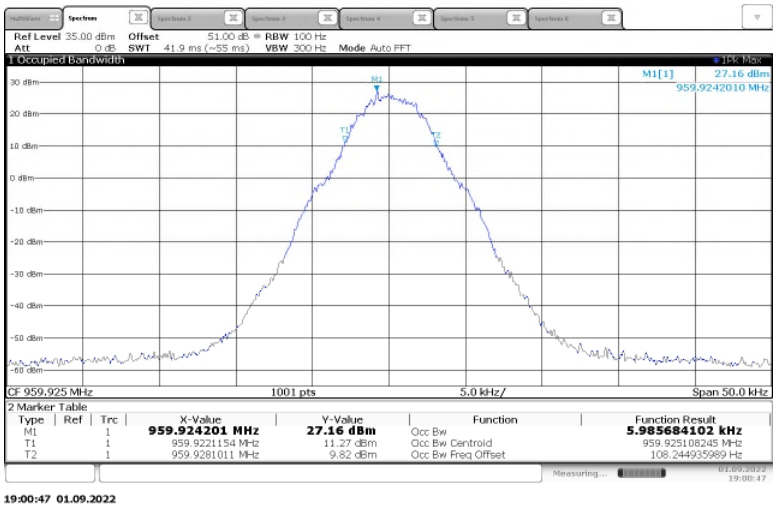

Figure 2.3.6-39: 99% Bandwidth – 959.925 MHz - m4Pass – Low Power

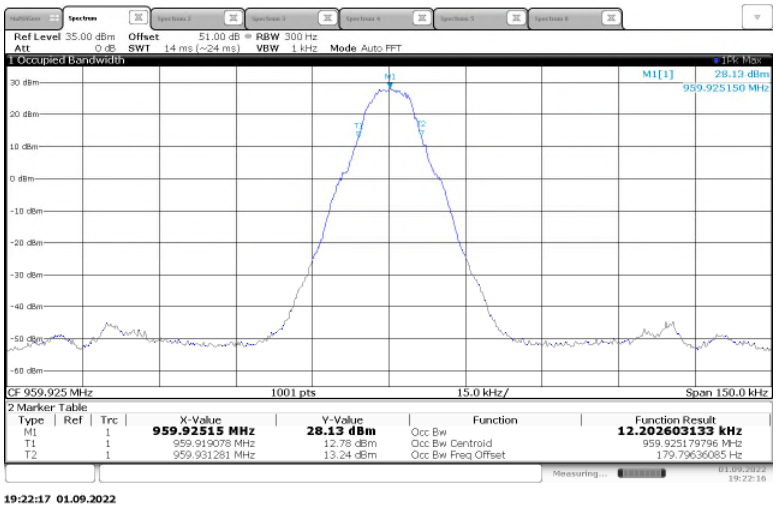

Figure 2.3.6-40: 99% Bandwidth – 959.925 MHz - m4Pass2 – Low Power

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
50ohms M/F 4GHz, 100W Attenuator	Fairview Microwave Inc.	SA4N100-20	615	N/A	12	25-Mar-2023
Duratest High Frequency Cable 26.5GHz	Teledyne Storm Products	921-0101-036	BEMC02112	N/A	12	20-Oct-2022
Atten 30dB N-M/F, DC, 18 GHz, 10W	Aeroflex Inmet	18N10W-30	DEMC3041	N/A	12	15-Jul-2023
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	07-Jun-2023

TU - Traceability Unscheduled
O/P MON - Traceability Unscheduled
N/A - Not Applicable
NCR – No Calibration Required

2.4 Spurious Emissions at Antenna Terminals

2.4.1 Specification Reference

FCC 47 CFR Parts: 2.1053; 24.133 a(1), a(2); 101.111 a(6)
ISED Canada RSS-119 5.8.6; RSS-134 4.4

2.4.2 Equipment Under Test and Modification State

M420, SN: 1953335308
M400G2 PA, SN: 582402163100074

2.4.3 Date of Test

2022-September-02

2.4.4 Test Method

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through a 50 dB passive attenuator. The spectrum analyzer resolution bandwidth was set to 100 kHz below 1000 MHz and 1 MHz above 1000 MHz. The internal correction factors of the spectrum analyzer were employed to correct for any cable or attenuator. The spectrum was investigated in accordance with CFR 47 Part 2.1057.

2.4.5 Environmental Conditions

Ambient Temperature	21.9 °C
Relative Humidity	52 %
Atmospheric Pressure	1015 mbar

2.4.6 Test Results

DC Powered Operating

FCC Part 24.133a(1),(a2); ISED Canada RSS-134 4.4

High Power Mode

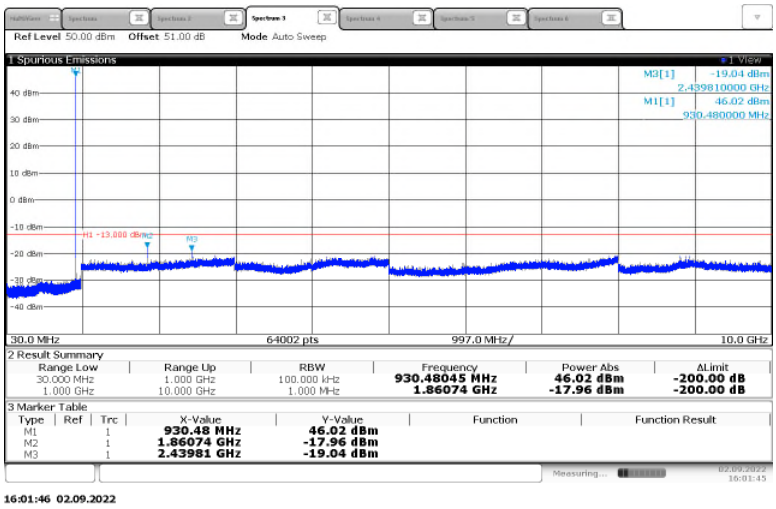

Figure 2.4.6-1: Transmitter Conducted Spurious Emissions – 930.5 MHz - mPass5k Mode – High Power

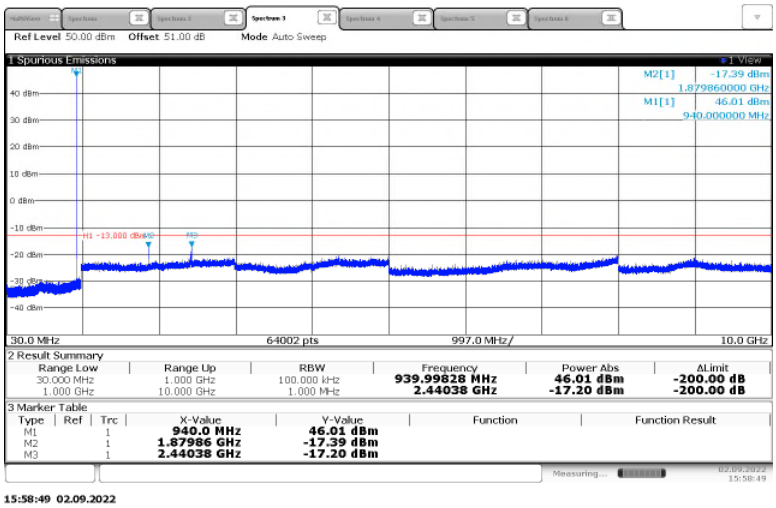

Figure 2.4.6-2: Transmitter Conducted Spurious Emissions – 940.0125 MHz - mPass5k Mode – High Power

Low Power Mode

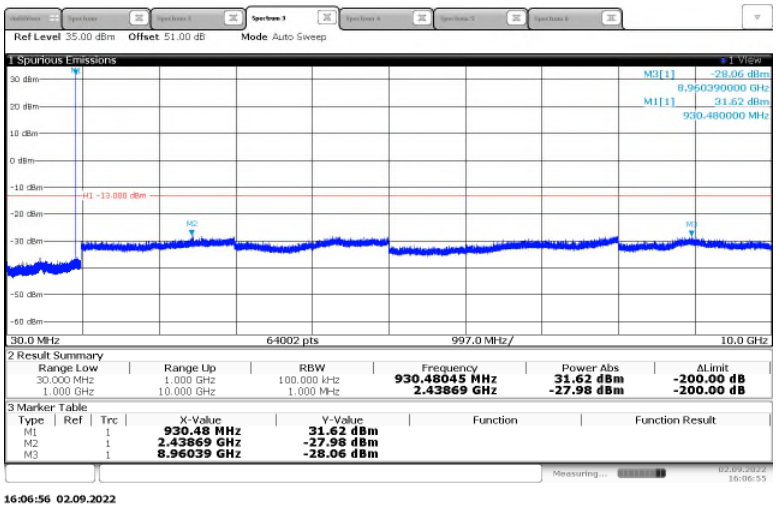

Figure 2.4.6-3: Transmitter Conducted Spurious Emissions – 930.5 MHz - mPass5k Mode – Low Power

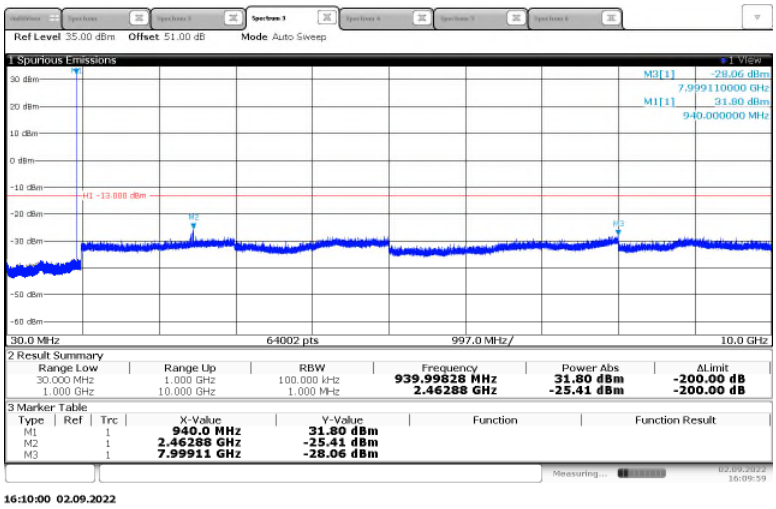

Figure 2.4.6-4: Transmitter Conducted Spurious Emissions – 940.0125 MHz - mPass5k Mode – Low Power

FCC 47 CFR Parts: 101.111 a(6); ISED Canada RSS-119 5.8.6

High Power Mode

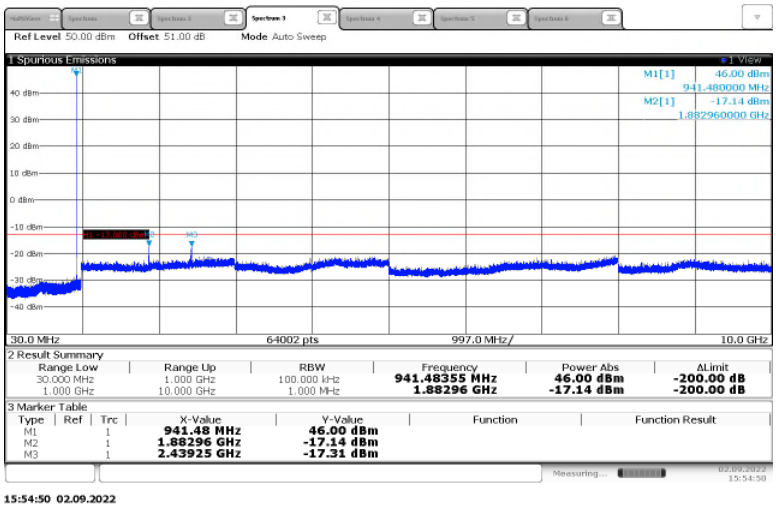

Figure 2.4.6-5: Transmitter Conducted Spurious Emissions – 941.4875 MHz - mPass5k Mode – High Power

