

FCC and ISED Test Report

Sepura Limited
Hand Portable Radio, Model: STP8X040



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

Prepared for: Sepura Limited
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FCC ID: XX6STP8X040X IC: 8739A-STP8X040X

COMMERCIAL-IN-CONFIDENCE

Document 75960173-03 Issue 03

SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Steve Marshall	Senior Engineer	Authorised Signatory	22 January 2025

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 2, FCC 47 CFR Part 90, ISED 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	Neil Rousell	22 January 2025	
	Aakash Rawal	22 January 2025	

FCC Accreditation

492497/UK2010 Octagon House, Fareham Test Laboratory

ISED Accreditation

12669A Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 2: 2022, FCC 47 CFR Part 90: 2022, ISED 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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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	23-July-2024
2	Second Issue – Amendment to serial number pg 10, 18 & 32	25-July-2024
3	Removal of test setup photographs and amendment of test method wording in section 2.3.4	22 -January-2025

Table 1

1.2 Introduction

Applicant	Sepura Limited
Manufacturer	Sepura Limited
Model Number(s)	STP8X040
Serial Number(s)	1PR902412G9Y2BU
Hardware Version(s)	PLX-11016M00-01 (mod state 9)
Software Version(s)	181301302937
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 2: 2022 FCC 47 CFR Part 90: 2022 ISED RSS-119: Issue 12 (05-2015) ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021)
Order Number	PLC-PO027821
Date	29-December-2023
Date of Receipt of EUT	30-April-2024
Start of Test	15-May-2024
Finish of Test	22-May-2024
Name of Engineer(s)	Neil Rousell and Aakash Rawal
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 2, FCC 47 CFR Part 90, ISED RSS-119 and ISED RSS-GEN is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	Part 2	Part 90	RSS-119	RSS-GEN			
Configuration and Mode: TETRA - 407 - 430 MHz							
2.1	-	-	5.4	6.12	Maximum Conducted Output Power	Pass	ANSI C63.26: 2015
2.2	-	-	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	
2.3	-	-	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.26: 2015
Configuration and Mode: TETRA - 450 - 470 MHz							
2.1	2.1046	90.205	5.4	6.12	Maximum Conducted Output Power	Pass	ANSI C63.26: 2015
2.2	2.1051	90.210	5.8	6.13	Spurious Emissions at Antenna Terminals	Pass	
2.3	2.1053	90.210	5.8	6.13	Radiated Spurious Emissions	Pass	ANSI C63.26: 2015

Table 2

Whilst the product supports TETRA in the entire range 407 to 470 MHz, the bands permitted by Canada / US are:

- Canada: 406.1-430 MHz & 450-470 MHz
- US : 450-470 MHz



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)		STP8X040 is a TETRA Hand Portable Radio with GPS and optional Bluetooth, compliant with IECEx/ATEX standards.	
Manufacturer:		Sepura Limited	
Model:		STP8X040	
Part Number:		STP8X040	
Hardware Version:		PLX-11016M00-01 (Mod State 9)	
Software Version:		Main: 181301302937	
FCC ID of the product under test – see guidance here		XX6STP8X040X	
IC ID of the product under test – see guidance here		8739A-STP8X040X	
Device Category	Mobile ☐	Portable ☒	Fixed ☐
Equipment is fitted with an Audio Low Pass Filter		Yes ☐	No ☒

Table 3

Intentional Radiators

Technology	TETRA – ISSED	TETRA – ISSED	TETRA – FCC	
Frequency Range (MHz to MHz)	407 - 430	450-470	450-470	
Conducted Declared Output Power (dBm)	29 dBm	29 dBm	29 dBm	
Antenna Gain (dBi) (pls see the section below of antenna characteristics for TETRA antennas)	1.86	0.67	0.67	
Supported Bandwidth(s) (MHz) (e.g. 1 MHz, 20 MHz, 40 MHz)	25 kHz	25 kHz	25 kHz	
Modulation Scheme(s) (e.g. GFSK, QPSK etc)	$\pi/4$ DQPSK	$\pi/4$ DQPSK	$\pi/4$ DQPSK	
ITU Emission Designator (see guidance here) (not mandatory for Part 15 devices)	22K0DXW	22K0DXW	20K0DXW 22K0DXW	
Bottom Frequency (MHz)	407.0125	450.0125	450.0125	
Middle Frequency (MHz)	418.05000	460.025	460.025	
Top Frequency (MHz)	429.9875	469.9875	469.9875	

Table 4



Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	470 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:	7.6	V
Extreme upper voltage:	8.4	V
Extreme lower voltage:	7	V
Max current:	2	A

Table 7

Battery Power Source

Voltage:	7.6V	V
End-point voltage:		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:	55	°C

Table 10



Cable Loss

Adapter Cable Loss (Conducted sample)		dB
--	--	----

Table 11

Antenna Characteristics

Antenna connector ☐			State impedance		Ohm
Temporary antenna connector ☐			State impedance		Ohm
External antenna ☒	Type:	310-00008	Gain	1.77	dBi
External antenna ☒	Type:	300-00882	Gain	1.22	dBi
External antenna ☒	Type:	300-00883	Gain	1.86	dBi
External antenna ☒	Type:	300-00884	Gain	0.67	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	Part Number:	300-00904
Model:	STP8X Desktop Charger	Country of Origin:	Romania
Manufacturer:	Sepura	Part Number:	300-00879
Model:	STP8X Programming Lead	Country of Origin:	Romania
Manufacturer:	Panorama	Part Number:	310-00008
Model:	TETRA Antenna	Country of Origin:	UK
Manufacturer:	Panorama	Part Number:	300-00882
Model:	TETRA Antenna	Country of Origin:	UK
Manufacturer:	Panorama	Part Number:	300-00883
Model:	TETRA Antenna	Country of Origin:	UK
Manufacturer:	Panorama	Part Number:	300-00884
Model:	TETRA Antenna	Country of Origin:	UK

Table 13

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

Name: Chris Beecham

Position held: Conformance Engineer

Date: 12/03/2024



1.5 Product Information

1.5.1 Technical Description

STP8X040 is a TETRA Hand Portable Radio with GPS and optional Bluetooth, compliant with IECEx/ATEX standards.

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: STP8X040, Serial Number: 1PR902412G9Y2BU			
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 - 407 - 430 MHz		
Maximum Conducted Output Power	Neil Rousell	UKAS
Spurious Emissions at Antenna Terminals	Neil Rousell	UKAS
Radiated Spurious Emissions	Aakash Rawal	UKAS
Configuration and Mode: TETRA - 450 - 470 MHz		
Maximum Conducted Output Power	Neil Rousell	UKAS
Spurious Emissions at Antenna Terminals	Neil Rousell	UKAS
Radiated Spurious Emissions	Aakash Rawal	UKAS

Table 15

Office Address:

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



2 Test Details

2.1 Maximum Conducted Output Power

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test and Modification State

STP8X040, S/N: 1PR902412G9Y2BU - Modification State 0

2.1.3 Date of Test

21-May-2024

2.1.4 Test Method

The EUT was configured to transmit using the 30 dBm TX power setting on the bottom, middle and top channels in burst mode.

The EUT was connected to a spectrum analyser via a cable and attenuation. The path loss was measured using a network analyser and entered as a reference level offset in the spectrum analyser. The average power over the burst was measured and the result recorded.

2.1.5 Environmental Conditions

Ambient Temperature	23.5 °C
Relative Humidity	41.7 %



2.1.6 Test Results

TETRA - 407 - 430 MHz

Parameter	407.0125 MHz	418.05 MHz	429.9875 MHz
Conducted Output Power (dBm)	28.42	28.08	28.31
Manufacturer Declared Power (dBm)	29	29	29
Δ from manufacturer Power (dB)	-0.6	-0.9	-0.7
Antenna Gain (dBi)	1.86	1.86	1.86
ERP (dBm)	28.13	27.79	28.02

Table 16 - ERP

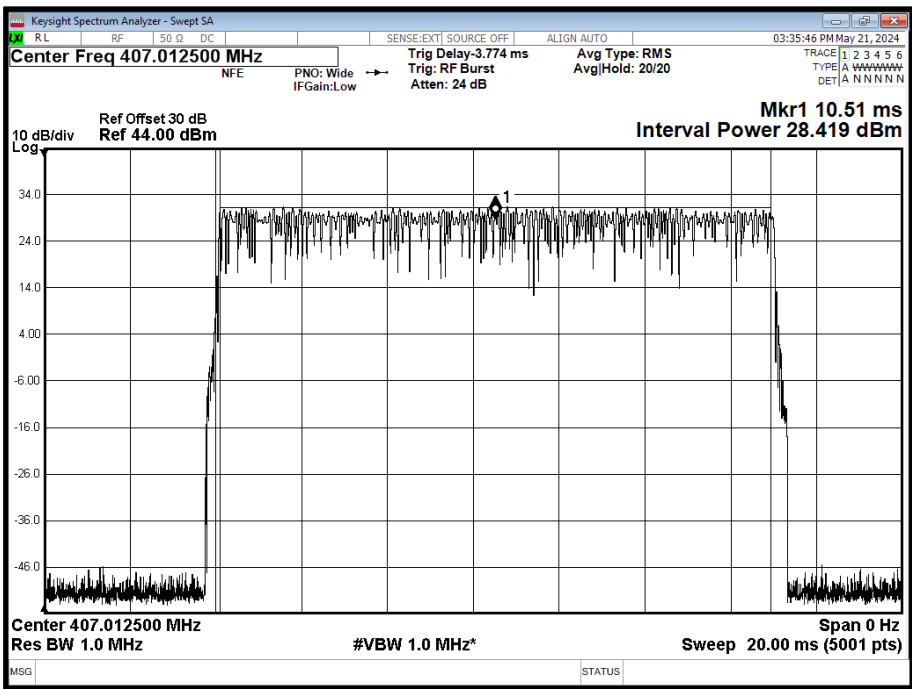


Figure 1 - 407.0125 MHz

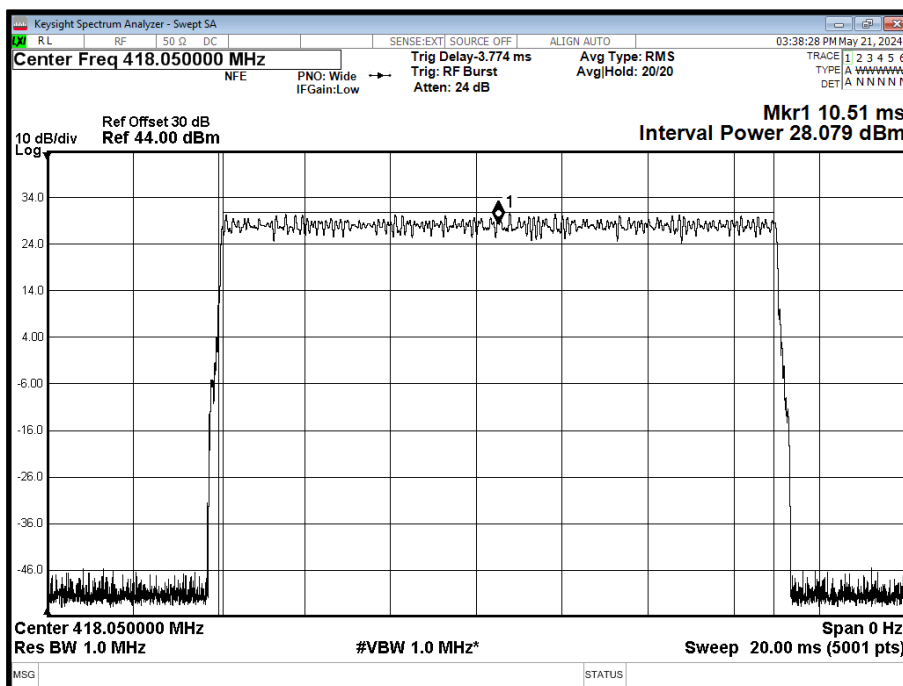


Figure 2 - 418.05 MHz

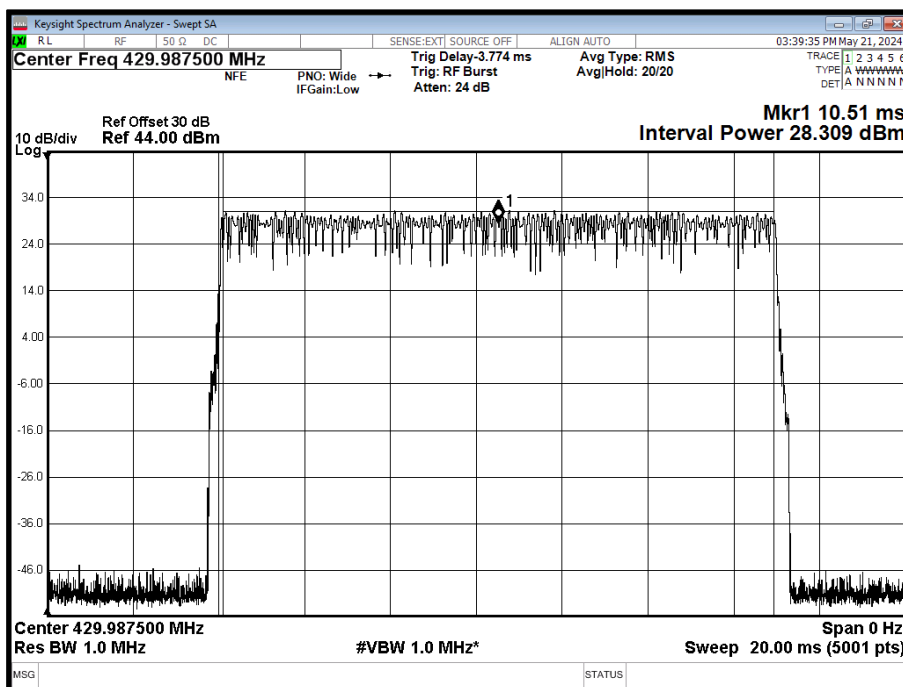


Figure 3 - 429.9875 MHz



TETRA - 450 - 470 MHz

Parameter	450.0125 MHz	460.025 MHz	469.9875 MHz
Conducted Output Power (dBm)	28.39	28.35	28.54
Manufacturer Declared Power (dBm)	29	29	29
Δ from manufacturer Power (dB)	-0.6	-0.6	-0.5
Antenna Gain (dBi)	0.67	0.67	0.67
ERP (dBm)	26.91	26.87	27.06

Table 17 - ERP

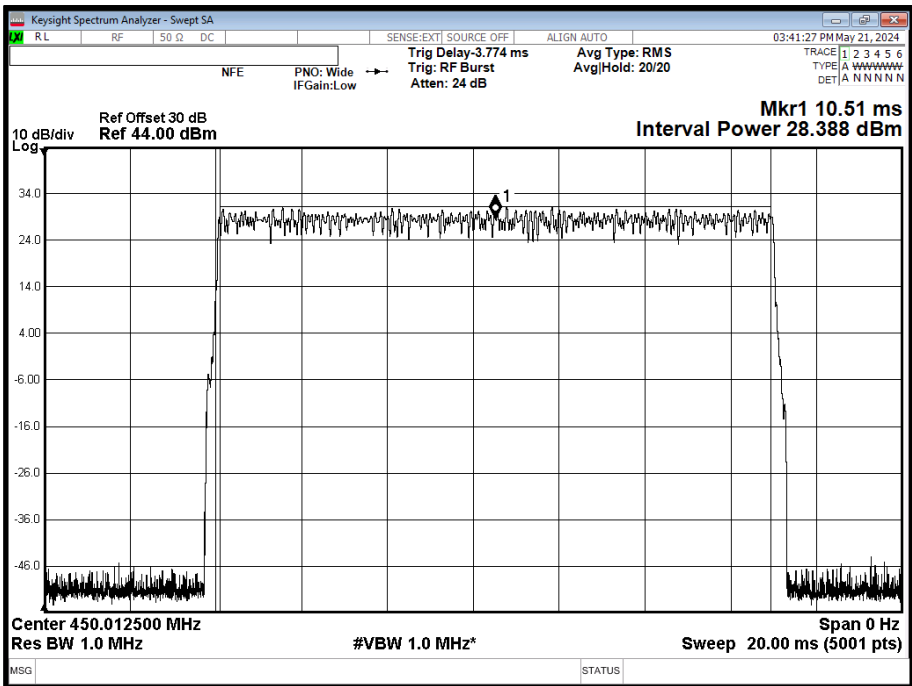


Figure 4 - 450.0125 MHz

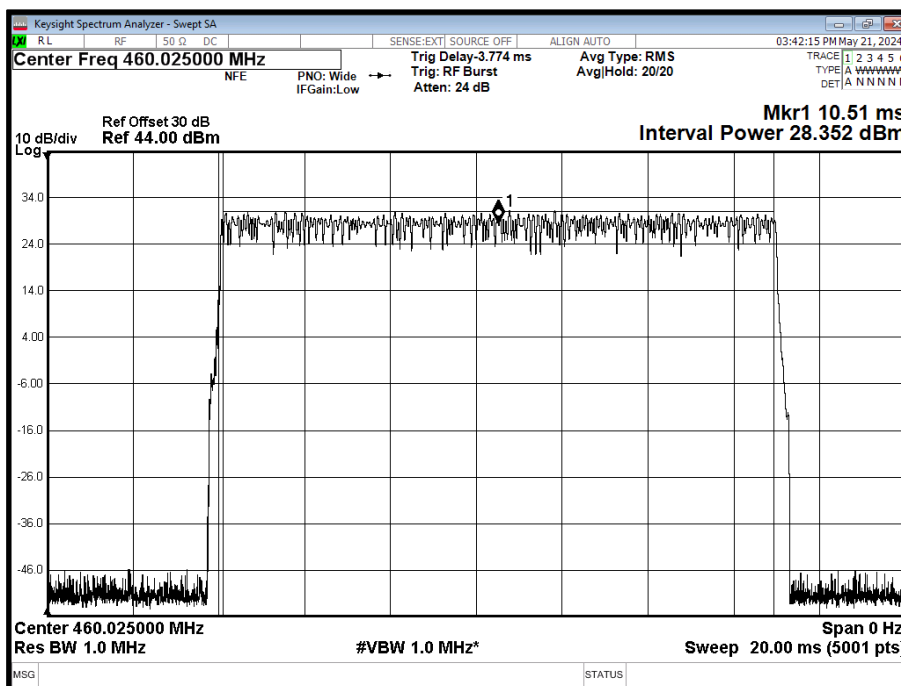


Figure 5 - 460.025 MHz

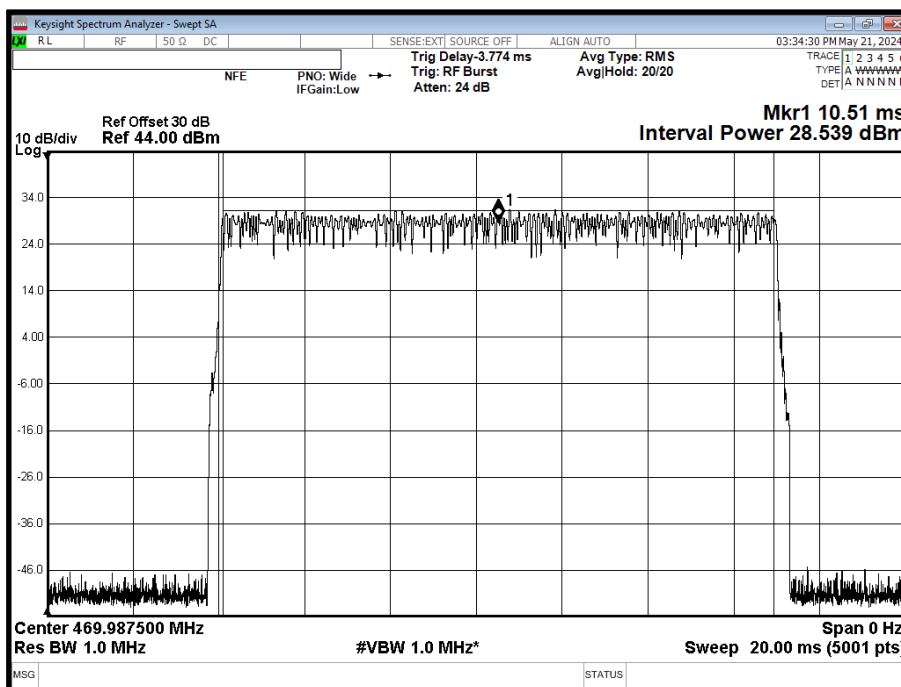


Figure 6 - 469.9875 MHz



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 18 - 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 and 941.5 to 944	110	30
*Equipment is generally authorised for effective radiated power (ERP) of less than 5 W.		

