FCC and ISED Test Report

Sepura Limited
TETRA Handheld Radio, Model: SC2021

In accordance with FCC 47 CFR Part 90, FCC 47 CFR Part 2, Industry Canada RSS-119 and ISED RSS-GEN (TETRA)

Prepared for: Sepura Limited
9000 Cambridge Research Park
Beach Drive
Waterbeach
Cambridge
CB25 9TL
United Kingdom

FCC ID: XX6SC2021M IC: 8739A-SC2021M

COMMERCIAL-IN-CONFIDENCE

Document 75961387-02 Issue 01

SIGNATURE			
S. Mn			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Steve Marshall	Senior Engineer	Authorised Signatory	21 October 2024

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

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 90, FCC 47 CFR Part 2, Industry Canada RSS-119 and ISED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Pier-Angelo Lorusso	21 October 2024	
	George Williams	21 October 2024	Gwilliams

FCC Accreditation
492497/UK2010 Octagon House, Fareham Test Laboratory

ISED Accreditation
12669A/UK0003 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 90: 2023, FCC 47 CFR Part 2: 2023, Industry Canada RSS-119: Issue 12 (05-2015) and ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021) for the tests detailed in section 1.3.

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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	21-October-2024

Table 1

1.2 Introduction

Applicant	Sepura Limited
Manufacturer	Sepura Limited
Model Number(s)	SC2021
Serial Number(s)	1PR002417GKZ790 1PR002417GKZ793
Hardware Version(s)	PLX-2V16515-03 (Mod State 12 Rev B024)
Software Version(s)	1807 009 07367
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 90: 2023 FCC 47 CFR Part 2: 2023 Industry Canada RSS-119: Issue 12 (05-2015) ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021)
Order Number	PLC-PO029056
Date	06-May-2024
Date of Receipt of EUT	18-June-2024
Start of Test	31-July-2024
Finish of Test	30-August-2024
Name of Engineer(s)	Pier-Angelo Lorusso and George Williams
Related Document(s)	ANSI C63.26: 2015

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 90, FCC 47 CFR Part 2, Industry Canada RSS-119 and ISED RSS-GEN is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	CFR Part 90	CFR Part 2	RSS-119	RSS-GEN			
Configuration and Mode: TETRA - 150.05-174 MHz (FCC and ISEDC)							
2.2	90.205	2.1046	5.4	6.12	Maximum Conducted Output Power	Pass	ANSI C63.26: 2015
2.3	90.209	2.1049	5.5	6.7	Bandwidth Limitations	Pass	ANSI C63.26: 2015
2.4	90.210	2.1051	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	
2.1	90.210	2.1053	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.26: 2015
2.5	90.213	2.1055	5.3	6.11	Frequency Stability	Pass	ANSI C63.26: 2015
2.6	90.214	-	5.9	-	Transient Frequency Behaviour	Pass	
2.7	90.207	2.1047	5.2	-	Types of Emissions	Satisfactory	
Configuration and Mode: TETRA - 148-149.9 MHz (ISEDC only)							
2.1	-	-	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.26: 2015
2.2	-	-	5.4	6.12	Maximum Conducted Output Power	Pass	ANSI C63.26: 2015
2.3	-	-	5.5	6.7	Bandwidth Limitations	Pass	ANSI C63.26: 2015
2.4	-	-	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	
2.6	-	-	5.9	-	Transient Frequency Behaviour	Pass	
2.5	-	-	5.3	6.11	Frequency Stability	Pass	ANSI C63.26: 2015
Configuration and Mode: TETRA - 138-144 MHz (ISEDC only)							
2.1	-	-	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.26: 2015
2.4	-	-	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	
2.2	-	-	5.4	6.12	Maximum Conducted Output Power	Pass	ANSI C63.26: 2015

2.3	-	-	5.5	6.7	Bandwidth Limitations	Pass	ANSI C63.26: 2015
2.6	-	-	5.9	-	Transient Frequency Behaviour	Pass	
2.5	-	-	5.3	6.11	Frequency Stability	Pass	ANSI C63.26: 2015
Configuration and Mode: TETRA High capacity battery - 150.05-174 MHz (FCC and ISEDC)							
2.5	90.213	2.1055	5.3	6.11	Frequency Stability	Pass	ANSI C63.26: 2015
Configuration and Mode: Tetra High capacity battery - 148-149.9 MHz (ISEDC only)							
2.5	-	-	5.3	6.11	Frequency Stability	Pass	ANSI C63.26: 2015
Configuration and Mode: Tetra High capacity battery - 138-144 MHz (ISEDC only)							
2.5	-	-	5.3	6.11	Frequency Stability	Pass	ANSI C63.26: 2015

Table 2

1.4 Application Form

Equipment Description

Technical Description: *(Please provide a brief description of the intended use of the equipment including the technologies the product supports)*	The SC2021 is a portable TETRA radio with GNSS, Bluetooth and WLAN functionality. It has a TETRA frequency range of 136-174 MHz.		
Manufacturer:	Sepura Limited		
Model:	SC2021		
Part Number:	SC2021		
Hardware Version:	PLX-2V16515-03 (Mod State 12 Rev B024)		
Software Version:	1807 009 07367		
FCC ID of the product under test – see guidance here		XX6SC2021M	
IC ID of the product under test – see guidance here		8739A-SC2021M	
Device Category	Mobile ☐	Portable ☒	Fixed ☐
Equipment is fitted with an Audio Low Pass Filter		Yes ☒	No ☐

Table 3

Intentional Radiators

Technology	TETRA	BT Classic / EDR	BLE	WLAN 802.11b	WLAN 802.11g	WLAN 802.11n
Frequency Range (MHz to MHz)	136-174	2402-2480	2402-2480	2412-2462	2412-2462	2412-2462
Conducted Declared Output Power (dBm)	34.3 average	7.34 peak	3.2 average	15.9 average	15.3 average	15.7 average
Antenna Gain (dBi)	1. -6.24 2. 5	2.5	2.5	2.5	2.5	2.5
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	20 kHz	1M20	2M11	11M7	16M9	18M2
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	π/4 DQPSK	GFSK / π/4 DQPSK / 8-DPSK	GFSK	CCK / DBPSK / DQPSK	OFDM	OFDM
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)	19K1DXW	1M20F1D	2M11F1D	11M7G1W	16M9D7W	18M2D7W
Bottom Frequency (MHz)	136	2402	2402	2412	2412	2412
Middle Frequency (MHz)	155	2441	2440	2437	2437	2437
Top Frequency (MHz)	174	2480	2480	2462	2462	2462

Table 4

Two antenna gains are given:

1. The maximum free space dBi for the specified frequency range of antennas used in a handheld system using the top antenna connector.
2. The maximum dBi provided by the antenna manufacturer for antennas used in a vehicle system using the rear connector.

Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	2480 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	32.768 kHz
Class A Digital Device (Use in commercial, industrial or business environment) ☒ Class B Digital Device (Use in residential environment only) ☐	

Table 5

AC Power Source

AC supply frequency:		Hz
Voltage		V
Max current:		A
Single Phase ☐ Three Phase ☒		

Table 6

DC Power Source

Nominal voltage:	7.4	V
Extreme upper voltage:	7.4	V
Extreme lower voltage:	6.29	V
Max current:	2	A

Table 7

Battery Power Source

Voltage:	7.4	V
End-point voltage:	6.2	V *(Point at which the battery will terminate)*
Alkaline ☐ Leclanche ☐ Lithium ☒ Nickel Cadmium ☐ Lead Acid* ☐ **(Vehicle regulated)*		
Other ☐ Please detail:		

Table 8

Charging

Can the EUT transmit whilst being charged	Yes ☒ No ☐

Table 9

Temperature

Minimum temperature:	-20	°C
Maximum temperature:	+60	°C

Table 10

Cable Loss

Adapter Cable Loss (Conducted sample)	N/A	dB

Table 11

Antenna Characteristics

Antenna connector ☐ for TETRA			State impedance	50	Ohm
Temporary antenna connector ☐			State impedance		Ohm
Integral antenna ☒ for BT and WLAN	Type:	Inverted F	Gain	2.5	dBi
External antenna ☒	Type:	300-02070 helical (handheld system)	Gain	-6.9	dBi
External antenna ☒	Type:	300-02071 helical (handheld system)	Gain	-6.24	dBi
External antenna ☒	Type:	300-02072 helical (handheld system)	Gain	-6.93	dBi
External antenna ☒	Type:	300-02073 helical (handheld system)	Gain	-14.6	dBi
External antenna ☒	Type:	AVGHB-H4 ⅝ Wave (vehicle system)	Gain	5	dBi
External antenna ☒	Type:	AVGHB-H5 ⅝ Wave (vehicle system)	Gain	5	dBi
External antenna ☒	Type:	AVGHB-H6 ⅝ Wave (vehicle system)	Gain	5	dBi
External antenna ☒	Type:	AVGHB-H7 ⅝ Wave (vehicle system)	Gain	5	dBi
For external antenna only: Standard Antenna Jack ☒ If yes, describe how user is prohibited from changing antenna (if not professional installed): Equipment is only ever professionally installed ☒ Non-standard Antenna Jack ☐ All part 15 applications will need to show how the antenna gain was derived either from a manufacturer data sheet or a measurement. Where the gain of the antenna is inherently accounted for as a result of the measurement, such as field strength measurements on a part 15.249 or 15.231 device, so the gain does not necessarily need to be verified. However, enough information regarding the construction of the antenna shall be provided. Such information maybe photographs, length of wire antenna etc.					

Table 12

Ancillaries (if applicable)

Manufacturer:	Sepura Limited	Part Number:	300-01123
Model:	CSM	Country of Origin:	Made in Taiwan
Manufacturer:	Sepura Limited	Part Number:	300-01930
Model:	1+1 Charger	Country of Origin:	Made in China

Table 13

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

Name: Chris Beecham
Position held: Conformance Engineer
Date: 07 August 2024

1.5 Product Information

1.5.1 Technical Description

The SC2021 is a portable TETRA radio with GNSS, Bluetooth and WLAN functionality.
It has a TETRA frequency range of 136-174 MHz.

1.6 Deviations from the Standard

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

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.

The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Model: SC2021, Serial Number: 1PR002417GKZ793			
0	As supplied by the customer	Not Applicable	Not Applicable
Model: SC2021, Serial Number: 1PR002417GKZ790			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 14

1.8 Test Location

TÜV SÜD conducted the following tests at our Octagon House Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: TETRA - 150.05-174 MHz (FCC and ISEDC)		
Maximum Conducted Output Power	George Williams	UKAS
Bandwidth Limitations	George Williams	UKAS
Spurious Emissions at Antenna Terminals	George Williams	UKAS
Radiated Spurious Emissions	Pier-Angelo Lorusso	UKAS
Frequency Stability	George Williams	UKAS
Transient Frequency Behaviour	George Williams	UKAS
Types of Emissions	George Williams	UKAS
Configuration and Mode: TETRA - 148-149.9 MHz (ISEDC only)		
Radiated Spurious Emissions	Pier-Angelo Lorusso	UKAS
Maximum Conducted Output Power	George Williams	UKAS
Bandwidth Limitations	George Williams	UKAS
Spurious Emissions at Antenna Terminals	George Williams	UKAS
Transient Frequency Behaviour	George Williams	UKAS
Frequency Stability	George Williams	UKAS

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: TETRA - 138-144 MHz (ISEDC only)		
Radiated Spurious Emissions	Pier-Angelo Lorusso	UKAS
Spurious Emissions at Antenna Terminals	George Williams	UKAS
Maximum Conducted Output Power	George Williams	UKAS
Bandwidth Limitations	George Williams	UKAS
Transient Frequency Behaviour	George Williams	UKAS
Frequency Stability	George Williams	UKAS
Configuration and Mode: Tetra High capacity battery - 150.05-174 MHz (FCC and ISEDC)		
Frequency Stability	George Williams	UKAS
Configuration and Mode: Tetra High capacity battery - 148-149.9 MHz (ISEDC only)		
Frequency Stability	George Williams	UKAS
Configuration and Mode: Tetra High capacity battery - 138-144 MHz (ISEDC only)		
Frequency Stability	George Williams	UKAS

Table 15

Office Address:

TÜV SÜD
Octagon House
Concorde Way
Fareham
Hampshire
PO15 5RL
United Kingdom

2 Test Details

2.1 Radiated Spurious Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 90, Clause 90.210
FCC 47 CFR Part 2, Clause 2.1053
Industry Canada RSS-119, Clause 5.8
ISED RSS-GEN, Clause 6.13

2.1.2 Equipment Under Test and Modification State

SC2021, S/N: 1PR002417GKZ790 - Modification State 0

2.1.3 Date of Test

31-July-2024

2.1.4 Test Method

A preliminary profile of the Radiated Spurious Emissions was obtained up to the 10th harmonic by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

The EUT was powered by a rechargeable 7.4V, 8.6Wh Lithium polymer battery supplied by the manufacturer for the duration of test.

Testing was performed in accordance with ANSI C63.26, Clause 5.5.

Prescans and final measurements were performed using the direct field strength method.

Field strength measurements were performed and then converted to Equivalent Power Measurements in accordance with ANSI C63.26, Clause 5.2.7 equation c)

Example calculation:

E (dBuV/m) + 20log(d) - 104.8 = EIRP (dBm) where (d) is the measurement distance.

82.2 (dBuV/m) + 20log(3) – 104.8 = EIRP (dBm)

-13.0 = EIRP (dBm)

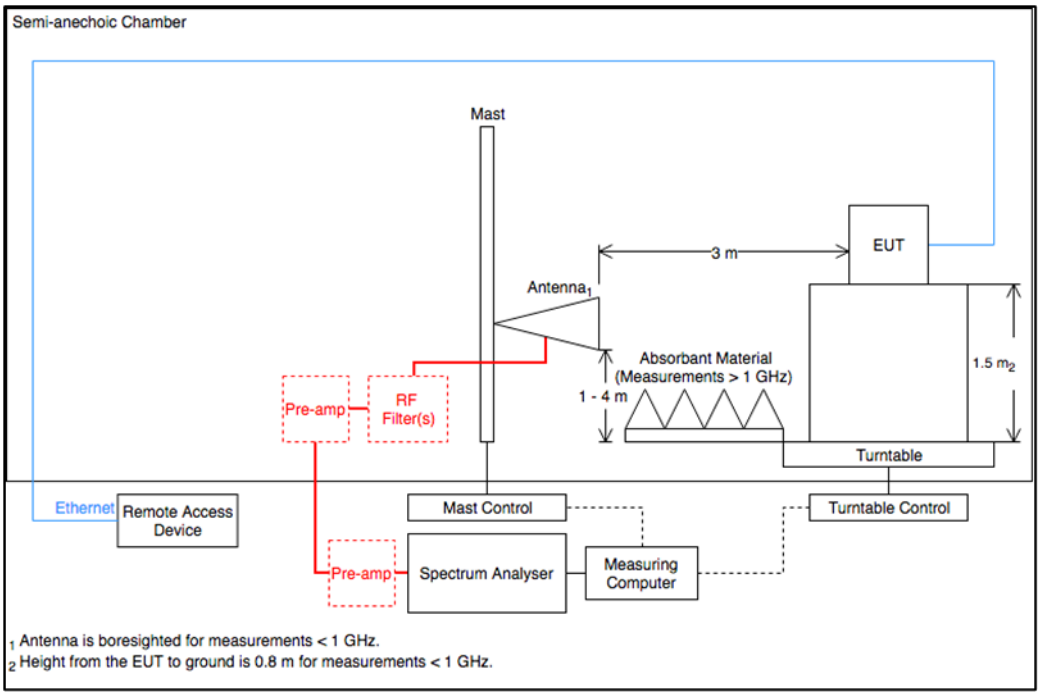

Figure 1 Radiated Emissions Test Setup Diagram

2.1.5 Environmental Conditions

Ambient Temperature	20.9 - 22.0 °C
Relative Humidity	48.3 - 56.7 %

2.1.6 Test Results

TETRA - 150.05-174 MHz (FCC and ISEDC)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

Table 16 - 150.075 MHz

*No emissions were detected within 10 dB of the limit.

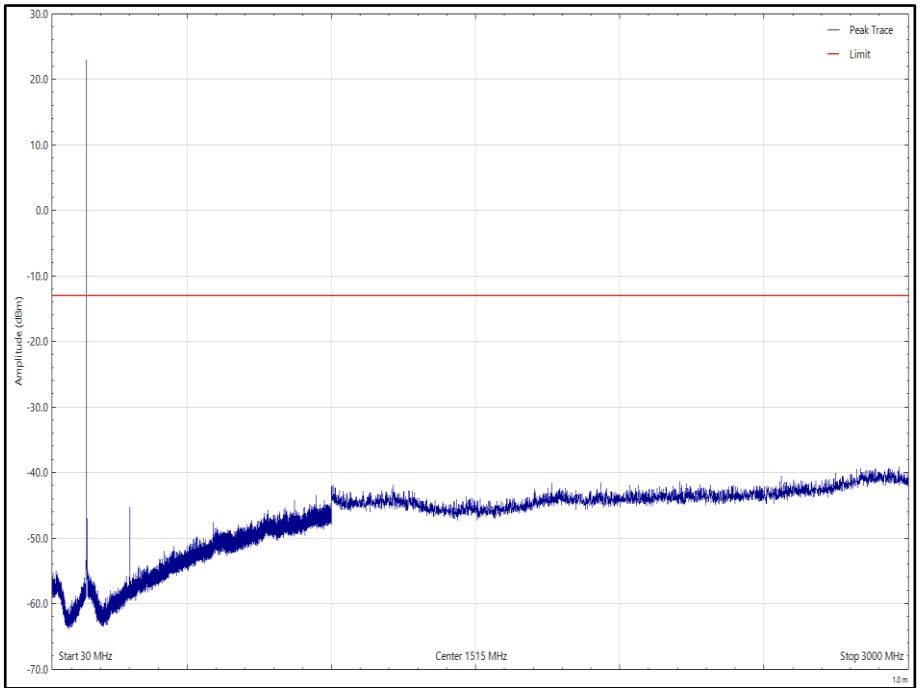

Figure 2 - 150.075 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation X

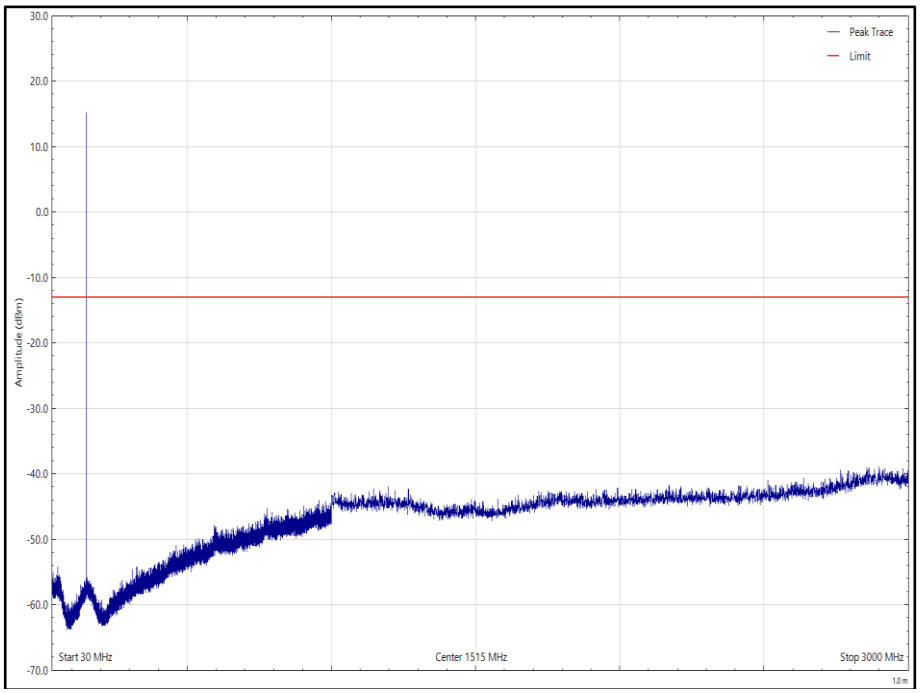

Figure 3 - 150.075 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation X

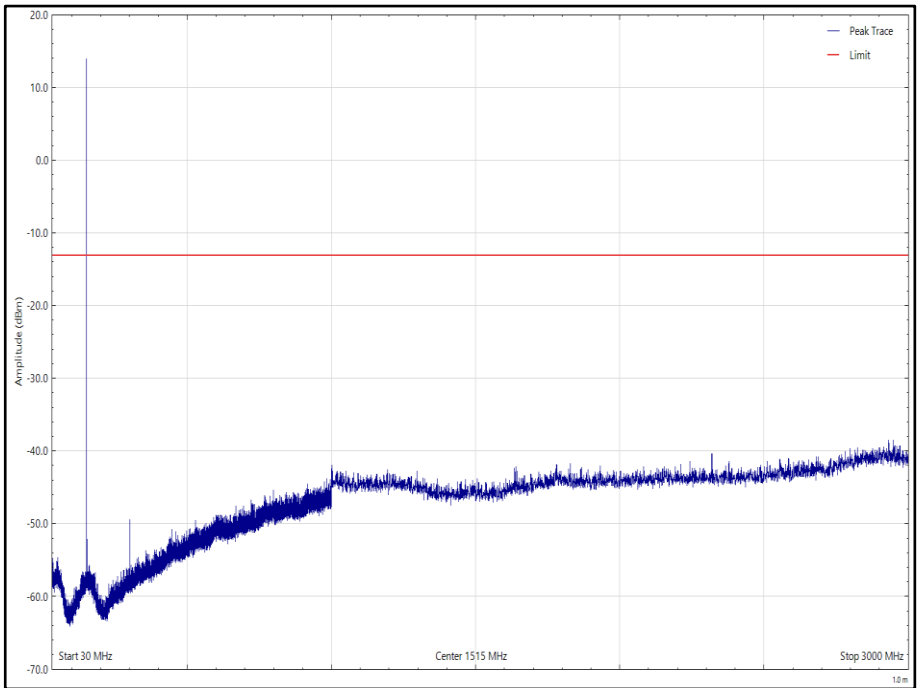

Figure 4 - 150.075 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation Y

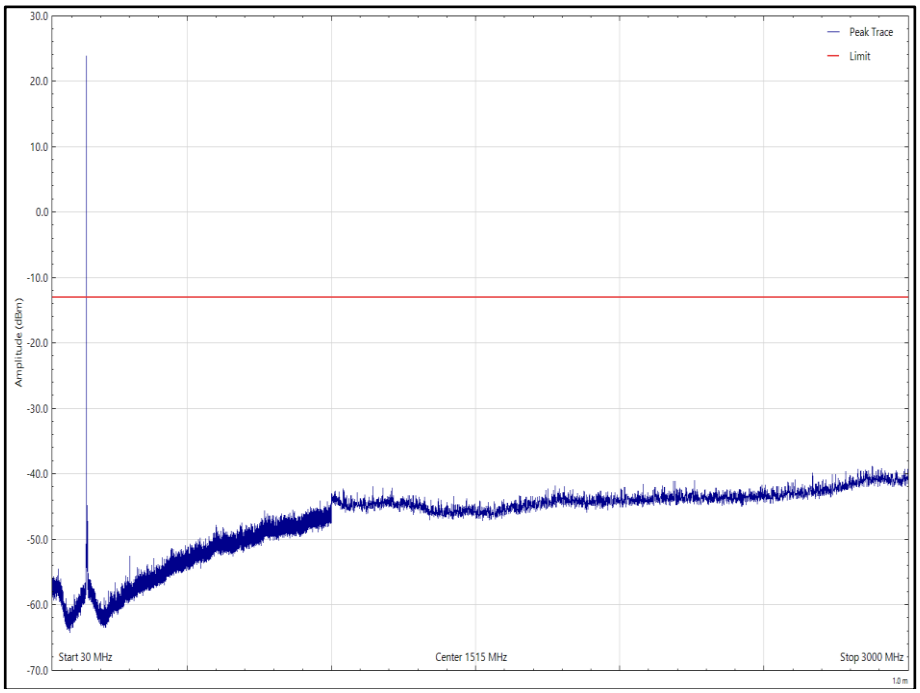

Figure 5 - 150.075 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation Y

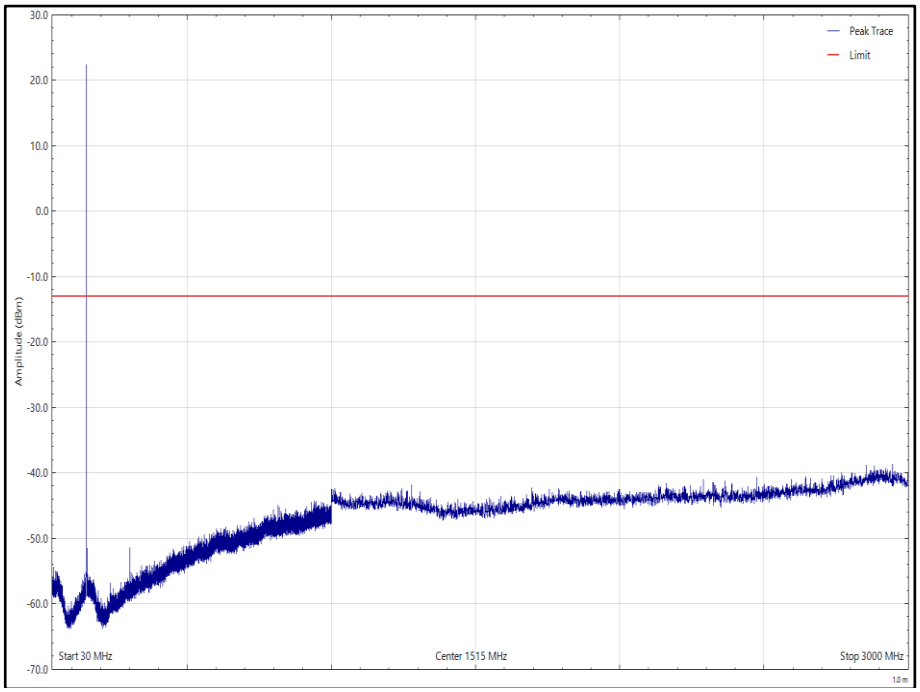

Figure 6 - 150.075 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation Z

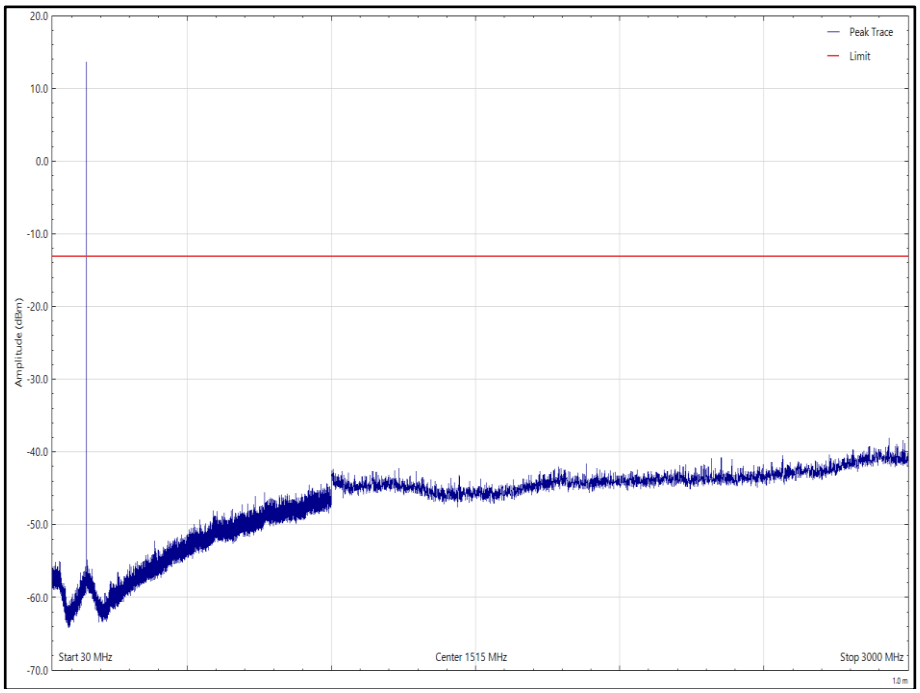

Figure 7 - 150.075 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation Z

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

Table 17 - 162.00 MHz

*No emissions were detected within 10 dB of the limit.

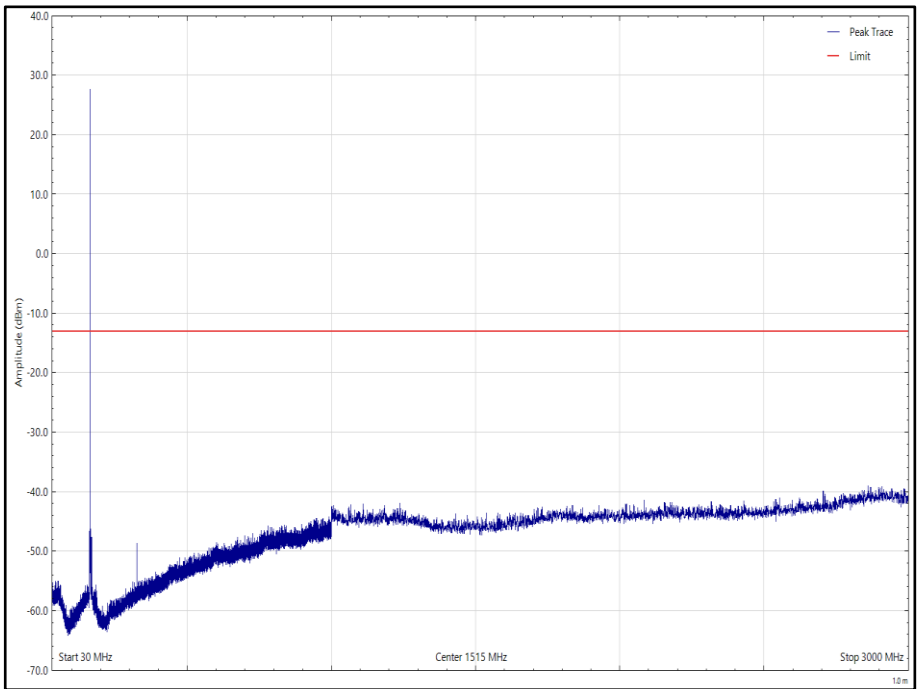

Figure 8 - 162.00 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation X

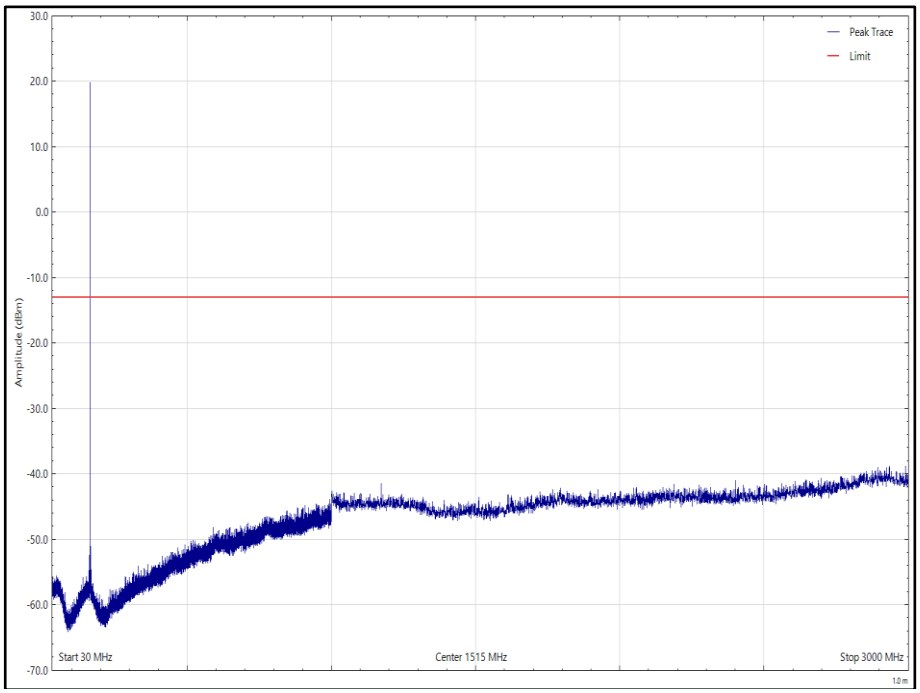

Figure 9 - 162.00 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation X

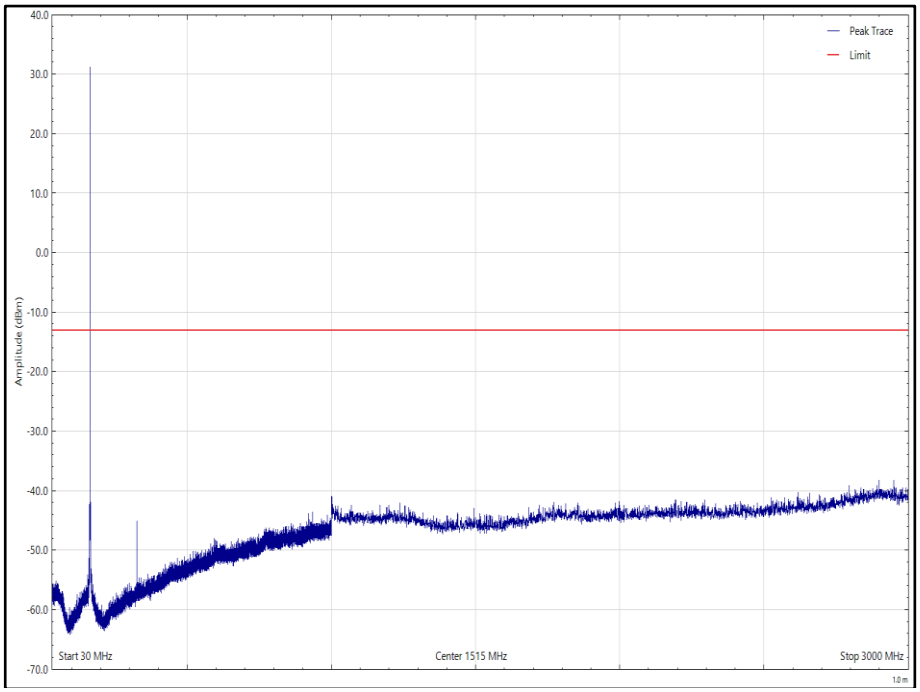

Figure 10 - 162.00 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation Y

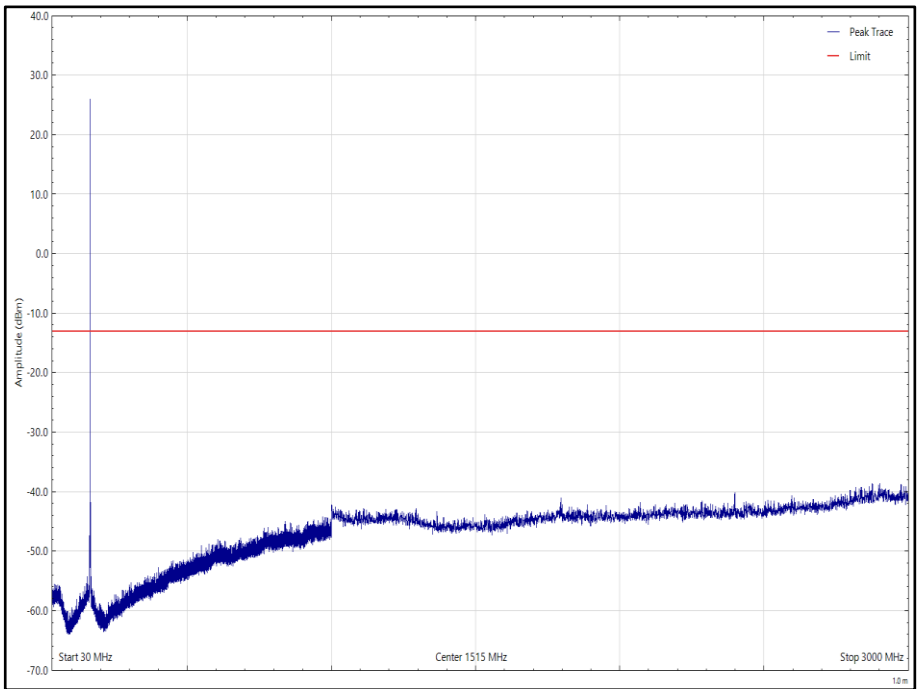

Figure 11 - 162.00 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation Y

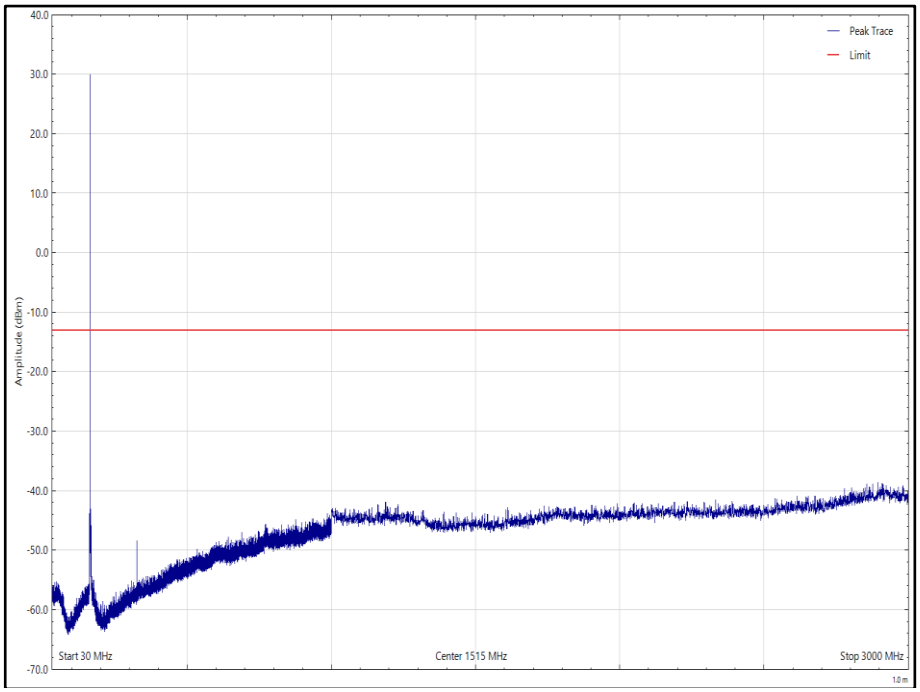

Figure 12 - 162.00 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation Z

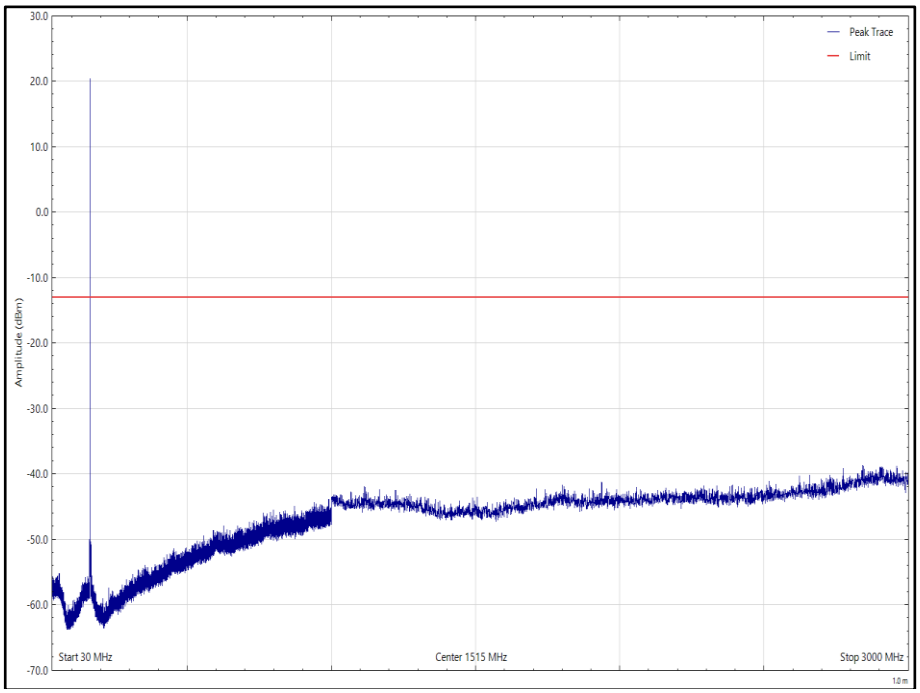

Figure 13 - 162.00 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation Z

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

Table 18 - 173.975 MHz

*No emissions were detected within 10 dB of the limit.