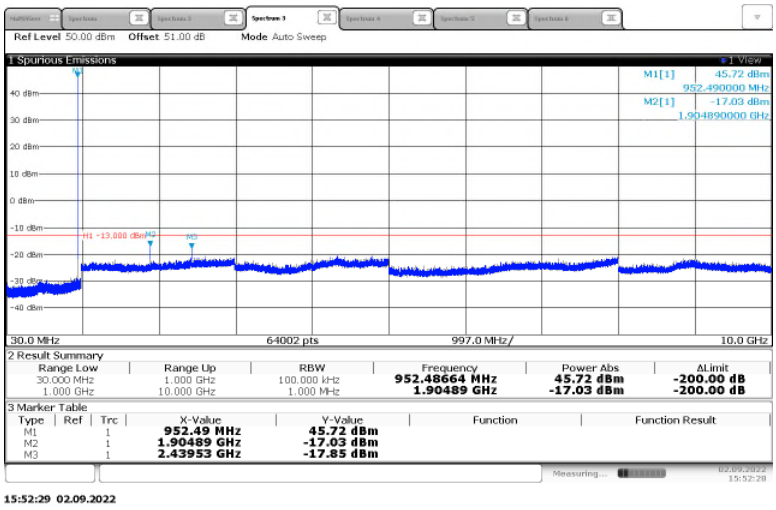

Figure 2.4.6-6: Transmitter Conducted Spurious Emissions – 952.5 MHz - mPass5k Mode – High Power

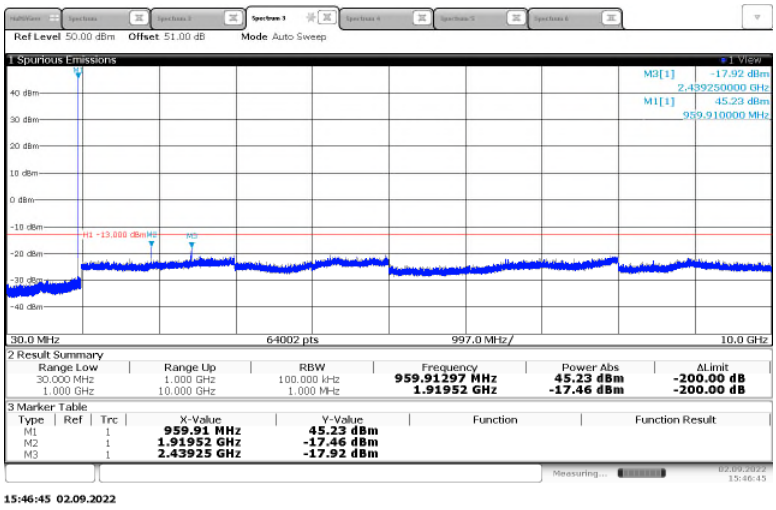

Figure 2.4.6-7: Transmitter Conducted Spurious Emissions – 959.925 MHz - mPass5k Mode – High Power

Low Power Mode

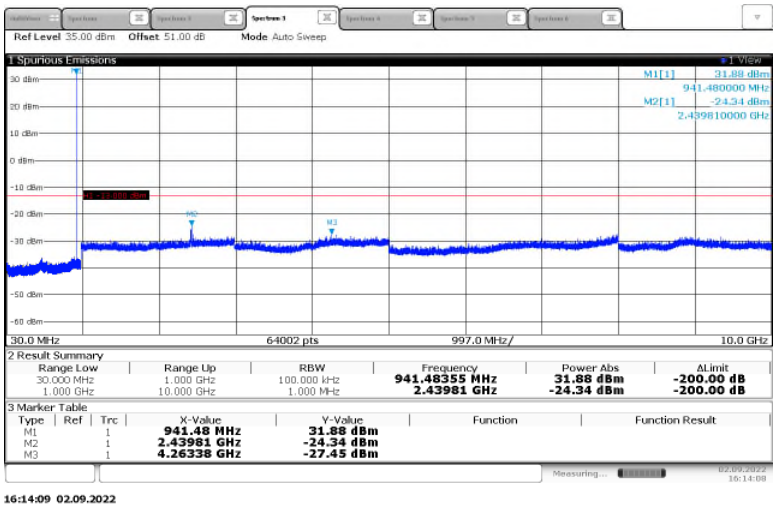

Figure 2.4.6-8: Transmitter Conducted Spurious Emissions – 941.4875 MHz - mPass5k Mode – Low Power

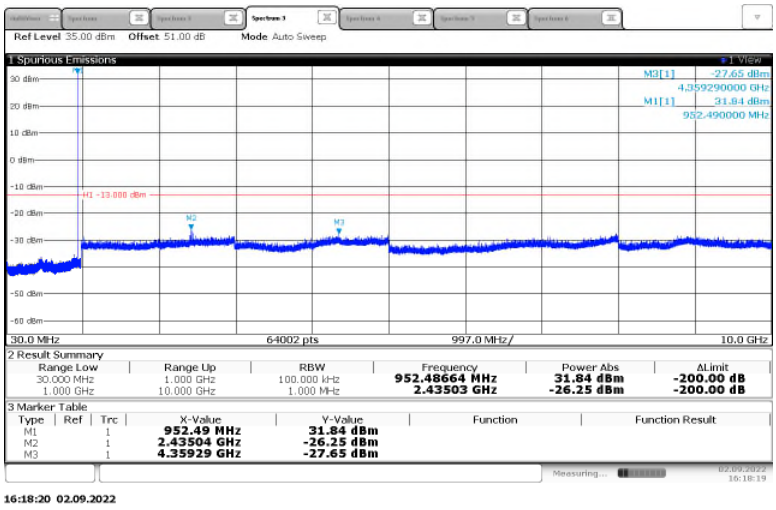

Figure 2.4.6-9: Transmitter Conducted Spurious Emissions – 952.5 MHz - mPass5k Mode – Low Power

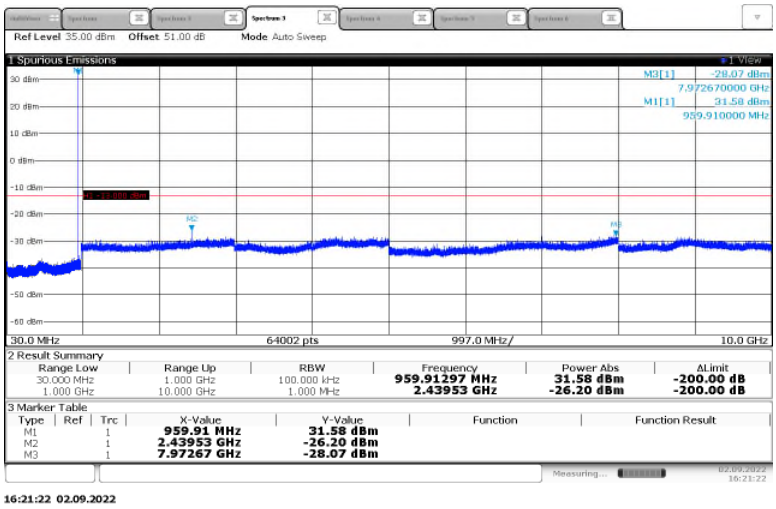

Figure 2.4.6-10: Transmitter Conducted Spurious Emissions – 959.925 MHz - mPass5k Mode – Low Power

2.4.7 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
50ohms M/F 4GHz, 100W Attenuator	Fairview Microwave Inc.	SA4N100-20	615	N/A	12	25-Mar-2023
Duratest High Frequency Cable 26.5GHz	Teledyne Storm Products	921-0101-036	BEMC02112	N/A	12	20-Oct-2022
Atten 30dB N-M/F, DC, 18 GHz, 10W	Aeroflex Inmet	18N10W-30	DEMC3041	N/A	12	15-Jul-2023
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	07-Jun-2023

TU - Traceability Unscheduled
O/P MON - Traceability Unscheduled
N/A - Not Applicable
NCR – No Calibration Required

2.5 Field Strength of Spurious Radiation

2.5.1 Specification Reference

FCC 47 CFR Parts: 2.1053; 24.133 a(1), a(2); 101.111 a(6)
ISED Canada RSS-119 5.8.6; RSS-134 4.4

2.5.2 Equipment Under Test and Modification State

M420, SN: 1953335308
M400G2 PA, SN: 582402163100074

2.5.3 Date of Test

2022-August-10 to 2022-August-31

2.5.4 Test Method

The EUT was evaluated in accordance to ANSI C63.26:2015 Section 5.5.3 Measurement of Spurious Emissions using Substitution Method.

The spectrum was investigated in accordance to FCC CFR 47 Part 2.1057. The equipment under test is placed in the Semi-Anechoic Chamber on a RF transparent table at the turntable center.

For measurements below 30 MHz, the receive antenna height was set to 1 m and the EUT was rotated through 360 degrees. Above 30 MHz, for each spurious emission, the antenna mast is raised and lowered from one (1) to four (4) meters and the turntable is rotated 360º and the maximum reading on the spectrum analyzer is recorded. This was repeated for both horizontal and vertical polarizations of the receive antenna.

The equipment under test is then replaced with a substitution antenna fed by a signal generator. The signal generator's frequency is set to that of the spurious emission recorded from the equipment under test. The antenna mast is raised and lowered from one (1) to four (4) meters to obtain a maximum reading on the spectrum analyzer. The output of the signal generator is then adjusted until the reading on the spectrum analyzer matches that obtained from the equipment under test. The signal generator level is recorded. The power in dBm of each spurious emission is calculated by correcting the signal generator level for the cable loss and gain of the substitution antenna referenced to a dipole.

The magnitude of all spurious emissions not reported were attenuated below the noise floor of the measurement system and therefore not specified in this report. Results are shown below.

2.5.5 Environmental Conditions

Ambient Temperature	21.7 °C
Relative Humidity	51 %
Atmospheric Pressure	1016 mbar

2.5.6 Test Results

DC Powered Operating

FCC Part 24.133a(1),(a2); ISED Canada RSS-134 4.4

High Power Mode

Table 2.5.6-1: Transmitter Radiated Spurious Emissions – 930.5 MHz – mPass5k Mode – High Power

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1861	-26.42	H	-22.72	-13.00	9.72
2791.5	-21.36	H	-16.53	-13.00	3.53
3722	-36.25	H	-29.56	-13.00	16.56
4652.5	-35.99	H	-26.42	-13.00	13.42
5583	-32.39	H	-21.05	-13.00	8.05
6513.5	-62.12	H	-53.07	-13.00	40.07
9305	-64.36	H	-56.94	-13.00	43.94
1861	-22.29	V	-18.98	-13.00	5.98
2791.5	-20.20	V	-15.01	-13.00	2.01
3722	-36.50	V	-29.11	-13.00	16.11
4652.5	-37.80	V	-27.95	-13.00	14.95
5583	-30.10	V	-18.46	-13.00	5.46
6513.5	-57.49	V	-46.24	-13.00	33.24
7444	-63.28	V	-56.72	-13.00	43.72
8374.5	-63.60	V	-56.36	-13.00	43.36
9305	-63.10	V	-55.90	-13.00	42.90

Table 2.5.6-2: Transmitter Radiated Spurious Emissions – 940.0125 MHz – mPass5k Mode – High Power

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1880.025	-25.01	H	-22.17	-13.00	9.17
2820.0375	-25.76	H	-20.25	-13.00	7.25
3760.05	-29.75	H	-22.96	-13.00	9.96
4700.0625	-39.39	H	-29.79	-13.00	16.79
5640.075	-52.33	H	-43.41	-13.00	30.41
6580.0875	-61.42	H	-51.92	-13.00	38.92
9400.125	-61.02	H	-50.21	-13.00	37.21
1880.025	-27.91	V	-25.08	-13.00	12.08
2820.0375	-25.70	V	-20.59	-13.00	7.59
3760.05	-32.95	V	-25.55	-13.00	12.55
4700.0625	-41.67	V	-32.28	-13.00	19.28
5640.075	-47.38	V	-37.32	-13.00	24.32
6580.0875	-55.03	V	-44.08	-13.00	31.08
9400.125	-61.04	V	-49.79	-13.00	36.79

Low Power Mode

Table 2.5.6-3: Transmitter Radiated Spurious Emissions – 930.5 MHz – mPass5k Mode – Low Power

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1861	-39.86	H	-37.02	-13.00	24.02
2791.5	-26.69	H	-21.59	-13.00	8.59
3722	-39.63	H	-33.34	-13.00	20.34
4652.5	-36.99	H	-27.41	-13.00	14.41
5583	-29.37	H	-17.92	-13.00	4.92
6513.5	-47.85	H	-34.11	-13.00	21.11
7444	-47.03	H	-33.74	-13.00	20.74
8374.5	-62.17	H	-52.45	-13.00	39.45
9305	-58.18	H	-46.71	-13.00	33.71
1861	-35.96	V	-32.52	-13.00	19.52
2791.5	-26.96	V	-21.53	-13.00	8.53
3722	-40.61	V	-33.60	-13.00	20.60
4652.5	-38.37	V	-28.55	-13.00	15.55
5583	-29.83	V	-18.22	-13.00	5.22
6513.5	-46.29	V	-32.51	-13.00	19.51
8374.5	-62.32	V	-55.08	-13.00	42.08
9305	-55.28	V	-43.06	-13.00	30.06