Table 19 - Industry Canada Limits for Transmitter Output Power



2.1.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 2.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Multimeter	Iso-tech	IDM101	2421	12	08-Nov-2024
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	4654	12	23-Jan-2025
Quad Power Supply	Rohde & Schwarz	HMP4040	4955	-	O/P Mon
Cable (40 GHz)	Rosenberger	LU1-001-1000	5022	12	04-Feb-2025
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5423	12	18-Feb-2025
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB 40	5605	12	07-Nov-2024
GPSDR Frequency standard	Orolia	SecureSync 2402-053	6339	6	14-Sep-2024
Attenuator 5W 30dB DC-18GHz	Aaren	AT40A-4041-D18-30	6563	12	18-Jun-2024

Table 20

O/P Mon – Output Monitored using calibrated equipment



2.2 Spurious Emissions at Antenna Terminals

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test and Modification State

STP8X040, S/N: 1PR902412G9Y2BU - Modification State 0

2.2.3 Date of Test

22-May-2024

2.2.4 Test Method

This test was performed in accordance with RSS-119, clause 4.2.2.

FCC/ISED emission masks - 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 the measured average power over the burst. The RBW was set to at least 1 % of the emission bandwidth. The mask as per FCC 47 CFR Part 90.210 (b) was applied.

For emissions removed more than 250% of the authorised bandwidth the EUT was connected to a spectrum analyser via a cable and attenuator. A max-hold trace and peak detector was used which was considered worst case. In the 450-470 MHz frequency range which applies to both FCC and ISED requirements, plots were only captured with the more stringent limit.

2.2.5 Environmental Conditions

Ambient Temperature	24.2 °C
Relative Humidity	45.9 %

2.2.6 Test Results

TETRA - 407 - 430 MHz

Results under this section were tested against RSS-119 Emission Mask Y.