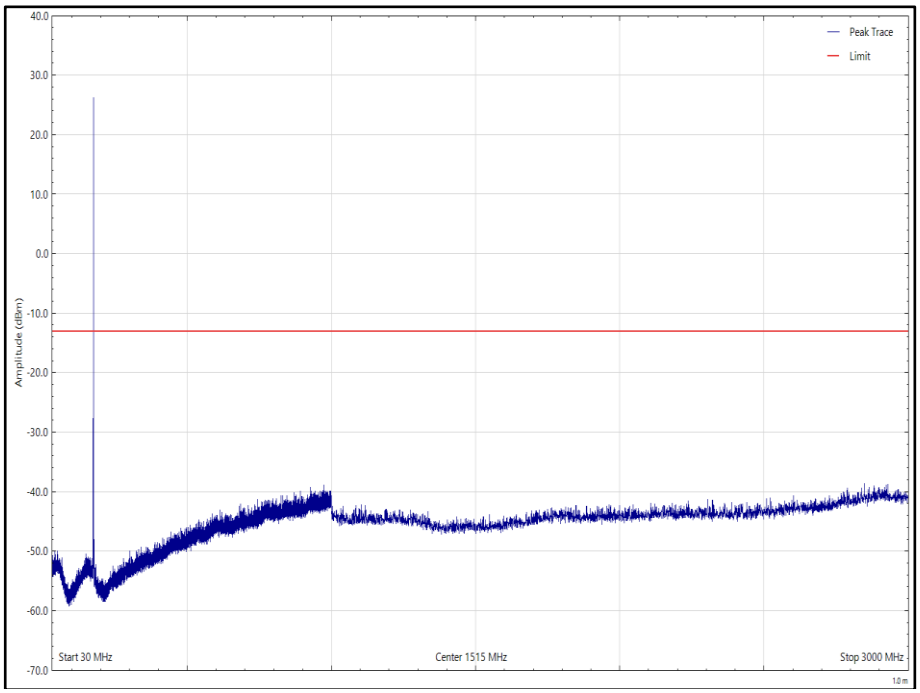

Figure 14 - 173.975 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation X

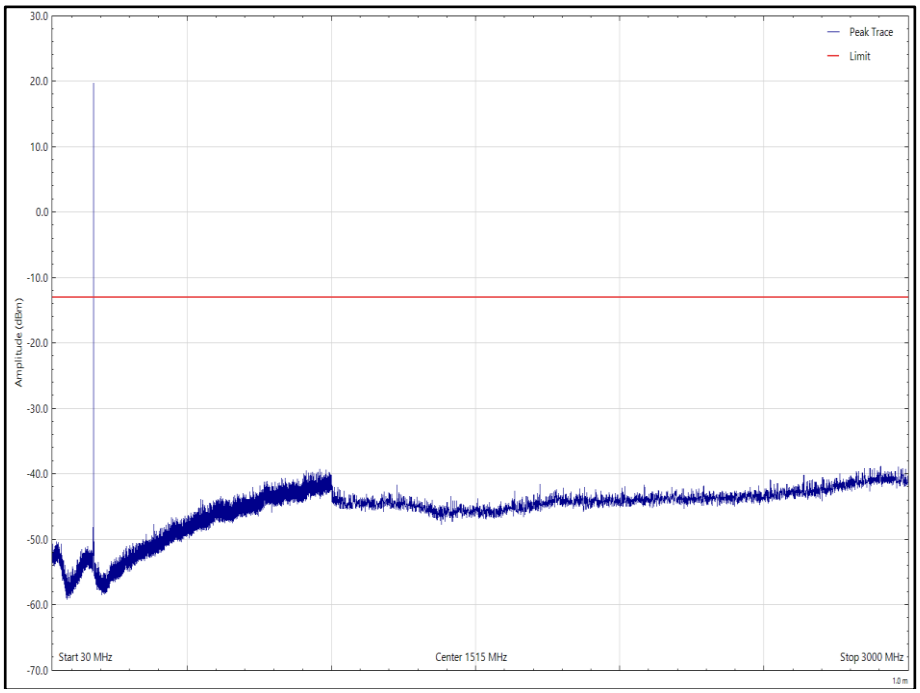

Figure 15 - 173.975 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation X

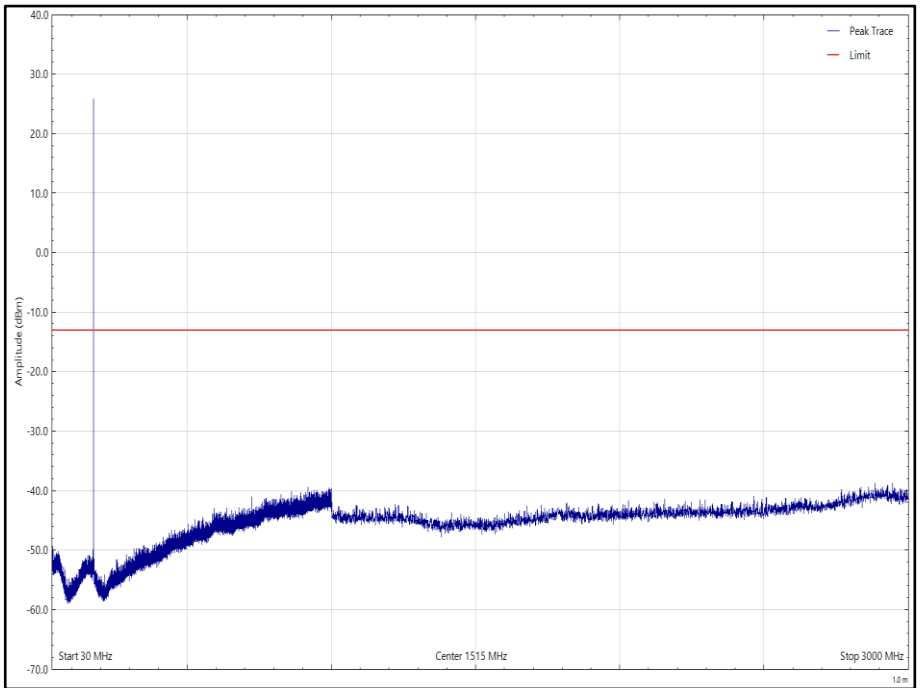

Figure 16 - 173.975 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation Y

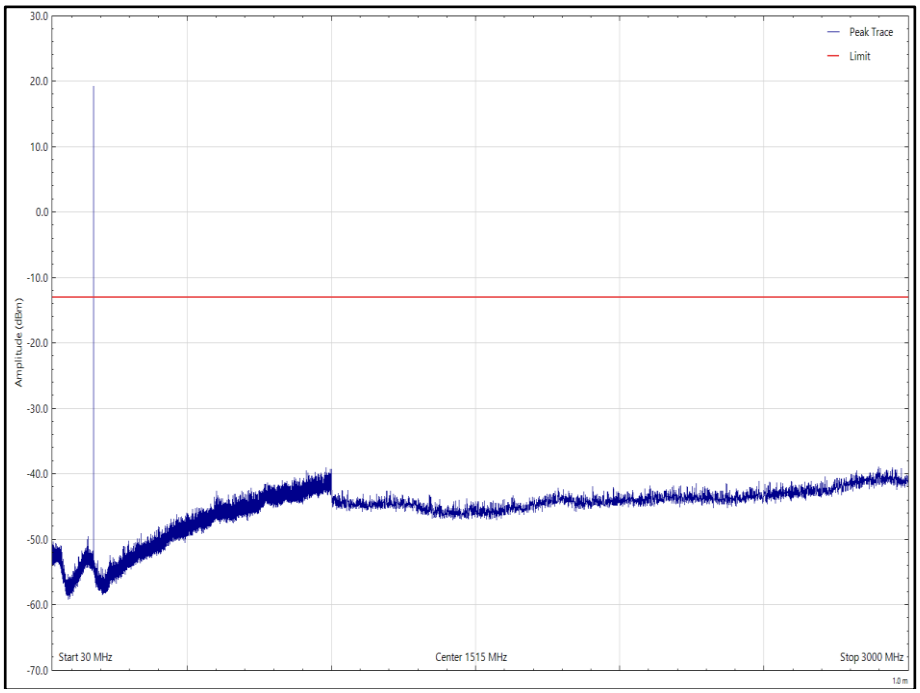

Figure 17 - 173.975 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation Y

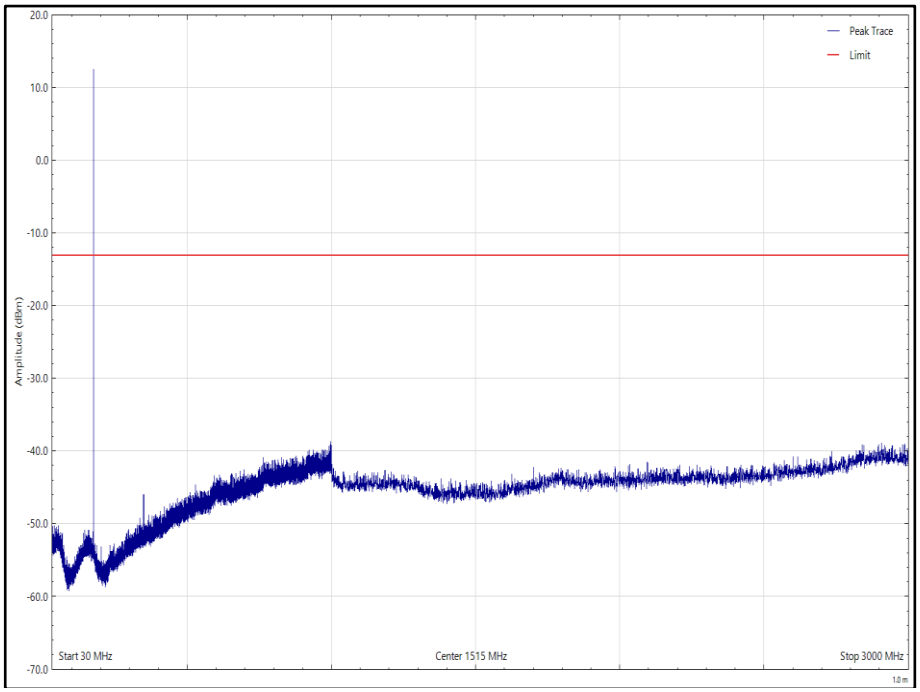

Figure 18 - 173.975 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation Z

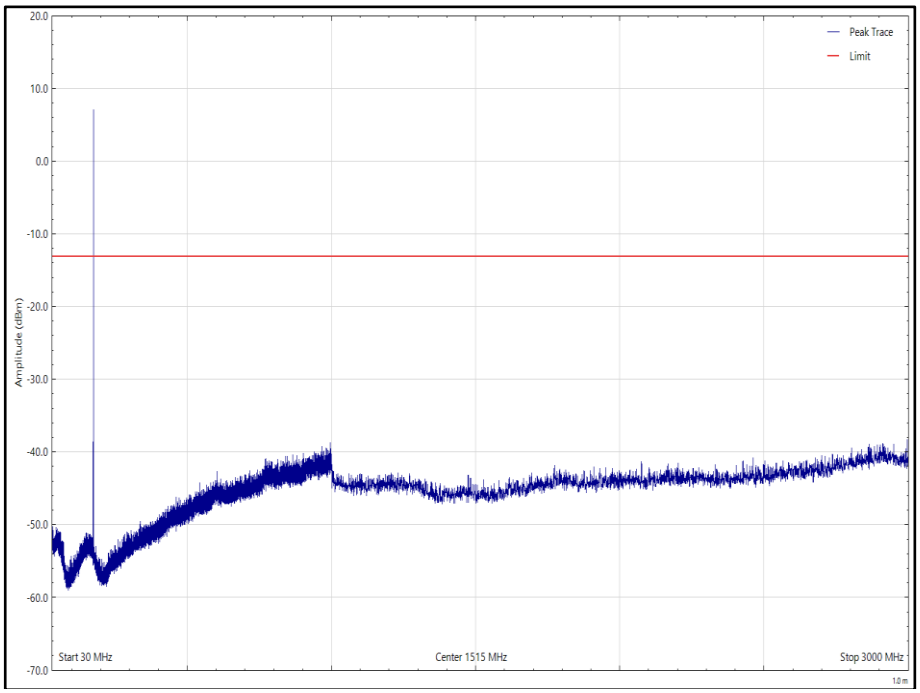

Figure 19 - 173.975 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation Z

FCC 47 CFR Part 90, Limit Clause 90.210

The EUT shall comply with emission mask B as per FCC 47 CFR Part 90, Clause 90.210.

Industry Canada RSS-119, Limit Clause 5.8

The EUT shall comply with emission mask B as per ISED RSS-119. Clause 5.8.

TETRA - 148-149.9 MHz (ISEDC only)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

Table 19 - 148.025 MHz

*No emissions were detected within 10 dB of the limit.

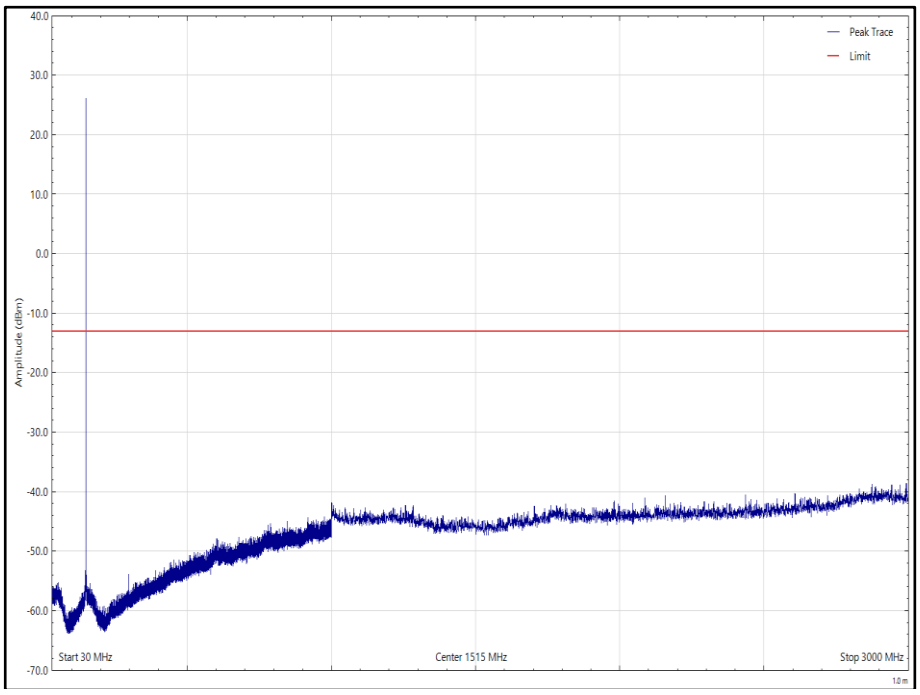

Figure 20 - 148.025 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation X

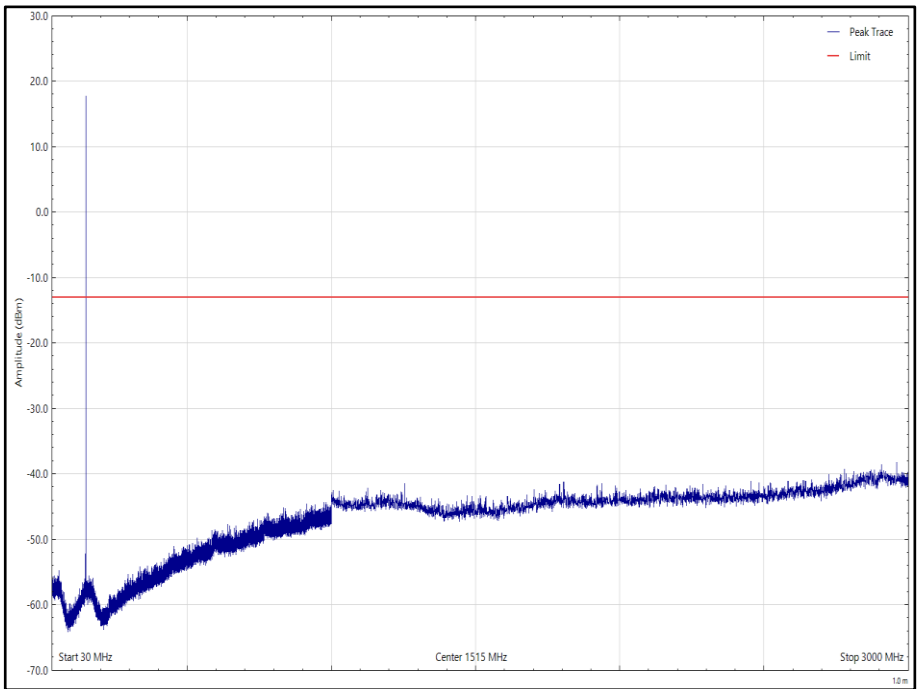

Figure 21 - 148.025 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation X

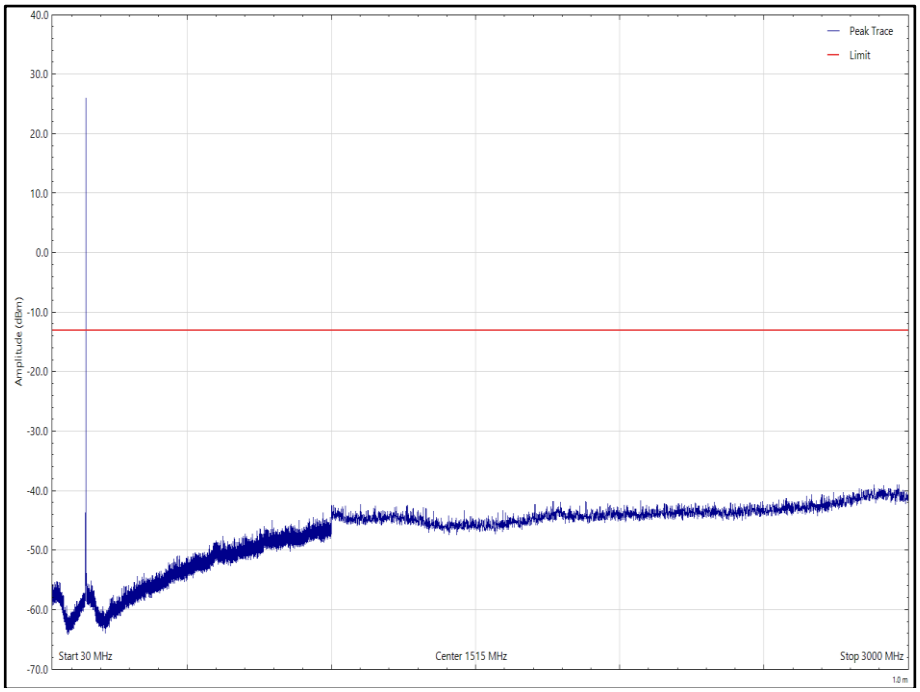

Figure 22 - 148.025 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation Y

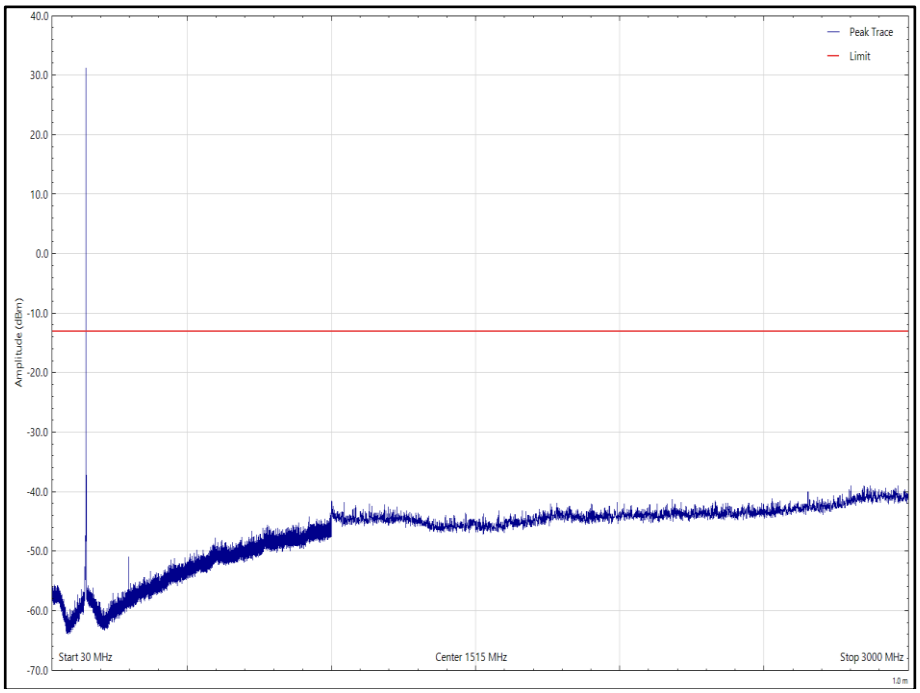

Figure 23 - 148.025 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation Y

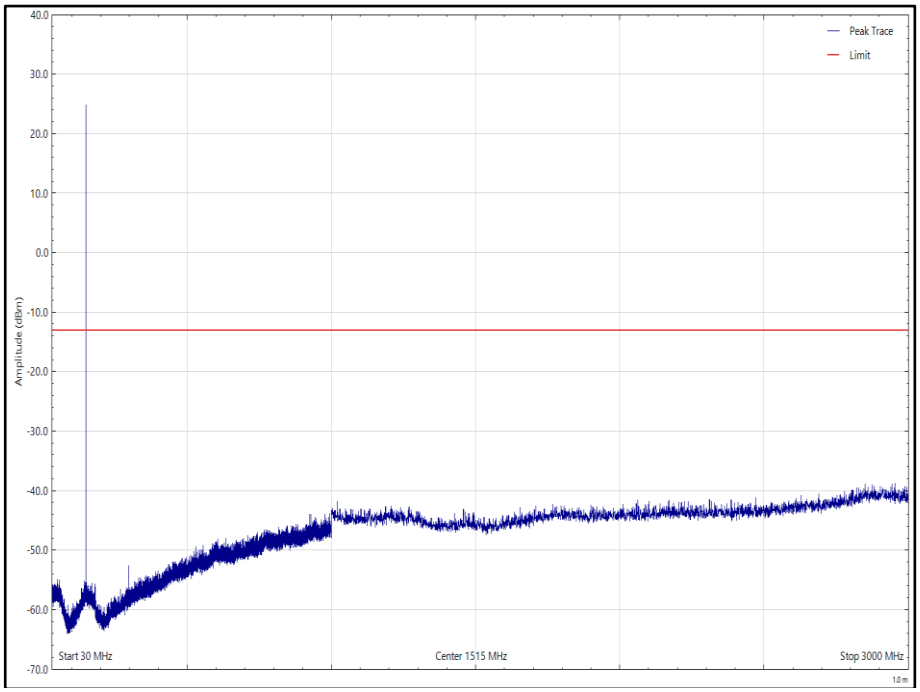

Figure 24 - 148.025 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation Z

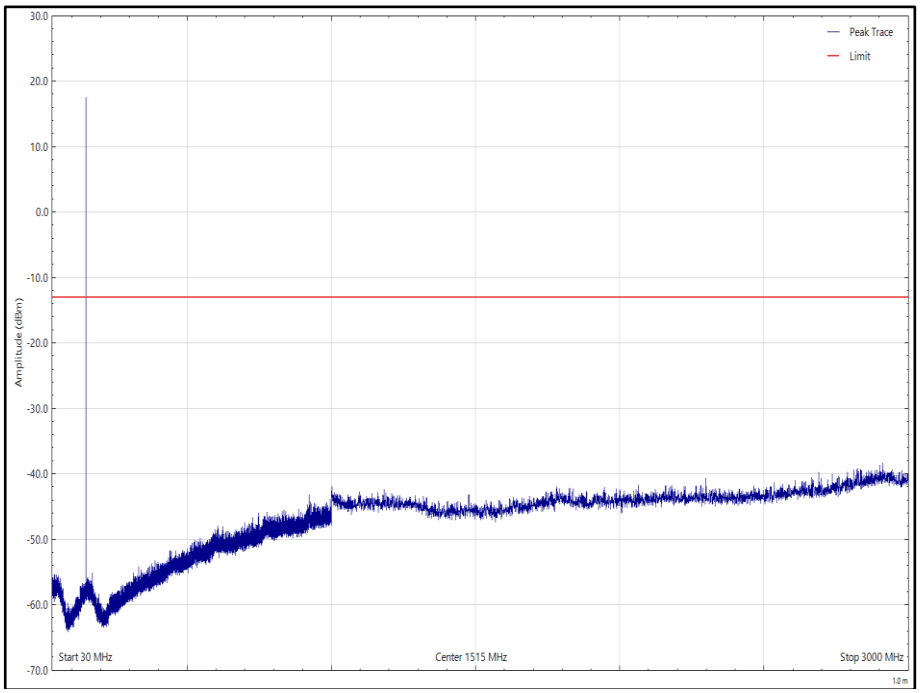

Figure 25 - 148.025 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation Z

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

Table 20 - 149.875 MHz

*No emissions were detected within 10 dB of the limit.

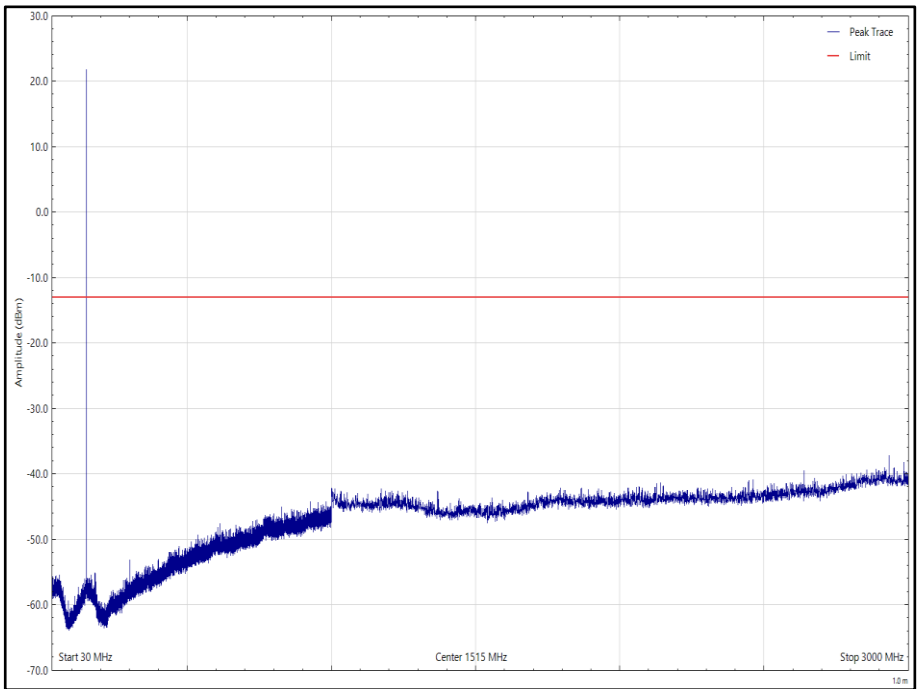

Figure 26 - 149.875 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation X

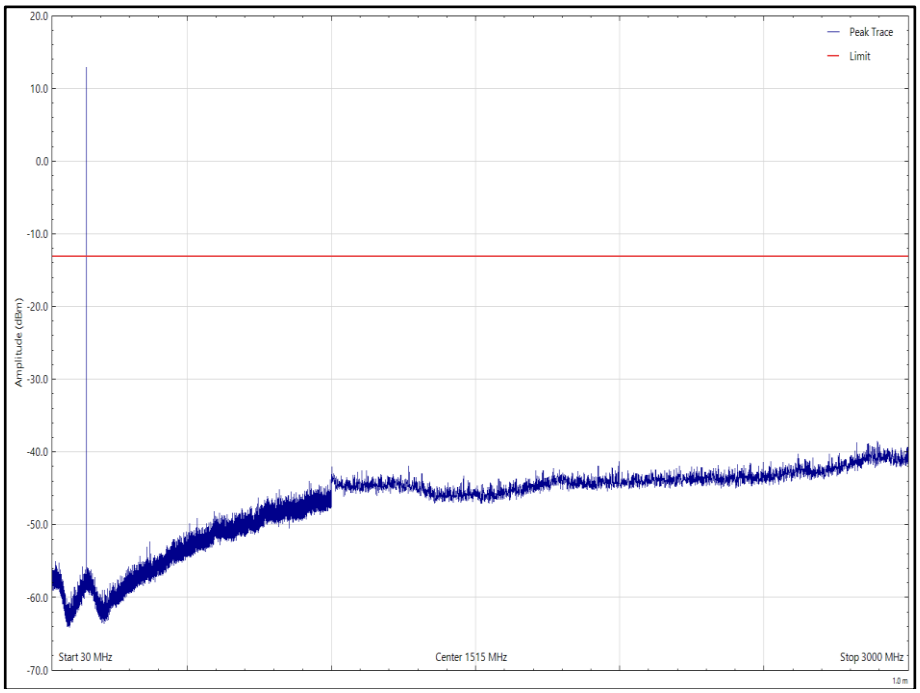

Figure 27 - 149.875 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation X

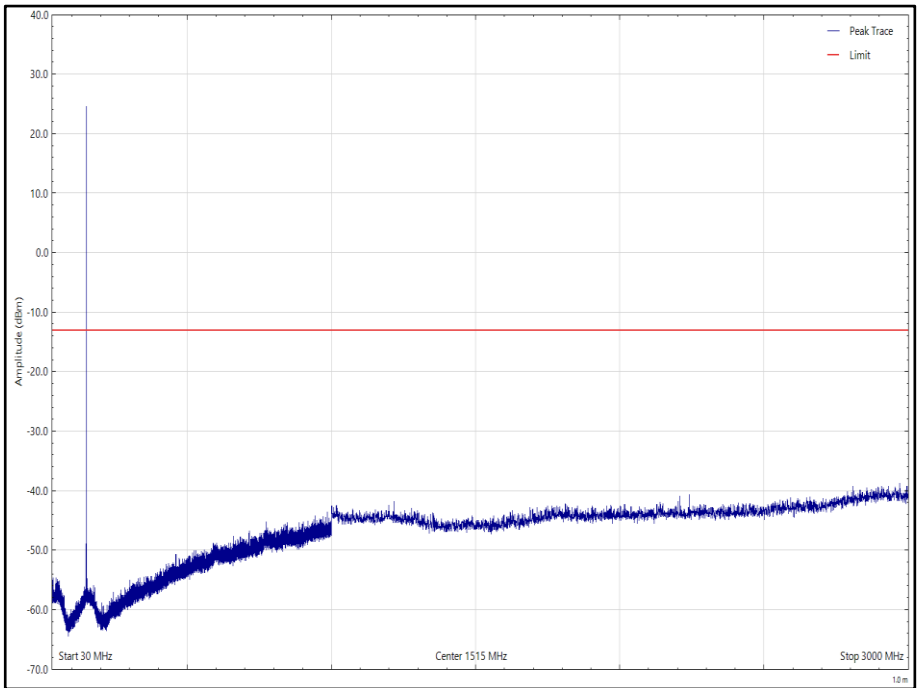

Figure 28 - 149.875 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation Y

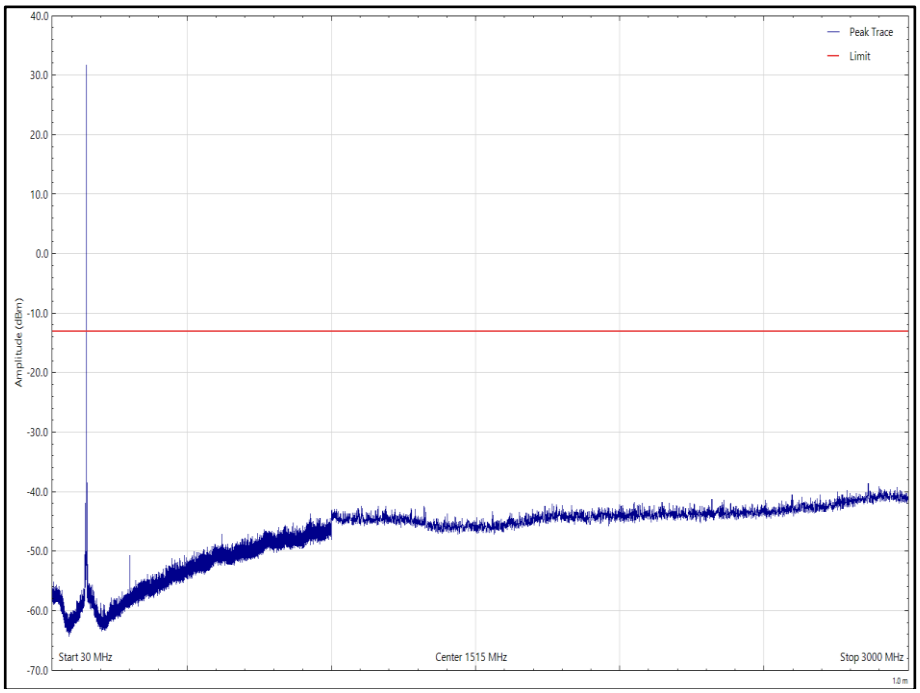

Figure 29 - 149.875 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation Y

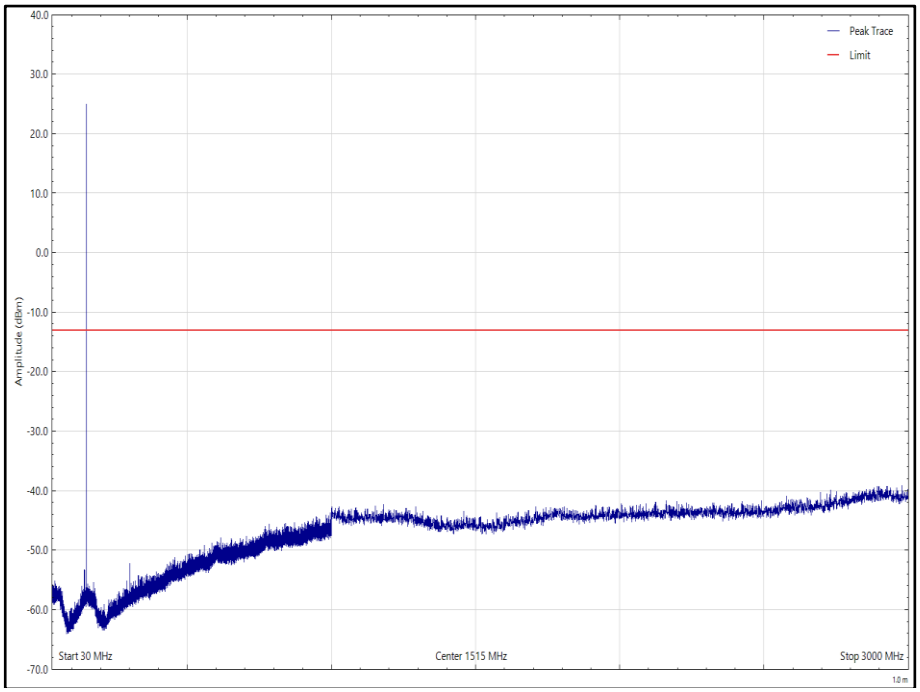

Figure 30 - 149.875 MHz - 30 MHz to 3 GHz, Horizontal, EUT Orientation Z

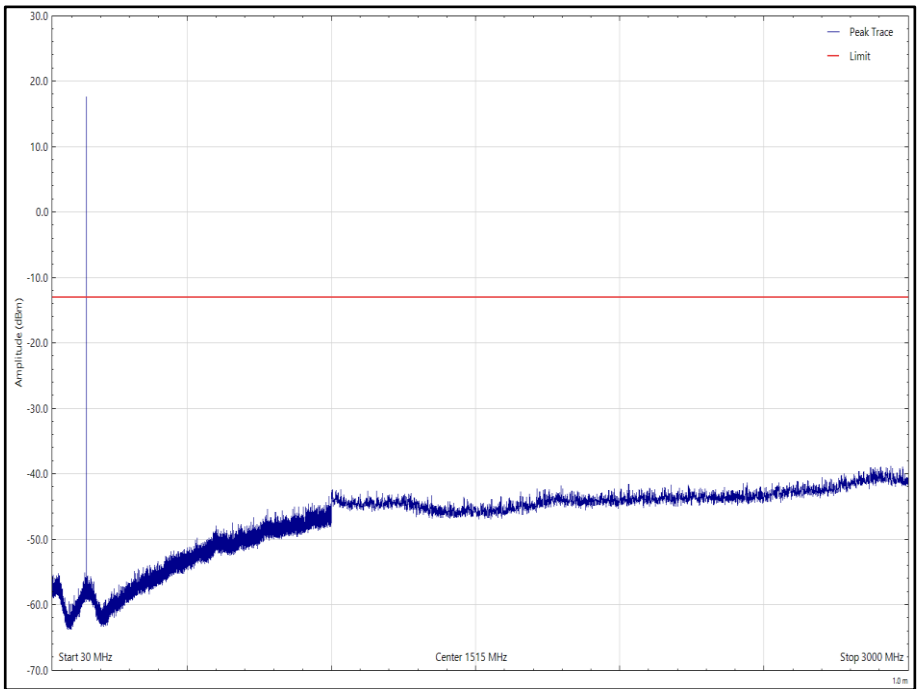

Figure 31 - 149.875 MHz - 30 MHz to 3 GHz, Vertical, EUT Orientation Z

Industry Canada RSS-119, Limit Clause 5.8

The EUT shall comply with emission mask B as per ISED RSS-119. Clause 5.8.