Table 2.5.6-4: Transmitter Radiated Spurious Emissions – 940.0125 MHz – mPass5k Mode – Low Power

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1880.025	-38.97	H	-36.92	-13.00	23.92
2820.0375	-36.37	H	-31.35	-13.00	18.35
3760.05	-33.28	H	-26.58	-13.00	13.58
4700.0625	-38.47	H	-28.83	-13.00	15.83
5640.075	-53.74	H	-45.00	-13.00	32.00
6580.0875	-50.22	H	-38.40	-13.00	25.40
8460.1125	-63.67	H	-55.20	-13.00	42.20
9400.125	-55.97	H	-42.76	-13.00	29.76
1880.025	-39.33	V	-37.40	-13.00	24.40
2820.0375	-36.91	V	-32.37	-13.00	19.37
3760.05	-37.46	V	-30.23	-13.00	17.23
4700.0625	-40.65	V	-31.14	-13.00	18.14
5640.075	-47.17	V	-37.12	-13.00	24.12
6580.0875	-42.22	V	-29.10	-13.00	16.10
7520.1	-61.67	V	-51.95	-13.00	38.95
8460.1125	-62.18	V	-51.62	-13.00	38.62
9400.125	-51.38	V	-37.56	-13.00	24.56

FCC 47 CFR Parts: 101.111 a(6); ISED Canada RSS-119 5.8.6

High Power Mode

Table 2.5.6-5: Transmitter Radiated Spurious Emissions – 941.4875 MHz – mPass5k Mode – High Power

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1882.975	-22.42	H	-19.25	-13.00	6.25
2824.4625	-25.66	H	-20.06	-13.00	7.06
3765.95	-34.08	H	-27.29	-13.00	14.29
4707.4375	-43.35	H	-33.91	-13.00	20.91
5648.925	-54.19	H	-45.09	-13.00	32.09
6590.4125	-62.40	H	-52.59	-13.00	39.59
9414.875	-62.17	H	-52.62	-13.00	39.62
1882.975	-28.70	V	-26.01	-13.00	13.01
2824.4625	-26.07	V	-20.50	-13.00	7.50
3765.95	-41.29	V	-34.40	-13.00	21.40
4707.4375	-43.09	V	-33.31	-13.00	20.31
5648.925	-47.08	V	-36.81	-13.00	23.81
6590.4125	-55.99	V	-43.48	-13.00	30.48
9414.875	-60.97	V	-50.47	-13.00	37.47

Table 2.5.6-6: Transmitter Radiated Spurious Emissions – 952.5 MHz – mPass5k Mode – High Power

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1905	-17.47	H	-14.77	-13.00	1.77
2857.5	-28.26	H	-22.57	-13.00	9.57
3810	-35.83	H	-28.76	-13.00	15.76
4762.5	-50.32	H	-41.86	-13.00	28.86
5715	-52.53	H	-43.07	-13.00	30.07
6667.5	-56.35	H	-43.45	-13.00	30.45
8572.5	-63.96	H	-53.70	-13.00	40.70
9525	-62.22	H	-51.88	-13.00	38.88
1905	-17.82	V	-15.28	-13.00	2.28
2857.5	-27.88	V	-22.49	-13.00	9.49
3810	-36.31	V	-29.08	-13.00	16.08
4762.5	-50.08	V	-41.34	-13.00	28.34
5715	-52.88	V	-43.15	-13.00	30.15
6667.5	-51.95	V	-38.50	-13.00	25.50
8572.5	-63.82	V	-53.41	-13.00	40.41
9525	-60.80	V	-51.51	-13.00	38.51

Table 2.5.6-7: Transmitter Radiated Spurious Emissions – 959.925 MHz – mPass5k Mode – High Power

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1919.85	-22.92	H	-19.85	-13.00	6.85
2879.775	-32.32	H	-26.47	-13.00	13.47
3839.7	-35.91	H	-28.83	-13.00	15.83
4799.625	-54.88	H	-47.39	-13.00	34.39
5759.55	-44.43	H	-33.42	-13.00	20.42
6719.475	-58.68	H	-48.07	-13.00	35.07
8639.325	-62.89	H	-53.80	-13.00	40.80
9599.25	-63.89	H	-54.38	-13.00	41.38
1919.85	-22.16	V	-18.70	-13.00	5.70
2879.775	-31.49	V	-26.21	-13.00	13.21
3839.7	-34.71	V	-26.80	-13.00	13.80
4799.625	-58.26	V	-51.41	-13.00	38.41
5759.55	-44.87	V	-33.83	-13.00	20.83
6719.475	-53.01	V	-39.28	-13.00	26.28
7679.4	-63.93	V	-54.12	-13.00	41.12
8639.325	-62.35	V	-50.77	-13.00	37.77
9599.25	-62.61	V	-51.24	-13.00	38.24

Low Power Mode

Table 2.5.6-8: Transmitter Radiated Spurious Emissions – 941.4875 MHz – mPass5k Mode – Low Power

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1882.975	-42.91	H	-40.80	-13.00	27.80
2824.4625	-38.04	H	-33.03	-13.00	20.03
3765.95	-38.35	H	-31.94	-13.00	18.94
4707.4375	-44.01	H	-34.57	-13.00	21.57
5648.925	-54.66	H	-45.56	-13.00	32.56
6590.4125	-58.39	H	-47.14	-13.00	34.14
7531.9	-63.72	H	-56.46	-13.00	43.46
9414.875	-56.23	H	-44.05	-13.00	31.05
1882.975	-43.36	V	-41.73	-13.00	28.73
2824.4625	-38.41	V	-33.50	-13.00	20.50
3765.95	-45.96	V	-39.45	-13.00	26.45
4707.4375	-43.58	V	-33.88	-13.00	20.88
5648.925	-47.29	V	-37.02	-13.00	24.02
6590.4125	-52.27	V	-39.05	-13.00	26.05
7531.9	-61.75	V	-53.73	-13.00	40.73
9414.875	-54.36	V	-41.03	-13.00	28.03

Table 2.5.6-9: Transmitter Radiated Spurious Emissions – 952.5 MHz – mPass5k Mode – Low Power

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1905	-37.81	H	-35.46	-13.00	22.46
2857.5	-36.28	H	-31.10	-13.00	18.10
3810	-42.31	H	-36.01	-13.00	23.01
4762.5	-42.34	H	-32.83	-13.00	19.83
5715	-41.32	H	-29.94	-13.00	16.94
6667.5	-55.57	H	-42.75	-13.00	29.75
7620	-61.51	H	-52.88	-13.00	39.88
8572.5	-61.83	H	-51.57	-13.00	38.57
9525	-57.90	H	-47.54	-13.00	34.54
1905	-35.53	V	-33.23	-13.00	20.23
2857.5	-36.47	V	-31.58	-13.00	18.58
3810	-38.99	V	-32.07	-13.00	19.07
4762.5	-45.29	V	-35.59	-13.00	22.59
5715	-38.34	V	-26.75	-13.00	13.75
6667.5	-47.02	V	-32.92	-13.00	19.92
7620	-58.31	V	-48.73	-13.00	35.73
8572.5	-60.23	V	-49.82	-13.00	36.82
9525	-54.96	V	-43.79	-13.00	30.79

Table 2.5.6-10: Transmitter Radiated Spurious Emissions – 959.925 MHz – mPass5k Mode – Low Power

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1919.85	-39.22	H	-36.92	-13.00	23.92
2879.775	-35.68	H	-30.17	-13.00	17.17
3839.7	-41.32	H	-34.68	-13.00	21.68
4799.625	-50.03	H	-41.39	-13.00	28.39
5759.55	-37.54	H	-25.98	-13.00	12.98
6719.475	-59.19	H	-48.72	-13.00	35.72
7679.4	-61.19	H	-52.33	-13.00	39.33
8639.325	-59.67	H	-50.58	-13.00	37.58
9599.25	-59.47	H	-49.96	-13.00	36.96
1919.85	-38.72	V	-36.10	-13.00	23.10
2879.775	-36.35	V	-31.44	-13.00	18.44
3839.7	-36.46	V	-28.65	-13.00	15.65
4799.625	-53.44	V	-45.12	-13.00	32.12
5759.55	-33.35	V	-21.55	-13.00	8.55
6719.475	-51.16	V	-36.99	-13.00	23.99
7679.4	-58.97	V	-49.16	-13.00	36.16
8639.325	-56.67	V	-45.09	-13.00	32.09
9599.25	-55.74	V	-44.37	-13.00	31.37

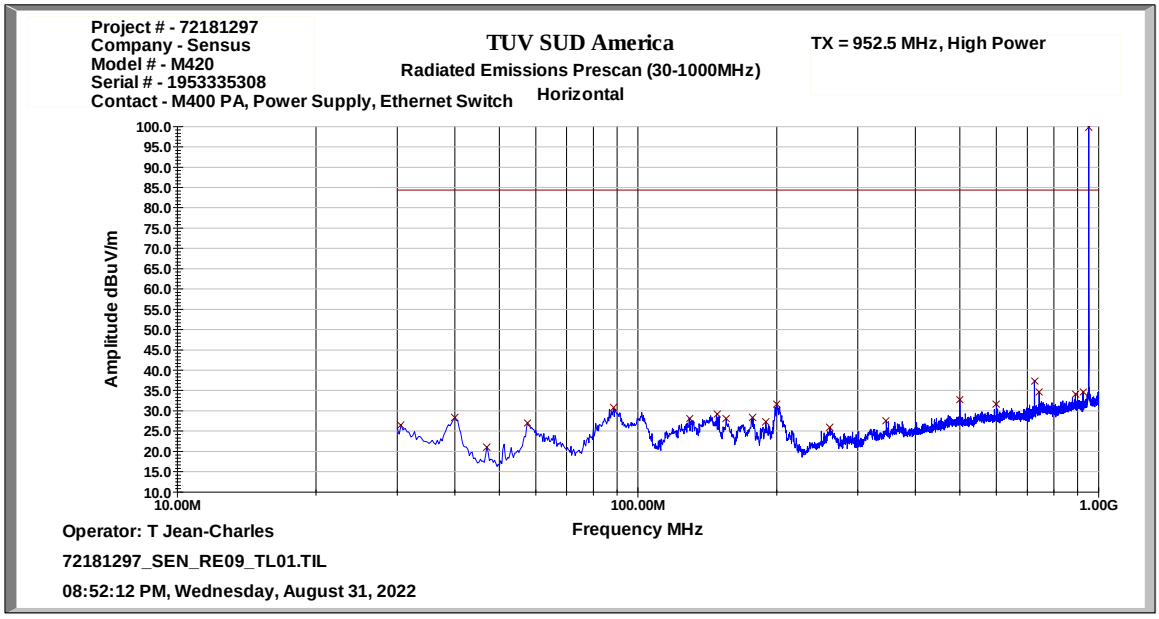

Figure 2.5.6-1: Transmitter Radiated Spurious Emissions – 952.5 MHz - mPass5k Mode – 30 MHz – 1 GHz – Horizontal Polarization