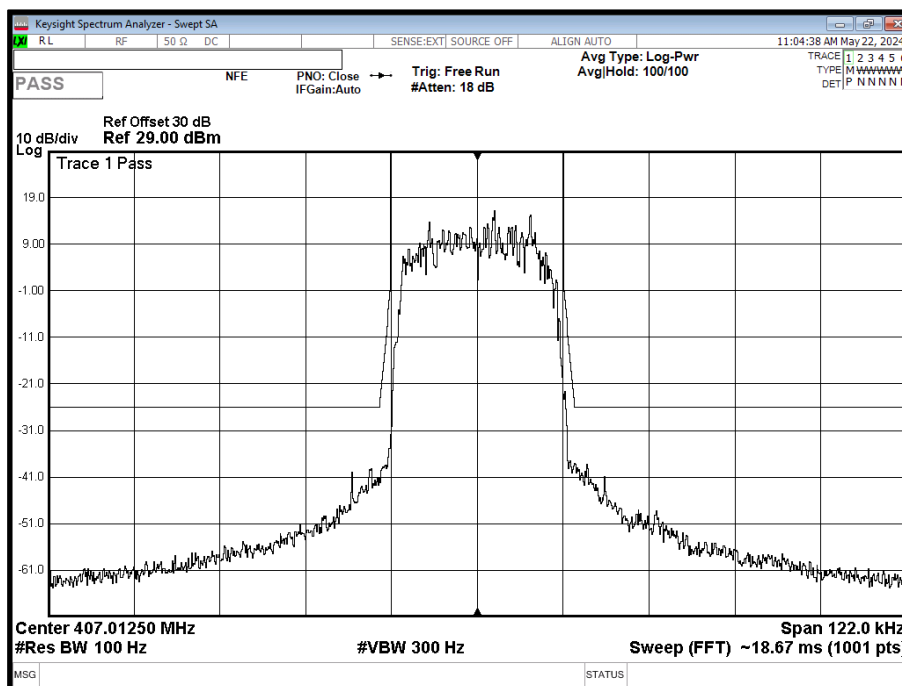


Figure 7 - 407.0125 MHz, Transmitter Mask

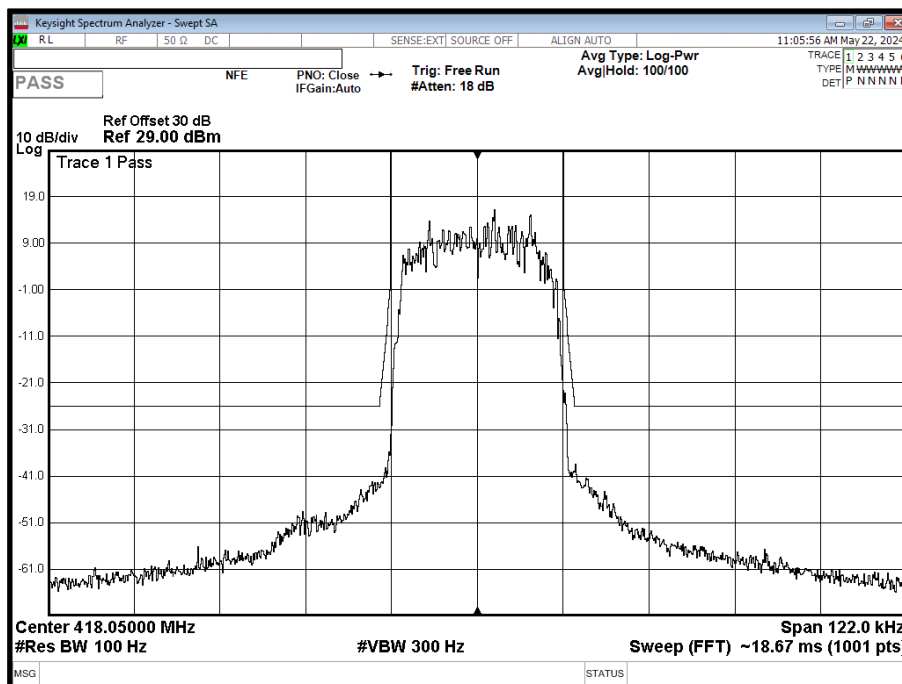


Figure 8 - 418.05 MHz, Transmitter Mask

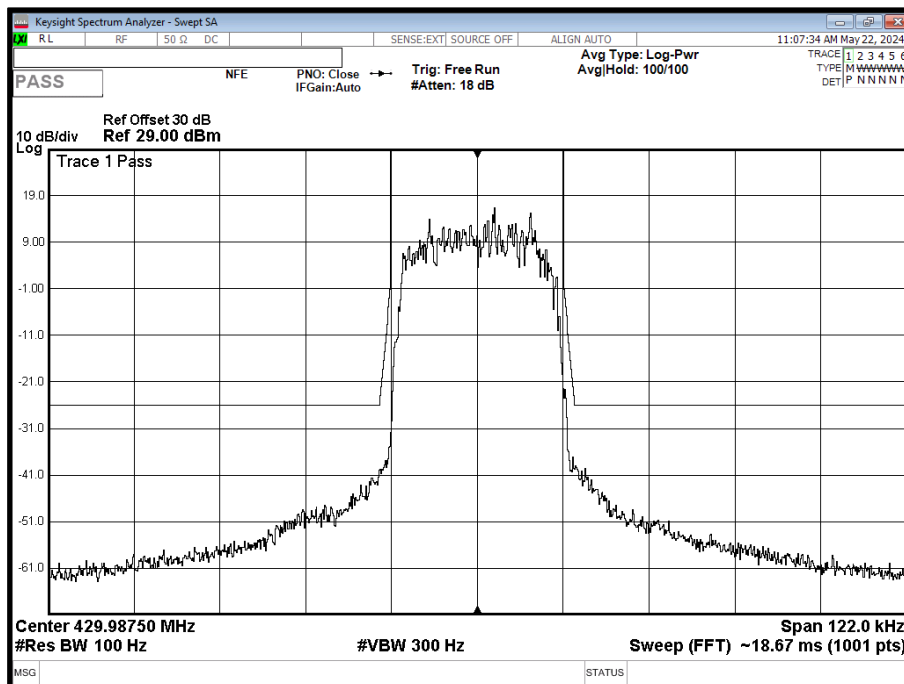


Figure 9 - 429.9875 MHz, Transmitter Mask

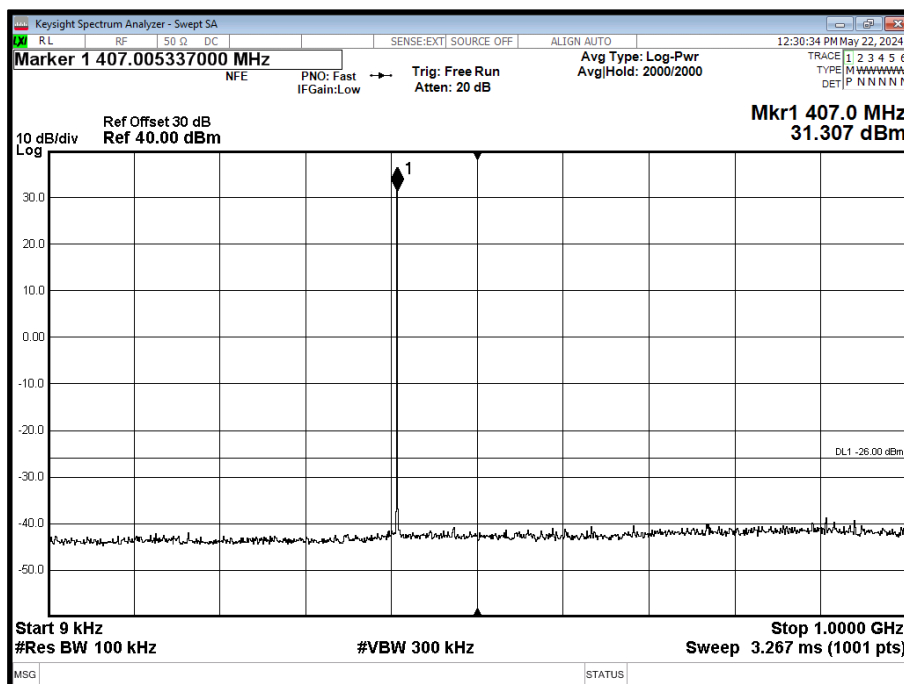


Figure 10 - 407.0125 MHz, 9 kHz to 1 GHz

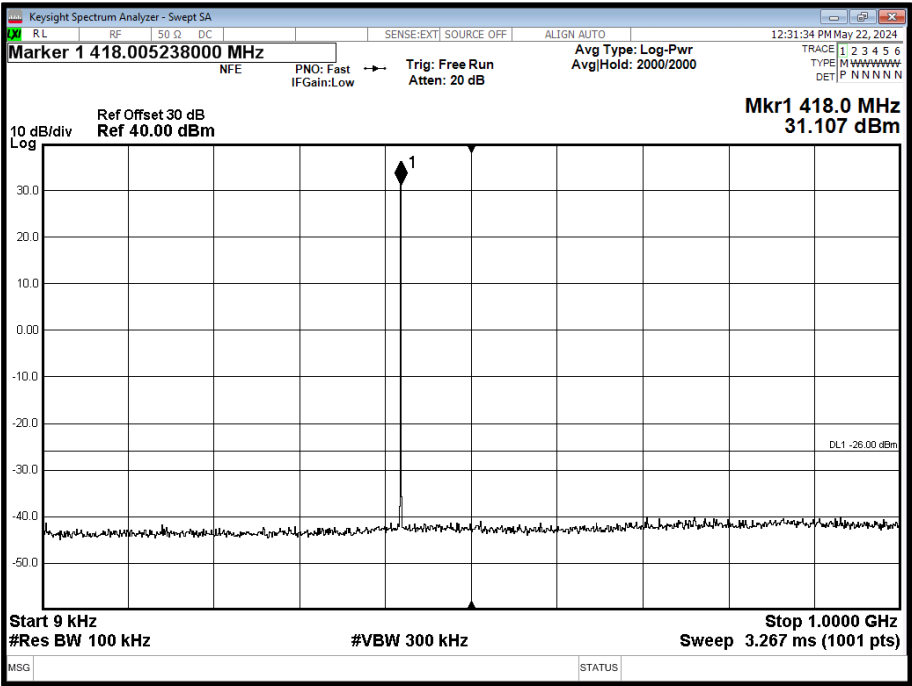


Figure 11 - 418.05 MHz, 9 kHz to 1 GHz

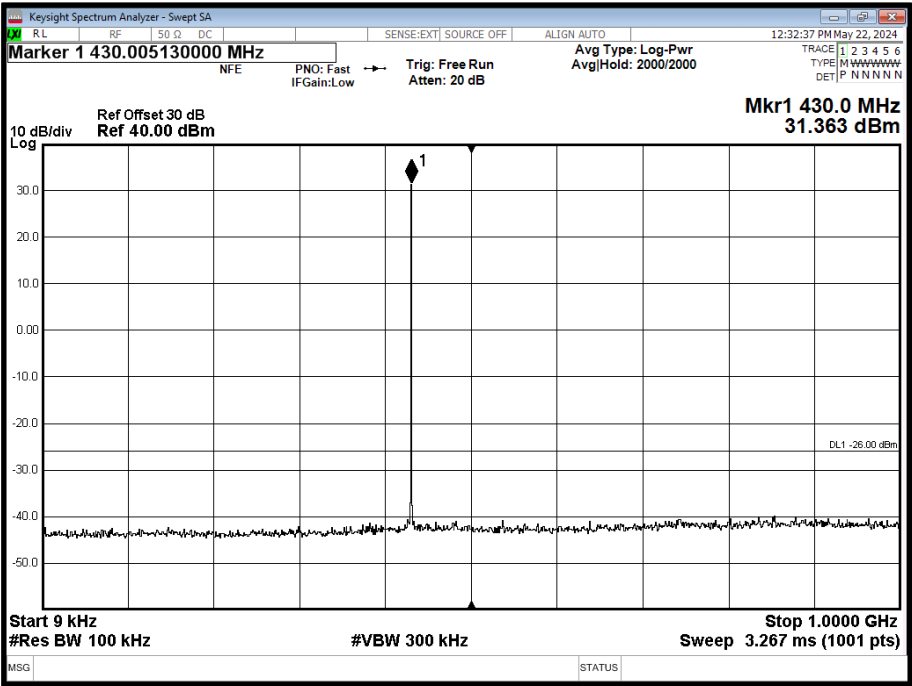


Figure 12 - 429.9875 MHz - 9 kHz to 1 GHz

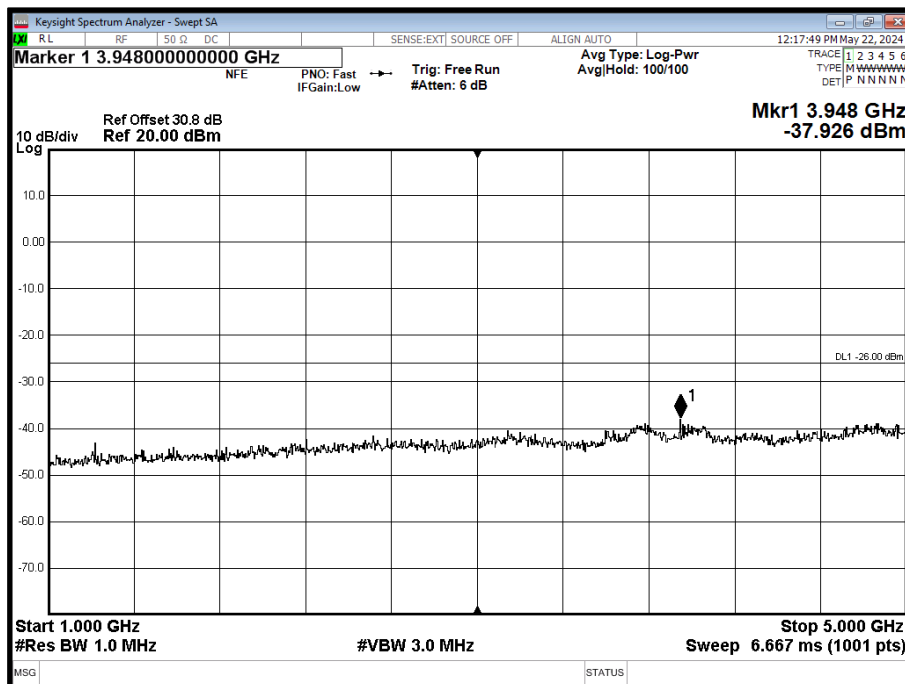


Figure 13 - 407.0125 MHz, 1 GHz to 5 GHz

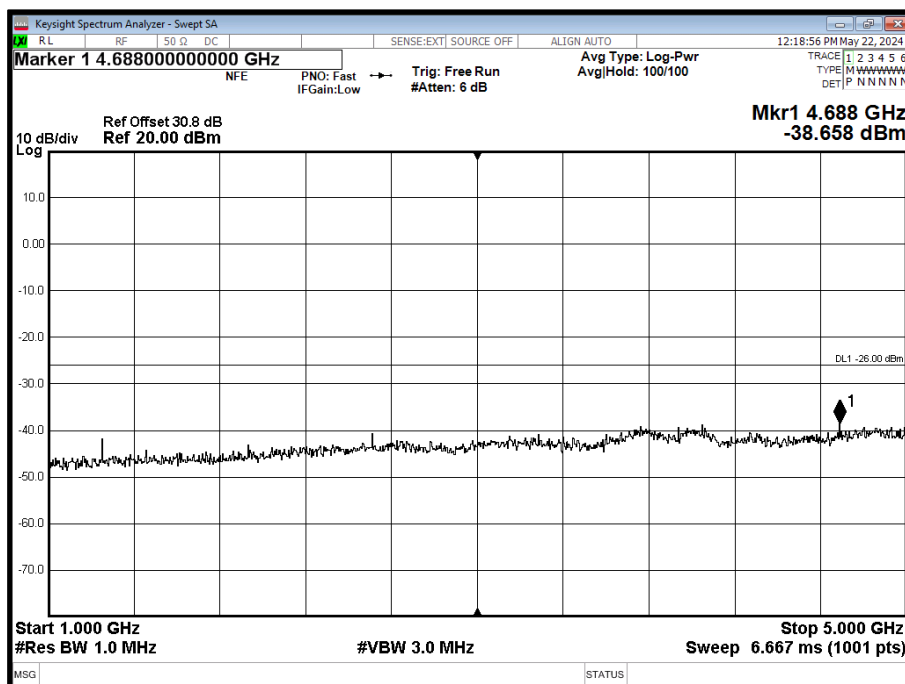


Figure 14 - 418.05 MHz, 1 GHz to 5 GHz

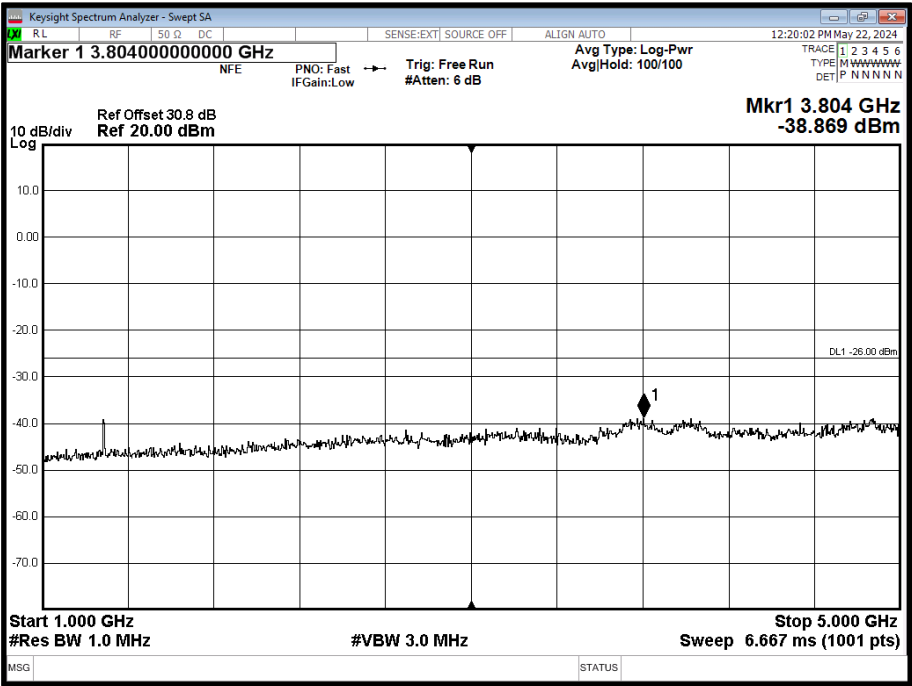


Figure 15 - 429.9875 MHz - 1 GHz to 5 GHz

TETRA - 450 - 470 MHz - ISEDC

Results under this section were tested against RSS-119, Emission Mask Y.

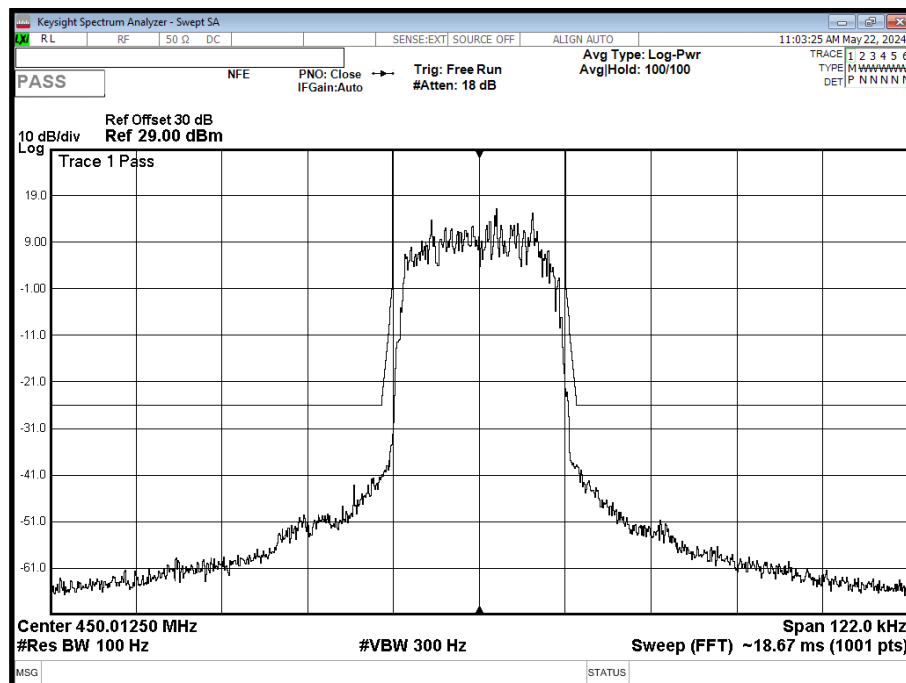


Figure 16 - 450.0125 MHz, Transmitter Mask

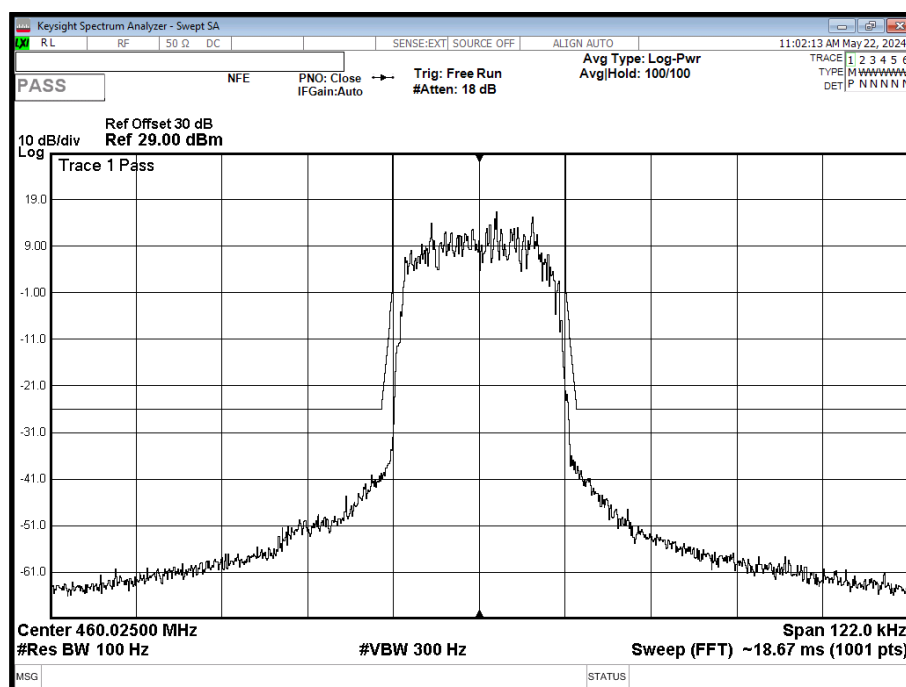


Figure 17 - 460.025 MHz, Transmitter Mask

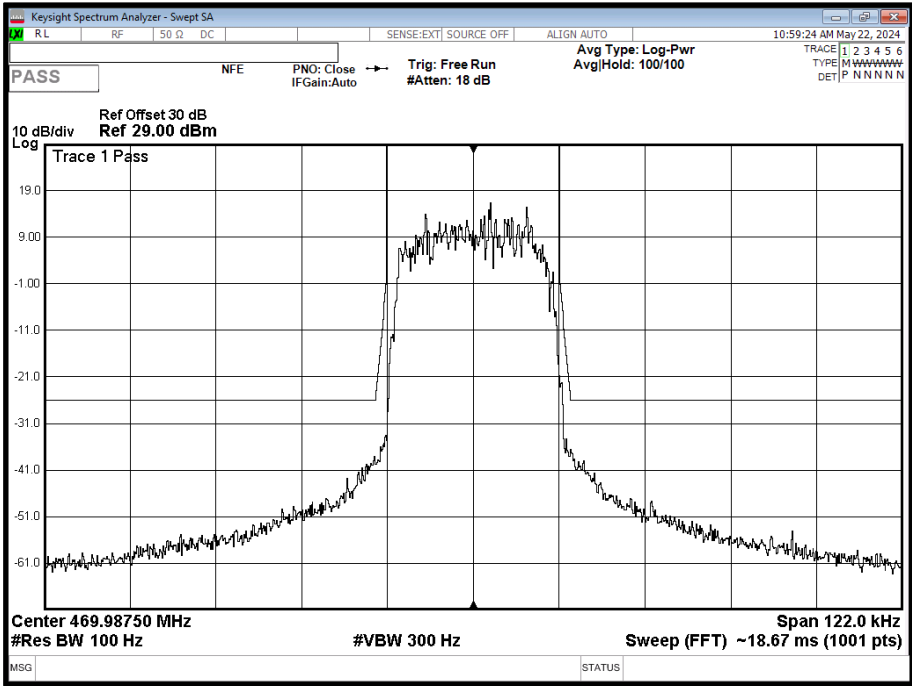


Figure 18 - 469.9875 MHz, Transmitter Mask

TETRA - 450 - 470 MHz - FCC

Results under this section were tested against FCC Part 90, Emission Mask B.

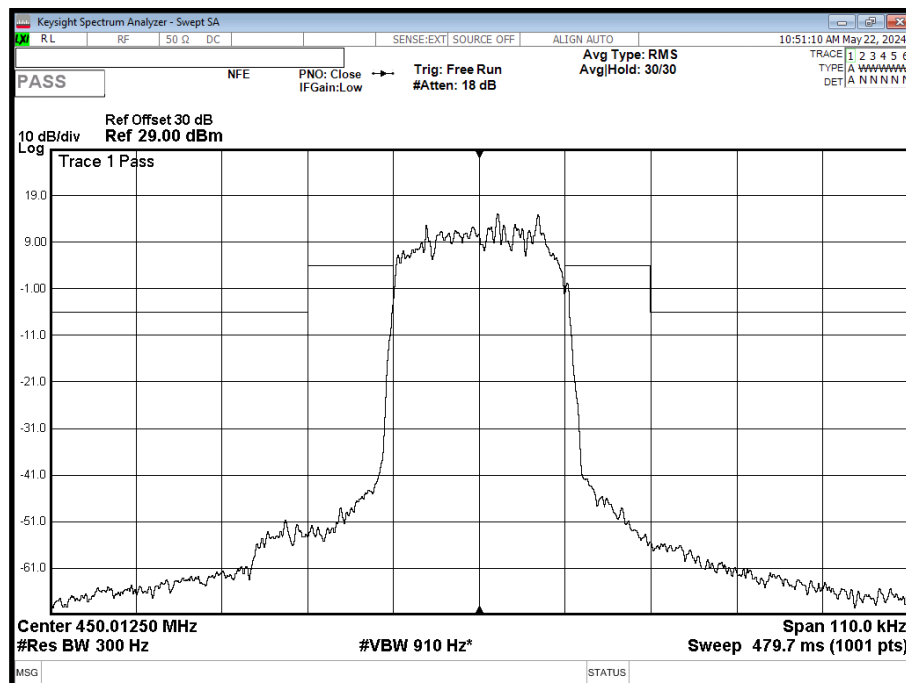


Figure 19 - 450.0125 MHz, Transmitter Mask

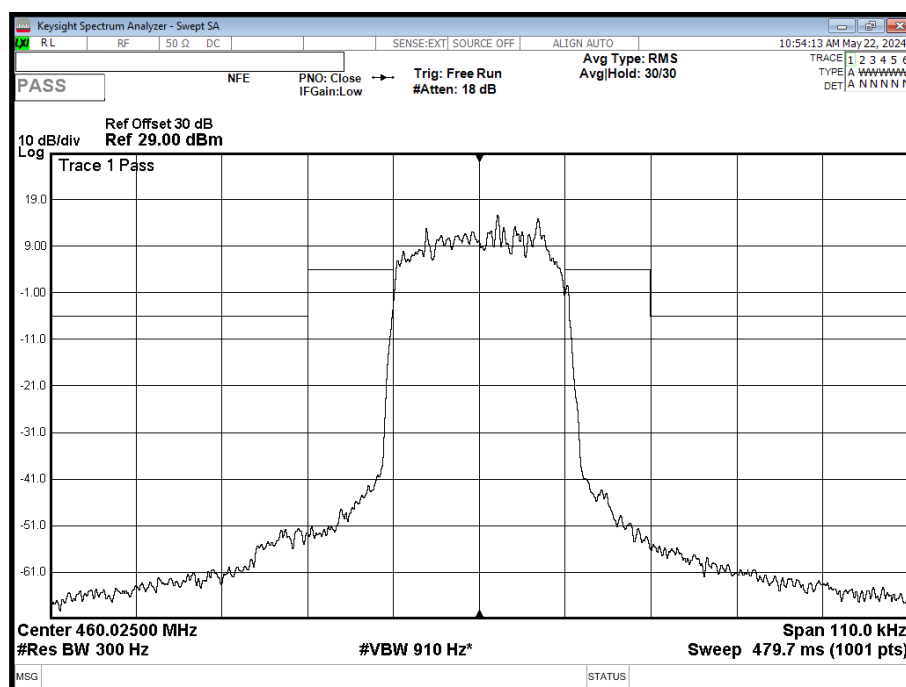


Figure 20 - 460.025 MHz, Transmitter Mask

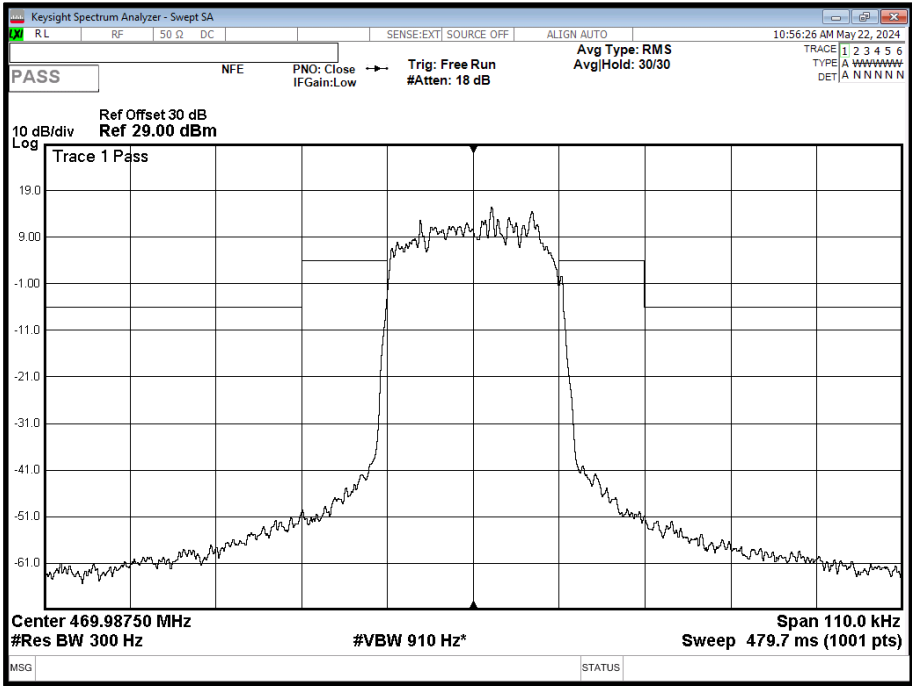


Figure 21 - 469.9875 MHz, Transmitter Mask

TETRA - 450 - 470 MHz - ISEDC

Results under this section were tested against RSS-119, Emission Mask Y.