TETRA - 138-144 MHz (ISEDC only)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

Table 21 - 138.025 MHz

*No emissions were detected within 10 dB of the limit.

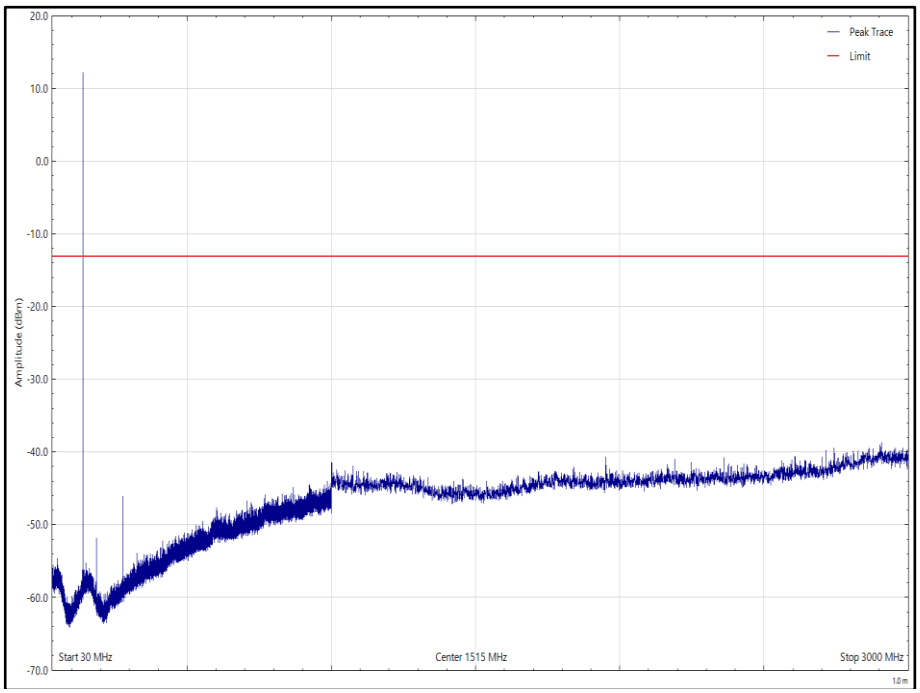

Figure 32 - 138.025 MHz - 30 MHz to 3 GHz, Horizontal EUT Orientation X

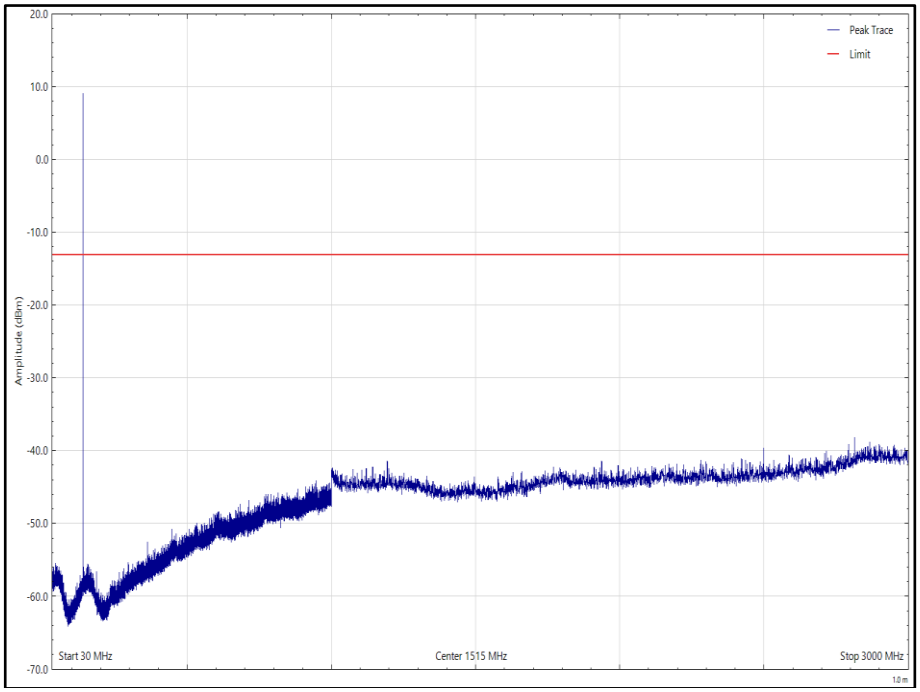

Figure 33 - 138.025 MHz - 30 MHz to 3 GHz, Vertical EUT Orientation X

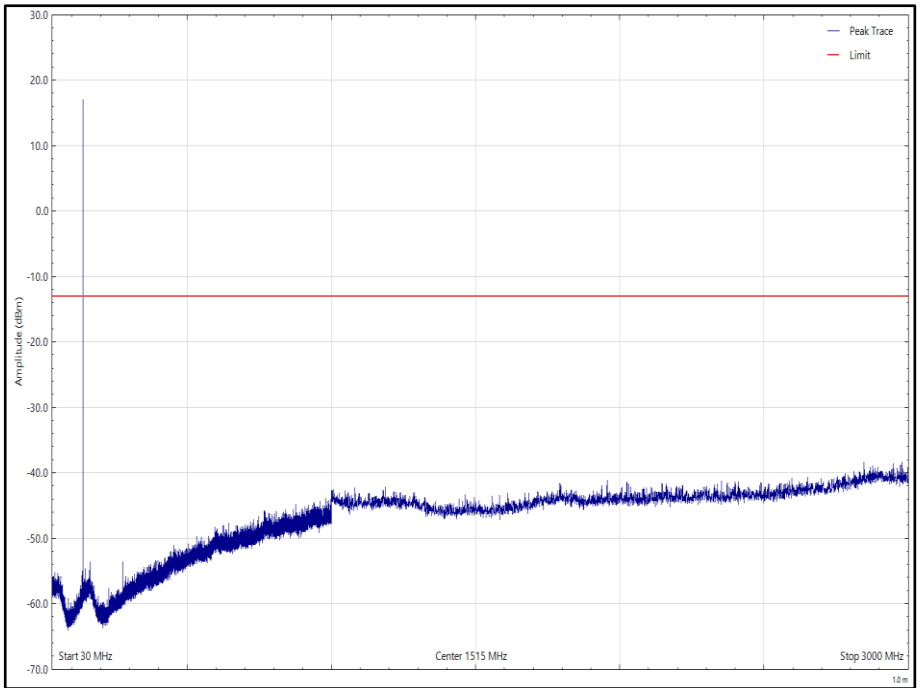

Figure 34 - 138.025 MHz - 30 MHz to 3 GHz, Horizontal EUT Orientation Y

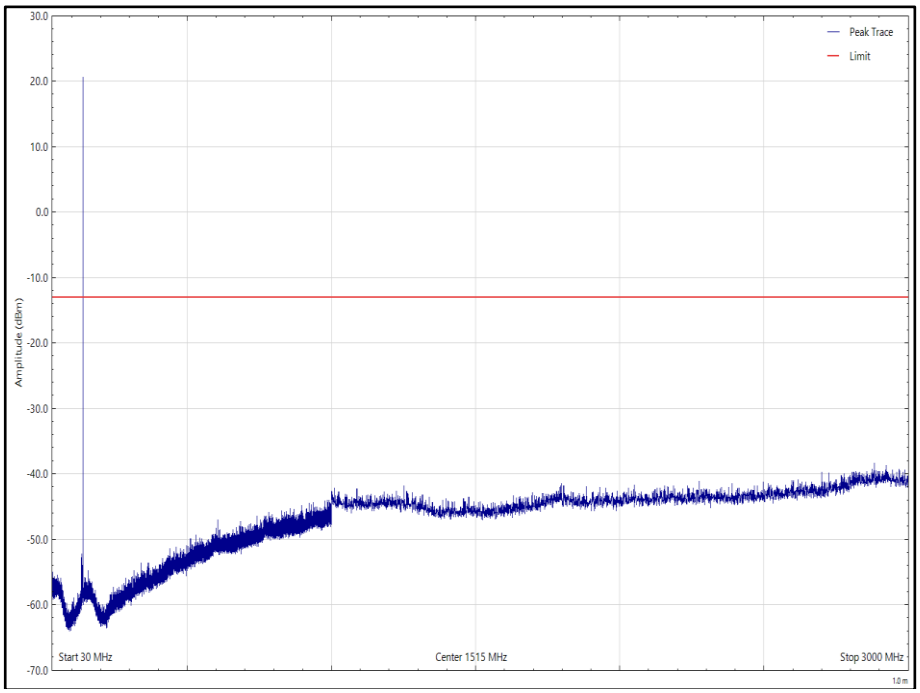

Figure 35 - 138.025 MHz - 30 MHz to 3 GHz, Vertical EUT Orientation Y

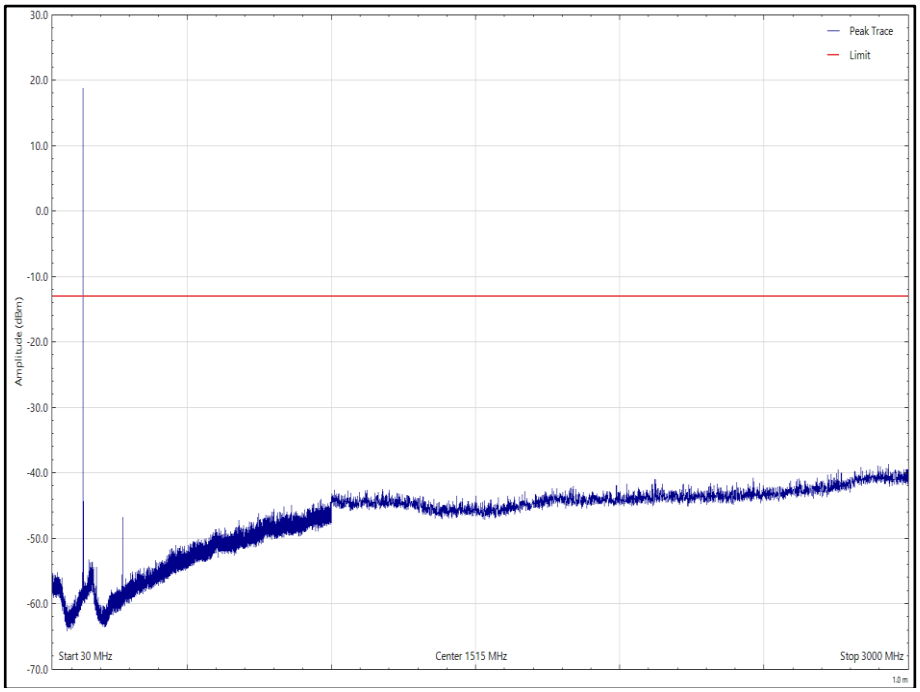

Figure 36 - 138.025 MHz - 30 MHz to 3 GHz, Horizontal EUT Orientation Z

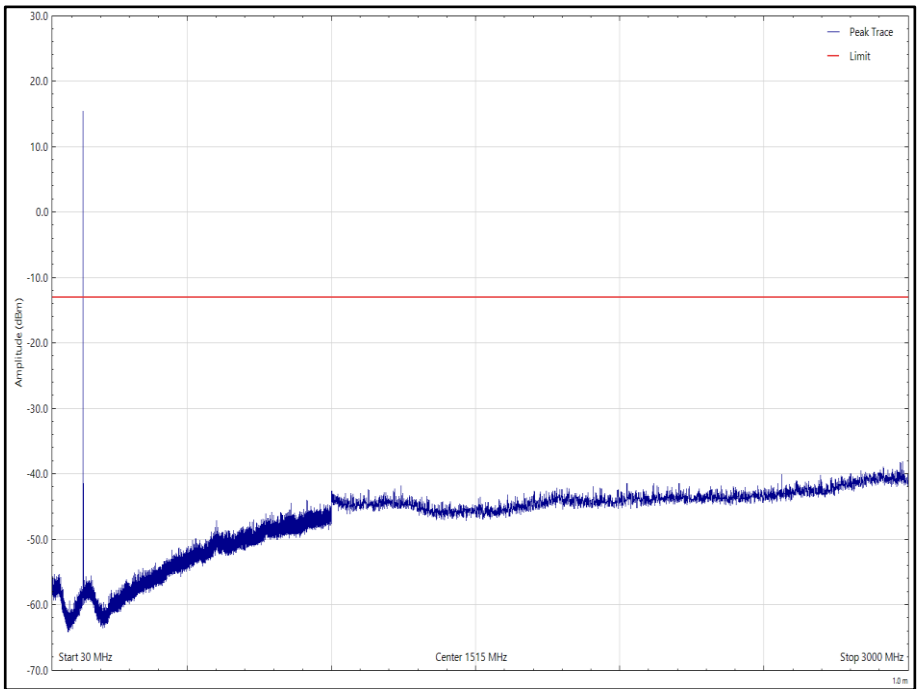

Figure 37 - 138.025 MHz - 30 MHz to 3 GHz, Vertical EUT Orientation Z

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Angle (°)	Height (cm)	Polarisation	Orientation
*								

Table 22 - 143.975 MHz

*No emissions were detected within 6 dB of the limit.

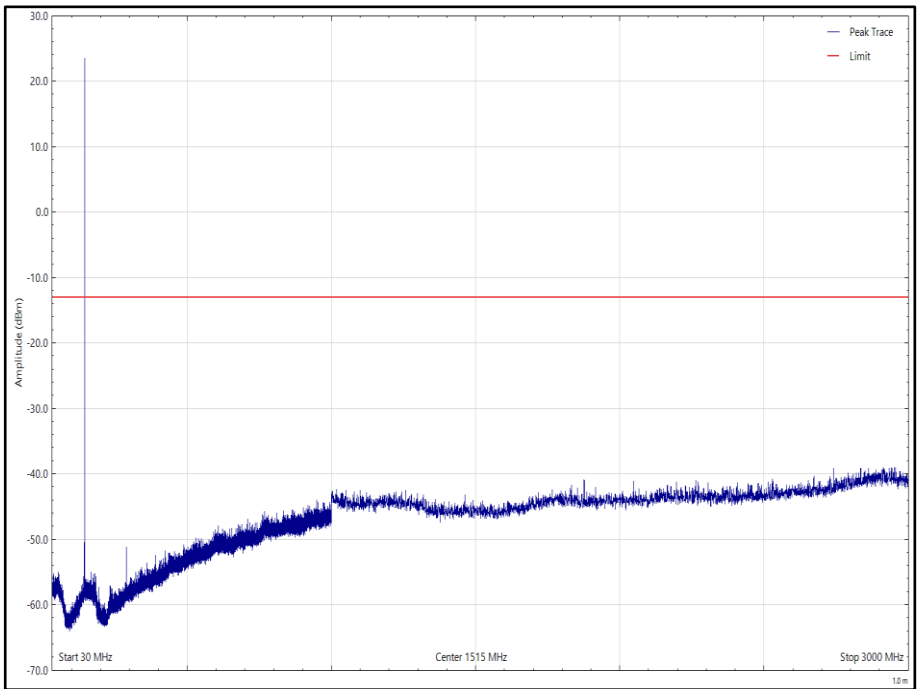

Figure 38 - 143.975 MHz - 30 MHz to 3 GHz, Horizontal EUT Orientation X

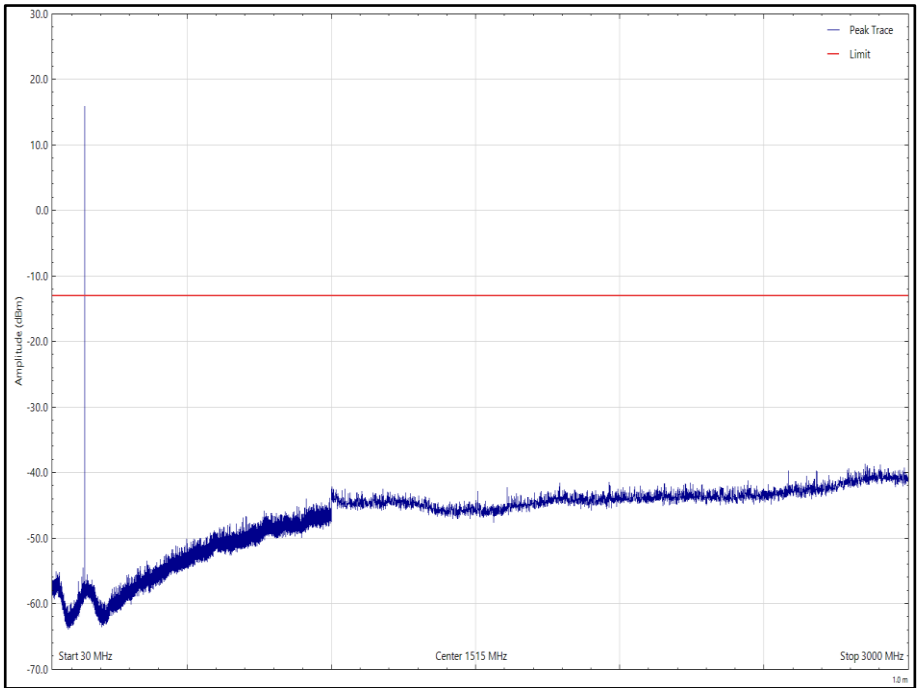

Figure 39 - 143.975 MHz - 30 MHz to 3 GHz, Vertical EUT Orientation X

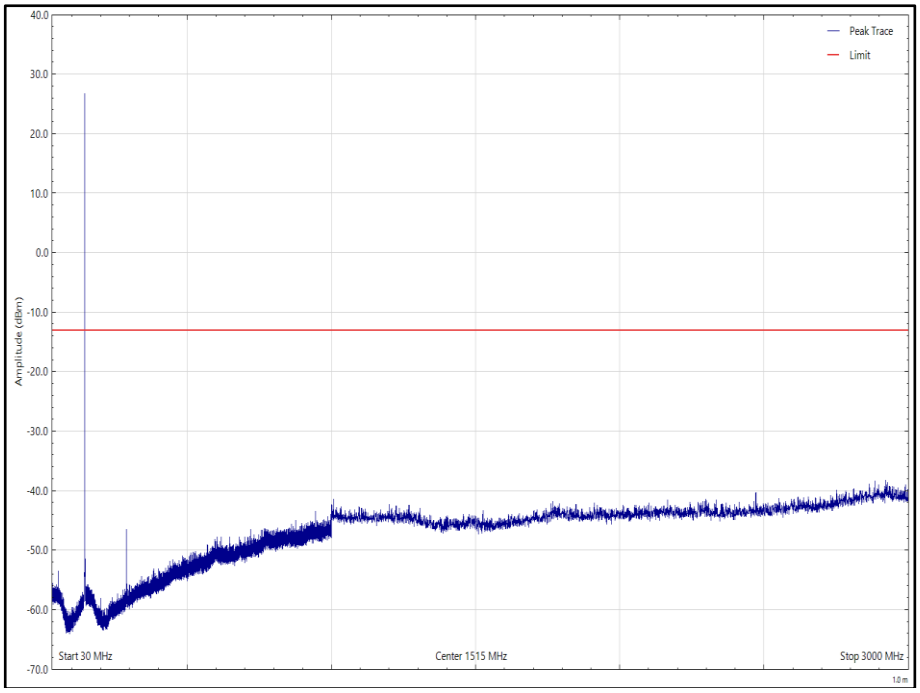

Figure 40 - 143.975 MHz - 30 MHz to 3 GHz, Horizontal EUT Orientation Y

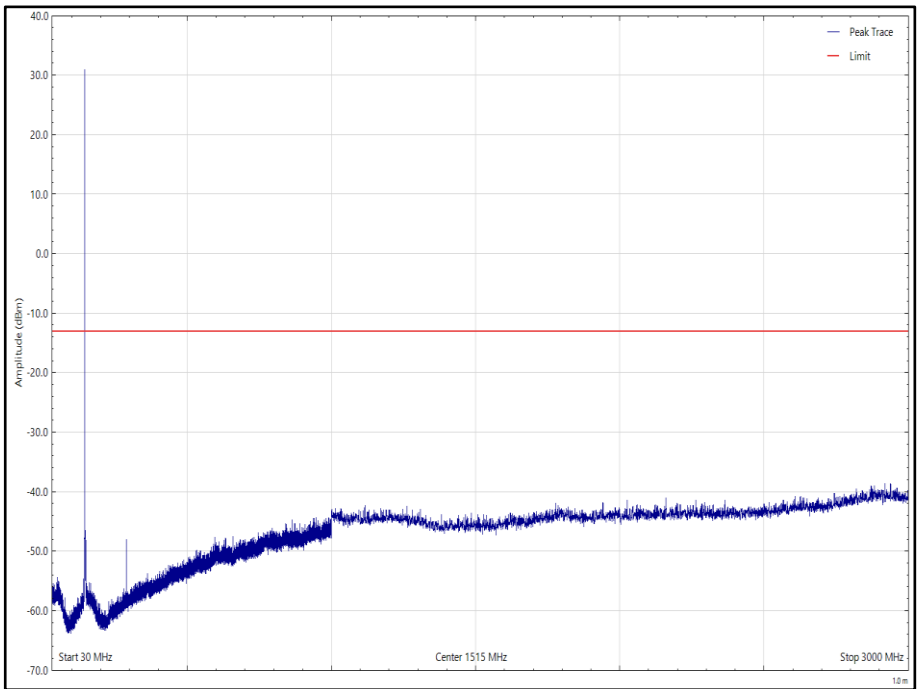

Figure 41 - 143.975 MHz - 30 MHz to 3 GHz, Vertical EUT Orientation Y

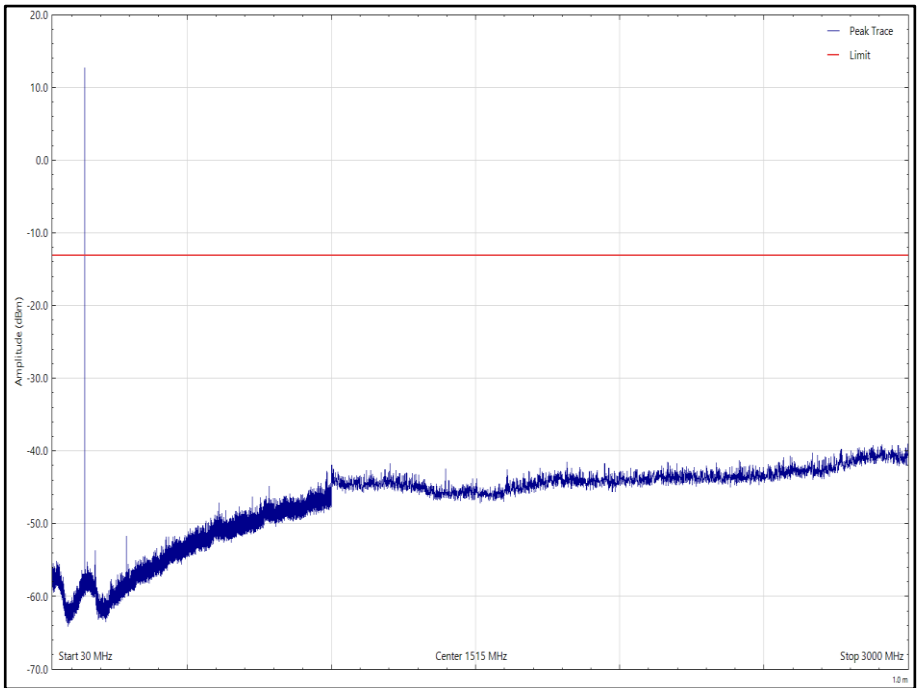

Figure 42 - 143.975 MHz - 30 MHz to 3 GHz, Horizontal EUT Orientation Z

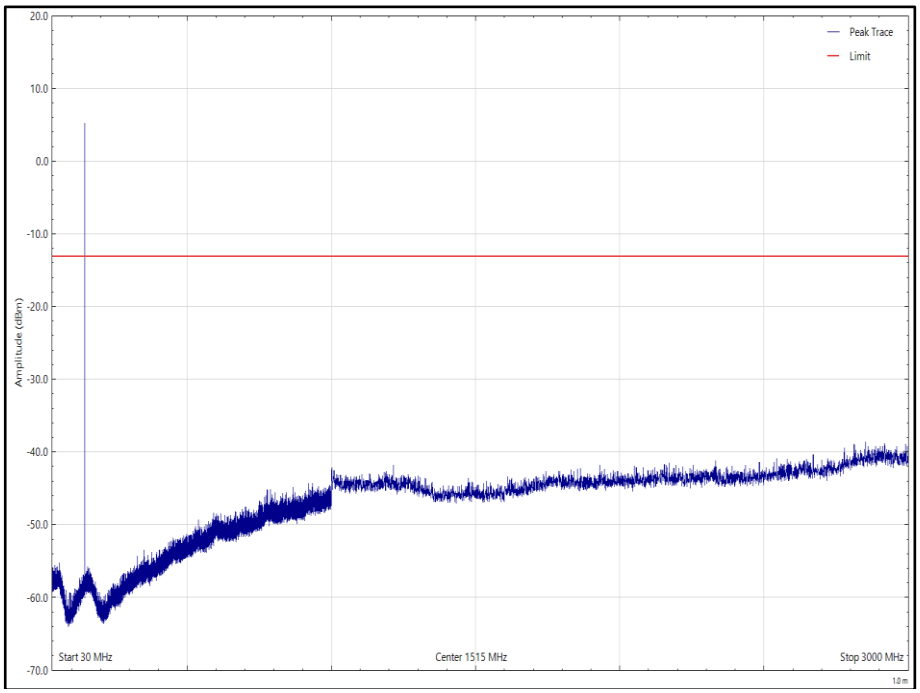

Figure 43 - 143.975 MHz - 30 MHz to 3 GHz, Vertical EUT Orientation Z

Industry Canada RSS-119, Limit Clause 5.8

The EUT shall comply with emission mask B as per ISED RSS-119. Clause 5.8.

2.1.7 Test Location and Test Equipment Used

This test was carried out in RF Chamber 11.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Test Receiver	Rohde & Schwarz	ESW44	5084	12	04-Nov-2024
Emissions Software	TUV SUD	EmX V3.4.2	5125	-	Software
3m Semi-Anechoic Chamber	Rainford	RF Chamber 11	5136	36	24-Nov-2024
Mast	Maturo	TAM 4.0-P	5158	-	TU
Mast and Turntable Controller	Maturo	Maturo NCD	5159	-	TU
Turntable	Maturo	TT 15WF	5160	-	TU
Antenna (DRG, 1 GHz to 10.5 GHz)	Schwarzbeck	BBHA9120B	5215	12	14-Jul-2025
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5481	12	13-May-2025
Cable (K-Type to K-Type, 1 m)	Junkosha	MWX241-01000KMSKMS/A	5512	12	23-May-2025
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5518	12	18-Apr-2025
Antenna (Tri-log, 30 MHz to 1 GHz)	Schwarzbeck	VULB 9168	5942	24	24-May-2026
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6330	12	17-Feb-2025

Table 23

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

2.2 Maximum Conducted Output Power

2.2.1 Specification Reference

FCC 47 CFR Part 90, Clause 90.205
FCC 47 CFR Part 2, Clause 2.1046
Industry Canada RSS-119, Clause 5.4
ISED RSS-GEN, Clause 6.12

2.2.2 Equipment Under Test and Modification State

SC2021, S/N: 1PR002417GKZ793 - Modification State 0

2.2.3 Date of Test

21-August-2024

2.2.4 Test Method

The test was applied in accordance with the test method requirements of FCC 47 CFR Part 90, Industry Canada RSS-119, and ISED RSS-GEN with reference to ANSI C63.26, clause 5.2.4.3.1.

The EUT was configured to transmit on maximum power on the bottom and top channel in continuous mode. Additionally, the middle channel was tested where required by ANSI C63.26 table 2.

The EUT was connected to a spectrum analyser via a cable and 50 dB of attenuation.

The path loss was measured using a calibrated signal generator connected to the wanted signal path and entered as a reference level offset in the spectrum analyser.

The RBW of the spectrum analyser was set to 22 kHz and the video bandwidth to 68 kHz with the trace set to average using an RMS detector over 1001 samples and the result was recorded.

The EUT was powered by a 7.4V, lithium polymer battery supplied by the manufacturer for the duration of test.

2.2.5 Environmental Conditions

Ambient Temperature	17.8 °C
Relative Humidity	69.5 %

2.2.6 Test Results

TETRA - 150.05-174 MHz (FCC and ISEDC)

Parameter	150.075 MHz	162.00 MHz	173.975 MHz
Conducted Output Power (dBm)	34.57	34.61	34.43
Manufacturer Declared Power (dBm)	34.3	34.3	34.3
Δ from manufacturer Power (dB)	0.27	0.31	0.13
Antenna Gain (dBi)	5	5	5
ERP (dBm)	37.42	37.46	37.28

Table 24 - ERP

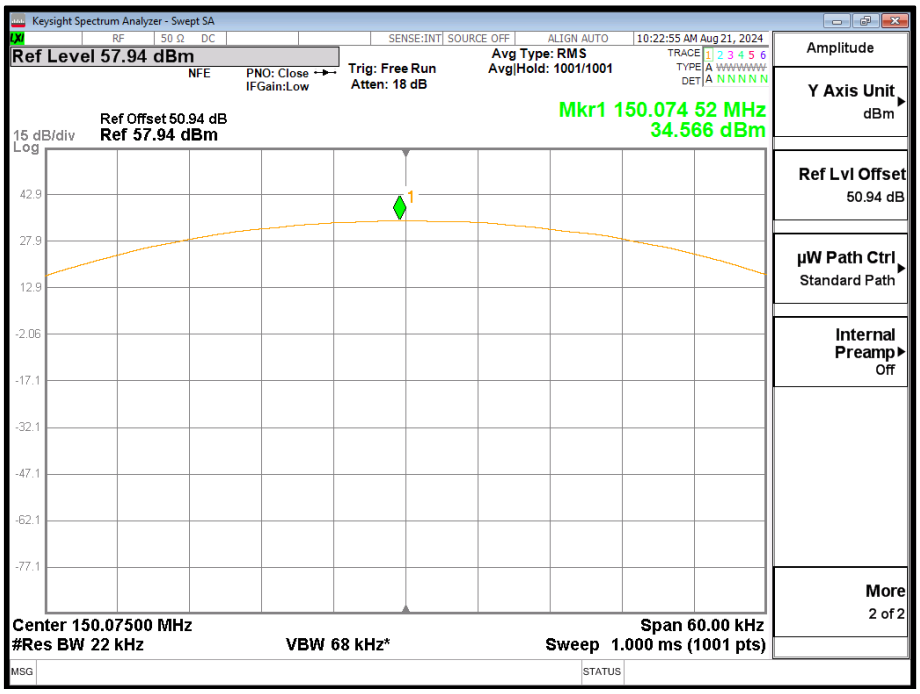

Figure 44 - 150.075 MHz

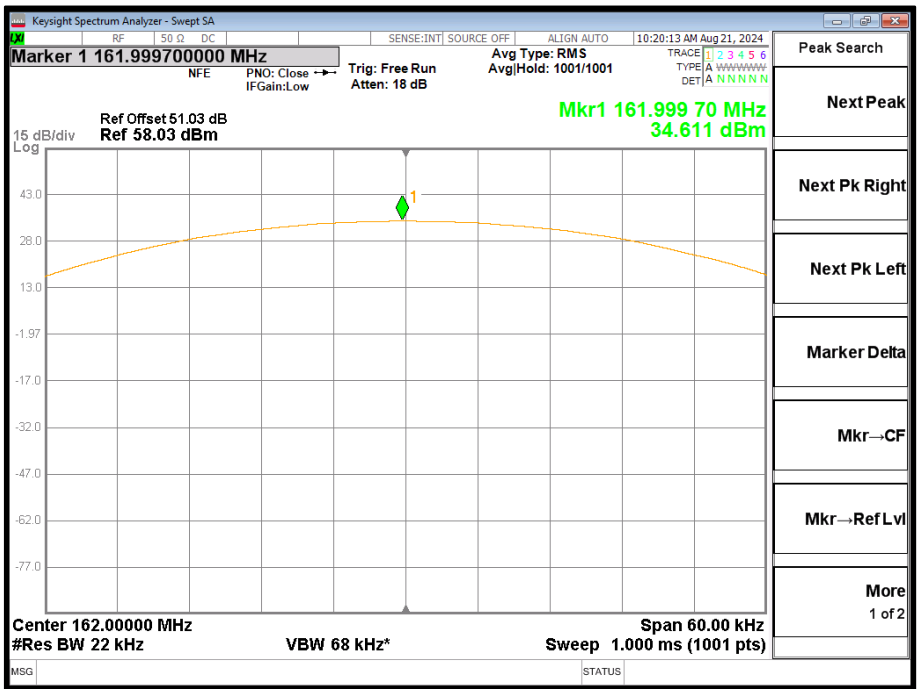

Figure 45 - 162.00 MHz

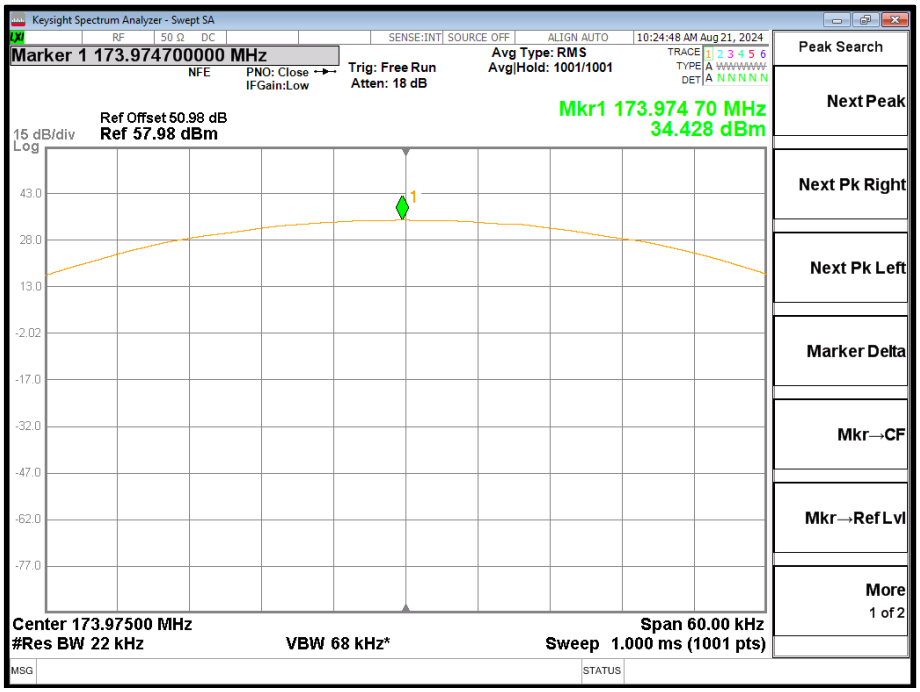

Figure 46 - 173.975 MHz

FCC 47 CFR Part 90, Limit Clause 90.205

Frequency (MHz)	Limit
< 25	1000 W
25 to 50	300 W
72 to 76	300 W
150 to 174	Refer to 90.205 (d) of the specification
217 to 220	Refer to 90.259 of the specification
220 to 222	Refer to 90.729 of the specification
421 to 430	Refer to 90.279 of the specification
450 to 470	Refer to 90.205 (h) of the specification
470 to 512	Refer to 90.307 and 90.309 of the specification
758 to 775 and 788 to 805	Refer to 90.541 and 90.542 of the specification
806 to 824, 851 to 869, 869 to 901 and 935 to 940	Refer to 90.635 of the specification
902 to 927.25	LMS systems operating pursuant to subpart M of the specification : 30 W
927.25 to 928	LMS equipment: 300 W
929 to 930	Refer to 90.494 of the specification
1427 to 1429.5 and 1429.5 to 1432	Refer to 90.259 of the specification
2450 to 2483.5	5 W
4940 to 4990	Refer to 90.1215 of the specification
5850 to 5925	Refer to subpart M of the specification
All other frequency bands	On a case by case basis

Table 25 - FCC Limits for Maximum ERP

Industry Canada RSS-119, Limit Clause 5.4

The output power shall be within ±1 dB of the manufacturer's rated power listed in the equipment specifications.