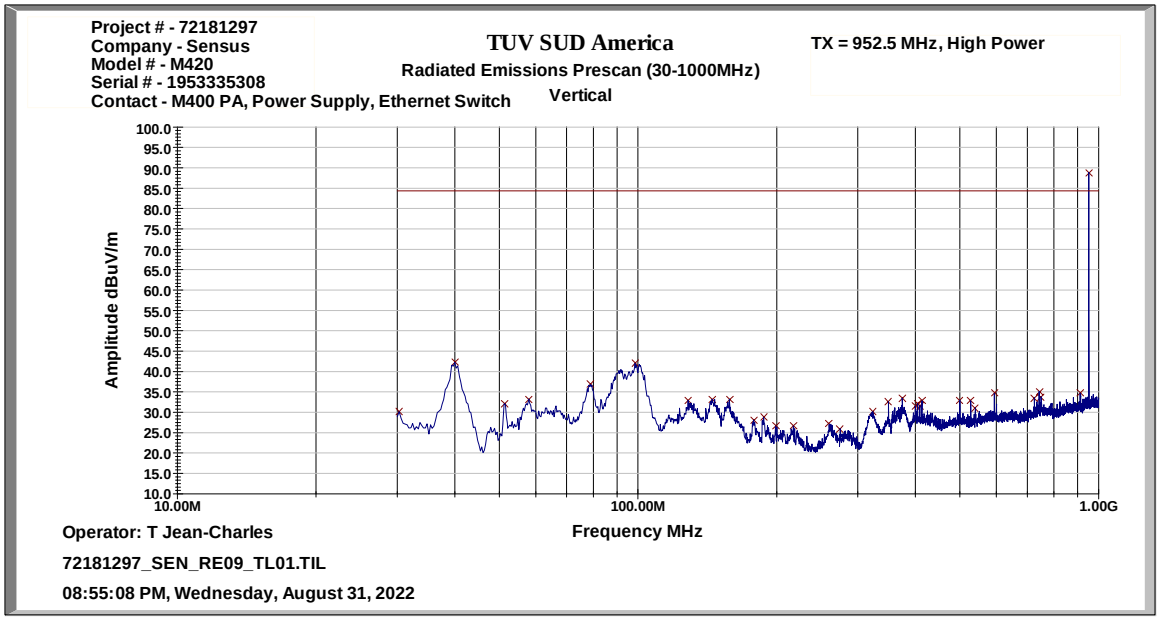

Figure 2.5.6-2: Transmitter Radiated Spurious Emissions – 952.5 MHz - mPass5k Mode – 30 MHz – 1 GHz – Vertical Polarization

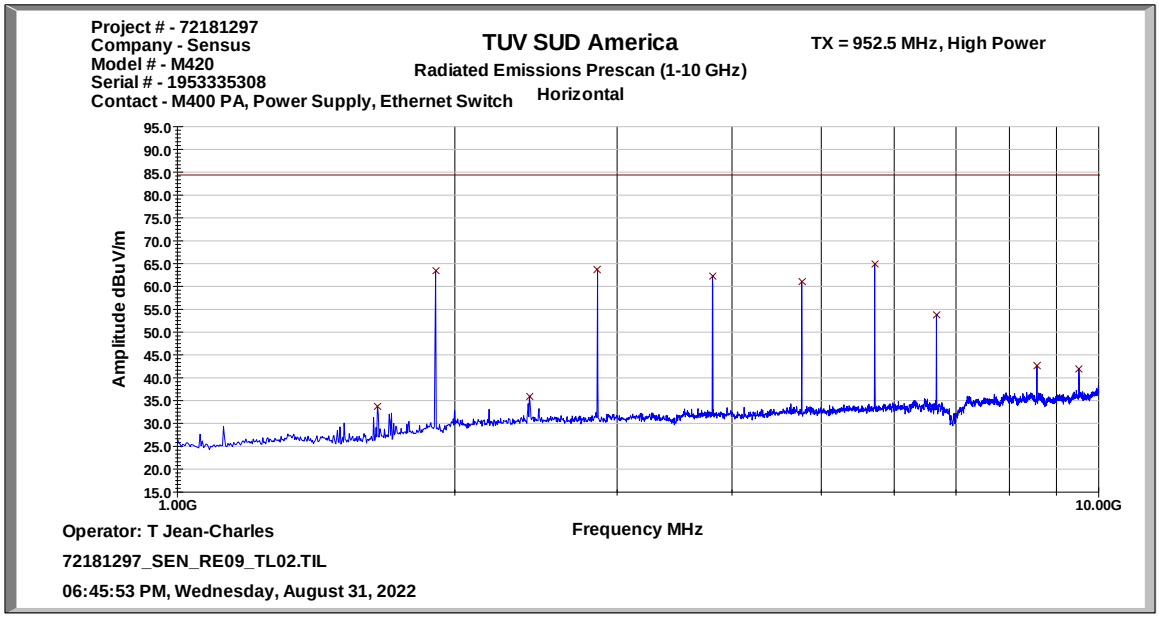

Figure 2.5.6-3: Transmitter Radiated Spurious Emissions – 952.5 MHz - mPass5k Mode – 1 GHz – 10 GHz – Horizontal Polarization

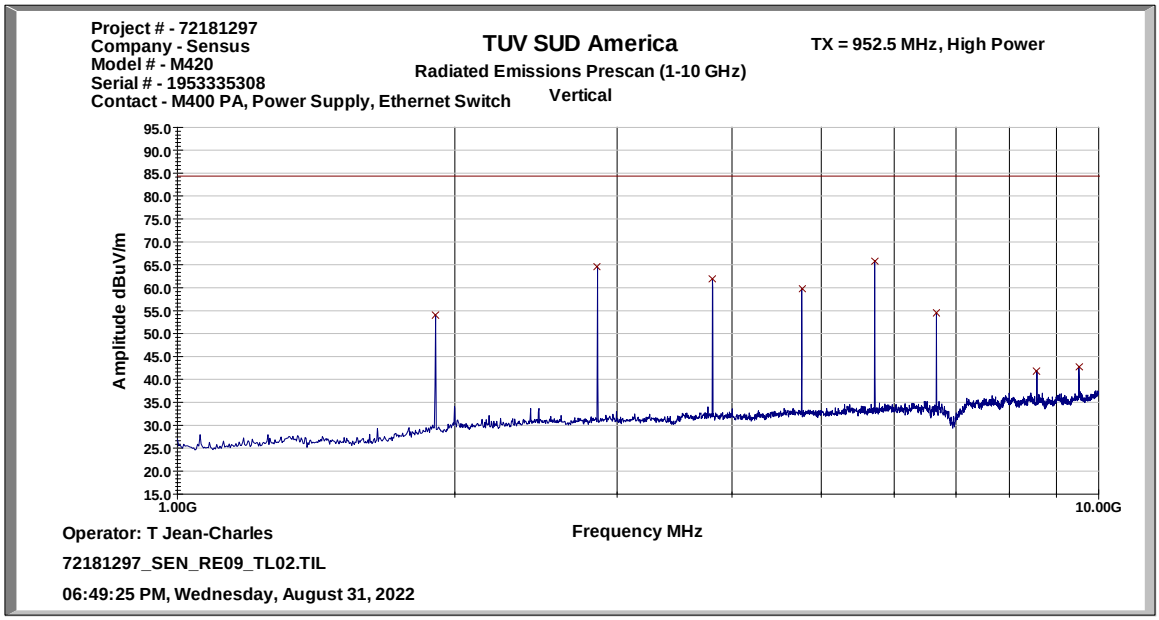

Figure 2.5.6-4: Transmitter Radiated Spurious Emissions – 952.5 MHz - mPass5k Mode – 1 GHz – 10 GHz – Vertical Polarization

2.5.7 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
100Hz-26.5GHz EMC analyzer/HYZ	Agilent	E7405A	BEMC00523	A.14.06	12	01-Feb-2023
Linear Polarized Horn antenna, 1-18 GHz	EMCO	3115	BEMC02006	N/A	24	10-Feb-2024
Tile Automation Software	ETS Lindgren	TILE4! - Version 4.2.A	BEMC02095	4.2A	N/A	NCR
Synthesized Signal Generator 0.05 - 26 GHz	Hewlett Packard	8673D	BEMC02126	N/A	24	07-Jun-2024
PE-P160 40 GHz Cable	Pasternack	PE360-396	BEMC02147	N/A	12	23-Jun-2023
BI LOG PERIODIC, ANTENNA	Schaffner	CBL6112B	TEMC00005	N/A	24	01-Nov-2023
EMC Chamber	Panashield	N/A	TEMC00031	N/A	36	28-Jan-2024
Double Ridge Guide Horn	ETS Lindgren	3117	TEMC00061	N/A	24	11-Feb-2024
Microwave Preamplifier	Com-Power Corporation	PAM-118A	TEMC00160	N/A	12	26-Mar-2023
A81-0303 18 GHz Cable Set	Teledyne Storm Products	A81-0303-360/96	TEMC00201	N/A	12	26-Mar-2023

TU - Traceability Unscheduled
O/P MON - Traceability Unscheduled
N/A - Not Applicable
NCR – No Calibration Required

2.6 Frequency Stability

2.6.1 Specification Reference

FCC Section 2.1055; FCC Section 24.135
ISED Canada RSS-134 4.5

2.6.2 Equipment Under Test and Modification State

M420, SN: 1953335308
M400G2 PA, SN: 582402163100074

2.6.3 Date of Test

2022-August-08 to 2022-August-09

2.6.4 Test Method

The equipment under test is placed inside an environmental chamber. The RF output is directly coupled to the input of the measurement equipment and a power supply is attached to the primary supply voltage.

Frequency measurements were made at the extremes of the of temperature range -30º C to +50º C and at intervals of 10º C at normal supply voltage. Sufficient time to stabilize all components of the equipment was allowed at each frequency measurement. At a temperature 20º C the supply voltage was reduced to the battery operating endpoint. The maximum variation of frequency was recorded.

2.6.5 Environmental Conditions

Ambient Temperature	21.9 °C
Relative Humidity	52 %
Atmospheric Pressure	1018 mbar

2.6.6 Test Results

DC Powered Operating

Frequency Range MHz	FCC Rule Part	ISED Canada	Limit ppm
930 - 931	24.135	RSS-134 4.5	1.0
940 - 941	24.135	RSS-134 4.5	1.0
941 – 941.5	101.107	RSS-119 5.3	1.5
952 – 953	101.107	RSS-119 5.3	5.0
959.85 - 960	101.107	N/A	5.0

Note: The more stringent limit of +/- 1 ppm was used across all bands.

FCC 47 CFR Parts: 24.135; ISED Canada RSS-134 4.5

Frequency Stability

Frequency (MHz):	930.499934
Deviation Limit (PPM):	1
Nominal Voltage (VDC):	24

Temperature C	Frequency MHz	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	**930.500400**	**0.500**	100%	24.00
-20 C	**930.500264**	**0.354**	100%	24.00
-10 C	**930.500212**	**0.298**	100%	24.00
0 C	**930.500138**	**0.219**	100%	24.00
10 C	**930.500042**	**0.116**	100%	24.00
20 C	**930.499934**	**0.000**	100%	24.00
30 C	**930.499998**	**0.069**	100%	24.00
40 C	**930.500026**	**0.099**	100%	24.00
50 C	**930.499976**	**0.045**	100%	24.00
20 C	**930.499954**	**0.021**	85%	20.40
20 C	**930.499914**	**-0.021**	115%	27.60

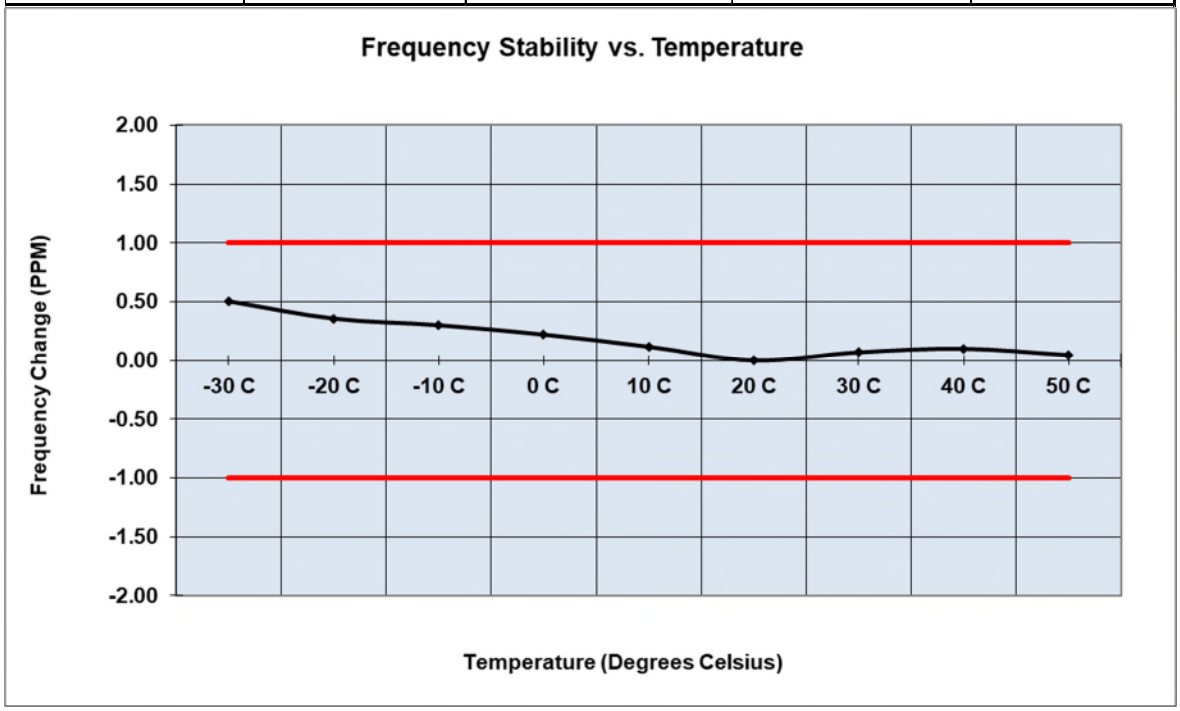

Figure 2.6.6-1: Frequency Stability – 930.5 MHz – High Power

Frequency Stability

Frequency (MHz): 940.012434
Deviation Limit (PPM): 1
Nominal Voltage (VDC): 24

Temperature	Frequency	Frequency Error	Voltage	Voltage
C	MHz	(PPM)	(%)	(VDC)
-30 C	**940.012880**	**0.474**	100%	24.00
-20 C	**940.012704**	**0.287**	100%	24.00
-10 C	**940.012688**	**0.270**	100%	24.00
0 C	**940.012614**	**0.191**	100%	24.00
10 C	**940.012534**	**0.106**	100%	24.00
20 C	**940.012434**	**0.000**	100%	24.00
30 C	**940.012500**	**0.070**	100%	24.00
40 C	**940.012528**	**0.100**	100%	24.00
50 C	**940.012560**	**0.134**	100%	24.00
20 C	**940.012436**	**0.002**	85%	20.40
20 C	**940.012428**	**-0.006**	115%	27.60