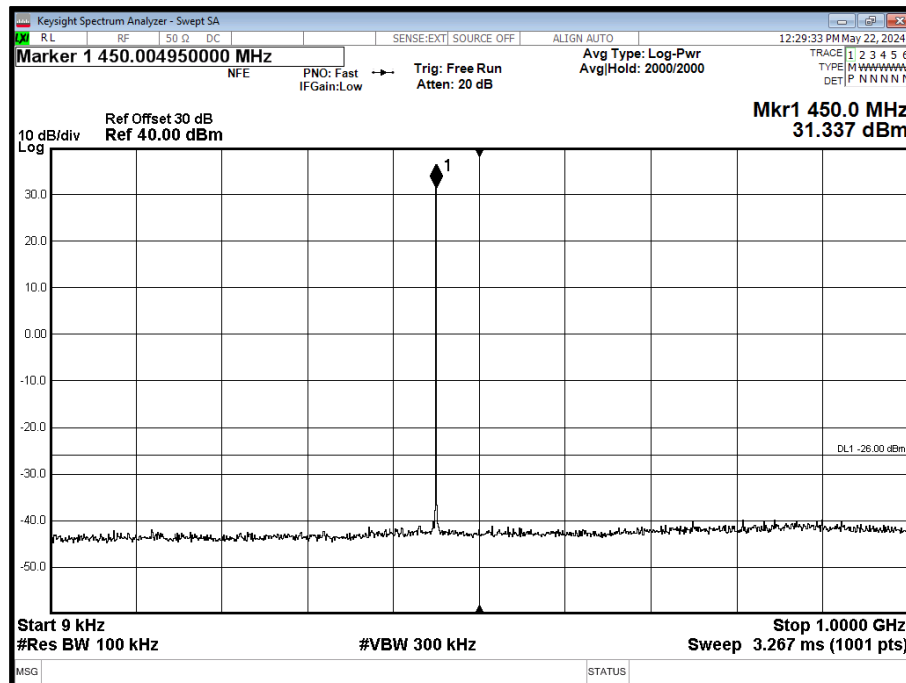


Figure 22 - 450.0125 MHz, 9 kHz to 1 GHz

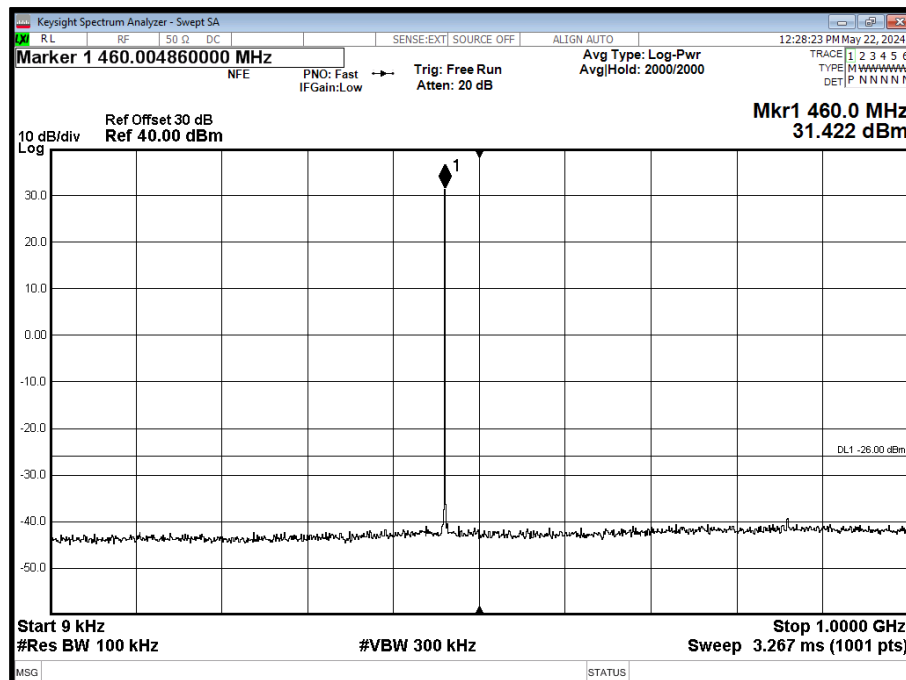


Figure 23 - 460.025 MHz, 9 kHz to 1 GHz

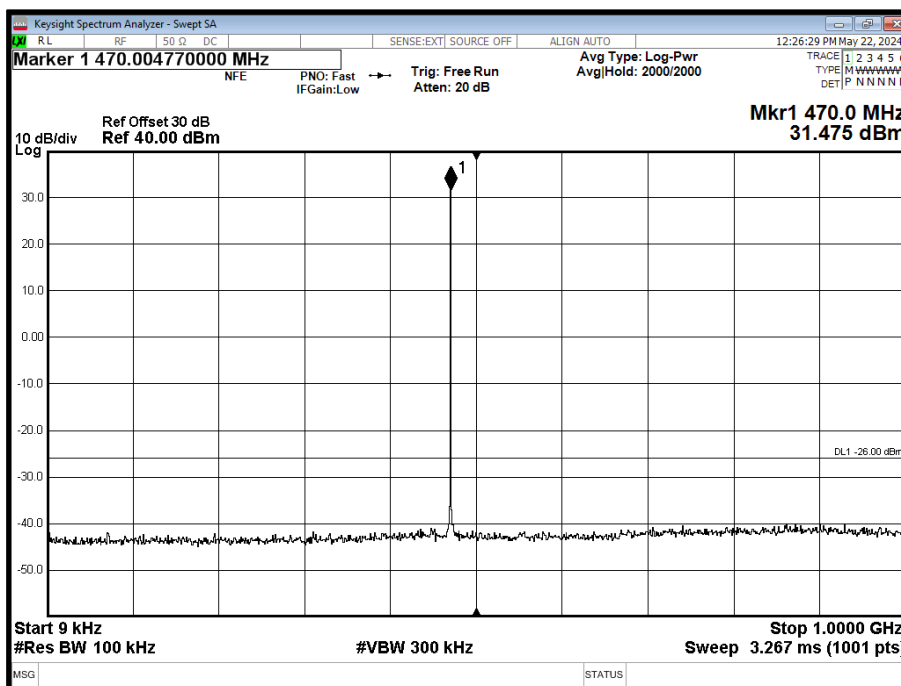


Figure 24 - 469.9875 MHz - 9 kHz to 1 GHz

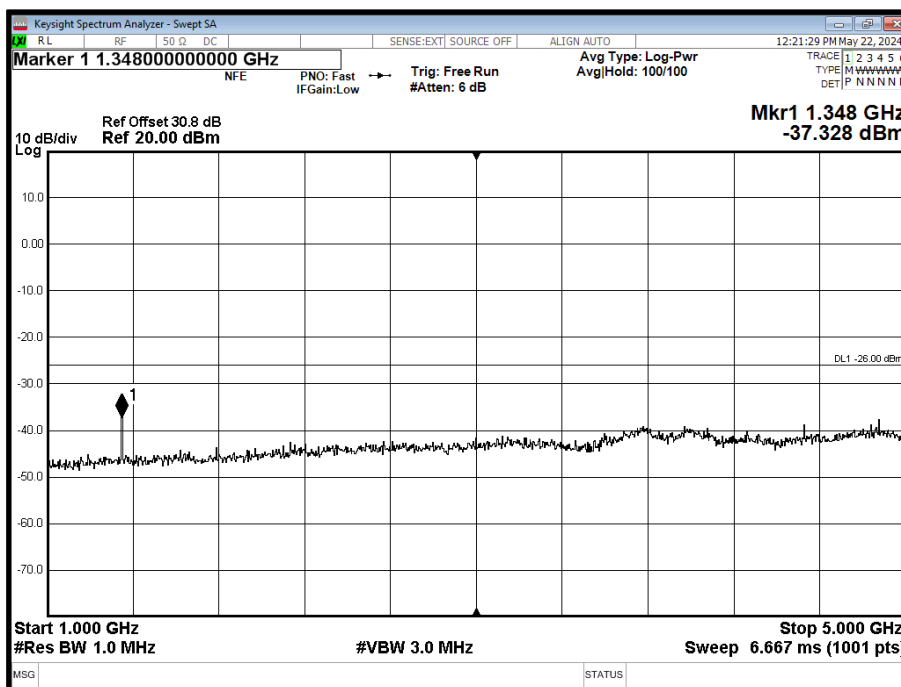


Figure 25 - 450.0125 MHz, 1 GHz to 5 GHz

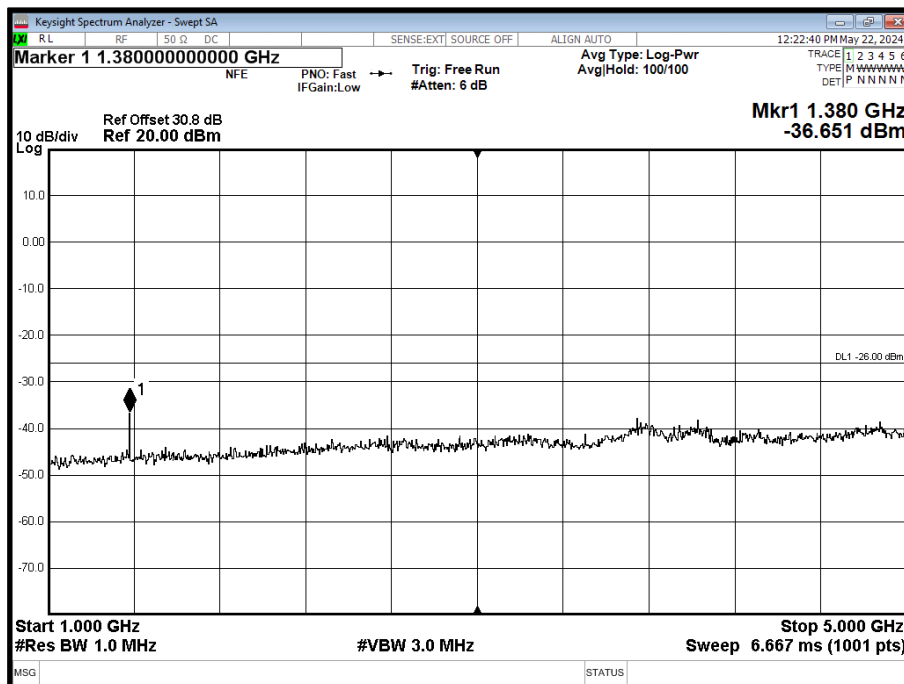


Figure 26 - 460.025 MHz, 1 GHz to 5 GHz

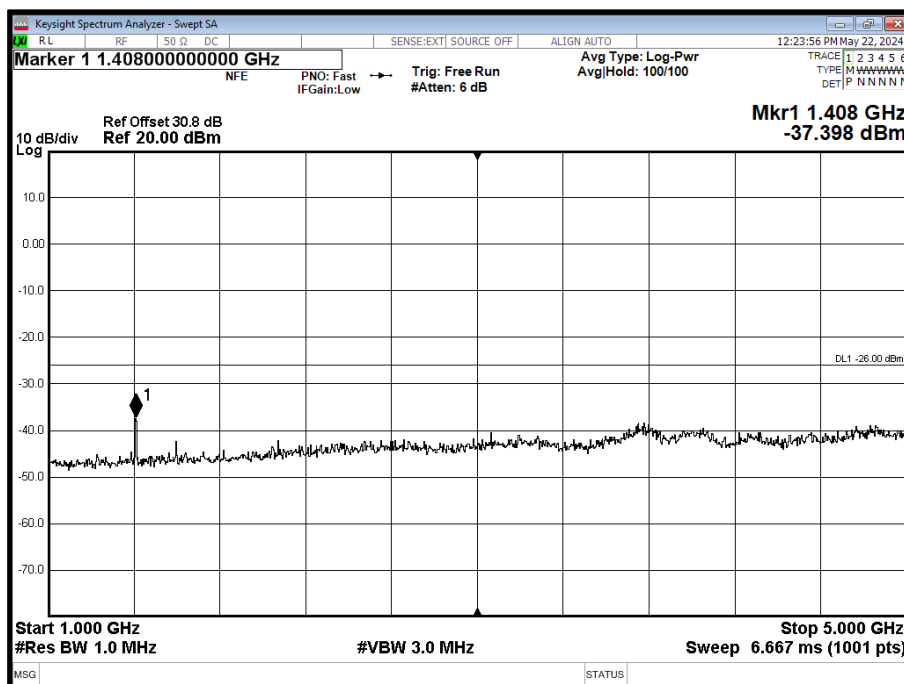


Figure 27 - 469.9875 MHz - 1 GHz to 5 GHz

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 Y as per Industry Canada RSS-119, clause 5.8.



2.2.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 2.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Multimeter	Iso-tech	IDM101	2421	12	08-Nov-2024
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	4654	12	23-Jan-2025
Quad Power Supply	Rohde & Schwarz	HMP4040	4955	-	O/P Mon
3.5 mm 2m Cable	Junkosha	MWX221-02000DMS	5423	12	18-Feb-2025
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB 40	5605	12	07-Nov-2024
GPSDR Frequency standard	Orolia	SecureSync 2402-053	6339	6	14-Sep-2024
Attenuator 5W 30dB DC-18GHz	Aaren	AT40A-4041-D18-30	6563	12	18-Jun-2024

Table 21



2.3 Radiated Spurious Emissions

2.3.1 Specification Reference

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

2.3.2 Equipment Under Test and Modification State

STP8X040, S/N: 1PR902412G9Y2BU - Modification State 0

2.3.3 Date of Test

15-May-2024 to 16-May-2024

2.3.4 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 test was applied in accordance with the test method requirements of FCC 47 CFR Part 90, ISED RSS-119, and ISED RSS-GEN with reference to ANSI C63.26, 5.5 and clause 5.2.3.3

The spectrum analyser was configured with a peak detector and max-hold trace. Below 1 GHz the RBW was set to 100 kHz and VBW to 300 kHz. Above 1 GHz the RBW was set to 1 MHz and VBW to 3 MHz.

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:

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

$70.2 \text{ (dBuV/m)} + 20\log(3) - 104.8 = \text{EIRP (dBm)}$

$-25.0 = \text{EIRP (dBm)}$

The EUT was powered by its 7.6V Li-Polymer battery.

In the 450-470 MHz band, the limit in RSS-119, Emission Mask Y limit of “ $55 + 10\log_{10}(p)$ ” was considered the most stringent limit and therefore has been shown on the plots in the section below.