Frequency (MHz)	Transmitter Output Power (W)	
	Base/Fixed Equipment	Mobile Equipment
27.41 to 28 and 29.7 to 50	300	30
72 to 76	No Limit	1
138 to 174	111100	60
217 to 217 and 219 to 220	See SRSP-512 for ERP limit	30*
220 to 222	110	50
406.1 to 430 and 450 to 470	See SRSP-511 for ERP limit	60
768 to 776 and 798 to 806	110	30 3 W ERP for portable equipment
806 to 821, 851 to 866, 821 to 824 and 866 to 869	110	30
896 to 901 and 935 to 940	110	60
929 to 930 and 931 to 932	110	30
928 to 929, 952 to 953, 932 to 932.5 and 941 to 941.5	110	30
932.5 to 935 ad 941.5 to 944	110	30
*Equipment is generally authorised for effective radiated power (ERP) of less than 5 W.		

Table 26 - Industry Canada Limits for Transmitter Output Power

TETRA - 148-149.9 MHz (ISEDC only)

Parameter	148.025 MHz	149.875 MHz
Conducted Output Power (dBm)	34.58	34.68
Manufacturer Declared Power (dBm)	34.3	34.3
Δ from manufacturer Power (dB)	0.28	0.38
Antenna Gain (dBi)	5	5
ERP (dBm)	38.43	38.53

Table 27 - ERP

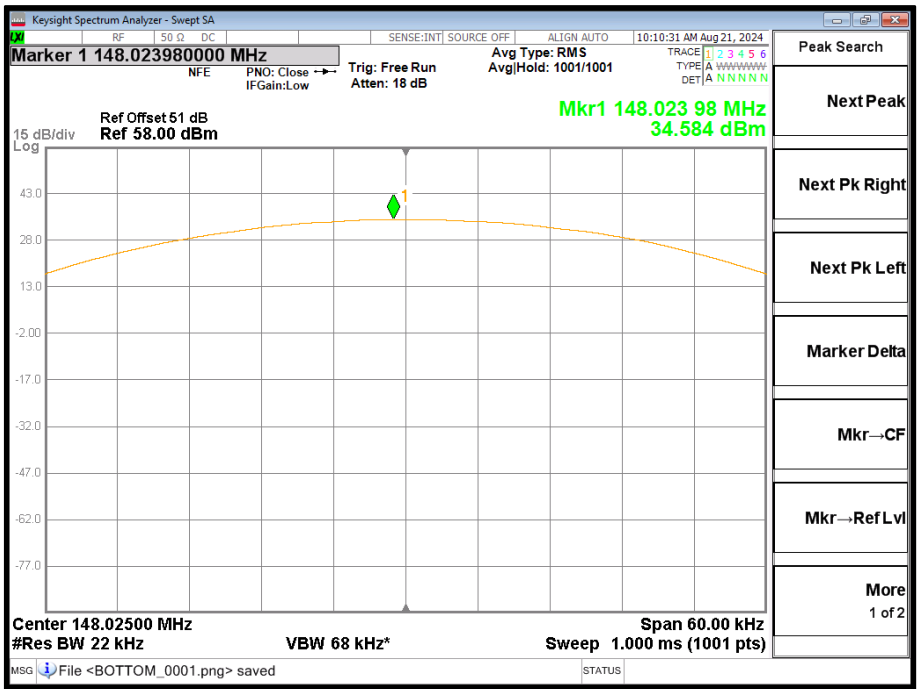

Figure 47 - 148.025 MHz

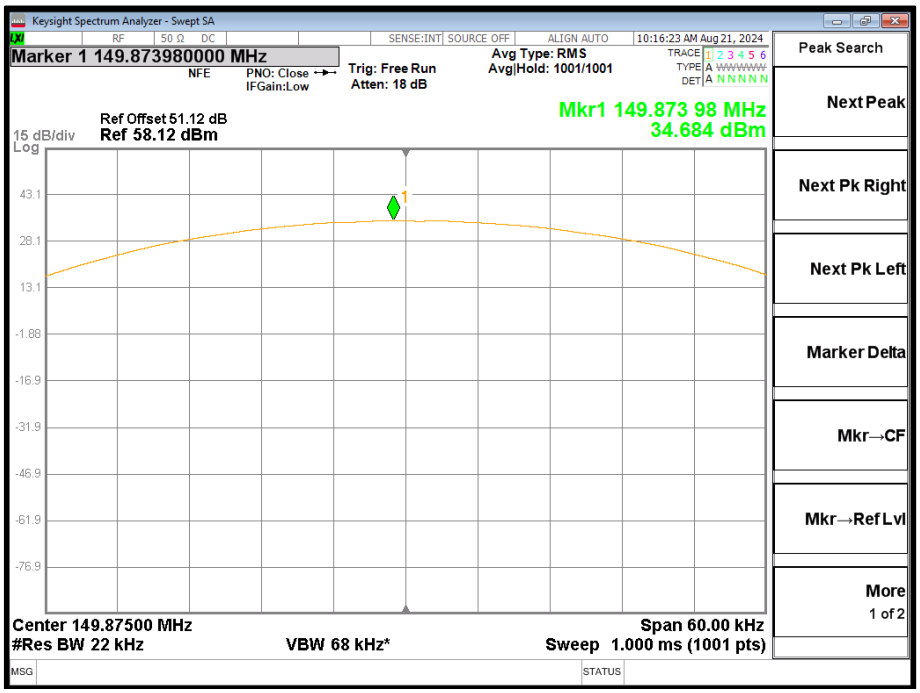

Figure 48 149.875 MHz

Industry Canada RSS-119, Limit Clause 5.4

The output power shall be within ±1 dB of the manufacturer's rated power listed in the equipment specifications.

Frequency (MHz)	Transmitter Output Power (W)	
	Base/Fixed Equipment	Mobile Equipment
27.41 to 28 and 29.7 to 50	300	30
72 to 76	No Limit	1
138 to 174	111100	60
217 to 217 and 219 to 220	See SRSP-512 for ERP limit	30*
220 to 222	110	50
406.1 to 430 and 450 to 470	See SRSP-511 for ERP limit	60
768 to 776 and 798 to 806	110	30 3 W ERP for portable equipment
806 to 821, 851 to 866, 821 to 824 and 866 to 869	110	30
896 to 901 and 935 to 940	110	60
929 to 930 and 931 to 932	110	30
928 to 929, 952 to 953, 932 to 932.5 and 941 to 941.5	110	30
932.5 to 935 ad 941.5 to 944	110	30
*Equipment is generally authorised for effective radiated power (ERP) of less than 5 W.		

Table 28 - Industry Canada Limits for Transmitter Output Power

TETRA - 138-144 MHz (ISEDC only)

Parameter	138.025 MHz	143.975 MHz
Conducted Output Power (dBm)	34.40	34.37
Manufacturer Declared Power (dBm)	34.30	34.30
Δ from manufacturer Power (dB)	0.10	0.07
Antenna Gain (dBi)	5	5
ERP (dBm)	37.25	37.22

Table 29 - ERP

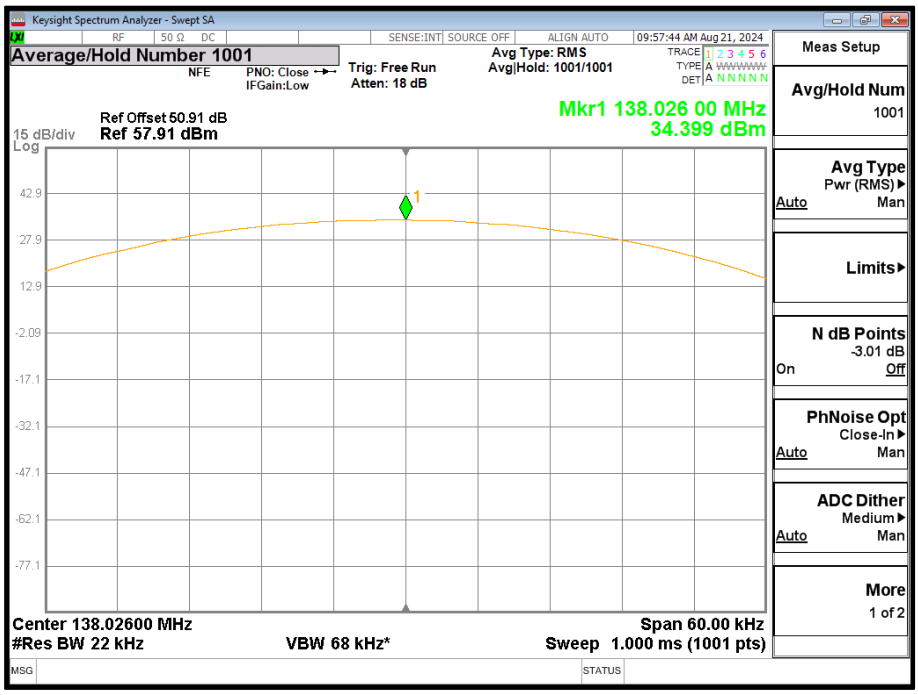

Figure 49 - 138.025 MHz

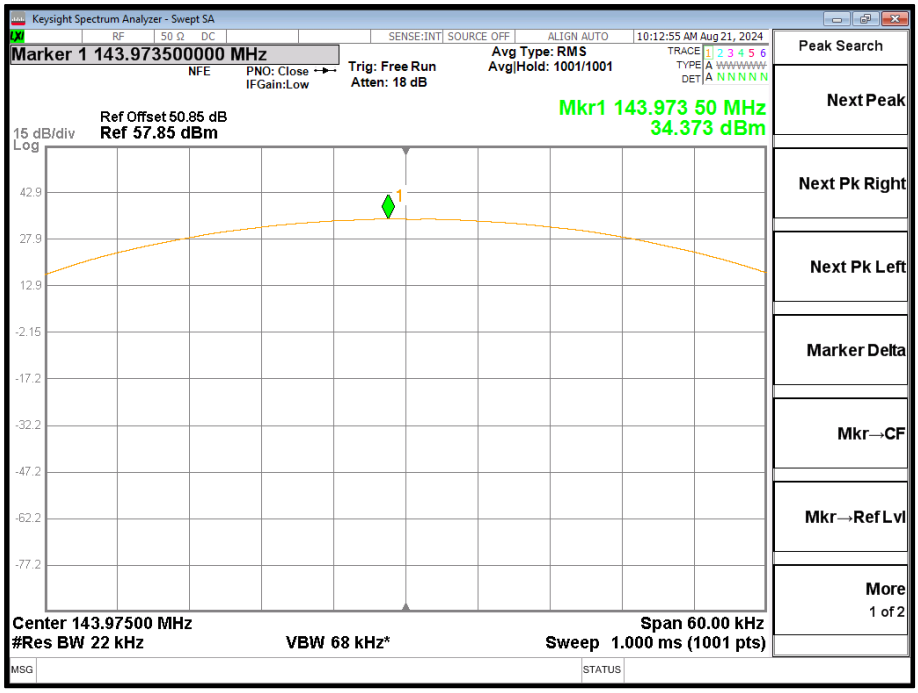

Figure 50 143.975 MHz

Industry Canada RSS-119, Limit Clause 5.4

The output power shall be within ±1 dB of the manufacturer's rated power listed in the equipment specifications.

Frequency (MHz)	Transmitter Output Power (W)	
	Base/Fixed Equipment	Mobile Equipment
27.41 to 28 and 29.7 to 50	300	30
72 to 76	No Limit	1
138 to 174	111100	60
217 to 217 and 219 to 220	See SRSP-512 for ERP limit	30*
220 to 222	110	50
406.1 to 430 and 450 to 470	See SRSP-511 for ERP limit	60
768 to 776 and 798 to 806	110	30 3 W ERP for portable equipment
806 to 821, 851 to 866, 821 to 824 and 866 to 869	110	30
896 to 901 and 935 to 940	110	60
929 to 930 and 931 to 932	110	30
928 to 929, 952 to 953, 932 to 932.5 and 941 to 941.5	110	30
932.5 to 935 ad 941.5 to 944	110	30
*Equipment is generally authorised for effective radiated power (ERP) of less than 5 W.		

Table 30 - Industry Canada Limits for Transmitter Output Power

2.2.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Attenuator (10dB, 10W)	Bird	8343-100	478	12	15-Jul-2025
Signal Generator, 9kHz to 3GHz	Rohde & Schwarz	SMA 100A	3494	12	22-Sep-2024
PXA Signal Analyser	Keysight Technologies	N9030A	4653	12	18-Apr-2025
Hygrometer	Rotronic	HP21	4741	12	30-May-2025
Cable (40 GHz)	Rosenberger	LU1-001-1000	5022	12	04-Feb-2025
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5417	12	06-Jun-2025
Coaxial Fixed Attenuator DC-18GHz 5W 10dB	RF-Lambda	RFS5G18B10SMP	6179	12	11-Oct-2024
Attenuator 5W 30dB DC-18GHz	Aaren	AT40A-4041-D18-30	6559	12	18-Jun-2025

Table 31

2.3 Bandwidth Limitations

2.3.1 Specification Reference

FCC 47 CFR Part 90, Clause 90.209
FCC 47 CFR Part 2, Clause 2.1049
Industry Canada RSS-119, Clause 5.5
ISED RSS-GEN, Clause 6.7

2.3.2 Equipment Under Test and Modification State

SC2021, S/N: 1PR002417GKZ793 - Modification State 0

2.3.3 Date of Test

22-August-2024

2.3.4 Test Method

The test was applied in accordance with the test method requirements of FCC 47 CFR Part 90, Industry Canada RSS-119, and ISED RSS-GEN with reference to ANSI C63.26, Clause 5.4.

The EUT was configured to transmit on maximum power on the bottom and top channel in continuous mode. Additionally, the middle channel was tested where required by ANSI C63.26 table 2.

The EUT was connected to a spectrum analyser via a cable and 50 dB of attenuation. The path loss was measured using a network analyser and entered as a reference level offset in the spectrum analyser including the manufacturers declared maximum antenna gain. The RBW of the spectrum analyser was set to 300 Hz and the video bandwidth to 1 kHz with the trace set to max hold using a peak detector and the result was recorded.

The EUT was powered by a 7.4V, lithium polymer battery supplied by the manufacturer for the duration of test

2.3.5 Environmental Conditions

Ambient Temperature	22.5 - 23.5 °C
Relative Humidity	54.3 - 56.8 %

2.3.6 Test Results

TETRA - 150.05-174 MHz (FCC and ISEDC)

150.075 MHz	162.00 MHz	173.975 MHz
19.551	19.573	19.561

Table 32

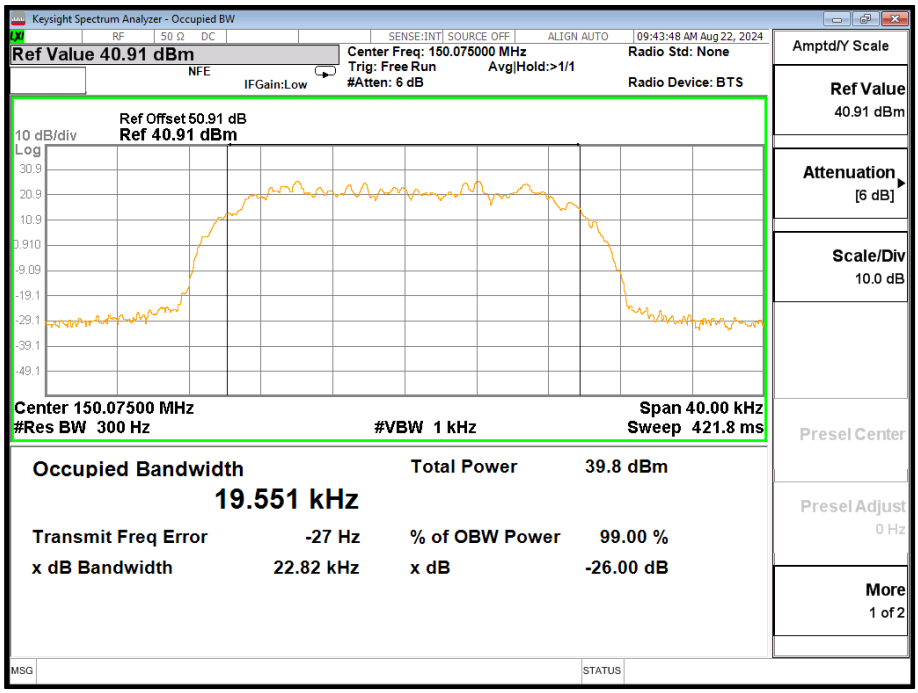

Figure 51 - 150.075 MHz

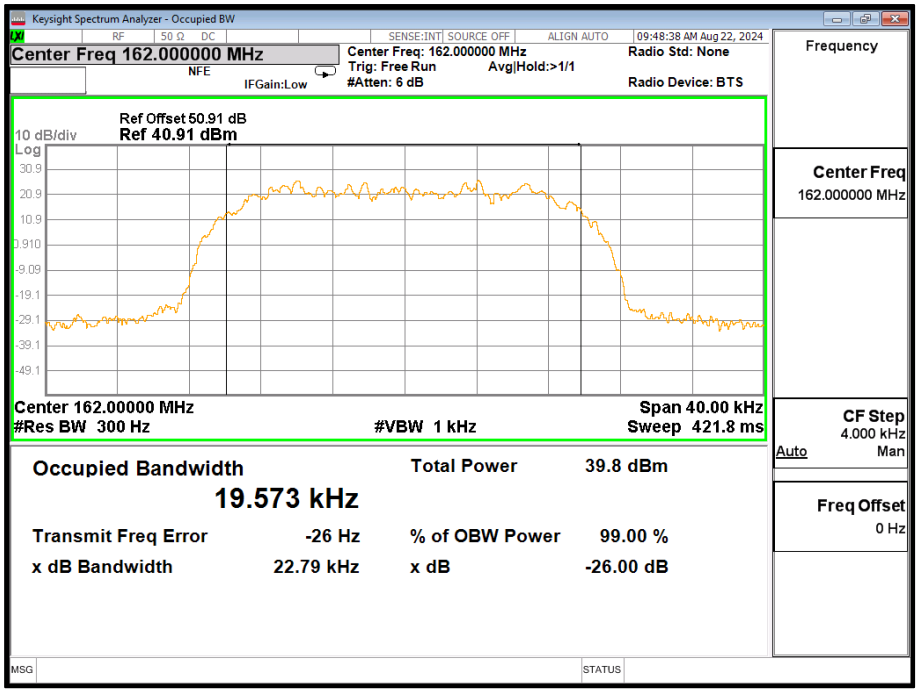

Figure 52- 162.00 MHz

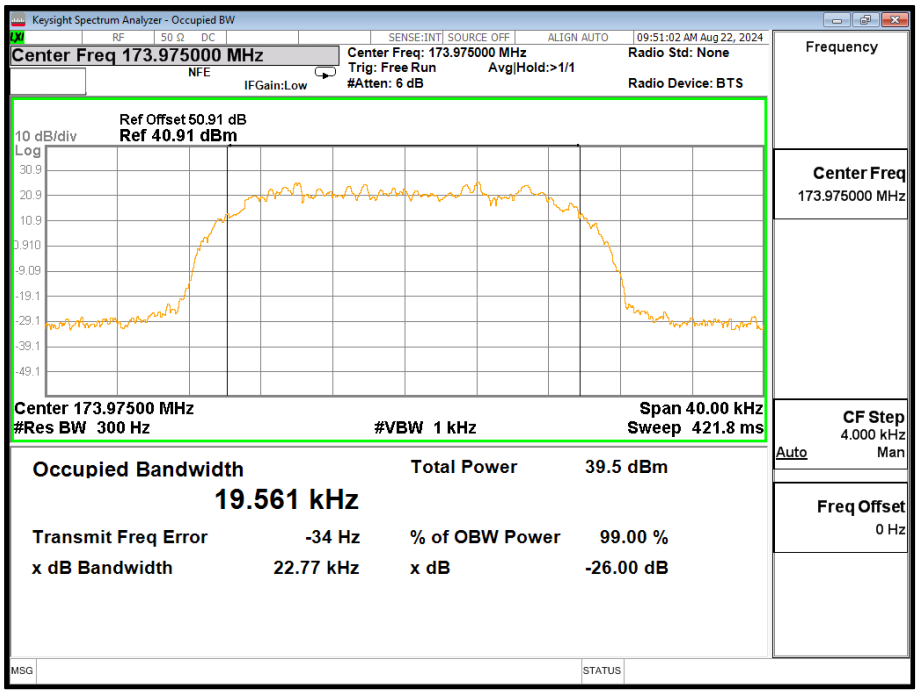

Figure 53- 173.975 MHz

TETRA - 148-149.9 MHz (ISEDC only)

148.025 MHz	149.875 MHz
19.556	19.587

Table 33

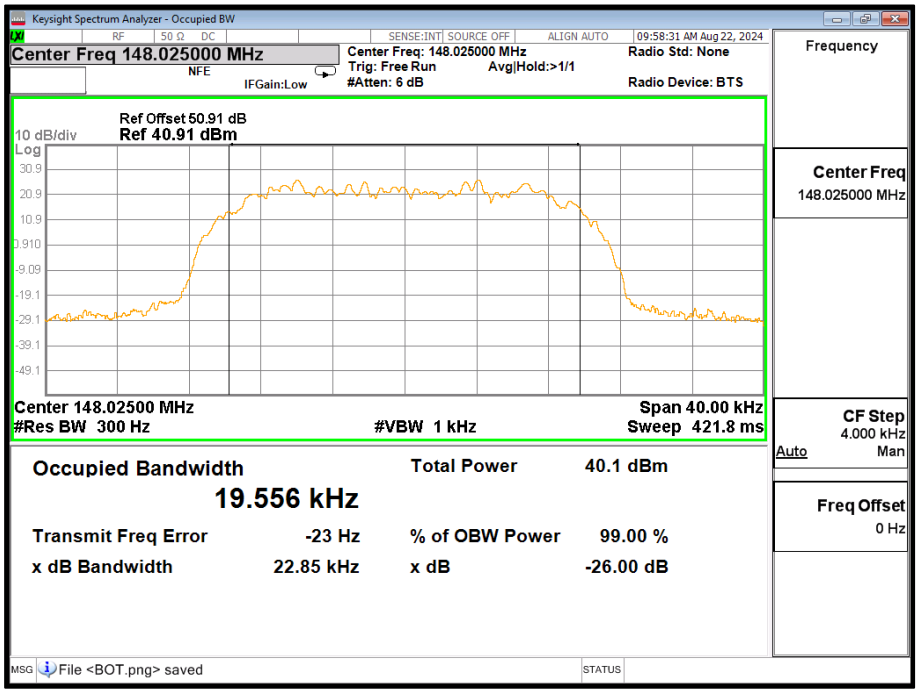

Figure 54 - 148.025 MHz

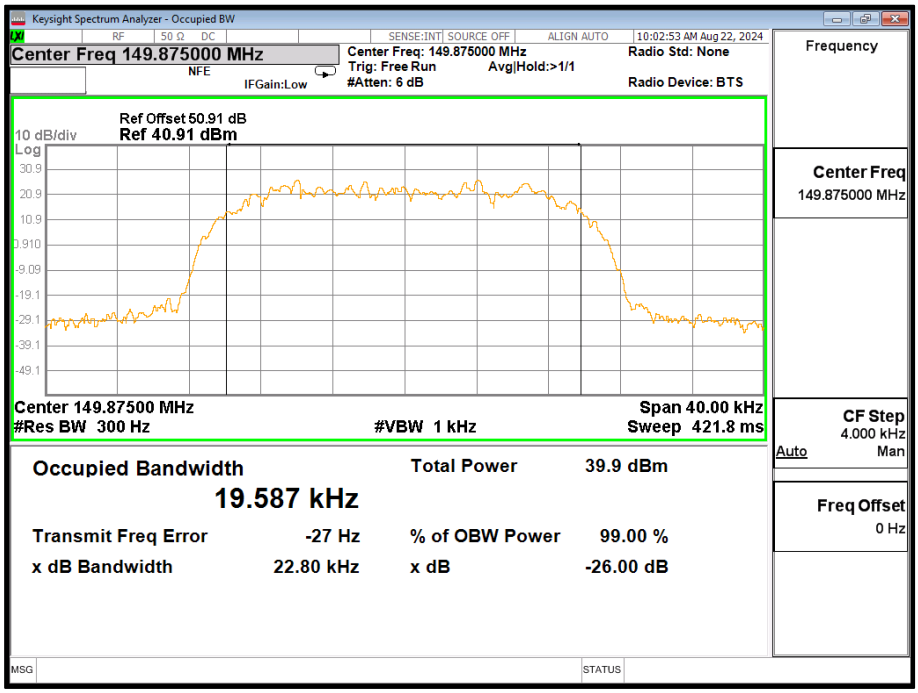

Figure 55 - 149.875 MHz

TETRA - 138-144 MHz (ISEDC only)

138.025 MHz	143.975 MHz
19.540	19.532

Table 34

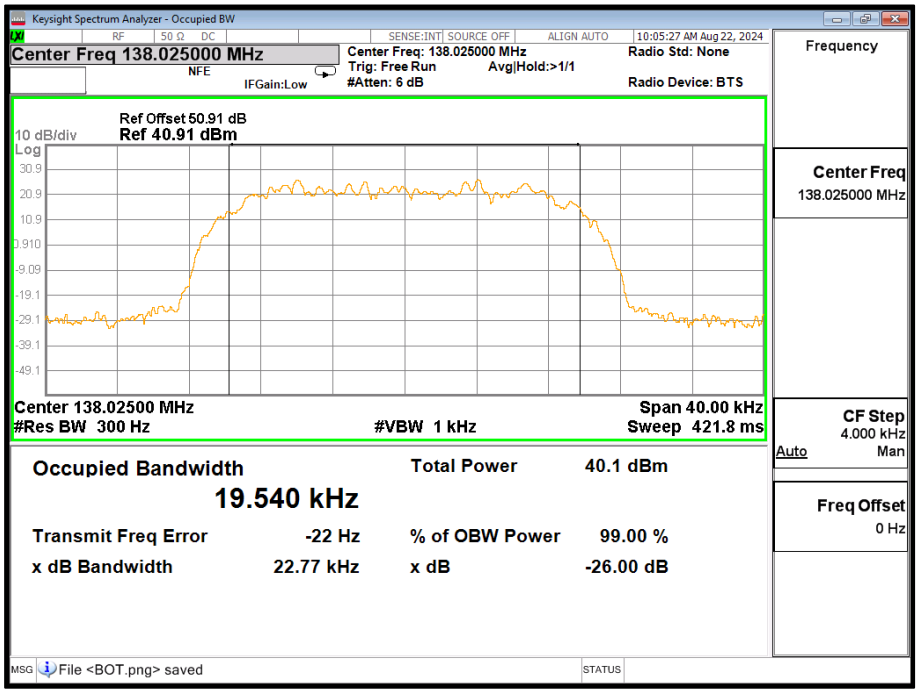

Figure 56 - 138.025 MHz

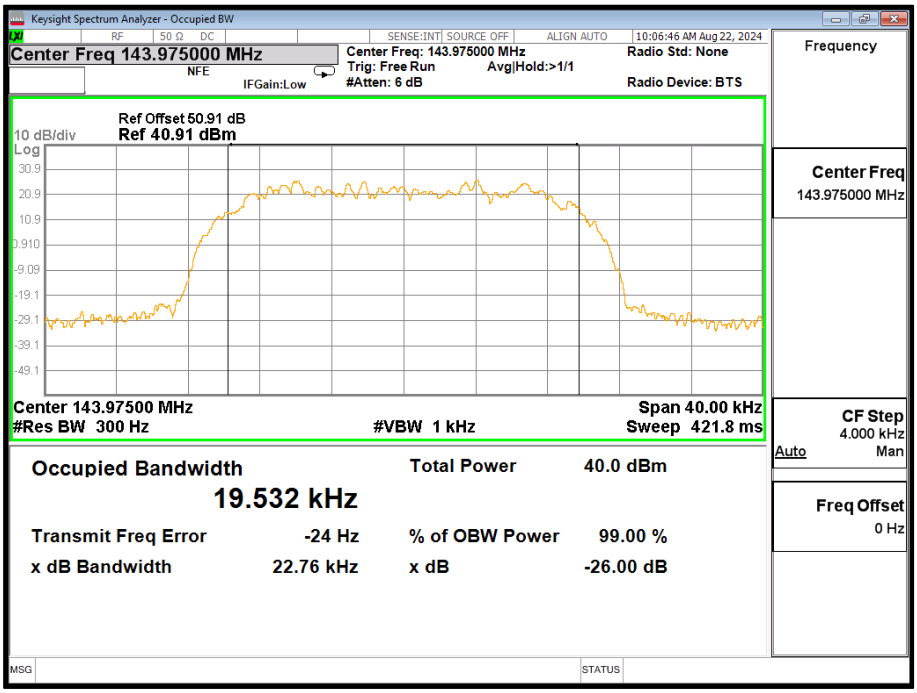

Figure 57- 143.975 MHz

FCC 47 CFR Part 90, Limit Clause 90.209

< 20 kHz

Industry Canada RSS-119, Limit Clause 5.5

The maximum permissible occupied bandwidth shall not exceed the authorized bandwidth specified in table 3 of the test specification for the equipment's frequency band as specified below.

20 kHz

2.3.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Attenuator (10dB, 10W)	Bird	8343-100	478	12	15-Jul-2025
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	20-Feb-2025
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	26-Feb-2025
PXA Signal Analyser	Keysight Technologies	N9030A	4653	12	18-Apr-2025
Hygrometer	Rotronic	HP21	4741	12	30-May-2025
Cable (40 GHz)	Rosenberger	LU1-001-1000	5022	12	04-Feb-2025
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5417	12	06-Jun-2025
Coaxial Fixed Attenuator DC-18GHz 5W 10dB	RF-Lambda	RFS5G18B10SMP	6179	12	11-Oct-2024
Attenuator 5W 30dB DC-18GHz	Aaren	AT40A-4041-D18-30	6559	12	18-Jun-2025

Table 35

2.4 Spurious Emissions at Antenna Terminals

2.4.1 Specification Reference

FCC 47 CFR Part 90, Clause 90.210
FCC 47 CFR Part 2, Clause 2.1051
Industry Canada RSS-119, Clause 5.8
ISED RSS-GEN, Clause 6.13

2.4.2 Equipment Under Test and Modification State

SC2021, S/N: 1PR002417GKZ793 - Modification State 0

2.4.3 Date of Test

22-August-2024

2.4.4 Test Method

For emissions where the frequency is removed less than 250 % of the authorised bandwidth measurements were performed conducted as follows:

The EUT was connected to a spectrum analyser via a cable and attenuator. The path loss between the EUT and analyser was calibrated using a network analyser and entered into the spectrum analyser as a reference level offset. The reference level for the mask was established with an RBW approximately 2 or 3 times the emission bandwidth. The RBW was then reduced to at least 1 % of the emission bandwidth, with a VBW of 3 times RBW. The mask as per FCC 47 CFR Part 90.210 (b) was applied.

For emissions where the frequency is removed more than 250 % of the authorized bandwidth measurements were performed both conducted and radiated as follows:

Conducted: A network analyser was used to measure the path loss and the worst case was entered as a reference level offset in to the spectrum analyser. The EUT was connected to a spectrum analyser via an attenuator, filter and cable. Between 300 MHz and 2 GHz a 300 MHz high pass filter was used. The spectrum analyser was configured with an RBW of 1 kHz between 9kHz and 150 kHz, an RBW of 10kHz was used between 150 kHz and 30 MHz, and an RBW of 100kHz was used between 30 MHz and 1 GHz. The RBW was set to 1 MHz for frequencies greater than 1 GHz with the trace set to max hold using a peak detector.