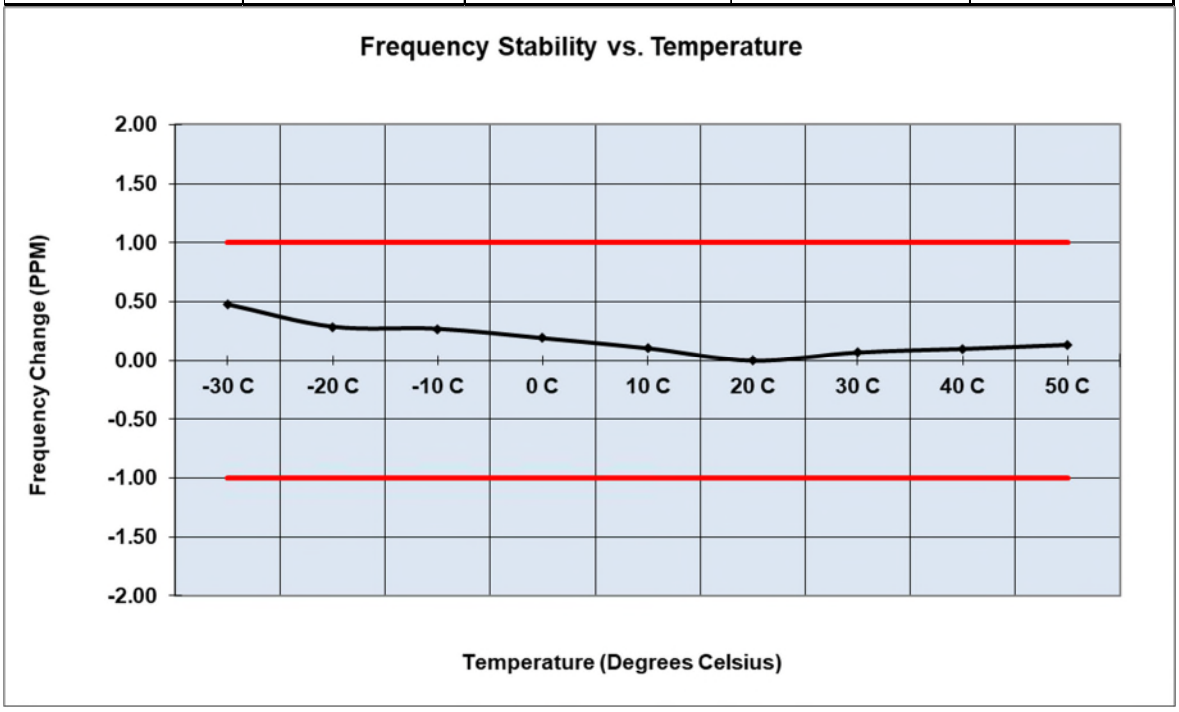

Figure 2.6.6-2: Frequency Stability – 940.0125 MHz – High Power

Frequency Stability

Frequency (MHz): 930.499932
Deviation Limit (PPM): 1
Nominal Voltage (VDC): 24

Temperature	Frequency	Frequency Error	Voltage	Voltage
C	MHz	(PPM)	(%)	(VDC)
-30 C	**930.500388**	**0.490**	100%	24.00
-20 C	**930.500222**	**0.311**	100%	24.00
-10 C	**930.500206**	**0.294**	100%	24.00
0 C	**930.500120**	**0.202**	100%	24.00
10 C	**930.500036**	**0.112**	100%	24.00
20 C	**930.499932**	**0.000**	100%	24.00
30 C	**930.499996**	**0.069**	100%	24.00
40 C	**930.500028**	**0.103**	100%	24.00
50 C	**930.499964**	**0.034**	100%	24.00
20 C	**930.499930**	**-0.002**	85%	20.40
20 C	**930.499944**	**0.013**	115%	27.60

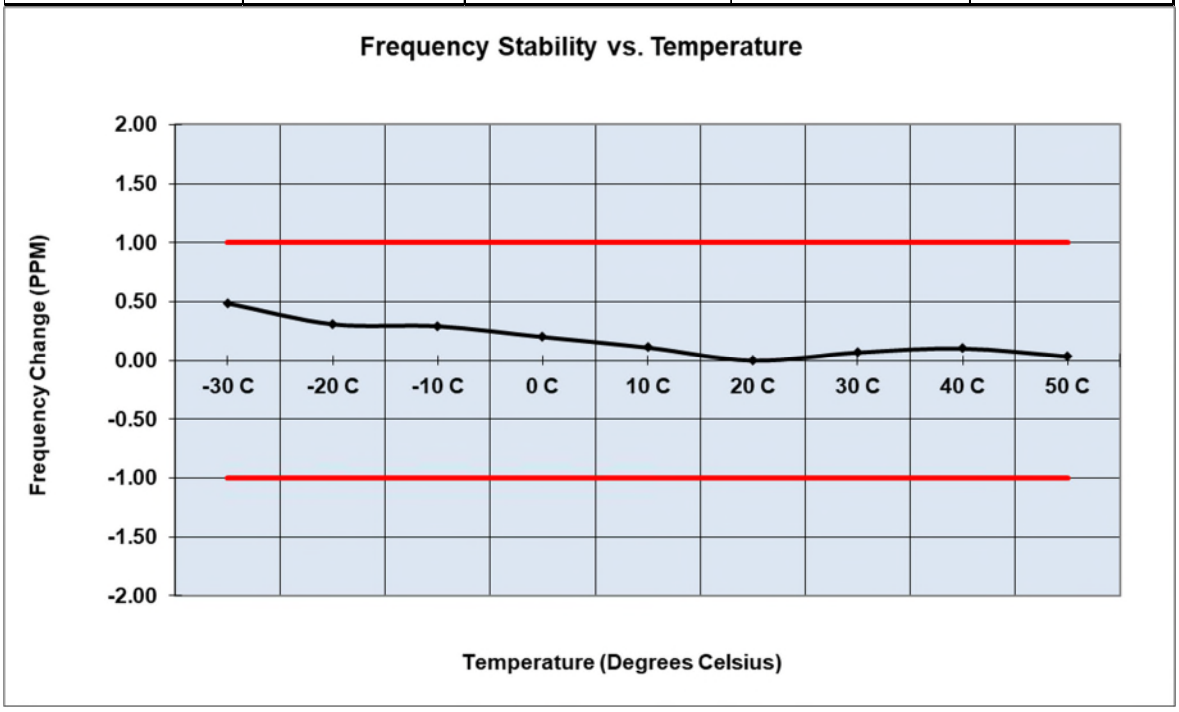

Figure 2.6.6-3: Frequency Stability – 930.5 MHz – Low Power

Frequency Stability

Frequency (MHz): 940.012426
Deviation Limit (PPM): 1
Nominal Voltage (VDC): 24

Temperature	Frequency	Frequency Error	Voltage	Voltage
C	MHz	(PPM)	(%)	(VDC)
-30 C	**940.012868**	**0.470**	100%	24.00
-20 C	**940.012696**	**0.287**	100%	24.00
-10 C	**940.012690**	**0.281**	100%	24.00
0 C	**940.012604**	**0.189**	100%	24.00
10 C	**940.012530**	**0.111**	100%	24.00
20 C	**940.012426**	**0.000**	100%	24.00
30 C	**940.012502**	**0.081**	100%	24.00
40 C	**940.012524**	**0.104**	100%	24.00
50 C	**940.012446**	**0.021**	100%	24.00
20 C	**940.012420**	**-0.006**	85%	20.40
20 C	**940.012432**	**0.006**	115%	27.60

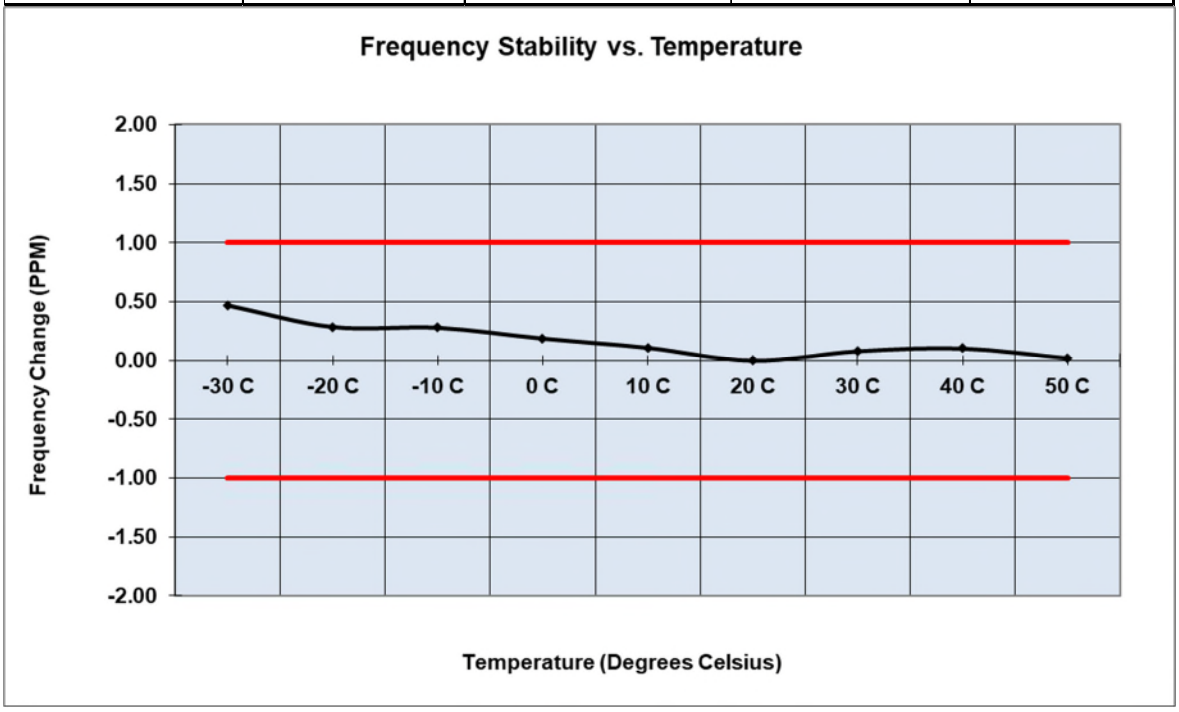

Figure 2.6.6-4: Frequency Stability – 940.0125 MHz – Low Power

FCC 47 CFR Part 101.107; ISED Canada RSS-119 5.3

Frequency Stability

Frequency (MHz): 941.487410
Deviation Limit (PPM): 1
Nominal Voltage (VDC): 24

Temperature C	Frequency MHz	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	**941.487858**	**0.475**	100%	24.00
-20 C	**941.487686**	**0.293**	100%	24.00
-10 C	**941.487680**	**0.286**	100%	24.00
0 C	**941.487590**	**0.191**	100%	24.00
10 C	**941.487528**	**0.125**	100%	24.00
20 C	**941.487410**	**0.000**	100%	24.00
30 C	**941.487506**	**0.102**	100%	24.00
40 C	**941.487526**	**0.123**	100%	24.00
50 C	**941.487410**	**0.000**	100%	24.00
20 C	**941.487438**	**0.030**	85%	20.40
20 C	**941.487422**	**0.013**	115%	27.60