Ambient Temperature	25.5 °C
Relative Humidity	38.8 %



2.3.6 Test Results

TETRA - 407 - 430 MHz

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

Table 22 - 407.0125 MHz

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

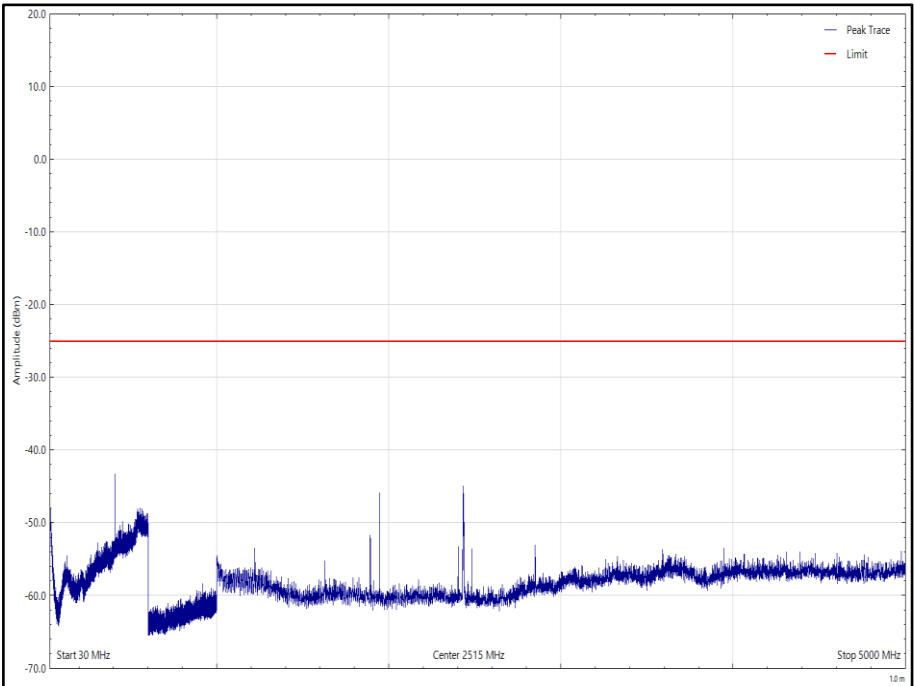


Figure 29 - 407.0125 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal

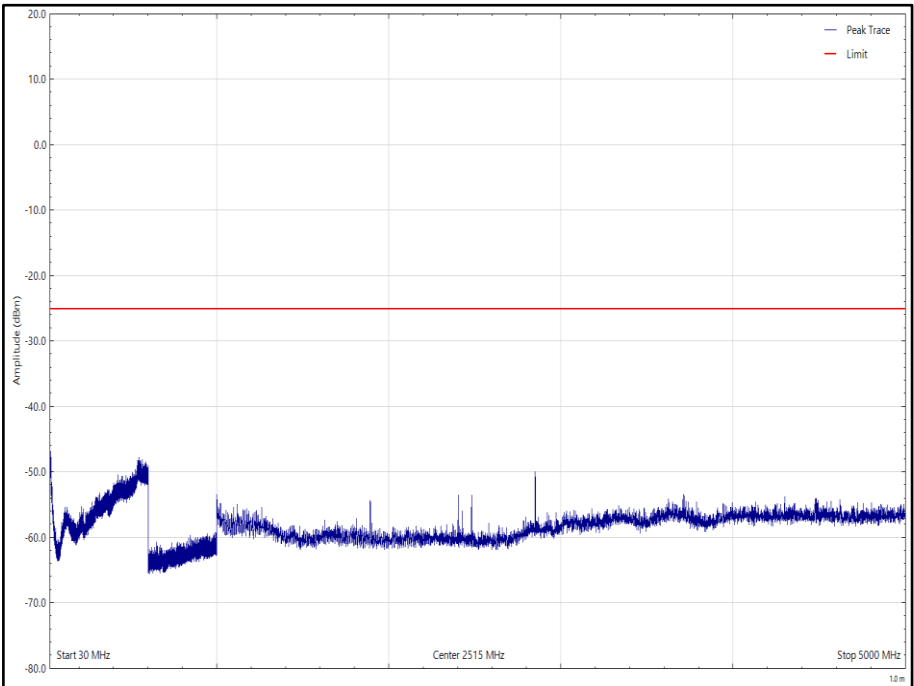


Figure 30 - 407.0125 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical

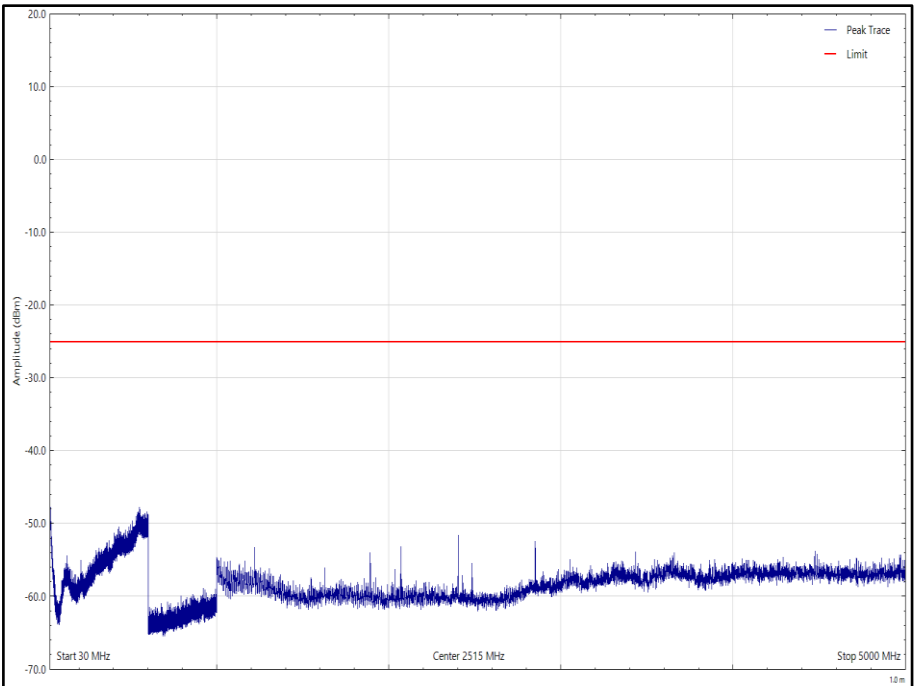


Figure 31 - 407.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal

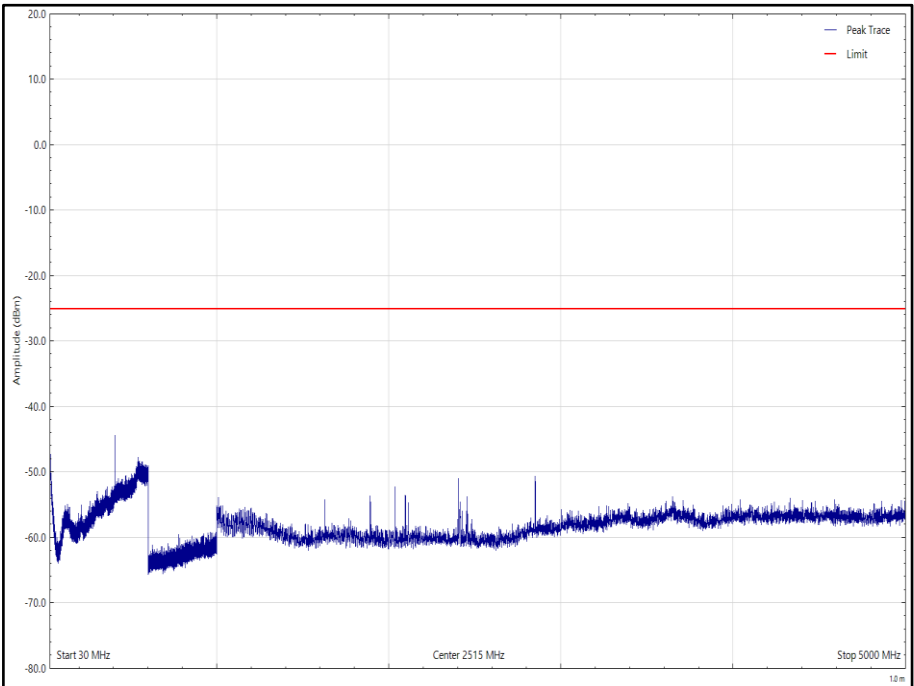


Figure 32 - 407.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Vertical

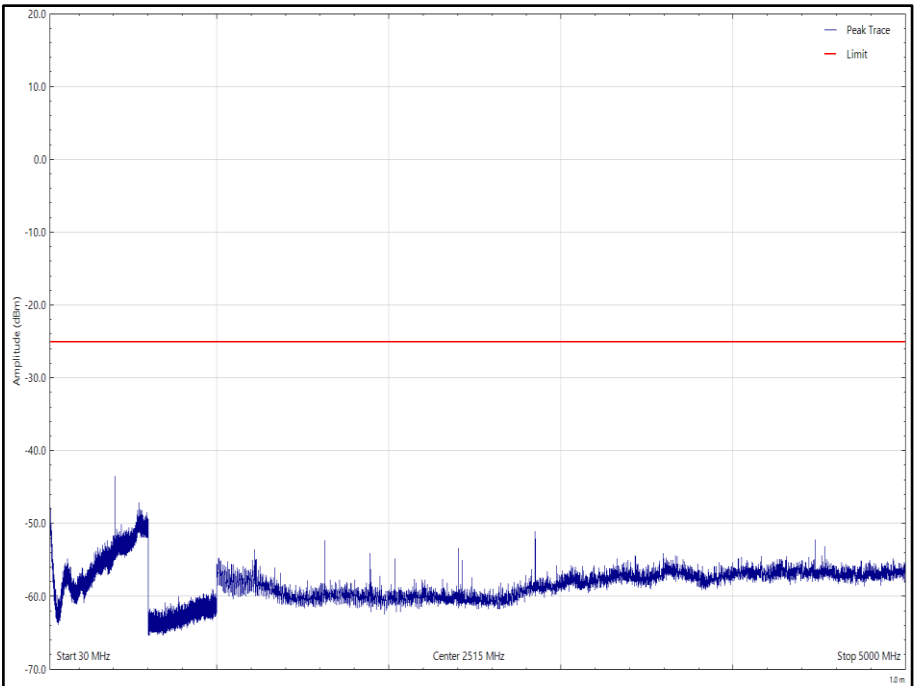


Figure 33 - 407.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Horizontal

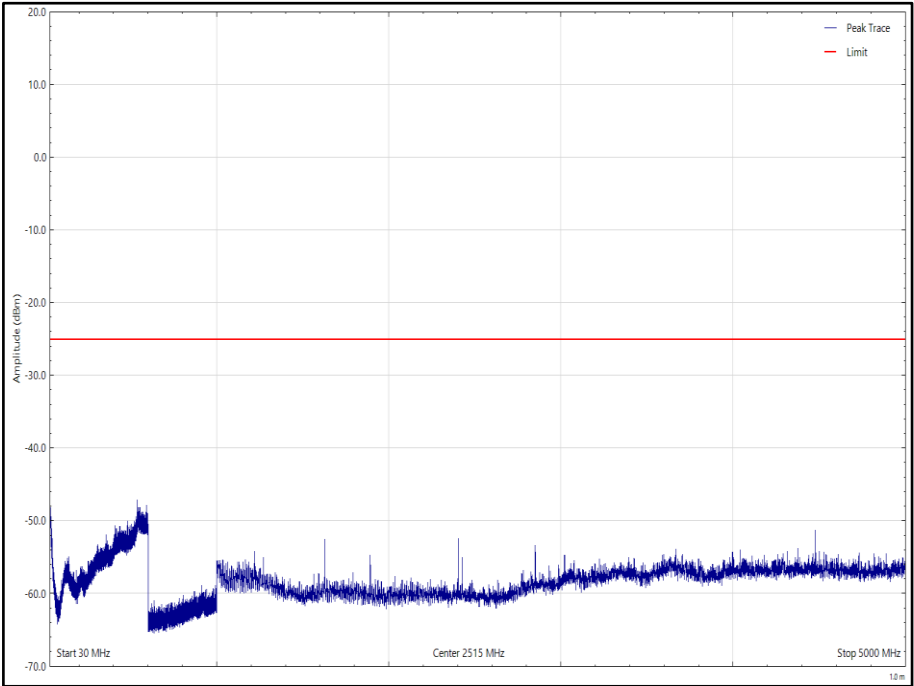


Figure 34 - 407.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Vertical



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

Table 23 - 418.05 MHz

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

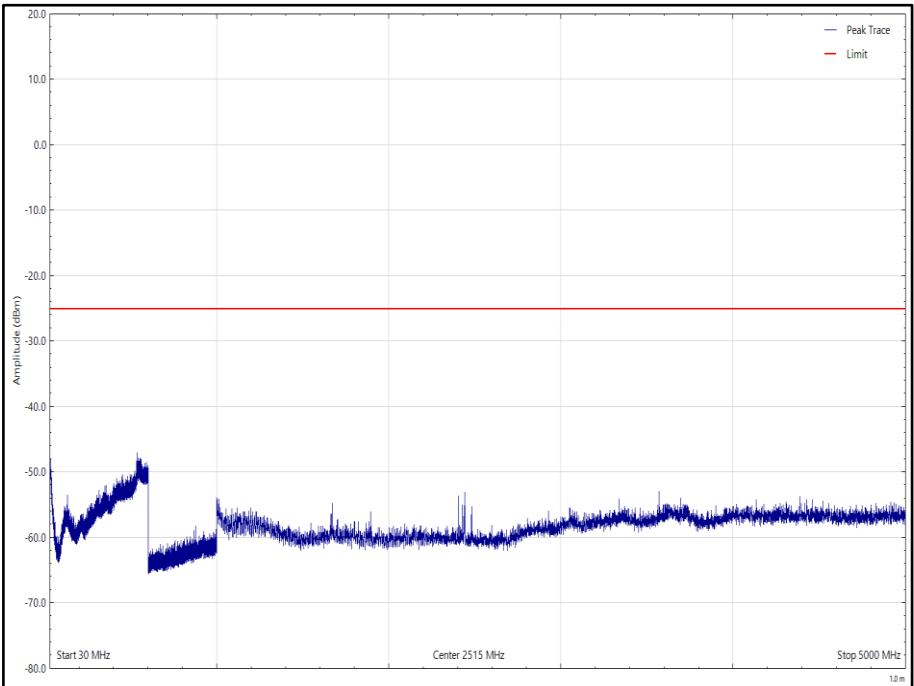


Figure 35 - 418.05 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal

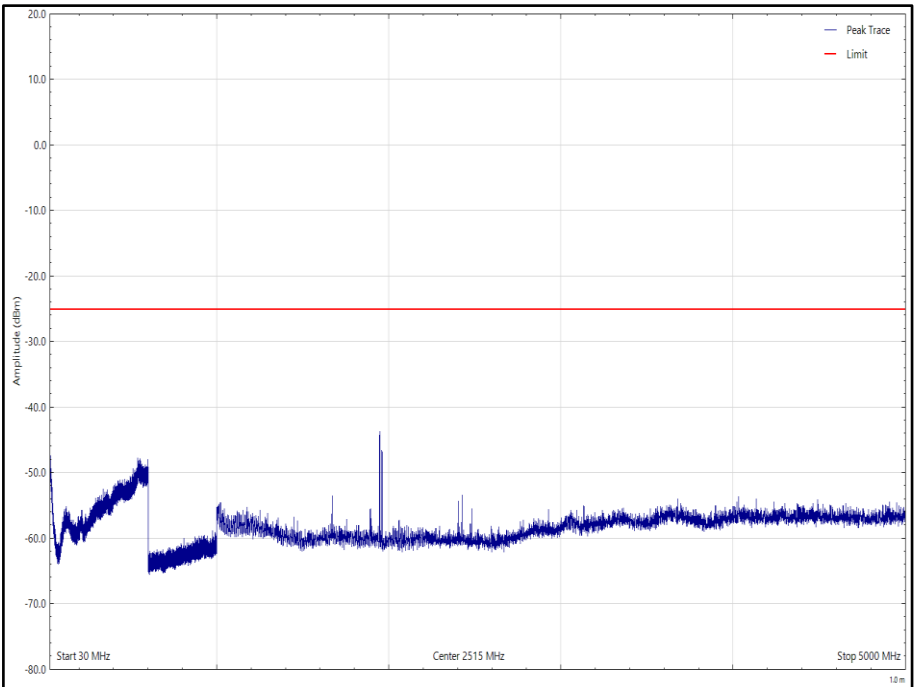


Figure 36 - 418.05 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical

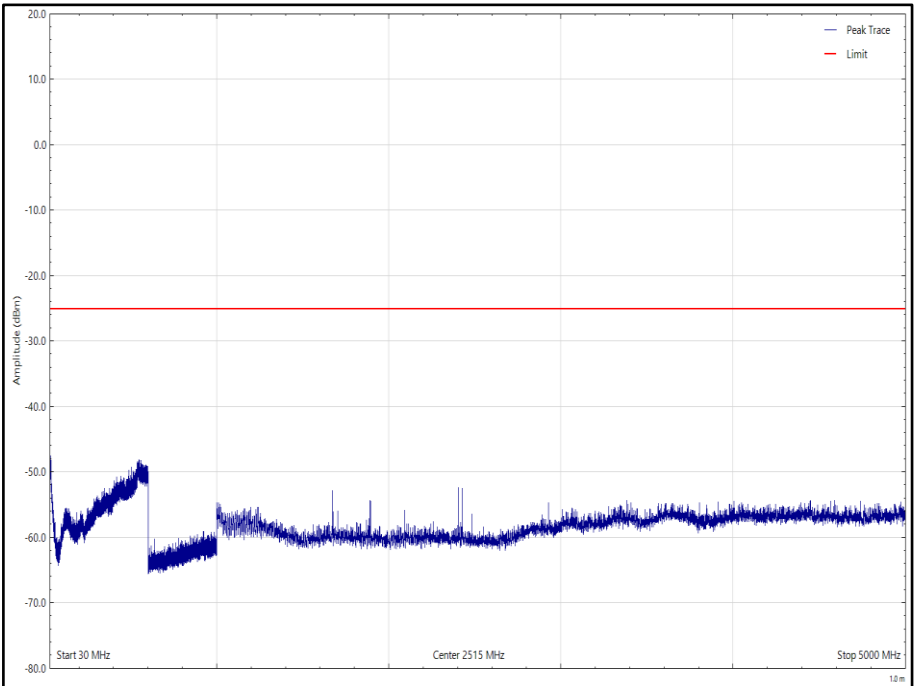


Figure 37 - 418.05 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal

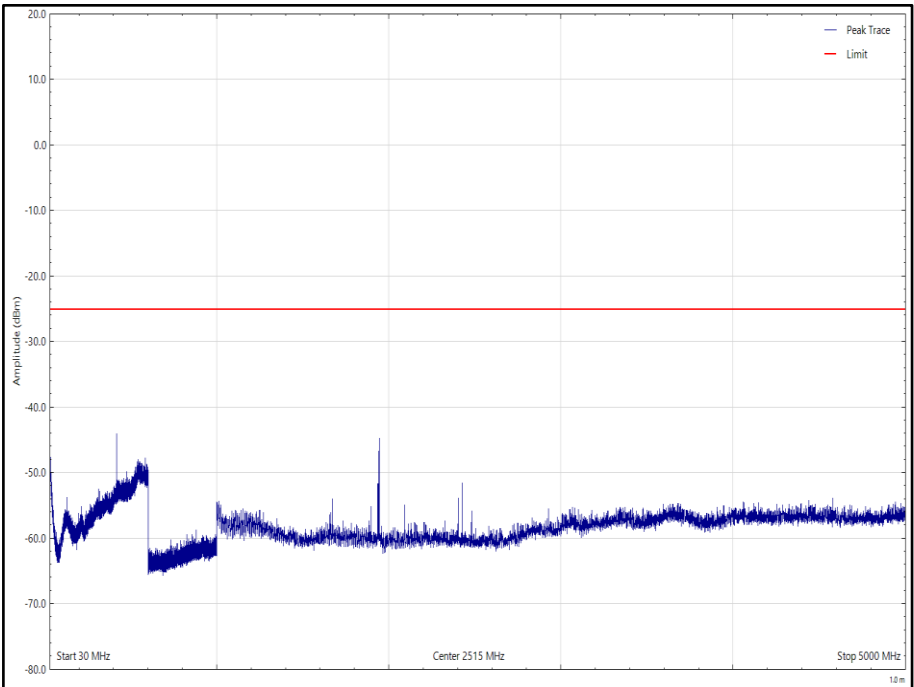


Figure 38 - 418.05 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Vertical

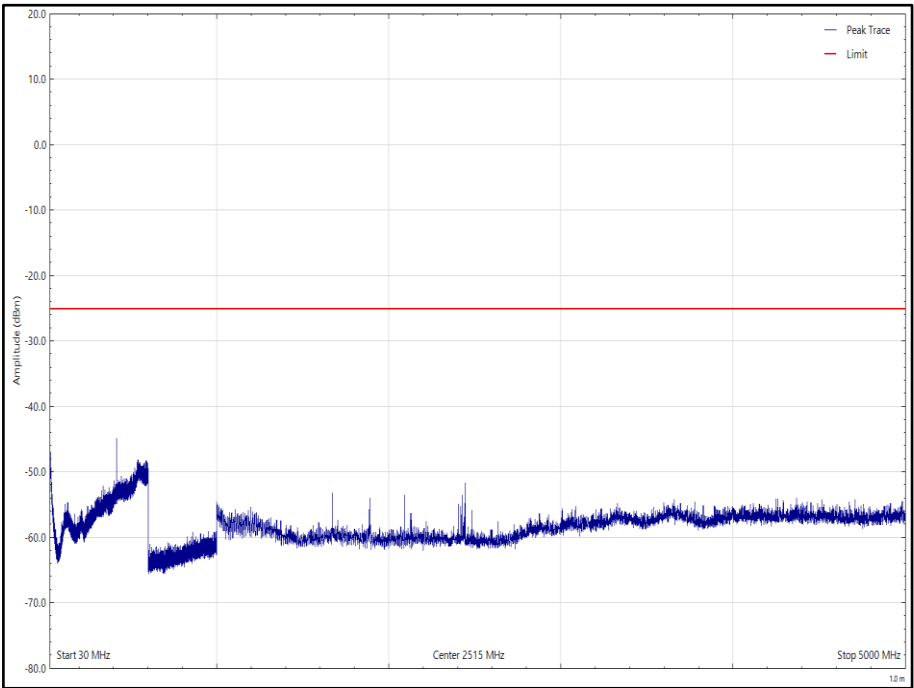


Figure 39 - 418.05 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Horizontal