Radiated:- see section 2.1

The EUT was powered by a 7.4V, lithium polymer battery supplied by the manufacturer for the duration of test

2.4.5 Environmental Conditions

Ambient Temperature	22.4 °C
Relative Humidity	58.9 %

2.4.6 Test Results

TETRA - 150.05-174 MHz (FCC and ISEDC)

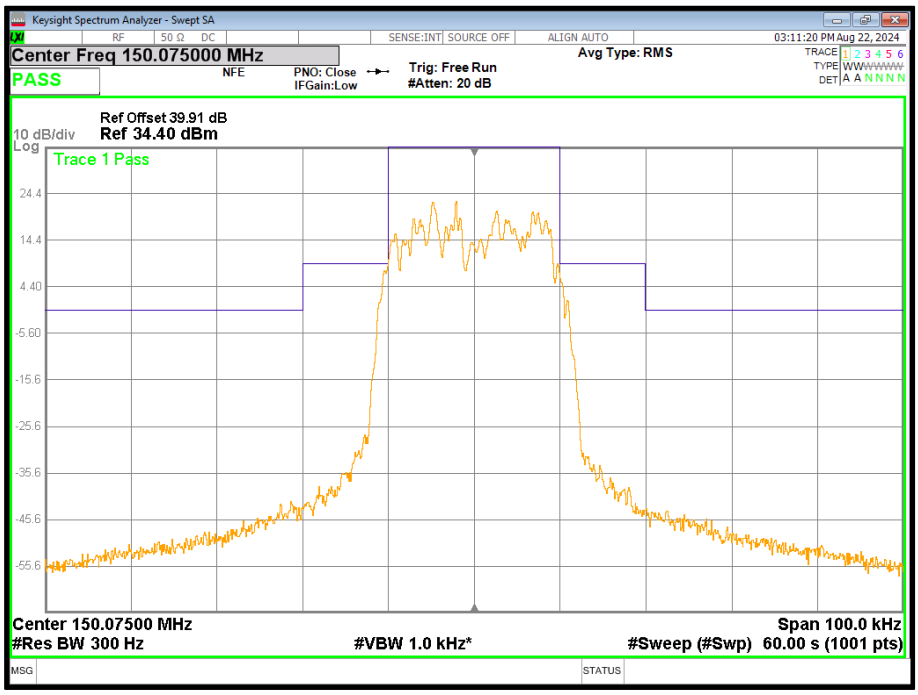

Figure 58 -150.075 MHz, Transmitter Mask

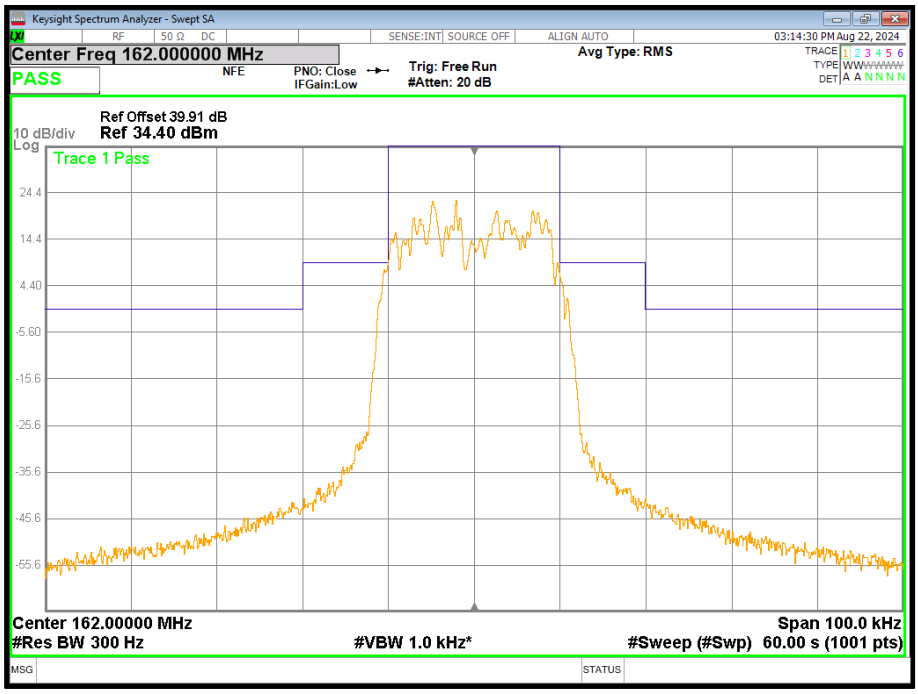

Figure 59 -162.00 MHz, Transmitter Mask

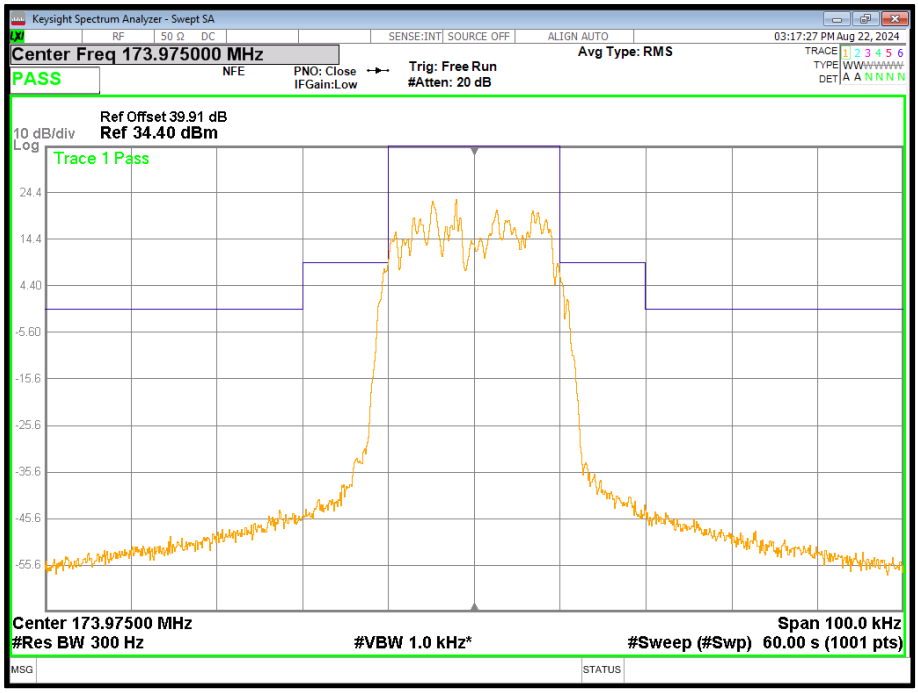

Figure 60 -173.975 MHz, Transmitter Mask

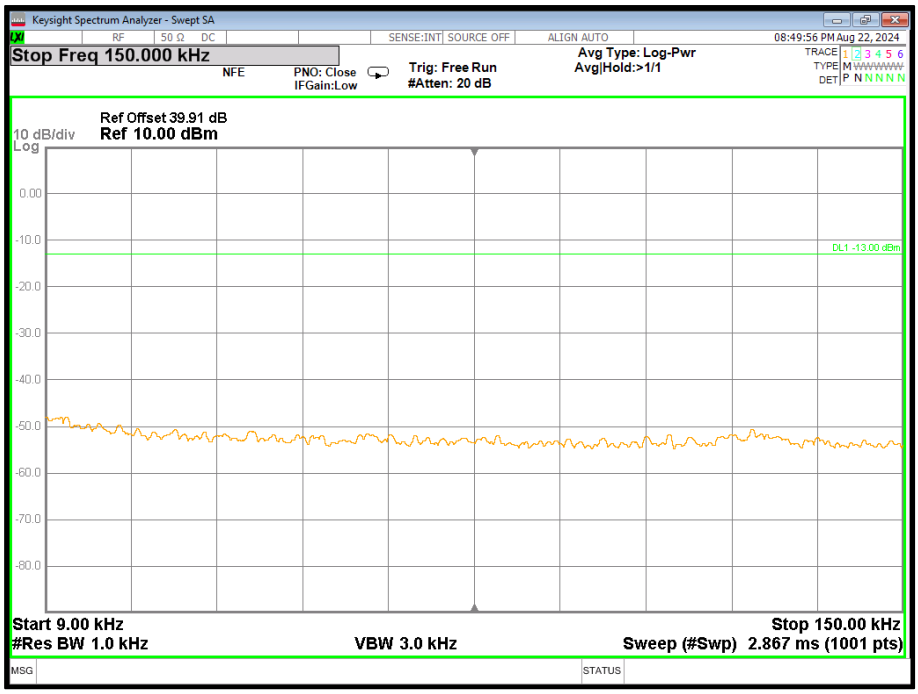

Figure 61 -150.075 MHz, 9 kHz to 150 kHz

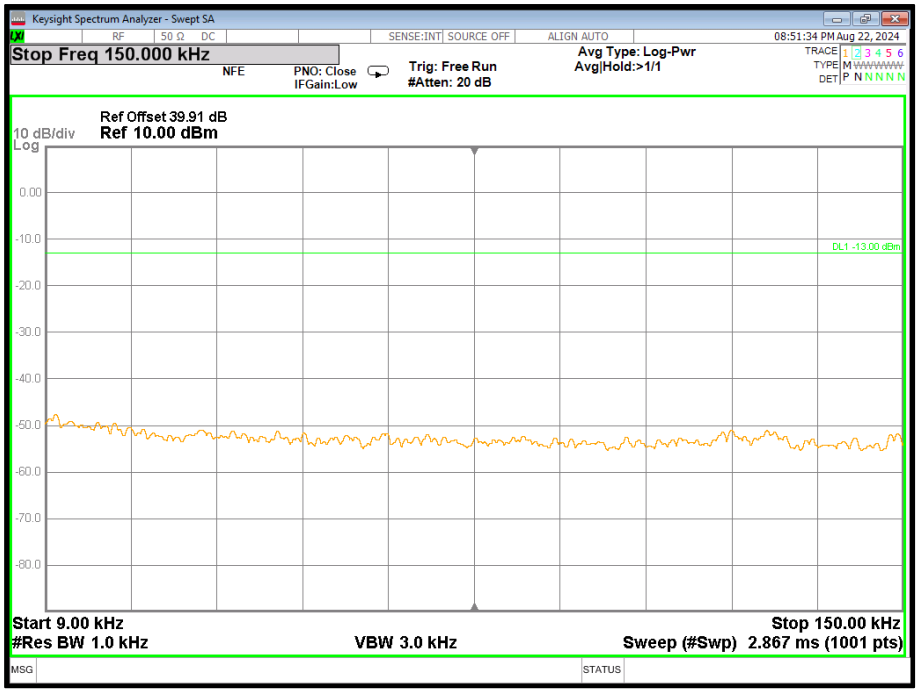

Figure 62 - 162.00 MHz, 9 kHz to 150 kHz

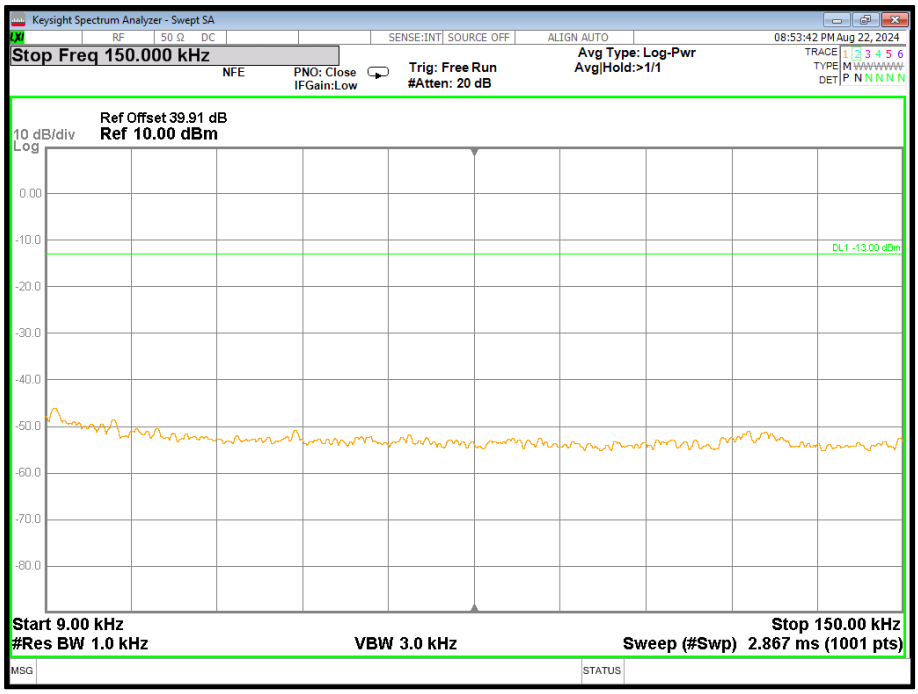

Figure 63 - 173.975 MHz - 9 kHz to 150 kHz

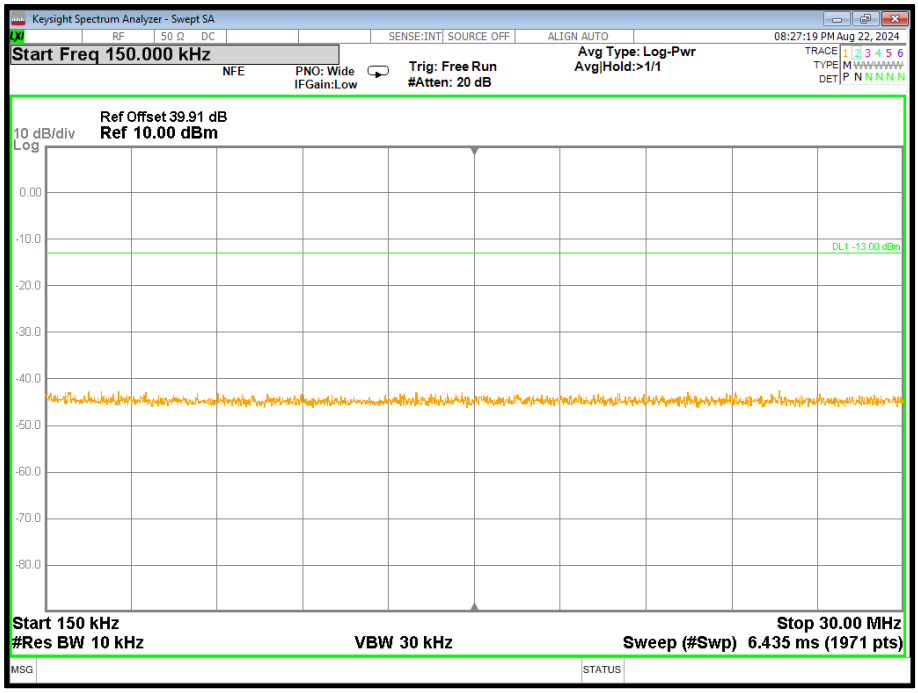

Figure 64 -150.075 MHz,150 kHz to 30 MHz

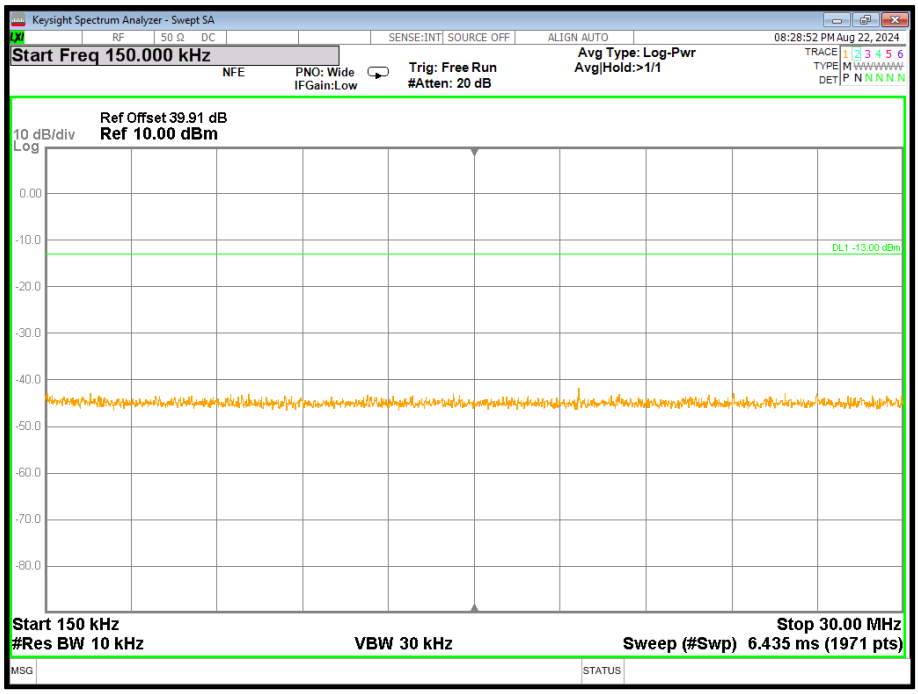

Figure 65 - 162.00 MHz, 150 kHz to 30 MHz

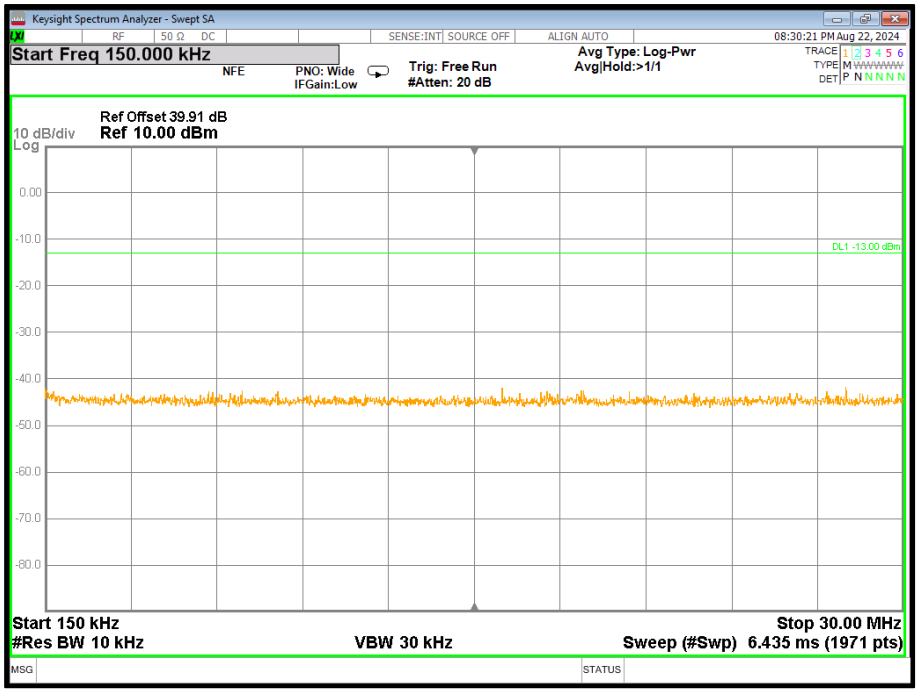

Figure 66 - 173.975 MHz - 150 kHz to 30 MHz

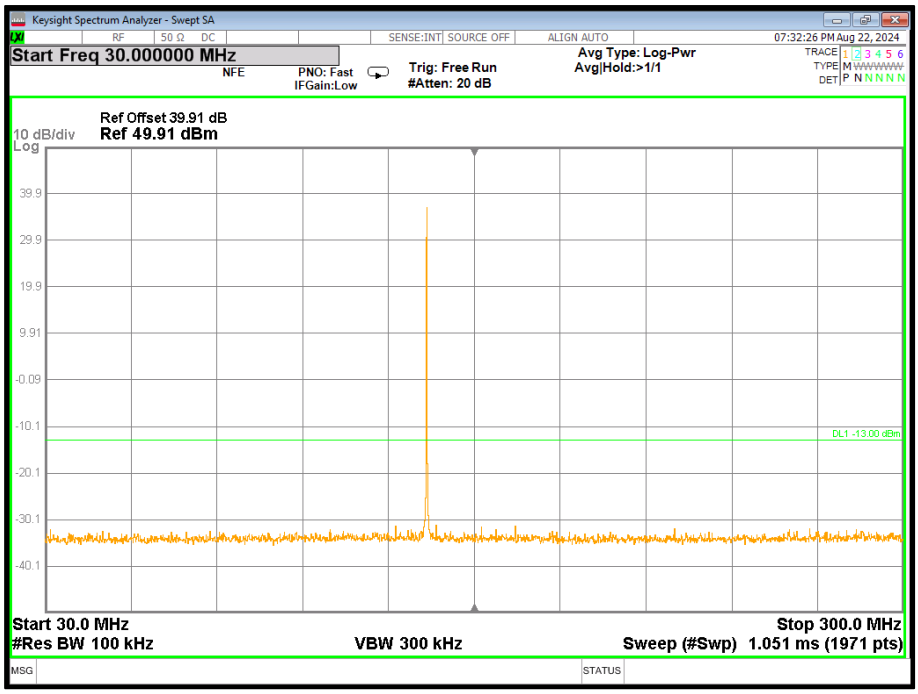

Figure 67 -150.075 MHz,30 MHz to 300 MHz

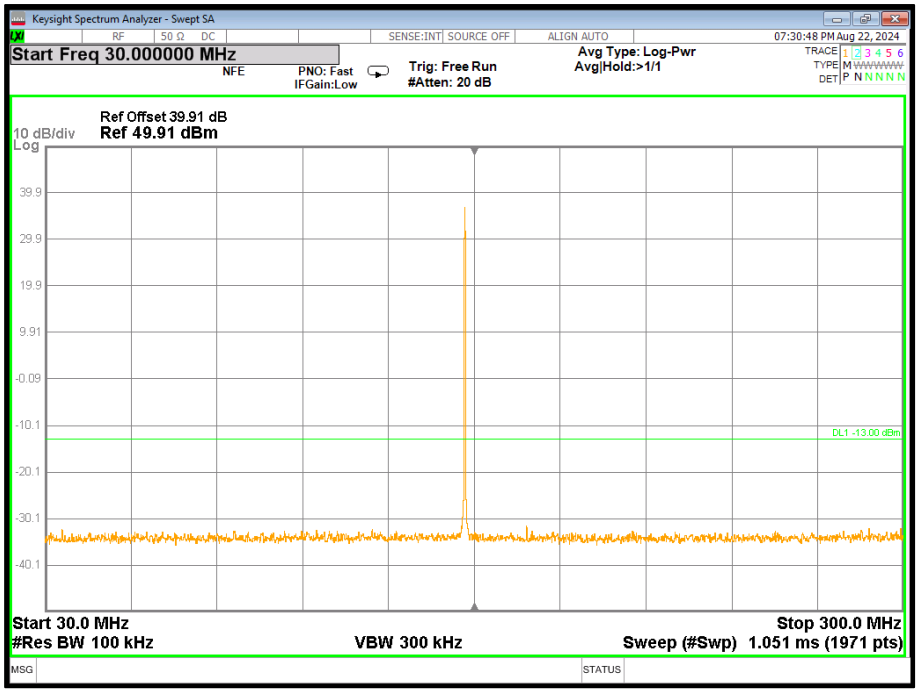

Figure 68 - 162.00 MHz, 30 MHz to 300 MHz

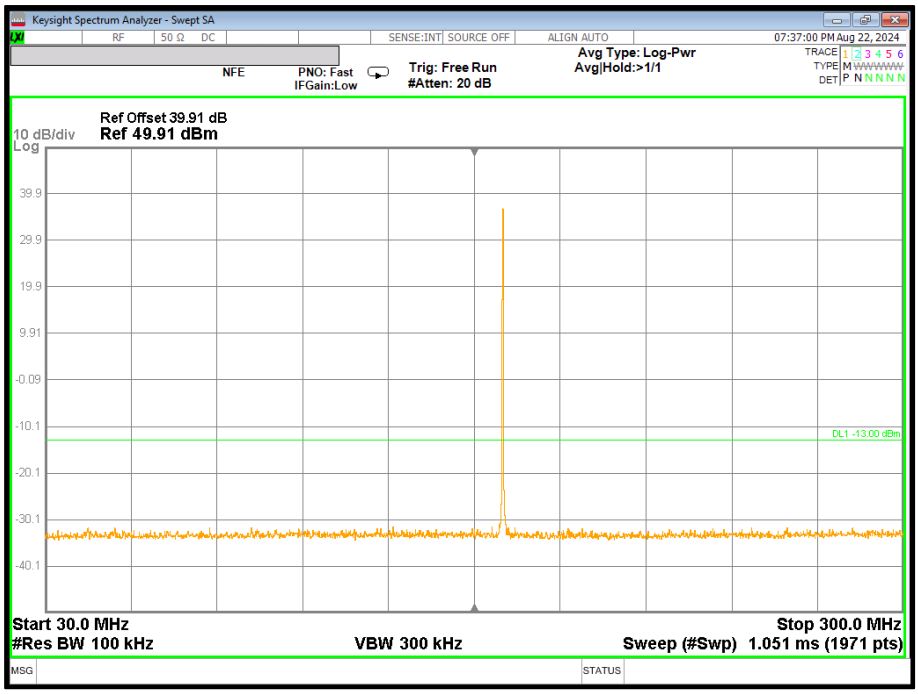

Figure 69 - 173.975 MHz - 30 MHz to 300 MHz

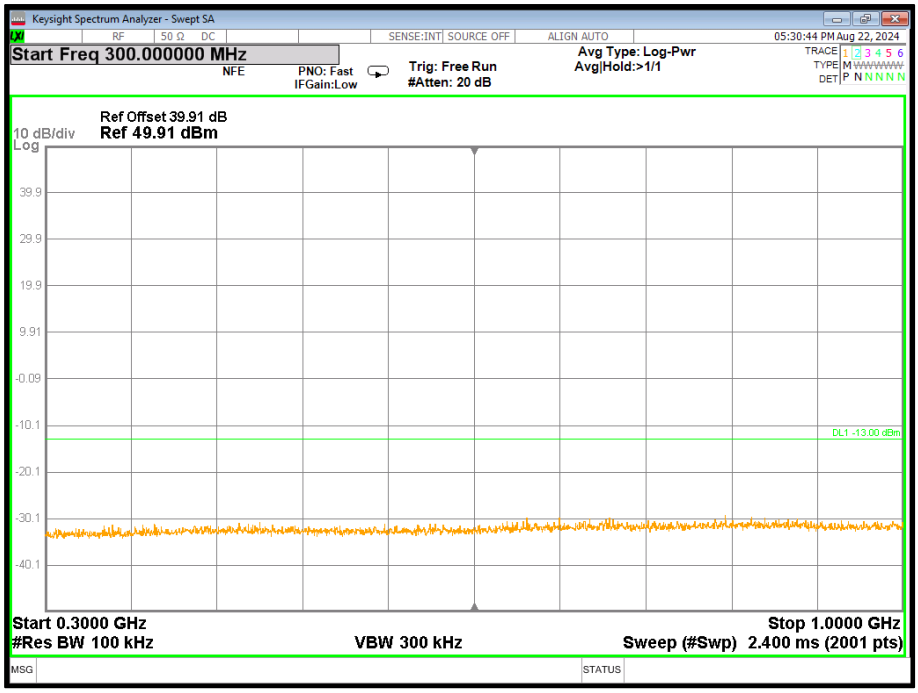

Figure 70 -150.075 MHz, 300 MHz to 1 GHz

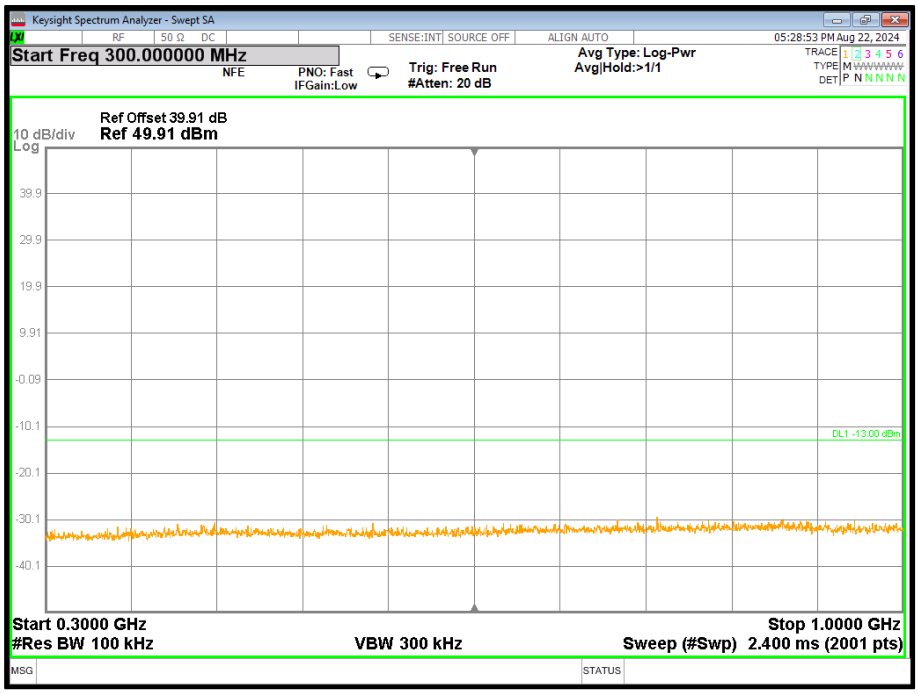

Figure 71 - 162.00 MHz, 300 MHz to 1 GHz

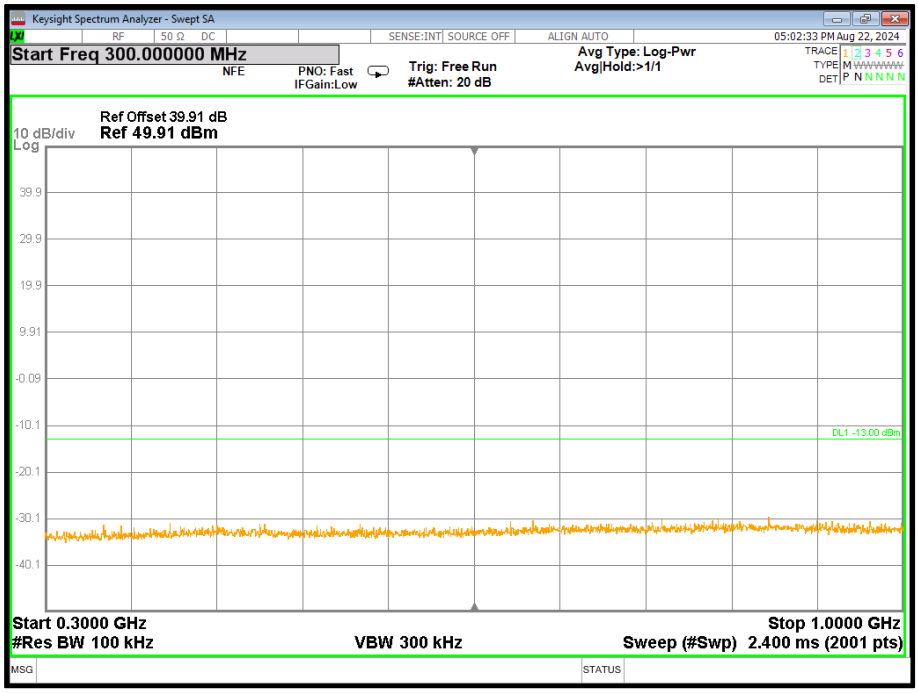

Figure 72 - 173.975 MHz - 300 MHz to 1 GHz

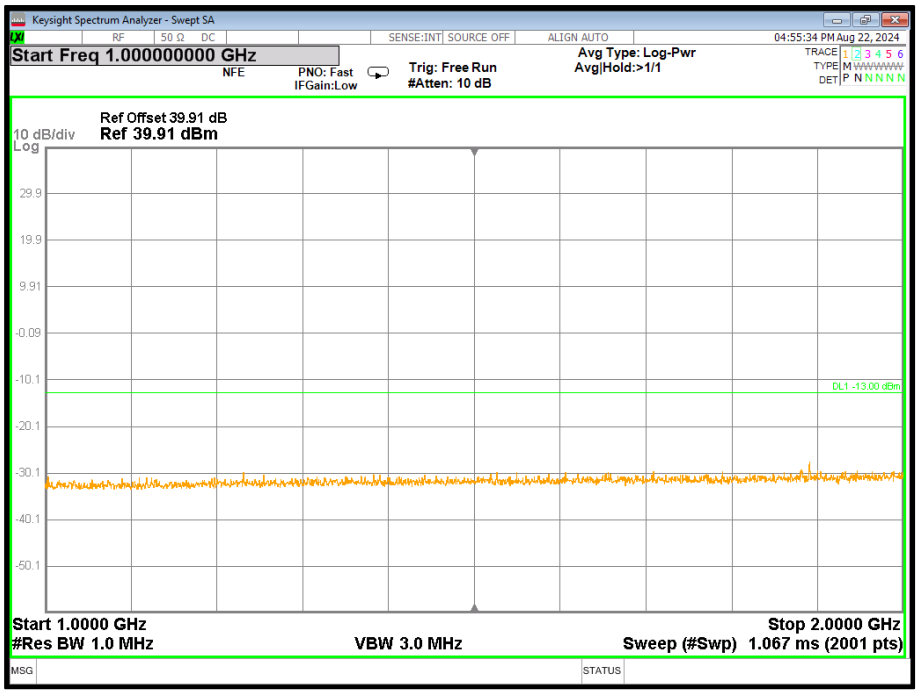

Figure 73 -150.075 MHz,1 GHz to 2 GHz

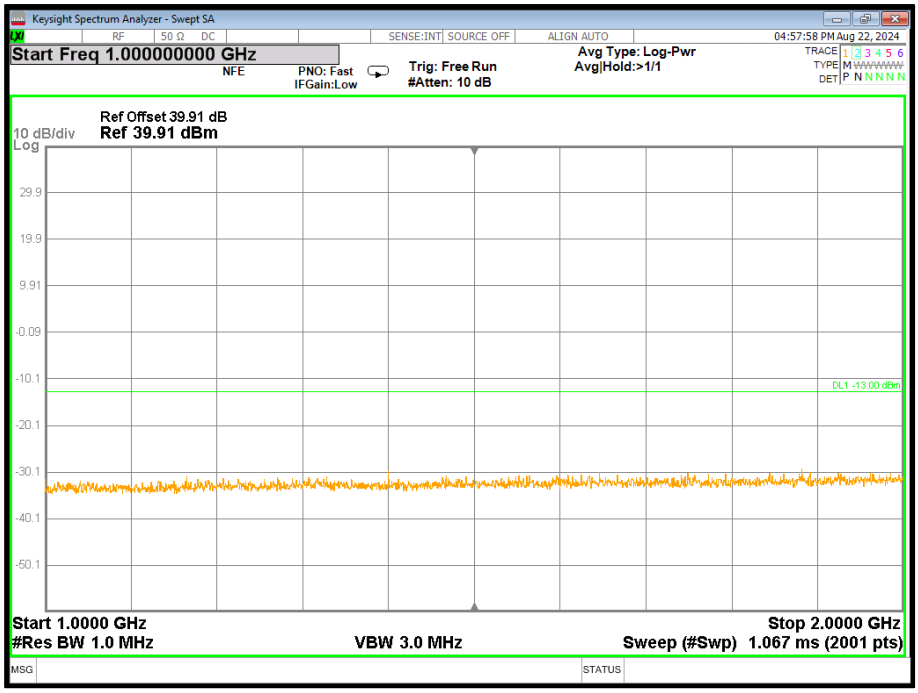

Figure 74 - 162.00 MHz, 1 GHz to 2 GHz

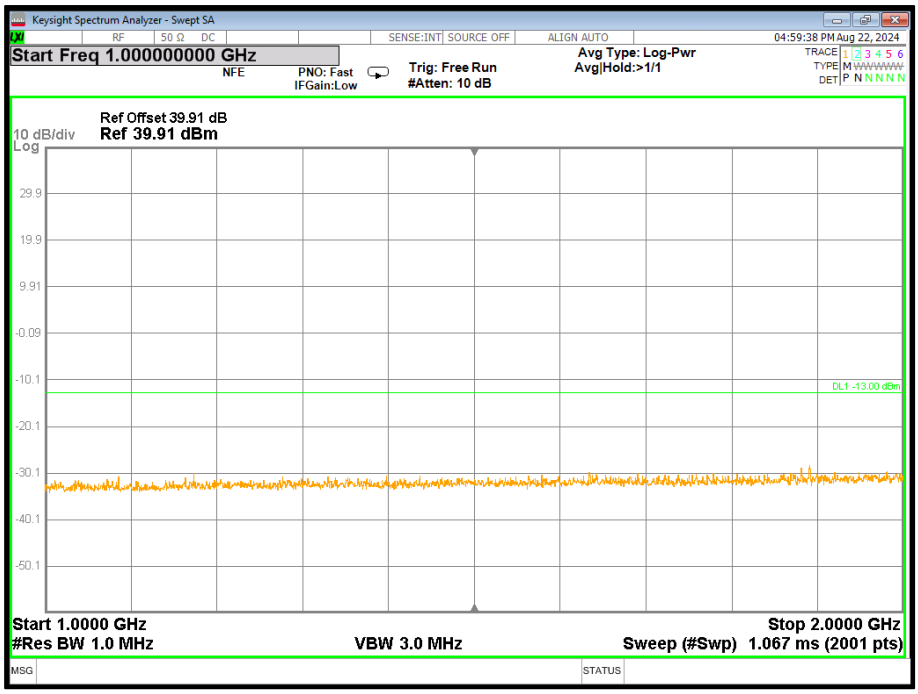

Figure 75 - 173.975 MHz - 1 GHz to 2 GHz

FCC 47 CFR Part 90, Limit Clause 90.210

The EUT shall comply with emission mask B as per FCC 47 CFR Part 90, clause 90.210.