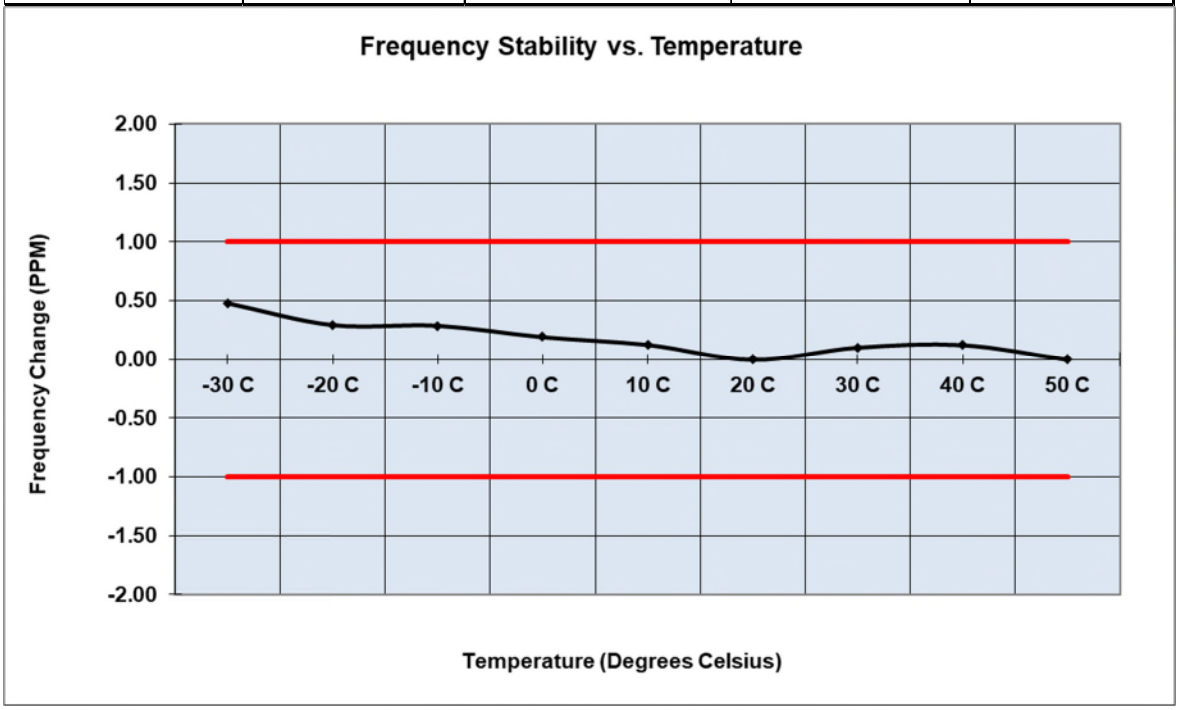

Figure 2.6.6-5: Frequency Stability – 941.4875 MHz – High Power

Frequency Stability

Frequency (MHz): 952.499914
Deviation Limit (PPM): 1
Nominal Voltage (VDC): 24

Temperature	Frequency	Frequency Error	Voltage	Voltage
C	MHz	(PPM)	(%)	(VDC)
-30 C	**952.500352**	**0.459**	100%	24.00
-20 C	**952.500186**	**0.285**	100%	24.00
-10 C	**952.500176**	**0.275**	100%	24.00
0 C	**952.500078**	**0.172**	100%	24.00
10 C	**952.500070**	**0.164**	100%	24.00
20 C	**952.499914**	**0.000**	100%	24.00
30 C	**952.500012**	**0.103**	100%	24.00
40 C	**952.500028**	**0.120**	100%	24.00
50 C	**952.499956**	**0.044**	100%	24.00
20 C	**952.499954**	**0.042**	85%	20.40
20 C	**952.499916**	**0.002**	115%	27.60

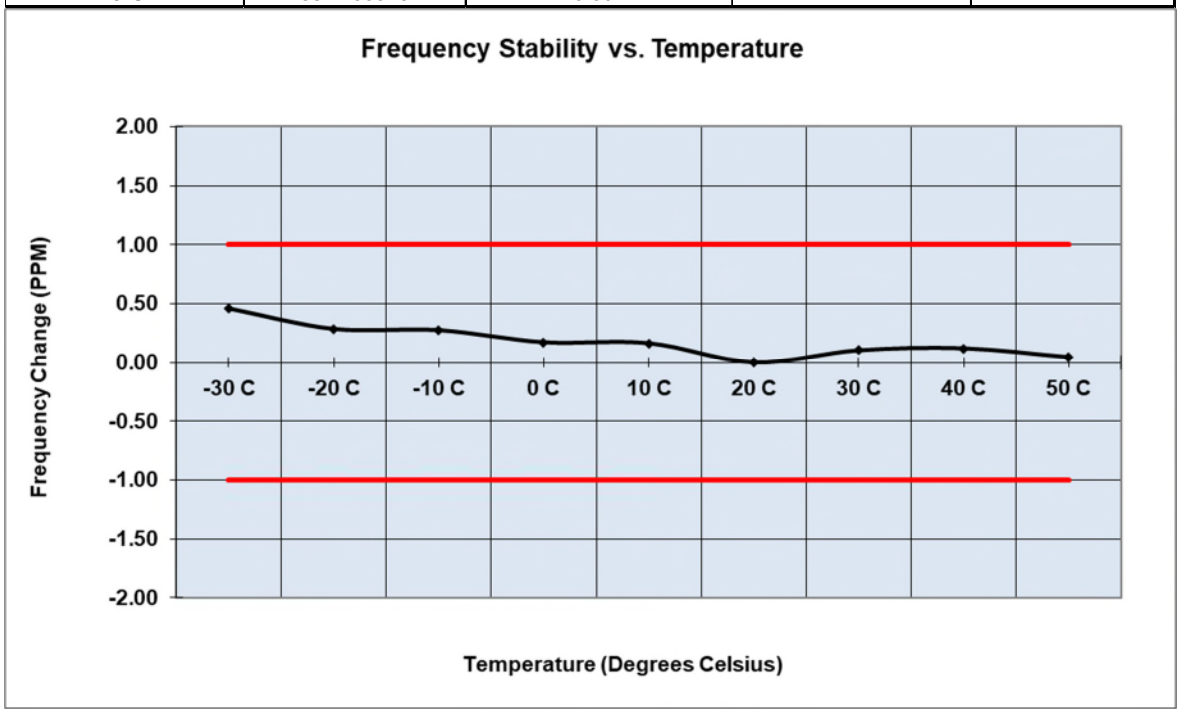

Figure 2.6.6-6: Frequency Stability – 952.5 MHz – High Power

Frequency Stability

Frequency (MHz): 959.924908
Deviation Limit (PPM): 1
Nominal Voltage (VDC): 24

Temperature	Frequency	Frequency Error	Voltage	Voltage
C	MHz	(PPM)	(%)	(VDC)
-30 C	**959.925350**	**0.460**	100%	24.00
-20 C	**959.925186**	**0.289**	100%	24.00
-10 C	**959.925186**	**0.289**	100%	24.00
0 C	**959.925104**	**0.204**	100%	24.00
10 C	**959.925062**	**0.160**	100%	24.00
20 C	**959.924908**	**0.000**	100%	24.00
30 C	**959.924996**	**0.092**	100%	24.00
40 C	**959.925028**	**0.125**	100%	24.00
50 C	**959.924938**	**0.031**	100%	24.00
20 C	**959.924938**	**0.031**	85%	20.40
20 C	**959.924912**	**0.004**	115%	27.60

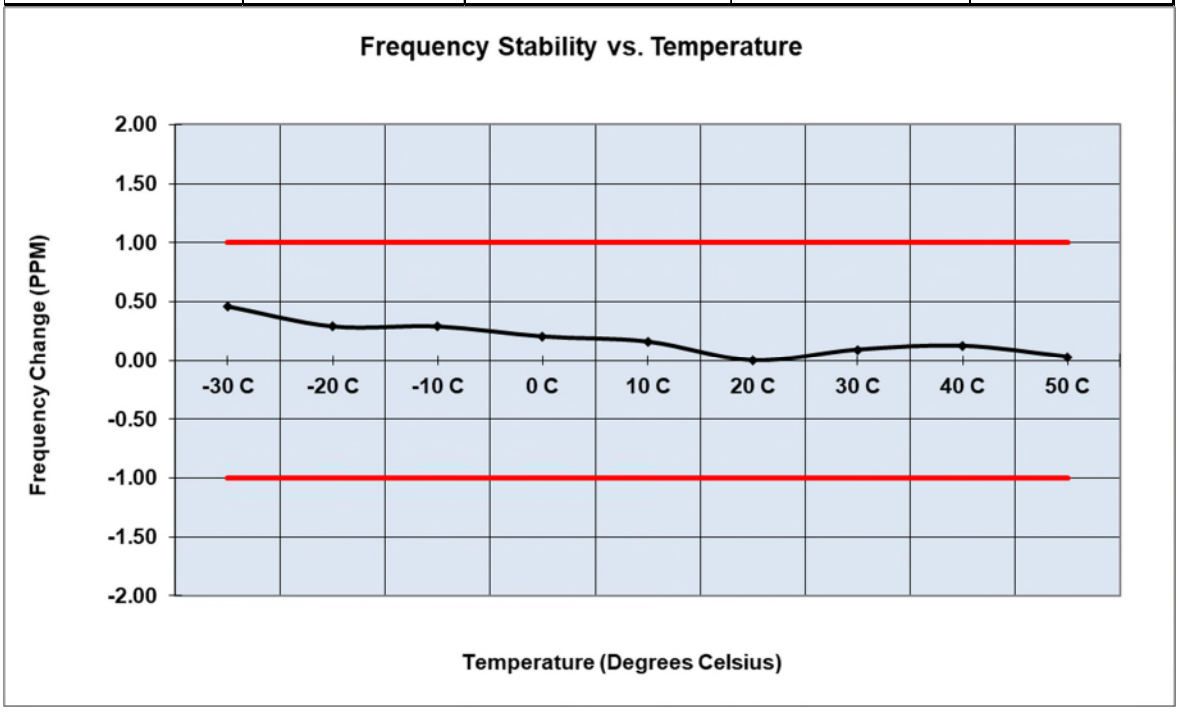

Figure 2.6.6-7: Frequency Stability – 959.925 MHz – High Power

Frequency Stability

Frequency (MHz): 941.487438
Deviation Limit (PPM): 1
Nominal Voltage (VDC): 24

Temperature	Frequency	Frequency Error	Voltage	Voltage
C	MHz	(PPM)	(%)	(VDC)
-30 C	**941.487852**	**0.439**	100%	24.00
-20 C	**941.487684**	**0.261**	100%	24.00
-10 C	**941.487674**	**0.250**	100%	24.00
0 C	**941.487586**	**0.157**	100%	24.00
10 C	**941.487524**	**0.091**	100%	24.00
20 C	**941.487438**	**0.000**	100%	24.00
30 C	**941.487508**	**0.074**	100%	24.00
40 C	**941.487516**	**0.083**	100%	24.00
50 C	**941.487406**	**-0.034**	100%	24.00
20 C	**941.487418**	**-0.021**	85%	20.40
20 C	**941.487426**	**-0.013**	115%	27.60