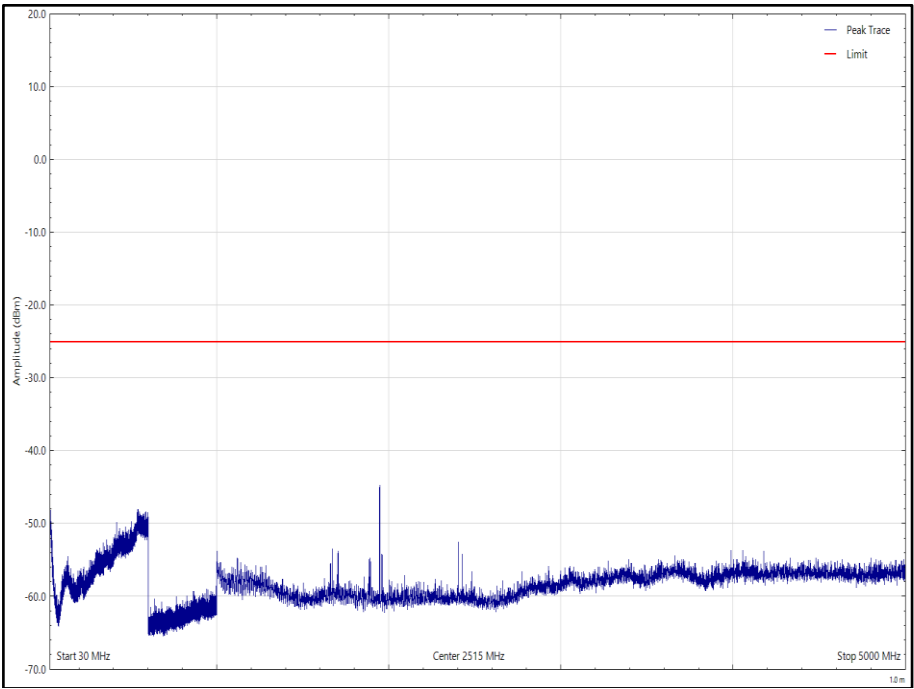


Figure 40 - 418.05 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Vertical



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

Table 24 - 429.9875 MHz

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

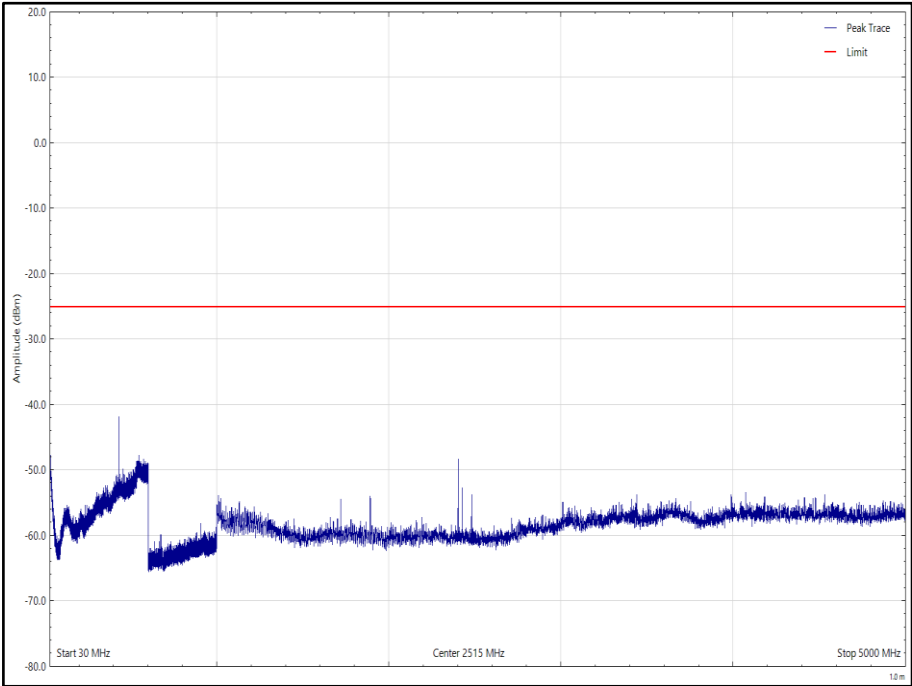


Figure 41 - 429.9875 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal

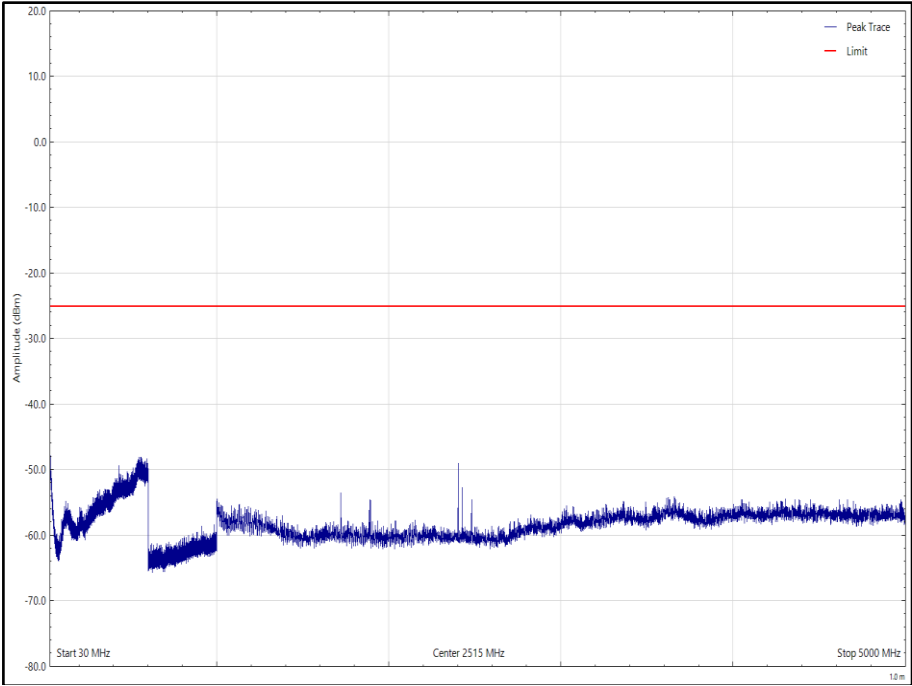


Figure 42 - 429.9875 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical

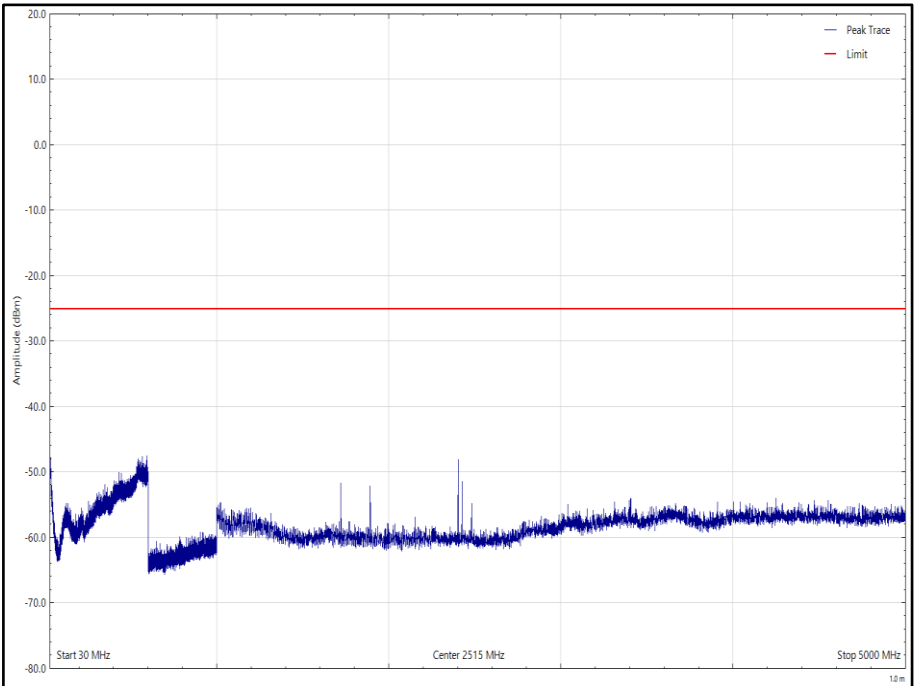


Figure 43 - 429.9875 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal

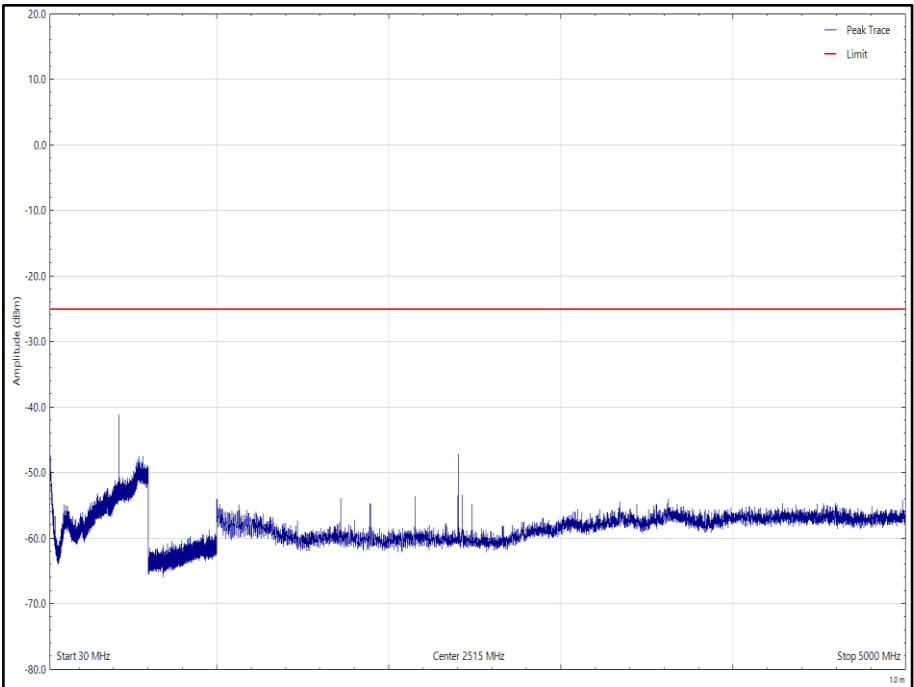


Figure 44 - 429.9875 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Vertical

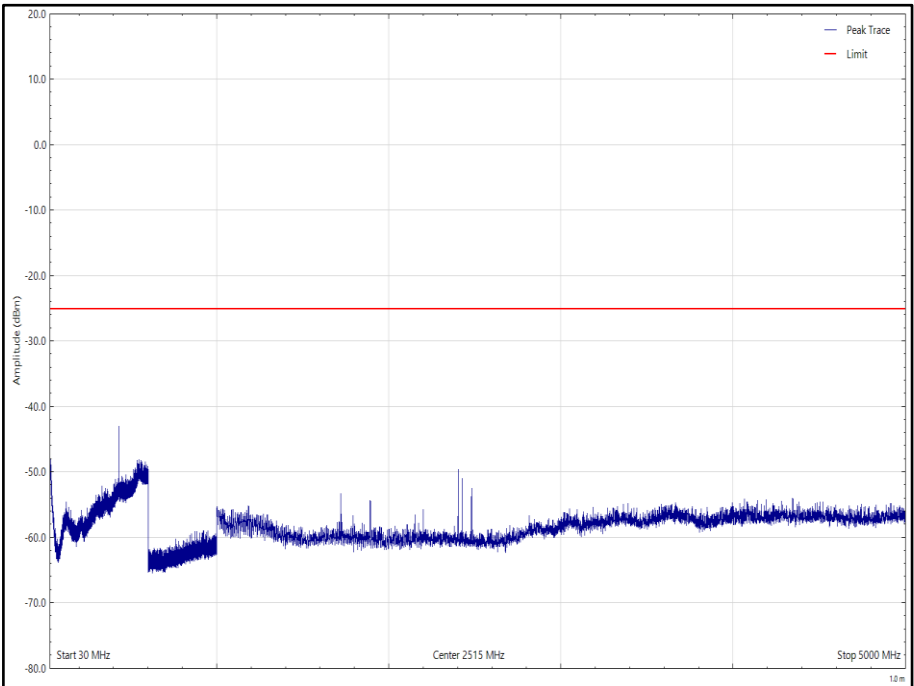


Figure 45 - 429.9875 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Horizontal

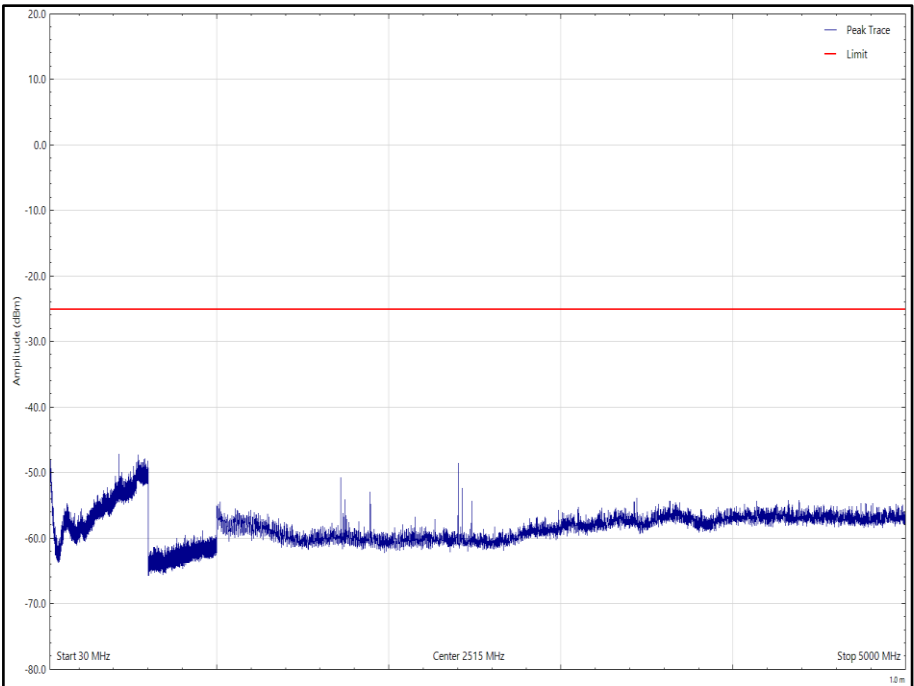


Figure 46 - 429.9875 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Vertical