Industry Canada RSS-119, Limit Clause 5.8

The EUT shall comply with emission mask B as per Industry Canada RSS-119, clause 5.8.
TETRA - 148-149.9 MHz (ISEDC only)

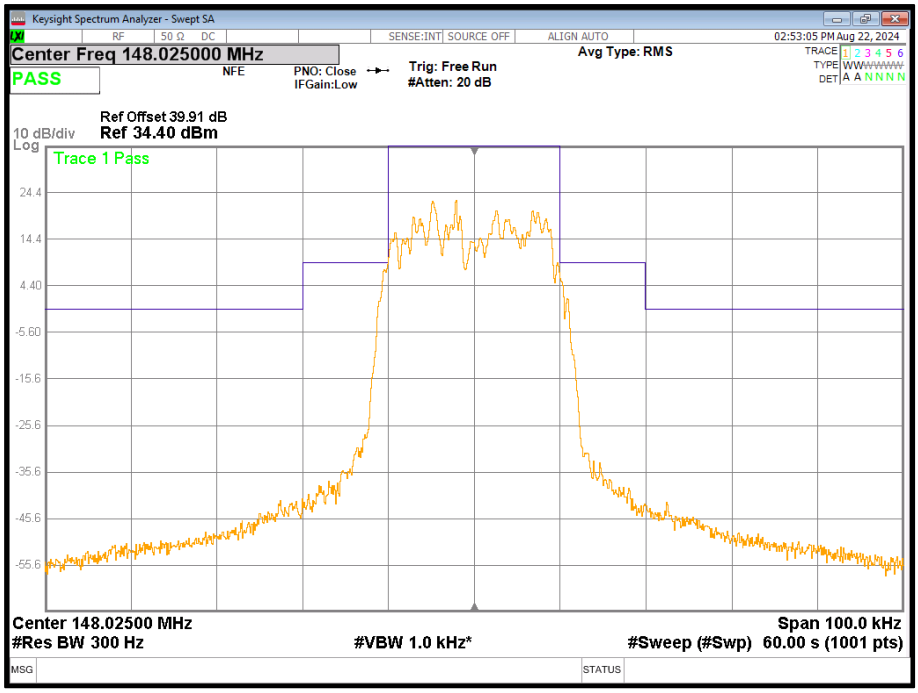

Figure 76 -148.025 MHz, Transmitter Mask

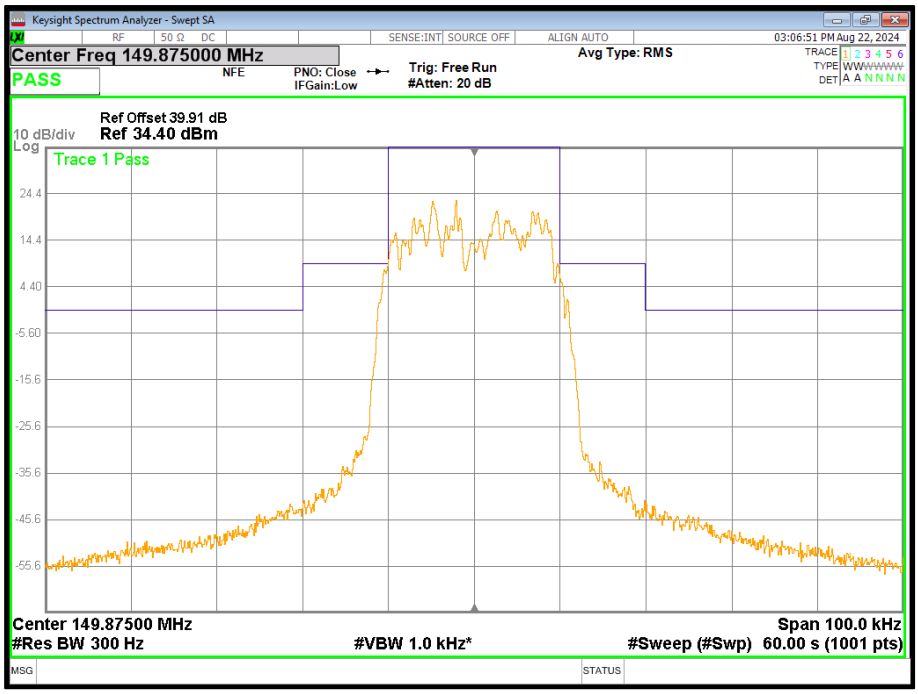

Figure 77 -149.875 MHz, Transmitter Mask

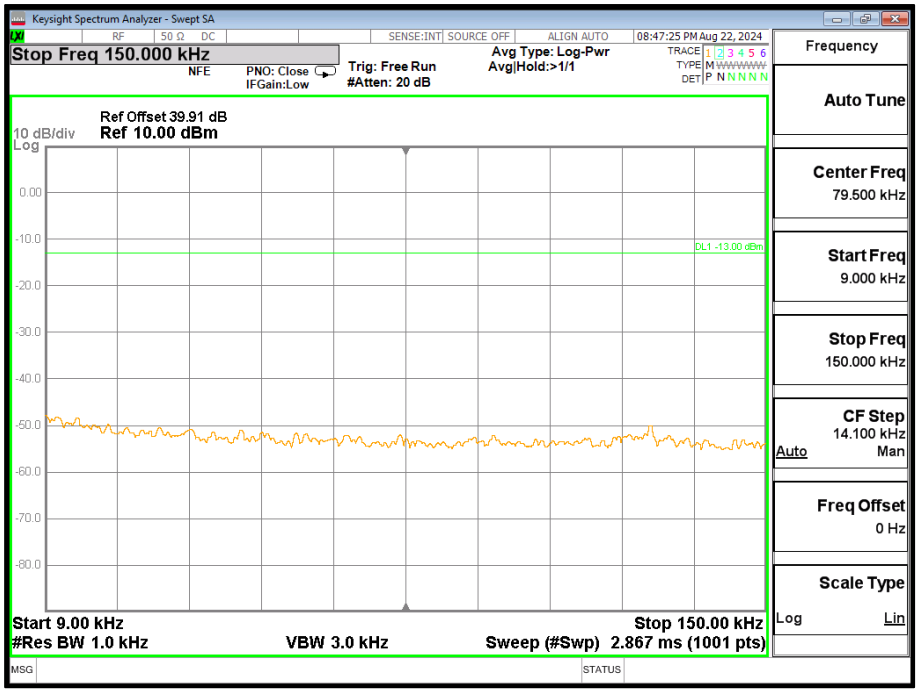

Figure 78 - 148.025 MHz, 9 kHz to 150 kHz

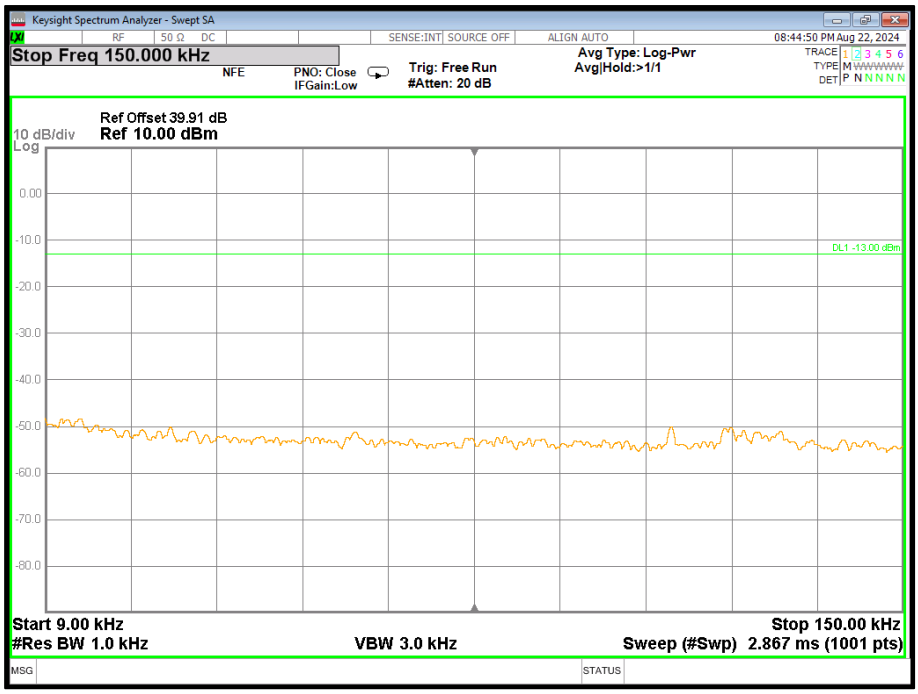

Figure 79 - 149.875 MHz, 9 kHz to 150 kHz

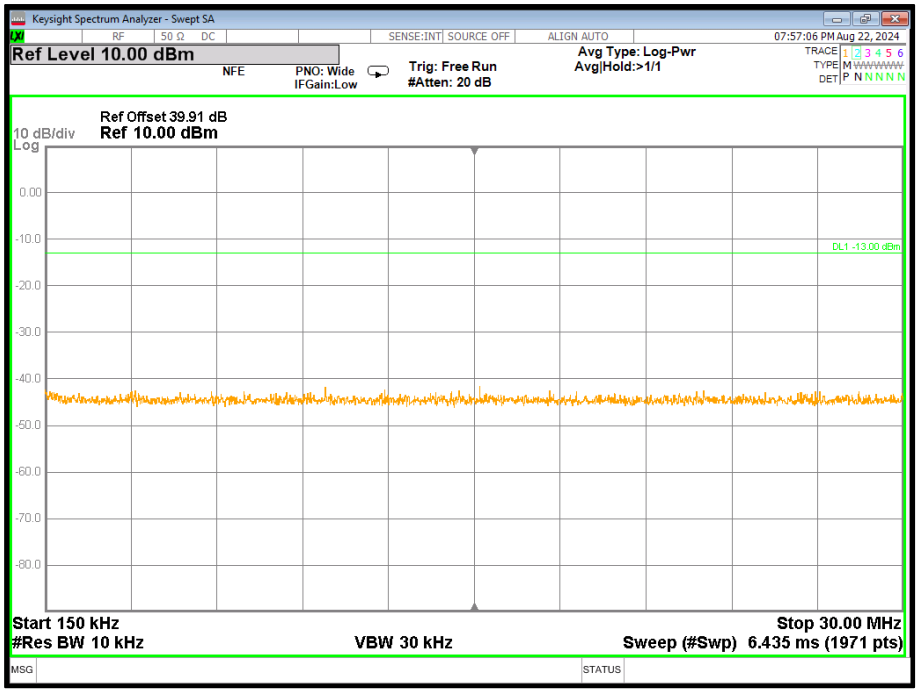

Figure 80 - 148.025 MHz, 150 kHz to 30 MHz

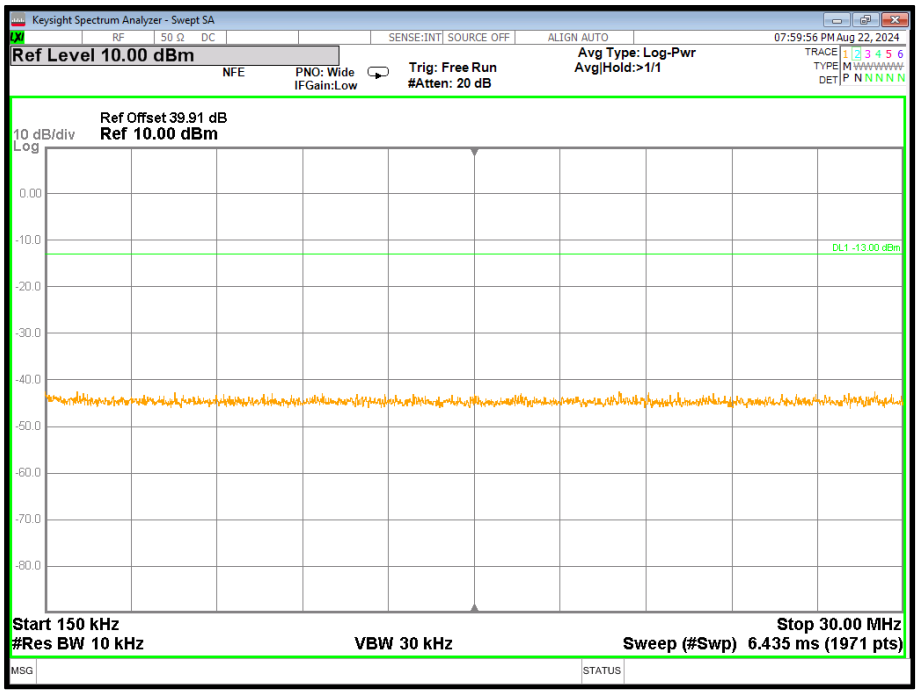

Figure 81 - 149.875 MHz, 150 kHz to 30 MHz

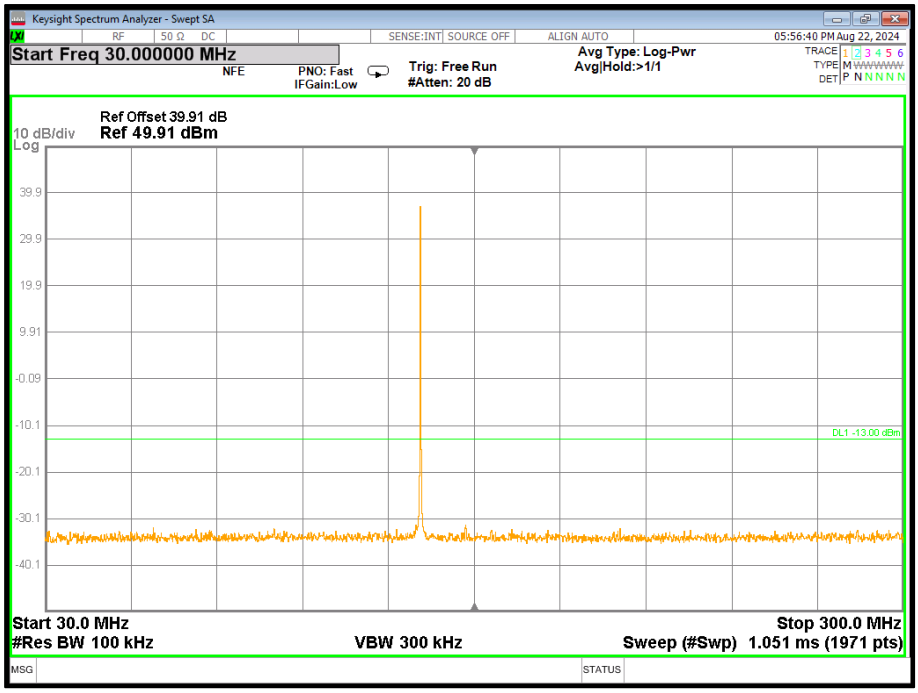

Figure 82 - 148.025 MHz, 30 MHz to 300 MHz

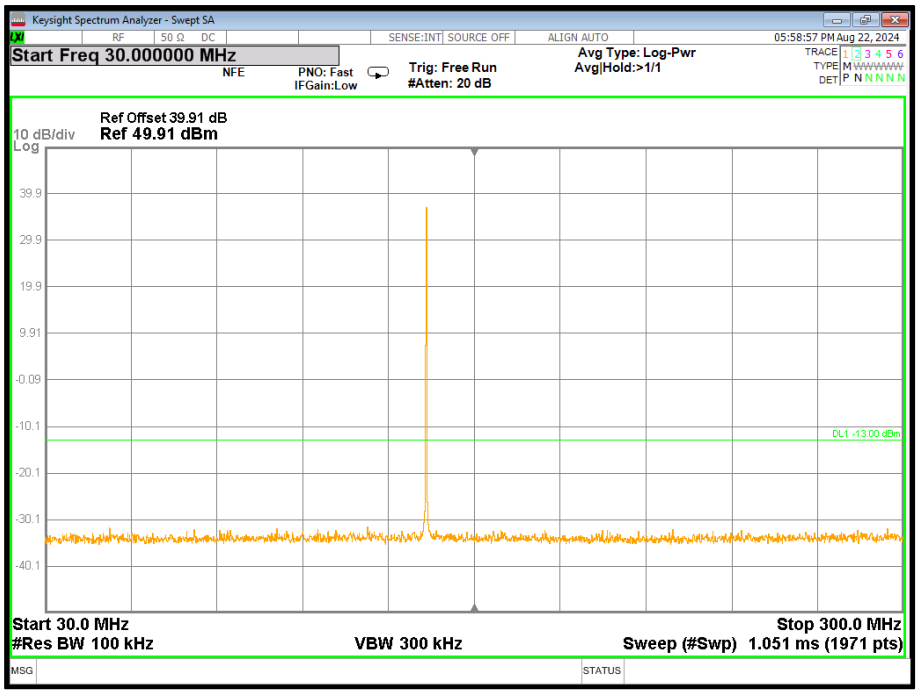

Figure 83 - 149.875 MHz, 30 MHz to 300 MHz

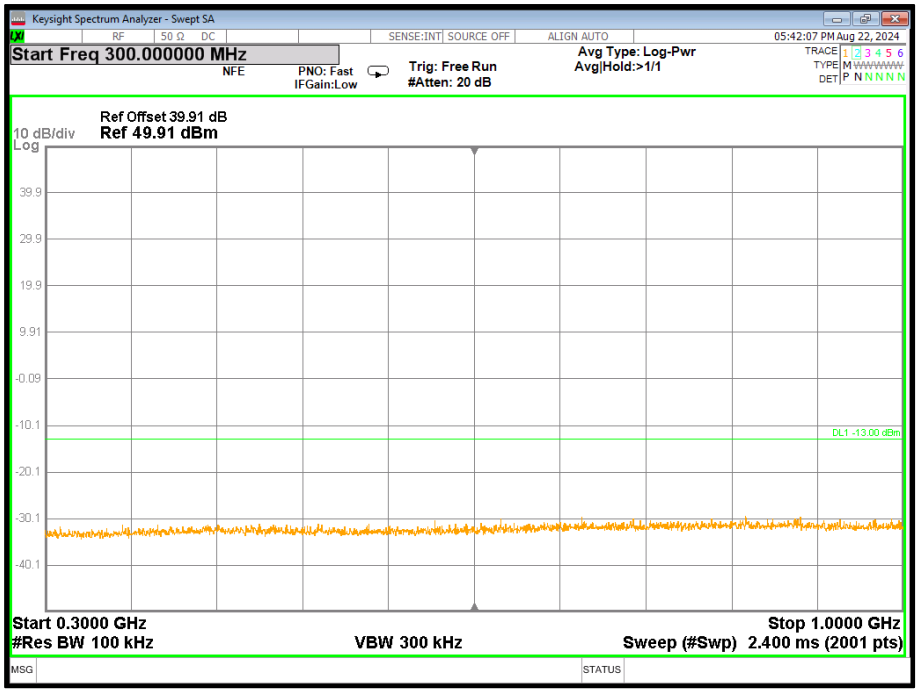

Figure 84 - 148.025 MHz, 300 MHz to 1 GHz

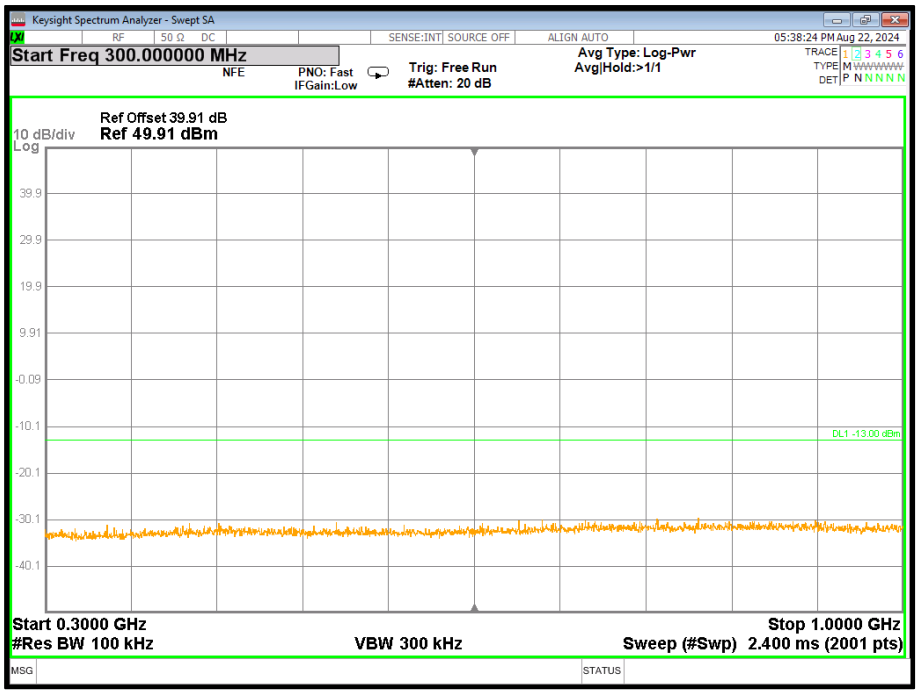

Figure 85 - 149.875 MHz, 300 MHz to 1 GHz

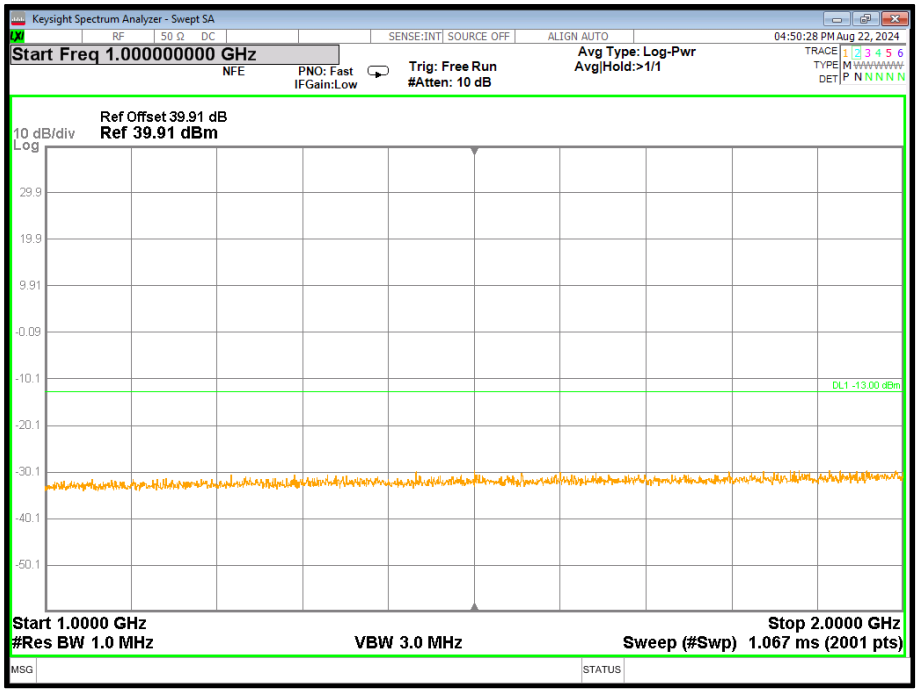

Figure 86 - 148.025 MHz, 1 GHz to 2 GHz

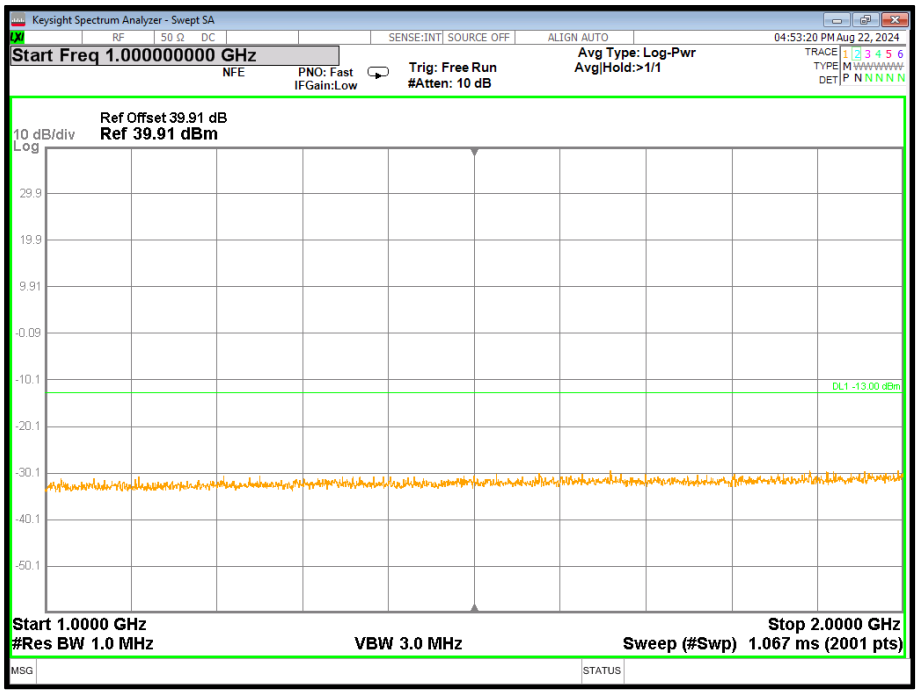

Figure 87 - 149.875 MHz, 1 GHz to 2 GHz

Industry Canada RSS-119, Limit Clause 5.8

The EUT shall comply with emission mask B as per Industry Canada RSS-119, clause 5.8.

TETRA - 138-144 MHz (ISEDC only)