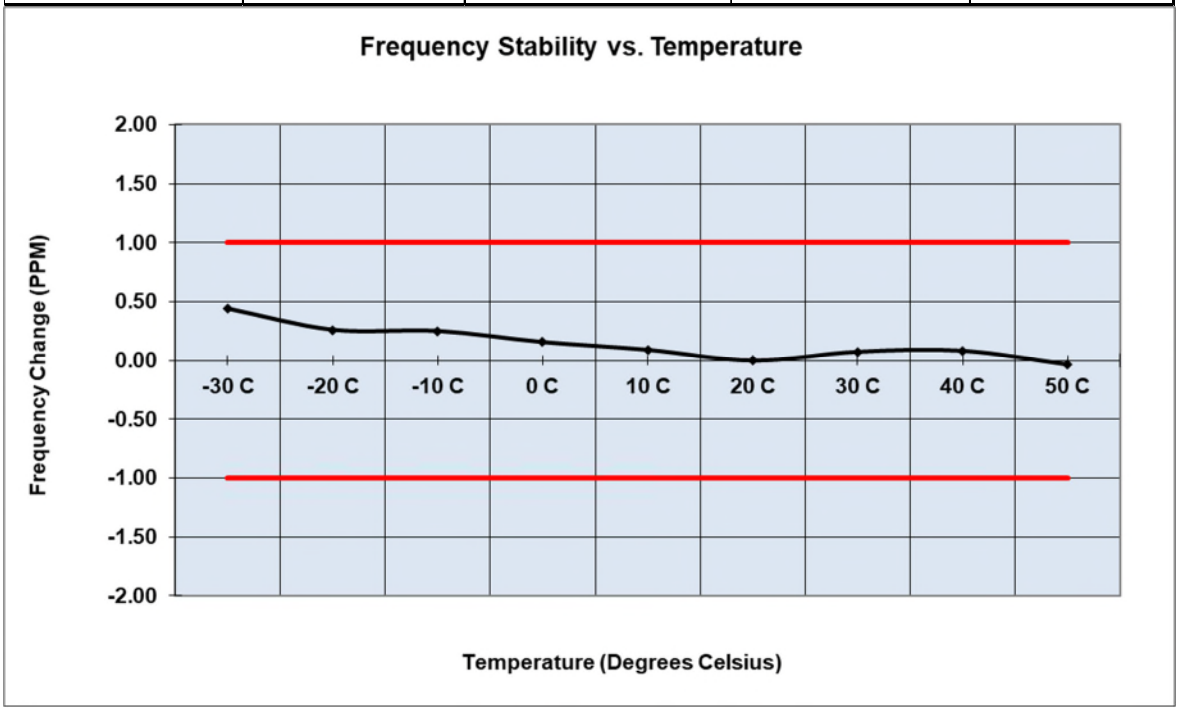

Figure 2.6.6-8: Frequency Stability – 941.4875 MHz – Low Power

Frequency Stability

Frequency (MHz):	952.499908
Deviation Limit (PPM):	1
Nominal Voltage (VDC):	24

Temperature	Frequency	Frequency Error	Voltage	Voltage
C	MHz	(PPM)	(%)	(VDC)
-30 C	**952.500348**	**0.461**	100%	24.00
-20 C	**952.500182**	**0.287**	100%	24.00
-10 C	**952.500180**	**0.285**	100%	24.00
0 C	**952.500102**	**0.203**	100%	24.00
10 C	**952.500060**	**0.159**	100%	24.00
20 C	**952.499908**	**0.000**	100%	24.00
30 C	**952.499988**	**0.084**	100%	24.00
40 C	**952.500024**	**0.122**	100%	24.00
50 C	**952.499944**	**0.038**	100%	24.00
20 C	**952.499954**	**0.048**	85%	20.40
20 C	**952.499912**	**0.004**	115%	27.60

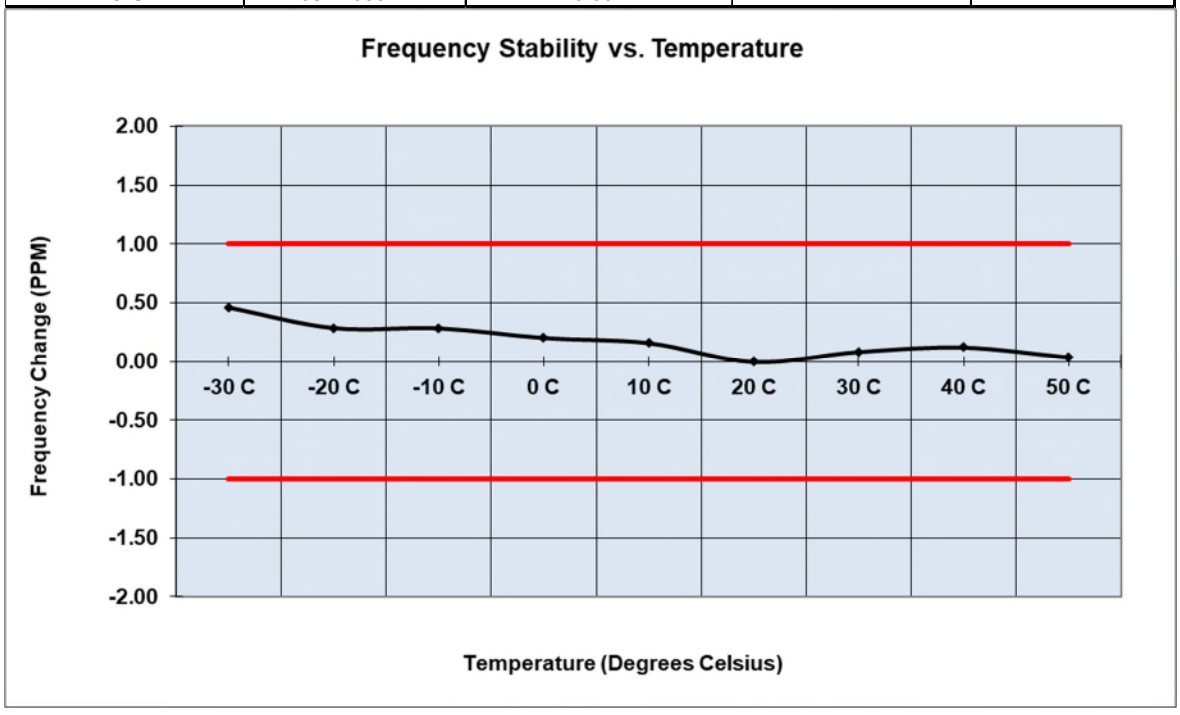

Figure 2.6.6-9: Frequency Stability – 952.5 MHz – Low Power

Frequency Stability

Frequency (MHz): 959.924922
Deviation Limit (PPM): 1
Nominal Voltage (VDC): 24

Temperature	Frequency	Frequency Error	Voltage	Voltage
C	MHz	(PPM)	(%)	(VDC)
-30 C	**959.925352**	**0.448**	100%	24.00
-20 C	**959.925182**	**0.271**	100%	24.00
-10 C	**959.925188**	**0.277**	100%	24.00
0 C	**959.925100**	**0.185**	100%	24.00
10 C	**959.925044**	**0.127**	100%	24.00
20 C	**959.924922**	**0.000**	100%	24.00
30 C	**959.924966**	**0.046**	100%	24.00
40 C	**959.925020**	**0.102**	100%	24.00
50 C	**959.924924**	**0.002**	100%	24.00
20 C	**959.924914**	**-0.008**	85%	20.40
20 C	**959.924924**	**0.002**	115%	27.60

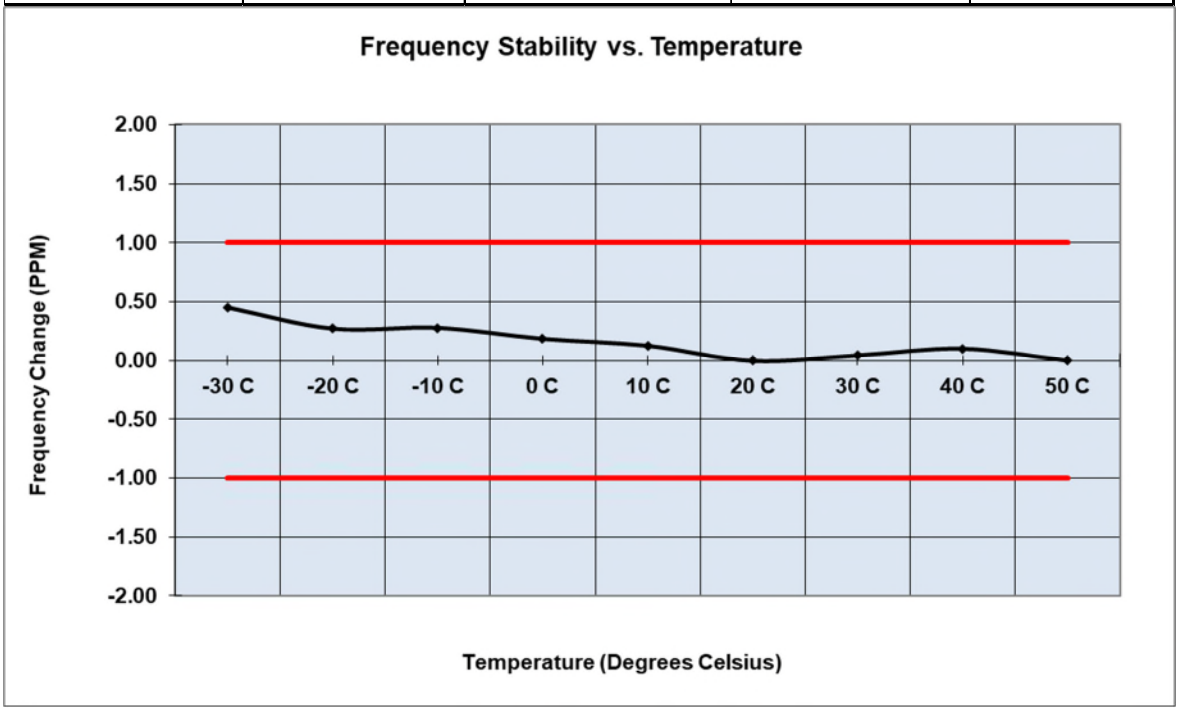

Figure 2.6.6-10: Frequency Stability – 959.925 MHz – Low Power

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
Digital Thermometer	Omega Engineering	MDSS41-TC	BEMC00002	N/A	24	21-Sep-2023
Digital MultiMeter	Fluke	115	BEMC02108	N/A	24	29-Mar-2023
High Frequency Cable 26 GHz	Hasco, Inc.	HLL142-S1-S1-192/WA	DEMC3032	N/A	12	15-Jul-2023
Atten 20dB N-M/F, DC-18GHz, 10W	Aeroflex Inmet	18N10W-20	DEMC3045	N/A	12	15-Jul-2023
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	07-Jun-2023
DC Power Supply	Xantrex	XHR60-18	TEMC00001	N/A	N/A	NCR
Temperature Test Chamber	Sun Electronic Systems, Inc.	EC127	TEMC00242	5.10	N/A	NCR

TU - Traceability Unscheduled
O/P MON - Traceability Unscheduled
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
50ohms M/F 4GHz, 100W Attenuator	Fairview Microwave Inc.	SA4N100-20	615	N/A	12	25-Mar-2023
Digital Thermometer	Omega Engineering	MDSS41-TC	BEMC00002	N/A	24	21-Sep-2023
100Hz-26.5GHz EMC analyzer/HYZ	Agilent	E7405A	BEMC00523	A.14.06	12	01-Feb-2023
Linear Polarized Horn antenna, 1-18 GHz	EMCO	3115	BEMC02006	N/A	24	10-Feb-2024
Tile Automation Software	ETS Lindgren	TILE4! - Version 4.2.A	BEMC02095	4.2A	N/A	NCR
Digital MultiMeter	Fluke	115	BEMC02108	N/A	24	29-Mar-2023
Duratest High Frequency Cable 26.5GHz	Teledyne Storm Products	921-0101-036	BEMC02112	N/A	12	20-Oct-2022
Synthesized Signal Generator 0.05 - 26 GHz	Hewlett Packard	8673D	BEMC02126	N/A	24	07-Jun-2024
PE-P160 40 GHz Cable	Pasternack	PE360-396	BEMC02147	N/A	12	23-Jun-2023
High Frequency Cable 26 GHz	Hasco, Inc.	HLL142-S1-S1-192/WA	DEMC3032	N/A	12	15-Jul-2023
Atten 30dB N-M/F, DC, 18 GHz, 10W	Aeroflex Inmet	18N10W-30	DEMC3041	N/A	12	15-Jul-2023
Atten 20dB N-M/F, DC-18GHz, 10W	Aeroflex Inmet	18N10W-20	DEMC3045	N/A	12	15-Jul-2023
Signal & Spectrum Analyzer	Rohde & Schwarz	FSW43	DEMC3085	2.90 SP1	12	07-Jun-2023
DC Power Supply	Xantrex	XHR60-18	TEMC00001	N/A	N/A	NCR
BI LOG PERIODIC, ANTENNA	Schaffner	CBL6112B	TEMC00005	N/A	24	01-Nov-2023
EMC Chamber	Panashield	N/A	TEMC00031	N/A	36	28-Jan-2024
Double Ridge Guide Horn	ETS Lindgren	3117	TEMC00061	N/A	24	11-Feb-2024
Microwave Preamplifier	Com-Power Corporation	PAM-118A	TEMC00160	N/A	12	26-Mar-2023
A81-0303 18 GHz Cable Set	Teledyne Storm Products	A81-0303-360/96	TEMC00201	N/A	12	26-Mar-2023
Temperature Test Chamber	Sun Electronic Systems, Inc.	EC127	TEMC00242	5.10	N/A	NCR