TETRA - 450 - 470 MHz

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

Table 25 - 450.0125 MHz

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

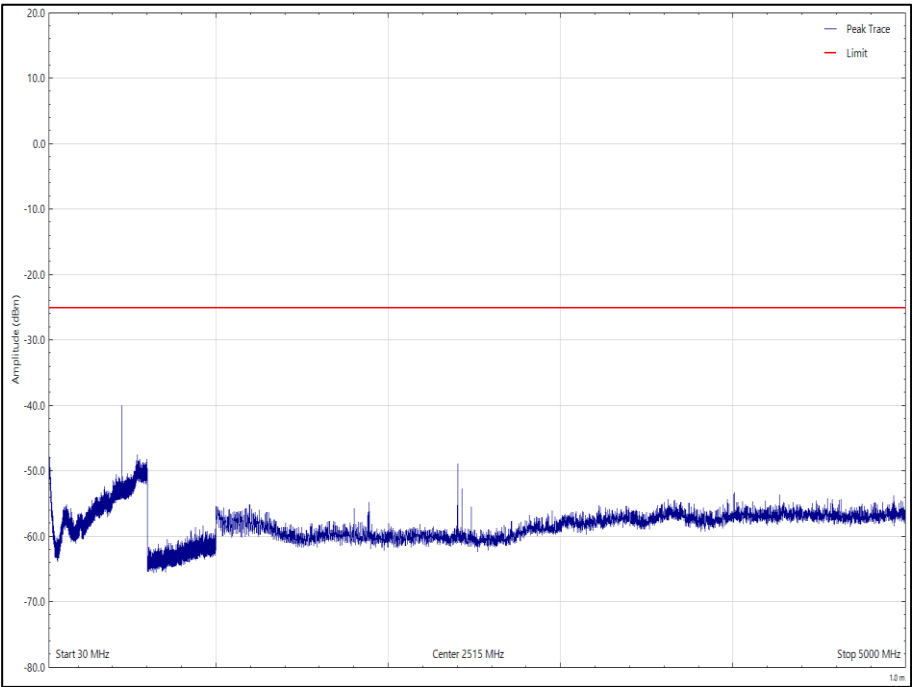


Figure 47 - 450.0125 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal

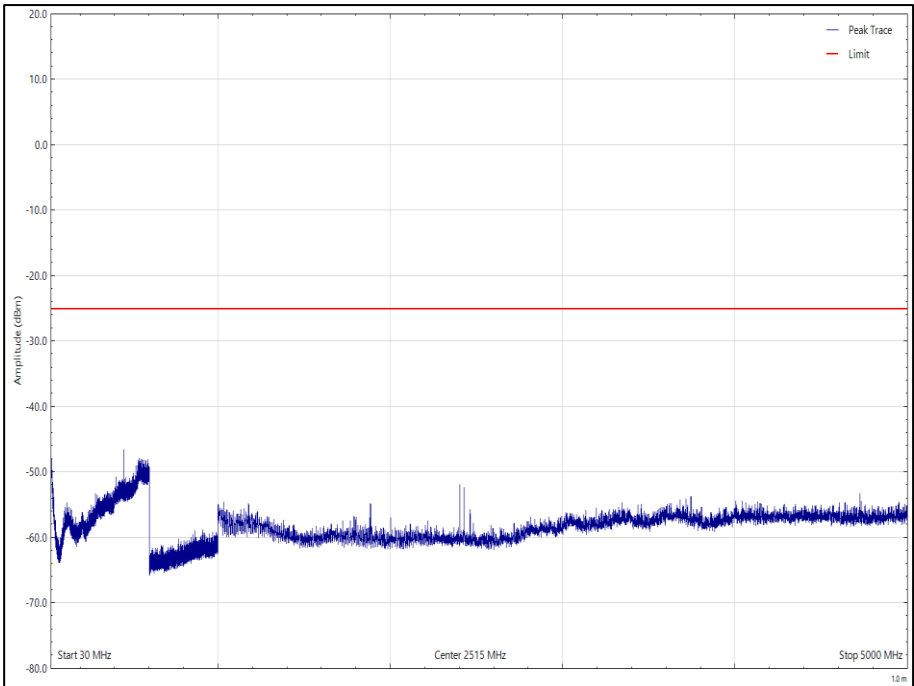


Figure 48 - 450.0125 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical

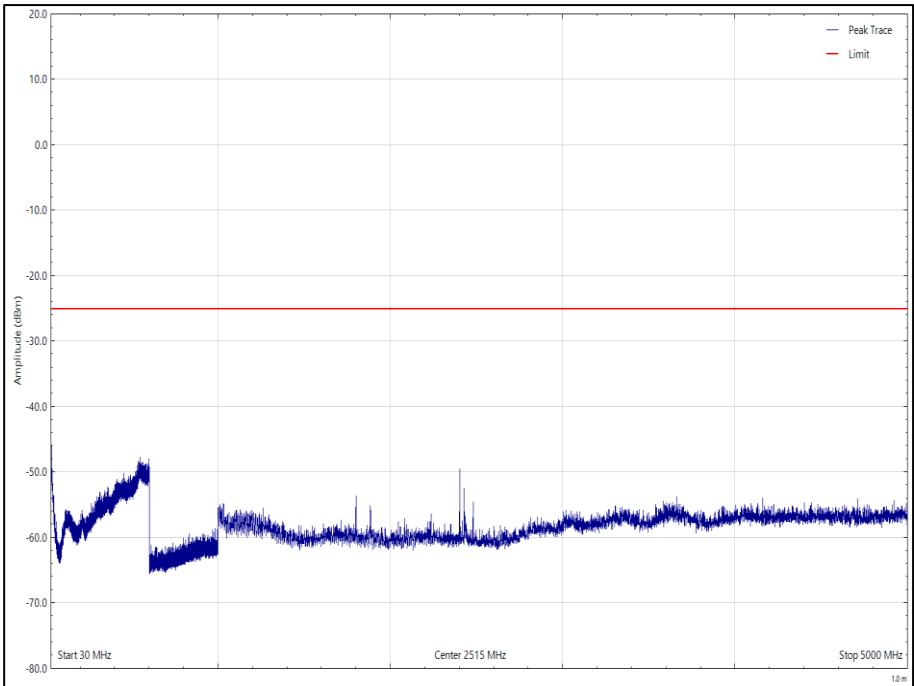


Figure 49 - 450.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal

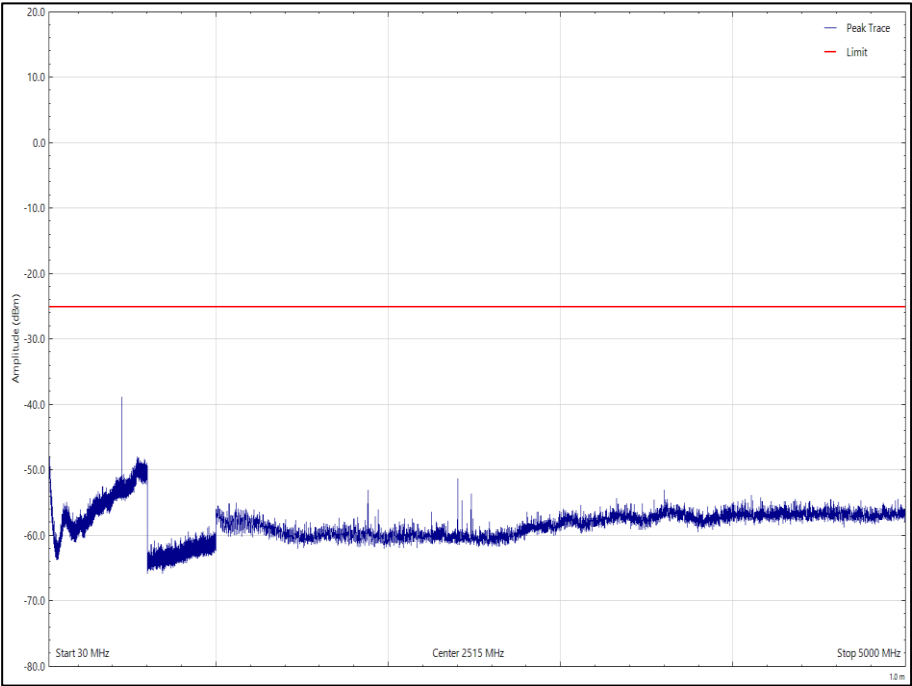


Figure 50 - 450.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Vertical

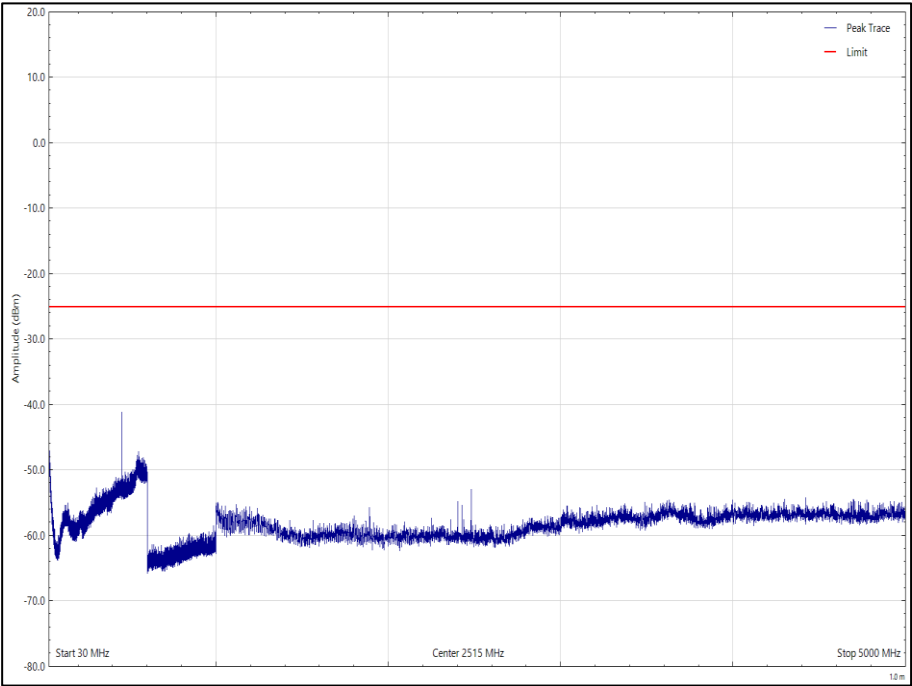


Figure 51 - 450.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Horizontal

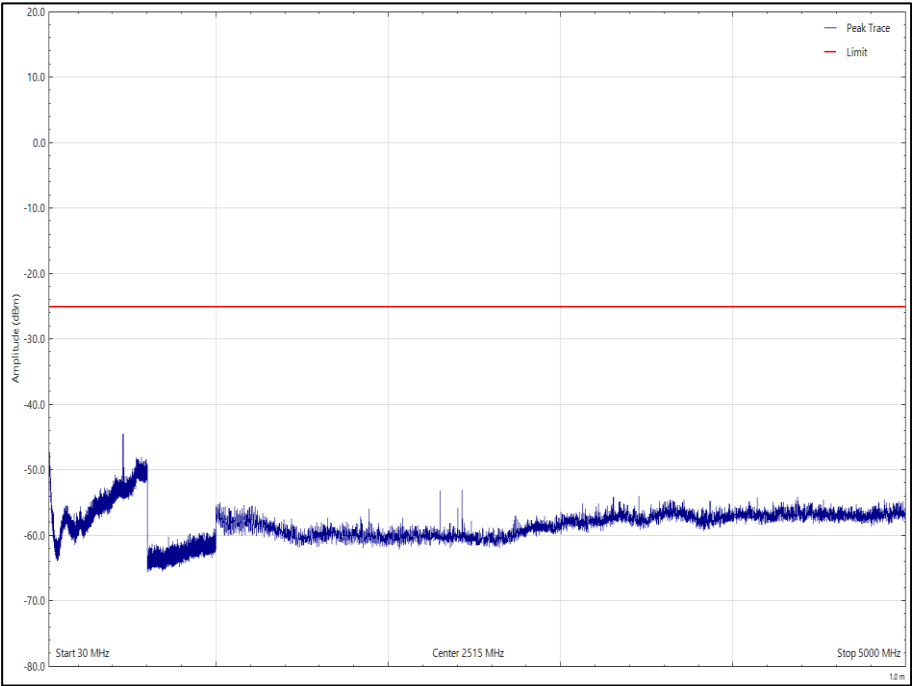


Figure 52 - 450.0125 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Vertical



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

Table 26 - 460.025 MHz

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

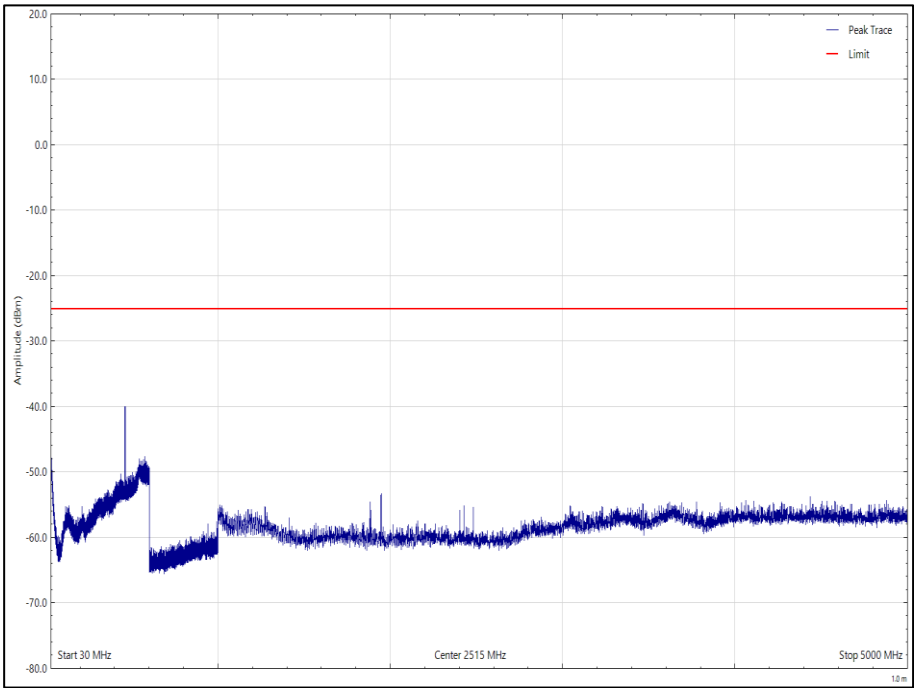


Figure 53 - 460.025 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal

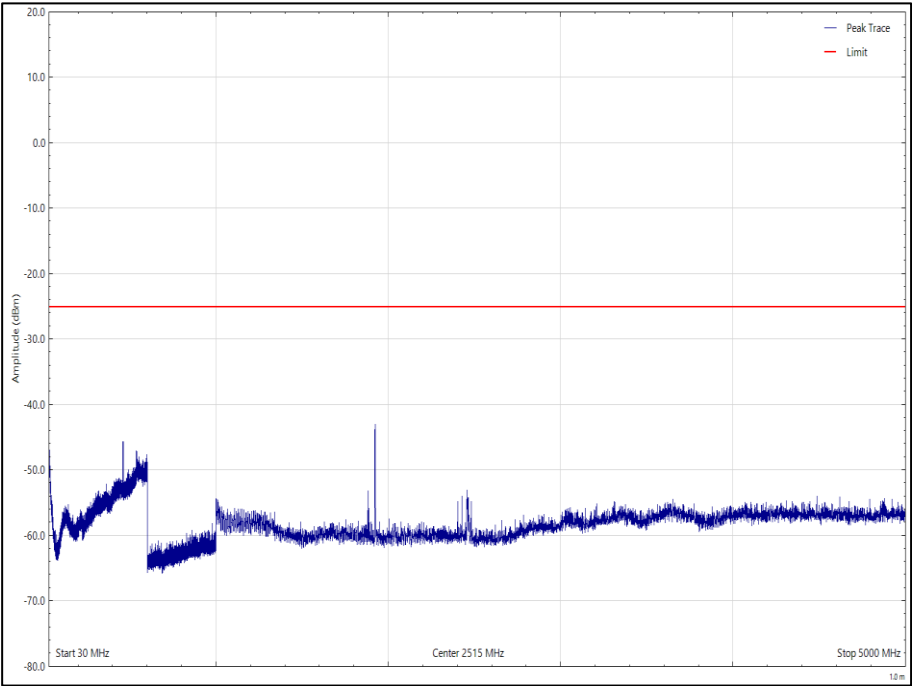


Figure 54 - 460.025 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical

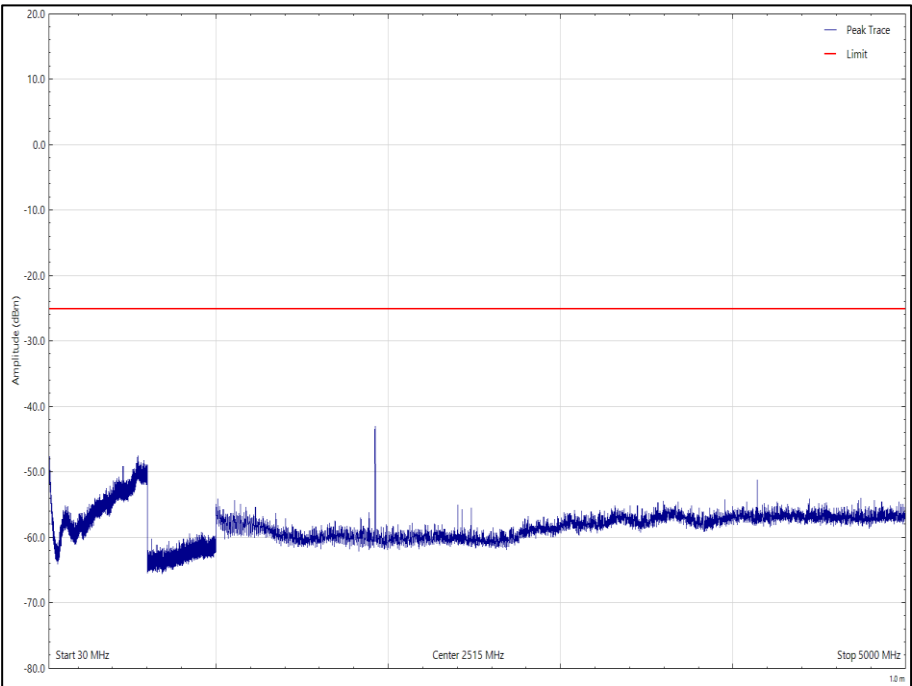


Figure 55 - 460.025 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal

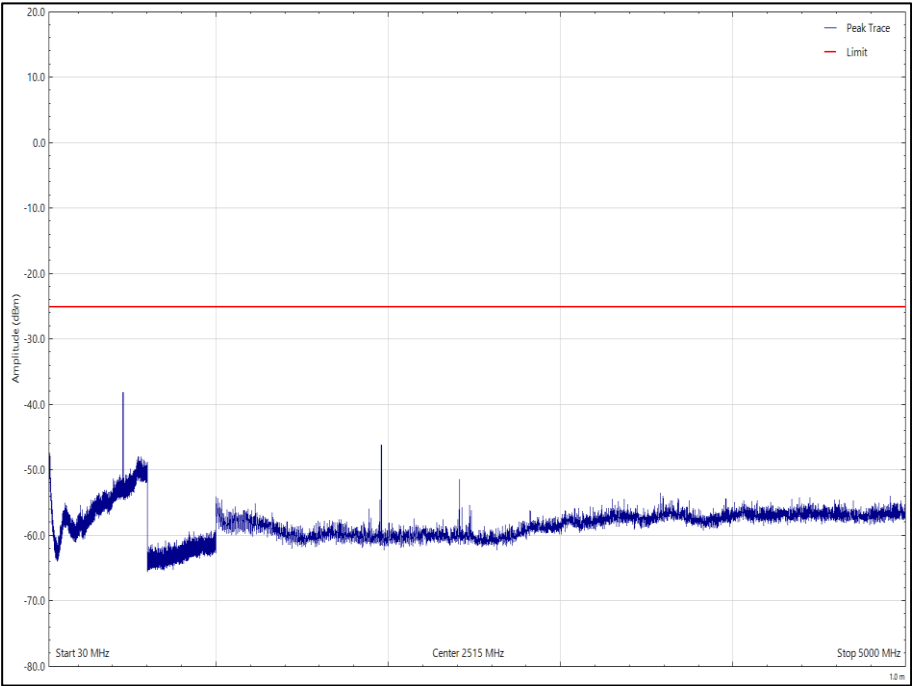


Figure 56 - 460.025 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Vertical