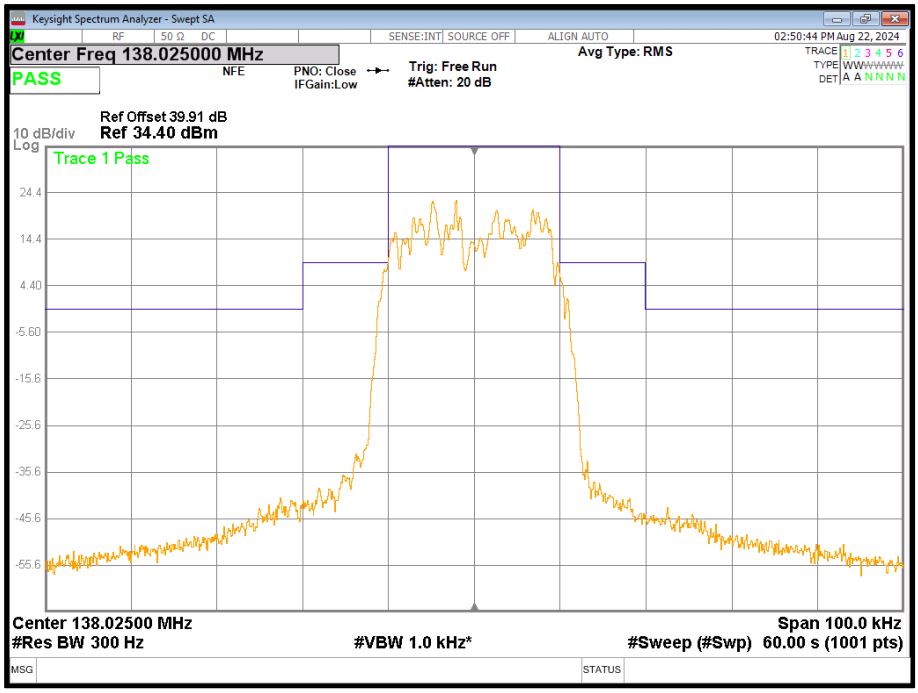

Figure 88 -138.025 MHz, Transmitter Mask

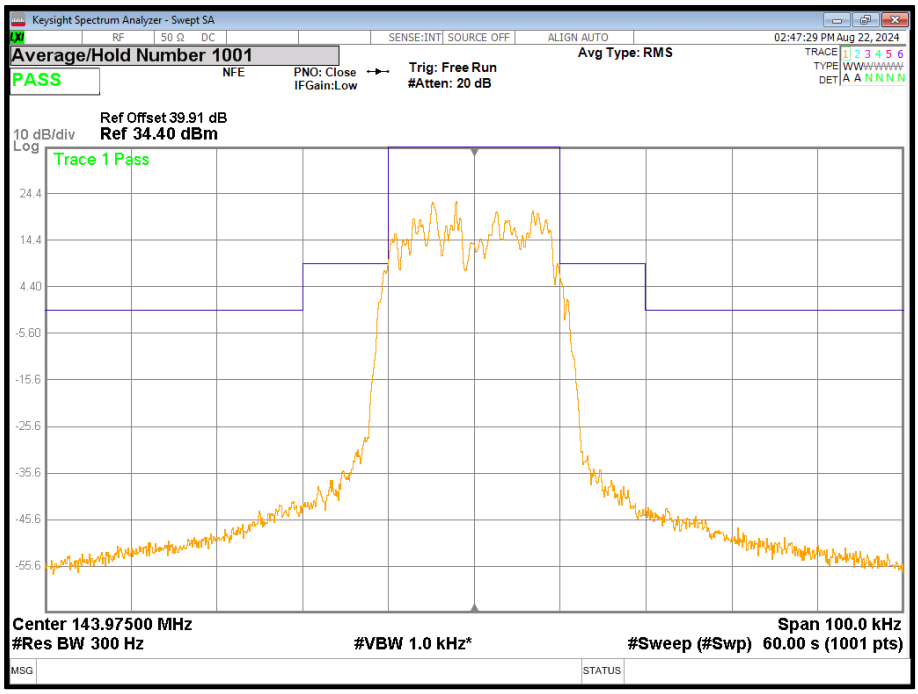

Figure 89 -143.975 MHz, Transmitter Mask

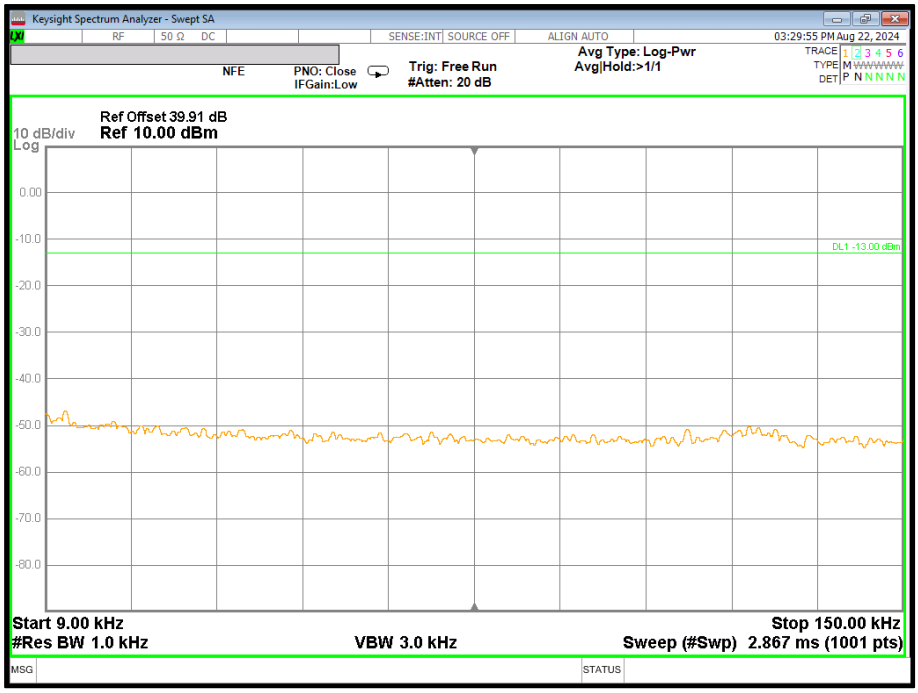

Figure 90 - 138.025 MHz, 9 kHz to 150 kHz

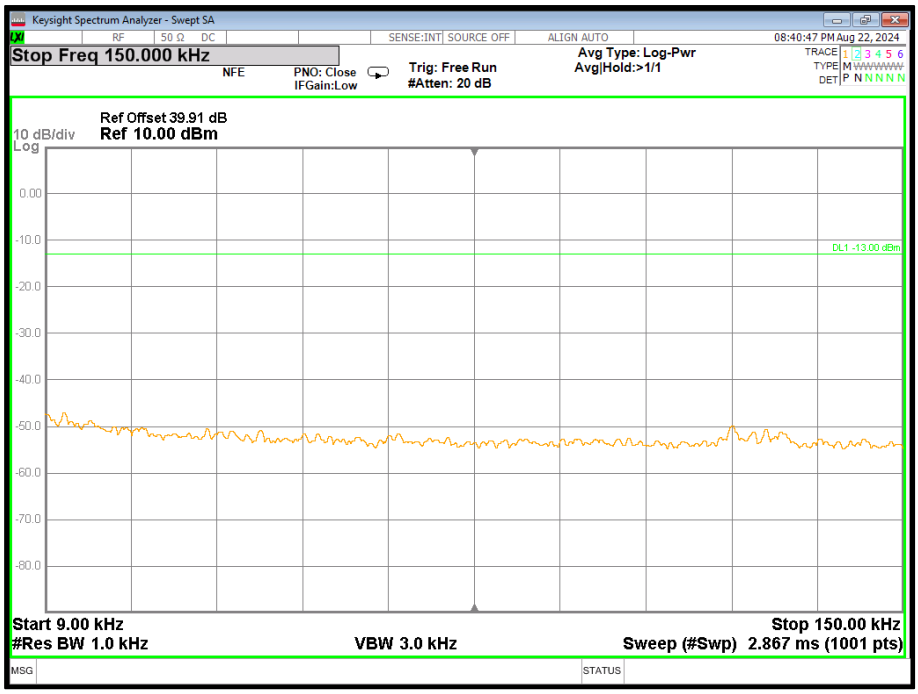

Figure 91 - 143.975 MHz, 9 kHz to 150 kHz

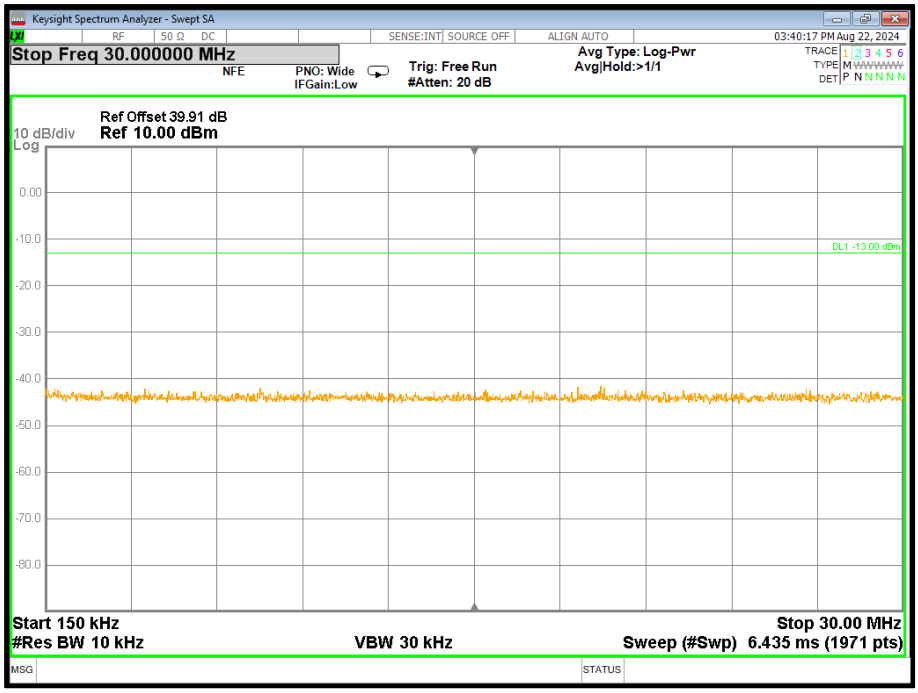

Figure 92 - 138.025 MHz, 150 kHz to 30 MHz

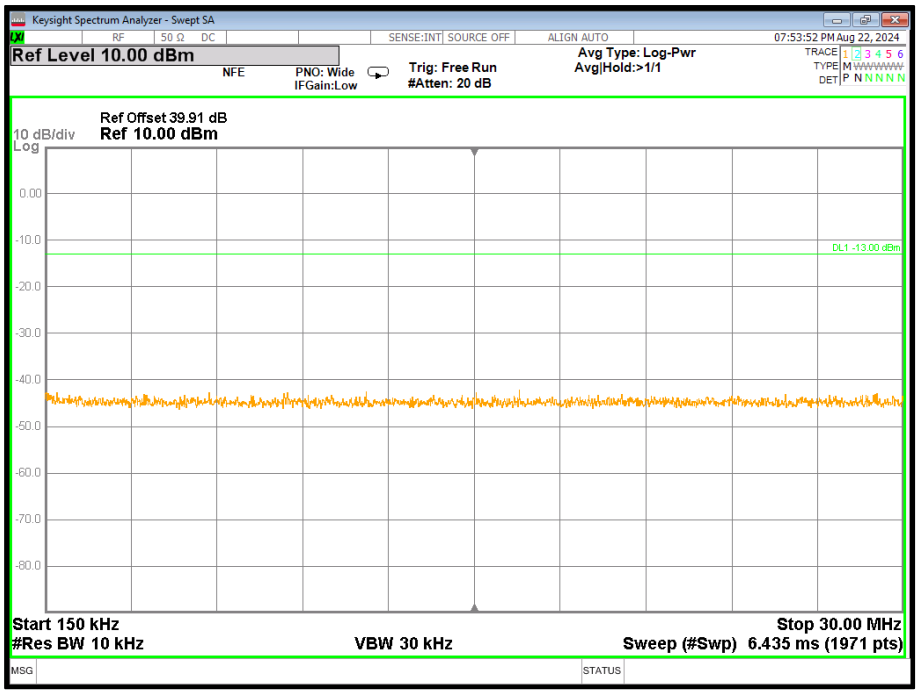

Figure 93 - 143.975 MHz, 150 kHz to 30 MHz

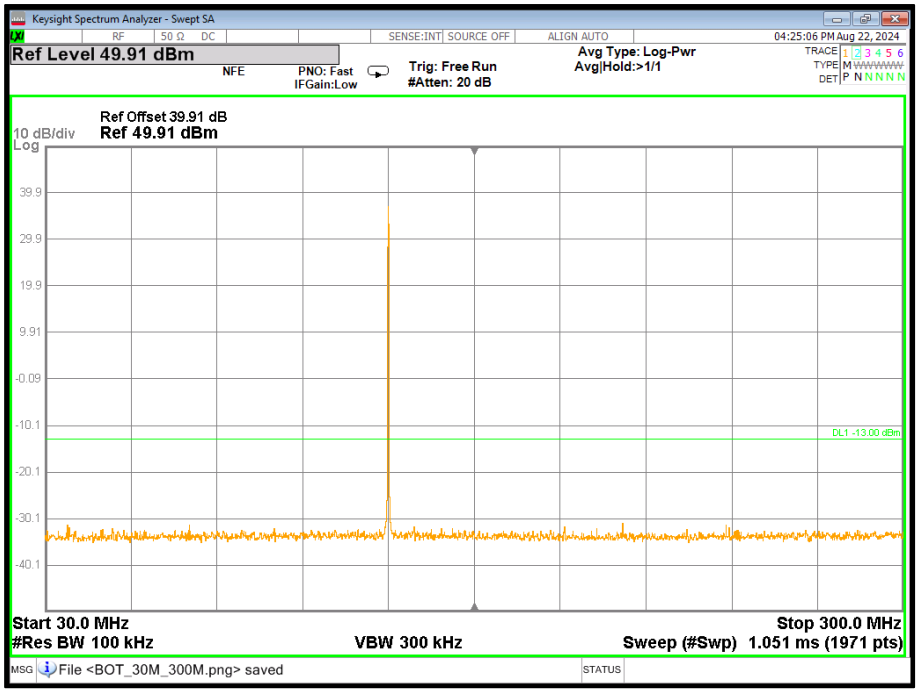

Figure 94 - 138.025 MHz, 30 MHz to 300 MHz

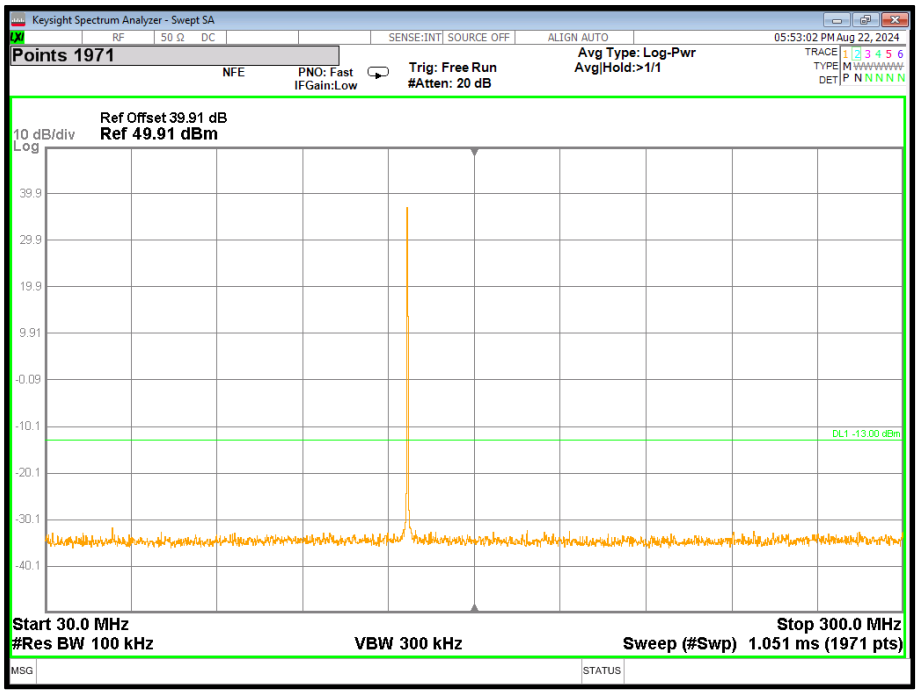

Figure 95 - 143.975 MHz, 30 MHz to 300 MHz

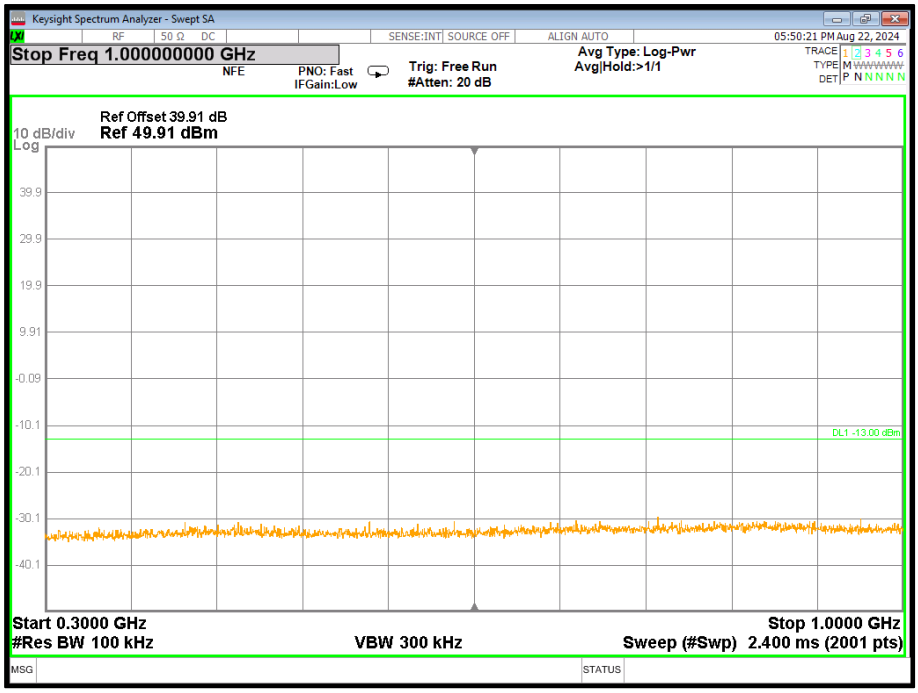

Figure 96 - 138.025 MHz, 300 MHz to 1 GHz

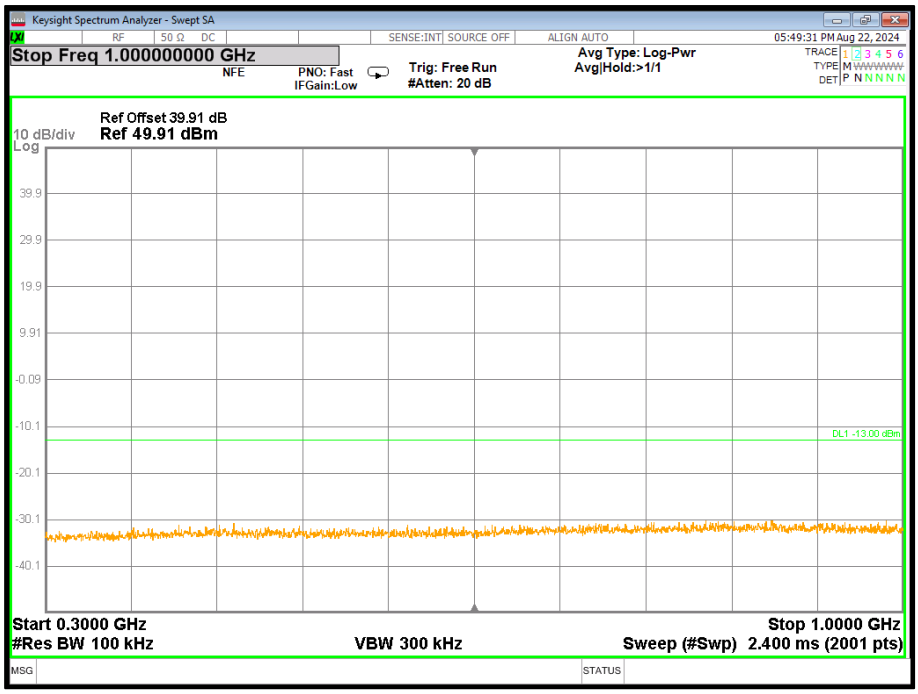

Figure 97 - 143.975 MHz, 300 MHz to 1 GHz

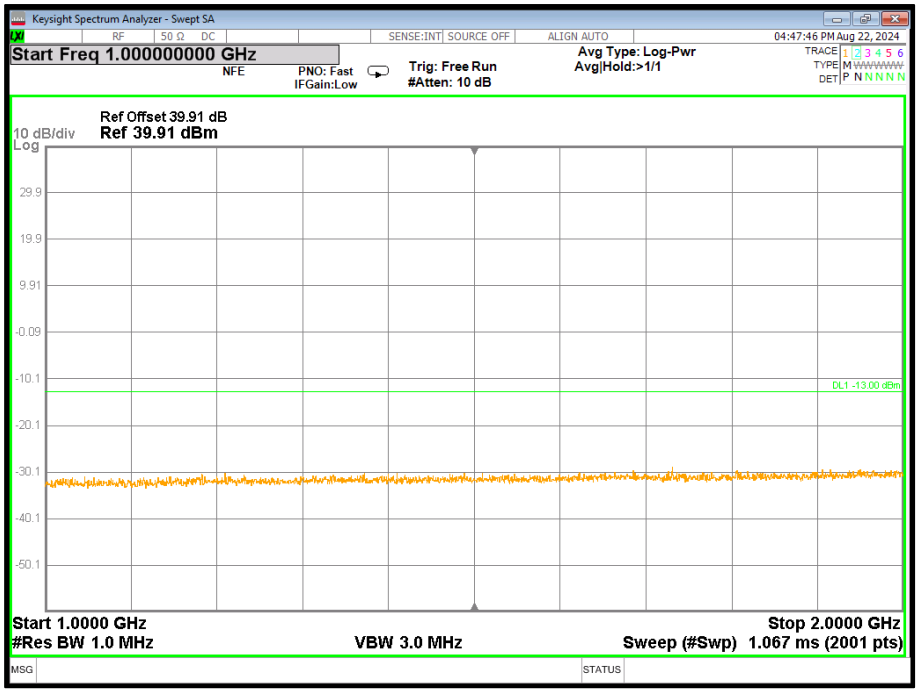

Figure 98 - 138.025 MHz, 1 GHz to 2 GHz

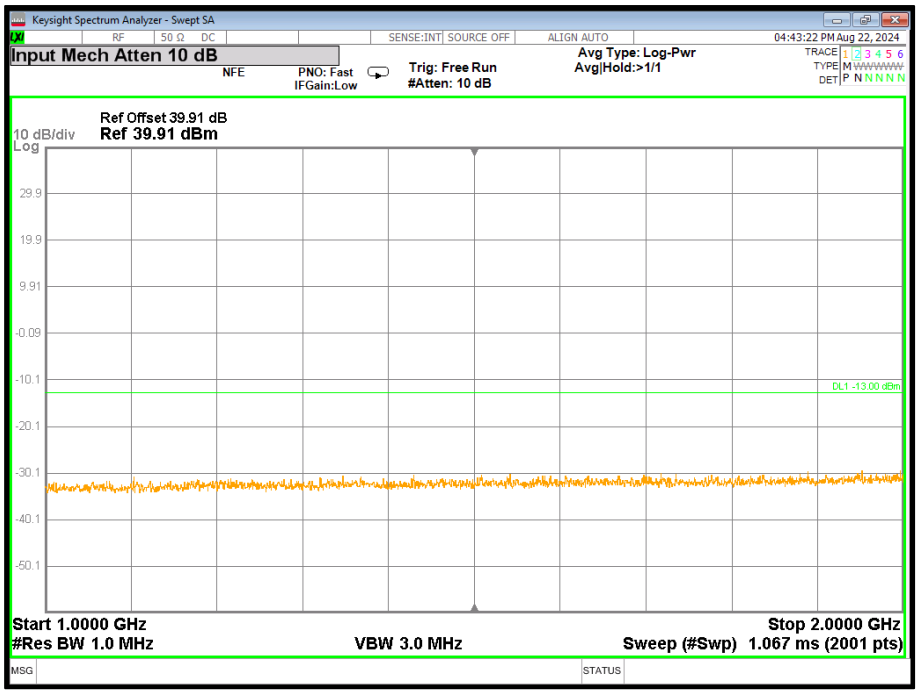

Figure 99 - 143.975 MHz, 1 GHz to 2 GHz

Industry Canada RSS-119, Limit Clause 5.8

The EUT shall comply with emission mask B as per Industry Canada RSS-119, clause 5.8.

2.4.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Attenuator (10 dB)	Weinschel	47-10-34	481	12	31-Jul-2025
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	20-Feb-2025
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	26-Feb-2025
PXA Signal Analyser	Keysight Technologies	N9030A	4653	12	18-Apr-2025
Hygrometer	Rotronic	HP21	4741	12	30-May-2025
Cable (40 GHz)	Rosenberger	LU1-001-1000	5022	12	04-Feb-2025
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5417	12	06-Jun-2025
300 MHz High Pass Filter	Mini-Circuits	NHP-300	5532	12	28-May-2025
Coaxial Fixed Attenuator DC-18GHz 5W 10dB	RF-Lambda	RFS5G18B10SMP	6179	12	11-Oct-2024
Attenuator 5W 30dB DC-18GHz	Aaren	AT40A-4041-D18-30	6559	12	18-Jun-2025

Table 36

2.5 Frequency Stability

2.5.1 Specification Reference

FCC 47 CFR Part 90, Clause 90.213
FCC 47 CFR Part 2, Clause 2.1055
Industry Canada RSS-119, Clause 5.3
ISED RSS-GEN, Clause 6.11

2.5.2 Equipment Under Test and Modification State

SC2021, S/N: 1PR002417GKZ793 - Modification State 0

2.5.3 Date of Test

30-August-2024

2.5.4 Test Method

This test was performed in accordance with ANSI C63.26, Clause 5.6. and the requirements of FCC 47 CFR Part 2, Clause 2.1055 (a)(1).

This test was performed on the bottom and top channel. Additionally, the middle channel was tested where required by ANSI C63.26 table 2.

The EUT was set to transmit on maximum power with an unmodulated carrier.

The EUT was connected to a spectrum analyser using an external 10 MHz frequency reference. The difference between the frequency of the fundamental and the frequency of the assigned channel in accordance with the manufacturer's documentation was recorded. In accordance with FCC 47 CFR, Clause 2.1055, the temperature was varied from -30 °C to +50 °C in 10 ° steps, with the EUT being supplied nominal voltage via a 7.4V, 8.6Wh lithium polymer battery supplied by the manufacturer. At nominal temperature, voltage was varied with the use of a DC PSU supplied to the EUT through a dummy battery.

2.5.5 Environmental Conditions

Ambient Temperature	16.7 °C
Relative Humidity	57.5 %

2.5.6 Test Results

TETRA - 150.05-174 MHz (FCC and ISEDC)

Voltage	Frequency Error (ppm)		
	150.075 MHz	162.00 MHz	173.975 MHz
8.51	0.0333	0.0340	0.0299
6.29	0.0253	0.0253	0.0236

Table 37 - Frequency Stability Under Voltage Variations

Temperature	Frequency Error (ppm)		
	150.075 MHz	162.00 MHz	173.975 MHz
+50.0 °C	0.0466	0.0506	0.0489
+40.0 °C	0.0613	0.0691	0.0673
+30.0 °C	0.0307	0.0327	0.0316
+20.0 °C	0.0160	0.0191	0.0155
+10.0 °C	0.1179	0.1142	0.1155
0 °C	0.0113	0.0142	0.0207
-10.0 °C	0.0273	0.0228	0.0144
-20.0 °C	0.1259	0.1086	0.1115
-30.0 °C	*	*	*

Table 38 - Frequency Stability Under Temperature Variations: 7.4V, 8.6Wh Lithium polymer battery

*The EUT shut down and did not transmit.

FCC 47 CFR Part 90, Limit Clause 90.213

5.00 ppm

Industry Canada RSS-199, Limit Clause 5.3

5.00 ppm

TETRA - 148-149.9 MHz (ISEDC only)

Voltage	Frequency Error (ppm)	
	148.025 MHz	149.875 MHz
8.51	0.0324	0.0347
6.29	0.0182	0.0214

Table 39 - Frequency Stability Under Voltage Variations

Temperature	Frequency Error (ppm)	
	148.025 MHz	149.875 MHz
+50.0 °C	0.0297	0.0367
+40.0 °C	0.0520	0.0594
+30.0 °C	0.0149	0.0227
+20.0 °C	0.0196	0.0187
+10.0 °C	0.1013	0.1101
0 °C	0.0142	0.0153
-10.0 °C	0.0493	0.0300
-20.0 °C	0.1398	0.1348
-30.0 °C	*	*

Table 40 - Frequency Stability Under Temperature Variations: 7.4V, 8.6Wh lithium polymer battery

*The EUT shut down and did not transmit.

Industry Canada RSS-199, Limit Clause 5.3

5.00 ppm

TETRA - 138-144 MHz (ISEDC only)

Voltage	Frequency Error (ppm)	
	138.025 MHz	143.975 MHz
8.51	0.0341	0.0319
6.29	0.0196	0.0194

Table 41 - Frequency Stability Under Voltage Variations

Temperature	Frequency Error (ppm)	
	138.025 MHz	143.975 MHz
+50.0 °C	0.0174	0.0236
+40.0 °C	0.0326	0.0438
+30.0 °C	0.0109	0.0042
+20.0 °C	0.0203	0.0201
+10.0 °C	0.0956	0.0986
0 °C	0.0109	0.0118
-10.0 °C	0.0326	0.0313
-20.0 °C	0.1710	0.1479
-30.0 °C	*	*

Table 42 - Frequency Stability Under Temperature Variations: 7.4V, 8.6Wh lithium polymer battery

*The EUT shut down and did not transmit.

Industry Canada RSS-199, Limit Clause 5.3

5.00 ppm

Tetra High capacity battery - 150.05-174 MHz (FCC and ISEDC)

Voltage	Frequency Error (ppm)		
	150.075 MHz	162.00 MHz	173.975 MHz
8.51	**	**	**
6.29	**	**	**

Table 43 - Frequency Stability Under Voltage Variations

Temperature	Frequency Error (ppm)		
	150.075 MHz	162.00 MHz	173.975 MHz
+50.0 °C	0.0280	0.0278	0.0241
+40.0 °C	0.0626	0.0636	0.0650
+30.0 °C	0.0220	0.0290	0.0385
+20.0 °C	0.0260	0.0247	0.0218
+10.0 °C	0.0980	0.1012	0.0989
0 °C	0.0073	0.0068	0.0069
-10.0 °C	0.0773	0.0846	0.0914
-20.0 °C	0.1406	0.1278	0.1109
-30.0 °C	*	*	*

Table 44 - Frequency Stability Under Temperature Variations: 7.4V, 14Wh lithium polymer battery

*The EUT shut down and did not transmit.

**As this testing was performed with a PSU and dummy battery, the results have been included in the results for the 8.6Wh battery, Table 39.

FCC 47 CFR Part 90, Limit Clause 90.213

5.00 ppm

Industry Canada RSS-199, Limit Clause 5.3

5.00 ppm

Tetra High capacity battery - 148-149.9 MHz (ISEDC only)

Voltage	Frequency Error (ppm)	
	148.025 MHz	149.875 MHz
8.51	**	**
6.29	**	**

Table 45 - Frequency Stability Under Voltage Variations

Temperature	Frequency Error (ppm)	
	148.025 MHz	149.875 MHz
+50.0 °C	0.0243	0.0260
+40.0 °C	0.0527	0.0580
+30.0 °C	0.0128	0.0200
+20.0 °C	0.0189	0.0220
+10.0 °C	0.0858	0.0927
0 °C	0.0074	0.0060
-10.0 °C	0.0642	0.0694
-20.0 °C	0.1473	0.1421
-30.0 °C	*	*

Table 46 - Frequency Stability Under Temperature Variations: 7.4V, 14Wh lithium polymer battery

*The EUT shut down and did not transmit.

**As this testing was performed with a PSU and dummy battery, the results have been included in the results for the 8.6Wh battery, Table 40.

Industry Canada RSS-199, Limit Clause 5.3

5.00 ppm

Tetra High capacity battery - 138-144 MHz (ISEDC only)

Voltage	Frequency Error (ppm)	
	138.025 MHz	143.975 MHz
8.51	**	**
6.29	**	**

Table 47 - Frequency Stability Under Voltage Variations

Temperature	Frequency Error (ppm)	
	138.025 MHz	143.975 MHz
+50.0 °C	0.0239	0.0243
+40.0 °C	0.0369	0.0451
+30.0 °C	0.0080	0.0028
+20.0 °C	0.0159	0.0160
+10.0 °C	0.0659	0.0806
0 °C	0.0043	0.0007
-10.0 °C	0.0703	0.0646
-20.0 °C	0.1608	0.1479
-30.0 °C	*	*

Table 48 - Frequency Stability Under Temperature Variations: 7.4V, 14Wh lithium polymer battery

*The EUT shut down and did not transmit.

**As this testing was performed with a PSU and dummy battery, the results have been included in the results for the 8.6Wh battery, Table 41.

Industry Canada RSS-199, Limit Clause 5.3

5.00 ppm

2.5.7 Test Location and Test Equipment Used

This test was carried out in RF Chamber 8.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Counter	Hewlett Packard	53181A	159	12	03-Aug-2024
Time Interval Analyser	Yokogawa	TA720	181	12	07-May-2025
Attenuator (10 dB)	Weinschel	47-10-34	481	12	31-Jul-2025
Multimeter	Iso-tech	IDM101	2421	12	08-Nov-2024
Hygrometer	Rotronic	I-1000	2882	12	07-Jun-2025
Meter & T/C	R.S Components	Meter 615-8206 & Type K T/C	3612	12	14-Sep-2024
GPSDR Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	14-Sep-2024
Quad Power Supply	Rohde & Schwarz	HMP4040	4954	-	O/P Mon
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5417	12	06-Jun-2025
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5420	12	06-Jun-2025
Attenuator 5W 30dB DC-18GHz	Aaren	AT40A-4041-D18-30	6559	12	18-Jun-2025

Table 49

O/P Mon – Output Monitored using calibrated equipment

2.6 Transient Frequency Behaviour

2.6.1 Specification Reference

FCC 47 CFR Part 90, Clause 90.214
Industry Canada RSS-119, Clause 5.9

2.6.2 Equipment Under Test and Modification State

SC2021, S/N: 1PR002417GKZ793 - Modification State 0

2.6.3 Date of Test

28-August-2024

2.6.4 Test Method

This test was performed on the bottom and top channel. Additionally, the middle channel was tested where required by ANSI C63.26 table 2.

Testing was performed using an unmodulated carrier output from the EUT and measured on a spectrum analyser in accordance with TIA Standard 603 (Referenced in Industry Canada RSS-119, Clause 5.9).

The EUT configuration application used to transmit an unmodulated signal was 2.25 kHz higher than the nominal centre frequency of the channel. Therefore, the trace plots recorded were centred on 2.25 kHz higher than the bottom, middle and top nominal centre frequencies.

The EUT was powered by a 7.4V lithium polymer battery, supplied by the manufacturer, for the duration of the test.

2.6.5 Environmental Conditions

Ambient Temperature	24.1 - 24.3 °C
Relative Humidity	51.4 %

2.6.6 Test Results

TETRA - 150.05-174 MHz (FCC and ISEDC)

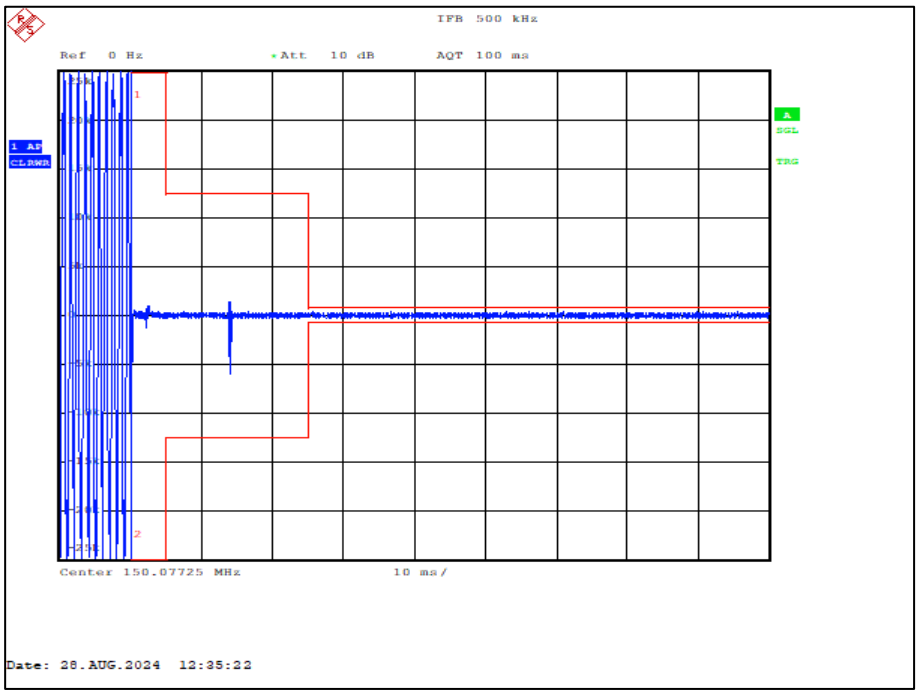

Figure 100 - 150.075 MHz, Switch On Transients

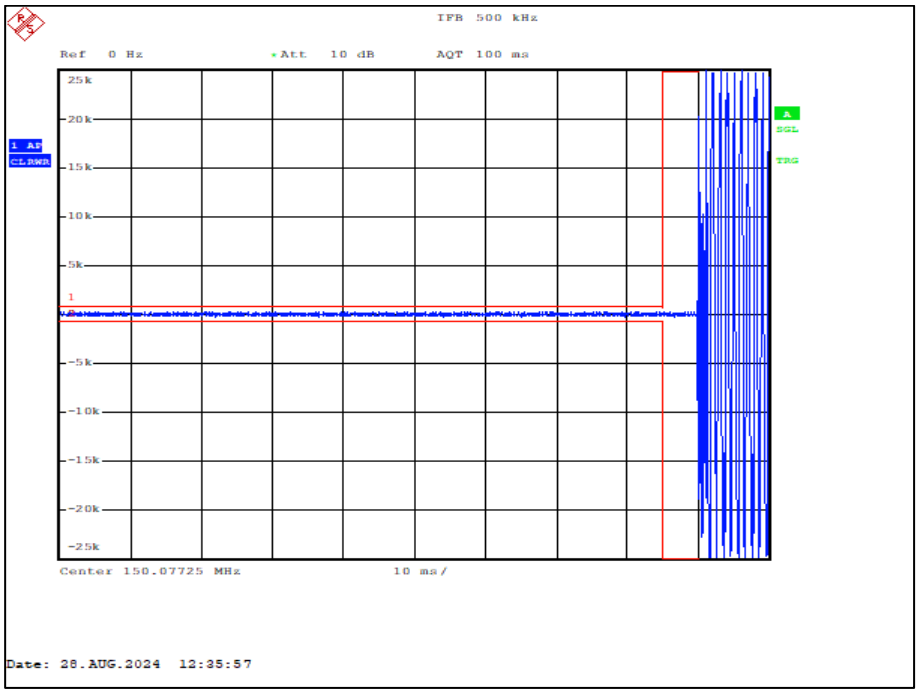

Figure 101- 150.075 MHz, Switch Off Transients

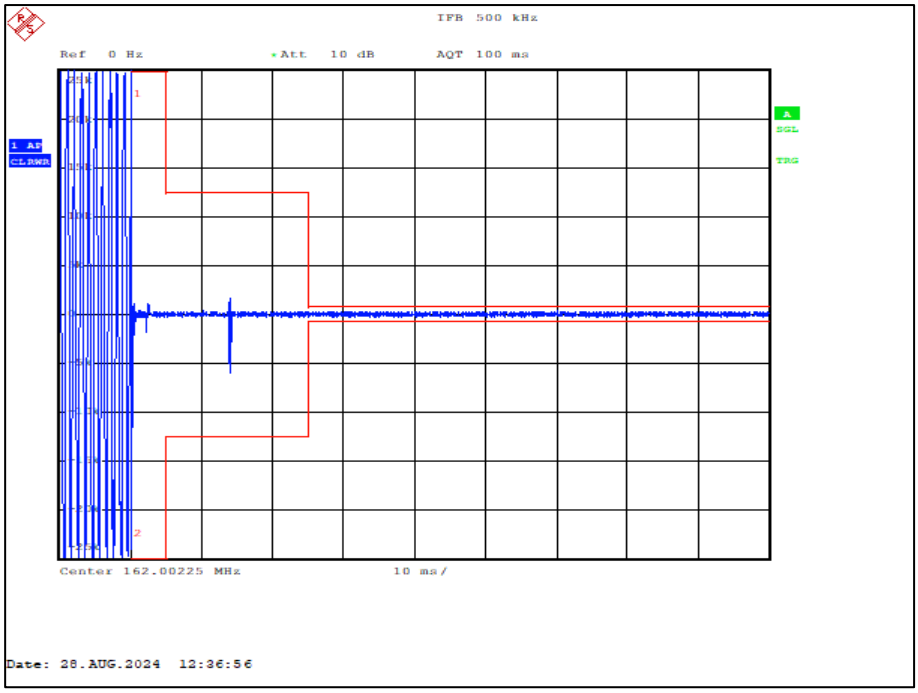

Figure 102 - 162.00 MHz, Switch On Transients

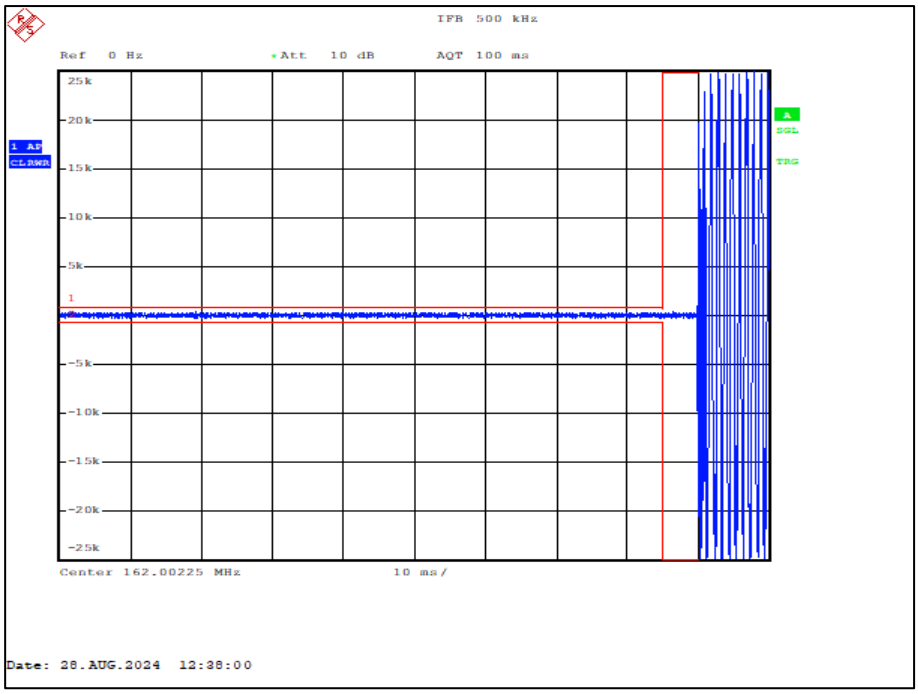

Figure 103- 162.00 MHz, Switch Off Transients

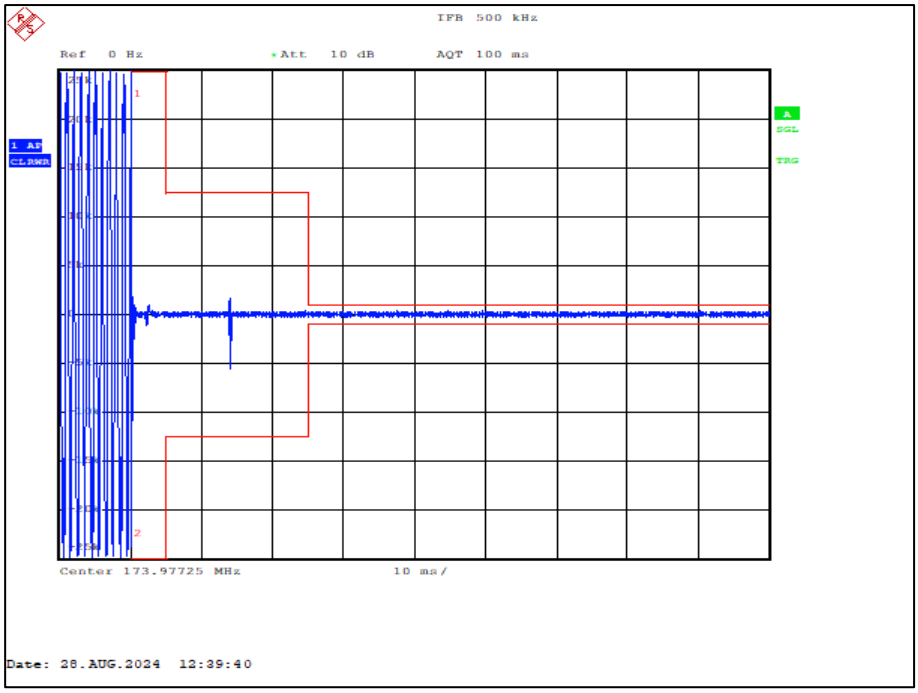

Figure 104 - 173.975 MHz, Switch On Transients

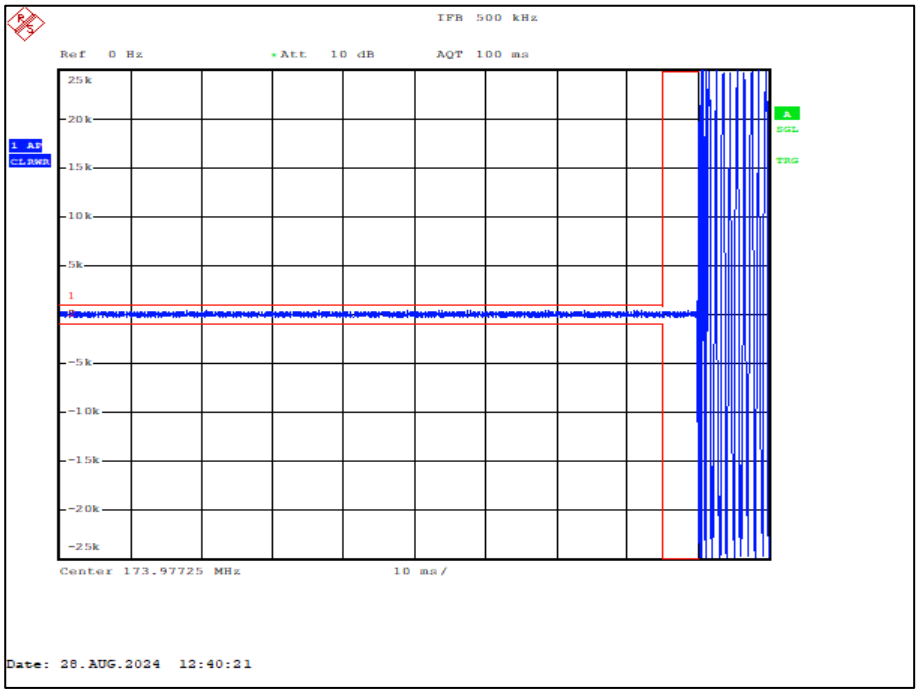

Figure 105- 173.975 MHz, Switch Off Transients

FCC 47 CFR Part 90, Limit Clause 90.214

Time Interval	Maximum Frequency Difference	150 to 174 MHz	421 to 512 MHz
Transient Frequency Behaviour for Equipment Designed to Operate on 25 kHz Channels			
T_1	± 25.0 kHz	5.0 ms	10.0 ms
T_2	± 12.5 kHz	20.0 ms	25.0 ms
T_3	± 25.0 kHz	5.0 ms	10.0 ms
Transient Frequency Behaviour for Equipment Designed to Operate on 12.5 kHz Channels			
T_1	± 12.5 kHz	5.0 ms	10.0 ms
T_2	± 6.25 kHz	20.0 ms	25.0 ms
T_3	± 12.5 kHz	5.0 ms	10.0 ms
Transient Frequency Behaviour for Equipment Designed to Operate on 6.25 kHz Channels			
T_1	± 6.25 kHz	5.0 ms	10.0 ms
T_2	± 3.125 kHz	20.0 ms	25.0 ms
T_3	± 6.25 kHz	5.0 ms	10.0 ms

Table 50

Industry Canada RSS-119, Limit Clause 5.9

Channel Bandwidth (kHz)	Time Intervals	Maximum Frequency Difference (kHz)	Transient Duration Limit (ms)	
			138 to 174 MHz	406.1 to 512 MHz
25.0	t_1	± 25.0	5	10
	t_2	±12.5	20	25
	t_3	± 25.0	5	10
12.5	t_1	± 12.5	5	10
	t_2	± 6.25	20	25
	t_3	± 12.5	5	10
6.25	t_1	± 6.25	5	10
	t_2	± 3.125	20	25
	t_3	± 6.25	5	10

Table 51

TETRA - 148-149.9 MHz (ISEDC only)