TU - Traceability Unscheduled
O/P MON - Traceability Unscheduled
N/A - Not Applicable
NCR - No Calibration Required

4 Diagram of Test Set-ups

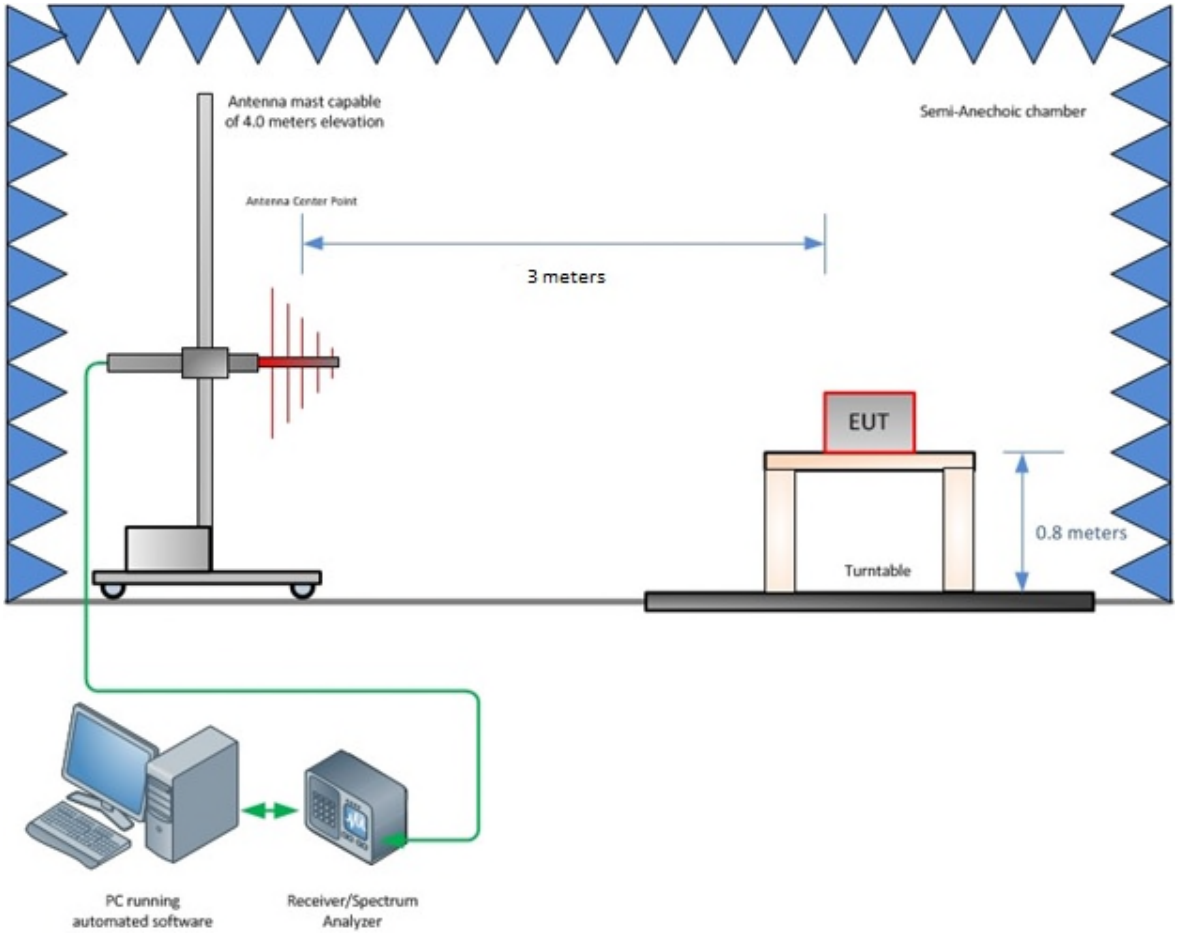

Figure 4-1 - Radiated Emissions Test Setup up to 1 GHz

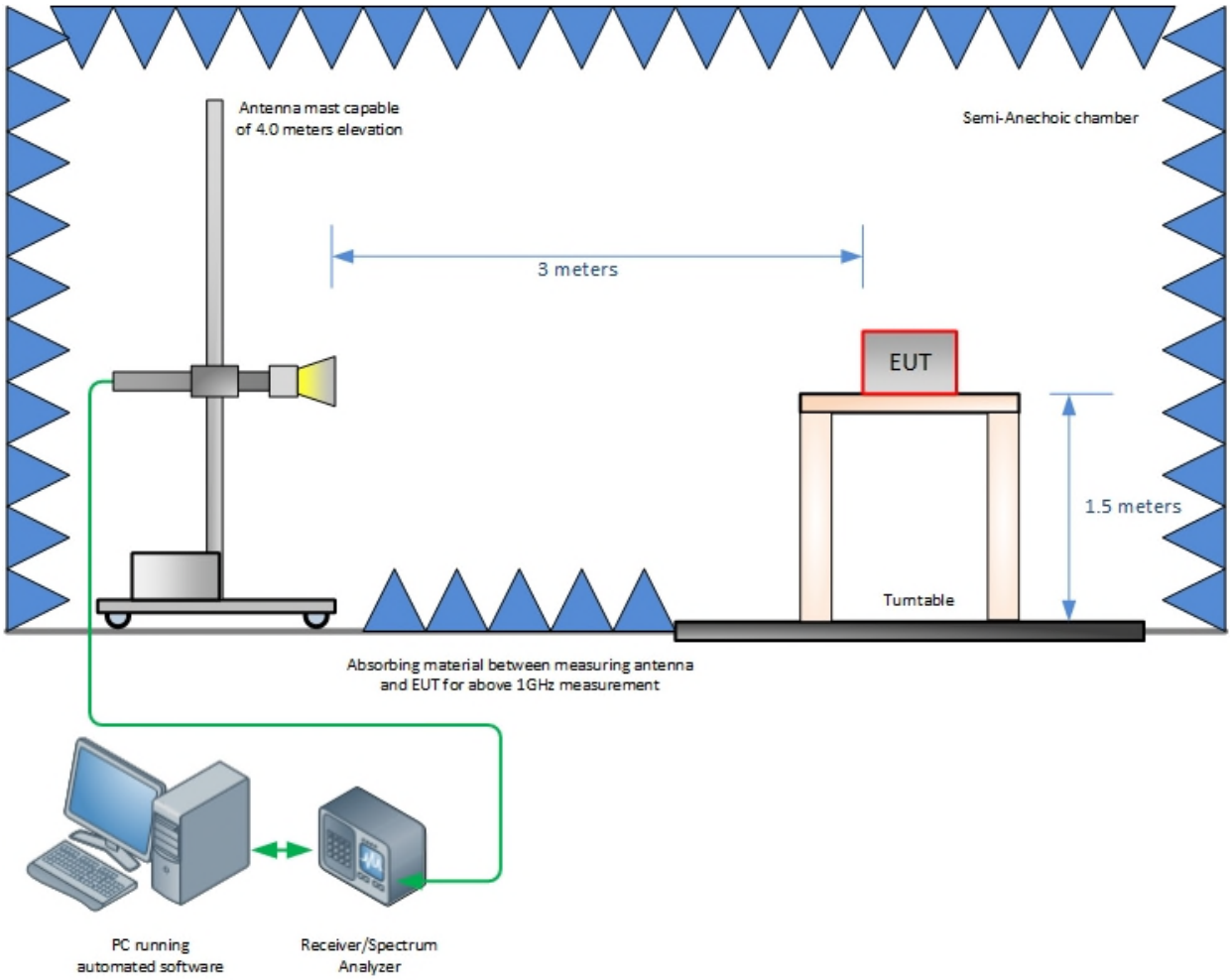

Figure 4-2 - Radiated Emissions Test Setup above 1 GHz

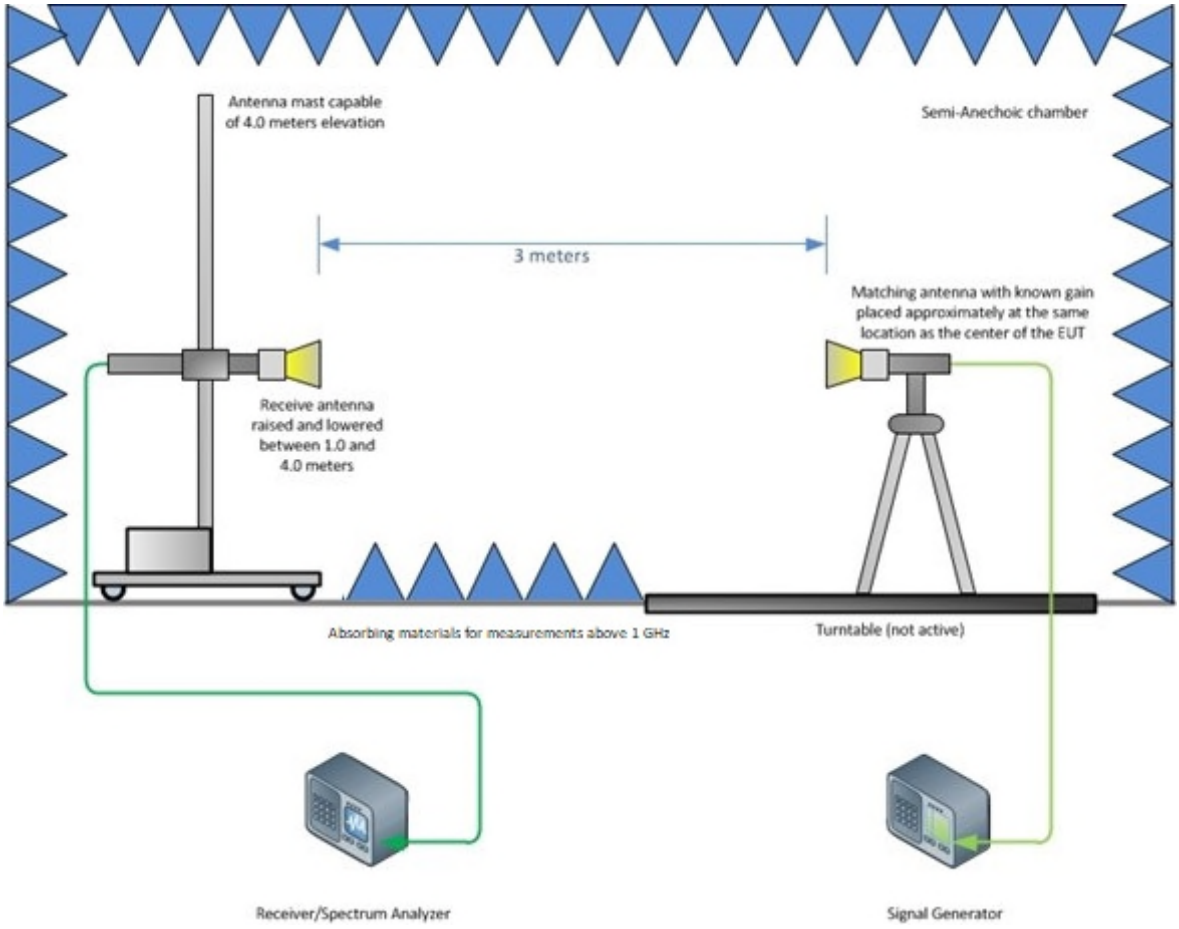

Figure 4-3 - Substitution Test Setup above 1 GHz

5 Measurement Uncertainty

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

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

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