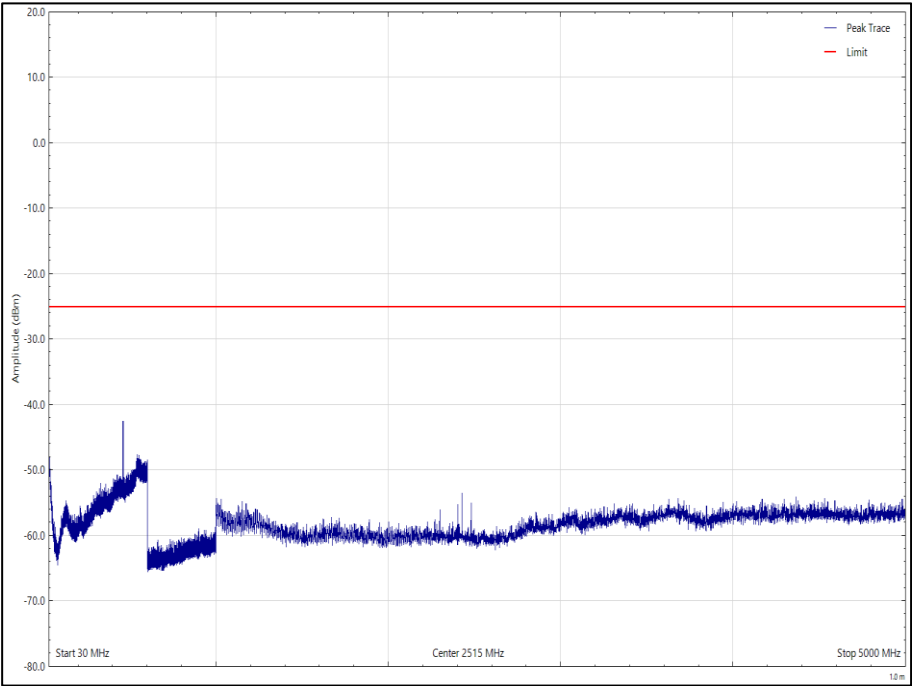


Figure 57 - 460.025 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Horizontal

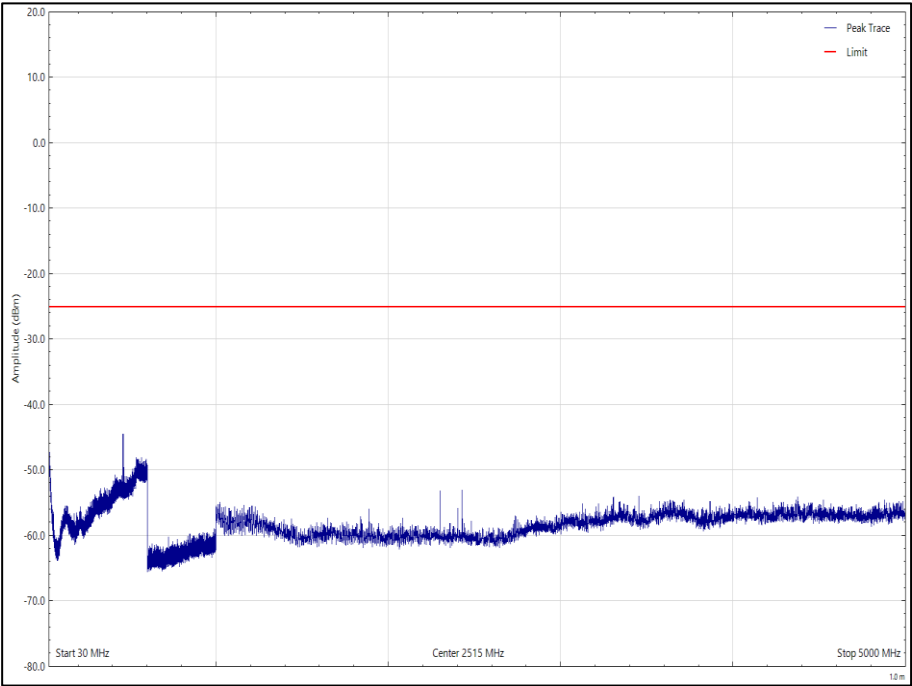


Figure 58 - 460.025 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Vertical



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

Table 27 - 469.9875 MHz

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

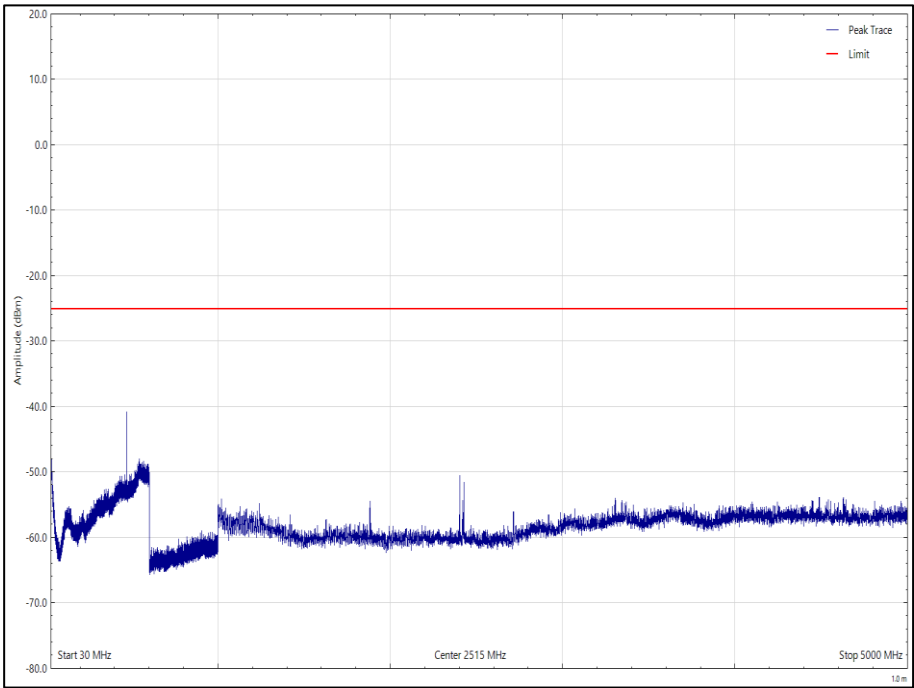


Figure 59 - 469.9875 MHz, 30 MHz to 5 GHz, EUT Orientation X, Horizontal

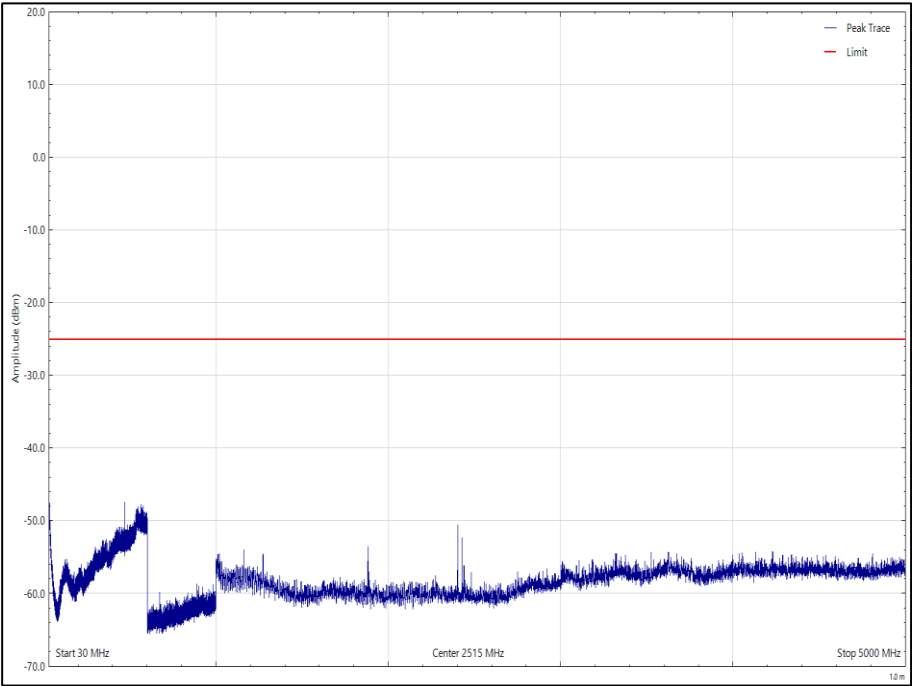


Figure 60 - 469.9875 MHz, 30 MHz to 5 GHz, EUT Orientation X, Vertical

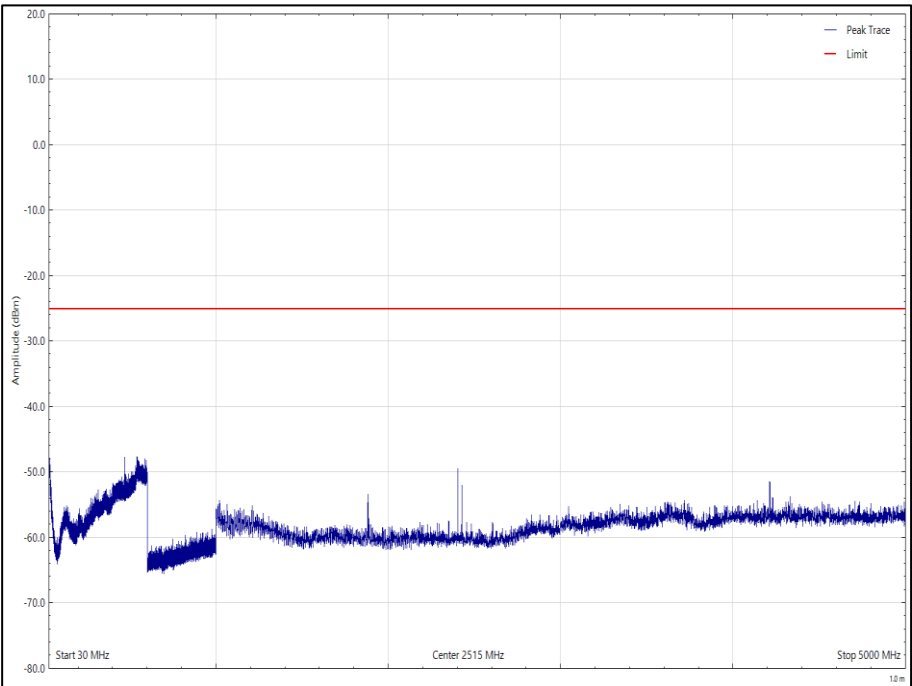


Figure 61 - 469.9875 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Horizontal

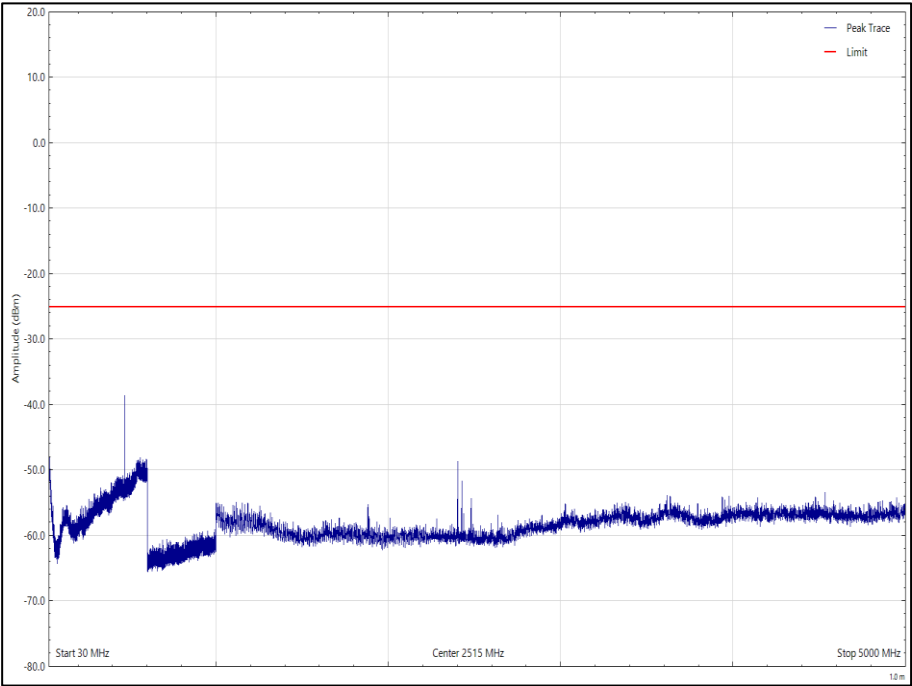


Figure 62 - 469.9875 MHz, 30 MHz to 5 GHz, EUT Orientation Y, Vertical

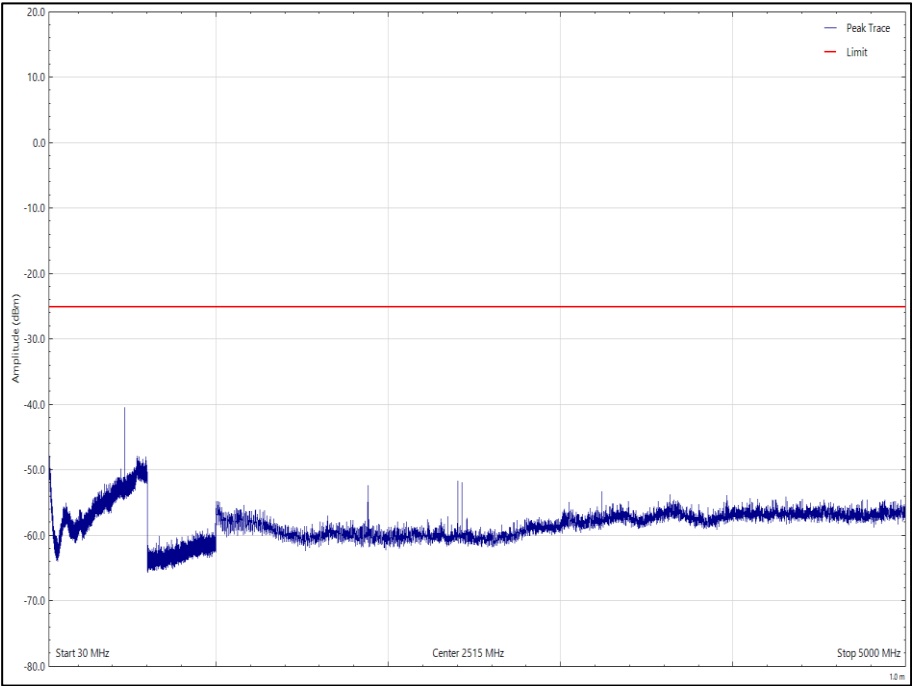


Figure 63 - 469.9875 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Horizontal

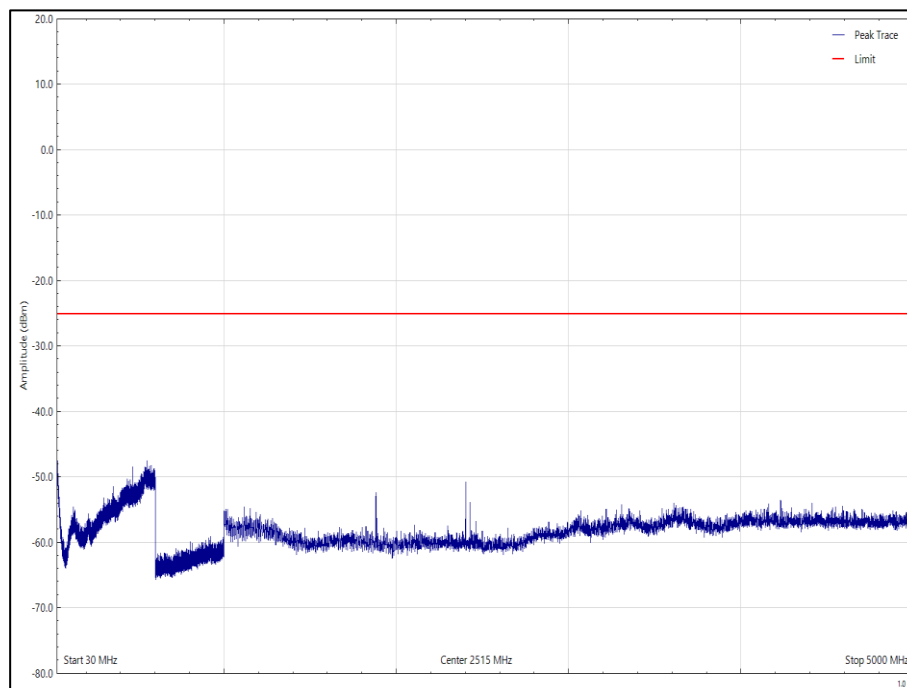


Figure 64 - 469.9875 MHz, 30 MHz to 5 GHz, EUT Orientation Z, Vertical

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 Y as per ISED RSS-119. clause 5.8.



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
Antenna (Bilog with attenuator, 30 MHz to 3 GHz)	Schaffner	CBL6143	287	24	02-Dec-2024
3m Semi-Anechoic Chamber	Rainford	RF Chamber 5	1545	36	23-Apr-2027
3.5mm - 3.5mm RF Cable (1m)	Rhophase	3PS-1803-1000-3PS	3696	12	05-Jun-2024
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	08-Aug-2024
Mast Controller	Maturo Gmbh	NCD	4810	-	TU
Tilt Antenna Mast	Maturo Gmbh	TAM 4.0-P	4811	-	TU
Antenna (DRG 1-10.5GHz)	Schwarzbeck	BBHA9120B	4848	12	09-Jul-2024
Emissions Software	TUV SUD	EmX V3.2.0	5125	-	Software
Conducted Immunity Test Software	Schaffner	WIN2070 V5.00	5251	-	Software
1 GHz High Pass Filter	Mini-Circuits	NHP 1000+	5260	12	24-Aug-2024
Pre-amplifier (30 dB, 1GHz to 18GHz)	Schwarzbeck	BBV 9718 C	5261	12	09-Apr-2025
Test Receiver	Rohde & Schwarz	ESW44	5379	12	12-Dec-2024
Cable (SMA to SMA, 2 m)	Junkosha	MWX221-02000AMSAMS/A	5517	12	21-May-2024
3 GHz High pass Filter	Wainwright	WHKX12-2580-3000-18000-80SS	5548	12	16-Aug-2024
Cable (N to N 8m)	Junkosha	MWX221-08000NMSNMS/B	6331	12	17-Feb-2025
Attenuator 5W 10dB DC-18GHz	Aaren	AT40A-4041-D18-10	6553	12	18-Jun-2024

Table 28

TU - Traceability Unscheduled



3 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
Spurious Emissions at Antenna Terminals	± 3.45 dB
Radiated Spurious Emissions	30 MHz to 1 GHz: ± 5.2 dB 1 GHz to 18 GHz: ± 6.3 dB

Table 29

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.