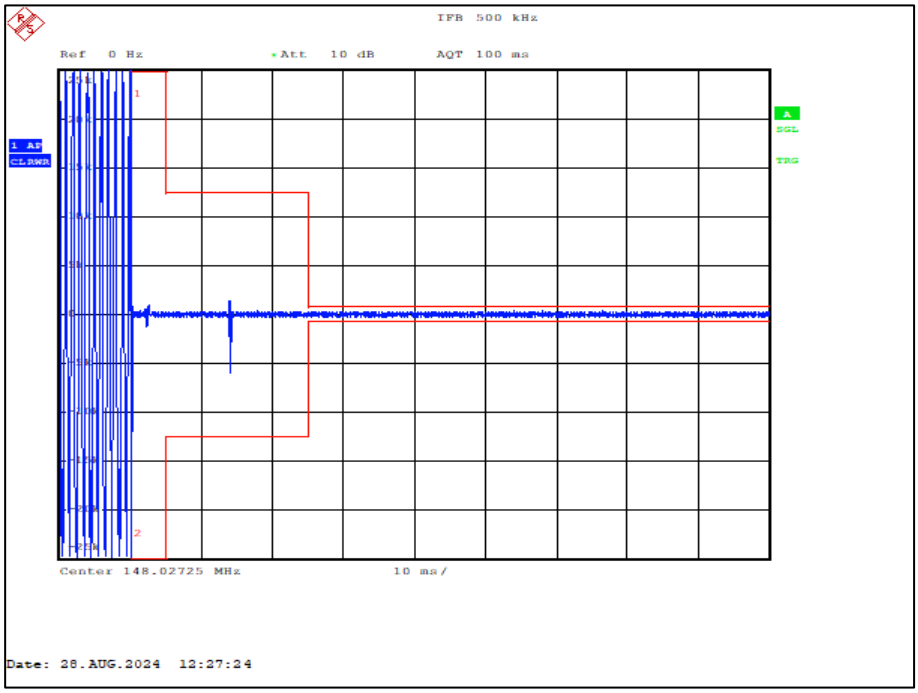

Figure 106 - 148.025 MHz, Switch On Transients

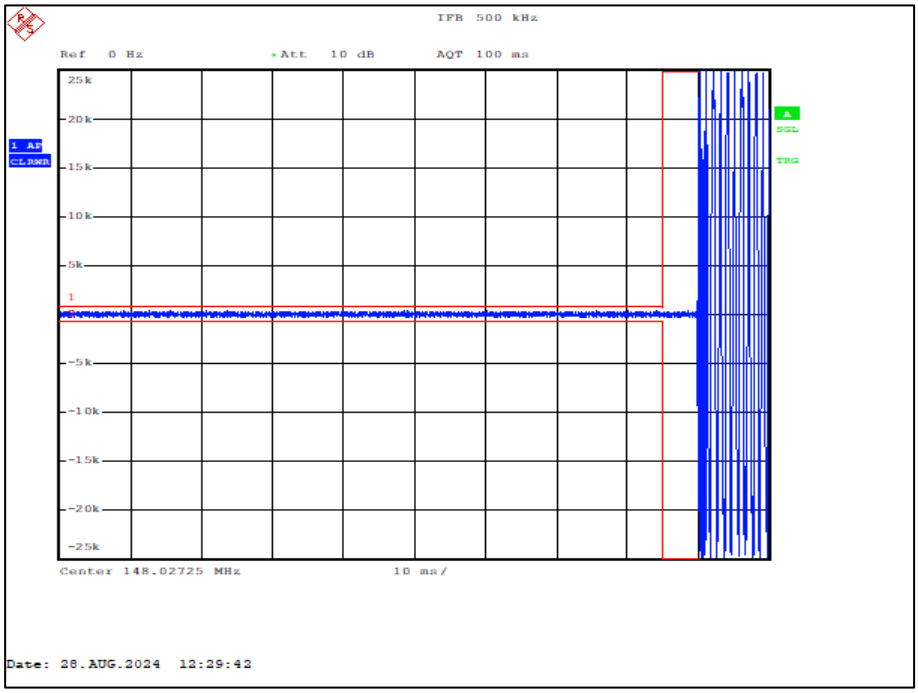

Figure 107- 148.025 MHz, Switch Off Transients

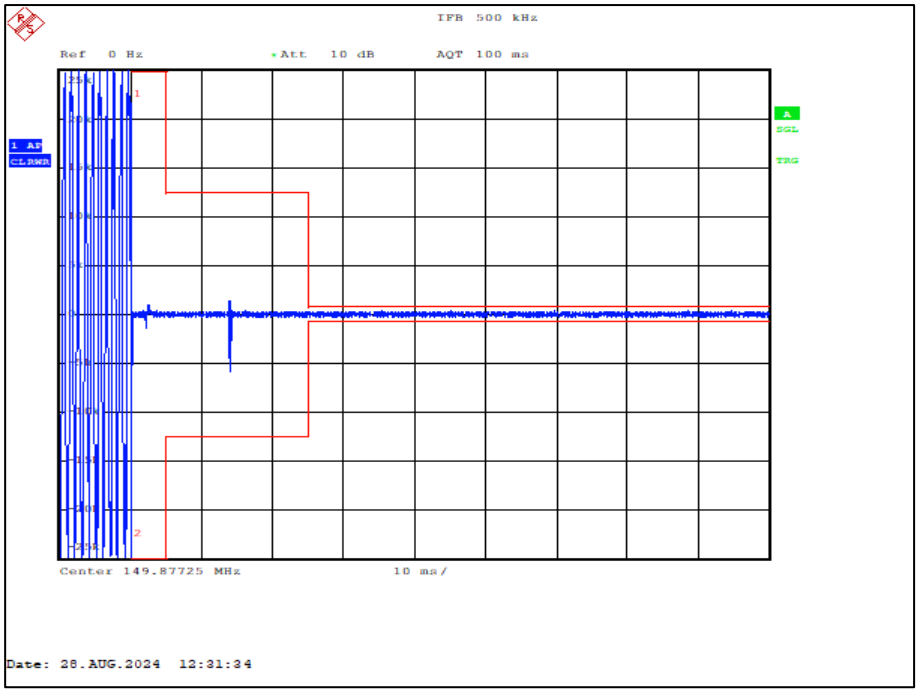

Figure 108 - 149.875 MHz, Switch On Transients

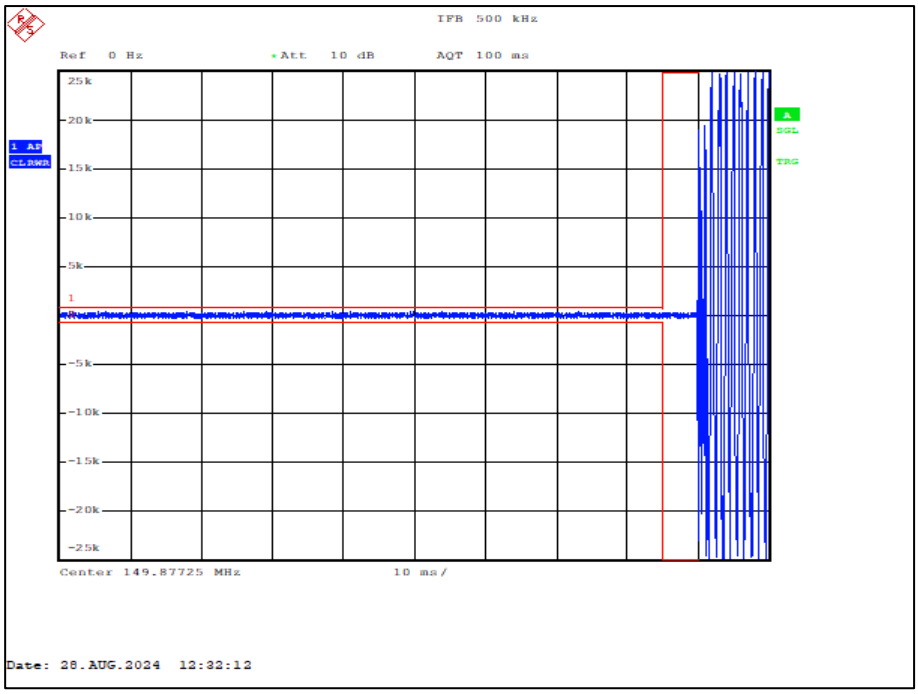

Figure 109- 149.875 MHz, Switch Off Transients

Industry Canada RSS-119, Limit Clause 5.9

Channel Bandwidth (kHz)	Time Intervals	Maximum Frequency Difference (kHz)	Transient Duration Limit (ms)	
			138 to 174 MHz	406.1 to 512 MHz
25.0	t_1	± 25.0	5	10
	t_2	±12.5	20	25
	t_3	± 25.0	5	10
12.5	t_1	± 12.5	5	10
	t_2	± 6.25	20	25
	t_3	± 12.5	5	10
6.25	t_1	± 6.25	5	10
	t_2	± 3.125	20	25
	t_3	± 6.25	5	10

Table 52

TETRA - 138-144 MHz (ISEDC only)

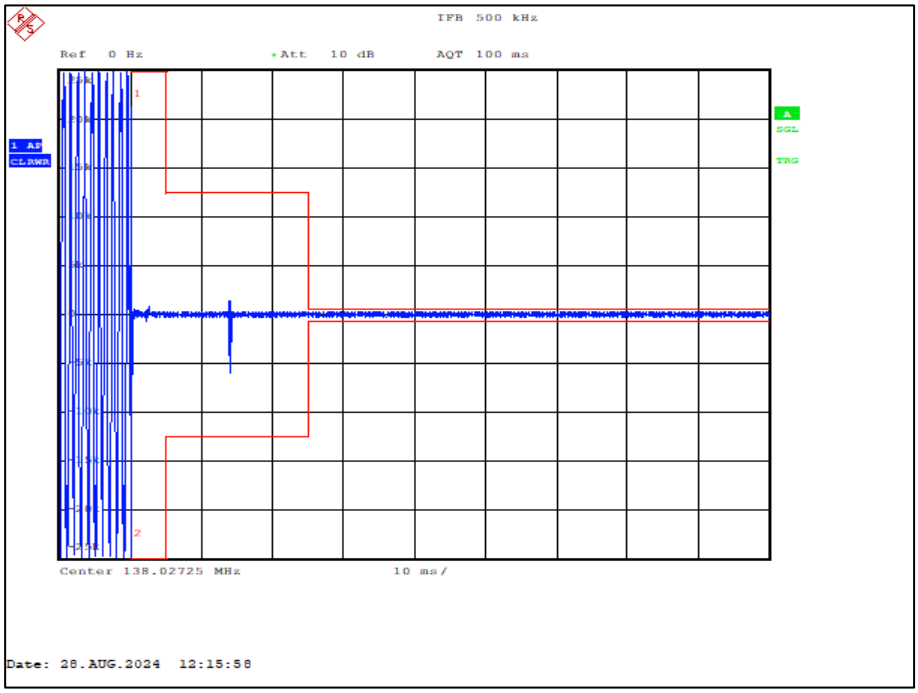

Figure 110 - 138.025 MHz, Switch On Transients

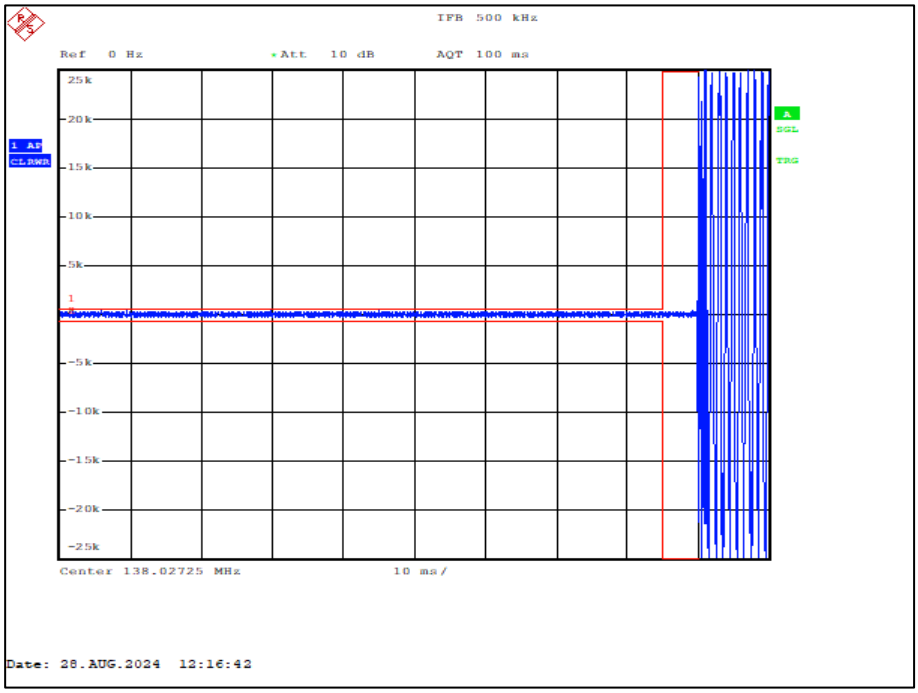

Figure 111- 138.025 MHz, Switch Off Transients

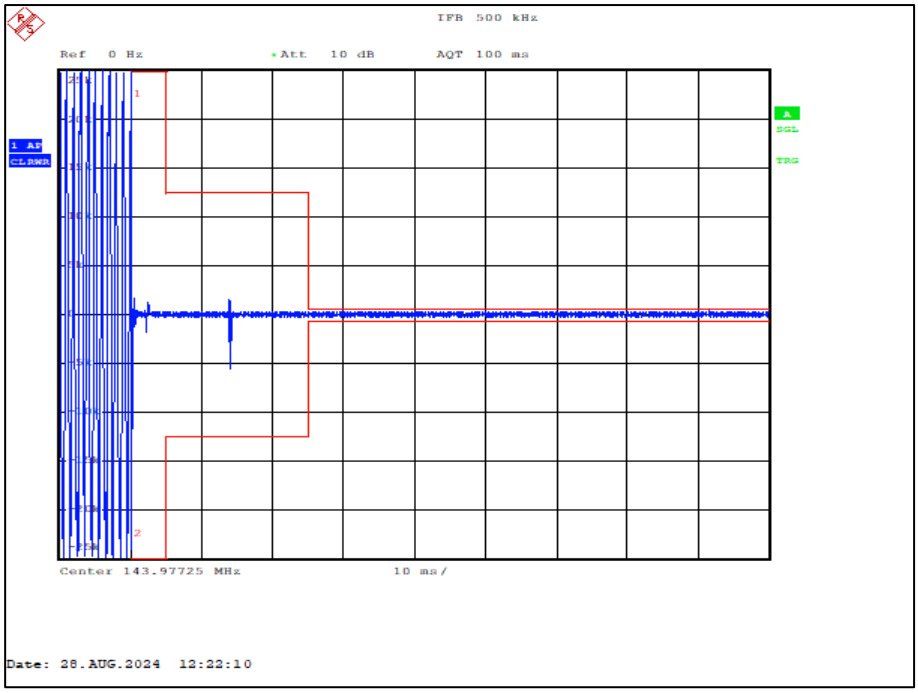

Figure 112 - 143.975 MHz, Switch On Transients

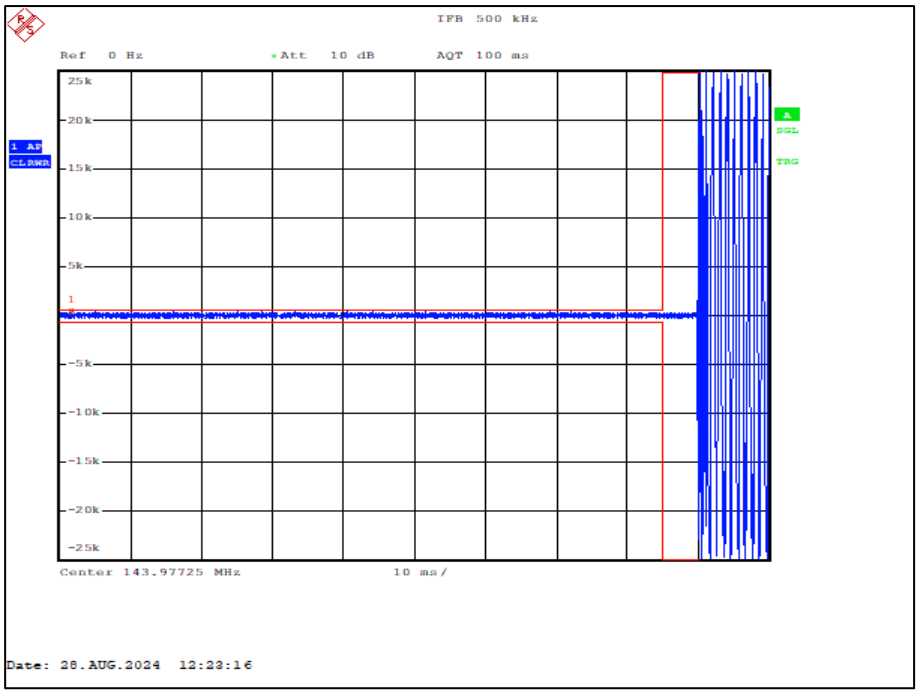

Figure 113- 143.975 MHz, Switch Off Transients

Industry Canada RSS-119, Limit Clause 5.9

Channel Bandwidth (kHz)	Time Intervals	Maximum Frequency Difference (kHz)	Transient Duration Limit (ms)	
			138 to 174 MHz	406.1 to 512 MHz
25.0	t_1	± 25.0	5	10
	t_2	±12.5	20	25
	t_3	± 25.0	5	10
12.5	t_1	± 12.5	5	10
	t_2	± 6.25	20	25
	t_3	± 12.5	5	10
6.25	t_1	± 6.25	5	10
	t_2	± 3.125	20	25
	t_3	± 6.25	5	10

Table 53

2.6.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Attenuator (10 dB)	Weinschel	47-10-34	481	12	31-Jul-2025
Signal Generator, 9kHz - 3GHz	Rohde & Schwarz	SMA 100A	3504	12	24-Oct-2024
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	31-May-2025
Cable (40 GHz)	Rosenberger	LU1-001-1000	5022	12	04-Feb-2025
Power Splitter, 2 way	Mini-Circuits	ZN2PD2-63-S+	5237	-	O/P Mon
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5417	12	06-Jun-2025
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5420	12	06-Jun-2025
Cable (K-Type to K-Type, 1 m)	Junkosha	MWX241-01000KMSKMS/A	5511	12	06-Jun-2025
Humidity & Temperature meter	R.S Components	1364	6149	12	12-Aug-2025
Attenuator 5W 30dB DC-18GHz	Aaren	AT40A-4041-D18-30	6559	12	18-Jun-2025

Table 54

O/P Mon – Output Monitored using calibrated equipment

2.7 Types of Emissions

2.7.1 Specification Reference

FCC 47 CFR Part 90, Clause 90.207
FCC 47 CFR Part 2, Clause 2.1047
Industry Canada RSS-119, Clause 5.2

2.7.2 Equipment Under Test and Modification State

SC2021, S/N: 1PR002417GKZ793 - Modification State 0

2.7.3 Date of Test

28-August-2024

2.7.4 Test Method

The duty cycle and burst length of the EUT were measured in accordance with the procedures in ANSI C63.26, clause 5.2.4.3.4 b). In addition to this, a spectral plot of the intentional transmission was produced.

The EUT was configured to transmit on maximum power on the middle channel in burst mode. The EUT was connected to a spectrum analyser via a cable and 40 dB of attenuation.

The path loss was measured using a calibrated signal generator connected to the wanted signal path and entered as a reference level offset in the spectrum analyser.

The EUT was powered by a 7.4V, lithium polymer battery supplied by the manufacturer for the duration of test.

2.7.5 Environmental Conditions

Ambient Temperature	17.0 °C
Relative Humidity	58.3 %

2.7.6 Test Results

TETRA - 150.05-174 MHz (FCC and ISEDC)

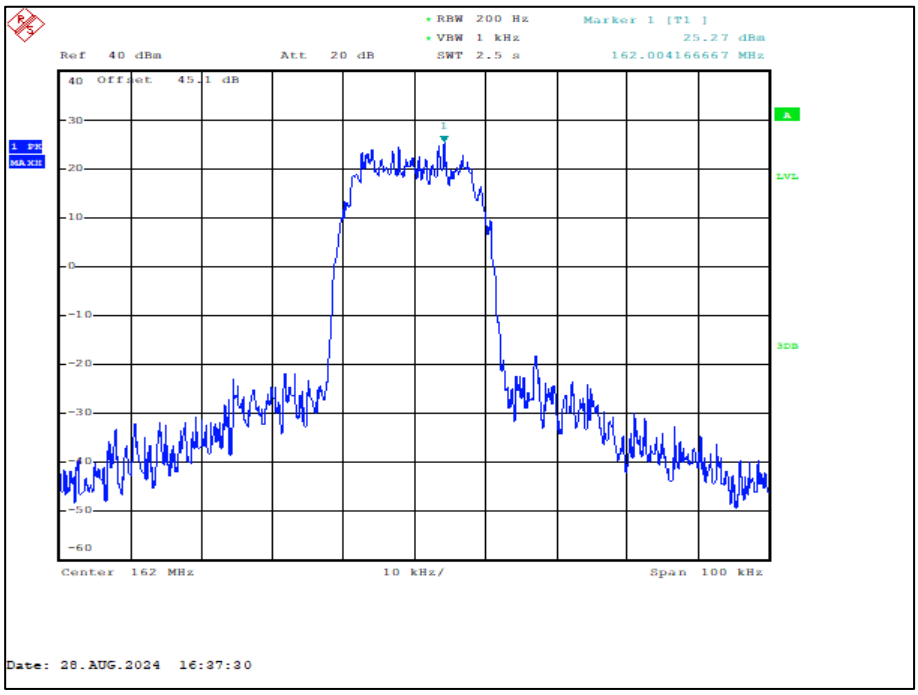

Figure 114-Spectral Plot

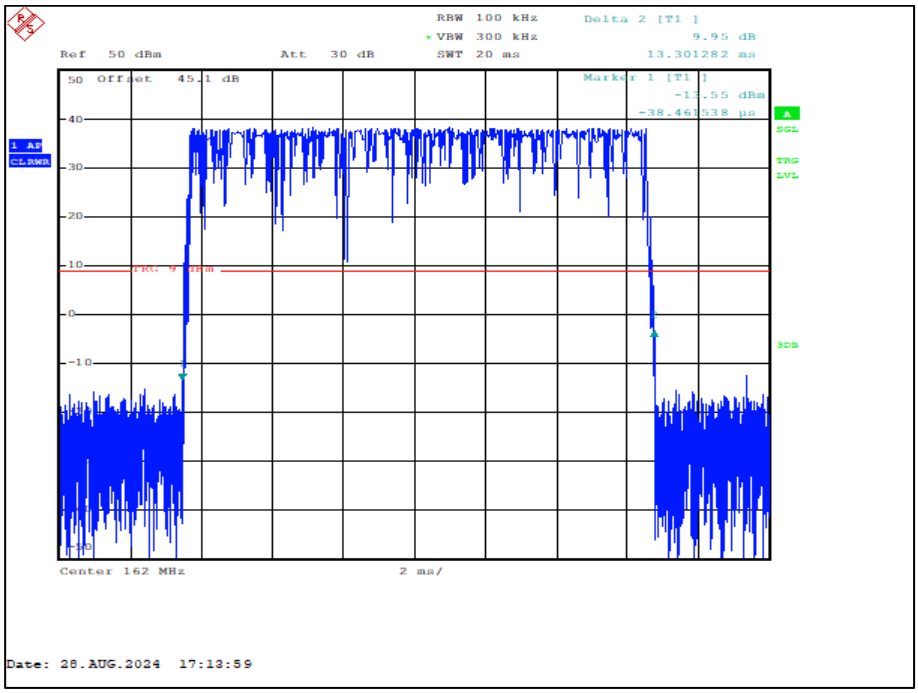

Figure 115-Burst Length

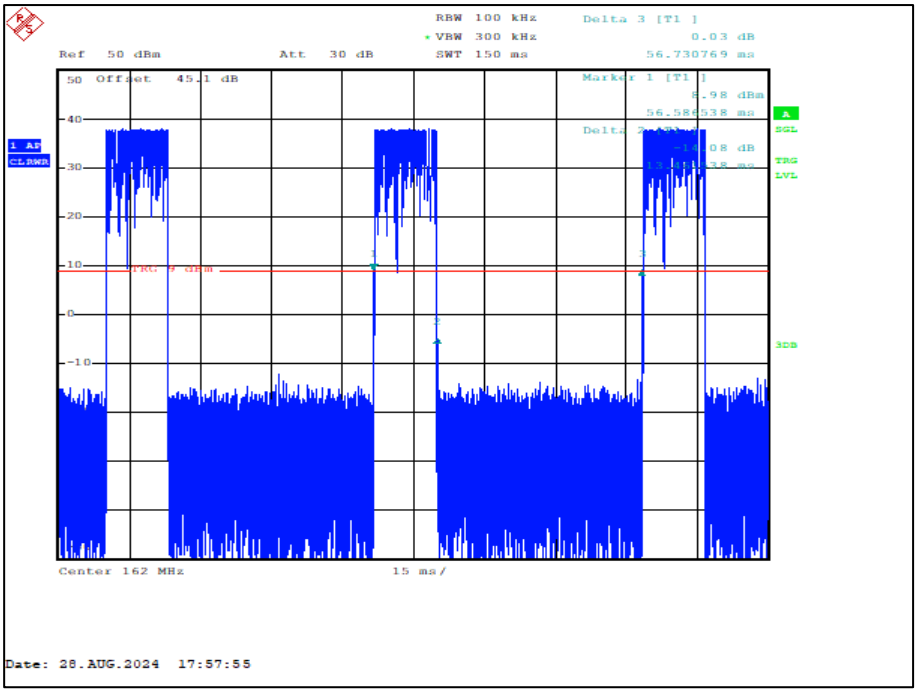

Figure 116-Duty Cycle

FCC 47 CFR Part 90, Limit Clause 90.207

As per FCC Part 90.207 (b) through (n).

FCC 47 CFR Part 2, Limit Clause 2.1047

Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

Industry Canada RSS-119, Limit Clause 5.3

Equipment that operates in the bands 768-776 MHz and 798-806 MHz shall use digital modulation. Mobile and portable transmitters that operate in these bands may have analogue modulation capability only as a secondary mode in addition to their primary digital mode. However, mobile and portable transmitters that operate only on the low-power channels as defined in SRSP-511 may employ any type of modulation.

2.7.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
PXA Signal Analyser	Keysight Technologies	N9030A	4653	12	18-Apr-2025
Hygrometer	Rotronic	HP21	4741	12	30-May-2025
Cable (40 GHz)	Rosenberger	LU1-001-1000	5022	12	04-Feb-2025
3.5 mm 1m Cable	Junkosha	MWX221-01000DMS	5417	12	06-Jun-2025
Coaxial Fixed Attenuator DC-18GHz 5W 10dB	RF-Lambda	RFS5G18B10SMP	6179	12	11-Oct-2024
Attenuator 5W 30dB DC-18GHz	Aaren	AT40A-4041-D18-30	6559	12	18-Jun-2025
Signal Generator, 9kHz to 3GHz	Rohde & Schwarz	SMA 100A	3494	12	22-Sep-2024

Table 55

3 Photographs

3.1 Test Setup Photographs

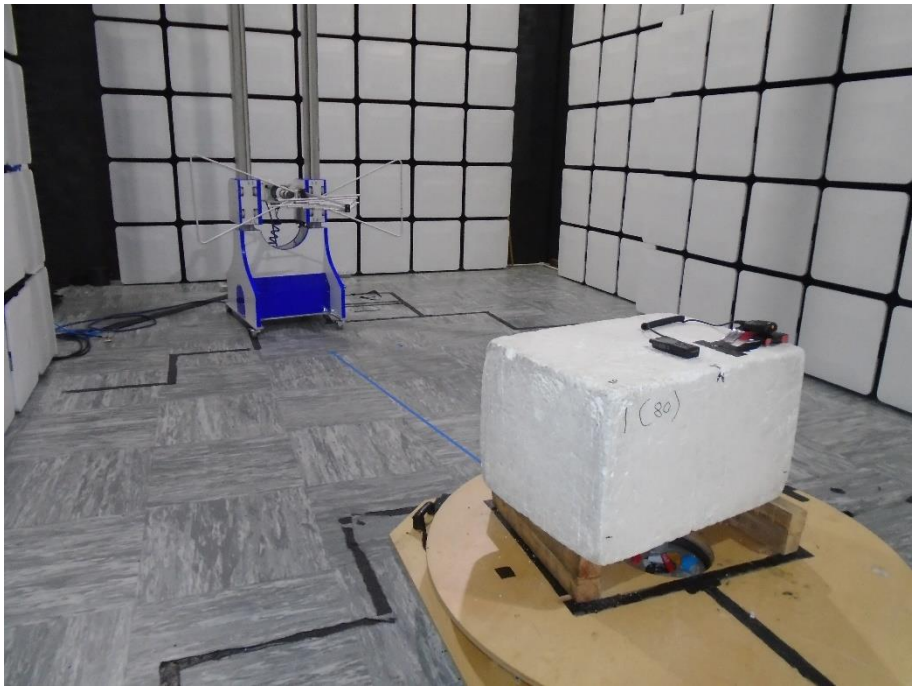

Figure 117 - Test Setup - 30 MHz to 1 GHz X-Plane

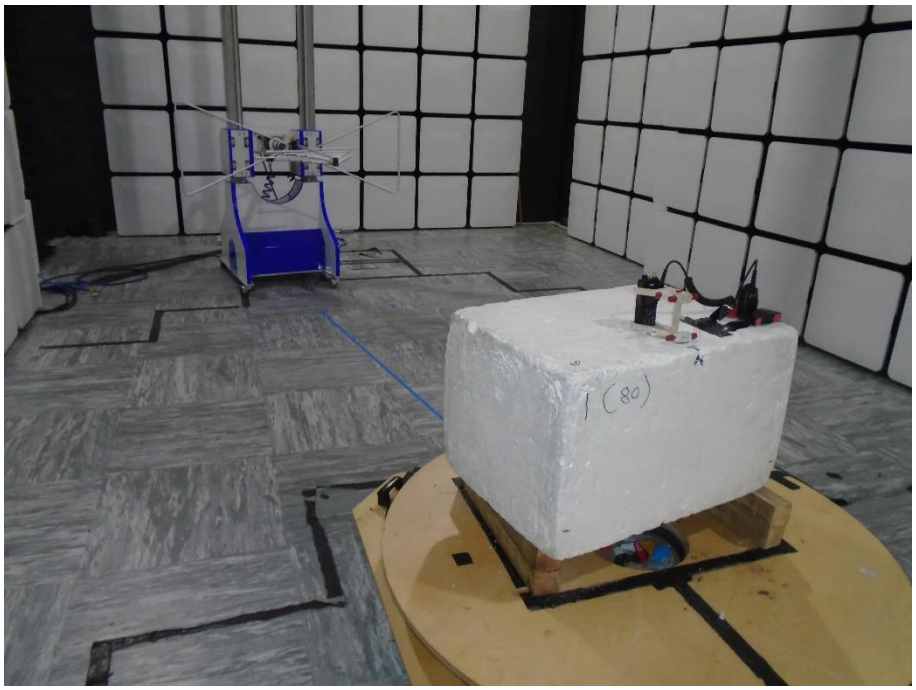

Figure 118 - Test Setup - 30 MHz to 1 GHz Y-Plane

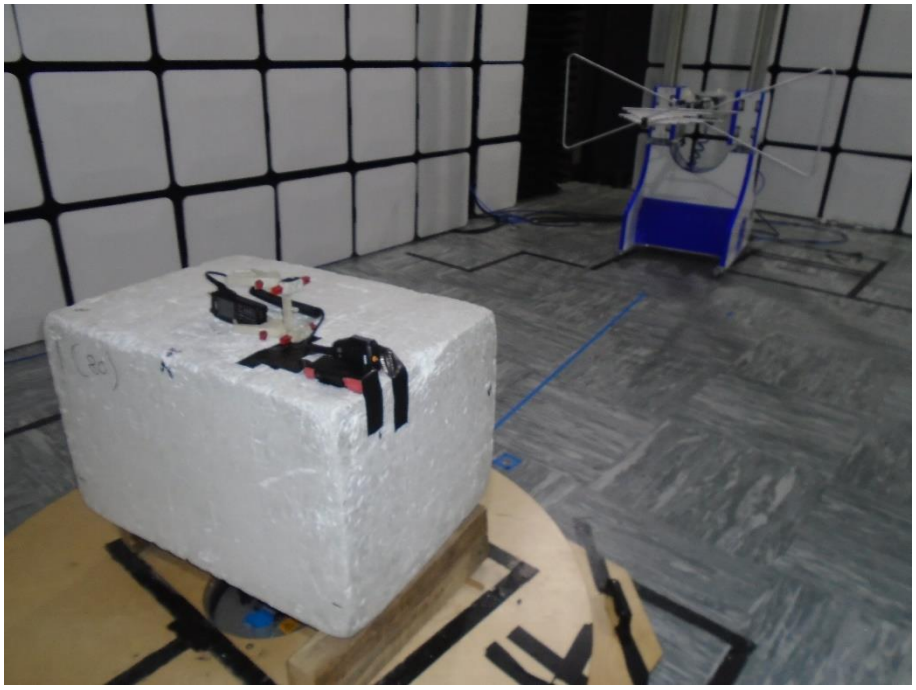

Figure 119 - Test Setup - 30 MHz to 1 GHz Z-Plane

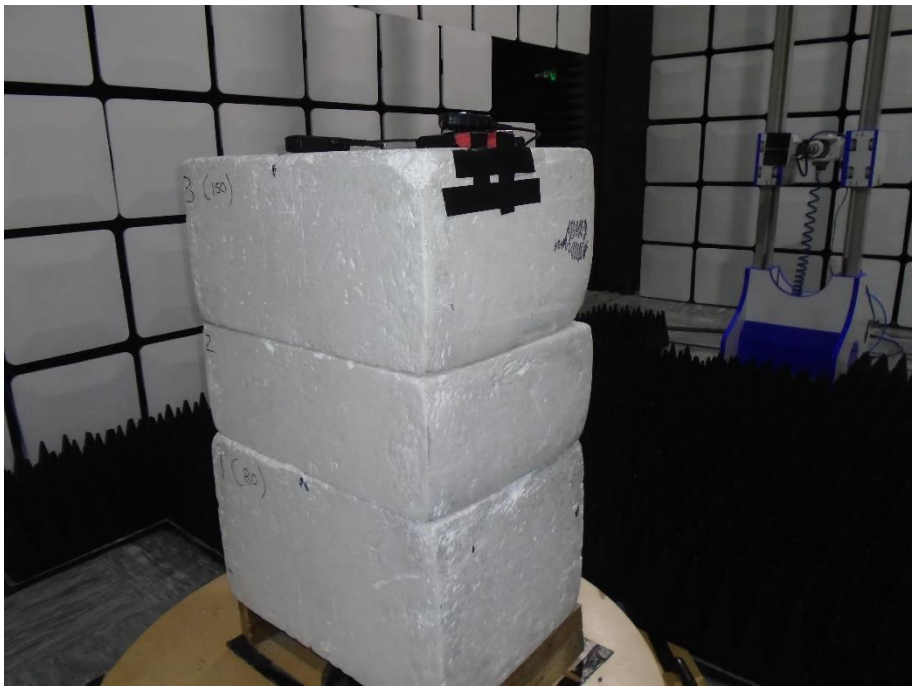

Figure 120 - Test Setup - 1 GHz to 3 GHz X-Plane

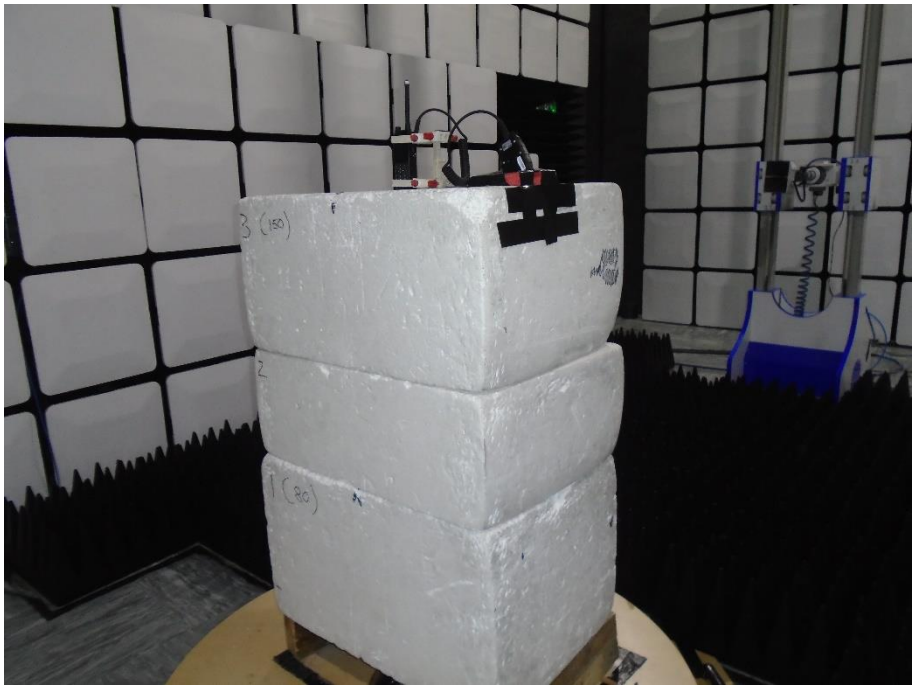

Figure 121 - Test Setup - 1 GHz to 3 GHz Y-Plane

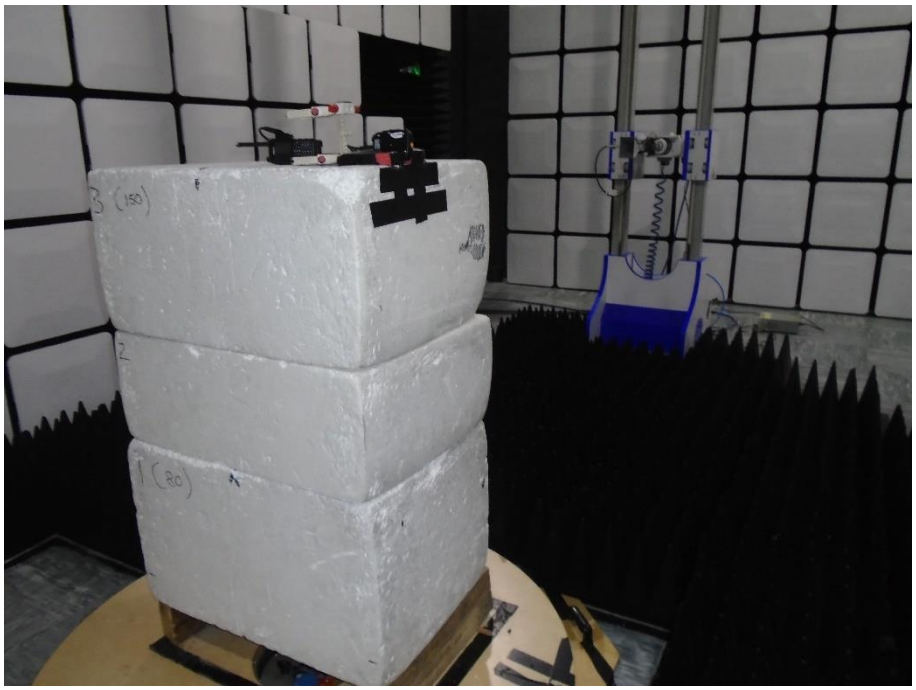

Figure 122 - Test Setup - 1 GHz to 3 GHz Z-Plane

4 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Maximum Conducted Output Power	± 3.2 dB
Bandwidth Limitations	± 58.05 Hz
Spurious Emissions at Antenna Terminals	± 3.45 dB
Frequency Stability	± 11 Hz
Transient Frequency Behaviour	± 0.2 Hz
Types of Emissions	-
Radiated Spurious Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 18 GHz: ± 6.3 dB

Table 56

Measurement Uncertainty Decision Rule – Accuracy Method

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2021, Clause 4.4.3 (Procedure 2). The measurement results are directly compared with the test limit to determine conformance with the requirements of the standard.

Risk: The uncertainty of measurement about the measured result is negligible with regard to the final pass/fail decision. The measurement result can be directly compared with the test limit to determine conformance with the requirement (compare IEC Guide 115). The level of risk to falsely accept and falsely reject items is further described in ILAC-G8.